CULVER'S JSP 23-37

CULVER'S JSP 23-37

Public hearing at the request of Union Pacific Holdings for JSP 23-37 Culver's for Planning Commission's recommendation to the City Council for approval of Preliminary Site Plan with a PD-2 Option, Special Land Use and Stormwater Management Plan approval. The subject property is located at the northwest corner of Novi Road and West Oaks Drive in Section 15. The applicant is proposing to develop a 4,160 square foot Culver's restaurant with a drive-through. The applicant will be utilizing the Planned Development 2 (PD-2) option to propose a drive-thru and is proposing to vacate and move a portion of Karevich Drive so that it traverses through the site. The street vacation and site plan will require approval from the City Council.

Required Action

Recommend approval/denial of the Preliminary Site Plan with PD-2 Option, Special Land Use Permit, and Storm Water Management Plan.

| REVIEW | RESULT | DATE | COMMENTS |
|---------------|--|--------------|---|
| Planning | Approval recommended | 6-4-24 | Findings regarding Section 3.31.4 relating to the PD-2 Option Special Land Use Permit required Ordinance deviations for the following Proximity to other restaurants Dumpster location |
| | | | Additional items to be addressed with Final Site Plan |
| Engineering | Approval recommended with conditions | 6-5-24 | Additional items to be addressed with Final Site Plan |
| Landscape | Approval recommended with conditions | 6-4-24 | Landscape deviations for the following No berm along either frontage Deficient perimeter depth on west side of site Additional items to be addressed with Final Site Plan |
| Traffic | Approval not recommended | 6-4-24 | Deviation required for deficient driveway turning radius where the mountable concrete median is proposed |
| Traffic Study | Approval not recommended | 02-27- 24 | Excessive delay (Level of Service F) at intersection of site driveway and West Oaks Drive; however, the potential queue will back up within the site and there is enough space to accommodate the number of vehicles at the peak periods of the day |
| Façade | Approval recommended | 1-8-24 | Section 9 Façade waiver required and recommended |
| Fire | Approval recommended with conditions | 6-3-24 | Additional items to be addressed with Final Site Plan |

Motion sheet

Recommend Approval – Special Land Use Permit

In the matter of the request of Union Pacific Holdings for JSP23-37 Culver's, motion to recommend approval to the City Council for Special Land Use based on and subject to the following:

- 1. The proposed use will **not** cause any detrimental impact on existing thoroughfares (based on Traffic review);
- 2. The proposed use will **not** cause any detrimental impact on the capabilities of public services and facilities (based on Engineering review);
- 3. The proposed use is compatible with the natural features and characteristics of the land (because there are no regulated natural features on site);
- 4. The proposed use is compatible with adjacent uses of land (because the proposed use is similar to other nearby restaurants with drive-thrus);
- 5. The proposed use is consistent with the goals, objectives, and recommendations of the City's Master Plan for Land Use (as it fulfills one of the Master Plan objectives to attract new businesses within City of Novi);
- 6. The proposed use will promote the use of land in a socially and economically desirable manner (as it fulfills one of the Master Plan objectives to attract new businesses within City of Novi);
- 7. The proposed use is (1) listed among the provision of uses requiring special land use review as set forth in the various zoning districts of this Ordinance, and (2) is in harmony with the purposes and conforms to the applicable site design regulations of the zoning district in which it is located;
- 8. (additional comments here if any)

(This motion is made because the plan is otherwise in compliance with Article 3, Article 4, Article 5, and Article 6 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

-AND-

Recommend Approval – Preliminary Site Plan with PD-2 Option

In the matter of the request of Union pacific Holdings for JSP23-37 Culver's, motion to <u>recommend approval</u> to the City Council for <u>Preliminary Site Plan with a PD-2 Option</u> based on and subject to the following:

- 1. Planning Commission findings that the standards of Section 3.31.4 of the Zoning Ordinance are adequately addressed, as identified in the Planning Review Letter;
- 2. The recommendation includes the following ordinance deviations for consideration by the City Council:
 - i. Deviation from Section 3.31.7.B.v.a, the use conditions for fast food drive-thru under PD-2 Option as listed that requires a minimum distance of 1,000 feet between a proposed independently freestanding restaurant from any other such use on the same side of the street. The proposed restaurant is less than 1,000 feet from the Carabba's to the south;
 - ii. Deviation from Section 4.19.2.F for allowing a **dumpster in the exterior side yard** instead of required rear yard;
 - iii. Landscape deviation from Section 5.5.3.B.ii and iii for lack of berm or wall along both Novi Road and West Oaks Drive;
 - iv. Landscape deviation from Section 5.5.3.B.ii and iii for **deficient perimeter depth** between the west drive and the west property line;

- Deviation from Section 11-216 of the Code of Ordinances, Design Considerations, for the deficient driveway turning radius where the mountable concrete median is proposed;
- vi. Section 9 Façade waiver for underage of brick and overage of composite siding
- 3. The findings of compliance with Ordinance standards in the staff and consultant review letters, and the conditions and items listed in those letters being addressed on the Final Site Plan; and
- 4. (additional conditions here if any).

(This motion is made because the plan is otherwise in compliance with Article 3, Article 4, and Article 5 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

-AND-

Recommend Approval – Stormwater Management Plan

In the matter of the request of Union Pacific Holdings for JSP23-37 Culver's, motion to <u>recommend approval</u> to the City Council for <u>Storm Water Management Plan</u> based on and subject to the following:

- a. The findings of compliance with Ordinance standards in the staff and consultant review letters, and the conditions and items listed in those letters being addressed on the Final Site Plan; and
- b. (additional conditions here if any).

(This motion is made because it otherwise in compliance with Chapter 11 of the Code of Ordinances and all other applicable provisions of the Ordinance.)

– OR –

<u>Recommend Denial – Special Land Use</u>

In the matter of the request of Union Pacific Holdings for JSP23-37 Culver's, motion to recommend denial to the City Council for <u>Special Land Use</u> (because the plan is not in compliance with Article 3, Article 4, and Article 5 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

-AND-

Recommend Denial – Preliminary Site Plan with a PD-2 Option

In the matter of the request of Union Pacific Holdings for JSP23-37 Culver's, motion to recommend denial to the City Council for <u>Preliminary Site Plan with a PD-2 Option</u>... (because the plan is not in compliance with Article 3, Article 4, and Article 5 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

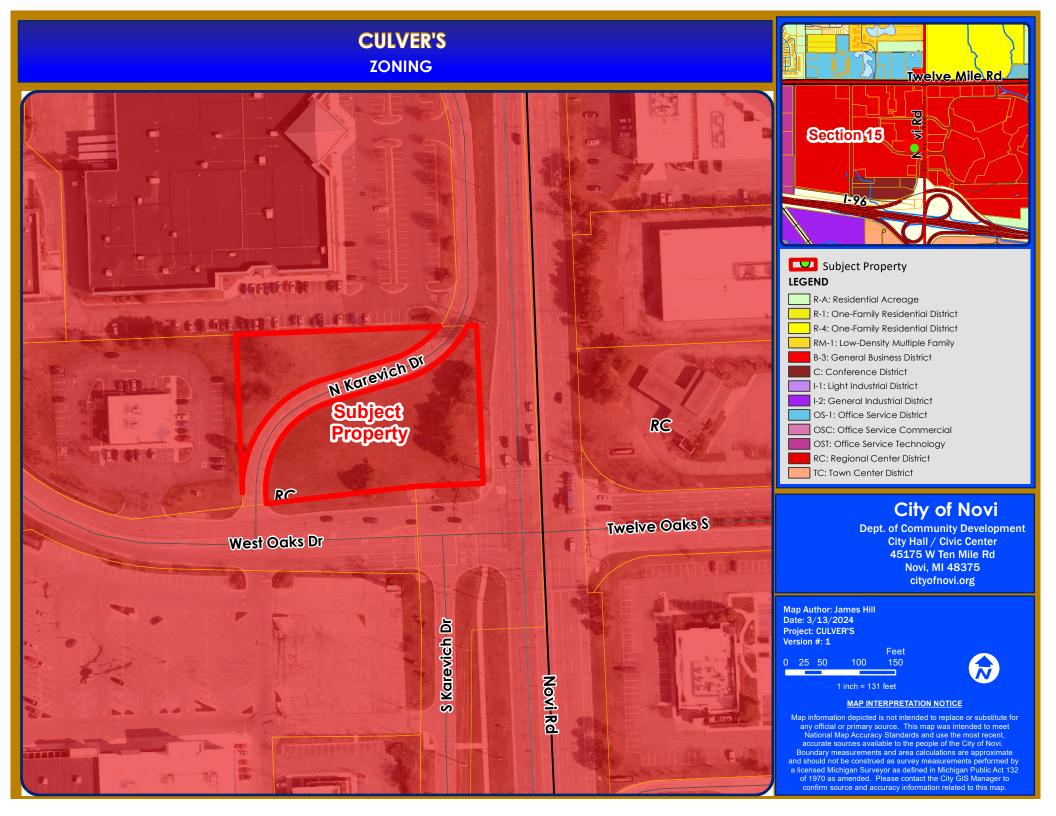
-AND-

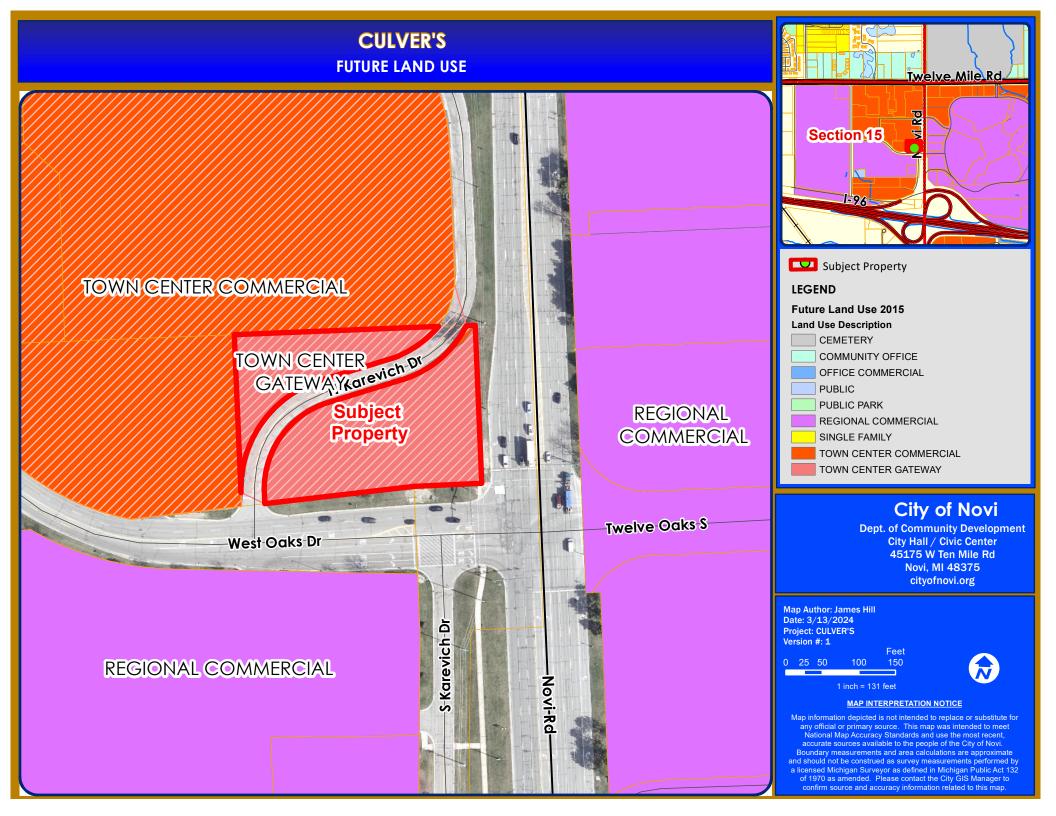
Recommend Denial – Stormwater Management Plan

In the matter of the request of Union Pacific Holdings for JSP23-37 Culver's, motion to recommend denial to the City Council for <u>Storm water Management Plan</u>...(because the plan is not in compliance with Chapter 11 of the Code of Ordinances and all other applicable provisions of the Ordinance.

<u>MAPS</u> Location Zoning Future Land Use Natural Features







PLANNING REVIEW



PLAN REVIEW CENTER REPORT Planning Review

Culver's JSP 23-37 June 4, 2024

PETITIONER

UPH Novi Property, LLC

REVIEW TYPE

2nd Revised Preliminary Site Plan with Planned Development 2 Option, Special Land Use Request, and a Street Vacation Request

PROPERTY CHARACTERISTICS

| Section | 15 | | | | | |
|------------------|---------------|---|--|--|--|--|
| Site Location | West of No | West of Novi Road, north of West Oaks Drive, 22-15-200-097 and -099 | | | | |
| Site School | Novi Com | munity School District | | | | |
| Site Zoning | RC Regior | nal Commercial with a PD-2 Option | | | | |
| | North | North RC Regional Commercial | | | | |
| Adjoining | East | RC Regional Commercial | | | | |
| Zoning | West | RC Regional Commercial | | | | |
| | South | RC Regional Commercial | | | | |
| Current Site Use | Vacant, b | Vacant, bisected by North Karevich Drive | | | | |
| | North | Value City Furniture | | | | |
| Adjoining Uses | East | Former bank (now vacant) | | | | |
| | West | Salon | | | | |
| | South | Parking for West Oaks | | | | |
| Site Size | 1.69 acres | | | | | |
| Plan Date | June 23, 2023 | | | | | |

PROJECT SUMMARY

The applicant is proposing to construct a Culver's restaurant with a drive-thru. North Karevich Drive is requested to be vacated, and the plan shows that a new private drive will be relocated through the restaurant site so that one can still drive from West Oaks Drive to North Karevich Drive in front of the Value City Furniture.

The subject property is currently vacant land zoned RC, Regional Commercial, with a Planned Development, PD-2 Option overlay. The land comprises approximately 1.4 acres as two parcels bisected by North Karevich Drive but is proposed to comprise approximately 1.69 acres if the site plan, street vacation, and parcel combination are approved. The site is located west of Novi Road, north of West Oaks Drive in Section 15.

In its recommendation to the City Council, the Planning Commission will also need to consider the standards for Special Land Use consideration as well as the standards of the site plan review section of the Planned Development option, as detailed in this letter. As a part of this request, the City Council will consider whether to vacate a portion of North Karevich Drive, and consider the terms under which the property could be conveyed to the applicant.

RECOMMENDATION

Approval of the Second Revised Preliminary Site Plan is recommended by staff. All reviewers now recommend approval of the Preliminary Site Plan. Façade recommended approval of the initial Preliminary Site Plan and although Landscape, Engineering, and Fire previously approved the revised Preliminary Site Plan, another review was warranted due to the change in layout of the site. Traffic is now recommending approval of both the site plan and Traffic Impact Study, with comments to be addressed on the Final Site Plan.

PLANNED DEVELOPMENT OPTION CONDITIONS

Section 3.31.4 of the ordinance outlines the review procedures for Preliminary Site Plans using the PD-2 Option. This requires the Preliminary Site Plan to receive a recommendation for approval or denial from the Planning Commission with City Council ultimately approving or denying the proposed plan. It also outlines specific factors the Planning Commission and City Council shall consider in the review:

- 1. The plan meets all the requirements of Section 6.1 of this Ordinance for Preliminary Site Plans and the requirements set forth in the City's Site Plan and Development Manual. The plan meets most requirements except the deviations as noted in the review letters.
- 2. The plan satisfies the intent of the Special Land Use provisions as stated in Section 6.1.2.c. See the Special Land Use Considerations noted in this Plan Review Letter.
- 3. The Community Impact Statement and Traffic Study are provided, regardless of site size, in accordance with the requirements set forth in the City's Site Plan and Development Manual. The applicant has provided Community Impact Statement and Traffic Impact Study see Traffic review letter for further details.
- 4. The plan satisfies the intent of this Section with respect to use of the land and principal and accessory use relationships within the site as well as with uses on adjacent sites.
- 5. That all existing or proposed streets, road, utilities and marginal access service drives, as are required, are correctly located on the site plan in accordance with the approved plans for these improvements. See the attached Engineering and Traffic Review Letter for additional information.
- 6. The plan meets all the applicable standards of this Ordinance relative to height, bulk and area requirements, building setbacks, off-street parking and preliminary site engineering requirements. The plan is in general conformance with the code requirements. See the attached Plan Review Chart for additional information.
- 7. That there exists a reasonable harmonious relationship between the location of buildings on the site relative to buildings on lands in the surrounding area; that there is a reasonable architectural and functional compatibility between all structures on the site and structures within the surrounding area to assure proper relationships between:
 - a. The topography of the adjoining lands as well as that of the site itself including any significant natural or manmade features. **Street relocation proposed.**
 - b. The relationship of one building to another whether on-site or on adjacent land, i.e., entrances, service areas and mechanical appurtenances.
 - c. The rooftops of buildings that may lie below street levels or from windows of higher adjacent buildings.
 - d. Landscape plantings, off-street parking areas and service drives on adjacent lands. Landscape generally conforms to the requirements. See the Landscape Review Letter for additional information.
 - e. Compliance with street, road and public utility layouts approved for the area. See the Engineering and Traffic Review Letters for additional information.

f. The architecture of the proposed building including overall design and façade materials used. Architectural design and façade material are to be complimentary to existing or proposed buildings within the site and the surrounding area. It is not intended that contrasts in architectural design and use of façade materials is to be discouraged, but care shall be taken so that any such contrasts will not be so out of character with existing building designs and façade materials so as to create an adverse effect on the stability and value of the surrounding area. See the Façade Review Letter for additional information.

Section 3.31.4.B indicates the City Council shall review the proposed plan considering the Planning Commission's recommendation and the requirements of Section 3.31.4.A. As part of its approval of the Preliminary Site Plan, the Council is permitted to impose conditions that are reasonably related to the purposes of this section and that will:

- 1. Insure that public services and facilities affected by a proposed land use or activity will be capable of accommodating increased services and facility loads caused by the land use or activity;
- 2. Protect the natural environment and conserving natural resources and energy;
- 3. Insure compatibility with adjacent use of land; and
- 4. Promote the use of land in a socially and economically desirable manner.

SPECIAL LAND USE CONSIDERATIONS

When the PD-2 Option is utilized, all uses fall under the Special Land Use requirements. Section 6.1.2.C of the Zoning Ordinance outlines specific factors the Planning Commission shall consider in the review and recommendation to City Council of the Special Land Use Permit request:

- i. Whether, relative to other feasible uses of the site, the proposed use will cause any detrimental impact on existing thoroughfares in terms of overall volumes, capacity, safety, vehicular turning patterns, intersections, view obstructions, line of sight, ingress and egress, acceleration/deceleration lanes, off-street parking, off-street loading/unloading, travel times and thoroughfare level of service.
- ii. Whether, relative to other feasible uses of the site, the proposed use will cause any detrimental impact on the capabilities of public services and facilities, including water service, sanitary sewer service, storm water disposal and police and fire protection to service existing and planned uses in the area.
- iii. Whether, relative to other feasible uses of the site, the proposed use is compatible with the natural features and characteristics of the land, including existing woodlands, wetlands, watercourses and wildlife habitats.
- iv. Whether, relative to other feasible uses of the site, the proposed use is compatible with adjacent uses of land in terms of location, size, character, and impact on adjacent property or the surrounding neighborhood.
- v. Whether, relative to other feasible uses of the site, the proposed use is consistent with the goals, objectives and recommendations of the City's Master Plan for Land Use.
- vi. Whether, relative to other feasible uses of the site, the proposed use will promote the use of land in a socially and economically desirable manner.
- vii. Whether, relative to other feasible uses of the site, the proposed use is
 - a. Listed among the provision of uses requiring special land use review as set forth in the various zoning districts of this Ordinance, and
 - b. Is in harmony with the purposes and conforms to the applicable site design regulations of the zoning district in which it is located.

ORDINANCE REQUIREMENTS

This project was reviewed for compliance with the Zoning Ordinance, with respect to Article 3 (Zoning Districts), Article 4 (Use Standards), Article 5 (Site Standards), and any other areas of the ordinance, as

noted. The plans show general compliance with ordinance requirements. Please address the items in **bold** with the next submittal.

- 1. <u>Criteria for authorizing deviations (Sec. 3.31.5)</u>: The City Council shall be authorized to grant deviations from the strict terms of the zoning ordinance governing area, bulk, yard, and dimensional requirements applicable to the property" in accordance with section 3.31.5. The standards are as follows):
 - a. That each zoning ordinance provision from which a deviation is sought would, if the deviation were not granted, prohibit an enhancement of the development that would be in the public interest;
 - b. That approving the proposed deviation would be compatible with the existing and planned uses in the surrounding area;
 - c. That the proposed deviation would not be detrimental to the natural features and resources of the affected property and surrounding area, or would enhance or preserve such natural features and resources;
 - d. That the proposed deviation would not be injurious to the safety or convenience of vehicular or pedestrian traffic; and
 - e. That the proposed deviation would not cause an adverse fiscal or financial impact on the City's ability to provide services and facilities to the property or to the public as a whole.
- 2. <u>Fast-food Restaurants (Sec. 3.31.7.B.v.a)</u>: Fast food restaurants are allowed as a special land use when using the PD-2 option in the RC district, subject to certain conditions, namely that
 - a. No restaurants shall be closer than 1,000 feet on the same side of the street. The subject property is within 1,000 feet of another restaurant, as both Carrabba's to the south and Starbucks to the north are within 1,000 feet. The applicant will be asking for a deviation from this standard, based on the criteria provided in item 1.
 - b. The parcel must be at least 1.25 acres (site is 1.69 acres); and
 - c. The site shall be designed to achieve traffic circulation features both within the site and in relation to access streets that assure safety and convenience of both vehicular and pedestrian traffic. Please see the Traffic Engineering Review letter for comment on this.
- 3. Street vacation request: The submitted site plan's approval will be contingent on the successful approval of the requested street vacation. The street vacation request will be reviewed separately with a public hearing at an upcoming City Council meeting. As the public street was not designed as a part of a plat, but was conveyed to the City by a deed, the vacated land does not automatically go to the adjacent property owner. The applicant has proposed to vacate the part of Karevich Drive that is intended to be moved in addition to the portion of Karevich Drive north of the site that is in front of Value City Furniture. The applicant has proposed to take on the maintenance responsibilities for the vacated street and maintain public access, in addition to constructing a sidewalk along Novi Road from West Oaks Drive to West Oaks Access Drive. The applicant has begun to prepare a formal letter for the street vacation proposal including the dedicated ROW, maintenance responsibilities, and other required details.
- 4. <u>Dumpster (Sec. 4.19.2)</u>: All exterior side yards abutting a street shall meet the regulations applicable to a front yard. Dumpsters may only be located in the rear yard. **Dumpster location will require a deviation.** Acknowledged by the applicant.
- 5. <u>Parking adjacent to parking lot entrance (Sec. 5.3.13)</u>: No parking stall located adjacent to a parking lot entrance from a street (public or private) shall be located closer than 25 feet from the street ROW line, easement, or sidewalk, whichever is closer. The parking stall in the northwest corner of the lot appears closer than 25 feet from the parking lot entrance. **Please either revise the layout so that space is shifted to the east or request a deviation**.

Additionally, there appears to be a claim in the response letter that no parallel parking spaces are proposed, even though all the spaces in front of the pick up window on either side of the drive aisle are parallel parking spaces (even if the spaces on the north side of the drive aisle are considered waiting spaces and not parking spaces). Please either 1) eliminate these spaces altogether, 2) dimension the parallel spaces so that they comply with the Ordinance (23' in length, 8' in width, with 6' long hatched spaces in between every other space as detailed in Section 5.3.2 of the Ordinance) or 3) seek a deviation from the Ordinance for the current layout or 4) some combination of eliminations, deviations, and proper dimensions, which can be outlined by the applicant in the next response letter. See Traffic Review for further detail.

- 6. <u>Consecutive parking spaces (Sec. 5.5.3.C)</u>: The bay just north of the building is in effect 17 spaces (the dumpster access way is 2 spaces), plus 2 accessible space aisles extend the bay even further. Please add in a 200sf island on the east or west side of the dumpster accessway. See Landscape letter for further detail.
- 7. <u>Bicycle Parking General Requirements (Sec. 5.16)</u>: Proposed dimensions are not in compliance with the Ordinance. Please revise the bicycle parking layout so that it meets the requirements from Text Amendment 18.301. Please also dimension the width of the sidewalk from the crosswalk to the bicycle parking to ensure that the 6' requirement is met. See Traffic review letter for further detail.
- 8. <u>Traffic Circulation (Sec. 3.31.7.B.v.c)</u>: The site plan shall be designed to achieve traffic circulation features both within the site and in relation to access streets that assure safety and convenience of both vehicular and pedestrian traffic. A deviation will be required for the mountable concrete median drive approach. Additionally, please revise sheet C5.4 to show the correct path of the fire truck. See Traffic review for further detail.
- 9. <u>Signage:</u> For sign permit information please contact Ordinance Enforcement at 248-735-5678 or <u>ordinanceenforcement@cityofnovi.org</u> in the Code Compliance Division for more information.
- 10. <u>Planning Chart:</u> Please be sure to address the other issues included in the attached Planning Chart.

OTHER REVIEWS

- a. <u>Engineering Review (6-6-2024)</u>: Engineering recommends approval of the 2nd revised Preliminary Site Plan, with comments to be addressed at the time of Final Site Plan submittal.
- b. <u>Landscape Review (6-4-2024)</u>: Landscape recommends approval of the 2nd revised Preliminary Site Plan, on the condition that the three unsupported waivers are eliminated.
- c. <u>Traffic Review (6-4-2024)</u>: Traffic recommends approval of the 2nd revised Preliminary Site Plan and the Traffic Impact Study. There are comments that need to be addressed in a response letter in addition to the Final Site Plan.
- d. <u>Façade Review (1-8-2024)</u>: Façade recommended approval of the initial Preliminary Site Plan. A Section 9 Façade waiver is required for an underage of brick and overage of composite siding.
- e. <u>Fire Review (6-3-2024)</u>: Fire recommended approval of the 2nd Revised Preliminary Site Plan, with comments to be addressed at Final Site Plan.
- f. <u>Irrigation Review (6-7-2024)</u>: The Water and Sewer Division is <u>not recommending approval</u> of the irrigation plan currently. Their comments will need to be addressed in the Final Site Plan submittal.

NEXT STEP: PLANNING COMMISSION AND RESPONSE LETTER

The Preliminary Site Plan, Special Land Use, and Stormwater Management Plan will need approval from the Planning Commission. The project is scheduled to appear before the Planning Commission on **June 26, 2024, at 7pm at the Novi Civic Center.** Please provide the following via email the week prior to the meeting once this stage is reached:

- 1. Site Plan submittal in PDF format (maximum of 10MB) NO CHANGES MADE (we have this already)
- 2. A response letter addressing ALL the comments from ALL review letters and a <u>request for</u> <u>waivers/variances as you see fit.</u>
- 3. A color rendering of the Site Plan (to be used for Planning Commission presentation).

FUTURE STEP: CITY COUNCIL FOR PRELIMINARY SITE PLAN AND STREET VACATION

After the Planning Commission meeting, the site plan and street vacation will concurrently appear before the City Council. Any deviations from the Zoning Ordinance that pertain to bulk, area, and dimensions will need to be granted by the City Council.

FUTURE STEP: FINAL SITE PLAN SUBMITTAL

After receiving City Council's approval of the Special Land Use, Preliminary Site Plan, and Stormwater Management Plan and any necessary deviations, please submit the following for review:

- 1. Six copies of Final Site Plan sets (24" x 36", folded) addressing ALL comments from Preliminary Site Plan Review.
- 2. Response letter addressing ALL comments from ALL review letters and refer to sheet numbers where the change is reflected.
- 3. Final Site Plan Application
- 4. <u>Final Site Plan Checklist</u>
- 5. <u>No Revision Façade Affidavit</u> (only if no façade changes have been made)
- 6. An itemized engineering cost estimate including sanitary sewer, watermain, storm sewer, paving and grading costs, size 8.5" x 11" (The cost estimate should not include soil erosion or demolition costs.)
- 7. An itemized landscaping cost estimate including greenbelt and greenbelt ornamental trees, perennials, pond plantings, shrubs, edging, mulch, seed mix and seeded lawn, size 8.5" x 11" (The cost estimate should not include woodland trees, replacement trees or mitigation.)
- 8. Other Agencies Checklist
- 9. Non-Domestic User Survey
- 10. <u>Hazardous Chemical Survey</u>

ELECTRONIC STAMPING SET SUBMITTAL AND RESPONSE LETTER

After receiving Final Site Plan approval, plans addressing the comments in all the staff and consultant review letters should be submitted electronically for informal review and approval prior to printing Stamping Sets. A letter from either the applicant or the applicant's representative addressing comments in this and other review letters and associated charts is to be submitted with the electronic stamping set. This letter should address all comments in ALL letters and ALL charts and **refer to sheet numbers where the change is reflected.** If required, drafts for all legal documents with a legal transmittal are to be submitted along with stamping sets.

STAMPING SET APPROVAL

Stamping sets will be required for this project. After having received all the review letters from City staff the applicant should make the appropriate changes on the plans and submit **9 size 24" x 36" copies with signature and seal (may be electronic)** to the Community Development Department for final Stamping Set approval.

PRE-CONSTRUCTION MEETING

A **Pre-Construction meeting is required for this project.** Prior to the start of any work on the site, Pre-Construction (Pre-Con) meetings must be held with the applicant's contractor and the City's consulting engineer. Pre-Con meetings are generally held after Stamping Sets have been issued and prior to the start of any work on the site. There are a variety of requirements, fees and permits that must be issued before a Pre-Con can be scheduled, so it is suggested you contact Sarah Marchioni (248.347.0430 or

<u>smarchioni@cityofnovi.org</u>) once the Final Site Plan has been approved to begin the Pre-Con checklist. If you have questions regarding the checklist or the Pre-Con itself, please contact Sarah.

CHAPTER 26.5

Chapter 26.5 of the City of Novi Code of Ordinances generally requires all projects be completed within two years of the issuance of any starting permit. Please contact Sarah Marchioni at 248-347-0430 for additional information on starting permits. The applicant should review and be aware of the requirements of Chapter 26.5 before starting construction.

If the applicant has any questions concerning the above review or the process in general, do not hesitate to contact me at 248.347.0547 or <u>jhill@cityofnovi.org</u>.

m Hill

James Hill, Planner

PLANNING REVIEW CHART: RC with PD-2 Option

CITY OF

cityofnovi.org

| Review Date: Review Type: | June 4, 2024 Revised Preliminary Site Plan |
|------------------------------|---|
| Project Name: | JSP 23-37 Culver's Restaurant |
| Plan Date: | May 15, 2024 |
| Prepared by: | James Hill, Planner |
| | E-mail: jhill@cityofnovi.org; Phone: (248) 347-0547 |

Items in **Bold** need to be addressed by the applicant with next submittal. <u>Underlined</u> items need to be addressed on the Stamping set submittal.

| Item | Required Code | Proposed | Meets Code | Comments |
|---|--|--|---------------|--|
| Zoning and Use Requi | rements | | • | |
| Master Plan (adopted July 27, 2017) | Regional Commercial | PD-2: Planned Development | Yes | PD-2 Option would require the Planning Commission's recommendation to City Council – concurrent with site plan/special land use |
| Area Study | None | | NA | |
| Zoning (Effective January 8, 2015) | RC: Regional Commercial | RC with PD-2 Option | Yes | |
| Uses Permitted (Sec 3.1.24. B & C) | Sec 3.1.24.B Principal Uses Permitted. Sec 3.1.24.C Special Land Uses | Restaurant: Fast food drive-through | Yes | Subject to City Council approval upon Planning Commission's recommendation The public hearing from the previous Planning Commission meeting remained open so a notice is not required |
| Phasing | Provide phases lines and detail description of activities in each phase | Phasing not proposed | NA | |
| Planned Developmen | Site Plan Submittal Requiremen | ts (Sec. 3.31.4.A) | • | |

| Item | Required Code | Proposed | Meets Code | Comments |
|--|--|--|---------------|--|
| Special Land Use (Sec. 3.31.4.A.ii) | Special Land use requirements listed in Sec. 6.1.2.C. | | Yes | |
| Community Impact Statement (Sec. 3.31.4.A.iii) | Required according to site plan manual (SDM link: <u>Site</u> <u>development Manual</u>) | Included | Yes | |
| Traffic Study (Sec. 3.31.4.A.iii) | Required according to site plan manual (SDM link: <u>Site</u> <u>development Manual</u>) | Included | Yes | |
| Planning Commission Findings for Site plan review (Sec. 3.31.4.A) | The proposed site plan meets the intent of other items listed in Section | | TBD | PD Option and PSP can proceed simultaneously – Review conditions listed in this section |
| Use Conditions for Allo | wable uses under PD-2 Option (| Sec. 3.31.7.B) | | |
| Fast food drive-thru (Sec. 3.31.7.B.v.a) | When restaurants are independently freestanding uses and not attached to or otherwise clearly accessory to a principle use, they shall be located no closer than one- thousand (1,000) feet from any other such use on the same side of the street | Carabba's (south of site) appears to be closer than 1000 feet | No | Deviation will be required Deviation will be subject to the Planning Commission's recommendation, which will then go to City Council for approval |
| Minimum parcel size (Sec. 3.31.7.B.v.b) | 1.25 acres. | 1.4 acres as two separate parcels 1.69 acres proposed | Yes | |
| Traffic Circulation (Sec. 3.31.7.B.v.c) | The site plan shall be designed to achieve traffic circulation features both within the site and in relation to access streets that assure safety and convenience of both vehicular and pedestrian traffic. | Traffic recommends approval | Yes | See Traffic Review for comments Deviation required for mountable concrete median drive approach Sheet C5.4 shows the fire truck path through parking spaces – please revise |

| Item | Required Code | Proposed | Meets Code | Comments |
|--|---|--|---------------|---|
| | | | | |
| Restaurant in the Char (Sec. 4.40.) | acter of a Fast Food Carryout, D | rive-In, Fast Food Drive-T | hrough | , or Fast Food Sit Down |
| Noise Impact Statement (Sec. 4.40.1) | A noise impact statement is required subject to the standards of Sec. 5.14.10.B. | Included | Yes | |
| Drive-through Lanes (S | ec. 5.3.11) | | • | |
| Drive-through Lanes Separation (Sec. 5.3.11.A) | Drive-through lanes shall be separate from the circulation routes & lanes necessary for ingress to & egress from the property | Shown | | |
| Drive-through setbacks (Sec. 5.3.11.A,B) | Drive through shall follow parking setback requirements and applicable parking lot landscaping requirements | Complies | Yes | |
| Drive-through lanes parking access (Sec. 5.3.11.C) | Drive-through lanes shall not utilize any space which is necessary for adequate access to parking spaces from internal maneuvering lanes | 20' one-way maneuvering lane along drive thru lane | Yes | See Traffic Review for further details |
| Bypass Lane for Drive-through (Sec. 5.3.11.D) | Drive-through facilities shall provide 1 bypass lane, min. of 18 ft. in width, unless otherwise determined by the Fire Marshal | Bypass lane shown to be 20 feet wide | Yes | |
| Width & Centerline Radius of Drive- through Lanes (Sec. 5.3.11.E,F,H) | Drive-through lanes shall have a minimum 9 ft. width, centerline radius of 25 ft. and a minimum length of 19 ft. | 10 ft wide 25 ft centerline radius | Yes | See Traffic Review for additional comments |
| Drive-Thru Stacking Spaces (Sec. 5.3.11.1) | The distance between the order board and the pick-up window shall store four (4) vehicles, and four (4) vehicles shall be stored in advance of the menu board (not including the vehicles at the pick-up window and menu | Two menu boards shown Cars sketched in to show stacking | Yes | See Traffic Review for additional comments – although sketches are provided, please dimension the length of the stacking space |

| ltem | Required Code | Proposed | Meets Code | Comments | | |
|---|--|---|---------------|----------|--|--|
| | board). | | | | | |
| Drive-through Lane Delineated (Sec. 5.3.11.G) | Drive-through lanes shall be striped, marked, or otherwise delineated | Appears to comply Drive-through lane delineated by concrete pavement | Yes | | | |
| Height, bulk, density a | nd area limitations (Sec 3.1.23.D |) | | | | |
| Frontage on a Public Street (Sec. 5.12) Access To Major Thoroughfare (Sec. 5.13) | Frontage on a Public Street is required. | Frontage on W Oaks Drive and Novi Road | Yes | | | |
| Minimum Zoning Lot Size for each Unit in Acres (Sec 3.6.2.D) | Except where otherwise provided in this Ordinance, the minimum lot area and width, and the maximum percent of lot coverage shall | | NA | | | |
| Minimum Zoning Lot Size for each Unit: Width in Feet (Sec 3.6.2.D) | be determined on the basis of off-street parking, loading, greenbelt screening, yard setback, or usable open space. | | NA | | | |
| Open Space Area | | | NA | | | |
| Maximum % of Lot Area Covered (By All Buildings) | (Sec 3.6.2.D) | Building lot coverage: 5.6% | Yes | | | |
| Building Height (Sec. 3.20) | 45 ft. or 3 stories whichever is less | 23 ft | Yes | | | |
| Outdoor Restaurants (S | Outdoor Restaurants (Sec. 4.84) | | | | | |
| Accessory Use (Sec. 4.84) | Outdoor seating as an accessory use is allowed per section 4.84. | 315 sq ft exterior seating area | Yes | | | |
| Site Plan Review (Sec. 4.84.1) | If the seating area is proposed as part of a site plan application it shall require site plan review and approval by the Planning Commission | | TBD | | | |
| Building and fire | Outdoor seating areas shall | | TBD | | | |

| ltem | Required Code | Proposed | Meets Code | Comments | |
|---|---|---|---------------|----------|--|
| codes (Sec. 4.84.1) | also comply with all applicable building and fire codes | | | | |
| Timings (Sec. 4.84.2) | Permitted between March 1 st and November 30 th . | Details included | Yes | | |
| Pathway (Sec. 4.84.4) | Outdoor seating areas shall be located in a manner to maintain a minimum pathway width of six (6) feet (clear of structures such as light poles, trees and hydrants) along the sidewalk | 315 sq ft patio area | Yes | | |
| Enclosure (Sec. 4.84.4) | It shall be enclosed where there is alcohol service. | | NA | | |
| Location (Sec. 4.84.5) | If located in public, ROW, then approval from all relate agencies is required. Additional requirements may apply. | | NA | | |
| Parking (Sec. 4.84.6) | For more than 20 seating, parking shall be calculated. | Approximately 15 seats appear to be shown | Yes | | |
| Hours of Operation (Sec. 4.84.7) | Hours of operation same as inside restaurant. | To be provided with FSP submittal | TBD | | |
| Building Setbacks (Sec | : 3.31.7.D) | | | | |
| Front @ W Oaks Drive (South) | 50 ft. | 50.52 ft | Yes | | |
| Exterior side yard @ Novi Road (East) | 50 ft | 80.52 ft | Yes | | |
| Exterior side yard @ N Karevich Drive (North) | 50 ft | 114.88 ft | Yes | | |
| Exterior Side Yard @ N Karevich Dr (West) | 50 ft. | 161.78 ft | Yes | | |
| Parking Setback (Sec 3.31.7.D) | | | | | |
| Front @ W Oaks Drive (South) | 20 ft. | 21 ft | Yes | | |
| Exterior side yard @ N Karevich Drive (West) | 20 ft. | Greater than 20 ft. | Yes | | |
| Exterior side yard @ N Karevich Drive (North) | 20 ft. | 20.8 ft. | Yes | | |

| Item | Required Code | Proposed | Meets Code | Comments |
|---|---|---|---------------|--|
| Exterior Side Yard @ Novi Road (East) | 20 ft. | 20.9 ft. | Yes | |
| Note To District Standa | rds for RC District (Sec 3.6.2) | | | |
| Exterior Side Yard Abutting a Street (Sec 3.6.2.C) | All exterior side yards abutting a street shall be provided with a setback equal to front yard. | Shown | NA | See comments above |
| Off-Street Parking in Front Yard (Sec 3.6.2.E) | Off-street parking is allowed in front yard. | Shown | Yes | |
| Distance between buildings (Sec 3.6.2.H) | It is governed by sec. 3.8.2 or by the minimum setback requirements, whichever is greater. | Only one building proposed | NA | |
| Wetland/Watercourse Setback (Sec 3.6.2.M) | A setback of 25ft from wetlands and from high watermark course shall be maintained. | No wetlands present | NA | |
| Additional Building height (Sec 3.6.2.0) | Additional height up to 65 ft. may be allowed for properties within 1200 ft from a freeway subject to additional conditions | | NA | |
| Parking setback screening (Sec 3.6.2.P) | Required parking setback area shall be landscaped per sec 5.5.3. | Landscape plan provided | TBD | See Landscape Review |
| Modification of parking setback requirements (Sec 3.6.2.Q) | The Planning Commission may modify parking setback requirements based on its determination according to Sec 3.6.2.Q. | Does not apply | NA | |
| Parking, Loading and | Dumpster Requirements | | | |
| Number of Parking Spaces Sec. 5.2.12.C | Fast Food Restaurants 1 for every 2 employees, plus 1 for every 2 customers allowed under maximum capacity (including waiting areas) | 6 employees per shift: 3 spaces 90 seats: 45 spaces Total required: 3+ 45 = 48 Total provided: 53 (according to site data table) | Yes | See Traffic Review for additional comments Since 8 spaces are provided in excess, the applicant could consider removing the parallel parking spaces in front of the pickup window on either side of the drive aisle for better traffic flow |

| Item | Required Code | Proposed | Meets Code | Comments |
|--|---|---|---------------|---|
| | | It appears that 56 spaces are provided | | |
| Parking Space Dimensions and Maneuvering Lanes | 90° spaces: 9 ft. x 19 ft. parking spaces with 24 ft. drives | 9 ft x 19 ft proposed with 24 ft. drive | Yes | See Traffic Review for additional comments |
| (Sec. 5.3.2) | <u>45° spaces:</u> 9 ft. x 18 ft. with 15 ft. drives | 15 spaces, 9 ft. wide x 18 ft. with 20 ft. drive | Yes | Also see comment above |
| | 9 ft. x 17 ft. parking spaces along 7 ft. interior sidewalks, provided a 4 in. curb at these locations & along landscaping | 19 spaces, 9ft. x 17 ft, not along sidewalk | Yes | |
| | <u>0° Parallel parking spaces:</u> 8 ft x 23 ft with 13 ft drives and 6 ft buffers | Varied lengths for parallel parking spaces – all deficient of the required 23 feet | TBD | |
| Parking stall located adjacent to a parking lot entrance(public or private) (Sec. 5.3.13) | - shall not be located closer than twenty-five (25) feet from the street right-of-way (ROW) line, street easement or sidewalk, whichever is closer | Parking spot located in the northwestern corner of the site appears to be closer than 25 feet from the street easement | TBD | Please either revise the plan so that this space is shifted to the east or request a deviation |
| End Islands (Sec. 5.3.12) | End Islands with landscaping and raised curbs are required at the end of all parking bays that abut traffic circulation aisles. The end islands shall generally be at least 8 feet wide, have an outside radius of 15 feet, and be constructed 3' shorter than the adjacent parking stall as illustrated in the Zoning Ordinance | End islands are 3' shorter than adjacent parking stall and appear to comply with the other requirements | Yes | See Landscape Review and Traffic Review for additional comments |
| Barrier Free Spaces Barrier Free Code | For 51 to 75 spaces, 3 BF spaces are required | 3 BF shown, 1 van accessible | Yes | |
| Barrier Free Space Dimensions Barrier Free Code | - 8' wide with an 8' wide access aisle for van accessible spaces - 8' wide with a 5' wide access aisle for regular accessible spaces | Shown | Yes | |

| Item | Required Code | Proposed | Meets Code | Comments |
|---|--|--|---------------|--|
| Barrier Free Signs Barrier Free Code | One sign for each accessible parking space. | Signs shown, details and dimensions provided on attachment | Yes | See Traffic Review for additional comments |
| Minimum number of Bicycle Parking (Sec. 5.16.1) | 4 spaces required | 3 bike hoops proposed, details of hoop provided, but not foundation and layout (distance between hoops) | TBD | Please include bicycle parking details in the next submittal See Sec. 5.16 for bicycle parking requirements |
| Bicycle Parking General requirements | No farther than 120 ft. from the entrance being served | Yes | Yes | |
| (Sec. 5.16) | When 4 or more spaces are required for a building with multiple entrances, the spaces shall be provided in multiple locations | One entrance served | | |
| | Spaces to be paved and the bike rack shall be inverted "U" design Shall be accessible via 6 ft. paved sidewalk | Connected to sidewalk | | |
| Bicycle Parking Lot layout (Sec 5.16.6) | Parking space width: 7 ft. One tier width: 11 ft. Two tier width: 18 ft. Maneuvering lane width: 4 ft. Parking space depth: 32 in. | Please provide details in the next submittal | TBD | See comments above |
| Loading Spaces Sec. 5.4.1 | Within the RC districts, loading, unloading space shall be: - provided in the rear yard at a ratio of ten (10) square feet for each front foot of building - in the case of a double frontage lot, in the interior side yard, beyond the minimum side yard setback requirement of the district. | Loading space: 10.5 ft. x 50 ft. (500 sq ft) | Yes | |

| Item | Required Code | Proposed | Meets Code | Comments | | |
|---|---|--|---------------|---|--|--|
| Dumpster Sec 4.19.2.F | Located in rear yard Attached to the building or No closer than 10 ft. from building if not attached Not located in parking setback If no setback, then it cannot be any closer than 10 ft., from property line. Away from Barrier free spaces | Dumpster shown and enclosure is attached to the building Located in exterior side yard Details provided | Yes | Location in the exterior side yard will require a deviation (3.6.2.C) Acknowledged by applicant | | |
| Dumpster Enclosure Sec. 21-145. (c) Chapter 21 of City Code of Ordinances | Screened from public view A wall or fence 1 ft. higher than height of refuse bin And no less than 5 ft. on three sides Posts or bumpers to protect the screening Hard surface pad. Screening Materials: Masonry, wood or evergreen shrubbery | Screening indicated | Yes | | | |
| Accessory Structures Sec. 4.19 | | | Yes | | | |
| Exterior lighting Sec. 5.7 | Photometric plan and exterior lighting details needed at time of Final Site Plan submittal. | Photometric Plan included | Yes | | | |
| Roof top equipment and wall mounted utility equipment Sec. 4.19.2.E.ii | - All roof top equipment must be screened and all wall mounted utility equipment must be enclosed and integrated into the design and color of the building. | None proposed | Yes | | | |
| Roof top appurtenances screening | Roof top appurtenances shall be screened in accordance with applicable facade regulations, and shall not be visible from any street, road, or adjacent property. | | | | | |
| Non-Motorized Facilitie | Non-Motorized Facilities | | | | | |
| Article XI. Off-Road Non-Motorized Facilities | A 6 foot sidewalk is required along collector and arterial roads | 8' sidewalk proposed along Novi Road Exits are connected to | Yes | See Engineering Review | | |
| | Building exits must be | sidewalks | | | | |

| ltem | Required Code | Proposed | Meets Code | Comments |
|---|---|---|---------------|--|
| | connected to sidewalk system or parking lot. | | | |
| Pedestrian Connectivity | Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets | Appears to comply | TBD | See Traffic Review for additional comments |
| Other Requirements | | | 1 | |
| Design and Construction Standards Manual | Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and page for subdivisions). | Appears to comply | Yes | New Sidwell number will need to be used once parcel combination and street vacation are complete |
| General layout and dimension of proposed physical improvements | Location of all existing and proposed buildings, proposed building heights, building layouts, (floor area in square feet), location of proposed parking and parking layout, streets and drives, and indicate square footage of pavement area (indicate public or private). | Appears to comply | Yes | |
| Economic Impact | Total cost of the proposed building & site improvements Number of anticipated jobs created (during construction & after building is occupied, if known) | Not included | Νο | <u>Please include the</u> <u>total cost and number</u> <u>of anticipated jobs with</u> <u>the Final Site Plan</u> <u>submittal</u> |
| Development/ Business Sign & Street addressing | Signage if proposed requires a permit. The applicant should contact the Building Division for an address prior to applying for a building permit. | Proposed signage not reviewed at this time | TBD | For further information contact Ordinance 248-347-0438 if a sign permit is required. |
| Project and Street naming | Some projects may need approval from the Street and Project Naming Committee. | | TBD | |

| Item | Required Code | Proposed | Meets Code | Comments |
|---|---|--|---------------|---|
| Property Split | The proposed property split must be submitted to the Assessing Department for approval. | No split proposed | NA | Parcels 22-15-200-097 and 22-15-200-098 will need to be combined prior to final approval Acknowledged by applicant |
| Lighting and Photome | tric Plan (Sec. 5.7) | | | |
| Intent (Sec. 5.7.1) | Establish appropriate minimum levels, prevent unnecessary glare, reduce spillover onto adjacent properties, & reduce unnecessary transmission of light into the night sky. | | Yes | |
| | Site plan showing location of all existing & proposed buildings, landscaping, streets, drives, parking areas & exterior lighting fixtures. | | Yes | |
| Security Lighting (Sec. 5.7.3.H) Lighting for security purposes shall be directed only onto the area to be secured. | All fixtures shall be located, shielded, and aimed at the areas to be secured. Fixtures mounted on the building and designed to illuminate the facade are preferred. | Provided | Yes | |
| Building Lighting (Sec. 5.7.2.A.iii) | Relevant building elevation drawings showing all fixtures, the portions of the walls to be illuminated, illuminance levels of walls and the aiming points of any remote fixtures. | Lighting shown on building elevations | Yes | |

| ltem | Required Code | Proposed | Meets Code | Comments |
|--|--|--|---------------|----------|
| Lighting Standards (Sec.5.7.A.2) | Specifications for all proposed & existing lighting fixtures. | Included | Yes | |
| | Photometric data | Included | Yes | |
| | Fixture height | Included | Yes | |
| | Mounting & design | Included | Yes | |
| | Glare control devices | Included | Yes | |
| | Type & color rendition of lamps | Included | Yes | |
| | Hours of operation | Included | Yes | |
| | Photometric plan illustrating all light sources that impact the subject site, including spill- over information from neighboring properties. | Included | Yes | |
| Maximum Height (Sec. 5.7.3.A) | Height not to exceed maximum height of zoning district (or 25 ft. where adjacent to residential districts or uses. | Max is 25 feet Not adjacent to residential | Yes | |
| Standard Notes (Sec. 5.7.3.B) | Electrical service to light fixtures shall be placed underground Flashing light shall not be permitted Only necessary lighting for security purposes & limited operations shall be permitted after a site's hours of operation | Included | Yes | |
| Average Light level ratio (Sec. 5.7.3.E) | Average light level of the surface being lit to the lowest light of the surface being lit shall not exceed 4:1. | 3.6:1 in exterior areas and 3.9:1 in parking lot | Yes | |
| Color Spectrum Management (Sec. 5.7.3.F) | For all permanent lighting installations – minimum Color Rendering Index of 70 and Correlated Color Temperature of no greater than 3000 Kelvin | All products show compliance with minimum CRI and maximum CCT | Yes | |
| Min. Illumination (Sec. 5.7.3.k) | Parking areas: 0.2 min | All in compliance | Yes | |
| | Loading & unloading areas: 0.4 min | | Yes | |
| | Walkways: 0.2 min | | Yes | |

| Item | Required Code | Proposed | Meets Code | Comments |
|--|---|--------------------------------|---------------|----------|
| | Building entrances, frequent use: 1.0 min | | Yes | |
| | Building entrances, infrequent use: 0.2 min | | Yes | |
| Max. Illumination adjacent to Non- Residential (Sec. 5.7.3.K) | When site abuts a non- residential district: - Maximum illumination at the property line shall not exceed 1 foot candle. | Appears to comply | Yes | |
| Cut off Angles (Sec. 5.7.3.L) | When adjacent to residential districts: All cut off angles of fixtures must be 90°. Maximum illumination at the property line shall not exceed 0.5 foot candle. | Not adjacent to residential | NA | |

NOTES:

1. This table is a working summary chart and not intended to substitute for any Ordinance or City of Novi requirements or standards.

2. The section of the applicable ordinance or standard is indicated in parenthesis. Please refer to those sections in Article 3, 4 and 5 of the zoning ordinance for further details

3. Please include a written response to any points requiring clarification or for any corresponding site plan modifications to the City of Novi Planning Department with future submittals.

ENGINEERING REVIEW



PLAN REVIEW CENTER REPORT

6/5/2024

Engineering Review

Culver's JSP23-0037

APPLICANT

Charles Paisley, UPH Novi Property LLC

REVIEW TYPE

2nd Revised Preliminary Site Plan

PROPERTY CHARACTERISTICS

- Site Location:
 - North side of W Oaks Drive west of Novi Road Site Size: 1.69 acres
- 5/15/2024 Plan Date:
- Design Engineer: Nowak & Fraus Engineers

PROJECT SUMMARY

- Construction of an approximately 4106 square-foot restaurant and associated parking. Site access would be provided via West Oaks Drive.
- Water service would be provided by 8-inch extension from the existing 8-inch water main along the west side of the property. Two 2-inch domestic leads are proposed, along with one additional hydrant.
- Sanitary sewer service would be provided by 8-inch extension from the existing sanitary sewer off-site on the neighboring property. A monitoring manhole is proposed on-site along with a 6-inch lead to the building.
- Storm water would be collected into the proposed storm sewer system and a pretreatment structure is proposed prior to storm water leaving the site. Stormwater will be detained in the West Oaks regional detention basin.

RECOMMENDATION

Approval of the 2nd Revised Preliminary Site Plan is recommended, with items to be addressed at Final Site Plan submittal.

Comments:

The 2nd Revised Preliminary Site Plan meets the general requirements of the design and construction standards as set forth in Chapter 11 of the City of Novi Code of Ordinances,

the Storm Water Management Ordinance and the <u>Engineering Design Manual</u> with the following items to be addressed at the time of Final Site Plan submittal:

<u>General</u>

- 1. North Karevich ROW vacation will be needed. The draft maintenance/access easement has been submitted. The access agreement should also include the cross access for the Value City customers. This can all be included into the one agreement.
- 2. Provide at least two reference benchmarks at intervals no greater than 1,200 feet. At least one referenced benchmark must be a City-established benchmark, refer to <u>City of Novi Survey Benchmarks Arch Map</u>. Benchmark 1522 is located at the crossing of West Oaks Drive and S Karevich Drive.
- 3. Provide a note on the plans that all work shall conform to the current City of Novi standards and specifications.
- 4. **Only at the time of the printed Stamping Set submittal**, provide the City's standard detail sheets for water main (5 sheets), sanitary sewer (3 sheets), storm sewer (2 sheets), and paving (2 sheets. The most updated details can be found on the City's website under Engineering Standards and Construction Details.
- 5. A <u>Right-of-Way Permit</u> will be required from the City of Novi for proposed sidewalk.
- 6. Provide sight distance measurements for the West Oaks Drive entrance in accordance with Figure VIII-E of the <u>Design and Construction Standards</u>, <u>Chapter 11 of the City of Novi Code of Ordinances</u>.
- 7. Provide a traffic control sign table listing the quantities of each **permanent** sign type proposed for the development. Provide a note along with the table stating all traffic signage will comply with the current MMUTCD standards.
- 8. Provide a note that compacted sand backfill (MDOT sand Class II) shall be provided for all utilities within the influence of paved areas; illustrate and label on the profiles.
- 9. Provide a construction materials table on the utility plan listing the quantity and material type for each utility (water, sanitary and storm) being proposed.
- 10. Provide a utility crossing table indicating that at least 18-inch vertical clearance will be provided, or that additional bedding measures will be utilized at points of conflict where adequate clearance cannot be maintained.
- 11. Provide a note stating if dewatering is anticipated or encountered during construction, then a dewatering plan must be submitted to the Engineering Division for review.
- 12. The grading and SESC sheets shall show the tree fence at least as far from the trunk as the critical root zone, defined as a circular area around a tree with a radius measured to the tree's longest dripline radius plus one (1) foot. No grading shall occur within the dripline. If the critical root zone is not fully protected, then replacements for that tree may be required.

<u>Water Main</u>

- 13. All water main easements shall be 20-feet wide. Revise the proposed easement accordingly.
- 14. Place the hydrants at least 7 feet off back of curb (allowing 3-foot clearance from sidewalk).
- 15. A tapping sleeve, valve and well is required at the connection to the existing water main.
- 16. Per current EGLE requirement, provide a profile for all proposed water main 8inch and larger. An 8-inch main is required for the proposed hydrant, additionally a 20-foot easement should be shown around the main and the hydrant.
- 17. 6-inch hydrant leads are allowed for leads less than or equal to 25 feet in length.8-inch leads are required for leads greater than 25 feet in length.
- 18. All gate valves 6" or larger shall be placed in a well with the exception of a hydrant shut off valve. A valve shall be placed in a box for water main smaller than 6".
- 19. Indicate why 2 water service leads are shown on the plans, label fire suppression.
- 20. A sealed set of utility plans along with the <u>Michigan Department of Environment</u>, <u>Great Lakes & Energy (EGLE) permit application</u> for water main construction, the <u>Streamlined Water Main Permit Checklist</u>, <u>Contaminated Site Evaluation</u> <u>Checklist</u>, and an electronic version of the utility plan should be submitted to the Engineering Division for review, assuming no further design changes are anticipated. Utility plan sets shall include only the cover sheet, any applicable utility sheets, and the standard detail sheets.

Irrigation Comments

21. Irrigation plans are not approved, see attached letter dated 6/7/2024.

Sanitary Sewer

- 22. Provide a sanitary sewer monitoring manhole, unique to this site, within a dedicated access easement or within the road right-of-way. Label Monitoring Manhole.
- 23. Provide a sanitary sewer basis of design for the development on the utility plan sheet. (Calculations should use peaking factor of 4.0 and 3.2 People/REU).
- 24. Provide a note on the Utility Plan and sanitary profile stating the sanitary leads will be buried at least 5 feet deep where under the influence of pavement.
- 25. For 8-inch and larger extensions Provide a testing bulkhead immediately upstream of the sanitary connection point. Additionally, provide a temporary 1-foot-deep sump in the first sanitary structure proposed upstream of the connection point, and provide a secondary watertight bulkhead in the downstream side of this structure.
- 26. Provide an internal drop connection if inlet pipe enters the manhole at an invert elevation 18 inches or greater above the invert elevation of the outlet pipe. Internal drop connections require a minimum 5-foot diameter structure.
- 27. Illustrate all pipes intersecting with manholes on the sanitary profiles.

28. Three (3) sealed sets of revised utility plans along with the <u>Michigan Department</u> of <u>Environment</u>, <u>Great Lakes & Energy (EGLE) permit application</u>, electronic utility plan for sanitary sewer construction, and the Streamlined Sanitary Sewer Permit Certification Checklist should be submitted to the Engineering Division for review, assuming no further design changes are anticipated. Utility plan sets shall include only the cover sheet, any applicable utility sheets, and the standard detail sheets. It should be indicated with the application if an expedited EGLE review is requested. EGLE will charge a fee that can be paid directly to the State.

Storm Sewer

- 29. Provide a 0.1-foot drop in the downstream invert of all storm structures where a change in direction of 30 degrees or greater occurs.
- 30. Match the 0.80 diameter depth above invert for pipe size increases.
- 31. Storm manholes with differences in invert elevations exceeding two feet shall contain a 2-foot-deep plunge pool.
- 32. Provide a four-foot-deep sump and an oil/gas separator in the last storm structure prior to discharge off- site/to the storm water basin.
- 33. Label all inlet storm structures on the profiles. Inlets are only permitted in paved areas and when followed by a catch basin within 50-feet.
- 34. Label the 10-year HGL on the storm sewer profiles and ensure the HGL remains at least 1-foot below the rim of each structure.
- 35. Illustrate all pipes intersecting storm structures on the storm profiles. Existing water main and sanitary lead not shown on profiles.
- 36. Provide a schedule listing the casting type, rim elevation, diameter, and invert sizes/elevations for each proposed, adjusted, or modified storm structure on the utility plan. Round castings shall be provided on all catch basins except curb inlet structures.
- 37. Show and label all roof conductors and show where they tie into the storm sewer.
- 38. Provide the storm sewer design table for this site.

Storm Water Management Plan

- 39. The Storm Water Management Plan (SWMP) for this development shall be designed in accordance with the Storm Water Ordinance and Chapter 5 of the <u>Engineering Design Manual</u> (updated Jan 31, 2024)
- 40. This site will ultimately discharge in to the West Oaks Regional Detention Basin, provide total amount of pervious vs impervious area. This is needed to calculate the Stormwater Detention Fees.
- 41. As part of the Storm Drainage Facility Maintenance Easement Agreement, provide an access easement for maintenance over the storm water detention system and the pretreatment structure. Also, include an access easement to the detention area from the public road right-of-way.
- 42. Provide manufacturer's details and sizing calculations for the pretreatment structure(s) on the plans. Provide drainage area and runoff coefficient

calculations specific to the area tributary to each treatment structure. The treated flow rate should be based on the 1-year storm event intensity (~1.6 In/Hr). Higher flows shall be bypassed.

43. Provide supporting calculations for the runoff coefficient determination. A runoff coefficient of 0.35 shall be used for all turf grass lawns (mowed lawns) and 0.95 shall be used for all impervious surfaces. Provide overall C factor for site.

Paving & Grading

- 44. Provide a construction materials table on the Paving Plan listing the quantity and material type for each pavement cross-section being proposed.
- 45. Provide grades for the proposed sidewalk along North Karevich Drive.
- 46. Provide a minimum of 6 spot elevations where the pathway crosses each driveway (one at each corner and two in the center of the driveway on each side of the pathway). Spot elevations shall be provided to demonstrate a level landing adjacent to each side of the pathway crossing.
- 47. No more than $\frac{1}{4}$ " vertical obstacle shall be allowed at each transition between the pathway and the drive approach.
- 48. Indicate why heavy-duty pavement is proposed, city standard asphalt and concrete detail can support truck load. If an non standard cross-section is being proposed show cross section on plans.
- 49. Provide dumpster pad cross-section or refer to city standard.
- 50. Provide spot elevations at the intersection of the proposed pathway with the existing pathway.
- 51. Detectable warning plates are required at all barrier free ramps, hazardous vehicular crossings and other areas where the sidewalk is flush with the adjacent drive or parking pavement. The barrier-free ramps shall comply with current MDOT specifications for ADA Sidewalk Ramps. Provide the latest version of the MDOT standard detail for detectable surfaces.
- 52. Label specific ramp locations on the plans where the detectable warning surface is to be installed.
- 53. Specify the product proposed and provide a detail for the detectable warning surface for barrier free ramps. The product shall be the concrete-embedded detectable warning plates, or equal, and shall be approved by the Engineering Division. Stamped concrete will not be acceptable.
- 54. Verify the slopes along the ingress/egress routing to the building from the barrierfree stalls. All barrier-free stalls shall comply with Michigan Barrier-Free regulations.
- 55. Provide existing and proposed contours on the Grading Plan at the time of the Final Site Plan submittal.
- 56. Provide a note on the Grading Plan stating that the proposed pathway within the road right-of-way shall match existing grades at both ends.
- 57. Provide at least 3-foot of buffer distance between the sidewalk and any fixed objects, including hydrants and irrigation backflow devices. Include a note on the plan where the 3-foot separation cannot be provided.

58. Show proposed grades for all adjusted sanitary, water, and storm structures.

- 59. Site grading shall be limited to 1V:4H (25-percent), excluding landscaping berms. Numerous areas appear to exceed this standard.
- 60. Provide spot grades along property lines adjacent to perimeter curb at 100-foot intervals to demonstrate site drainage is self-contained.
- 61. Provide additional spot grades as necessary to demonstrate that a minimum 5percent slope away from the building is provided for a minimum distance of ten feet around the perimeter of the building.
- 62. The City standard straight-faced curb (MDOT F-4 curb detail) shall be provided. Remove detail and attach City standard paving details.
- 63. Provide top of curb/walk and pavement/gutter grades to indicate height of curb adjacent to parking stalls or drive areas.
- 64. Dimensions of parking stalls abutting a curb or sidewalk are to the face of curb or walk. All other dimensions are to back of curb unless otherwise indicated.
- 65. Curbing and walks adjacent to the end of 17-foot stalls shall be reduced to 4inches high. The grading sheet shows that the curb on the north side of the property is 6-inches adjacent to the 17-foot stalls. Show 2-foot overhang on paving sheets.

Soil Erosion and Sediment Control

66. A SESC permit is required. A full review has not been completed at this time. A review will be done when a completed packet is submitted to Sarah Marchioni at Community Development.

Off-Site Easements

- 67. Any off-site utility easements anticipated must be executed **prior to Stamping Set Approval**. If you have not already done so, drafts of the easements and a recent title search shall be submitted to the Community Development Department as soon as possible for review and shall be approved by the Engineering Division and the City Attorney prior to executing the easements.
- 68. Off-Site Sanitary Sewer Easement
- 69. North Karevich maintenance Agreement/ Access Agreement.

The following must be submitted with the Final Site Plan :

- 70. A letter from either the applicant or the applicant's engineer must be submitted with the Stamping Set highlighting the changes made to the plans addressing each of the comments listed above <u>and indicating the revised sheets involved</u>. Additionally, a statement must be provided stating that all changes to the plan have been discussed in the applicant's response letter.
- 71. An itemized construction cost estimate must be submitted to the Community Development Department for the determination of plan review and construction inspection fees. This estimate should only include the civil site work and not any costs associated with construction of the building or any demolition work. **The estimate must be itemized** for each utility (water, sanitary, storm

sewer), on-site paving (square yardage, should include number do detectable warning plates), right-of-way paving (including proposed right-of-way), grading, and the storm water basin (basin construction, control structure, pre-treatment structure and restoration).

72. Due to the above comments, the itemized construction cost estimate should be revised and resubmitted to the Community Development Department for the determination of plan review and construction inspection fees.

The following must be submitted with the Stamping Set:

(Please note that all documents must be submitted together as a package with the Stamping Set submittal with the legal review transmittal form that is attached to this review letter. Partial submittals will <u>not</u> be accepted. Links to the PDF copy of the easements are below, word document versions of each legal document can be found on the City's Website under Forms and Permits)

- 73. A draft copy of the <u>Storm Drainage Facility Maintenance Easement Agreement</u> (<u>SDFMEA</u>), as outlined in the Storm Water Management Ordinance, must be submitted to the Community Development Department. Once the agreement is approved by the City's Legal Counsel, this agreement will then be sent to City Council for approval/acceptance. The SDFMEA will then be recorded at the office of the Oakland County Register of Deeds. This document is available on our website.
- 74. A draft copy of the 20-foot-wide <u>Watermain System Easement</u> onsite must be submitted to the Community Development Department.
- 75. A draft copy of the 20-foot-wide <u>Sanitary Sewer Easement</u> onsite must be submitted to the Community Development Department.
- 76. A draft sidewalk easement will be needed for the portion of the sidewalk along Novi Road that is on private property. 8-foot-wide pathways need a 12-foot wide easement.
- 77. Executed copies of approved off-site utility easements must be submitted.

The following must be addressed prior to construction:

- 78. A pre-construction meeting shall be required prior to any site work being started. Please contact Sarah Marchioni in the Community Development Department to setup a meeting (248-347-0430). **Be advised that scheduling the pre-construction meeting can take 2-4 weeks**.
- 79. A City of Novi Grading Permit will be required prior to any grading on the site. This permit will be issued at the pre-construction meeting (no application required). No fee is required for this permit.
- 80. Material certifications must be submitted to Spalding DeDecker for review prior to the construction of any onsite utilities. Contact Ted Meadows at 248-844-5400 for more information.

- 81. Construction inspection fees in the amount of **\$TBD** must be paid to the Community Development Department. ****fees are subject to change.**
- 82. Off-Site Legal exhibit review fees in the amount of \$1,320.00 must be paid to the Community Development Department. (ONLY FOR OFF-SITE DOCUMENTS)
- 83. Legal escrow fees in the amount of \$1,725.00 must be deposited with the Community Development Department. All unused escrow will be returned to the payee at the end of the project (except for escrows that are \$50 or less). This amount includes engineering legal fees only. There may be additional legal fees for planning legal documents. **fees are subject to change.
- 84. Legal fees for off-site easements should be paid as soon as possible so that documents can be approved.
- 85. A storm water performance guarantee in the amount of **\$TBD** (Equal to 120% of the cost required to complete the storm water management facilities) as specified in the Storm Water Management Ordinance must be posted at the Community Development Department.
- 86. Storm water detention tap fees in the amount of **\$TBD** for the proposed discharge to an off-site regional detention basin must be paid to the Community Development Department. ****fees are subject to change.**
- 87. Water and Sanitary Sewer Fees must be paid prior to the pre-construction meeting. Contact the Treasury Department at 248-347-0498 to determine the amount of these fees.
- 88. A street sign financial guarantee in the amount of **\$5,200.00**(\$400 per traffic control sign proposed) must be posted at the Community Development Department. Signs must be installed in accordance with MMUTCD standards.
- 89. A traffic control inspection fee of **\$605.00** must be paid to Community Development. This fee is the inspection of traffic control items such as signs, striping, curbs, parking stalls, sidewalk, detectable warning surfaces, and temporary pavement markings.
- 90. A <u>Soil Erosion Control Permit</u> must be obtained from the City of Novi. Contact Sarah Marchioni in the Community Development Department, Building Division (248-347-0430) for forms and information. The financial guarantee and inspection fees will be determined during the SESC review.
- 91. A permit for all proposed work activities within the road right-of-way must be obtained from the City of Novi. This application is available from the City Engineering Division or on the city website (<u>Right-of-Way Permit Application</u>) and can be filed once the Final Site Plan has been submitted. Please contact the Engineering Division at 248-347-0454 for further information. Please submit the cover sheet, standard details, and plan sheets applicable to the permit only.
- 92. An <u>Act 399 Permit for Community Water Supply Systems</u> for water main construction must be obtained from EGLE. This permit application must be

submitted through the Engineering Division after the water main plans have been approved. Please submit the cover sheet, overall utility sheet, standard details, and plan/profile sheets applicable to the permit.

- 93. A <u>Part 41 Permit For Wastewater Systems</u> for sanitary sewer construction must be obtained from EGLE. This permit application must be submitted through the Engineering Division after the sanitary sewer plans have been approved. Please submit the cover sheet, overall utility sheet, standard details and plan/profile sheets applicable to the permit. **Be aware that approval by both (1) Oakland County Water Resources Commissioner (OCWRC) and (2) Wayne County Department of Public Services (WCDPS) are required prior to submittal to EGLE.**
- 94. An inspection permit for the sanitary sewer tap must be obtained from the Oakland County Water Resources Commissioner (OCWRC).

<u>The following must be addressed prior to issuance of a Temporary Certificate of</u> <u>Occupancy (TCO) approval for the development:</u>

- 95. The amount of the incomplete site work performance guarantee for any outstanding site improvement items (limited to top course of pavement and other minor items), is calculated at 1.2 times the amount required to complete the site improvements (as specified in the Performance Guarantee Ordinance).
- 96. All easements and agreements referenced above, must be executed, notarized and approved by the City Attorney and Engineering Division.
- 97. A <u>Bill of Sale for the Utilities</u> conveying the improvements to the City of Novi must be submitted to the Community Development Department.
- 98. The City's consultant Engineer Spalding DeDecker will prepare the record drawings for this development. The record drawings will be prepared in accordance with Article XII, Design and Construction Standards, Chapter 11 of the Novi Code of Ordinances.
- 99. Submit to the Community Development Department, Waivers of Lien from any parties involved with the installation of each utility as well as a Sworn Statement listing those parties and stating that all labor and material expenses incurred in connection with the subject construction improvements have been paid.
- 100. Submit a Maintenance Bond to the Community Development Department in the amount of **\$TBD** (Equal to 25 percent of the cost of the construction of the utilities to be accepted). This bond must be for a period of two years from the date that the Utility Acceptance Permit is issued by the City of Novi Engineering Division. This document is available on the City's website under Forms and Permits.
- 101. Submit an up-to-date Title Policy (dated within 90 days of City Council consideration of acceptance) for the purpose of verifying that the parties signing the Easement and Bill of Sale documents have the legal authority to do so. Please be sure that all parties of interest shown on the title policy (including

mortgage holders) either sign the easement documents themselves or provide a Subordination Agreement. Please be aware that the title policy may indicate that additional documentation is necessary to complete the acceptance process.

To the extent this review letter addresses items and requirements that require the approval of or a permit from an agency or entity other than the City, this review shall not be considered an indication or statement that such approvals or permits will be issued.

Please contact Humna Anjum at (248)735-5632 or email at <u>hanjum@cityofnovi.org</u> with any questions.

trum Jumma

Humna Anjum, Project Engineer

cc: James Hill, Community Development Ben Nelson, Engineering Ben Croy, City Engineer LANDSCAPE REVIEW



PLAN REVIEW CENTER REPORT June 4, 2024 <u>Culver's Restaurant</u> Second Revised Preliminary Site Plan - Landscaping

<u>Review Type</u> Second Revised Preliminary Site Plan Landscape Review Job # JSP23-0037

Property Characteristics

- Site Location:
- Site Acreage:
- Site Zoning:
- Adjacent Zoning:
- Plan Date:

1.5 ac. (approx.) R-C with PD2 option North, South, East, West: R-C 5/31/2024

NW corner of Novi Road and West Oaks Drive

Ordinance Considerations

This project was reviewed for conformance with Chapter 37: Woodland Protection, Zoning Article 5.5 Landscape Standards, the Landscape Design Manual and any other applicable provisions of the Zoning Ordinance. Items in **bold** below must be addressed and incorporated as part of the revised Preliminary Site Plan submittal. Underlined items must be addressed on the Final Site Plans. Please follow guidelines of the Zoning Ordinance and Landscape Design Guidelines. This review and the accompanying Landscape Chart are summaries and are not intended to substitute for any Ordinance.

RECOMMENDATION:

This project is **recommended for approval if the conditions requiring the three unsupported waivers are eliminated.** The remaining changes required can be addressed on Final Site Plans.

LANDSCAPE WAIVERS REQUIRED FOR PROPOSED LAYOUT

- No greenbelt berms are provided on either frontage supported by staff as a hedge is provided as screening.
- Three greenbelt subcanopy trees not planted along 75lf of West Oaks frontage occupied by existing utility easements supported by staff
- The space between the west access drive and the property line is not 10 feet supported by staff if the curb cut must be maintained in its existing position by Engineering and/or Traffic but would not be supported if the drive can be moved eastward 4 feet.
- The proposed loading zone screening plantings will not provide the required screening not supported by staff.
- The interior parking lot area and trees planted are deficient not supported by staff
- Accessway perimeter tree not planted along the drive-thru lane within the watermain easement supported by staff.
- The bay immediately north of the building is 15 spaces, plus the handicap access aisles and two-space wide access drive to the dumpster enclosure not supported by staff.

Please add the City Project Number, JSP23-0037, to the bottom right corner of the Cover Sheet.

Ordinance Considerations

Existing Trees (Sec 37 Woodland Protection, Preliminary Site Plan checklist #17 and LDM 2.3 (2))

- 1. A complete tree survey is provided.
- 2. No wetlands exist on the site.
- 3. Two trees are shown as being preserved but one also appears to be impacted by grading. Please add tree protection fencing around the trees to be saved.
- 4. <u>Please add a note stating that any off-site trees negatively impacted by its construction</u> <u>shall be replaced.</u>

Adjacent to Residential - Buffer (Zoning Sec. 5.5.3.B.ii and iii)

The site is not adjacent to any residential property.

Adjacent to Public Rights-of-Way – Berm/Wall, Buffer and Street Trees (Zoning Sec. 5.5.3.B.ii, iii)

- 1. A landscape waiver is required for the lack of berms along both West Oaks Drive and Novi Road. It would be supported by staff because hedges are provided to screen the drive-thru lanes from both roads.
- 2. A landscape waiver to not provide some of the subcanopy trees within the watermain easement along West Oaks Drive should be requested. It will be supported by staff.

Parking Lot Landscaping (Zoning Sec. 5.5.3.C.)

- Per the vehicular use area, the required landscape area and interior trees are not provided but it appears that they could be with correct labeling and identification.
 Please correct the calculation as shown on the landscape chart, label interior islands and corners with interior trees with their SF, and add the required trees if necessary.
- 2. See the detailed discussion regarding parking lot perimeter trees and accessway perimeter tree placement.
- 3. A landscape waiver to not plant accessway perimeter trees within the watermain easement would be supported by staff.
- 4. A landscape waiver for the deficient perimeter depth between the west drive and west property line is required. It would be supported by staff if Engineering and/or Traffic require that the curb cut remain as it is.
- 5. The bay just north of the building is in effect 17 spaces (the dumpster access way is 2 spaces), plus 2 accessible space aisles extend the bay even further. This requires a landscape waiver. It would not be supported by staff. Please add a 200sf island on the east or west side of the dumpster access way.

Building Foundation Landscaping (Zoning Section 5.5.3.D)

- 1. Calculations and hatched area showing proposed landscape areas are provided.
- 2. Please add labels showing the SF of the different foundation landscaping areas.

<u> Plant List (LDM 4, 10)</u>

- 1. 14 of 19 species used (74%) are native to Michigan.
- 2. The number of red maples used exceeds the 15% maximum. Please reduce the number of red maples to meet the diversity requirement.

Planting Notations and Details (LDM 10)

- 1. All required notes are provided.
- 2. <u>Please add any additional planting details that may be required.</u>

Storm Basin Landscape (Zoning Sec 5.5.3.E.iv and LDM 3)

- 1. No above-ground detention is proposed.
- 2. If above-ground detention is required by Engineering, the basin must be landscaped per the current ordinance.

Irrigation (LDM 10)

1. An irrigation system plan is provided.

2. <u>It will be reviewed by our cross-connection specialist.</u>

If the applicant has any questions concerning the above review or the process in general, do not hesitate to contact me at 248.735.5621 or <u>rmeader@cityofnovi.org</u>.

The Meader

Rick Meader – Landscape Architect

LANDSCAPE REVIEW SUMMARY CHART – Second Revised Preliminary Site Plan

| Review Date: | June 4, 2024 |
|---------------------|--|
| Project Name: | JSP23 – 0037: CULVER'S RESTAURANT |
| Plan Date: | May 15, 2024 |
| Prepared by: | Rick Meader, Landscape Architect E-mail: <u>rmeader@cityofnovi.org;</u> Phone: (248) 735-5621 |

Items in **Bold** need to be addressed by the applicant before approval of the Preliminary Site Plan. <u>Underlined</u> items need to be addressed for Final Site Plan.

LANDSCAPE WAIVERS REQUIRED FOR PROPOSED LAYOUT

- No greenbelt berms are provided on either frontage supported by staff as a hedge is provided as screening.
- Three greenbelt subcanopy trees not planted along 75lf of West Oaks frontage occupied by existing utility easements supported by staff
- The space between the west access drive and the property line is not 10 feet supported by staff if the curb cut must be maintained in its existing position by Engineering and/or Traffic, but would not be supported if the drive can be moved eastward 4 feet.
- The proposed loading zone screening plantings will not provide the required screening not supported by staff.
- The interior parking lot area and trees planted are deficient not supported by staff
- Accessway perimeter tree not planted along the drive-thru lane within the watermain easement supported by staff.
- The bay immediately north of the building is 15 spaces, plus the handicap access aisles and twospace wide access drive to the dumpster enclosure – not supported by staff.

| ltem | Required | Proposed | Meets Code | Comments |
|--|---|-------------------------------------|---------------|--|
| Landscape Plan Requir | ements (Landscape Design | Manual (LDM) and Zo | ning Ordinc | ince (Zoning Sec) |
| Landscape Plan (Zoning Sec 5.5.2, LDM 2, 10) | New commercial or residential developments Addition to existing building greater than 25% increase in overall footage or 400 SF whichever is less. 1" = 20' minimum with proper North. Variations from this scale can be approved by LA Consistent with plans throughout set | Scale: 1" = 20' | Yes | |
| Project Information (LDM 10) | Name and Address | Yes | Yes | |
| Owner/Developer Contact Information (LDM 10) | Name, address and telephone number of the owner and developer or association | Only on cover sheet | No | Please add the information to the title block of the landscape plan and other sheets. |
| Landscape Architect contact information | Name, Address and telephone number of | John Ackerman, PLA – Kimley-Horn | Yes | |

| Item | Required | Proposed | Meets Code | Comments |
|--|--|---|----------------------------------|--|
| (LDM 10) | RLA/PLA/LLA who created the plan | of Michigan | | |
| Sealed by LA. (LDM 10) | Requires original signature | None | | Signature and seal of LA is required on the printed stamping sets. |
| Miss Dig Note (800) 482-7171 (LDM 10) | Show on all plan sheets | Yes | Yes | |
| Zoning (LDM 10) | Include all adjacent zoning | <u>Parcel:</u> R-C with PD-2 option <u>North South, East,</u> <u>West:</u> R-C | Yes/No | Please show the zoning of the parcels north and south of the site. |
| Survey information (LDM 10) | Legal description or boundary line survey Existing topography | Legal description on Sheet 1 Topographical survey is on Sheet C-2.0 | Yes | |
| Existing plant material Existing woodlands or wetlands (LDM 10) | Show location type and size. Label to be saved or removed. Plan shall state if none exists. | Tree survey is shown on Sheet C2.0. Removals are indicated on same sheet. Tree chart is shown on Sheet L- 1.0 There are no wetlands or regulated woodlands on the site | • Yes • Yes • Yes • Yes | As there are no regulated trees being removed (not 36" dbh or greater and not in a regulated woodland), no replacements are required for any trees removed from the site. Trees #1286 and #1287 are shown as being saved, but it appears that #1287 will be significantly impacted by the grading. Please revise the grading or show it as being removed. Any of those offsite trees that are negatively impacted by the sewer line construction must be replaced with similar plant material. Please add a note to that effect to the relevant plan sheet and the landscape plan. |
| Soil types (LDM10) | • <u>As determined by Soils</u> <u>survey of Oakland</u> | Sheet L-1.0Entire site is | Yes | |

| Item | Required | Proposed | Meets Code | Comments |
|--|---|---|----------------|---|
| | <u>county</u> • <u>Show types,</u> <u>boundaries</u> | Marlette sandy Ioam | | |
| Existing and proposed improvements (LDM 10) | Existing and proposed buildings, easements, parking spaces, vehicular use areas, and R.O.W | Yes | Yes | Please extend the "finger" between the west drive and the drive-thru lanes as much as possible to the north to increase the amount of greenspace on the site. |
| Existing and proposed utilities (LDM 10) | Overhead and underground utilities, including hydrants Show all existing and proposed lightposts on the site. | All utility lines and structures are shown on the landscape plan. Proposed lighting is shown | • Yes • Yes | Please show the utility easement boundary lines on the landscape plan so it is clear where trees shouldn't be planted. |
| Proposed grading. 2' contour minimum (LDM 10) | Provide proposed contours at 2' interval | Sheets 4 and 4.1 No berms are proposed | • Yes • No | A landscape waiver is requested for the lack of the required berms. |
| Snow deposit (LDM 10) | Show snow deposit areas on plan | Yes | Yes | |
| LANDSCAPING REQUIRE | MENTS | | | |
| Parking Area Landscap | e Requirements (Zoning Se | c 5.5.3.C and LDM 5) | | |
| General requirements (LDM 5) | Clear sight distance within parking islands No evergreen trees | Clear vision zones shown for all entries | Yes | <u>The clear zone is not</u> <u>required at the drive-</u> <u>thru lanes for this layout.</u> |
| Name, type and number of ground cover (LDM 5) | As proposed on planting islands | Groundcovers for all areas are indicated with different hatching patterns. | Yes | |
| General (Zoning Sec 5. | 5.3.C) | | | |
| Parking lot Islands | A minimum of 200 SF to qualify A minimum of 200sf unpaved area per tree planted in an island 6" curbs Islands minimum width 10' BOC to BOC | All islands appear to be sufficiently large but their areas in SF are not provided | Yes/No | Please add SF area tags for all areas to be counted toward the parking lot interior requirement. The island at the northeast corner of the building with the hydrant does not provide enough room for the tree there. Please move the sidewalk or enlarge the island to provide sufficient room and green space for that tree. |

| ltem | Required | Proposed | Meets Code | Comments |
|--|---|---|----------------|---|
| Curbs and Parking stall reduction (Zoning Sec 5.3.12) | Parking stall can be reduced to 17' and the curb to 4" adjacent to a sidewalk of minimum 7 ft. | Spaces are shown as 17' long where they abut greenspace and 19 feet long when they abut a 5-foot sidewalk | Yes | |
| Contiguous space limit (Zoning sec 5.5.3.C) | Maximum of 15 contiguous spaces | 15 spaces, plus the 2-space access way for the dumpster, is the maximum bay length | No | Please add a 200sf landscaped island in the long bay north of the building, east or west of the dumpster entry, to break up the long bay. A landscape waiver would be required for the long bay. It would not be supported by staff. |
| Plantings around Fire Hydrant (Zoning sec 5.5.3.C) | No plantings with matured height greater than 12' within 10 ft. of fire hydrants Plant trees at least 5 ft from water and storm lines and 10 feet from sanitary lines. Plantings near hydrants or FDCs should be no taller than 12" | One hydrant is shown northeast of the building. A Fire Department Connection is shown on the north side of the building with a note indicating that the plantings in front of it shall not be taller than 12". | • Yes • Yes | |
| Landscaped area (Zoning sec 5.5.3.C) | Areas not dedicated to parking use or driveways exceeding 100 sq. ft. shall be landscaped | Yes | Yes | |
| | DS-2, OSC, OST, B-1, B-2, B-3 district (Zoning Sec 5.5.3.C) | | C-1, RC, Sp | ecial Land Use or non- |
| A = Total square footage of vehicular use areas up to 50,000sf x 7.5% | A = x sf * 7.5 % = A sf 11911 * 7.5% = 893 sf | Calculations proposed | No | Please correct the calculation to remove the subtraction part. That is incorrect. |
| B = Total square footage of additional paved vehicular use areas (not including A or B) over 50,000 SF) x 1 % | B = x sf * 1% = B sf (xxx - 50000) * 1% = xx sf | NA | | |
| | 1-2 (Zoning Sec 5.5.3.C) | | | |
| A. = Total square footage of vehicular | A = x sf * 6% = A sf | NA | | |

| Item | Required | Proposed | Meets Code | Comments |
|--|--|---|---|---|
| use area up to 50,000 sf x 5% | | | | |
| B = Total square footage of additional paved vehicular use areas over 50,000 SF x 0.5% | B = 0.5% x 0 sf = B SF | NA | | |
| All Categories | | | | |
| C = A+B Total square footage of landscaped islands | • C = A + B • C = 893 + 0 = 893 SF | 514 sf | No | A waiver is required for the deficiency. It would not be supported by staff. Please provide all of the required area. |
| D = C/200 Number of canopy trees required | D = C/200 trees 893/200 = 4 Trees | 3 trees | No | A waiver is required for the deficiency. It would not be supported by staff. Please provide all of the required trees. |
| Perimeter Green space (Zoning Sec 5.5.3.C) | 1 Canopy tree per 35 lf North side: 192/35 = 5 trees South side: 65/35 = 2 trees | North side: 8 trees South side: 1 tree | • Yes • No | Please move one of the northern perimeter trees so there are two perimeter trees west of the dumpster. |
| Accessway perimeter (Zoning Sec 5.5.3.C) | 1 canopy tree per 35 lf on each side of road, less widths of access drives. West accessway: (228+150)/35 = 11 trees Drive-thru accessway including east edge of northeastern accessway: • Inner edge: (128 + 36+35+95)/35 = 6 trees • Outer edge: 530/35 = 15 trees Northeastern accessway • 95/35 = 2 trees | Exterior accessway Only 6 feet is provided between the drive and the property line. 11 trees are provided along the drive Drive-thru accessway Inner edge: 6 trees Outer edge: 18 trees (3 shared with western outer drive) Northeastern accessway West side of northeastern accessway drive: 1 tree | • No • Yes • Yes • Yes • No | Please shift the drive over 4 feet to provide the required 10 feet of space. A waiver for the space deficiency is required for the proposed layout. It would only be supported if Engineering and/or Traffic determine that the entry cannot be shifted. Please spread the trees along the western access drive out so they reach the start of the clear vision zone, are fairly equally spaced and don't crowd the tree on the adjoining property. Please move the red oak near the north entrance east to |

| ltem | Required | Proposed | Meets Code | Comments |
|--|--|---------------------------|---------------|---|
| | | | | within 10 feet of the accessway curb. 4. If possible, please extend the greenspace in the interior drive-thru island in place of at least some of the striped pavement west of the island to increase the site's green space. 5. A waiver to not provide 1 tree along the outer edge of the interior drive within the watermain easement would be supported by staff. |
| Berms (Zoning Sec 5.5 | .3.A & LDM 1) | | | sopponed by sidn. |
| Berm should be loca Berms should be con | a maximum slope of 33%. G ated on lot line except in cor nstructed with 6" of topsoil. To Non-residential (Sec 5.5.3. The site is not adjacent to residential property so | A & LDM 1.a) | | |
| (Zoning Sec 5.5.A) | this screening berm is not required. | None | Yes | |
| Adjacent to Public Rig | hts-of-Way (Sec 5.5.3.B and | LDM 1.b) | | |
| Berm requirements (Zoning Sec 5.5.3.A.(5)) | An undulating berm a minimum 2 feet high with a 3-foot-wide crest is required | No berm is proposed | No | A landscape waiver is required for the lack of a berm. As a screening hedge is proposed for most of the frontages, it would be supported by staff. |
| Cross-Section of Berm | s (LDM 10) | | | |
| Slope, height and width | Label contour lines Maximum 33% Min. 3 feet flat horizontal area Minimum 3 feet high Constructed of loam with 6' top layer of topsoil. | No berms are proposed. | | |
| Type of Ground Cover | | NA | | |
| Walls (Zoning Sec 5.5.3 | 3.A & LDM 10) | | | |
| Material, height and | Freestanding walls | No walls are | TBD | |
| | | | | |

| Required | Proposed | Meets Code | Comments |
|--|---|---|--|
| should have brick or stone exterior with masonry or concrete interior | indicated | | |
| | NA | | |
| ning Requirements (Zoning | Sec 5.5.3.B.ii) | | |
| Adj to Parking: 20 ft. | Novi Road: 20 ft West Oaks Dr: 20 ft | YesYes | |
| Adj to Parking: 2 ft. | None | No | As noted above, a landscape waiver is required for the lack of a berm. As a screening hedge is proposed for most of the frontage, it would be supported by staff |
| Adj to Parking: 3 ft. | None | No | See above |
| (2)(3)(4) | No | | |
| Adj to Parking: 1 tree per 35 lf Novi Road: 217/35 = 6 trees West Oaks Dr: 286/35 = 8 trees | Novi Road: 7 trees (double-counted accessway perimeter trees) West Oaks Dr: 8 trees (8 double- counted accessway perimeter trees). | • Yes • Yes | |
| Adj to Parking: 1 tree per 20 lf Novi Road: 217/20 = 11 trees West Oaks Dr: 286/20 = 14 trees | Novi Road: 11 trees West Oaks Dr: 11 trees | • Yes • No | A waiver to not plant trees within the 75 feet of West Oaks frontage occupied by the water main easement would be supported by staff. |
| Parking & No Parking: 1 tree per 45 lf Novi Road: (217- 120)/45 = 3 trees (120lf is shown as in the RCOC "no plant" zone) West Oaks Dr: (307- 70)/45 = 5 trees | Novi Road: 5 subcanopy trees near overhead wires West Oaks Dr: 6 trees | • Yes • Yes | As the Road Commission does not allow plantings between the sidewalk and road along Novi Road, those trees do not need to be provided at all, but correspondence from RCOC showing that should be provided to the City. |
| | should have brick or stone exterior with masonry or concrete interior Adj to Parking: 20 ft. Adj to Parking: 20 ft. Adj to Parking: 2 ft. (2) (3) (4) • Adj to Parking: 1 tree per 35 lf • Novi Road: 217/35 = 6 trees • West Oaks Dr: 286/35 = 8 trees • West Oaks Dr: 286/35 = 8 trees • West Oaks Dr: 286/20 = 14 trees • Parking & No Parking: 1 tree per 45 lf • Novi Road: (217- 120)/45 = 3 trees (120If is shown as in the RCOC "no plant" zone) • West Oaks Dr: (307- | should have brick or stone exterior with masonry or concrete interiorindicatedImage: Name NaNANameNameAdj to Parking: 20 ft.• Novi Road: 20 ft • West Oaks Dr: 20 ftAdj to Parking: 2 ft.• NoveAdj to Parking: 3 ft.None(2)(3)(4)No• Adj to Parking: 1 tree per 35 lf• Novi Road: 7 trees (double-counted accessway perimeter trees)• Novi Road: 217/35 = 6 trees• Novi Road: 7 trees (double-counted accessway perimeter trees).• Adj to Parking: 1 tree per 20 lf• Novi Road: 11 trees• Novi Road: 217/20 = 11 trees• Novi Road: 11 trees• Novi Road: 217/20 = 11 trees• Novi Road: 11 trees• Novi Road: 217/20 = 11 trees• Novi Road: 5 subcanopy trees near overhead wires• Parking & No Parking: 1 tree per 45 lf • Novi Road: (217- 120)/45 = 3 trees (120lf is shown as in the RCOC "no plant" zone)• Novi Road: 5 subcanopy trees near overhead wires • West Oaks Dr: 6 trees | RequiredProposedCodeshould have brick or stone exterior with masonry or concrete interiorindicatedCodeNANANAIng Requirements (Zoning Sec 5.5.3.B.i)NAAdj to Parking: 20 ft.• Novi Road: 20 ft • West Oaks Dr: 20 ft• Yes • YesAdj to Parking: 21 ft.NoneNoAdj to Parking: 3 ft.NoneNo(2)(3)(4)No-• Adj to Parking: 1 tree per 35 lf• Novi Road: 7 trees (double-counted accessway perimeter trees)• Yes • Yes• Novi Road: 217/35 = 6 trees• Novi Road: 7 trees (double-counted accessway perimeter trees)• Yes • Yes• Novi Road: 217/20 = 11 trees• Novi Road: 11 trees• Yes • Novi Road: 217/20 = 11 trees• Novi Road: 217/20 = 14 trees• Novi Road: 5 subcanopy trees near overhead wires• Yes • Yes• Parking & No Parking: 1 tree per 45 lf • Novi Road: (217- 120)/45 = 3 trees (120lf is shown as in the RCOC "no plant" zone)• Novi Road: 5 subcanopy trees near overhead wires • West Oaks Dr: 6 trees• Yes |

| Item | Required | Proposed | Meets Code | Comments |
|---|--|--|----------------|---|
| Screening of outdoor storage, loading/unloading (Zoning Sec. 3.14, 3.15, 4.55, 4.56, 5.5) | The loading zone must be screened from roads | The proposed loading zone is partially blocked by greenbelt plantings from view of West Oaks Drive. | TBD | The proposed shrubs will not attain a height sufficient to screen trucks in the loading zone from West Oaks and Novi Road. Please switch those plantings to taller, fuller species that will provide the required screening. As they are, a landscape waiver would be required. It would not be supported by staff. |
| Transformers/Utility boxes (LDM 6) | A minimum of 2ft. separation between box and the plants Ground cover below 4" is allowed up to pad. No plant materials within 8 ft. from the doors | No transformer is shown | TBD | When transformer locations are finalized, screening shrubs per standard detail are required. Please add the City utility box screening detail to plans. City of Landscape Note #13 should read 4 sides should be screened, not 3. |
| Building Foundation Lar | ndscape Requirements (Zor | ning Sec 5.5.3.D) | | |
| Interior site landscaping SF (Zoning Sec 5.5.3.D) | Equal to the entire perimeter of the building x 8. A: (283-16.42)If x 8ft = 2,133 SF Planting beds should have a minimum width of 4 ft. | 2192 sf – not noted | TBD | Shaded areas indicate that sufficient area is provided but the areas' SF is not provided. Please label all foundation landscape areas with their SF so the calculation can be verified. |
| Building Frontage Landscaping (Zoning Sec 5.5.3.D) | If visible from public street a minimum of 60% of the exterior building perimeter should be covered in green space | Novi Road: 100% West Oaks Dr.: 100% | • Yes • Yes | The greenbelt hedge may be included in the West Oaks Drive frontage calculation since it blocks the view of the building from West Oaks Drive. |
| | sin Requirements (Zoning Se | ec. 5.5.3.E & LDM 3) | | |
| Planting requirements | Clusters of large native | No above-ground | TBD | If above-ground |

| Item | Required | Proposed | Meets Code | Comments |
|--|--|--|---------------|---|
| (Zoning Sec 5.5.3.E & LDM 3) | shrubs shall cover 70- 75% of the basin rim area at 10 lf from permanent water level 10" to 14" tall grass along sides of basin Refer to wetland for basin mix Deciduous canopy tree 1/35 of east, south and west sides of pond at 10 feet from permanent water level | detention is shown | | detention is provided, it must be landscaped per the current ordinance. |
| Phragmites and Japanese Knotweed Control (Zoning Sec 5.5.6.B) | Any and all populations of Phragmites australis and/or Japanese Knotweed on site shall be included on tree survey. Treat populations per MDEQ guidelines and requirements to eradicate the weed from the site. | A note indicates there is none of either weed on the site | Yes | |
| · · · · · · | DETAILS AND GENERAL REQ | | | |
| | ize City of Novi Standard No | | | |
| Installation date (LDM 10) | Provide intended date | Between Mar 15 and Nov 15 | Yes | |
| Maintenance & Statement of intent (Zoning Sec 5.5.6 & LDM 10) | Include statement of intent to install and guarantee all materials for 2 years. Include a minimum one cultivation in June, July and August for the 2-year warranty period. | Both notes are provided | Yes | |
| Plant source (LDM 10 & 11) | Shall be northern nursery grown, No.1 grade. | Northern nursery | Yes | |
| Irrigation plan (LDM 10) | A fully automatic irrigation system or a method of providing sufficient water for plant establishment and survival is required on Final Site Plans. If irrigation won't be used, note how trees will get sufficient water for establishment and | Provided | TBD | The irrigation plan will be reviewed by our cross-connection specialist. |

| ltem | Required | Proposed | Meets Code | Comments |
|---|---|--|---------------|--|
| | long-term survival | | | |
| Establishment period (Zoning Sec 5.5.6 & LDM 10) | 2 yr. Guarantee | Yes | Yes | If the developer does only requires a 1-year guarantee from their contractor, then Landscape Note #7 can remain as is, but the developer is responsible for a 2-year guarantee. |
| Approval of substitutions. (Zoning Sec 5.5.5 & LDM 10) | City must approve any substitutions in writing prior to installation. | Yes | Yes | |
| Plant List (LDM 10 & 11) | – Include all cost estimates | 5 | | |
| Quantities and sizes | | Yes | Yes | |
| Root type | | Yes | Yes | |
| Botanical and common names (LDM 4 & 11) | At least 50% of species used shall be native to Michigan Tree diversity shall follow guidelines of LDM Section 4 | 14 of 19 species (74%) are native to Michigan. Too many red maples are used (21%). | • Yes • No | <u>Please reduce the</u> <u>number of red</u> <u>maples used to no</u> <u>more than 12 (15%).</u> <u>This can be done by</u> <u>adding a species or</u> <u>using more of the</u> <u>species with less than</u> <u>12 trees on the site.</u> |
| Type and amount of lawn | | Different groundcovers are indicated with hatching Areas (in SF) of seed and sod are not indicated. | Yes | |
| Cost estimate (LDM 10) | For all new plantings, mulch and sod as listed on the plan | No | | <u>Please add to final</u> <u>site plan.</u> <u>Areas and costs of</u> <u>seed, sod and mulch</u> <u>should be included in</u> <u>the cost estimate.</u> <u>Use these standard</u> <u>costs:</u> <u>Canopy tree:</u> <u>\$400 ea</u> <u>Lg evergreen:</u> <u>\$375 ea</u> <u>Ornamental:</u> \$375 <u>ea</u> <u>Shrub:</u> \$50 ea <u>Perennial/orname</u> <u>ntal grass:</u> \$15 ea |

| Item | Required | Proposed | Meets Code | Comments |
|---|--|--|---------------|--|
| | | | | <u>Grass seed: \$3/syd</u> <u>Sod: \$6/syd</u> <u>Mulch: \$35/cyd</u> |
| Planting Details/Info (LE | DM Part III) – Utilize City of N | ovi Standard Details | | |
| Canopy Deciduous Tree | - | Yes | Yes | |
| Evergreen Tree | | No | No | Please add if any evergreen trees will be used. |
| Multi-stem Tree | Refer to LDM for detail | No | TBD | Please add if any multi- stem trees will be used. |
| Shrub | drawings | Yes | Yes | |
| Perennial/ Ground Cover |] | Yes | Yes | |
| Tree stakes and guys. (Wood stakes, fabric guys) | | Yes | Yes | |
| Tree protection fencing | Located at Critical Root Zone (1' outside of dripline) | 2 on-site trees are shown as being saved but no tree fencing around them is shown. Tree protection detail is on L-1.0 | • No • Yes | Please show protective tree fence on the Demolition and/or Soil Erosion Control plan to protect any saved trees or trees on adjacent properties within 50 feet of disturbance, including off-site trees near the sanitary sewer extension. |
| Other Plant Material Re | quirements (LDM 11) | • | · | |
| General Conditions | Plant materials shall not be planted within 4 ft. of property line | The trees west of the west drive are within 4 feet | No | Please move the drive eastward to provide the required spacing. |
| Landscape tree credit (LDM 11) | Substitutions to landscape standards for preserved canopy trees outside woodlands/ wetlands should be approved by LA. Refer to Landscape tree Credit Chart in LDM | None proposed | | |
| Plant Sizes for ROW, Woodland replacement and others (LDM 11) | Size determined by use detailed in LDM Table 11.b.(2)a.i Indicate on plant list | On plant list | Yes | |
| Plant size credit (LDM 11) | NA | No | | |
| Prohibited Plants (LDM 11.b) | No plants on City Invasive Species List | No prohibited plants are | Yes | |

| Item | Required | Proposed | Meets Code | Comments | |
|---|---|---|---------------|---|--|
| | | proposed | | | |
| Recommended trees for planting under overhead utilities (LDM 11) | Label the distance from the overhead utilities | Overhead lines are shown along Novi Road Subcanopy trees are proposed as street trees there. | Yes | The subcanopy street trees are not required if the RCOC does not allow street trees between the sidewalk and road. | |
| Nonliving Durable Material: Mulch (LDM 12) | Trees shall be mulched to 3"depth and shrubs, groundcovers to 2" depth Specify natural color, finely shredded hardwood bark mulch. Include in cost estimate. | On details | Yes | | |

NOIES:

1. This table is a working summary chart and not intended to substitute for any Ordinance or City of Novi requirements or standards.

2. The section of the applicable ordinance or standard is indicated in parenthesis. For the landscape requirements, please see the Zoning Ordinance landscape section 5.5 and the Landscape Design Manual for the appropriate items under the applicable zoning classification.

3. Please include a written response to any points requiring clarification or for any corresponding site plan modifications to the City of Novi Planning Department with future submittals.

TRAFFIC REVIEW

ΑΞϹΟΜ

AECOM 39575 Lewis Dr, Ste. 400 Novi MI, 48377 USA aecom.com

Project name: JSP23-37 – Culver's 2nd Revised Preliminary Traffic Review

From: AECOM

Date: June 4, 2024

To: Barbara McBeth, AICP City of Novi 45175 10 Mile Road Novi, Michigan 48375

CC:

Lindsay Bell, Humna Anjum, Diana Shanahan, James Hill, Adam Yako, Heather Zeigler, Dan Commer

Memo

Subject: JSP23-37 - Culver's 2nd Revised Preliminary Traffic Review

The 2nd revised preliminary site plan was reviewed to the level of detail provided and AECOM recommends **approval** as long as the comments and deviations provided below are adequately addressed to the satisfaction of the City.

GENERAL COMMENTS

- 1. The applicant, Union Pacific Holdings, LLC, is proposing a 4,106 SF Culver's restaurant.
- 2. The development is located on the south side of Karevich Drive, north of West Oaks Drive and west of Novi Road. Karevick Drive and West Oaks Drive are under the jurisdiction of the City of Novi. Novi Road is under the jurisdiction of the Road Commission for Oakland County.
- 3. The site is zoned RC (Regional Center) with PD-2 option.
- 4. There following traffic related deviations may be required if plans are not revised:
 - a. Below standard radius at one driveway.
 - b. Potential below standard bicycle parking layout.
 - c. Potential below minimum clear path width to bicycle parking.
- 5. The applicant has indicated the following deviations will be requested:
 - a. Dumpster location.

TRAFFIC IMPACTS

1. AECOM performed an initial trip generation based on the ITE Trip Generation Manual, 11th Edition, as follows.

ITE Code: 934 – Fast-Food Restaurant with Drive-Through Window Development-specific Quantity: 4,106 GLA Zoning Change: None

| Trip Generation Summary | Estimated Trips | Estimated Peak- Direction Trips | City of Novi Threshold | Above Threshold? |
|-------------------------------|-----------------|------------------------------------|---------------------------|---------------------|
| AM Peak-Hour Trips | 183 | 93 | 100 | No |
| PM Peak-Hour Trips | 135 | 70 | 100 | No |
| Daily (One-Directional) Trips | 1,917 | N/A | 750 | Yes |

2. The City of Novi generally requires a traffic impact study/statement if the number of trips generated by the proposed development exceeds the City's threshold of more than 750 trips per day or 100 trips per either the AM or PM peak hour, or if the project meets other specified criteria.

| Trip Impact Study Recommendation | | | | | | |
|----------------------------------|--|--|--|--|--|--|
| Type of Study: | Justification | | | | | |
| Traffic Impact Study | A revised traffic study was submitted and approved with no pending comments. Revised TIS: An evaluation of the parking related to the proposed development was completed following the city zoning ordinance. This calculates to 48 spaces. The development is proposing 48 parking spaces, which meets the City's zoning ordinance. | | | | | |

TRAFFIC REVIEW

The following table identifies the aspects of the plan that were reviewed. Items marked O are listed in the City's Code of Ordinances. Items marked with ZO are listed in the City's Zoning Ordinance. Items marked with ADA are listed in the Americans with Disabilities Act. Items marked with MMUTCD are listed in the Michigan Manual on Uniform Traffic Control Devices.

The values in the 'Compliance' column read as 'met' for plan provision meeting the standard it refers to, 'not met' stands for provision not meeting the standard and 'inconclusive' indicates applicant to provide data or information for review and 'NA' stands for not applicable for subject Project. The 'remarks' column covers any comments reviewer has and/or 'requested/required variance' and 'potential variance'. A potential variance indicates a variance that will be required if modifications are not made or further information provided to show compliance with the standards and ordinances. The applicant should put effort into complying with the standards; the variances should be the last resort after all avenues for complying have been exhausted. Indication of a potential variance does not imply support unless explicitly stated.

| EXT | EXTERNAL SITE ACCESS AND OPERATIONS | | | | | | |
|-----|---|-------------------------------------|---------------|--|--|--|--|
| No. | Item | Proposed | Compliance | Remarks | | | |
| 1 | Driveway Radii O <u>Figure IX.3</u> | 6', 30' and matching existing | Partially Met | 6' does not meet 15' minimum requirement. A mountable concrete median drive approach has been added. The applicant has not indicated if they will be requesting a deviation. Provide truck turning movements for anticipated delivery trucks that need to get to the loading zone. | | | |
| 2 | Driveway Width O Figure IX.3 | 28.5' and 36' | Met | Within range. | | | |
| 3 | Driveway Taper O Figure IX.11 | | | | | | |
| 3a | Taper length | - | N/A | | | | |
| 3b | Tangent | - | N/A | | | | |
| 4 | Emergency Access O <u>11-194.a.19</u> | 2 access points | Met | | | | |

| EXT | EXTERNAL SITE ACCESS AND OPERATIONS | | | | | |
|-----|--|---|---------------|---|--|--|
| No. | Item | Proposed | Compliance | Remarks | | |
| 5 | Driveway sight distance O <u>Figure</u> | Not indicated | N/A | For major through roads. | | |
| 6 | Driveway spacing | | | | | |
| 6a | Same-side O <u>11.216.d.1.d</u> | - | N/A | | | |
| 6b | Opposite side O <u>11.216.d.1.e</u> | - | N/A | | | |
| 7 | External coordination (Road agency) | - | N/A | No changes proposed to Novi Road. | | |
| 8 | External Sidewalk <u>Master Plan &</u> <u>EDM</u> | Proposed 8' walk along Novi Road and 5' connection to site | Met | | | |
| 9 | Sidewalk Ramps EDM 7.4 & R-28-K | Indicated | Partially Met | Include standard detail R- 28-K in future submittal. | | |
| 10 | Any Other Comments: | | | | | |

| INTERNAL SITE | ODEDATIONS |
|---------------|------------|
| | UPERALIUNS |

| | RNAL SITE OPERATIONS | | | |
|-----|--|---|------------|--|
| No. | Item | Proposed | Compliance | Remarks |
| 11 | Loading zone <u>ZO 5.4</u> | 500 SF required, 1,010 proposed | Met | |
| 12 | Trash receptacle <u>ZO 5.4.4</u> | Proposed directly next to the building on the west side | Not Met | The applicant is requesting a deviation for location of dumpster. |
| 13 | Emergency Vehicle Access | Turning movements provided | Met | |
| 14 | Maneuvering Lane <u>ZO 5.3.2</u> | 20' and 30' | Met | |
| 15 | End islands ZO 5.3.12 | | | |
| 15a | Adjacent to a travel way | Dimensioned | Met | 3' shorter than adjacent space. |
| 15b | Internal to parking bays | Provided | Met | Internal islands not required to be 3' shorter than adjacent parking. |
| 16 | Parking spaces <u>ZO 5.2.12</u> | 56 including 3 accessible spaces | | See Planning review letter. The site data table lists 53 spaces but the site plan total shows 56 spaces. |
| 17 | Adjacent parking spaces <u>ZO</u> <u>5.5.3.C.ii.i</u> | <15 spaces in all parking bays | Met | |
| 18 | Parking space length <u>ZO 5.3.2</u> | 17' and 19' perpendicular spaces, 18' angled spaces, 21' minimum parallel spaces | Met | |

| INTE | INTERNAL SITE OPERATIONS | | | | | |
|------|--|-------------------------------------|---------------|---|--|--|
| No. | Item | Proposed | Compliance | Remarks | | |
| 19 | Parking space Width <u>ZO 5.3.2</u> | 8' parallel spaces and 9' | Met | | | |
| 20 | Parking space front curb height <u>ZO</u> <u>5.3.2</u> | Not Indicated | Inconclusive | Provide in future submittal, 6" standard in front of 19' parking spaces, 4" standard with 2' overhang in front of 17' spaces. Provide detail of bumper blocks in future submittal. | | |
| 21 | Accessible parking – number ADA | 3 | Met | | | |
| 22 | Accessible parking – size <u>ADA</u> | 8' with 5' or 8' aisle | Met | | | |
| 23 | Number of Van-accessible space ADA | 1 | Met | | | |
| 24 | Bicycle parking | | | | | |
| 24a | Requirement <u>ZO 5.16.1</u> | 4 required, 4 proposed | Met | | | |
| 24b | Location <u>ZO 5.16.1</u> | Provided | Met | | | |
| 24c | Clear path from Street <u>ZO 5.16.1</u> | 6' required | Inconclusive | Dimension the width of the sidewalk from the crosswalk to the bicycle parking to ensure the 6' requirement is met. | | |
| 24d | Height of rack <u>ZO 5.16.5.B</u> | 3' required | Inconclusive | Provide in future submittal. | | |
| 24e | Other (Covered / Layout) <u>ZO 5.16.1</u> | Not dimensioned | Not Met | Refer to Text Amendment 18.301 for updated layout requirements. | | |
| 25 | Sidewalk – min 5' wide <u>Master Plan</u> | 5' | Met | | | |
| 26 | Sidewalk ramps <u>EDM 7.4 & R-28-K</u> | Not indicated at accessible spaces. | Inconclusive | Label on plan and provide detail in future submittal. | | |
| 27 | Sidewalk – distance back of curb EDM 7.4 | - | N/A | | | |
| 28 | Cul-De-Sac O Figure VIII-F | - | N/A | | | |
| 29 | EyeBrow O Figure VIII-G | - | N/A | | | |
| 30 | Stacking Spaces <u>ZO 5.3.11.1</u> | Partially dimensioned | Partially Met | Dimension length of stacking space in future submittal. | | |
| 31 | Any Other Comments:Minimum 25' drive-through lane centerline radius provided. 48 parking spaces are required; the applicant could remove the 8 parallel parking spaces along the back of the site (or at least the 4 right in front of the drive-thru) since those spaces could interfere with drive-thru traffic. | | | | | |

| SIG | SIGNING AND STRIPING | | | | | | | |
|-----|-------------------------------------|--------------|------------|------------------------------------|--|--|--|--|
| No. | Item | Proposed | Compliance | Remarks | | | | |
| 32 | Signing: Sizes MMUTCD | Not included | Not Met | Include in future submittal. | | | | |
| 33 | Signing table: quantities and sizes | Not included | Not Met | Include table in future submittal. | | | | |

| SIG | SIGNING AND STRIPING | | | | | | |
|-----|--|---|---------------|--|--|--|--|
| No. | Item | Proposed | Compliance | Remarks | | | |
| 34 | Signs 12" x 18" or smaller in size shall be mounted on a galvanized 2 lb. U- channel post <u>MMUTCD</u> | Not indicated | Not Met | Include in future submittal. | | | |
| 35 | Signs greater than 12" x 18" shall be mounted on a galvanized 3 lb. or greater U-channel post <u>MMUTCD</u> | Not indicated | Not Met | Include in future submittal. | | | |
| 36 | Sign bottom height of 7' from final grade <u>MMUTCD</u> | Not indicated | Not Met | Include in future submittal. | | | |
| 37 | Signing shall be placed 2' from the face of the curb or edge of the nearest sidewalk to the near edge of the sign <u>MMUTCD</u> | Not included | Not Met | Include in future submittal. | | | |
| 38 | FHWA Standard Alphabet series used for all sign language <u>MMUTCD</u> | Not included | Not Met | Include in future submittal. | | | |
| 39 | High-Intensity Prismatic (HIP) sheeting to meet FHWA retro-reflectivity MMUTCD | Not included | Not Met | Include in future submittal. | | | |
| 40 | Parking space striping notes | 4" proposed | Partially Met | Indicate color of all proposed markings in future submittal. | | | |
| 41 | The international symbol for accessibility pavement markings ADA | Not included | Not Met | Include detail in future submittal. | | | |
| 42 | Crosswalk pavement marking detail | Not included | Not Met | Include in future submittal. | | | |
| 43 | Any Other Comments: | Provide details for arrows, drive-thru, stop, and hatched pavement markings. The applicant should indicate the reason for the left turn-only sign after the drive-thru with the two-way street in front. | | | | | |

Note: Hyperlinks to the standards and Ordinances are for reference purposes only, the applicant and City of Novi to ensure referring to the latest standards and Ordinances in its entirety.

Should the City or applicant have questions regarding this review, they should contact AECOM for further clarification.

Sincerely,

AECOM

Paulo K. Johnson

Paula K. Johnson, PE Senior Transportation Engineer

Saumin Shal

Saumil Shah, PMP Project Manager

FIRE REVIEW



CITY COUNCIL

Mayor Justin Fischer

Mayor Pro Tem Laura Marie Casey

Dave Staudt

Brian Smith

Ericka Thomas

Matt Heintz

Priya Gurumurthy

City Manager Victor Cardenas

Director of Public Safety Chief of Police Erick W. Zinser

Fire Chief John B. Martin

Assistant Chief of Police Scott R. Baetens

Assistant Fire Chief Todd Seog

Novi Public Safety Administration 45125 Ten Mile Road Novi, Michigan 48375 248.348.7100 248.347.0590 fax

cityofnovi.org

June 3, 2024

TO: Barbara McBeth - City Planner Lindsay Bell - Plan Review Center James Hill – Plan Review Center Heather Zeigler – Plan Review Center Dan Commer – Plan Review Center Diana Shanahan – Planning Assistant

RE: Culver's

PSP# 23-055

PreApp# 23-0018 PSP#23-055 JSP#23-37

Project Description:

Build a 4,060 Sq. Ft. structure off West Oaks Dr.

Comments:

- All fire hydrants **MUST** be installed and operational prior to any combustible material is brought on site. IFC 2015 3312.1
- For new buildings and existing buildings, you **MUST** comply with the International Fire Code Section 510 for Emergency Radio Coverage. This shall be completed by the time the final inspection of the fire alarm and fire suppression permits.
- <u>Completed 6-3-24 KSP-</u> The minimum width of a posted fire lane is 20 feet. The minimum height of a posted fire lane is 14 feet. (D.C.S Sec. 158-99(a).)
- <u>Completed 6-3-24 KSP-</u> Fire apparatus access drives to and from buildings through parking lots shall have a minimum fifty (50) feet outside turning radius and designed to support a minimum of thirty-five (35) tons. (D.C.S. Sec 11-239(b)(5))
- <u>**RECEIVED 12/22/23**</u> A hazardous chemical survey is required to be submitted to the Planning & Community Development Department for distribution to the Fire Department at the time any Preliminary Site Plan is submitted for review and approval. Definitions of chemical types can be obtained from the Fire Department at (248) 735-5674.
- <u>COMPLETED 12/22/23</u> Watermains and fire hydrant shall be put on the plans for review.
- Water mains greater than 25', shall be at least 8" in diameter. Shall be put on plans for review. (D.S.C. Sec.11-68(C)(1)(c)

<u>Recommendation</u>: Approved with Conditions

Sincerely,

Kevin S. Pierce-Fire Marshal City of Novi – Fire Dept.

file cc:



CITY OF NOVI Department of Public Services Water & Sewer Division 26300 Lee BeGole Dr. Novi, Michigan 48375 248.735.5661 Phone / 248.735.5659 Fax cityofnovi.org

Date: 06/07/2024

IRRIGATION SYSTEM / CONNECTION TO PUBLIC WATER SUPPLY

Project Name: Culvers W. Oaks Dr at Novi Rd

Drawings and Revision Dates Reviewed:

- Revision date: 05/09/24
- List of Drawings: IR-1, IR-3

Plan Review:

Not approved

Point of Connection [POC] Identified: Yes,1 ½" off domestic. IR-1 reference notes 1. Please clarify the notation on plans means before building containment RPZ. Irrigation to have own RPZ.

Expansion of existing irrigation system or new system: New

Reduced Pressure Zone Assembly (RPZ) proposed protective assembly: Yes

RPZ's must be installed as the required protective assembly unless circumstances warrant the installation of a Pressure Vacuum Breaker (PVB) assembly for protection of the public water supply. PVB's must have specific approval from the Water & Sewer Cross Connection Specialist or Water & Sewer Manager for such installations and such approval with conditions of approval documented on the drawings.

Comments: Febco 1 1/2" 825Y RPZ in legend on IR-1

| Backflow preventer attached to building or common area: | Building |
|---|----------|
| Backflow preventer riser diagram provided: | Yes |

Comments: IR-3

Detail provided showing installation meets manufacturer winterization requirements per city handout:

Yes

Comments: IR-1 reference notes 3.

The following notation provided:

No

Required RPZ must be ASSE 1013 listed as a complete assembly including shutoff valves. Assembly required to be installed by a licensed plumbing contractor. Plumbing permit is required. New assembly must be tested after installation by a licensed plumber also ASSE 5110 Certified to test. Results must be recorded on the City of Novi test report form with a copy sent to the Novi Water & Sewer Division. RPZ must be installed not less than 12-inches above FINISHED GRADE measured from the bottom of the pressure relieve valve. Assemblies must be incompliance with the Michigan Plumbing Code, manufacturer installation instructions including winterization and ASSE listing approvals for orientation, valves, etc.

Please feel free to contact us at 248-735-5661 with any questions you may have.

Sincerely, Linda Slepetski Water & Sewer Division



CITY OF NOVI Department of Public Services Water & Sewer Division 26300 Lee BeGole Dr. Novi, Michigan 48375

248.735.5661 Phone / 248.735.5659 Fax cityofnovi.org

06/07/2024

Culver's of Novi. W.Oaks

Re: Cross Connection Control - New Construction Building Containment Requirements

Project Architect,

Pursuant to the Safe Drinking Water Act, P.A. 399, Part 14 Rules (Rule 1406) and the City of Novi Cross Connection Control Program (CCCP) please be advised of the following requirements.

The Water and Sewer Division is requiring an ASSE 1013 listed and approved Reduced Pressure Zone Assembly (RPZ) to be installed immediately downstream of the water meter in addition to the below requirements.

- The assembly shall be provided in an accessible location with access through a swing door if installed in an enclosed location.
- Access shall be approved by the Water & Sewer Division.
- A floor drain shall be provided in accordance with the Michigan Plumbing Code or Michigan Residential Code and approved by the Community Development Department Plumbing Division.
- Thermal Expansion requirements must be considered in accordance with the Michigan Plumbing Code or Michigan Residential Code and approved by the Community Development Department Plumbing Division.
- If a booster pump is necessary, low pressure cutoff requirements must be addressed in accordance with the Michigan Plumbing Code.

Please feel free to contact us at 248-735-5661 with any questions you may have.

Sincerely,

< 7

Kevin Roby Cross Connection Specialist <u>kroby@cityofnovi.org</u>

FAÇADE REVIEW





January 8, 2024

City of Novi Planning Department

Status: Approved Section 9 Waiver Recommended

45175 W. 10 Mile Rd. Novi, MI 48375-3024

Re: FACADE ORDINANCE - Facade Review – Preliminary Site Plan Culver's, JSP23-37 Façade Region: 1, Zoning District: RC

Dear Ms. McBeth;

The following Facade Review is based on the drawings prepared by Henrickson Architects, dated 10/12/23. The percentages of materials proposed for each façade are as shown on the table below. The maximum percentages allowed by the Façade Ordinance are shown in the right-hand column. Materials in non-compliance with the Façade Chart, if any, are highlighted in bold.

| | North (Front) | East | West | South | Ordinance Maximum (Minimum) |
|---|------------------|------|------|-------|--------------------------------|
| Brick | 23% | 30% | 15% | 47% | 100% (30%) |
| Cultured Stone | 26% | 50% | 50% | 23% | 50% |
| Composite Siding (Simulated Wood) | 31% | 6% | 6% | 18% | 25% |
| EIFS | 7% | 11% | 10% | 4% | 25% |
| Metal Awnings (Simiar to Standing Seam) | 13% | 3% | 19% | 8% | 25% |

As shown above the minimum percentage of Brick is not provided on the north and west elevations and the percentage of Composite Siding exceeds the maximum amount allowed by the Façade Ordinance on the north elevation. In this case the combined percentage of Brick and Stone meets the intent of the Ordinance with respect to the minimum amount of masonry and the comparatively small overage of Composite Siding enhances the design on the north elevation.

The aforementioned deviations are consistent with the intent and purpose of the Façade Ordinance. A Section 9 Waiver for the underage of Brick and overage of Composite Siding is therefore recommended.

The applicant has provided a sample board indicating that all facade materials including the "harbor blue" accents are consistent with Section 5.15.2 of the Ordinance. It should be noted that the blue LED accent lights proposed for the cornice must also comply with Section 5.15.2, which prohibits intense colors.

Notes to the Applicant:

- Façade Ordinance requires façade inspection(s) for all projects. Materials and colors must be consistent with those displayed on the approved sample board or otherwise approved. It is the applicant's responsibility to request the inspection of each façade material at the appropriate time, prior to installation. Inspections may be requested using the Novi Building Department's Online Inspection Portal with the following link. Please click on "Click here to Request an Inspection" under "Contractors", then click "Façade". <u>http://www.cityofnovi.org/Services/CommDev/OnlineInspectionPortal.asp</u>.
- 2. All roof top equipment must be concealed from view from all vantage points both onsite and off-site using extended parapets or roof screens constructed of materials in compliance with the Façade Chart and harmonious with other façade materials.

If you have any questions regarding this review, please do not hesitate to call.

Sincerely, DRN & Architects PC

Douglas R. Necci, AIA

SITE PLAN (Full plan set available for viewing at the Community Development Department)



LADDER TO ALLOW FOR INSTALLATION

| EXTERIOR HOLLOW METAL: | PAINT TO MATCH ''GAUNTLET GRAY'' |
|---------------------------|-----------------------------------|
| REMOVABLE MULLION: | SILVER, TO MATCH ALUMINUM |
| BOLLARD COVER: | ACCESSIBLE BLUE |
| ALUMINUM FRAMES & DOORS: | CLEAR ANODIZED FINISH |
| TRANSITION BASE FLASHING: | PREFINISHED, MATCH UPPER MATERIAL |
| ROOF LADDER: | MILL FINISH, ALUMINUM |
| LIGHT FIXTURES: | SEE ELECTRICAL |

CLADDING ALTERNATE

IN LIEU OF ULTRASHIELD COMPOSITE CLADDING, PROVIDE LONGBOARD CLADDING SYSTEM COMPLETE W/ MFGR, CLIPS & TRIMS, INSTALL ON FURRING STRIPS PER MANUFACTURER SPECIFICATIONS,





S.P.A. EXTERIOR ELEVATIONS PROJECT No. 230626 DRAWN BY JMV 12.27.2023 DATE:





HT 2023-ALL RIGHTS RESERVED. THIS DRAWING REMAINS THE PROPERTY OF HENRICKSON A&P AND IS FOR USE ONLY AS AUTHORIZED BY HENRICKSON A&P

name: K: \DET_DS\268693000_uph culvers_novi_mi\2 Design\CADD\plansheets\C0.0-111LE SHEET.dwg C0.0 May 14, 2024 8: 31pm by: Brock.

DEVELOPER/OWNER UNION PACIFIC HOLDINGS LLC. CHARLES PAISLEY 49169 ALPHA DRIVE WIXOM, MI 48393 TEL: (248) 8600-8365

<u>civil engineer</u> kimley—horn of Michigan, inc.

1000 TOWN CENTER, SUITE 1900

LEGAL DESCRIPTION

TYLER SMITH, P.E.

SOUTHFIELD, MI 48075 TEL: (331) 218-3272

REFER TO SHEET V1.0

LANDSCAPE ARCHITECT KIMLEY-HORN OF MICHIGAN, INC. AUTUMN MCNINCH JOHN ACKERMAN, P.L.A. 1000 TOWN CENTER, SUITE 1900 SOUTHFIELD, MI 48075 TEL: (313) 572-1560

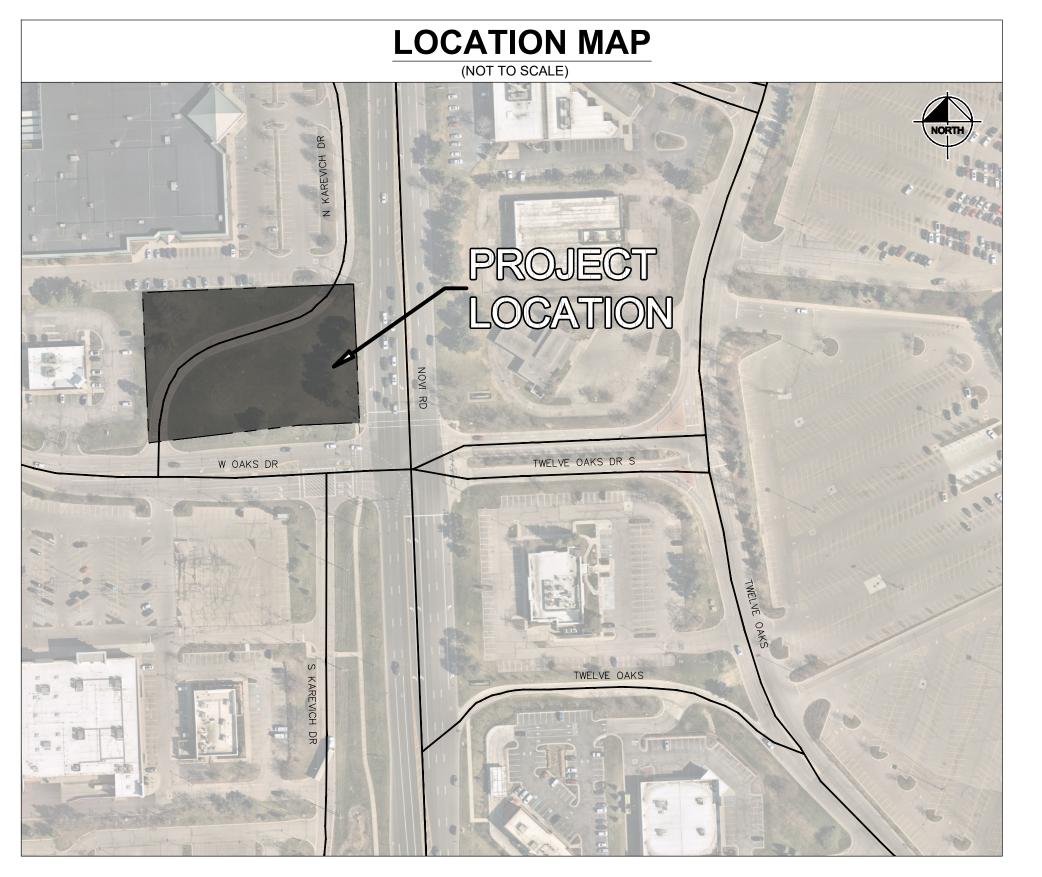
<u>Land surveyor engineer</u> Nowack & fraus engineers

TEL: (248) 332–7931 EMAIL: RFRAUS@NFE–ENGR.COM

46777 WOODWARD AVENUE

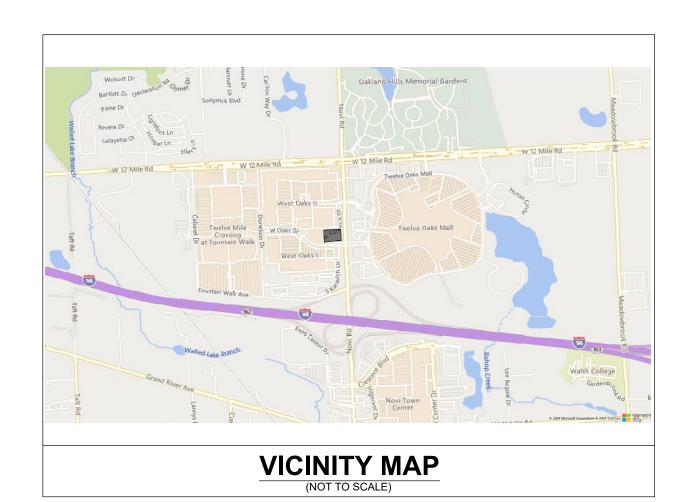
PONTIAC, MI 48342

PRELIMINARY SITE PLANS CULVER'S OF NOVI W OAKS DR AT NOVI ROAD NOVI, MI 48137



OAKLAND

CONSTRUCTION OF A ± 4,100 SF RESTURANT BUILDING FOR UNION PACIFIC HOLDINGS, LLC. PROJECT IS IN THE NE $\frac{1}{4}$ OF SECTION 15, T1N, R8E IN OAKLAND COUNTY, MICHIGAN



Shee C0.0 V1.0 C2.0 C3.0 C3.1 C4.0 C4.1 C5.0 C5.1 C5.2 C5.3 C5.4 C6.0 C6.1 C7.0 C7.1 C8.0 C8.1 L1.0 L1.1 L1.2 L1.3 IR-1

| | | | | | | В |
|----------|---|-----------------|------------------------|-----------------------------|-----------------------------------|----------|
| | | /24 | | | | |
| | | 05/15 | | | | DATE |
| | | | | | | |
| | | Z | | | | |
| | | RESUBMISSION | | | | |
| | | SUBN | | | | S |
| | | - R | | | | EVISIONS |
| | | NOV | | | | RE |
| | | Y OF | | | | |
| | | CITY | | | | |
| | | \triangleleft | | | | O Z |
| | | | <u> </u> | | | |
| | | | HOLD Michigan, Inc. | MICHIGAN | 2 | |
| | | | of Mic | OF MICH | 5550 5550 COM | |
| | | | ey | -HORN | 87– 180. | |
| | | | KIMIey » H | KIMLEY. | FIELD, MI : 630-4. IMLEY-HO | |
| | Sheet List Table | | 2 | ©2024 | PHONE: WWW.KIN | |
| et Numbe | r Sheet Title | NOTED | Y: TES | LDF | | |
| 0 | TITLE SHEET | AS | IGNED BY | A BY: | (ED BY: | |
| 0 | ALTA SURVEY | SCALE | DESIG | DRAWN | CHECKED | |
| 0 | DEMOLITION PLAN | | | | | |
| 0 | SITE PLAN | | | | | |
| 1 | SITE PLAN | | | | | |
| 0 | GRADING PLAN | | | | | |
| 1 | DETAILED GRADING PLAN | | | | | |
| 0 | | _ | | | | _ |
| 1 | UTILTY PLAN - STORM SEWER | | | | | |
| 2 | UTILITY PLAN - STORM SEWER PLAN AND PROFILE | (| S. | RGERS & | | |
| 3 | UTILITY PLAN- SANITARY | | 9 | | | |
| 4 0 | UTILITY PLAN - FIRE PROTECTION STORMWATER MANAGEMENT | | | R | | |
| 0 1 | STORMWATER MANAGEMENT STORMWATER MANAGEMENT DETAILS | | | Ř | | |
| 0 | LIGHTING PLAN | | | | | |
| <u> </u> | LIGHTING DETAILS | | | | | _ |
| 0 | CIVIL DETAILS | | | | | |
| 1 | CIVIL DETAILS | | ŀ | | | |
|)) | EXISTING LANDSCAPE CONDITIONS & REMOVAL | | L | UTEE | | |
| 1 | LANDSCAPE CALCULATIONS | | - | I | | |
| 2 | LANDSCAPE PLAN | | | | | |
| 3 | LANDSCAPE DETAILS | | Ē | | | |
| 1 | IRRIGATION PLANS | | Ĩ | | | |
| | | | I | | | |
| | | | | | | _ |
| | | | | ROAD | | |
| | | | | | | |
| | | | SS | | 137 | |
| | | | ΈF | AT | II 48 | |
| | | | | IVE | NOVI, MI 48137 | |
| | | | CULVERS | DR | Ń | |
| | | | - | N OAKS DRIVE AT NOVI | | |
| | | 1 | | S ≥ | | |

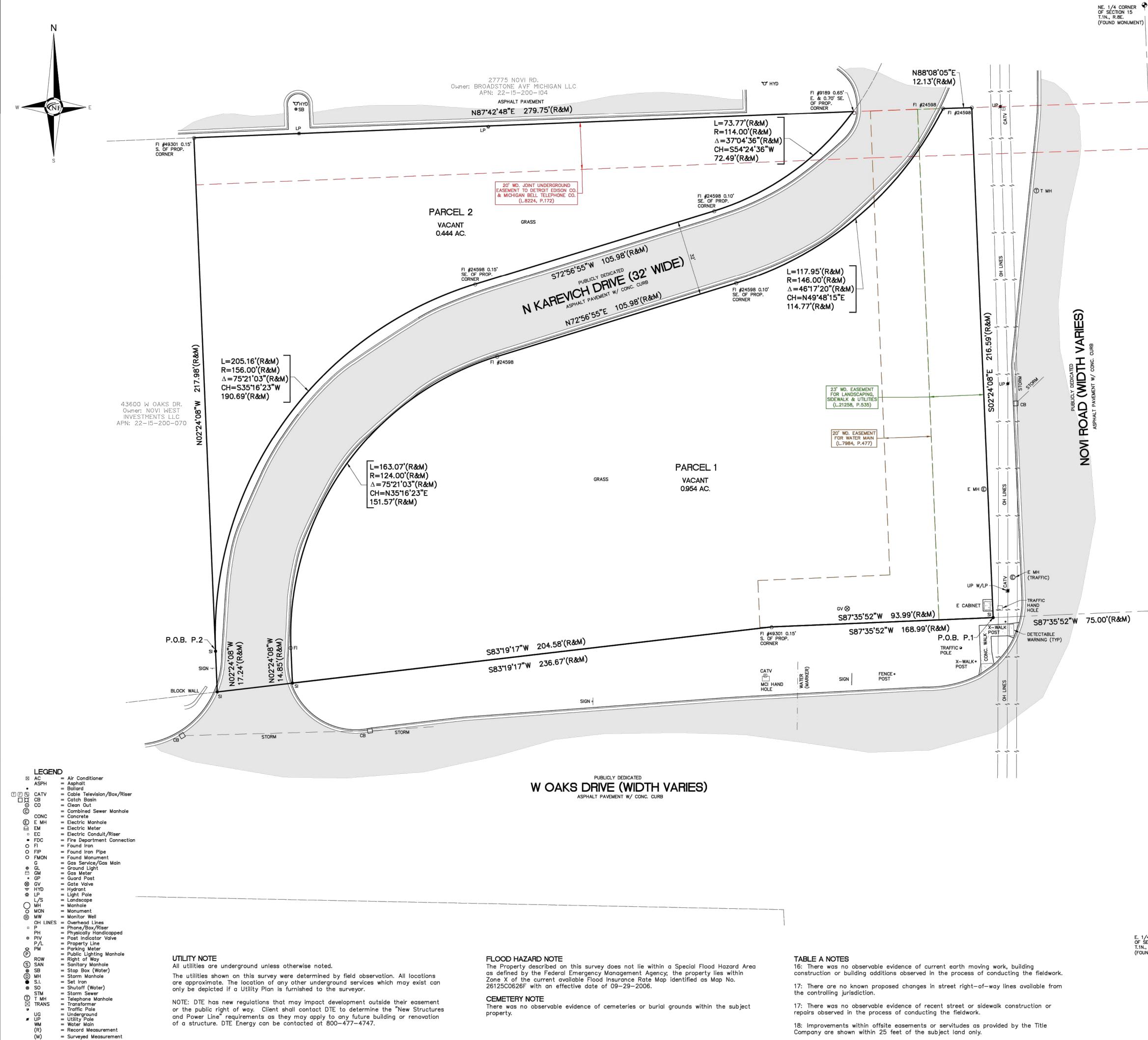


 \geq

ORIGINAL ISSUE: 05/15/2024 KHA PROJECT NO. 268693000

SHEET NUMBER

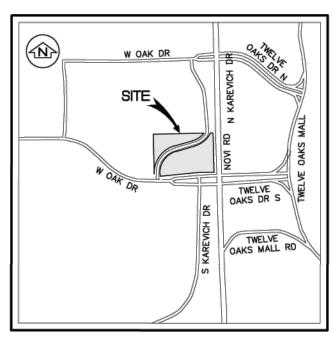
C0.0



E. 1/4 CORNER OF SECTION 15 T.1N., R.8E. (FOUND MONUMENT)

(C)

= Calculated



LOCATION MAP

LEGAL DESCRIPTION

Land in the City of Novi, Oakland County, MI, described as follows: Parcel 1

Part of the Northeast 1/4 of Section 15, Town 1 North, Range 8 East, City of Novi, Oakland County, Michigan, described as beginning at a point located North 02 degrees 24 minutes 08 seconds West 1103.75 feet along the East line of said Section 15 and South 87 degrees 35 minutes 52 seconds West 75.00 feet from the East 1/4 corner of said Section; thence continuing South 87 degrees 35 minutes 52 seconds West 93.99 feet; thence South 83 degrees 19 minutes 17 seconds West 204.58 feet; thence North 02 degrees 24 minutes 08 seconds West 14.85 feet to a point of curve; thence along the arc of a curve to the right 163.07 feet to a point of tangency, said curve having a radius of 124.00 feet, a central angle of 75 degrees 21 minutes 03 seconds, and a long chord bearing North 35 degrees 16 minutes 23 seconds East 151.57 feet; thence North 72 degrees 56 minutes 55 seconds East 105.98 feet to a point of curve; thence along the arc of a curve to the left 117.95 feet to a non-tangent point, said curve having a radius of 146.00 feet, a central angle of 46 degrees 17 minutes 20 seconds, and a long chord bearing North 49 degrees 48 minutes 15 seconds East 114.77 feet; thence North 88 degrees 08 minutes 05 seconds East 12.13 feet; thence South 02 degrees 24 minutes 08 seconds East 216.59 feet to the point of beginning.

Parcel 2:

Part of the Northeast 1/4 of Section 15, Town 1 North, Range 8 East, City of Novi, Oakland County, Michigan, described as beginning at a point located North 02 degrees 24 minutes 08 seconds West 1103.75 feet along the East line of said Section 15 and South 87 degrees 35 minutes 52 seconds West 168.99 feet and South 83 degrees 19 minutes 17 seconds West 236.67 feet and North 02 degrees 24 minutes 08 seconds West 17.24 feet from the East 1/4 corner of said Section; thence continuing North 02 degrees 24 minutes 08 seconds West 217.98 feet; thence North 87 degrees 42 minutes 48 seconds East 279.75 feet to a point on curve; thence along the arc of a curve to the right 73.77 feet to a point of tangency, said curve having a radius of 114.00 feet, a central angle of 37 degrees 04 minutes 36 seconds, and a long chord bearing South 54 degrees 24 minutes 36 seconds West 72.49 feet; thence South 72 dearees 56 minutes 55 seconds West 105.98 feet to a point of curve; thence along the arc of a curve to the left 205.16 feet, said curve having a radius of 156.00 feet, a central angle of 75 degrees 21 minutes 03 seconds, and a long chord bearing South 35 degrees 16 minutes 23 seconds West 190.69 feet to the point of beginning.

Novi Road and West Oaks Drive — Vacant Tax ID: Parcel 1 22—15—200—099 & Parcel 2 22—15—200—097

BASIS OF BEARING NOTE

The basis of bearing for this survey was established by the record description as shown in the Title Commitment referenced hereon.

TITLE NOTES

2. Any facts, rights, interests or claims that are not shown by the Public Records but that could be ascertained by making inquiry of persons in possession of the Land.

3. Easements, encumbrances, or claims thereof, not shown by the Public Records. 7. Easement granted to Michigan Bell Telephone Company, a Michigan Corporation disclosed by instrument recorded in Liber 6139, Page 332, Oakland County Records. (Affects Parcel 2) [EASEMENT IS WITHIN THE PUBLIC R.O.W. OF NOVI ROAD AND DOES NOT TOUCH THE SURVEYED LAND AND ITS LOCATION IS NOT SHOWN].

8. The terms, provisions and easement(s) contained in the document entitled "Declaration of Easements" recorded April 08, 1981 as Liber 7984, Page 477 of Official Records. (Affects both Parcels) [PERMANENT EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN].

9. The terms, provisions and easement(s) contained in the document entitled "Joint Underground Easement" recorded August 09, 1982 as Liber 8224, Page 172 of Official Records. (Affects both Parcels) [EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN].

10. The terms, provisions and easement(s) contained in the document entitled "Warranty Deed" recorded April 04, 2000 as Liber 21258, Page 535 of Official Records. (Affects Parcel 1) [EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN].

11. Interest, if any, of the United States, State of Michigan, or any political subdivision thereof, in the oil, gas and minerals in and under and that may be produced from the captioned land.

12. Rights of tenants under unrecorded leases.

13. Any rights, title, interest or claim thereof to that portion of the land taken, used or granted for streets, roads or highways.

ALL EXCEPTIONS SHOWN OR NOTED ON THIS SURVEY WERE OBTAINED FROM TITLE COMMITMENT NO. NCS-1183326-MICH, WITH A COMMITMENT DATE OF 06-20-2023, ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY.

SITE DATA

Gross Land Area: 41,566 Square Feet or 0.954 Acres - PARCEL 1 19,326 Square Feet or 0.444 Acres - PARCEL 2 There exist no parking spaces on surveyed land - vacant. Zoned: RC (Regional Center District) Building Setbacks: Front= 100'

Sides= 100' Rear= 100'

Max. Building Height permitted: 3 stories/45'

The above zoning and zoning requirements were obtained from the City of Novi online Zoning Map and Zoning Ordinance.

NOTE: The setbacks & height restrictions noted above are for reference purposes only and should not be used for design or construction and should not be used to determine compliance. A surveyor cannot make a certification on the basis of an interpretation or opinion of another party. A zoning endorsement letter should be obtained from the City of Novi to insure conformity as well as make a final determination of the required building setback & height requirements.

SURVEYOR'S CERTIFICATION

Novi 4 and 5, LLC, a Michigan limited liability company First American Title Insurance Company

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 1, 2, 3, 4, 6(a), 6(b), 7(a), 7(b1), 7(c), 8, 9, 11(a), 13, 14, 16, 17, 18 & 19 of Table A thereof.

The field work was completed on 07-07-2023.

Kevin Christopher Navaroli, P.S. No 4001053503 Date of Plat or Map: 07-17-2023 Revised:



NOWAK & FRAUS ENGINEERS

46777 WOODWARD AVENUE PONTIAC, MI 48342 TEL. (248) 332-7931 FAX. (248) 332-8257 www.nowakfraus.com EMAIL: rfraus@nfe-engr.com

PROJECT

NOVI ROAD AND WEST OAKS DRIVE

PROJECT LOCATION Vacant Novi Road & West Oaks Drive Part of the NE. 1/4 of Section 15, T.1N., R.8E., City of Novi, Oakland County, MI

SHEET ALTA / NSPS Land Title Survey

REVISIONS

| DRAWN BY: | | |
|--------------------|-------|---------|
| A.G. | | |
| APPROVED BY: | | |
| K.N./R.FRAUS | | |
| EMAIL: | | |
| rfraus@nfe-eng | r.con | 1 |
| DATE ISSUED: | | |
| 07-17-2023 | | |
| SCALE: $1'' = 20'$ | | |
| 20 10 0 | 10 | 20 |
| | | |
| NFE JOB NO. | SH | EET NQ. |
| N706 | | |
| 11/00 | I | . UI IM |



MISS DIG / UTILITY DISCLAIMER NOTE

A MISS DIG TICKET NUMBER 2023100502363, PURSUANT TO MICHIGAN PUBLIC ACT 174 WAS ENTERED FOR THE SURVEYED PROPERTY. DUE TO THE EXTENDED REPORTING PERIOD FOR UNDERGROUND FACILITY OWNERS TO PROVIDE THEIR RECORDS, THE SURVEY MAY NOT REFLECT ALL THE UTILITIES AT THE TIME THE SURVEY WAS ISSUE ON OCTOBER 12, 2023. THE SURVEY ONLY REFLECTS THOSE UTILITIES WHICH COULD BE OBSERVED BY THE SURVEYOR IN THE FIELD OR AS DEPICTED BY THE UTILITY COMPANY RECORDS FURNISH PRIOR TO THE DATE THIS SURVEY WAS ISSUED. THE CLIENT AND/OR THEIR AUTHORIZED AGENT SHALL VERIFY WITH THE FACILITY OWNERS AND/OR THEIR AUTHORIZED AGENTS, THE COMPLETENESS AND EXACTNESS OF THE UTILITIES LOCATION.

DTE DISCLAIMER NOTE

=___

SHRUB 🖳

(TYP.)

PLEASE NOTE THAT DTE HAS NEW REGULATIONS THAT MAY IMPACT DEVELOPMENT OUTSIDE THEIR EASEMENT OR THE PUBLIC RIGHT OF WAY. CLIENT SHALL CONTACT DTE TO DETERMINE THE "NEW STRUCTURES AND POWER LINE" REQUIREMENTS AS THEY MAY APPLY TO ANY FUTURE BUILDING OR RENOVATION OF A STRUCTURE. DTE ENERGY CAN BE CONTACTED AT 800-477-4747

SURVEY DATA

SITE AREA: PARCEL 1: 41,566 SQUARE FEET OR 0.954 ACRES PARCEL 2: 19,326 SQUARE FEET OR 0.444 ACRES ZONED: **RC, REGIONAL CENTER DISTRICT**

PARKING SPACES: **NO PARKING SPACES (VACANT)**

BUILDING SETBACKS: FRONT: 100' SIDES: 100' REAR: 100'

MAX. BUILDING HEIGHT PERMITTED: 3 STORIES / 45 FEET

THE ABOVE ZONING AND ZONING REQUIREMENTS WERE OBTAINED FROM THE CITY OF NOVI ONLINE ZONING MAP AND ZONING ORDINANCE. FRONT: THE SETBACKS & HEIGHT RESTRICTIONS NOTED ABOVE ARE FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION AND SHOULD NOT BE USED TO DETERMINE COMPLIANCE. A SURVEYOR CANNOT MAKE A CERTIFICATION ON THE BASIS OF AN INTERPRETATION OR OPINION OF ANOTHER PARTY. A ZONING ENDORSEMENT LETTER SHOULD BE OBTAINED FROM THE CITY OF NOVI TO INSURE CONFORMITY AS WELL AS MAKE A FINAL DETERMINATION OF THE REQUIRED BUILDING SETBACK & HEIGHT REQUIREMENTS.

LEGEND

SITE DISTURBANCE PAVEMENT REMOVE MANHOLE(MH) - — SA — — $- \odot^{UU}$ — SA — — EXISTING SAN. CLEAN OUT HYDRANT(HYD) GATE VALVE(GVW)

UTILITY POLE GUY POLE

. 供 LP

ASPH

CONC.

FD. / FND.

RET. WALL

R.O.W.

SPK

(TYP)

(R)

C/L

--- w 2 --- w --- existing water main

UP 0H GUY WIRE EX. OVERHEAD ELECTRIC

----- E ---- E ---- E ---- EX. UNDERGROUND (UG.) ELECTRIC _____ G ____ G ____ G ____ EXISTING GAS MAIN LIGHT POLE SIGN ASPHALT CONCRETE FOUND RETAINING WALL RIGHT-OF-WAY SET PK NAIL TYPICAL RECORD MEASURED CENTERLINE PROPERTY LINE GAS METER ELECTRIC METER LANDSCAPE TRAFFIC POLE

FLAG POLE

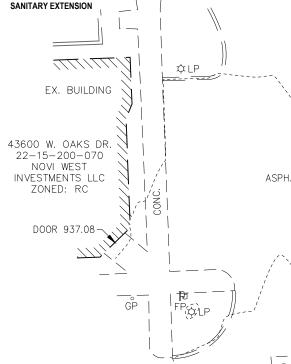
HAND HOLE

FIBER RISER

guard post

SPRINKLER VALVE

ELECTRIC RISER



5"、STORŇ

'CATCH BASIN

ŘIM 0,00 OFFSET T/WATER 930.66

- W.Z

XASPH.

E TC941.20

REMOVE AND REPLACE

EXISTING CURB FOR

SANITARY EXTENSION

ASPH.

G.V. & WELL RIM 938.56

Alm

- REMOVE AND REPLACE EXISTING ASPHALT FOR

tiA+

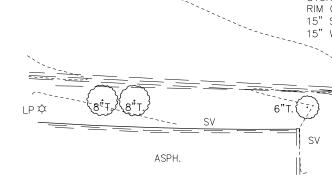
~~~~RIM~9.37.04~~RTM 937.97

└─G.V. & WEL

-STOP BOX

REMOVE AND REPLACE -EXISTING CURB FOR

SANITARY EXTENSION



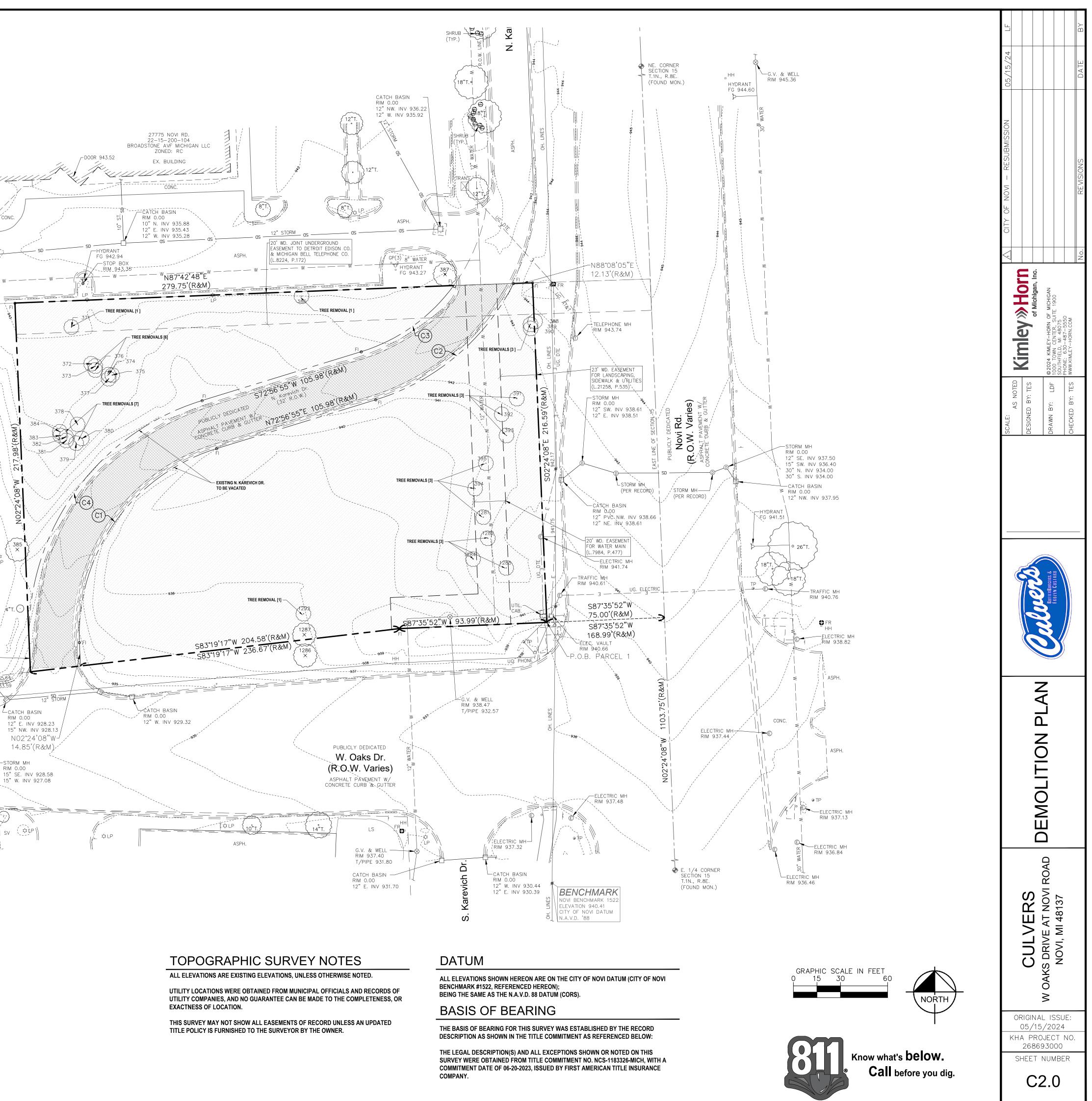
₩02°2/4′08″W

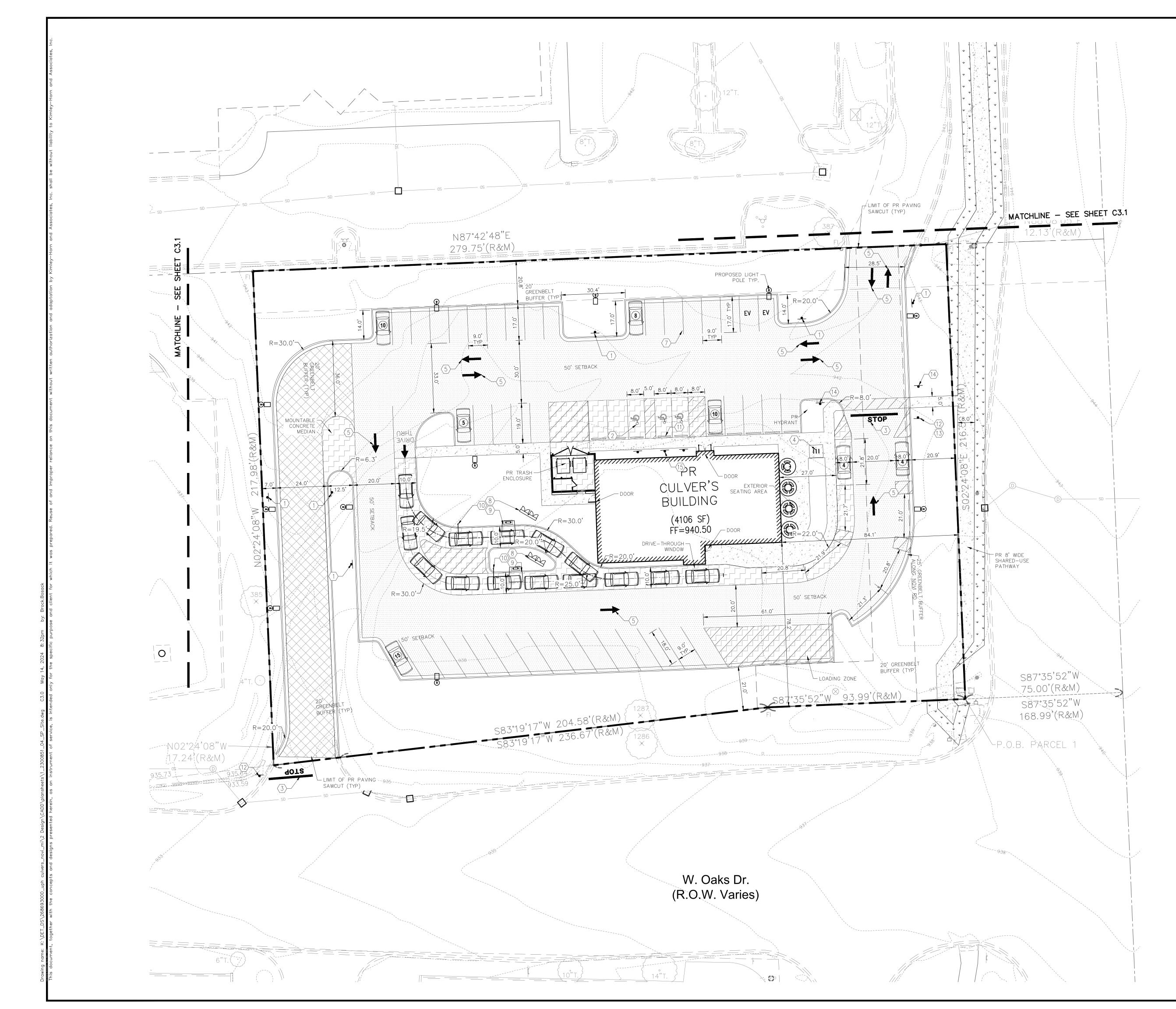
/17.24 (R&M)

RET. WALL --

UG. PHUNL







## LEGEND

| ā               | PROPOSED LIGHT POLE              |
|-----------------|----------------------------------|
|                 | PROPOSED STORM INLET             |
|                 | PROPOSED STORM MANHOLE           |
|                 | PROPOSED ADS BARRICUDA STRUCTURE |
|                 | PROPOSED SANITARY SEWER MANHOLE  |
| 0               | PROPOSED CLEANOUT                |
| Q               | PROPOSED HYDRANT                 |
| $\otimes$       | PROPOSED WATER VALVE             |
| $\triangleleft$ | PROPOSED WATERMAIN REDUCER       |
|                 |                                  |
|                 |                                  |

STANDARD DUTY ASPHALT PAVEMENT SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION HEAVY DUTY ASPHALT PAVEMENT SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION <u>RIGHT OF WAY PAVEMENT</u> SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION <u>CONCRETE SIDEWALK</u> SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION

HEAVY DUTY CONCRETE PAVEMENT SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION

## SITE DATA TABLE

## SITE AREA: 1.69 ACRES (73,763 SF.) NET AND GROSS ZONING: RC

PROPOSED USE: RESTAURANT (4,060 SF.)

BUILDING INFORMATION: MAXIMUM ALLOWABLE BUILDING HEIGHT = 45 FEET

PROPOSED BUILDING HEIGHT = 23 FEET (1 STORY) BUILDING FOOTPRINT AREA = 4,060 SF BUILDING LOT COVERAGE = 5.6%

SETBACK REQUIREMENTS: REQUIRED: PROPOSED: 100' 50.52' 100' 100' FRONT: 100' 100' 100' 100' SIDE:

REAR: PARKING CALCULATIONS:

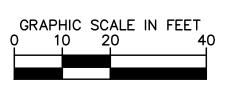
RESTAURANT = ONE FOR EVERY TWO EMPLOYEES, PLUS FOR EVERY TWO CUSTOMERS ALLOWED UNDER MAXIMUM CAPACITY (INCLUDING WAITING AREAS) TOTAL PARKING REQUIRED = 90 SEATS / 2 = 45 SPACES + 6 EMPLOYEES PER SHIFT / 2 = 3

= 48 SPACES TOTAL PROPOSED PARKING SPACES = 53 SPACES INC. 3 H/C SPACES

LOADING CALCULATIONS: LOADING REQUIRED = 1 10'X50' SPACE LOADING PROVIDED=1,010 SF AT BACK OF BUILDING

## SITE PLAN NOTES

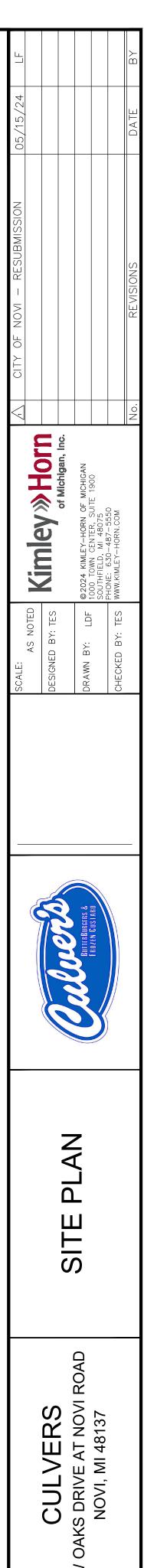
- THERE WILL NOT BE ANY ROOFTOP EQUIPMENT INCLUDED WITH THE PROPOSED CULVER'S BUILDING
   OUTDOOR SEATING PERMITTED BETWEEN MARCH 1ST AND NOVEMBER 30TH.
   ALL TRAFFIC SIGNAGE WILL COMPLY WITH THE CURRENT MMUTCD STANDARDS.
- $\langle 1 \rangle$  fire lane
- $\langle 2 \rangle$  barrier free parking striping
- $\overline{3}$  stop bar
- 4 3 BIKE HOOPS
- $\left< 5 \right>$  directional arrow
- $\left< 6 \right>$  drive thru arrow
- (7) 4" WIDE PARKING STRIPE
- $\langle 8 \rangle$  menu board
- $\langle 9 \rangle$  drive-thru call box
- (10) HEIGHT RESTRICTION POLE
- $\langle 11 \rangle$  wheel stop
- (12) STOP SIGN
- $\langle 13 \rangle$  left turn only sign
- $\langle 14 \rangle$  do not enter sign
- $\langle 15 \rangle$  ada parking sign







Know what's **below.** Call before you dig.





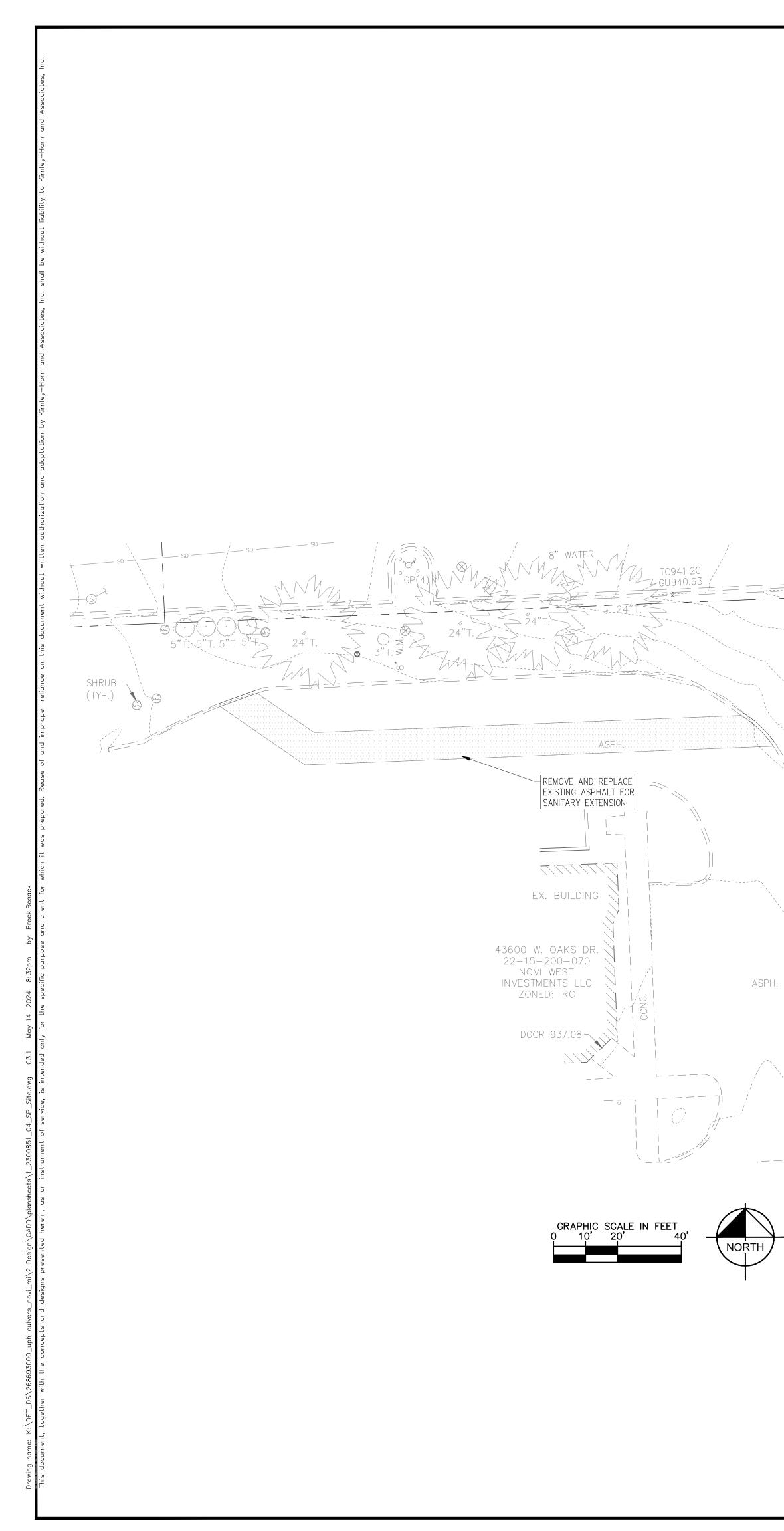
 $\geq$ 

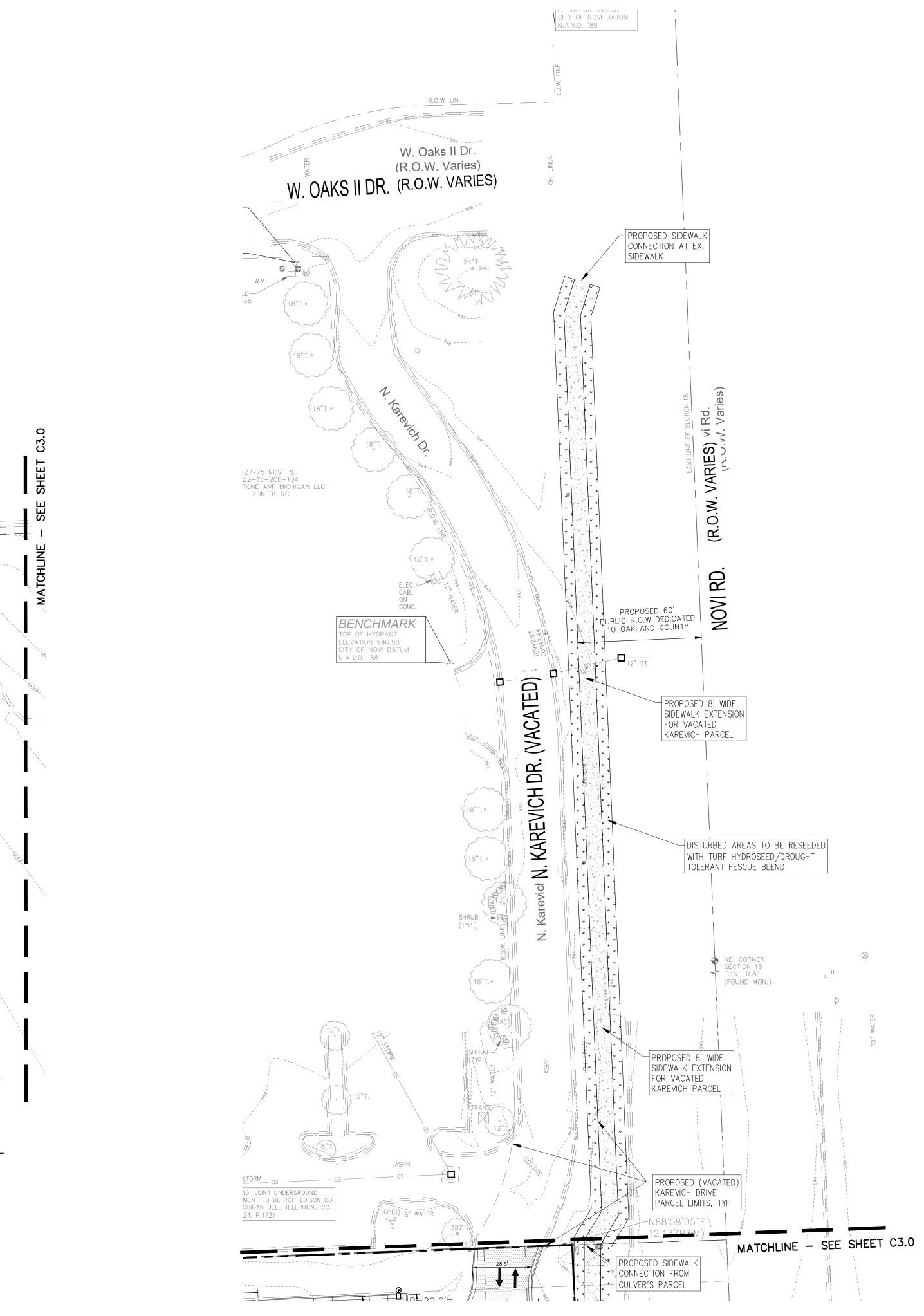
ORIGINAL ISSUE: 05/15/2024

KHA PROJECT NO.

268693000

SHEET NUMBER





## LEGEND

| ů.              | PROPOSED LIGHT POLE              |
|-----------------|----------------------------------|
|                 | PROPOSED STORM INLET             |
|                 | PROPOSED STORM MANHOLE           |
|                 | PROPOSED ADS BARRICUDA STRUCTURE |
|                 | PROPOSED SANITARY SEWER MANHOLE  |
| Ø               | PROPOSED CLEANOUT                |
| Q               | PROPOSED HYDRANT                 |
| $\otimes$       | PROPOSED WATER VALVE             |
| $\triangleleft$ | PROPOSED WATERMAIN REDUCER       |
|                 |                                  |
|                 |                                  |

STANDARD DUTY ASPHALT PAVEMENT SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION HEAVY DUTY ASPHALT PAVEMENT SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION

<u>CONCRETE\_SIDEWALK</u> SEE\_CONSTRUCTION\_DETAILS\_FOR PAVEMENT\_SECTION HEAVY DUTY CONCRETE PAVEMENT SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION

## SITE DATA TABLE

SITE AREA: 1.69 ACRES (73,763 SF.) NET AND GROSS ZONING: RC

PROPOSED USE: RESTAURANT (4,060 SF.)

BUILDING INFORMATION: MAXIMUM ALLOWABLE BUILDING HEIGHT = 45 FEET PROPOSED BUILDING HEIGHT = 23 FEET (1 STORY) BUILDING FOOTPRINT AREA = 4,060 SF

BUILDING LOT COVERAGE = 5.6%SETBACK REQUIREMENTS:

REQUIRED: FRONT: 100'

| I INOINT. | 100  |
|-----------|------|
| SIDE:     | 100' |
| REAR:     | 100' |
|           |      |

PARKING CALCULATIONS: RESTAURANT = ONE FOR EVERY TWO EMPLOYEES, PLUS FOR EVERY TWO CUSTOMERS ALLOWED UNDER MAXIMUM CAPACITY (INCLUDING WAITING AREAS) TOTAL PARKING REQUIRED = 90 SEATS / 2 = 45 SPACES + 6 EMPLOYEES PER SHIFT / 2 = 3

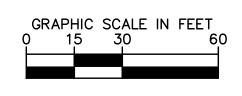
= 56 SPACES

TOTAL PROPOSED PARKING SPACES = 48 SPACES INC. 3 H/C SPACES LOADING CALCULATIONS:

LOADING REQUIRED = 1 10'X50' SPACE LOADING PROVIDED=865 SF AT BACK OF BUILDING

## SITE PLAN NOTES

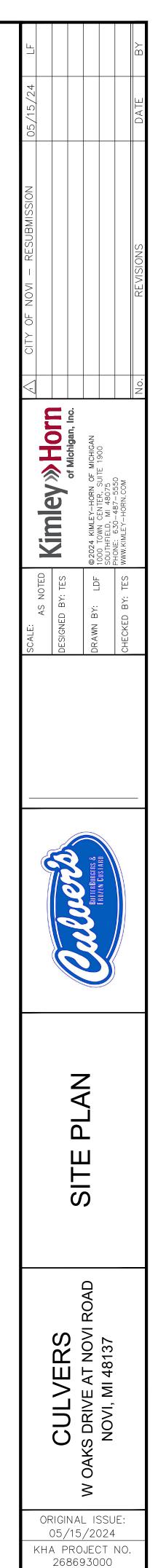
- THERE WILL NOT BE ANY ROOFTOP EQUIPMENT INCLUDED WITH THE PROPOSED CULVER'S BUILDING
   OUTDOOR SEATING PERMITTED BETWEEN MARCH 1ST AND NOVEMBER 2011
- NOVEMBER 30TH. 3. ALL TRAFFIC SIGNAGE WILL COMPLY WITH THE CURRENT MMUTCD STANDARDS.
- $\langle 1 \rangle$  fire lane
- $\langle 2 \rangle$  barrier free parking striping
- $\overline{3}$  stop bar
- $\langle 4 \rangle$  3 bike hoops
- $\langle 5 \rangle$  directional arrow
- $\langle 6 \rangle$  drive thru arrow
- (7) 4" WIDE PARKING STRIPE
- $\langle 8 \rangle$  menu board
- $\langle 9 \rangle$  drive-thru call box
- (10) HEIGHT RESTRICTION POLE
- $\langle 11 \rangle$  wheel stop





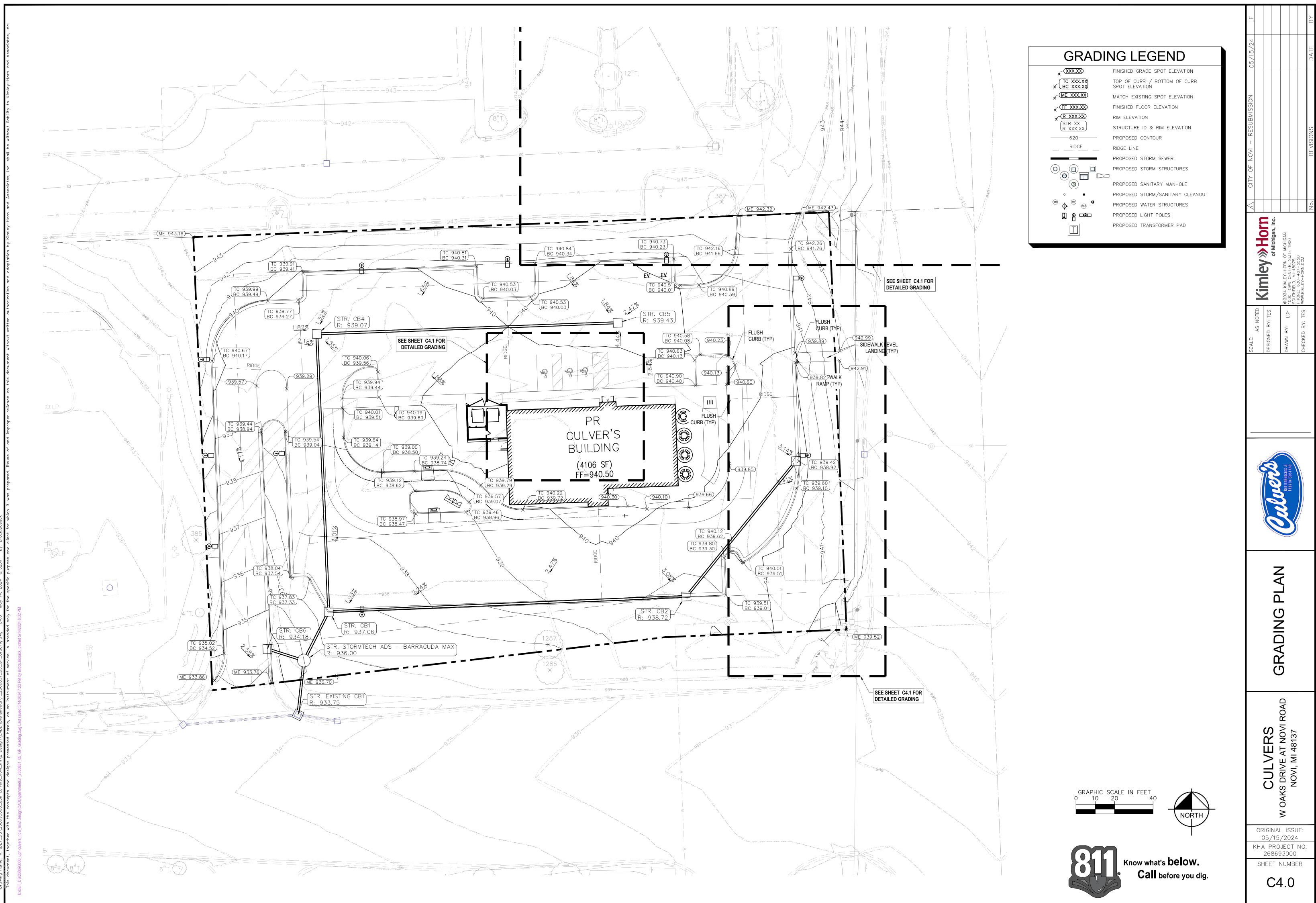


Know what's **below.** Call before you dig.

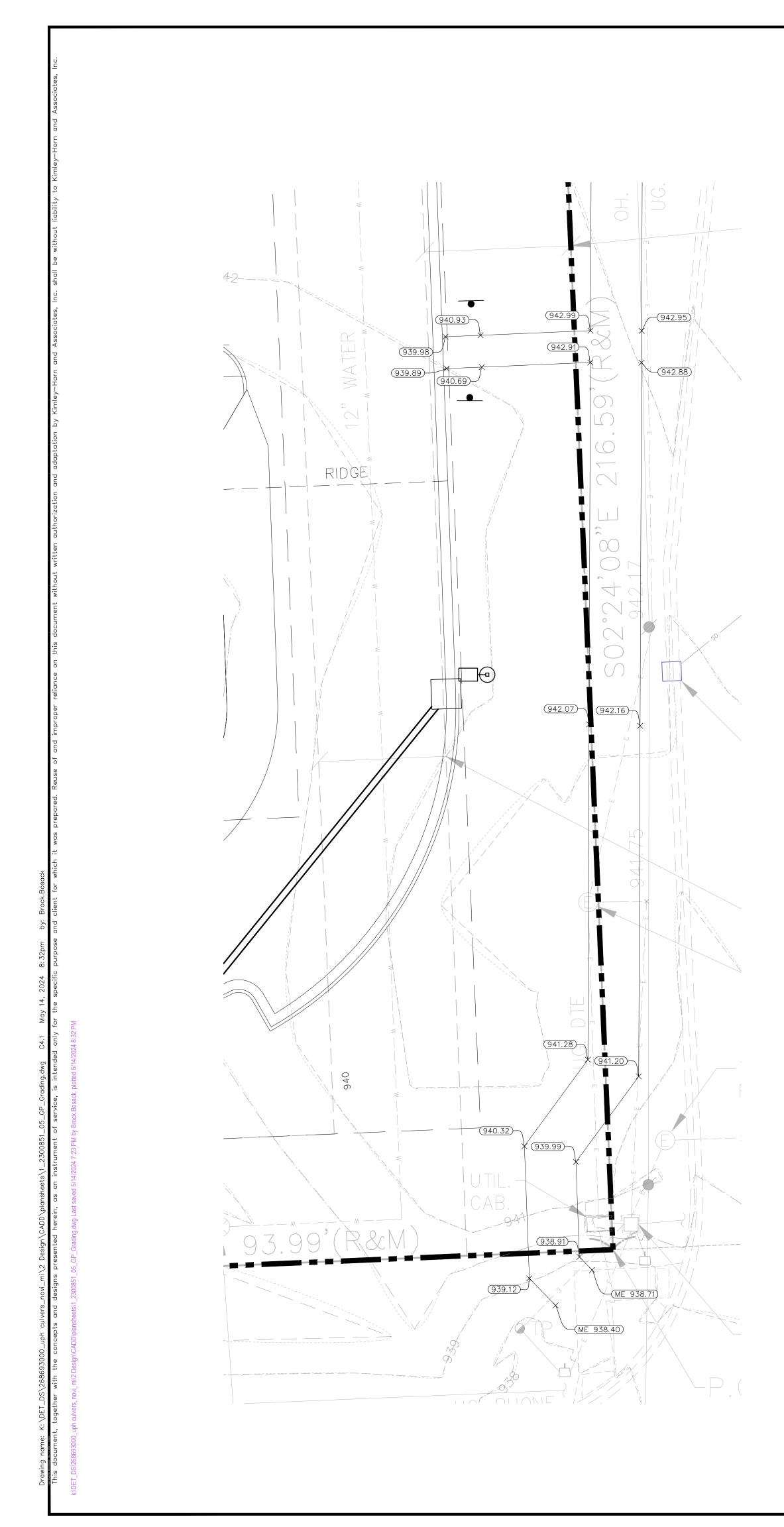


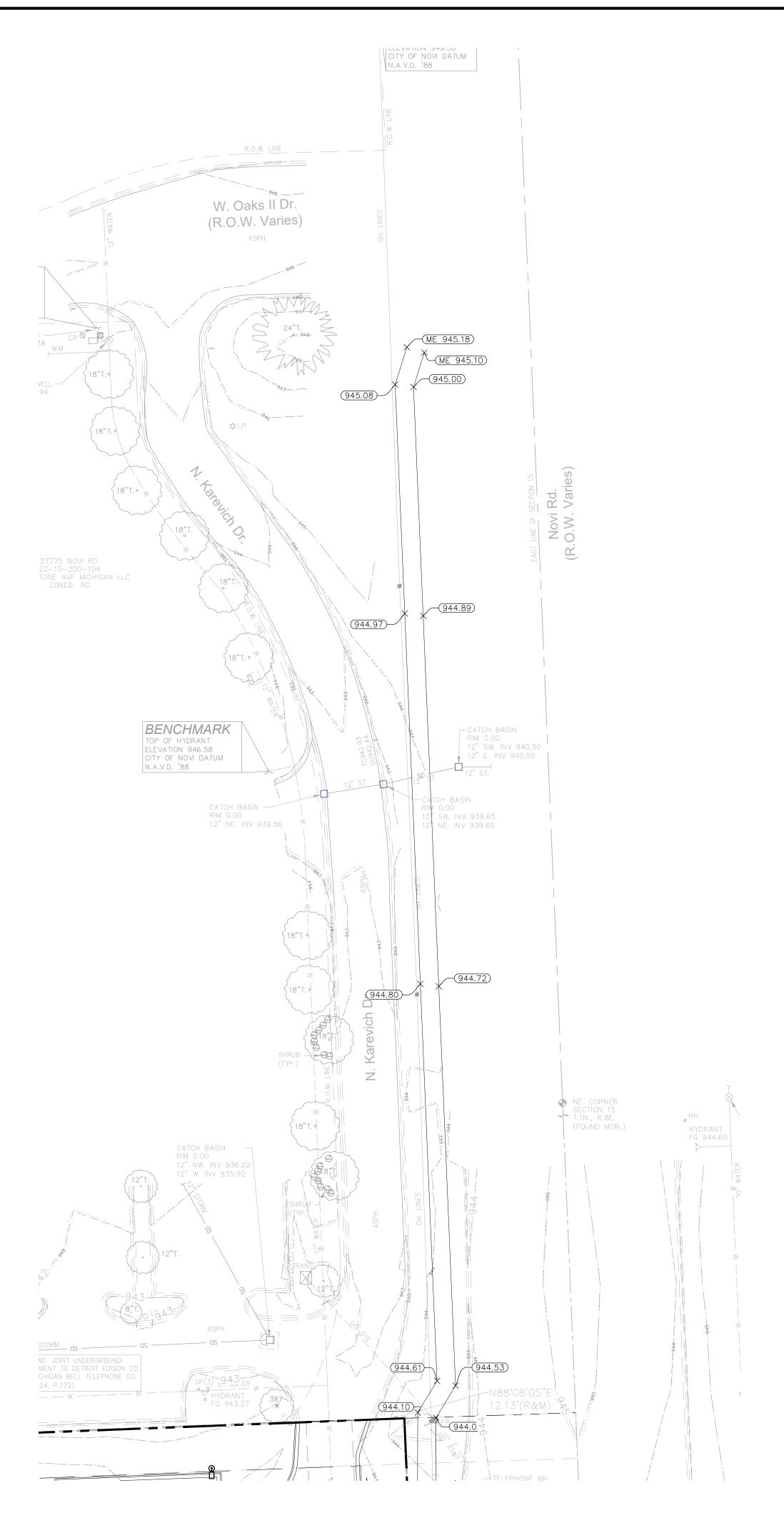
C3.1

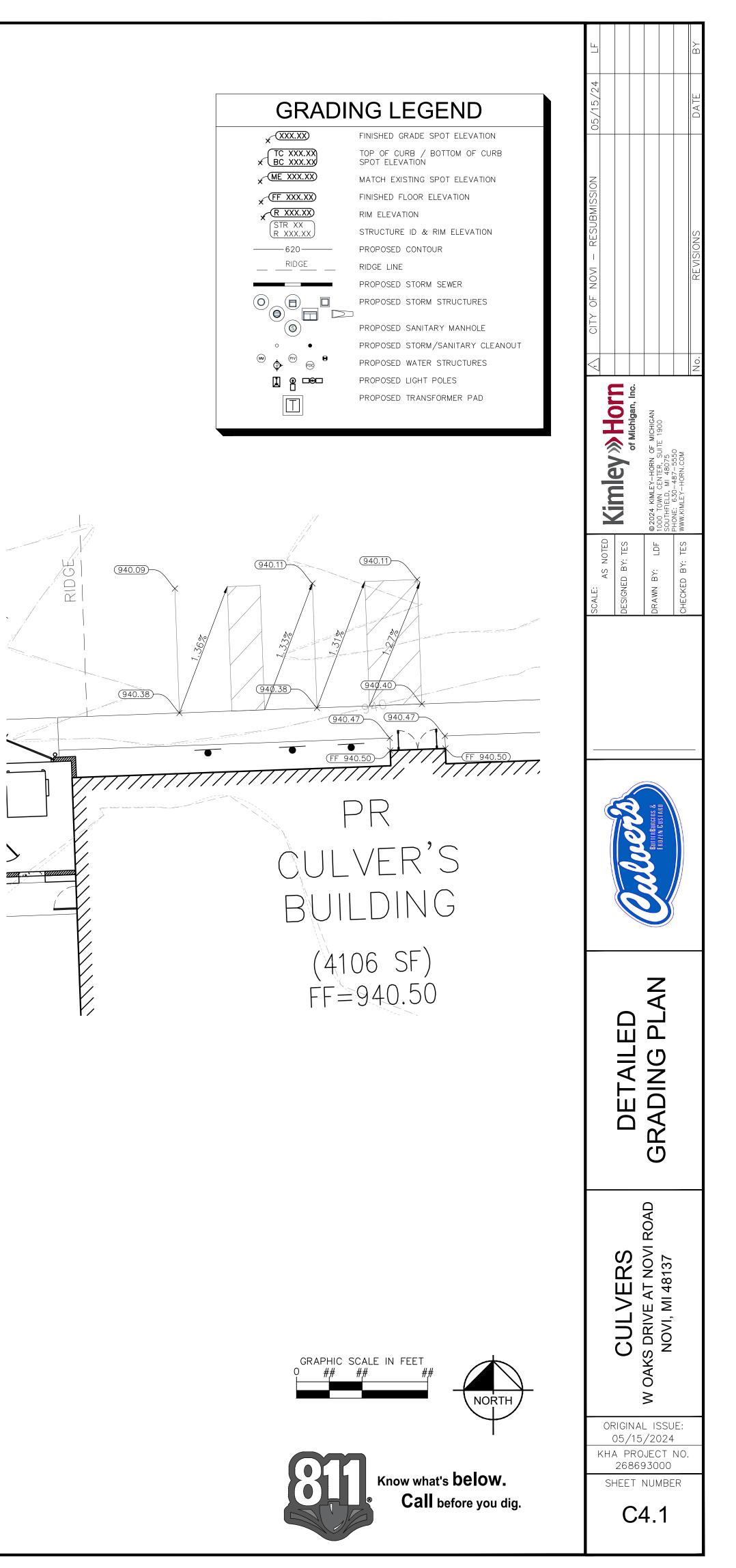
SHEET NUMBER

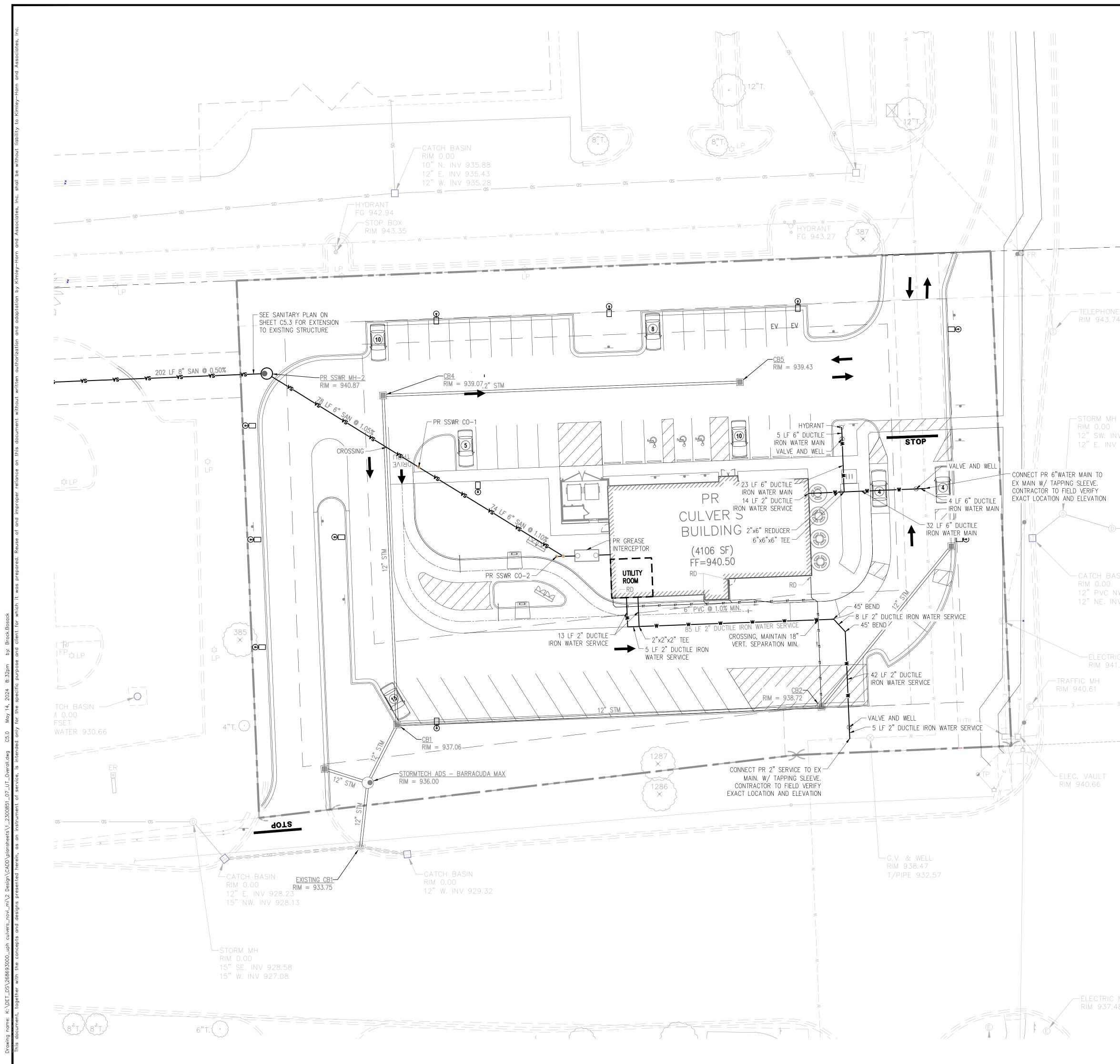


name: K: \DET\_DS\268693000\_uph culvers\_novi\_mi\2 Design\CADD\plansheets\1\_2300851\_05\_GP\_Grading.dwg C4.0 May 14, 2024 8:32pm by: Brock

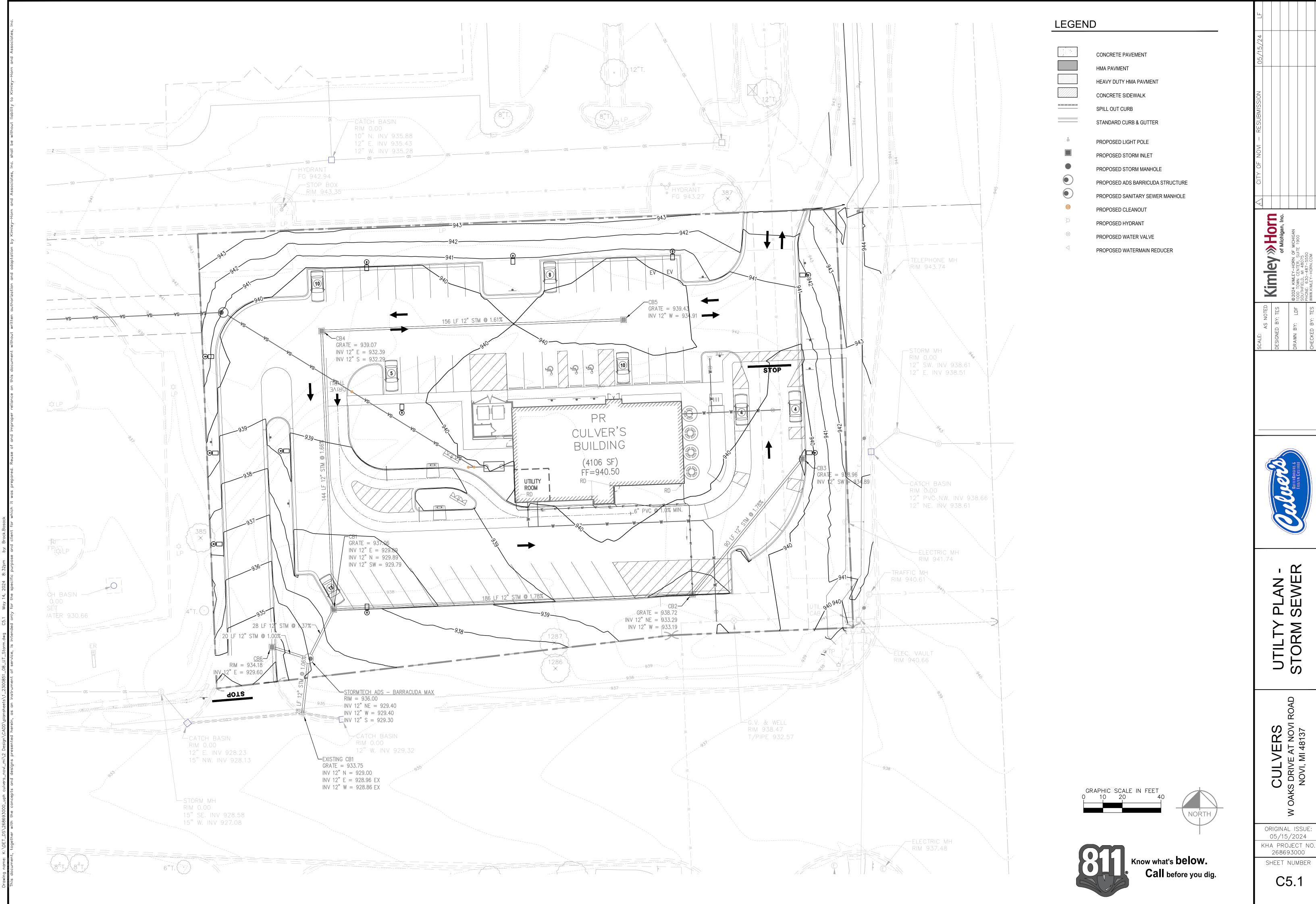






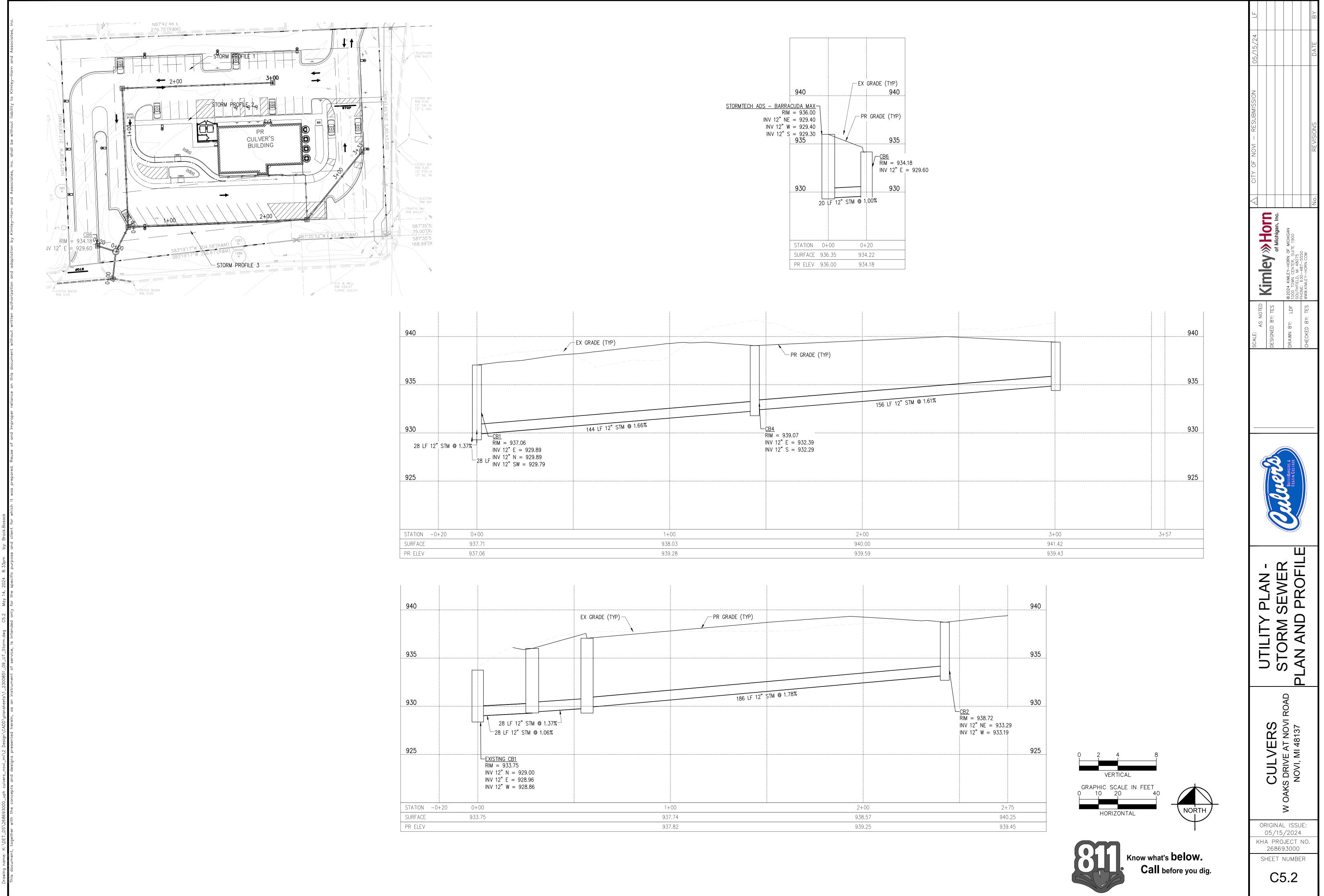


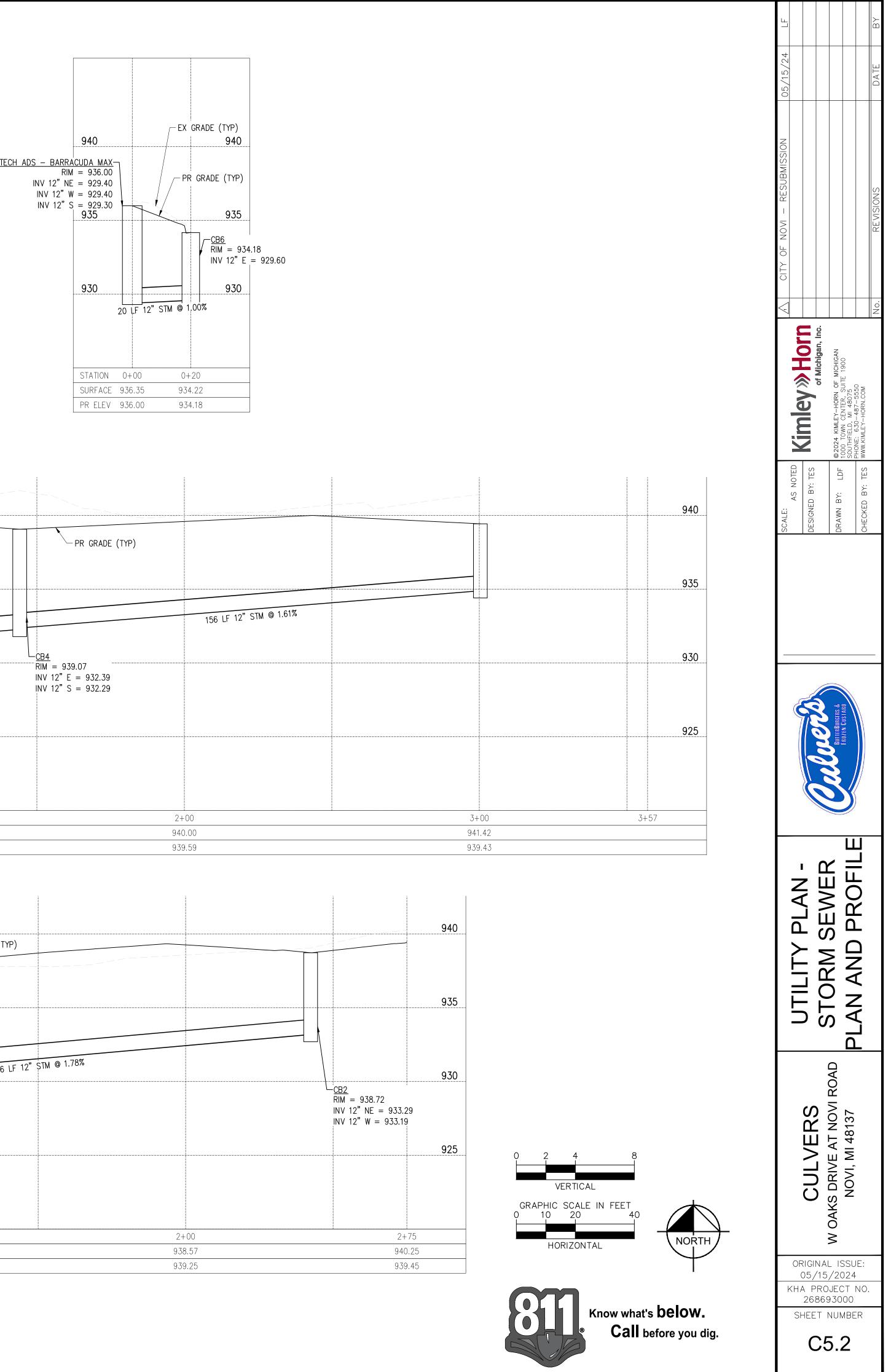
|                                                  |                                                                |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BY                          |
|--------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                                  | LEGEND                                                         |                                                                                                                                                            | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
|                                                  |                                                                | CONCRETE PAVEMENT                                                                                                                                          | 5/15/2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DATE                        |
|                                                  | H H                                                            | HMA PAVMENT                                                                                                                                                | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
|                                                  |                                                                | HEAVY DUTY HMA PAVMENT                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  |                                                                | CONCRETE SIDEWALK                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | S                                                              | SPILL OUT CURB                                                                                                                                             | SUBMISSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |
|                                                  | s                                                              | STANDARD CURB & GUTTER                                                                                                                                     | RESU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ONS                         |
|                                                  | ř.                                                             | PROPOSED LIGHT POLE                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EVISIO                      |
|                                                  | E F                                                            | PROPOSED STORM INLET                                                                                                                                       | NON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | RI                          |
|                                                  | F                                                              | PROPOSED STORM MANHOLE                                                                                                                                     | Υ OF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
|                                                  | e F                                                            | PROPOSED ADS BARRICUDA STRUCTURE                                                                                                                           | CIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
|                                                  | F                                                              | PROPOSED SANITARY SEWER MANHOLE                                                                                                                            | $\overline{\langle}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N                           |
|                                                  | ð                                                              | PROPOSED CLEANOUT                                                                                                                                          | ن المراجع |                             |
|                                                  | ∕~ ⊦<br>⊗                                                      |                                                                                                                                                            | igan, I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
|                                                  | F                                                              |                                                                                                                                                            | MICHIGAN<br>F MICHIGAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| FELEPHONE MH                                     |                                                                | PROPOSED WATERMAIN REDUCER                                                                                                                                 | ORN OF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| RIM 943.74                                       | UTILITY NOTES                                                  |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | , мі т<br>20—487-<br>У—НОRЛ |
|                                                  |                                                                | EXTREME CAUTION WHEN EXCAVATING AROUND EXISTING RELOCATION WITH RESPECTIVE UTILITY OWNER.                                                                  | Kimley » Hichi<br>of Michi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | N.KIMLE                     |
|                                                  |                                                                | ICERNING EXISTING UTILITIES IS NOT REPRESENTED,<br>TO BE COMPLETE OR ACCURATE. INVESTIGATION, LOCATION,                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DHA<br>MM                   |
|                                                  | SUPPORT, PROTECTION, AND R                                     | RESTORATION OF ALL EXISTING UTILITIES AND<br>RESPONSIBILITY OF THE CONTRACTOR, PRIOR TO                                                                    | S NOTED<br>BY: TES<br>: LDF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BΥ: TES                     |
|                                                  | CONSTRUCTION TO DETERMINE<br>ALL EXISTING UTILITIES WHETH      | IN THE FIELD THE ACTUAL LOCATION AND ELEVATIONS OF ER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR                                                            | B A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
| STORM MH                                         |                                                                | IRS PRIOR TO THE START OF CONSTRUCTION.                                                                                                                    | SCALE: A<br>DESIGNED<br>DRAWN B'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CHECKED                     |
| 2" SW. INV 938.61                                | HORIZONTAL BETWEEN ALL UN                                      | VIDE MINIMUM CLEARANCES OF 1.0' VERTICAL AND 3.0'<br>DERGROUND UTILITIES. WATER, SANITARY AND STORM                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| 2" E. INV 938.51                                 | FACILITY SHALL BE INSTALLED                                    | EARANCES OF 1.5' VERTICAL AND 10.0' HORIZONTAL. NO<br>WITH LESS THAN THESE MINIMUM CLEARANCES WITHOUT                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | CONTRACTOR SHALL EXPOSE A                                      | HE OWNERS OF THE OTHER FACILITIES INVOLVED. THE<br>ALL UTILITIES OR STRUCTURES PRIOR TO CONSTRUCTION TO<br>RIZONTAL CLEARANCES WITH PROPOSED CONSTRUCTION. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| IAIN TO<br>LEEVE.                                | THE FLOW OF ALL SEWERS, DF                                     | RAINS AND WATER COURSES ENCOUNTERED AND DISTURBED<br>ROSECUTION OF THE WORK SHALL BE RESTORED BY THE                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| VERIFY<br>LEVATION                               | CONTRACTOR TO A SATISFACT                                      | ORY CONDITION.                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | 4. COMPACTED SAND BACKFILL (I<br>UTILITIES WITHIN THE INFLUENC | MDOT SAND CLASS II) SHALL BE PROVIDED FOR ALL<br>CE OF PAVED AREAS.                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| D SD                                             |                                                                | TORE OFF-SITE CONSTRUCTION AREAS TO EQUAL OR<br>TED PRIOR TO COMMENCEMENT.                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  |                                                                | DIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES FOUND                                                                                                         | REA<br>REAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
|                                                  |                                                                | D CONDITIONS PRIOR TO START OF CONSTRUCTION.                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| CATCH BASIN<br>RIM 0.00<br>2" PVC NW. INV 938.66 |                                                                | ATE ELECTRICAL SERVICE WITH UTILITY COMPANY TO VERIFY<br>RVICE, AND ALL STANDARDS FOR WORK. SEE                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| 2" NE. INV 938.61                                |                                                                | PIPES SHALL BE RCP UNLESS STATED OTHERWISE.                                                                                                                | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
|                                                  | 9. PER THE TEN STATES STANDA                                   | RDS ARTICLE 8.8.3, ONE FULL 20-FOOT PIPE LENGTH OF                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $\langle $                  |
|                                                  | WATER MAIN SHALL BE USED<br>CROSSED, AND THE PIPE SHAL         | WHENEVER STORM SEWER OR SANITARY SEWER IS<br>LL BE CENTERED ON THE CROSSING, IN ORDER TO ENSURE                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| ELECTRIC MH                                      | 10-FOOT SEPARATION BETWEE                                      | N WATER MAIN AND SEWERS.                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| RIM 941.74                                       | <u>STORM</u><br>600 LF – 12" RCP STOR<br>165 LF – 6" RCP ROOF  |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| C MH<br>-0.61                                    | 6 – 2' X 3' RECTA                                              |                                                                                                                                                            | z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
| зз+                                              | SANITARY                                                       | JUNINAUUDA WAA                                                                                                                                             | UTILITY PLAN<br>OVERALL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
|                                                  | 172 LF – 6" SANITARY S                                         | SEWER (SDR 23.5 MINIMUM)<br>SEWER (SDR 26)                                                                                                                 | ן קא                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
| >                                                | 2 – 5' CIRCULAR M<br>2 – SANITARY CLE                          | /ANHOLE<br>ANOUT                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | 1 – GREASE INTER                                               |                                                                                                                                                            | ∣╘ँ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
| VAULT                                            |                                                                | ON WATER SERVICE                                                                                                                                           | 린이                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| 40.66                                            | 1 – 2" VALVE AND<br>2 – 45° BEND<br>1 – 2"v2"v2" TEE           | / WELL                                                                                                                                                     | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
|                                                  |                                                                | ON WATER MAIN                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | 1 – 6"x6"x6" TEE                                               |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | 1 – 2"x6" REDUCE<br>1 – HYDRANT                                |                                                                                                                                                            | ROAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
|                                                  |                                                                |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  |                                                                |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20                          |
|                                                  |                                                                |                                                                                                                                                            | CULVER<br>DRIVE AT NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                           |
|                                                  |                                                                |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  |                                                                | · · · · · · · · · · · · · · · · · · ·                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|                                                  | GRA<br>0<br>1                                                  | PHIC SCALE IN FEET                                                                                                                                         | W OAKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| 1                                                |                                                                |                                                                                                                                                            | S ≥                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
|                                                  |                                                                |                                                                                                                                                            | ORIGINAL ISS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |
| ELECTRIC MH                                      |                                                                | ,                                                                                                                                                          | 05/15/202<br>KHA PROJECT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
| RIM 937.48                                       |                                                                | Know what's <b>below</b> .                                                                                                                                 | 268693000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0                           |
|                                                  |                                                                | Call before you dig.                                                                                                                                       | SHEET NUME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |
|                                                  |                                                                |                                                                                                                                                            | C5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | )                           |
|                                                  |                                                                |                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |

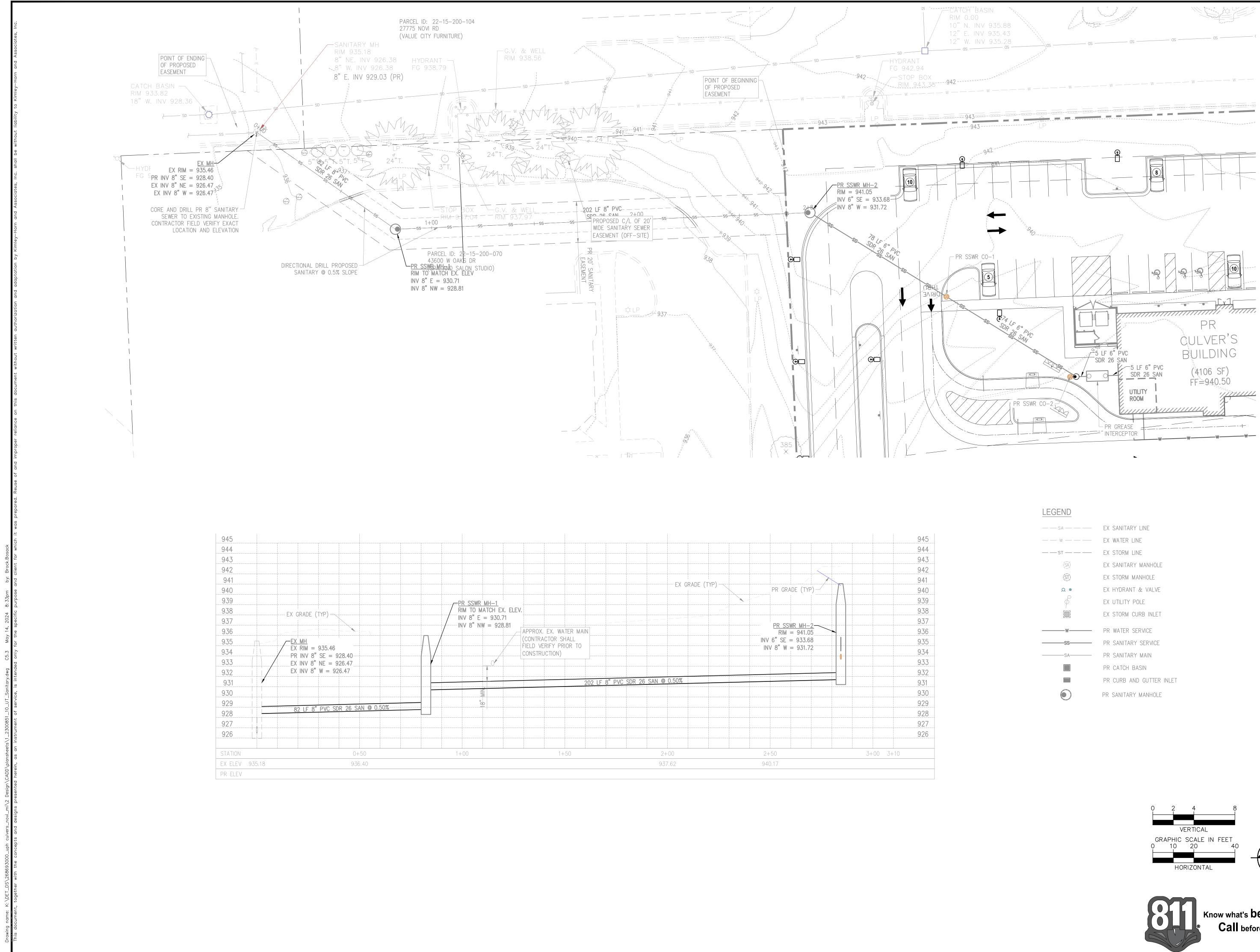


Kimley » Horn of Michigan, Inc. ·ద∍∶ , luer UTILTY PLAN -STORM SEWER CULVERS V OAKS DRIVE AT NOVI ROAD NOVI, MI 48137

 $\geq$ 







| — — SA — — — | ΕX | SANITAR |
|--------------|----|---------|
| W            | ЕX | WATER I |
| — — ST — — — | ΕX | STORM I |
| (SA)         | ЕX | SANITAR |
| (ST)         | ΕX | STORM I |
| Q ø          | ΕX | HYDRAN  |
| φ            | ΕX | UTILITY |
|              | ΕX | STORM   |
| w            | PR | WATER   |
| SS           | PR | SANITAR |
| SA           | PR | SANITAR |
|              | PR | CATCH   |
|              | PR | CURB A  |
|              | PR | SANITAR |
|              |    |         |

| ЕX | SANITARY LINE        |
|----|----------------------|
| ΕX | WATER LINE           |
| ЕX | STORM LINE           |
| ΕX | SANITARY MANHOLE     |
| ЕX | STORM MANHOLE        |
| ΕX | HYDRANT & VALVE      |
| ΕX | UTILITY POLE         |
| ΕX | STORM CURB INLET     |
| PR | WATER SERVICE        |
| PR | SANITARY SERVICE     |
| PR | SANITARY MAIN        |
| PR | CATCH BASIN          |
|    | CURD AND CUTTER INLE |

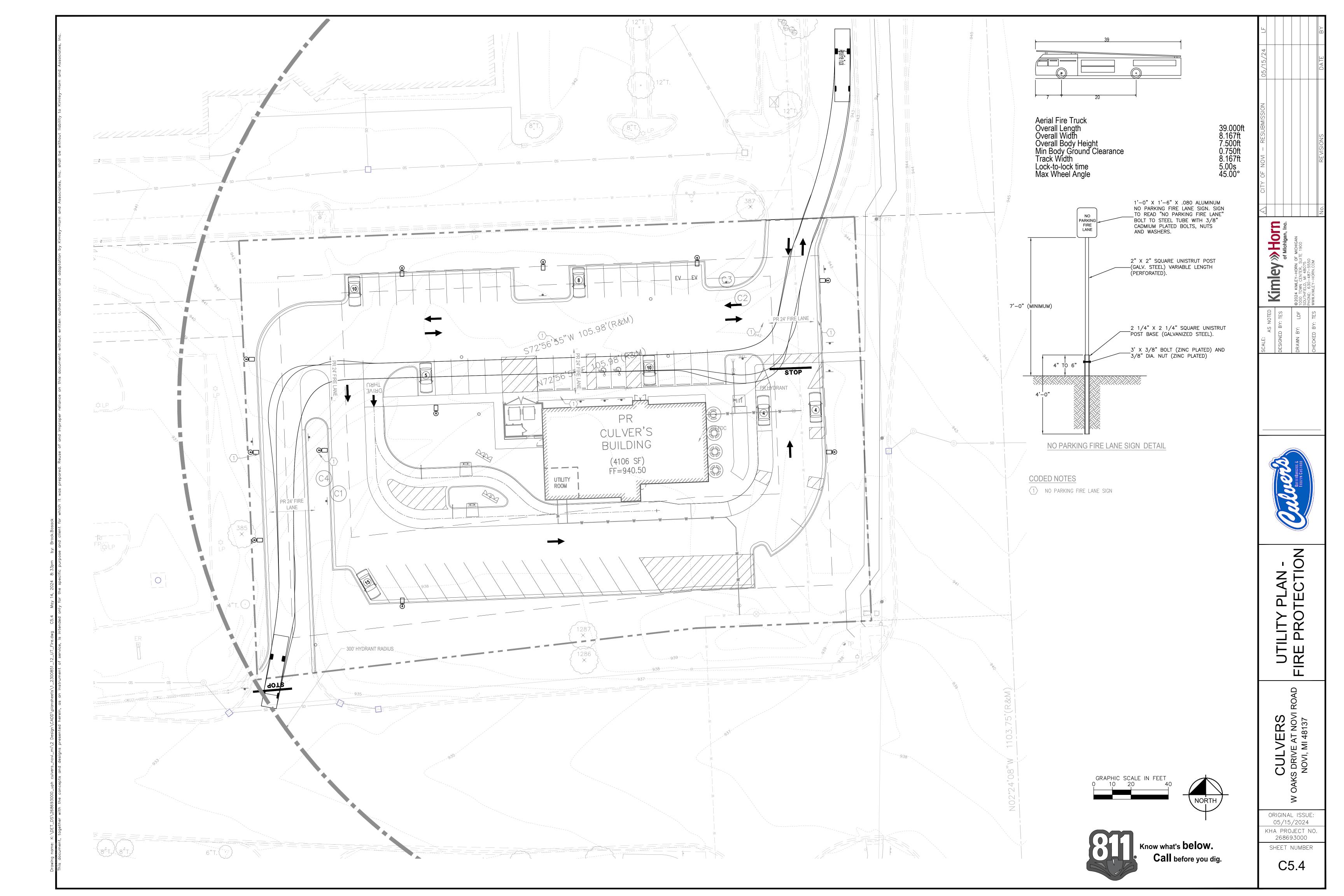
Know what's **below.** Call before you dig.

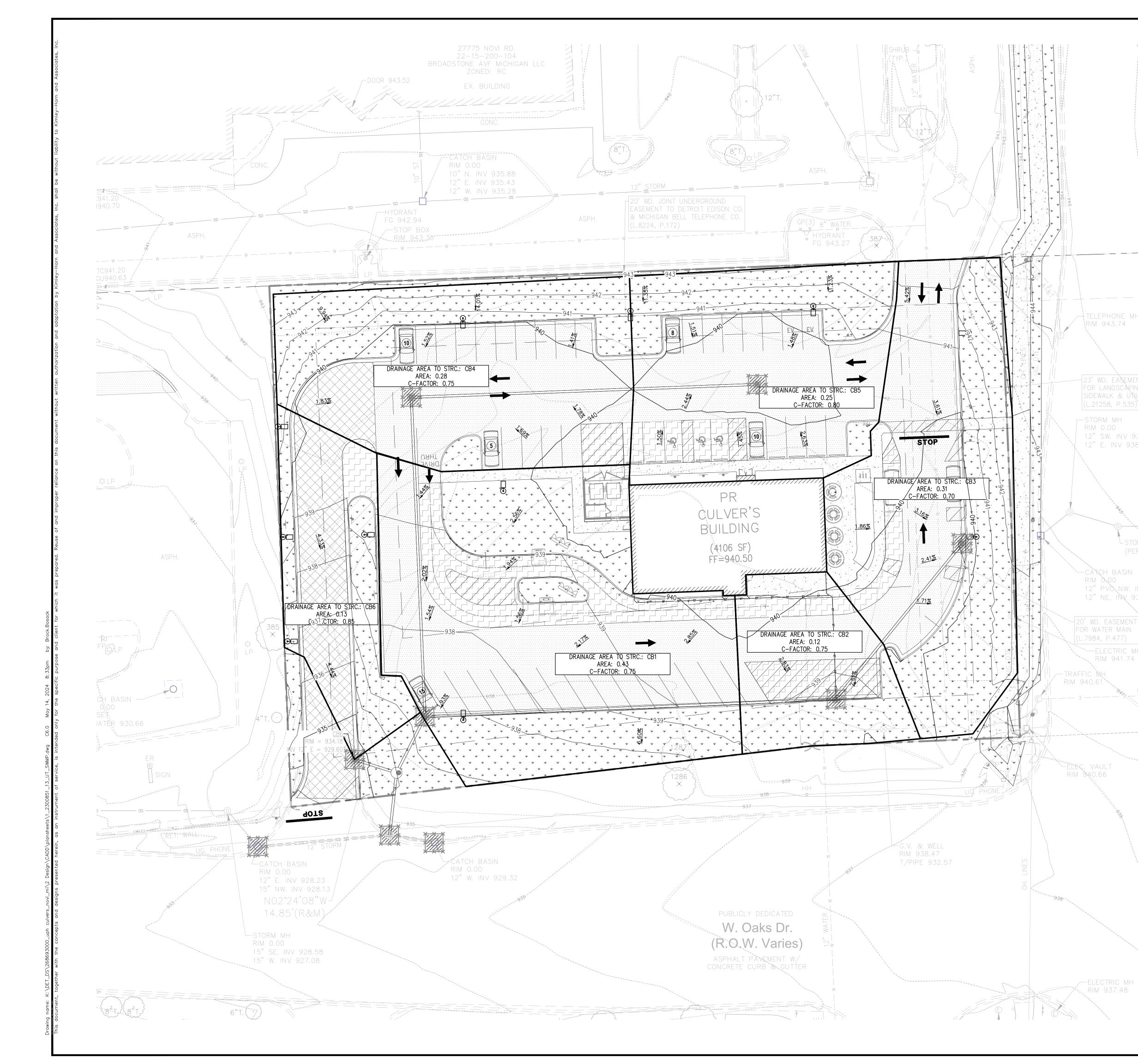
NORTH

|                                       |                                                                                       |                                            | DATE BY                                                                                                                     |
|---------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
|                                       |                                                                                       |                                            | REVISIONS                                                                                                                   |
|                                       |                                                                                       |                                            | No.                                                                                                                         |
| NIMIEY >>>> HOLN<br>of Michigan, Inc. | ©2024 KIMLEY-HORN OF MICHIGAN<br>1000 TOWN CENTER, SUITE 1900<br>SOUTHFIELD, MI 48075 | PHONE: 630-487-5550<br>WWW.KIMLEY-HORN.COM |                                                                                                                             |
| ESIGNED BY: TES                       | RAWN BY: LDF                                                                          | HECKED BY: TES                             |                                                                                                                             |
| Juero                                 | BUTTERBURGERS &<br>FROZEN CUSTARD                                                     |                                            |                                                                                                                             |
|                                       |                                                                                       | )                                          |                                                                                                                             |
| UTILITY PLAN -                        | SANITARY                                                                              |                                            |                                                                                                                             |
|                                       | DESIGNED BY: TES NIMEY WHOLN of Michigan, Inc.                                        | DESIGNED BY: TES                           | DESIGNED BY: TES<br>DRAWN BY: LDF<br>0000 TOWN CENTER, SI<br>SOUTHFIELD, MI 48075<br>CHECKED BY: TES<br>WWW.KIMLEY-HORN.COM |

KHA PROJECT NO. 268693000

SHEET NUMBER





|                                                                                          | LEGEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BY                                                                                                                                                   |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                          | LEGEND     CONCRETE PAVEMENT   HMA PAVMENT   HEAVY DUTY HMA PAVMENT   CONCRETE SIDEWALK   SPILL OUT CURB   STANDARD CURB & GUTTER   PROPOSED LIGHT POLE   PROPOSED STORM INLET   PROPOSED STORM MANHOLE   PROPOSED ADS BARRICUDA STRUCTURE   PROPOSED SANITARY SEWER MANHOLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | A     CITY OF NOVI - RESUBMISSION     05/15/24       No.     No.     DATE                                                                            |
| ин<br>ИН                                                                                 | <ul> <li>PROPOSED CLEANOUT</li> <li>PROPOSED HYDRANT</li> <li>PROPOSED WATER VALVE</li> <li>PROPOSED WATERMAIN REDUCER</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Timley » Horn<br>of Michigan, Inc.<br>4 KIMLEY-HORN OF MICHIGAN<br>TOWN CENTER, SUITE 1900<br>HFIELD, MI 48075<br>E: 630-487-5550<br>KIMLEY-HORN.COM |
| IENT<br>PING,<br>TILITIES<br>5)                                                          | INLET PROTECTION  STABILIZED CONSTRUCTION ENTRANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SCALE:<br>AS NOTED<br>DESIGNED BY: TES<br>DRAWN BY: LDF<br>0000<br>CHECKED BY: TES<br>PHON<br>WWW!                                                   |
| 938.61<br>38.51<br>BDICATED SECTION<br>BUBLICLY DEDICATED<br>SD<br>CORW WH<br>ER RECORD) | STORMWATER MANAGEMENT SUMMARY.<br>SITE DRAINAGE SUMMARY:<br>THE EXISTING SITE DRAINAGE PATTERN FLOWS FROM NORTHEAST TO SOUTHWEST,<br>ULTIMATELY DISCHARGING INTO W OAKS DRIVE. THE ENTIRE SITE'S STORMWATER WILL<br>BE CAPTURED AND MANAGED THROUGH A COMPREHENSIVE STORM SEWER SYSTEM.<br>STORMWATER CONVEYANCE AND TREATMENT:<br>INTEGRATED STORM SEWER SYSTEM: THE FULL SITE'S STORMWATER RUNOFF WILL BE<br>COLLECTED BY STORM SEWER. THE PRIMARY TREATMENT AND MANAGEMENT OF<br>STORMWATER WILL BE FACILITATED BY THE ADS BARRACUDA MAX STRUCTURE. THIS                                                                                                                                                                                          |                                                                                                                                                      |
| INV 938.66<br>938.61                                                                     | SYSTEM IS SELECTED FOR ITS EFFICIENCY IN TREATING STORMWATER, PARTICULARLY<br>FOR THE CRITICAL FIRST FLUSH VOLUME, WHICH IS OFTEN THE MOST POLLUTED.<br>FIRST FLUSH VOLUME MANAGEMENT: SPECIAL ATTENTION IS GIVEN TO TREATING THE<br>FIRST FLUSH VOLUME, WHICH CARRIES A SIGNIFICANT AMOUNT OF POLLUTANTS. THE<br>ADS BARRACUDA MAX SYSTEM IS DESIGNED TO EFFECTIVELY TREAT THIS INITIAL<br>RUNOFF, ENHANCING THE OVERALL QUALITY OF DISCHARGED WATER.<br>FLOW RATE CONTROL: THE SYSTEM IS CALIBRATED TO MANAGE A DISCHARGE RATE OF<br>0.15 CUBIC FEET PER SECOND (CFS) PER ACRE. THIS CONTROLLED RATE HELPS IN<br>MITIGATING POTENTIAL EROSION AND FLOODING ISSUES DOWNSTREAM AND ENSURES<br>COMPLIANCE WITH LOCAL STORMWATER MANAGEMENT STANDARDS. | ENTERBURE<br>FRUGEN GUSSI                                                                                                                            |
| MH<br>UG. ELECTRIC                                                                       | CONNECTION TO EXISTING INFRASTRUCTURE: THE TREATED STORMWATER WILL BE<br>DISCHARGED INTO THE EXISTING STORMWATER INFRASTRUCTURE LOCATED IN W OAKS<br>DRIVE. THIS CONNECTION IS DESIGNED TO SEAMLESSLY INTEGRATE WITH THE EXISTING<br>MUNICIPAL STORMWATER SYSTEM, ENSURING EFFICIENT MANAGEMENT OF SITE RUNOFF.<br><u>OVERALL STORMWATER MANAGEMENT DESIGN:</u><br>THE STORMWATER MANAGEMENT SYSTEM, INCLUSIVE OF THE ADS BARRACUDA MAX, IS<br>DESIGNED TO UPDATE AND ENHANCE THE SITE'S DRAINAGE PATTERNS. IT ALIGNS WITH<br>THE CURRENT STANDARDS SET BY THE OAKLAND COUNTY WATER RESOURCE DIVISION.                                                                                                                                               | STORMWATER<br>MANAGEMENT                                                                                                                             |
| N02°24'08"W 1103.75'(R&M)                                                                | GRAPHIC SCALE IN FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CULVERS<br>W OAKS DRIVE AT NOVI ROAD<br>NOVI, MI 48137                                                                                               |
|                                                                                          | Know what's below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ORIGINAL ISSUE:<br>05/15/2024<br>KHA PROJECT NO.<br>268693000<br>SHEET NUMBER                                                                        |

Know what's **below**. Call before you dig.

C6.0

SHEET NUMBER

| Statistics                                         |        |         |         |         | ř.      |         |
|----------------------------------------------------|--------|---------|---------|---------|---------|---------|
| Description                                        | Symbol | Avg     | Max     | Min     | Max/Min | Avg/Mir |
| AVERAGE LIGHT LEVEL OF ALL EXTERIOR AREAS COMBINED |        | 3.6 fc  | 32.7 fc | 1.0 fc  | 32.7:1  | 3.6:1   |
| DRIVE THRU ENTRANCE                                | +      | 14.6 fc | 14.6 fc | 14.6 fc | 1.0:1   | 1.0:1   |
| MAIN ENTRANCE                                      | +      | 18.0 fc | 18.0 fc | 18.0 fc | 1.0:1   | 1.0:1   |
| SIDEWALK AREA                                      | +      | 7.3 fc  | 29.2 fc | 1.2 fc  | 24.3:1  | 6.1:1   |
| VERTICAL WALL BACK OF BUILDING                     | +      | 1.4 fc  | 2.3 fc  | 0.4 fc  | 5.8:1   | 3.5:1   |
| VERTICAL WALL DRIVE THRU WINDOW                    | +      | 16.6 fc | 35.0 fc | 7.0 fc  | 5.0:1   | 2.4:1   |
| VERTICAL WALL FRONT OF BUILDING                    | +      | 1.1 fc  | 3.9 fc  | 0.3 fc  | 13.0:1  | 3.7:1   |
| VERTICAL WALL LEADING TO DRIVE THRU WINDOW         | +      | 3.4 fc  | 6.8 fc  | 1.7 fc  | 4.0:1   | 2.0:1   |
| VERTICAL WALL LEAVING DRIVE THRU WINDOW            | +      | 3.4 fc  | 14.2 fc | 0.7 fc  | 20.3:1  | 4.9:1   |
| VERTICAL WALL OF MAIN ENTRANCE                     | +      | 7.3 fc  | 24.5 fc | 0.3 fc  | 81.7:1  | 24.3:1  |
| EMPLOYEE ENTRANCE AND SIDEWALK                     | +      | 5.9 fc  | 19.0 fc | 2.0 fc  | 9.5:1   | 3.0:1   |
| AREA OUTSIDE OF PROPERTY LINE                      | +      | 0.1 fc  | 0.5 fc  | 0.0 fc  | N/A     | N/A     |
| PARKING LOT                                        | +      | 3.1 fc  | 8.9 fc  | 0.8 fc  | 11.1:1  | 3.9:1   |

0.0

0.0

0.1

0.2

0.2

+0.2

+0.2

+0.2

+0.1

+0.1

0.1

0.1

<sup>+</sup>0.1

0.1

0.1

+0.1

+0.1

+0.0

+0.0

0.0

935.64 \_\_\_\_\_

933.59

0.0

 $\square$ 

<sup>+</sup>0.1 <sup>+</sup>0.1

0.3

0.2

0.1

0.1

+0.1

+0.1

0.2

0.2

0.2

+0.1

+0.1

+0.0

0.0

0.0

0.0

0.0

+0.0 +0.0

.

OE1

2.7

2.8

2.2

1.8

1.6

· 🔳 OE3

0.0

0.1

2.1

2.1

OE 3

| Schedule   |          |          |                                                                                       |          |  |  |
|------------|----------|----------|---------------------------------------------------------------------------------------|----------|--|--|
| Symbol     | Label    | Quantity | Catalog Number                                                                        | Wattage  |  |  |
| $\bigcirc$ | N        | 19       | LDN6 30/15 LO6AR LS<br>MVOLT GZ10 -<br>MOUNTED AT 18'                                 | 17.52    |  |  |
| $\bigcirc$ | N        | 2        | LDN6 30/15 LO6AR LS<br>MVOLT GZ10 -<br>MOUNTED AT 8' MAIN<br>ENT CANOPY               | 17.52    |  |  |
| $\bigcirc$ | N        | 22       | LDN6 30/15 LO6AR LS<br>MVOLT GZ10 -<br>MOUNTED AT 22'                                 | 17.52    |  |  |
| $\bigcirc$ | N        | 2        | LDN6 30/15 LO6AR LS<br>MVOLT GZ10 -<br>MOUNTED AT 8' IN<br>DRIVE THRU CANOPY          | 17.52    |  |  |
|            | OC       | 1        | DSX1 LED P7 30K T5M<br>MVOLT - 23' POLE,<br>BASE 2' ABOVE GRADE                       | 184.43   |  |  |
|            | OC4      | 0        | DSX1 LED P7 30K T5W<br>MVOLT HS - 23' POLE,<br>BASE 2' ABOVE GRADE                    | 184.4348 |  |  |
|            | OC1<br>2 | 2        | DSX1 LED P5 30K T5M<br>MVOLT HS - 23' POLE,<br>BASE 2' ABOVE GRADE                    | 138      |  |  |
|            | OE       | 3        | DSX1 LED P6 30K BLC3<br>MVOLT - 23' POLE, BASE<br>2' ABOVE GRADE                      | 163      |  |  |
|            | OE1      | 3        | DSX1 LED P4 30K BLC3<br>MVOLT - 23' POLE, BASE<br>2' ABOVE GRADE                      | 123.94   |  |  |
| _          | OE2      | 1        | DSX1 LED P3 30K BLC3<br>MVOLT - 23' POLE, BASE<br>2' ABOVE GRADE                      | 102.17   |  |  |
| -          | OE3      | 3        | DSX1 LED P2 30K BLC3<br>MVOLT - 23' POLE, BASE<br>2' ABOVE GRADE                      | 67.79    |  |  |
|            | OE6      | 1        | DSX1 LED P5 30K BLC4<br>MVOLT - 23' POLE, BASE<br>2' ABOVE GRADE                      | 138.16   |  |  |
|            | Р        | 1        | SLIM17FA15ADJ_3K -<br>MOUNTED AT 9'                                                   | 14.2     |  |  |
| <b>^</b>   | S        | 18       | WS-W52610 / 3K COLOR<br>TEMP                                                          | 11.7402  |  |  |
|            | LCP      | 1        | LIGHTING CONTROL<br>PANEL / ARP 32<br>CIRCUIT, VERIFY<br>NUMBER OF CIRCUITS<br>NEEDED | 0        |  |  |
|            | PE       | 1        | LIGHTING CONTROL PE /<br>NIO PC KIT / PHOTO EYE<br>/ VERIFY INSTALL<br>LOCATION       | 0        |  |  |





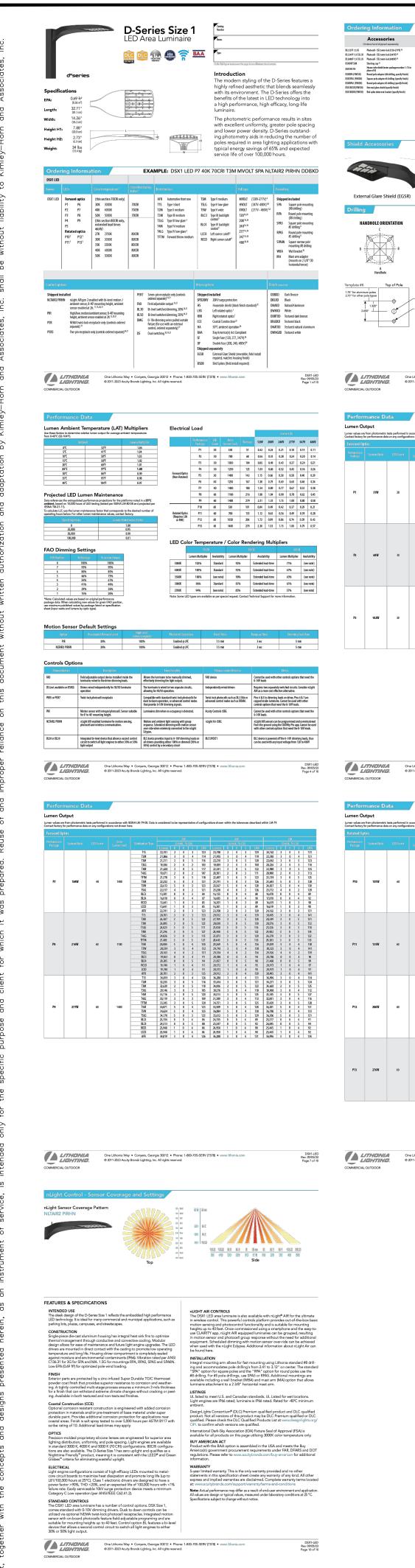
933.59

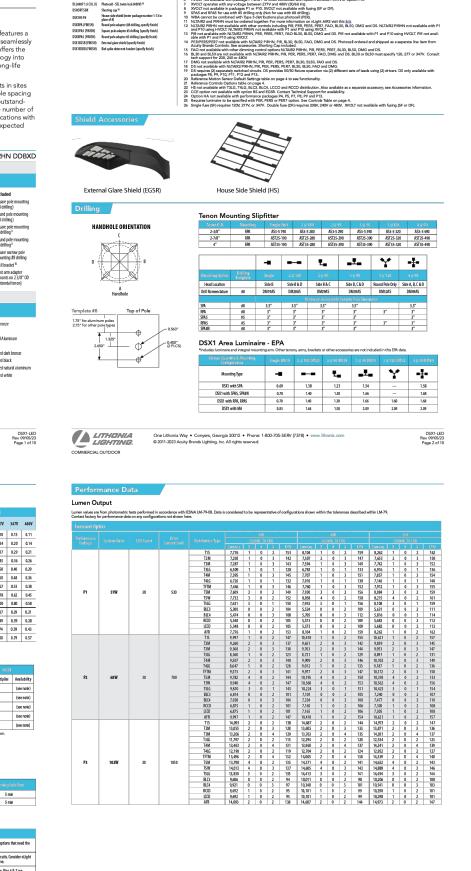
2. FLASHING LIGHT SHALL NOT BE PERMITTED 3. ONLY NECESSARY LIGHTING FOR SECURITY PURPOSES & LIMITED OPERATIONS SHALL BE PERMITTED AFTER A SITE'S HOURS OF OPERATION

935.73

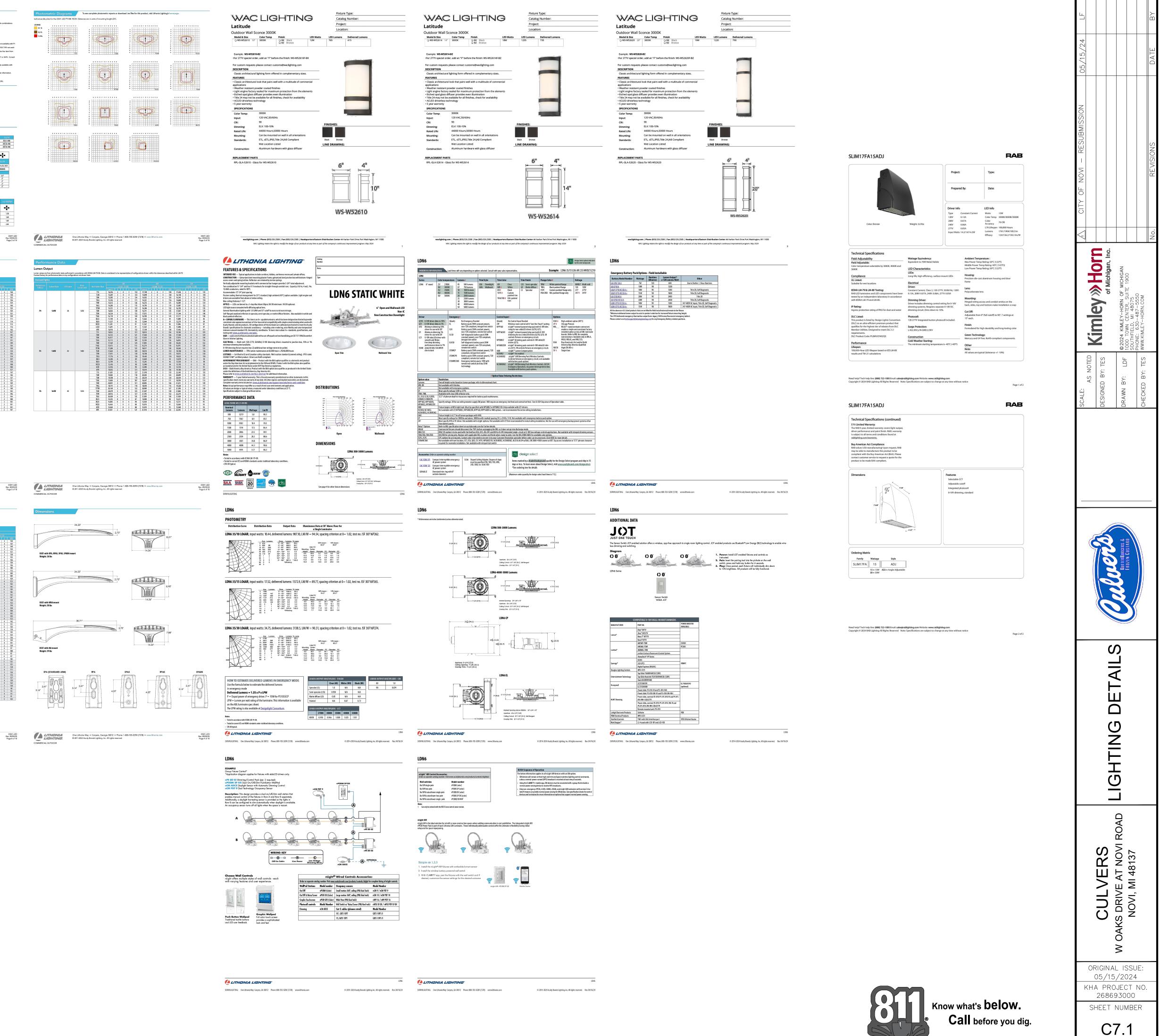
935.21

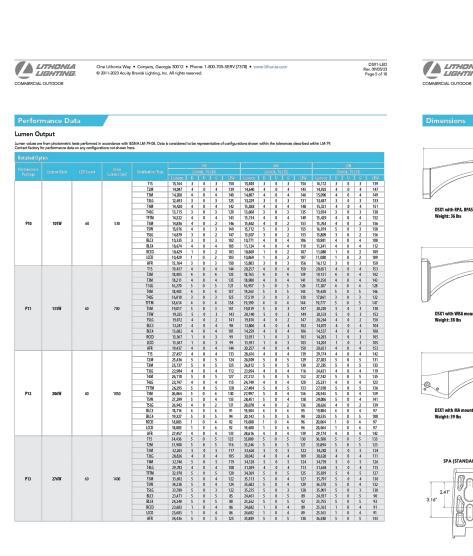






ne voltage from 120-277V (S0/60 mz). ne voltage from 347-480V (S0/60 Hz). ige P1 and P10 when combined with option NLTAIR2 PIRHN or option PIR.

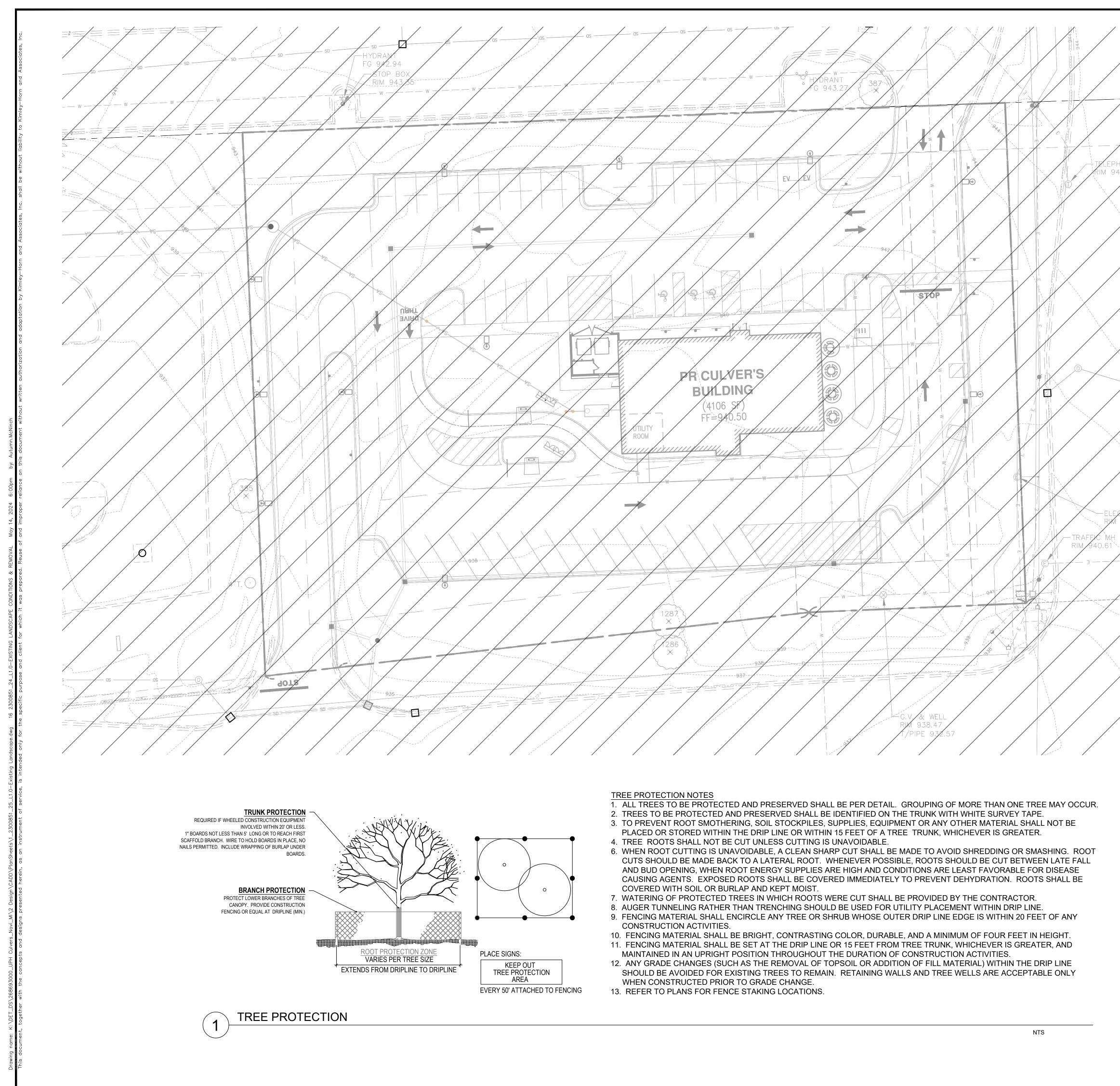




Commercial OutDoor

DSX1-LED Rev. 09/05/23 Page 8 of 10

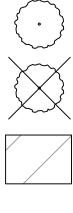
Call before you dig



- 1. ALL TREES TO BE PROTECTED AND PRESERVED SHALL BE PER DETAIL. GROUPING OF MORE THAN ONE TREE MAY OCCUR.

|       |       | TREE REMOV                  | AL LIST   |         |                      |
|-------|-------|-----------------------------|-----------|---------|----------------------|
| TAG # | DBH   | TYPE<br>(DECIDOUS/EVERGREEN | CONDITION | REMOVAL | REPLACEMENT<br>COUNT |
| 371   | 15"   | DECIDOUS                    | GOOD      | YES     | 0                    |
| 372   | 12"   | DECIDOUS                    | GOOD      | YES     | 0                    |
| 373   | 22.5" | DECIDOUS                    | GOOD      | YES     | 0                    |
| 374   | 3.5"  | DECIDOUS                    | POOR      | YES     | 0                    |
| 375   | 14"   | DECIDOUS                    | FAIR      | YES     | 0                    |
| 376   | 15"   | DECIDOUS                    | GOOD      | YES     | 0                    |
| 377   | 11"   | DECIDOUS                    | GOOD      | YES     | 0                    |
| 378   | 17"   | DECIDOUS                    | POOR      | YES     | 0                    |
| 379   | 12"   | EVERGREEN                   | POOR      | YES     | 0                    |
| 380   | 5"    | DECIDOUS                    | POOR      | YES     | 0                    |
| 381   | 20"   | DECIDOUS                    | POOR      | YES     | 0                    |
| 382   | 5"    | DECIDOUS                    | POOR      | YES     | 0                    |
| 383   | 30"   | DECIDOUS                    | POOR      | YES     | 0                    |
| 384   | 8"    | DECIDOUS                    | FAIR      | YES     | 0                    |
| 385   | 14"   | EVERGREEN                   | GOOD      | NO      | 0                    |
| 386   | 12.2" | DECIDOUS                    | GOOD      | YES     | 0                    |
| 387   | 18"   | DECIDOUS                    | GOOD      | YES     | 0                    |
| 388   | 28"   | DECIDOUS                    | GOOD      | YES     | 0                    |
| 389   | 21.6" | DECIDOUS                    | GOOD      | YES     | 0                    |
| 390   | 16.3" | DECIDOUS                    | GOOD      | YES     | 0                    |
| 391   | 13.4" | EVERGREEN                   | FAIR      | YES     | 0                    |
| 392   | 11.3" | EVERGREEN                   | GOOD      | YES     | 0                    |
| 393   | 15"   | EVERGREEN                   | GOOD      | YES     | 0                    |
| 394   | 15.4" | EVERGREEN                   | GOOD      | YES     | 0                    |
| 395   | 14"   | EVERGREEN                   | GOOD      | YES     | 0                    |
| 1281  | 12.8" | EVERGREEN                   | GOOD      | YES     | 0                    |
| 1282  | 13.2" | EVERGREEN                   | GOOD      | YES     | 0                    |
| 1284  | 14"   | EVERGREEN                   | GOOD      | YES     | 0                    |
| 1285  | 12.2" | EVERGREEN                   | GOOD      | YES     | 0                    |
| 1286  | 9"    | EVERGREEN                   | POOR      | NO      | 0                    |
| 1287  | 18"   | EVERGREEN                   | GOOD      | NO      | 0                    |
| 1292  | 12"   | EVERGREEN                   | POOR      | YES     | 0                    |

## LEGEND:



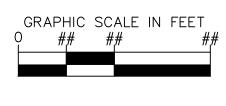
**EXISTING TREE TO REMAIN** 

EXISTING TREE TO BE REMOVED

MARLETTE SANDY LOAM, 1 TO 6 PERCENT SLOPES

## NOTES:

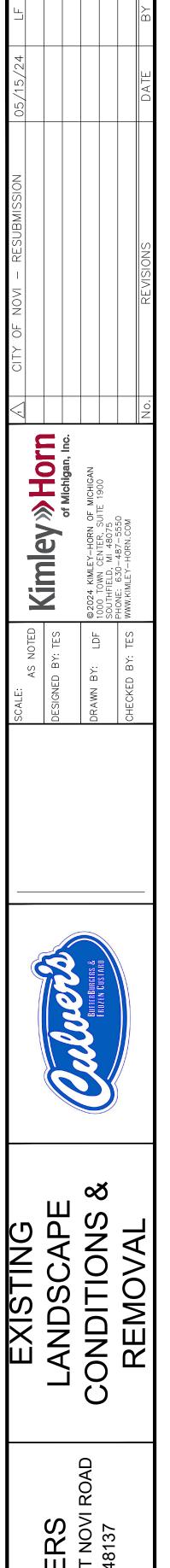
- 1. PER THE SOILS SURVEY OF OAKLAND COUNTY, THERE IS ONLY ONE SOIL TYPE, (MARLETTE SANDY LOAM, 1 TO 6
- PERCENT SLOPES) ON AND AROUND THE PROPERTY. 2. PER THE SURVEY THERE IS NO PHRAGMITES OR JAPANESE KNOTWEED ON SITE. CONTRACTOR TO COMPLETELY REMOVE IF FOUND DURING CONSTRUCTION.



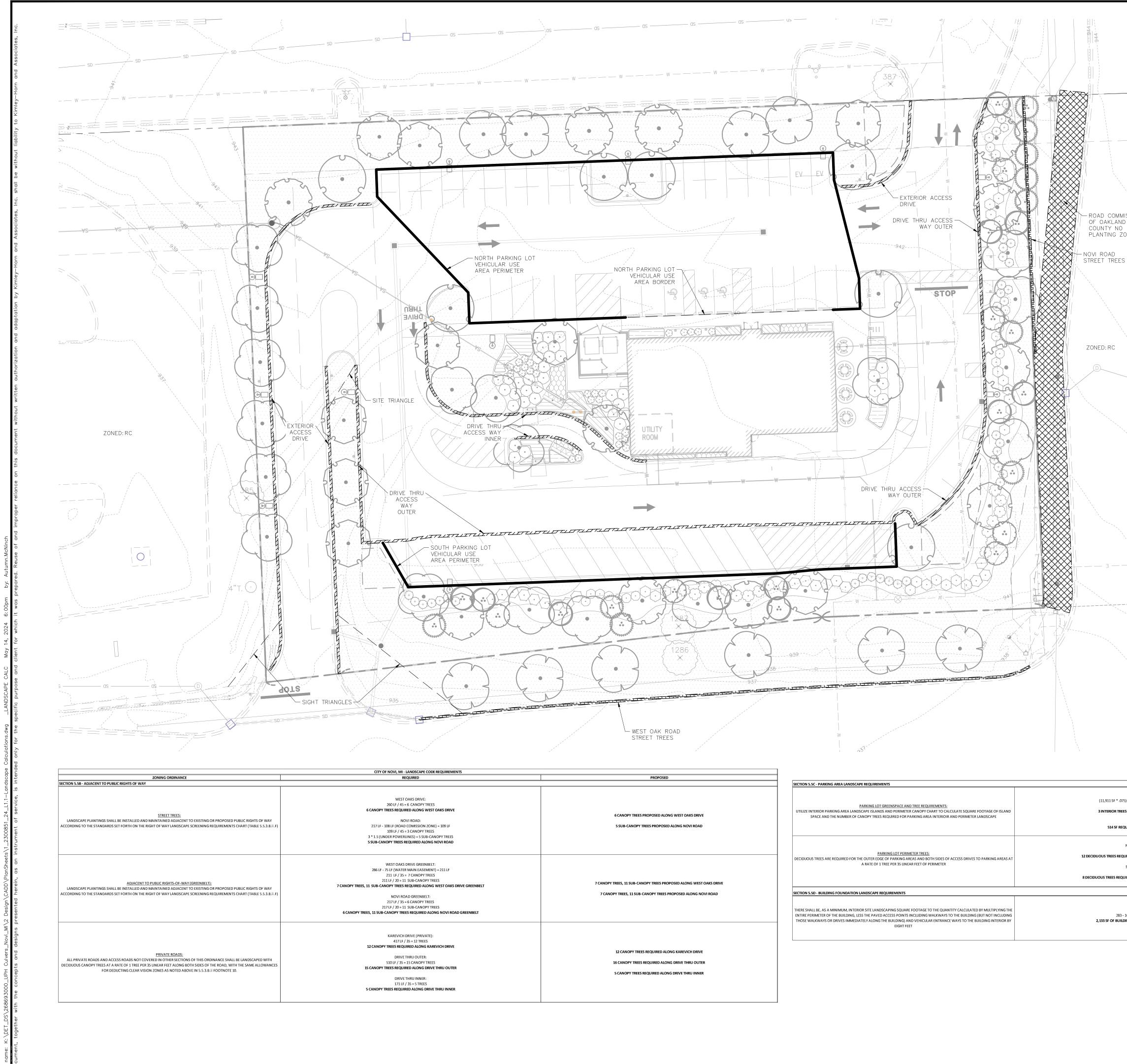




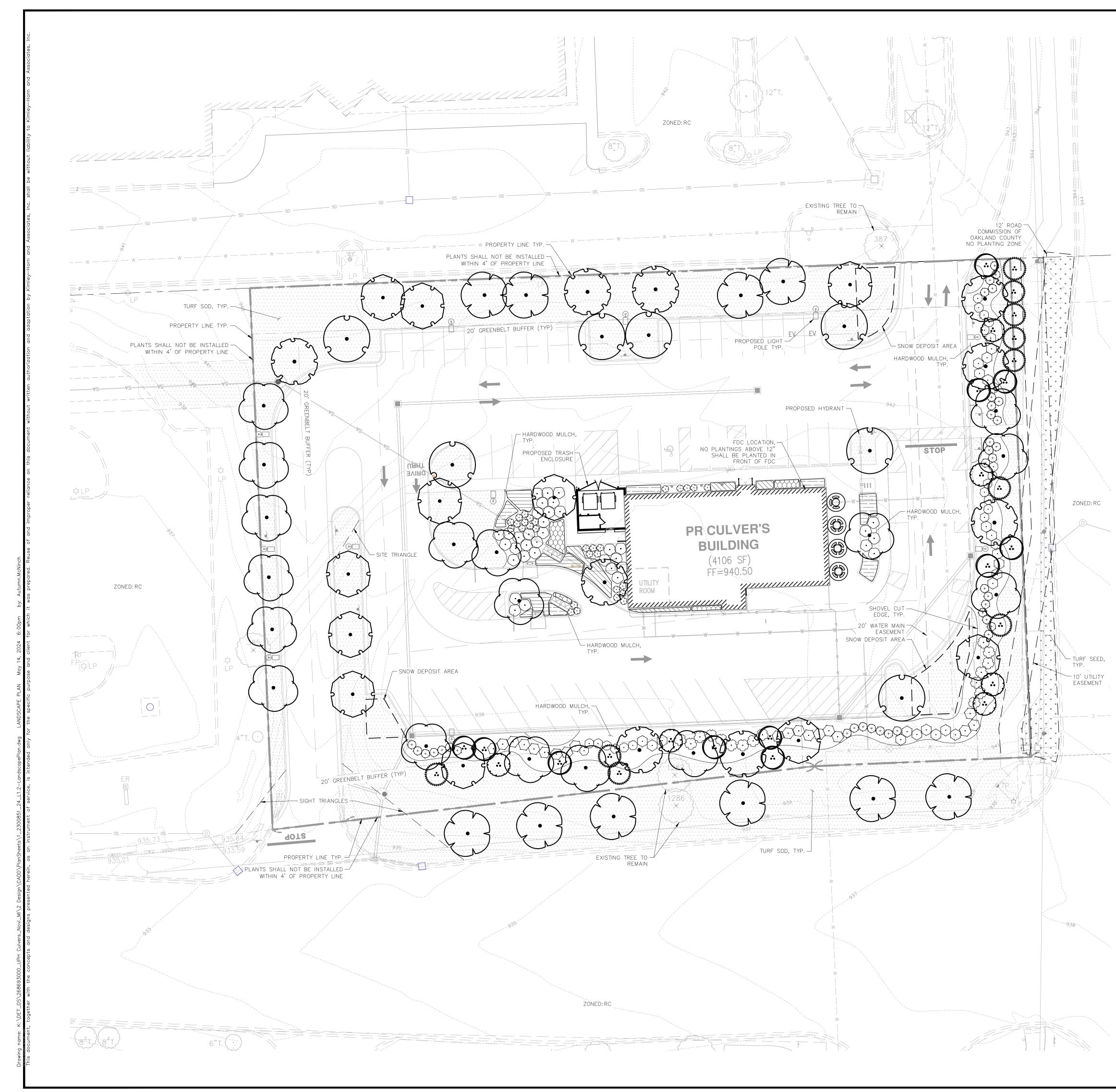
Know what's **below.** Call before you dig.







|                                                                                                                                              |         |                                                                                                                                     | BY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                              |         |                                                                                                                                     | /15/24<br>DATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                              |         |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         |                                                                                                                                     | RESUBMISSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                              |         |                                                                                                                                     | DVI - RESUBI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                              |         |                                                                                                                                     | OF NOVI<br>REVI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MMISSION<br>AND<br>NO<br>ZONE                                                                                                                |         |                                                                                                                                     | CITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ES                                                                                                                                           | LEGEND: |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         | VEHICULAR USE AREA BORDER                                                                                                           | Solution of Michigan, In<br>or Michigan, In<br>of Mi |
|                                                                                                                                              |         | VEHICULAR USE AREA PERIMETER                                                                                                        | LEY-HORN OF<br>CENTER, SUI<br>MI 48075<br>0-487-5550<br>1'-HORN.COM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                              |         | ACCESS WAY PERIMETER                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         |                                                                                                                                     | : AS NOTED<br>AS NOTED<br>VED BY: TES<br>KED BY: TES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                              |         | STREET TREE PERIMETER                                                                                                               | SCALE:<br>DESIGNED<br>DRAWN B<br>CHECKED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                              |         | ROAD COMMISSION OF OAKLAND<br>COUNTY NO PLANTING ZONE                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         |                                                                                                                                     | IN I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                              |         |                                                                                                                                     | Burrende<br>Relation 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                              |         |                                                                                                                                     | S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                              |         |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                              |         |                                                                                                                                     | ы<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N<br>N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                              |         |                                                                                                                                     | DSCAPI<br>ULATIO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                              |         |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| NORTHERN INTERIOR:<br>* .075) + ((11,911 SF - 50,000 SF) * .01) = 514 SF<br>514 SF / 200 = 3 TREES<br>TREES REQUIRED IN NORTHERN PARKING LOT |         | 3 INTERIOR CANOPY TREES PROPOSED IN NORTHERN PARKING LOT<br>5,279 PROPOSED GREEN SPACE IN NORTHERN PARKING LOT                      | CAL(                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| NORTH GREEN SPACE:<br>REQUIRED IN NORTHERN PARKING LOT<br>NORTHERN PERIMETER:<br>419 LF / 35 = 12 TREES                                      |         | SOUTHERN LOT ONLY REQUIRES PERIMETER TREES PER ZONING ORDINANCE 5.5.3.C.iv.i                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| REQUIRED ALONG NORTHERN PARKING LOT PERIN<br>SOUTHERN PERIMETER:<br>245 LF / 35 = 8 TREES<br>REQUIRED ALONG SOUTHERN PARKING LOT PERIM       |         | 12 DECIDUOUS TREES PROPOSED ALONG NORTHERN PARKING LOT PERIMETER<br>8 DECIDUOUS TREES PROPOSED ALONG SOUTHERN PARKING LOT PERIMETER | /I ROAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 283 - 16.42 = 266.58 LF * 8 = 2,133 SF<br>BUILDING FOUNDATION LANDSCAPE REQUIRED                                                             |         | 2,193 SF OF BUILDING FOUNDATION LANDSCAPE PROPOSED                                                                                  | TERS<br>AT NOV<br>148137                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                              |         |                                                                                                                                     | CULVERS<br>S DRIVE AT NOVI<br>NOVI, MI 48137                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                              |         | GRAPHIC SCALE IN FEET                                                                                                               | W OAKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                              |         | NORTH                                                                                                                               | ORIGINAL ISSUE:<br>05/15/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                              |         | Know what's <b>below</b> .                                                                                                          | KHA PROJECT NO.<br>268693000<br>SHEET NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                              |         | Call before you dig.                                                                                                                | L1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



| Y       BOTANICAL / COMMON NAME       CONT       CAL       SIZE         ACER RUBRUM / RED MARLE       B & B       S'CAL MIN.       Image: Control of Contro of Contro of Contro of Control of Contro of Control of Control of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NUM         ODE         ODE         ODE         ODE         DE           1         COME         ODE         ODE         ODE         DE         DE           1         C         COME         ODE         ODE         DE         DE         DE           1         C         C         COME         ODE         ODE         ODE         DE         DE         DE           1         C         C         C         COME         ODE         ODE         DE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |                                    |                         |                                                                                                                       |             |              |              | 05/15/24                                 |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------|--------------|--------------|------------------------------------------|------------|
| Y       BOTANICAL / COMMON NAME       CONT       CAL       SIZE         ACER RUBRUM / RED MARLE       B & B       S'CAL MIN.       Image: Control of Contro of Contro of Contro of Control of Contro of Control of Control of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | A CODE         OTH         OTHER CLOCATION NAME         OCH         OL         BEE           VILLES         VILLES         BEB         TOAL         BEE         TOAL         BEE           VILLES         VILLES         BEB         TOAL         BEB         TOAL         BEE           VILLES         VILLES         BEB         TOAL         BEB         TOAL         BEE           VILLES         VILLES         BEB         TOAL         BEB         TOAL         BEB           VILLES         VILLES         BEB         TOAL         BEB         TOAL         BEB           VILLES         BEB         TOAL         BEB         TOAL         BEB         TOAL         BEB           VILLES         BEB         TOAL         BEB         TOAL         BEB         TOAL         BEB           NS         NUMERADIATION FROMES         NEEDERS         BEB         TOAL         BEB         TOAL         BEB           NOT         MERCENCINCERNERS         BEB         TOAL         BEB         TOAL         BEB           NOT         MERCENCINCERNERS         BEB         TOAL         BEB         TOAL         BEB           NOT         MA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                    |                         |                                                                                                                       |             |              |              | OF NOVI -                                |            |
| gYMMOCLADUS DIOKUS / KENTUCKY COFFEETREE       B & B       3' CAL MN.       Image: Comparison of the comparison of t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | AH       17       ACHA RUMRUM / RED MAP #       R.A.B.       31 CAL. MN         AH       12       CEDITER ATRACAMTORY F. INFERIORY / TOORNESS HOMEY LOCUST       B.A.B.       31 CAL. MN         AK       13       GYMROCLADUS DIDICUS / KENTUCKY COFFEETREE       B.B.B.       31 CAL. MN         AK       13       GYMROCLADUS DIDICUS / KENTUCKY COFFEETREE       B.B.B.       31 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       31 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       11       ALERICUS RUBRA / NORTHERN RED GAK       B.B.B.       21 CAL. MN         AK       12       MALUE X SNOWORDER / DAMAY / KOREAN FOROYTONY SERVICE       B.B.B.       21 CAL. MN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                    |                         | BOTANICAL / COMMON NAME                                                                                               | CONT        | CAL          | SIZE         | $\overline{\langle}$                     |            |
| gYMMOCLADUS DIOKUS / KENTUCKY COFFEETREE       B & B       3' CAL MN.       Image: Comparison of the comparison of t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | AC         10         OYUNOCLADUS DOCUS/ KENTUCKY COFFEETREF         8.8.8         3"CAL MIN.           NS         8         NYSA SULVITICA/ TUPELO         8.8.8         3"CAL MIN.           NS         8         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         3"CAL MIN.           NRTY         A         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         2"CAL MIN.           NRTY         A         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         2"CAL MIN.           NRTY         A         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         2"CAL MIN.           NRTY         A         1         AMELANCHERA ARSOREA / DOWNY DERVICEBERRY         8.8.8         2"CAL MIN.           NRTY         A         10         COMPANDAL / COMMON NAME         COMPANDAL / COMMON NAME         00           NRTY         B         3         CAL MIN.         5         CAL SEE PLAN.         20"TH. MIN.           NRTY         B         19         LINDERA EDIX ORVITIERT CRARAPH F         R& 8         2"CAL MIN.           NRTY         B         19         LINDERA EDIX ORVITIERT CRARAPH F         R& 8         2"CAL MIN.           NRTY         B         19         LINDERA EDIX OR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         | _                                  | 17                      | ACER RUBRUM / RED MAPLE                                                                                               | B & B       | 3" CAL. MIN. |              |                                          |            |
| gYMMOCLADUS DIOKUS / KENTUCKY COFFEETREE       B & B       3' CAL MN.       Image: Comparison of the comparison of t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | AC         10         OYUNOCLADUS DOCUS/ KENTUCKY COFFEETREF         8.8.8         3"CAL MIN.           NS         8         NYSA SULVITICA/ TUPELO         8.8.8         3"CAL MIN.           NS         8         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         3"CAL MIN.           NRTY         A         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         2"CAL MIN.           NRTY         A         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         2"CAL MIN.           NRTY         A         11         OUERCUS RUBRA/ NORTHERN RED OAK         8.8.8         2"CAL MIN.           NRTY         A         1         AMELANCHERA ARSOREA / DOWNY DERVICEBERRY         8.8.8         2"CAL MIN.           NRTY         A         10         COMPANDAL / COMMON NAME         COMPANDAL / COMMON NAME         00           NRTY         B         3         CAL MIN.         5         CAL SEE PLAN.         20"TH. MIN.           NRTY         B         19         LINDERA EDIX ORVITIERT CRARAPH F         R& 8         2"CAL MIN.           NRTY         B         19         LINDERA EDIX ORVITIERT CRARAPH F         R& 8         2"CAL MIN.           NRTY         B         19         LINDERA EDIX OR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ~                                       |                                    |                         |                                                                                                                       |             |              |              | Michiga<br>Michiga                       |            |
| GYMANOCLADUS DIGICUS / KENTUCKY COFFEETREE       B & B       9" CAL MN.       Image: Calification of the cal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | AK       10       SYMMOLULOUS PURCUUS VENTUCKY COFFEETREE       B&B       3'CAL MIN.         HS       P       NYSSA SYLVATICA / TUFELO       B&B       3'CAL MIN.         AR       11       OUEROUS RUBRA / NORTHERN RED OAK       B&B       3'CAL MIN.         AA       11       OUEROUS RUBRA / NORTHERN RED OAK       B&B       3'CAL MIN.         MCPY       AA       11       AMELANCHER ARSOREA / DOWNY SERVICEBERTY       B&B       2'CAL MIN.         CC       10       CANTAGGUS CRUS-GALLI / COMMON SERVICEBERTY       B&B       2'CAL MIN.       Immon         MS       0       MAUUS X SNOWDRIFT' SMOWDRIFT'S SMOWDRIFT                                                                                                                                                                                  | · J G                                   | т                                  | 7                       | GLEDITSIA TRIACANTHOS F. INERMIS / THORNLESS HONEY LOCUST                                                             | B & B       | 3" CAL. MIN. |              | 8N 0 8N 0                                | N.COM      |
| NYSSA SYLVATICA / TUPELO B & B CAL MIN.  UEUTAL GRASSES UNBERA / NORTHERN RED DAK B & B CAL MIN.   AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.  AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.   AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.   AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.    AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.    AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.     AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.     AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.        AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & B CAL MIN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NS         9         NYSSA SYLVATICA / TUPELO         B & B         3' CAL MIN.         Image: CAL MIN.           0R         11         QUERCUS RUSRA / NORTHERN RED OAK.         B & B         3' CAL MIN.         Image: CAL M                                                                                                                                                                                                                                                                                                                                                 | · J G                                   | К                                  | 10                      | GYMNOCLADUS DIOICUS / KENTUCKY COFFEETREE                                                                             | B & B       | 3" CAL. MIN. |              |                                          | <u>_</u>   |
| QUERCUS RUBRA / NORTHERN RED OAK       B & B       3' CAL MIN.       Image: Cal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0 or       11       QUERCUS RUBRA/ NORTHERN RED OAK       8 & B       3" CAL.MIN.         NAME       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0       0 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | محمد الا                                | S                                  | 9                       | NYSSA SYLVATICA / TUPELO                                                                                              | B & B       | 3" CAL. MIN. |              | ©2024 1<br>1000 TO<br>SOUTHFIE<br>PHONE: | WWW.KIMLE  |
| AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & CAL. MIN.<br>AMELANCHIER ARBOREA / DOWNY SERVICEBERRY B & B & CAL. MIN.<br>CRATAEGUS CRUS-GALLI / COCKSPUR HAWTHORN B & B & CAL. MIN.<br>MALUS X'SNOWDRIFT / SNOWDRIFT ORABAPPLE B & B & CAL. MIN.<br>MALUS X'SNOWDRIFT / SNOWDRIFT ORABAPPLE B & B & CAL. MIN.<br>MALUS X'SNOWDRIFT / SNOWDRIFT ORABAPPLE B & B & CAL. MIN.<br>MALUS X'SNOWDRIFT / SNOWDRIFT ORABAPPLE B & B & CAL. MIN.<br>MALUS X'SNOWDRIFT / SNOWDRIFT ORABAPPLE S & CAL. MIN.<br>MALUS X'SNOWDRIFT / SNOWDRIFT ORABAPPLE S & GAL. SEE PLAN 30' HT. MIN.<br>INDERA BENZOIN / SPICEBUSH S GAL. SEE PLAN 30' HT. MIN.<br>PHYSOCARPUS OPULFOLIUS / NINEBARK S GAL. SEE PLAN 30' HT. MIN.<br>SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA S GAL. SEE PLAN 12' HT. MIN.<br>VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM S GAL. SEE PLAN 12' HT. MIN.<br>VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM S GAL. SEE PLAN 30' HT. MIN.<br>WENTAL GRASSES<br>MEMEROCALLIS X'STELLA DE ORO / STELLA DE ORO DAYLLY 1 GAL. 18' O.C.<br>PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36' O.C.<br>RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 24' O.C.<br>SPOROBOLLIS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36' O.C.<br>Y BOTANICAL / COMMON NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NMOPY       AA       11       AMELANCHER ARBOREA/DOWNY SERVICEBERRY       B & B       2' CAL MIN         NOPY       AA       11       AMELANCHER ARBOREA/DOWNY SERVICEBERRY       B & B       2' CAL MIN         NO       CO       10       CRATAEGUS CRUS-GALLI/COCKSPUR HAWTHORN       B & B       2' CAL MIN         MS       0       MALUS X'SNOWDRIFT / SNOWDRIFT / SNOWDRI | and<br>N                                |                                    |                         |                                                                                                                       |             |              |              | NOTED<br>X: TES                          | BY: TES    |
| AMELANCHIER ARBOREA / DOWINY SERVICEBERRY B & B 2 ° CAL. MIN. CRATAEGUS CRUS-GALLI / COCKSPUR HAWTHORN B & B 2 ° CAL. MIN. CRATAEGUS CRUS-GALLI / COCKSPUR HAWTHORN B & B 2 ° CAL. MIN. MALUS X 'SNOWDRIFT / SNOWDRIFT CRABAPPLE B & B 2 ° CAL. MIN. Y B BOTANICAL / COMMON NAME CONT SPACING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | AA       11       AMELANCHER ARBOREA / DOWNY SERVICEBERRY       B & B       2" CAL_MN.         CC       10       CRATAEOUS CRUS-GALLI / COCKSPUR HAWTHORN       B & B       2" CAL_MN.         MS       6       MALUS X SNOWDRIFT / SNOWDRIFT GRABAPLE       B & B       2" CAL_MN.         MS       6       MALUS X SNOWDRIFT / SNOWDRIFT GRABAPLE       B & B       2" CAL_MN.         MS       6       MALUS X SNOWDRIFT / SNOWDRIFT GRABAPLE       B & B       2" CAL_MN.         MS       6       MALUS X SNOWDRIFT / SNOWDRIFT GRABAPLE       B & B       2" CAL_MN.         MS       6       MALUS X SNOWDRIFT / SNOWDRIFT GRABAPLE       B & B       2" CAL_MN.         MS       10       LINDERA BENZON / SPICEBUSH       G GAL_SEE PLAN_SOTHT.       SEE         PN       19       PHYSOCARPUS OPULIFOLUS / NINEBARK       S GAL_SEE PLAN_24" HT. MN.         SA       29       SPRAEA X BUMALDA WITERER / ANTHONY WATERER SPIREA       G GAL_SEE PLAN_24" HT. MN.         VD       16       VIDURINUM DENTATUM ARROWWOOD / ARROWWOOD / MERGRANT SUMAC       G GAL_SEE PLAN_24" HT. MN.         MALUS AND DORMANENTAL GRABSES       JUNIPERUS CHINENSIS 'SEA GREEN / ISEA GREEN JUNIPER       G GAL_SEE PLAN_24" HT. MN.         MALS AND DORMANENTAL GRASSES       JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       G GAL_SEE P                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ه کم و                                  | R                                  | 11                      | QUERCUS RUBRA / NORTHERN RED OAK                                                                                      | B & B       | 3" CAL. MIN. |              |                                          | CHECKED B. |
| MALUS X 'SNOWDRIFT / SNOWDRIFT CRABAPPLE       B & B       2' CAL MIN.         Y       BOTANICAL / COMMON NAME       CONT       SPACING       SIZE         FORSYTHIA OVATA / KOREAN FORSYTHIA       5 GAL.       SEE PLAN       30' HT. MIN.         LINDERA BENZOIN / SPICEBUSH       5 GAL.       SEE PLAN       30' HT. MIN.         PHYSOCARPUS OPULIFOLIUS / NINEBARK       5 GAL.       SEE PLAN       24'' HT. MIN.         SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       12'' HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       10'' HT. MIN.         JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24'' HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       10'' HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD / JARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       24'' HT. MIN.         VIBURNUM DENTATUM 'HEAVY METAL 'Y HEAVY METAL SWITCH GRASS       1 GAL.       18'' O.C.       VIBURGATUM 'HEAVY METAL 'Y HEAVY METAL SWITCH GRASS       1 GAL.       36'' O.C.       VIBURGATUM 'HEAVY METAL 'Y HEAVY METAL SWITCH GRASS       1 GAL.       36'' O.C.       VIBURGATUM 'HEAVY METAL 'Y HEAVY METAL SWITCH GRASS       1 GAL.       36'' O.C.       VIBURGATUM 'HEAVY METAL 'Y HEAVY METAL SWITCH GRASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MS       6       MAUUS X 'SNOWORIFT / SNOWORIFT CRABAPPLE       B & B       2' CAL. MIN.         L       CODE       QTY       BOTANICAL / COMMON NAME       CONT       SPACING       SIZE         USUS SHRUES       F0       24       FORSYTHIA OVATA / KOREAN FORSYTHIA       S GAL       SEE PLAN       30' HT. MIN         LB       19       LINDERA BENZOIN / SPICEBUSH       S GAL       SEE PLAN       24' HT. MIN         NR       36       RHUS AROMATICA 'CRO-LOW / GRO-LOW FRAGRANT SUMAC       S GAL       SEE PLAN       12' HT. MIN         SA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER' SPIREA       5 GAL       SEE PLAN       30' HT. MIN         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL       SEE PLAN       24' HT. MIN         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL       SEE PLAN       24' HT. MIN         NEEE       JF       36       JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL       SEE PLAN       24' HT. MIN         NEEE       H02       115       HEMEROCALLIS X STELLA DE ORO'/ STELLA DE ORO JAVILLY       1 GAL       16' O.C.       36' O.C.       36' O.C.         PH       310       PANICUM VIRGATUM 'HEAVY METAL' /HEAV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CANOPY                                  | A                                  | 11                      | AMELANCHIER ARBOREA / DOWNY SERVICEBERRY                                                                              | B & B       | 2" CAL. MIN. |              | SC.<br>DES                               | CHI        |
| Y       BOTANICAL / COMMON NAME       CONT       SPACING       SIZE         FORSYTHIA OVATA / KOREAN FORSYTHIA       5 GAL.       SEE PLAN       30" HT. MIN.         LINDERA BENZOIN / SPICEBUSH       5 GAL.       SEE PLAN       30" HT. MIN.         PHYSOCARPUS OPULIFOLIUS / NINEBARK       5 GAL.       SEE PLAN       24" HT. MIN.         RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12" HT. MIN.         SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER' SPIREA       5 GAL.       SEE PLAN       30" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         MENTAL GRASSES       JUNIVERUM VIRGATUM 'HEAVY METAL SWITCH GRASS       1 GAL.       18" O.C.       VIENTINGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENTIC UNGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENTICAL / COMMON NAME         Y       BOTANICAL / COMMON NAME       1 GAL.       36" O.C.       VIENTICAL / COMMON NAME </td <td>L       CODE       OTY       BOTANICAL / COMMON NAME       CONT       SPACING       SIZE         LOUD SHRUES       FO       24       FORSYTHIA OVATA / KOREAN FORSYTHIA       5 GAL       SEE PLAN       30° HT. MIN.         LB       19       LINDERA BENZOIN / SPICEBUSH       5 GAL       SEE PLAN       30° HT. MIN.         NO.       RG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12° HT. MIN.         NG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       18° HT. MIN.         NG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       18° HT. MIN.         NG       36       NUMPERUS ABUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18° HT. MIN.         NG       36       VIEURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       18° HT. MIN.         JF       38       JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24° HT. MIN.         NMLS AND ORNAMENTAL GRASSES       JF       31       PANICUM VIRGATUM 'HEAVY METAL'/ HEAVY METAL SWITCH GRASS       1 GAL.       36° O.C.       VIENTINGAL / COMMON NAME         ML</td> <td>,000000000000000000000000000000000000</td> <td>с</td> <td>10</td> <td>CRATAEGUS CRUS-GALLI / COCKSPUR HAWTHORN</td> <td>B &amp; B</td> <td>2" CAL. MIN.</td> <td></td> <td></td> <td></td>                                                                                                                           | L       CODE       OTY       BOTANICAL / COMMON NAME       CONT       SPACING       SIZE         LOUD SHRUES       FO       24       FORSYTHIA OVATA / KOREAN FORSYTHIA       5 GAL       SEE PLAN       30° HT. MIN.         LB       19       LINDERA BENZOIN / SPICEBUSH       5 GAL       SEE PLAN       30° HT. MIN.         NO.       RG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12° HT. MIN.         NG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       18° HT. MIN.         NG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       18° HT. MIN.         NG       36       NUMPERUS ABUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18° HT. MIN.         NG       36       VIEURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       18° HT. MIN.         JF       38       JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24° HT. MIN.         NMLS AND ORNAMENTAL GRASSES       JF       31       PANICUM VIRGATUM 'HEAVY METAL'/ HEAVY METAL SWITCH GRASS       1 GAL.       36° O.C.       VIENTINGAL / COMMON NAME         ML                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ,000000000000000000000000000000000000   | с                                  | 10                      | CRATAEGUS CRUS-GALLI / COCKSPUR HAWTHORN                                                                              | B & B       | 2" CAL. MIN. |              |                                          |            |
| FORSYTHIA OVATA / KOREAN FORSYTHIA<br>FORSYTHIA OVATA / KOREAN FORSYTHIA<br>LINDERA BENZOIN / SPICEBUSH<br>PHYSOCARPUS OPULIFOLIUS / NINEBARK<br>RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC<br>S GAL. SEE PLAN 24" HT. MIN.<br>SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA 5 GAL. SEE PLAN 12" HT. MIN.<br>VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM<br>JUNIPERUS CHINENSIS 'SEA GREEN ' / SEA GREEN JUNIPER<br>JUNIPERUS CHINENSIS 'SEA GREEN ' / SEA GREEN JUNIPER<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>ARROWWOOD' / ARROWMOOD ' I GAL. 18" O.C.<br>PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS<br>SO HEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO / STELLA DE ORO DAYLLIY<br>MENTAL / MENTA / BLACK-EYED SUSAN<br>MENTAL / MENTA / BLACK-EYED SUSAN<br>MENTAL GRASSES<br>MENTAL / COMMON NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Index shrubs         FO       24       FORSYTHIA OVATA / KOREAN FORSYTHIA       5 GAL.       SEE PLAN       30" HT. MIN.         LB       19       LINDERA BENZOIN / SPICEBUSH       5 GAL.       SEE PLAN       30" HT. MIN.         PN       19       PHYSOCARPUS OPULIFOLIUS / NINEBARK       5 GAL.       SEE PLAN       24" HT. MIN.         RG       36       RHUB AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       18" HT. MIN.         NA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18" HT. MIN.         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         NEEE SHRUBS       JF       36       JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         NALE AND ORNAMENTAL GRASSES       JF       36       JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL.       36" O.C.       JF         PH       31       PANICUM VIRGATUM HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       JF       JF       20       SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       24" O.C.       JF         ML       CODE <t< td=""><td></td><td>S</td><td>6</td><td>MALUS X 'SNOWDRIFT' / SNOWDRIFT CRABAPPLE</td><td>B &amp; B</td><td>2" CAL. MIN.</td><td></td><td></td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                             |                                         | S                                  | 6                       | MALUS X 'SNOWDRIFT' / SNOWDRIFT CRABAPPLE                                                                             | B & B       | 2" CAL. MIN. |              |                                          |            |
| LINDERA BENZOIN / SPICEBUSH 5 GAL. SEE PLAN 30" HT. MIN.<br>PHYSOCARPUS OPULIFOLIUS / NINEBARK 5 GAL. SEE PLAN 24" HT. MIN.<br>RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC 5 GAL. SEE PLAN 12" HT. MIN.<br>SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIRE 5 GAL. SEE PLAN 16" HT. MIN.<br>VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM 5 GAL. SEE PLAN 30" HT. MIN.<br>UNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER 5 GAL. SEE PLAN 24" HT. MIN.<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY 1 GAL. 18" O.C.<br>PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.<br>RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 36" O.C.<br>SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | F0       24       F0RSYTHIA OVATA / KOREAN FORSYTHIA       5 GAL       SEE PLAN       30" HT. MIN.         LB       19       LINDERA BENZOIN / SPICEBUSH       5 GAL       SEE PLAN       30" HT. MIN.         PN       19       PHYSOCARPUS OPULIFOLIUS / NINEBARK       5 GAL       SEE PLAN       24" HT. MIN.         RG       36       RHUB AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL       SEE PLAN       18" HT. MIN.         NA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL       SEE PLAN       18" HT. MIN.         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL       SEE PLAN       30" HT. MIN.         NREEN SHRUBS       JF       36       JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL       SEE PLAN       24" HT. MIN.         NALS AND ORNAMENTAL GRASSES       JF       36       JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL       36" O.C.       JF         M1       PA       31       PANICUM VIRGATUM HEAVY METAL'/ HEAVY METAL SWITCH GRASS       1 GAL       36" O.C.       JF       JF       31       PANICUM VIRGATUM HEAVY METAL'/ HEAVY METAL SWITCH GRASS       1 GAL       36" O.C.       JF       JF       31       PANICUM VIRGATUM HEAVY METAL'/ HEAVY METAL SWITCH GRASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <u>30L</u> <u>C</u>                     | <u>ODE</u>                         | QTY                     | BOTANICAL / COMMON NAME                                                                                               | <u>CONT</u> | SPACING      | SIZE         |                                          |            |
| LINDERA BENZOIN / SPICEBUSH 5 GAL. SEE PLAN 30" HT. MIN.<br>PHYSOCARPUS OPULIFOLIUS / NINEBARK 5 GAL. SEE PLAN 24" HT. MIN.<br>RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC 5 GAL. SEE PLAN 12" HT. MIN.<br>SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIRE 5 GAL. SEE PLAN 16" HT. MIN.<br>VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM 5 GAL. SEE PLAN 30" HT. MIN.<br>UNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER 5 GAL. SEE PLAN 24" HT. MIN.<br>MENTAL GRASSES<br>MEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY 1 GAL. 18" O.C.<br>PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.<br>RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 36" O.C.<br>SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | IB       19       LINDERA BENZOIN / SPICEBUSH       5 GAL.       SEE PLAN       30" HT. MIN         PN       19       PHYSOCARPUS OPULIFOLIUS / ININEBARK       5 GAL.       SEE PLAN       24" HT. MIN         RG       36       RHUS AROMATICA 'GRO-LOW' / GRO-LOW' FRAGRANT SUMAC       5 GAL.       SEE PLAN       12" HT. MIN         SA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER' SPIREA       5 GAL.       SEE PLAN       16" HT. MIN         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       24" HT. MIN         NALES AND ORNAMENTAL GRASSES       JUNIPERUS CHINENSIS 'SEA GREEN ' SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN         NALES AND ORNAMENTAL GRASSES       HO2       115       HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO / STELLA DE ORO D'AYLILY       1 GAL.       36" O.C.         PH       31       PANICUM VIRGATUM 'HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       IS" O.C.         PH       31       PANICUM VIRGATUM 'HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       IS" O.C.       I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $\sim$                                  |                                    | 24                      | FORSYTHIA OVATA / KOREAN FORSYTHIA                                                                                    | 5 GAI       | SEE PLAN     | 30" HT MIN   |                                          |            |
| PHYSOCARPUS OPULIFOLIUS / NINEBARK       5 GAL.       SEE PLAN       24" HT. MIN.         RHUS AROMATICA 'GRO-LOW' / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12" HT. MIN.         SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       24" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       24" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       24" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       24" HT. MIN.         VINIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         VINIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       1 GAL.       18" O.C.       VINIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER       1 GAL.       24" O.C.       VINIPERUS CHINENGAL' / HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       24" O.C.       VINIPERUS CHINENGAL' / MEANAL' / HEAVY METAL SWITCH GRASS       1 GAL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PN       19       PHYSOCARPUS OPULIFOLIUS / NINEBARK       5 GAL.       SEE PLAN       24" HT. MIN.         RG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FAGRANT SUMAC       5 GAL.       SEE PLAN       12" HT. MIN.         SA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18" HT. MIN.         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         REE SHRUBS         JF       36       JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         NIALS AND ORNAMENTAL GRASSES         H02       115       HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLLLY       1 GAL.       36" O.C.         PH       31       PANIGUM VIRGATUM 'HEAVY METAL''/HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.         RH2       87       RUDBECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.         SH       20       SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36" O.C.         SH       20       SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36" O.C.         SL       CODE       GTY       BOTANICAL / COMMON NAME       I TH </td <td>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                               | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
| RHUS AROMATICA 'GRO-LOW' / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12" HT. MIN.         SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       30" HT. MIN.         MENTAL GRASSES       JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         Semuticum VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       18" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIENCUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C. <td>RG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12' HT. MIN.         SA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18' HT. MIN.         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30' HT. MIN.         INEEEN SHRUBS       JJF       36       JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24' HT. MIN.         NALS AND ORNAMENTAL GRASSES       HOR 2 115       HEMEROCALLIS X 'STELLA DE ORO ', STELLA DE ORO DAYLILY       1 GAL.       18'' O.C.         PH       31       PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL' SWITCH GRASS       1 GAL.       36'' O.C.         RH2       87       RUDBECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36'' O.C.         SH       20       SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36'' O.C.         SL       CODE       OTY       BOTANICAL / COMMON NAME       HOCOVERS       TH       TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD</td> <td><math>\sim</math></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> | RG       36       RHUS AROMATICA 'GRO-LOW / GRO-LOW FRAGRANT SUMAC       5 GAL.       SEE PLAN       12' HT. MIN.         SA       29       SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18' HT. MIN.         VD       16       VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30' HT. MIN.         INEEEN SHRUBS       JJF       36       JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24' HT. MIN.         NALS AND ORNAMENTAL GRASSES       HOR 2 115       HEMEROCALLIS X 'STELLA DE ORO ', STELLA DE ORO DAYLILY       1 GAL.       18'' O.C.         PH       31       PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL' SWITCH GRASS       1 GAL.       36'' O.C.         RH2       87       RUDBECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36'' O.C.         SH       20       SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36'' O.C.         SL       CODE       OTY       BOTANICAL / COMMON NAME       HOCOVERS       TH       TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD / DROUGHT TOLERANT FESCUE BLEND       TH       TURF SOD                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\sim$                                  |                                    |                         |                                                                                                                       |             |              |              |                                          | 1          |
| SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA       5 GAL.       SEE PLAN       18" HT. MIN.         VIBURNUM DENTATUM 'ARROWWOOD / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         WENTAL GRASSES       HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY       1 GAL.       18" O.C.       VIGUAL / COMMON METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIGUAL / COMMON NAME       1 GAL.       36" O.C.       VIGUAL / COMMON NAME       VIGUAL / COMMON NAME       VIGUAL / COMMON NAME       1 GAL.       36" O.C.       VIGUAL / COMMON NAME       VIGUAL / COM / COMMON NAME<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sa 29 SPIRAEA X BUMALDA 'ANTHONY WATERER' / ANTHONY WATERER SPIREA 5 GAL. SEE PLAN 18" HT. MIN.   VD 16 VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM 5 GAL. SEE PLAN 30" HT. MIN.   IF 36 JUNIPERUS CHINENSIS 'SEA GREEN ' / SEA GREEN JUNIPER 5 GAL. SEE PLAN 24" HT. MIN. INLAS AND ORNAMENTAL GRASSES HO2 115 HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY 1 GAL. 16 17 17 18 10 10 10 10 11 10 11 11 11 11 12 11 12 13 14 13 14 14 14 14 14 15 14 10 15 16 17 16 17 18 18 10 10 16 16 17 17 10 18 18 18 19 19 19 10 10 10 10 10 10 10 11 10 10 11 10 11 10 10 10 10 11 11 11 11 11 11 11 12 16 18 10 10 10 16 16 17 17 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 11 10 10 10 11 11 11 11 11 12 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
| VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM       5 GAL.       SEE PLAN       30" HT. MIN.         JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         MENTAL GRASSES       HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY       1 GAL.       18" O.C.       VIBURNUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       24" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA       VIBURDECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       36" O.C.       VIBURDECKIA       VIBURDEC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | VD 16 VIBURNUM DENTATUM 'ARROWWOOD' / ARROWWOOD VIBURNUM 5 GAL. SEE PLAN 30" HT. MIN.     IREEN SHRUBS      JF   36 JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER 5 GAL. SEE PLAN 24" HT. MIN.   NALS AND ORNAMENTAL GRASSES   H02 115 HEMERQCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY 1 GAL. 18" O.C.   PH   31 PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.   PH   31 PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.   PH   31 PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.   PH   34 20 SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.   PL CODE OTY BOTANICAL / COMMON NAME DECOVERS TH TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND TS TURF SOD / DROUGHT TOLERANT FESCUE BLEND TS TURF SOD / DROUGHT TOLERANT FESCUE BLEND TS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | $\sim$                                  |                                    |                         |                                                                                                                       |             |              |              | 3ª                                       |            |
| JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER       5 GAL.       SEE PLAN       24" HT. MIN.         WENTAL GRASSES       HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY       1 GAL.       18" O.C.       Image: Comparison of the comparison                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | IREER SHRUES   JF 36   JUNIPERUS CHINENSIS 'SEA GREEN '/ SEA GREEN JUNIPER   SGAL   NALS AND ORNAMENTAL CRASSES   H02   H02   15   HEMEROCALLIS X 'STELLA DE ORO'/ STELLA DE ORO DAYLILY   1   GAL   8H   20   SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED   1   GAL   20   SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED   1   GAL   20   SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED   1   GAL   20   SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED   1   1   CODE   0TY   BOTANICAL / COMMON NAME   1   1   1   1   1   1   1   1   1   1   1   2   1   1   2   1   1   2   1   2   1   2   1   2   1   2   1   2   1   2   1   2   2   2   2   1   2   2   2   3   2   2   3   2   2   3 </td <td>~</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ~                                       |                                    |                         |                                                                                                                       |             |              |              | 3                                        |            |
| MENTAL GRASSES       NEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY       1 GAL.       18" O.C.       NUTIONALIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY       1 GAL.       36" O.C.         PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.       Image: Comparing the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | JF 36 JUNIPERUS CHINENSIS 'SEA GREEN / SEA GREEN JUNIPER 5 GAL. SEE PLAN 24" HT. MIN.   NALS AND ORNAMENTAL GRASSES   HO2 115 HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY 1 GAL. 18" O.C.   PH 31 PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.   RH2 87 RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 24" O.C.   SH 20 SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.   V CODE 0TY BOTANICAL / COMMON NAME VIRF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND   TH V TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND VIRF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $\sim$                                  |                                    |                         | VIBURINUM DENTATUM ARKOWWOOD / ARROWWOOD VIBURINUM                                                                    | 5 GAL.      | SEE PLAN     | 30 HT. MIN.  |                                          |            |
| <ul> <li>HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY</li> <li>HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY</li> <li>PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS</li> <li>I GAL.</li> <li>I GAL.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | HO2 115 HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY 1 GAL. 18" O.C.   PH 31 PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.   RH2 87 RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 24" O.C.   SH 20 SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.   SL CODE QTY BOTANICAL / COMMON NAME UCCVERS   TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND TS TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |                                    |                         | JUNIPERUS CHINENSIS 'SEA GREEN' / SEA GREEN JUNIPER                                                                   | 5 GAL.      | SEE PLAN     | 24" HT. MIN. |                                          |            |
| PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS       1 GAL.       36" O.C.         RUDBECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       24" O.C.         SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36" O.C.         Y       BOTANICAL / COMMON NAME       U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PH 31 PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS 1 GAL. 36" O.C.   RH2 87 RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 24" O.C.   SH 20 SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.   L CODE QTY BOTANICAL / COMMON NAME 36" O.C.   ND COVERS TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND TH TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ENNIALS A                               | ND ORI                             | NAMENTAL                | GRASSES                                                                                                               |             |              |              | Z                                        |            |
| RUDBECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       24" O.C.         SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36" O.C.         Y       BOTANICAL / COMMON NAME       V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RH2 87 RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 24" O.C.   SH 20 SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.   SL CODE QTY BOTANICAL / COMMON NAME   ND COVERS TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND   TS TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | н                                       | 02                                 | 115                     | HEMEROCALLIS X 'STELLA DE ORO' / STELLA DE ORO DAYLILY                                                                | 1 GAL.      | 18" O.C.     |              | ₹                                        |            |
| RUDBECKIA HIRTA / BLACK-EYED SUSAN       1 GAL.       24" O.C.         SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL.       36" O.C.         Y       BOTANICAL / COMMON NAME       V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RH2 87 RUDBECKIA HIRTA / BLACK-EYED SUSAN 1 GAL. 24" O.C.   SH 20 SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED 1 GAL. 36" O.C.   SL CODE QTY BOTANICAL / COMMON NAME   ND COVERS TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND   TS TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | P                                       | Н                                  | 31                      | PANICUM VIRGATUM 'HEAVY METAL' / HEAVY METAL SWITCH GRASS                                                             | 1 GAL.      | 36" O.C.     |              |                                          |            |
| SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED       1 GAL. 36" O.C.         Y       BOTANICAL / COMMON NAME         TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND         TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND Ts TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | R                                       | H2                                 | 87                      | RUDBECKIA HIRTA / BLACK-EYED SUSAN                                                                                    | 1 GAL.      | 24" O.C.     |              |                                          |            |
| Y       BOTANICAL / COMMON NAME         TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND         TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND Ts TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | s                                       | Н                                  | 20                      | SPOROBOLUS HETEROLEPIS / PRAIRIE DROPSEED                                                                             | 1 GAL.      | 36" O.C.     |              |                                          |            |
| TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TH TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND Ts TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | BOL C                                   | ODE                                | <u>QTY</u>              | BOTANICAL / COMMON NAME                                                                                               |             |              |              |                                          |            |
| TURF SOD / DROUGHT TOLERANT FESCUE BLEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | * * *                                   |                                    |                         | TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND                                                                        |             |              |              | SC SC                                    |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | · · · · · · · · · · · · · · · · · · ·   |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TREES ARE TO BE 10 FEET AWAY FROM ALL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MBOL C<br>COUND COVE                    | <u>ODE</u><br><u>ERS</u><br>H<br>S | <u>ΩΤΥ</u><br>Ε ΤΟ ΒΕ 1 | BOTANICAL / COMMON NAME<br>TURF HYDROSEED / DROUGHT TOLERANT FESCUE BLEND<br>TURF SOD / DROUGHT TOLERANT FESCUE BLEND | 1 GAL.      | 36" C        | D.C.         | D.C.                                     | LANDS      |
| TO BE 10 FEET AWAY FROM ALL<br>EWERS AND 5 FEET AWAY FROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ALL<br>. PLAN                           | WATE                               | R AND ST                | ORM SEWER LINES<br>BE INSTALLED WITHIN 4                                                                              |             |              |              | ROF                                      |            |
| TO BE 10 FEET AWAY FROM ALL<br>EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>ALL NOT BE INSTALLED WITHIN 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
| TO BE 10 FEET AWAY FROM ALL<br>EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>LL NOT BE INSTALLED WITHIN 4<br>E PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4<br>FEET OF THE PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |                                    |                         |                                                                                                                       |             |              |              | NO 8137                                  |            |
| EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>ALL NOT BE INSTALLED WITHIN 4<br>E PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4<br>FEET OF THE PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
| EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>ALL NOT BE INSTALLED WITHIN 4<br>E PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4<br>FEET OF THE PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
| EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>ALL NOT BE INSTALLED WITHIN 4<br>E PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4<br>FEET OF THE PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |                                    |                         |                                                                                                                       |             |              |              |                                          |            |
| EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>ALL NOT BE INSTALLED WITHIN 4<br>E PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4<br>FEET OF THE PROPERTY LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |                                    |                         | GRAPHIC SCALE IN FEET                                                                                                 | )           |              |              | AKS                                      |            |
| EWERS AND 5 FEET AWAY FROM<br>AND STORM SEWER LINES<br>JUL NOT BE INSTALLED WITHIN 4<br>E PROPERTY LINE<br>GRAPHIC SCALE IN FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ALL WATER AND STORM SEWER LINES<br>PLANTS SHALL NOT BE INSTALLED WITHIN 4<br>FEET OF THE PROPERTY LINE<br>SCALE IN FEET<br>0 10 20 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                                    |                         |                                                                                                                       |             |              |              | _ ~                                      |            |

ORIGINAL ISSUE: 05/15/2024 KHA PROJECT NO. 268693000 SHEET NUMBER

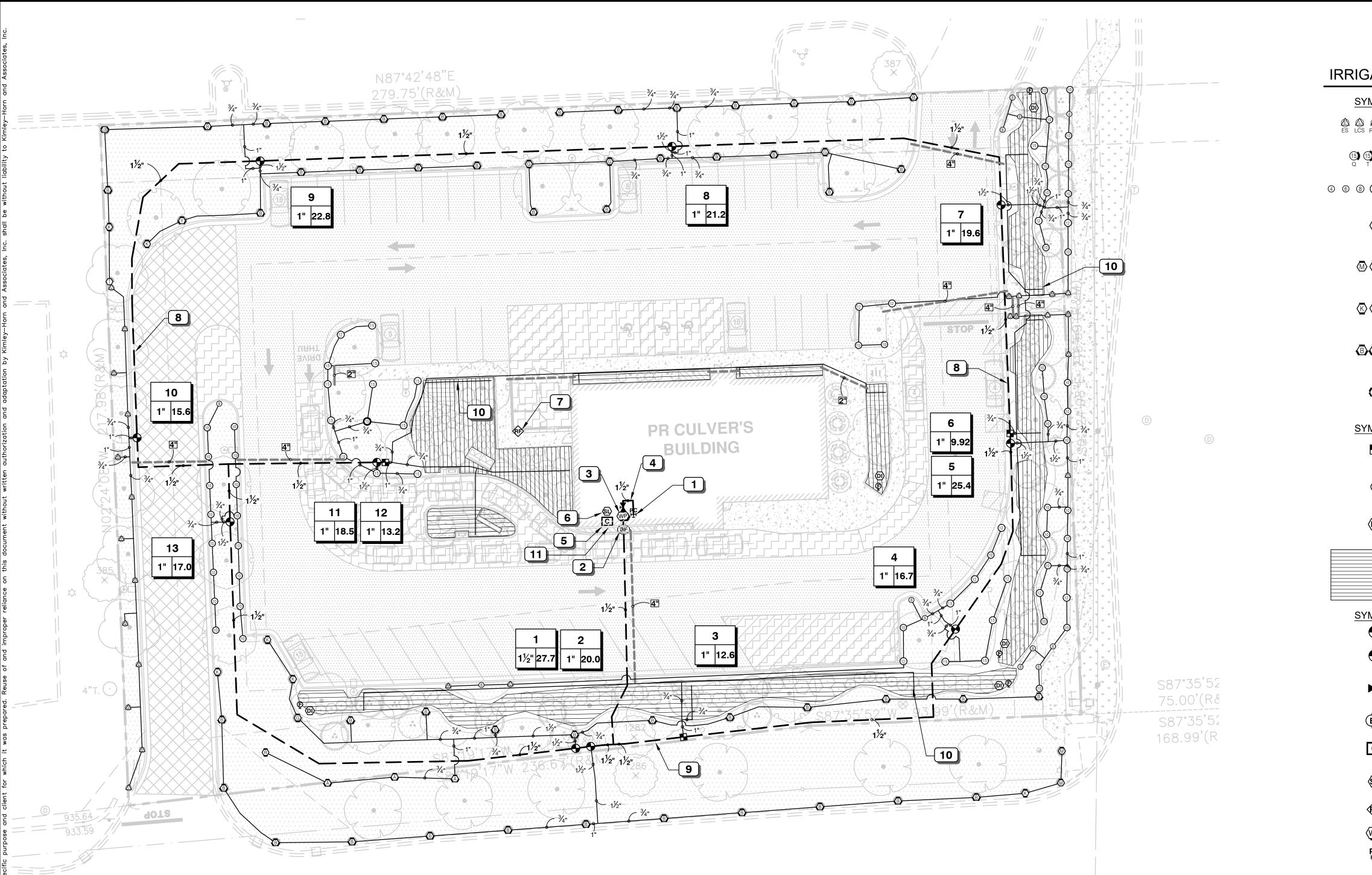
 $\geq$ 



Know what's **below.** 

NORTH

L1.2



## CRITICAL ANALYSIS

| Generated:                                     | 2024-05-14 13:10                |
|------------------------------------------------|---------------------------------|
|                                                |                                 |
| P.O.C. NUMBER: 01<br>Water Source Information: | Irrigation Point of Connection. |
|                                                | Ingation Foint of Connection.   |
| FLOW AVAILABLE                                 |                                 |
| Point of Connection Size:                      | 1 1/2"                          |
| Flow Available                                 | 40.32 GPM                       |
|                                                |                                 |
| PRESSURE AVAILABLE                             |                                 |
| Static Pressure at POC:                        | <u>60 PSI</u>                   |
| Pressure Available:                            | 60 PSI                          |
| DESIGN ANALYSIS                                |                                 |
| Maximum Station Flow:                          | 27.7 GPM                        |
| Flow Available at POC:                         | 40.32 GPM                       |
| Residual Flow Available:                       | 12.62 GPM                       |
|                                                |                                 |
| Design Pressure:                               | 30 PSI                          |
| Friction Loss:                                 | 3.47 PSI                        |
| Fittings Loss:                                 | 0.35 PSI                        |
| Elevation Loss:                                | 0 PSI                           |
| Loss through Valve:                            | 6 PSI                           |
| Pressure Req. at Critical Station:             | 39.8 PSI                        |
| Loss for Fittings:<br>Loss for Main Line:      | 0.09 PSI<br>0.87 PSI            |
| Loss for POC to Valve Elevation:               | 0.87 PSI<br>0 PSI               |
| Loss for Backflow:                             | 11.2 PSI                        |
| Critical Station Pressure at POC:              | 52.0 PSI                        |
| Pressure Available:                            | 60 PSI                          |
| Residual Pressure Available:                   | 8.03 PSI                        |
|                                                |                                 |

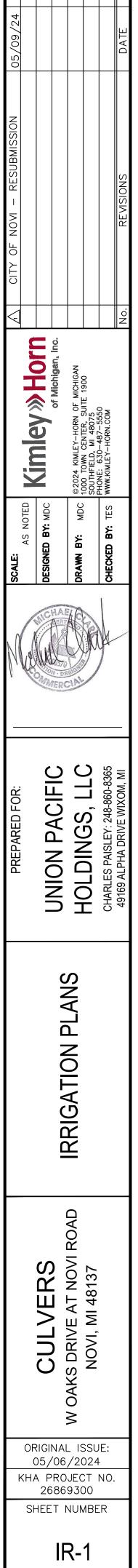
| VALVE SUREDULE | VAI | LVE | SCHED | ULE |
|----------------|-----|-----|-------|-----|
|----------------|-----|-----|-------|-----|

| NUMBER | MODEL                | SIZE   | TYPE              | <u>GPM</u> | PRECIP    |
|--------|----------------------|--------|-------------------|------------|-----------|
| 1      | Rain Bird PGA Globe  | 1-1/2" | Turf Rotary       | 27.7       | 0.28 in/h |
| 2      | Rain Bird PGA Globe  | 1"     | Turf Rotary       | 20.03      | 0.23 in/h |
| 3      | Rain Bird XCZ-100-LC | 1"     | Area for Dripline | 12.56      | 0.59 in/h |
| 4      | Rain Bird PGA Globe  | 1"     | Turf Spray        | 16.66      | 1.36 in/h |
| 5      | Rain Bird PGA Globe  | 1"     | Turf Spray        | 25.43      | 1.82 in/h |
| 6      | Rain Bird XCZ-100-LC | 1"     | Area for Dripline | 9.92       | 0.61 in/h |
| 7      | Rain Bird PGA Globe  | 1"     | Turf Spray        | 19.62      | 1.78 in/h |
| 8      | Rain Bird PGA Globe  | 1"     | Turf Rotary       | 21.22      | 0.53 in/h |
| 9      | Rain Bird PGA Globe  | 1"     | Turf Rotary       | 22.81      | 0.51 in/h |
| 10     | Rain Bird PGA Globe  | 1"     | Turf Spray        | 15.6       | 1.36 in/h |
| 11     | Rain Bird PGA Globe  | 1"     | Turf Spray        | 18.48      | 1.46 in/h |
| 12     | Rain Bird XCZ-100-LC | 1"     | Area for Dripline | 13.16      | 0.7 in/h  |
| 13     | Rain Bird PGA Globe  | 1"     | Turf Spray        | 17.01      | 1.49 in/h |

## REFERENCE NOTES SCHEDULE

| SYMBOL | DESCRIPTION                                                                                                                                                                                                                                              |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Irrigation system water source to be a 1-1/2" connection off of the domestic water line, prior to building backflow preventer. System requirements are 27 gpm at a working pressure of 53 psi. Verify available flow and pressure prior to construction. |
| 2      | Install RPZ 12" above finished grade as per applicable plumbing code. All exposed piping to be either copper or galvanzied pipe.                                                                                                                         |
| 3      | Winterization point, 1-1/2" x 1" tee, 1"x3" nipple and 1" gate valve with a plug in the outlet.                                                                                                                                                          |
| 4      | All interior piping to be copper or galavanized.                                                                                                                                                                                                         |
| 5      | Coordinate the exact location of the controller with the owners representative.<br>Provide 120v 10 amp power to the controller. Install controller as per plan notes,<br>details and manufacturers instructions.                                         |
| 6      | Install WiFi link in the controller as per manufacturers instructions.                                                                                                                                                                                   |
| 7      | Coordinate the exact location of the Wireless Rain Freeze sensor with the owners representative. Install and program as per plan notes, detail and manufacturers instructions.                                                                           |
| 8      | Pipe location is diagrammatic. Install all pipe as per plan notes and details.<br>Multiple pipes in a common trench must have a minimum 3" seperation.                                                                                                   |
| 9      | Install all mainline and control valves within the property lines.                                                                                                                                                                                       |
| 10     | Dripline lateral supply header. Install as per drip layout example details. Typical for all lateral pipe to dripline connections.                                                                                                                        |
| 11     | All control wire from the controller to 12" below FG to be in SCH 40 PVC electical conduit. Mulit-conducter wire is not an approved wire product for the project.                                                                                        |

| IRRIGATION        | SCHEDULE                                                                                                                                                                                                                                                                                                                                               |   |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| SYMBOL            | MANUFACTURER/MODEL/DESCRIPTION                                                                                                                                                                                                                                                                                                                         |   |
| ES LCS RCS CS SS  | Hunter PROS-06-PRS30-CV Strip Series<br>Turf Spray, 30 psi regulated 6in. Pop-Up. With factory installed Drain<br>Check Valve. Co-molded wiper seal with UV Resistant Material.                                                                                                                                                                        |   |
|                   | Hunter PROS-06-PRS30-CV 15 Series<br>Turf Spray, 30 psi regulated 6in. Pop-Up. With factory installed Drain<br>Check Valve. Co-molded wiper seal with UV Resistant Material.                                                                                                                                                                           |   |
| 0 6 8 10 12 15 17 | Hunter PROS-06-PRS30-CV Adj Series<br>Turf Spray, 30 psi regulated 6in. Pop-Up. With factory installed Drain<br>Check Valve. Co-molded wiper seal with UV Resistant Material.                                                                                                                                                                          |   |
|                   | Hunter MP Corner PROS-06-PRS30-CV<br>Turf Rotator, 6in. pop-up with factory installed check valve, pressure<br>regulated to 30 psi, MP Rotator nozzle on PRS30 body. T=Turquoise adj<br>arc 45-105.                                                                                                                                                    |   |
| $\odot$           | Hunter MP1000 PROS-06-PRS30-CV<br>Turf Rotator, 6in. pop-up with check valve, pressure regulated to 30 psi,<br>MP Rotator nozzle on PRS30 body. M=Maroon adj arc 90 to 210,<br>L=Light Blue 210 to 270 arc, O=Olive 360 arc.                                                                                                                           |   |
| K G B             | Hunter MP2000 PROS-06-PRS30-CV<br>Turf Rotator, 6in. pop-up with factory installed check valve, pressure<br>regulated to 30 psi, MP Rotator nozzle on PRS30 body. K=Black adj arc<br>90-210, G=Green adj arc 210-270, R=Red 360 arc.                                                                                                                   | - |
|                   | Hunter MP3000 PROS-06-PRS30-CV<br>Turf Rotator, 6in. pop-up with factory installed check valve, pressure<br>regulated to 30 psi, MP Rotator nozzle on PRS30 body. B=Blue adj arc<br>90-210, Y=Yellow adj arc 210-270, A=Gray 360 arc.                                                                                                                  |   |
|                   | Hunter MP3500 PROS-06-PRS30-CV<br>Turf Rotator, 6in. Pop-up with factory installed check valve, pressure<br>regulated to 30 psi, MP Rotator nozzle on PRS30 body. LB=light brown<br>adjustable arc, 90-210.                                                                                                                                            |   |
| SYMBOL            | MANUFACTURER/MODEL/DESCRIPTION<br>Rain Bird XCZ-100-LC 1"                                                                                                                                                                                                                                                                                              |   |
| <b>P</b>          | Wide Flow Drip Control Kit, for Light Commercial Uses. 1in. PEB Valve,<br>with 1in. Pressure Regulating 40psi Basket Filter. 0.3-20 GPM.<br>Hunter PLD-BV<br>Manual flush/shut off valve, barbed insert. Typically installed in 10in. box,                                                                                                             |   |
|                   | with adequate blank tubing to extend valve out of valve box. Use with<br>HDL or other 3/4in. dripline.<br>Hunter ECO-ID<br>ECO-ID: 1/2in. FPT connection with 12 psi-70 psi operating pressure.                                                                                                                                                        |   |
|                   | Specify with Hunter SJ swing joint.<br>Area to Receive Dripline<br>Rain Bird XFCV-06-18<br>XFCV On-Surface Landscape Dripline with a Heavy-Duty 3.5 psi Check<br>Valve. 0.6 GPH emitters at 18" O.C. Dripline laterals spaced at 18" apart,<br>with emitters offset for triangular pattern. Great for elevation change.<br>Specify XF insert fittings. |   |
| SYMBOL            | MANUFACTURER/MODEL/DESCRIPTION                                                                                                                                                                                                                                                                                                                         |   |
| •                 | Rain Bird PGA Globe 1"<br>1in., 1-1/2in., 2in. Electric Remote Control Valve, Globe.                                                                                                                                                                                                                                                                   |   |
| $\bullet$         | Rain Bird PGA Globe 1-1/2"<br>1in., 1-1/2in., 2in. Electric Remote Control Valve, Globe.                                                                                                                                                                                                                                                               |   |
| M                 | Landscape Products Inc. BBV<br>1/2in., 3/4in., 1in., 1-1/4in., 1-1/2in., 2in., 2-1/2in., 3in. Full Port Brass Ball<br>Valve. Suitable for a full range of liquids and gases in residential and<br>commercial applications.                                                                                                                             |   |
| BF                | Febco 825Y 1"<br>Reduced Pressure Backflow Preventer                                                                                                                                                                                                                                                                                                   |   |
| С                 | Rain Bird ESP4ME3 with (1) ESP-SM3 (2) ESP-SM6<br>19 Station, Hybrid Modular Outdoor Controller. For Residential or Light<br>Commercial Use. LNK WiFi Module and Flow Sensor Ready.                                                                                                                                                                    |   |
| SL                | Rain Bird LNK2WIFI<br>Upgrades controllers (ESP-M, ESP-RZXe, ST8) to Have Weather Data<br>for ET-Based Adjustments (WaterSense Approved) & WiFi Capabilities -                                                                                                                                                                                         |   |
| RF                | Rain Bird WR2-RFS<br>Wireless Rain/Freeze Sensor.                                                                                                                                                                                                                                                                                                      |   |
| WP                | Winterization Point<br>Line sized tee with 1" gate valve for compressor connection.                                                                                                                                                                                                                                                                    |   |
| PC<br>坵           | Point of Connection 1 1/2"<br>Irrigation Point of Connection.                                                                                                                                                                                                                                                                                          |   |
|                   | Irrigation Lateral Line: PVC Class 200 SDR 21 3/4"                                                                                                                                                                                                                                                                                                     |   |
|                   | <ul> <li>Irrigation Lateral Line: PVC Class 200 SDR 21 1"</li> <li>Irrigation Lateral Line: PVC Class 200 SDR 21 1 1/2"</li> </ul>                                                                                                                                                                                                                     |   |
|                   | Irrigation Mainline: PVC Class 200 SDR 21 1 1/2"                                                                                                                                                                                                                                                                                                       |   |
|                   | Pipe Sleeve: PVC Schedule 40                                                                                                                                                                                                                                                                                                                           |   |
|                   | Pipe Sleeve: PVC Schedule 40 2"                                                                                                                                                                                                                                                                                                                        |   |
|                   | Pipe Sleeve: PVC Schedule 40 4"                                                                                                                                                                                                                                                                                                                        |   |
| # •               | Valve Callout Valve Number                                                                                                                                                                                                                                                                                                                             |   |
| #" #              | Valve Flow                                                                                                                                                                                                                                                                                                                                             |   |
| └━━┋╧╧═══┛        | Valve Size                                                                                                                                                                                                                                                                                                                                             |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        |   |
|                   |                                                                                                                                                                                                                                                                                                                                                        | ľ |
|                   | $\frown$                                                                                                                                                                                                                                                                                                                                               | ŀ |



1" = 20'

80 feet



Call before you dig.

Know what's **below.** 

TRAFFIC IMPACT STUDY

## Culver's of Novi Traffic Impact Study

## Union Pacific Holdings, LLC

Project No. 231767 May 13, 2024



**REVISION 1** 



39500 MacKenzie Drive, Suite 100 Novi, Michigan 48377

248.324.2090 | fishbeck.com

Culver's of Novi Traffic Impact Study

Prepared For: Union Pacific Holdings, LLC Wixom, MI

May 13, 2024 Project No. 231767

**Revision 1** 

## **Table of Contents**

| Executi | ve Summary                                                                       |                                                                                             | E1               |
|---------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------|
| 1.0     | <ol> <li>Project</li> <li>Study N</li> <li>Intersect</li> <li>Roadway</li> </ol> | Overview<br>Aethodology<br>ction Characteristics<br>ay Characteristics<br>g Traffic Volumes | 1<br>2<br>2<br>4 |
| 2.0     | 2.1 Traffic                                                                      | onditions Analysis<br>Operations Analysis Methodology<br>g Conditions Traffic Analysis      | 6                |
| 3.0     | 3.1 Trip Ge                                                                      | racteristics<br>neration<br>tribution                                                       | 8                |
| 4.0     | <ul><li>4.1 Turn La</li><li>4.2 Future</li><li>4.3 Access</li></ul>              | nditions Analysis<br>ne Warrants<br>Conditions Traffic Analysis<br>Management<br>Evaluation | 13<br>13<br>14   |
| 5.0     | Findings and Re                                                                  | commendations                                                                               | 14               |

## List of Figures

| Figure 1 – Project Location and Study Network | 1  |
|-----------------------------------------------|----|
| Figure 2 – 2024 Existing Lane Configurations  |    |
| Figure 3 – 2024 Existing Traffic Volumes      |    |
| Figure 4 – Conceptual Site Plan               |    |
| Figure 5 – Trip Generation Volumes            |    |
| Figure 6 – Pass-By Volumes                    | 11 |
| Figure 7 – 2024 Future Traffic Volumes        |    |
| 5                                             |    |

## List of Tables

| Table 1 – Roadway Characteristics                  | 4 |
|----------------------------------------------------|---|
| Table 2 – Signal Characteristics                   | 4 |
| Table 3 – LOS Criteria                             |   |
| Table 4 – LOS Analysis for Existing Conditions     | 7 |
| Table 5 – Trip Generation for Proposed Development |   |
| Table 6 – Trip Distribution                        | 9 |
| Table 7 – Turn Lane Warrants                       |   |
| Table 8 – LOS Analysis for Future Conditions       |   |
|                                                    |   |

#### **List of Appendices**

Appendix 1 – Traffic Volume Data Appendix 2 – Existing LOS Output Reports Appendix 3 – Trip Generation Calculations Appendix 4 – Turn Lane Warrants Appendix 5 – Future LOS Output Reports

#### List of Abbreviations/Acronyms

| AADT   | Average Annual Daily Traffic                                       |
|--------|--------------------------------------------------------------------|
| AASHTO | American Association of State Highway and Transportation Officials |
| City   | City of Novi                                                       |
| EB     | eastbound                                                          |
| HCM    | Highway Capacity Manual                                            |
| ITE    | Institute of Transportation Engineers                              |
| LOS    | Level of Service                                                   |
| LUC    | Land Use Code                                                      |
| m.d.   | mid-day                                                            |
| MDOT   | Michigan Department of Transportation                              |
| mph    | miles per hour                                                     |
| NB     | northbound                                                         |
| RCOC   | Road Commission for Oakland County                                 |
| SB     | southbound                                                         |
| SCATS  | Sydney Coordinated Adaptive Traffic System                         |
| sft    | square foot                                                        |
| TIS    | Traffic Impact Study                                               |
| TMC    | Turning Movement Count                                             |
| WB     | westbound                                                          |
| vpd    | vehicles per day                                                   |
|        |                                                                    |

#### References

Institute of Transportation Engineers, 2021, *Trip Generation Manual*, 11th Edition. Michigan Department of Transportation, 2021, *Electronic Traffic Control Device Guidelines*. Michigan Department of Transportation, 2017, *Geometric Design Guidance*. Michigan Department of Transportation, 2013, *Michigan Manual on Uniform Traffic Control Devices*. Transportation Research Board, 2016, *Highway Capacity Manual*, 6th Edition.

## **Executive Summary**

Fishbeck has conducted a traffic impact study (TIS) related to the proposed development located in the northwest corner of the intersection of Novi Road and West Oaks Drive/Twelve Oaks Mall Road in the City of Novi (City), Oakland County, Michigan. Existing land use is vacant with Karevich Drive crossing through the site. The proposed development consists of a 4,106 square foot (sft) Culver's fast-food restaurant with a drive-through window and realignment of Karevich Drive. Access to the proposed site will be provided via one proposed driveway on West Oaks Drive and access to Karevich Drive. The development is assumed to be open and fully operational in 2024.

This study was conducted according to the methodologies and guidance published by Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), Michigan Department of Transportation (MDOT), Road Commission for Oakland County (RCOC), and the City.

Vehicular turning movement counts (TMCs) were collected at the study intersections during the weekday mid-day (m.d.) (11 a.m. to 1 p.m.) and p.m. (4 p.m. to 6 p.m.) peak periods of the road network on Thursday, January 25, 2024.

Site-generated traffic was forecast using the information and methodologies specified in the *Trip Generation Manual*. Existing traffic volumes, site layout, and engineering judgement were used to develop a trip distribution model for the m.d. and p.m. peak hours for the new traffic that would be generated by the proposed development.

A portion of the site-generated trips are anticipated to be pass-by in nature, meaning they already exist on the adjacent road network and are interrupted to visit the site.

Operational analyses were conducted for existing and total future conditions based on the *Highway Capacity Manual* (HCM) 6th Edition methodologies using Synchro traffic analysis software. Synchro network models were also simulated using SimTraffic to evaluate network operations including intersection queueing.

Based on the findings of the HCM operational analyses and site traffic generation, no improvements are recommended to mitigate traffic impacts.

The opinions, findings, and conclusions expressed in this TIS are those of Fishbeck and not necessarily those of the Owner/Applicant, MDOT, RCOC, or the City.

**Prepared By:** 

Jill Bauer, PE, PTOE Project Manager – Fishbeck

## 1.0 Introduction

## **1.1 Project Overview**

On behalf of Union Pacific Holdings, LLC, Fishbeck has conducted a TIS related to the proposed development located in the northwest corner of the intersection of Novi Road and West Oaks Drive/Twelve Oaks Mall Road in the City, Oakland County, Michigan. Existing land use is vacant with Karevich Drive crossing through the site. The proposed development consists of a 4,106 sft Culver's fast-food restaurant with a drive-through window and realignment of Karevich Drive. Access to the proposed site will be provided via one proposed driveway on West Oaks Drive and access to Karevich Drive. The development is assumed to be open and fully operational in 2024.

The project location and study intersections are displayed in Figure 1.



Figure 1 – Project Location and Study Network

## 1.2 Study Methodology

The objectives of this TIS were to determine what impacts the proposed project traffic would have on adjacent roadway traffic operations, and to develop recommendations for any improvements necessary to mitigate the traffic impacts on the studied intersections. Study analyses were completed relative to typical weekday m.d. and p.m. peak periods.

This study was conducted according to the methodologies and guidance published by ITE, AASHTO, MDOT, RCOC, and the City.

## **1.3** Intersection Characteristics

Based on the type and size of the proposed development and the area of influence for the site trips, traffic operations were analyzed for the following intersections:

- Novi Road and Twelve Oaks Mall Road/Oaks Drive South (signalized).
- Novi Road and Oaks Drive North (signalized).
- Oaks Drive South and Karevich Drive/Proposed Site Driveway (unsignalized).
- Oaks Drive North and Karevich Drive (unsignalized).

The existing intersection lane configurations, traffic controls, and posted speed limits are displayed in Figure 2.

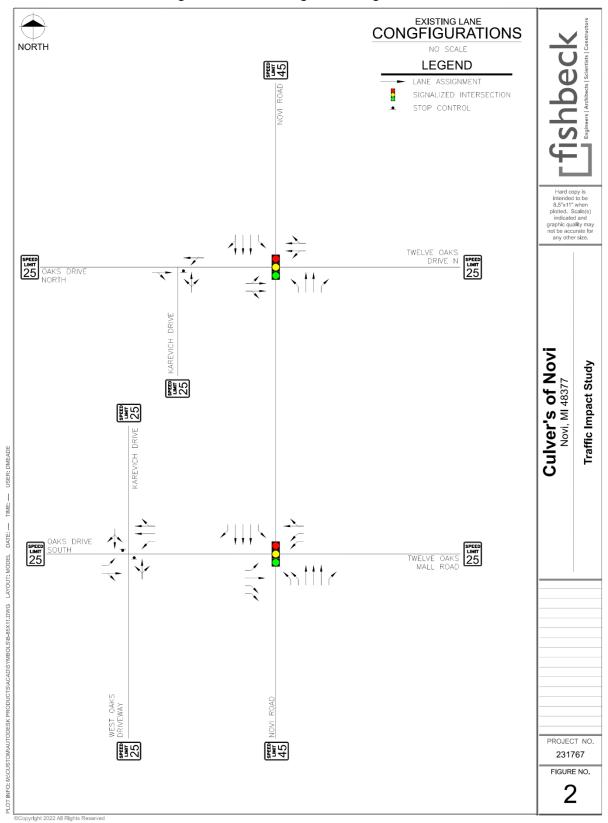


Figure 2 – 2024 Existing Lane Configurations

## 1.4 Roadway Characteristics

The characteristics of the study area roadways and signalized intersections are described in Tables 1 and 2. The data points referenced were from the Southeast Michigan Council of Governments Traffic Count Database System online maps.

| Roadway          | Jurisdiction | Speed Limit<br>(mph) | No. of<br>Lanes | Roadway<br>Classification | Direction | AADT (vpd)    |
|------------------|--------------|----------------------|-----------------|---------------------------|-----------|---------------|
| Novi Dood        | RCOC         | 45                   | 7-9             | Principal                 | NB        | 16,358        |
| Novi Road        | REUE         | 45                   | 7-9             | Arterial                  | SB        | 8,847         |
| Karevich Drive   | City of Novi | Not Posted           | 2               | Local                     | NB        | Not Available |
|                  |              |                      |                 | LOCAI                     | SB        | Not Available |
| Oaks Drive North | Private      | Not Posted           | 2-4             | Uncertified               | EB        | 2,254         |
| Oaks Drive North | Private      | NOL POSLEU           | Z-4             | Uncertineu                | WB        | 1,822         |
| Oake Drive South | City of Novi | 30                   | 4-7             | Local                     | EB        | 6,198         |
| Oaks Drive South | City of Novi | 50                   | 4-7             | Local                     | WB        | 4,294         |

AADT Average Annual Daily Traffic

mph miles per hour

vpd vehicles per day

#### Table 2 – Signal Characteristics

| Intersection                                            | Jurisdiction | Left Turn Phasing          |                            |           |           |  |  |
|---------------------------------------------------------|--------------|----------------------------|----------------------------|-----------|-----------|--|--|
|                                                         | Julisaletion | NB                         | SB                         | EB        | WB        |  |  |
| Novi Road and Twelve Oaks Mall<br>Road/Oaks Drive South |              | Protected                  | Protected                  | Protected | Protected |  |  |
| Novi Road and Oaks Drive North                          | RCOC         | Permitted and<br>Protected | Permitted and<br>Protected | Protected | Protected |  |  |

EB eastbound

NB northbound

SB southbound

WB westbound

## **1.5 Existing Traffic Volumes**

Vehicular TMCs were collected at the following study intersections during the weekday m.d. (11 a.m. to 1 p.m.) and p.m. (4 p.m. to 6 p.m.) peak periods of the road network on Thursday, January 25, 2024:

- Novi Road and Twelve Oaks Mall Road/Oaks Drive South
- Novi Road and Oaks Drive North
- Oaks Drive South and Karevich Drive/Proposed Site Driveway
- Oaks Drive North and Karevich Drive

Traffic volume information can be found in Appendix 1, which includes heavy vehicle data. The existing traffic volumes used in this study are provided in Figure 3.

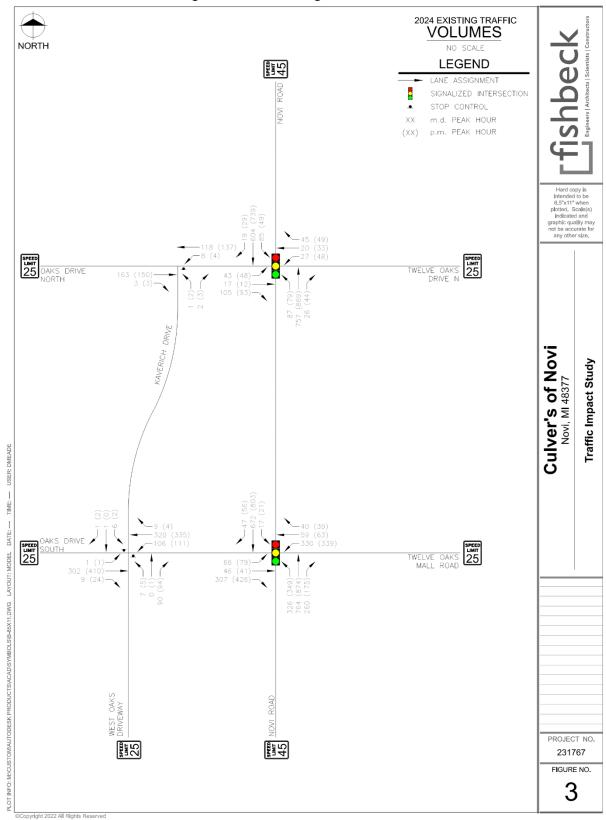


Figure 3 – 2024 Existing Traffic Volumes

## 2.0 2024 Existing Conditions Analysis

## 2.1 Traffic Operations Analysis Methodology

Synchro was used to perform HCM operational analyses during the m.d. and p.m. peak hours for all intersections within this study. According to the most recent editions of the HCM, Level of Service (LOS) is a qualitative measure describing operational conditions of a traffic stream or intersection. LOS ranges from A to F, with LOS A representing desirable traffic operations characterized by low delay and LOS F representing extremely poor traffic operations characterized by excessive delays and long vehicle queues. LOS D is considered acceptable for most areas. Table 3 presents the HCM criteria for various LOSs for unsignalized and signalized intersections. The color coding in the table is used in the operational analysis summary tables later in this report.

|     | Average Stopped Vehicle Delay (seconds) |               |  |  |  |  |  |
|-----|-----------------------------------------|---------------|--|--|--|--|--|
| LOS | Unsignalized                            | Signalized    |  |  |  |  |  |
| А   | ≤ 10                                    | ≤ 10          |  |  |  |  |  |
| В   | > 10 and ≤ 15                           | > 10 and ≤ 20 |  |  |  |  |  |
| С   | > 15 and ≤ 25                           | > 20 and ≤ 35 |  |  |  |  |  |
| D   | > 25 and ≤ 35                           | > 35 and ≤ 55 |  |  |  |  |  |
| E   | > 35 and ≤ 50                           | > 55 and ≤ 80 |  |  |  |  |  |
| F   | > 50                                    | > 80          |  |  |  |  |  |

#### Table 3 – LOS Criteria

## 2.2 Existing Conditions Traffic Analysis

Synchro models for the existing network were created based on the existing roadway configurations and traffic controls. The traffic signal timing permits for the signalized intersections were provided by RCOC for use in the models. The traffic signals are a part of RCOC's Sydney Coordinated Adaptive Traffic System (SCATS), meaning the traffic signals will adapt to give more green time to approaches than what may be shown in the traffic signal timing permit. The traffic signal cycle lengths and clearance intervals were maintained based on the traffic signal timing permit; however, the traffic signal timing splits were optimized in Synchro at the intersection of Novi Road and Twelve Oaks Mall Road/Oaks Drive South.

The resulting LOS and delay for the existing conditions are provided in Table 4.

| Approach                                                          | LOS/Delay(s) |           |                |      |  |  |  |
|-------------------------------------------------------------------|--------------|-----------|----------------|------|--|--|--|
| Approach                                                          | m.d.         | Peak Hour | p.m. Peak Hour |      |  |  |  |
| Novi Road and Twelve Oaks Mall Road/Oaks Drive South (Signalized) |              |           |                |      |  |  |  |
| EB Oaks Drive South                                               | C            | 29.5      | D              | 36.2 |  |  |  |
| WB Twelve Oaks Mall Road                                          | D            | 37.2      | D              | 42.5 |  |  |  |
| NB Novi Road                                                      | C            | 24.2      | С              | 27.6 |  |  |  |
| SB Novi Road                                                      | C            | 28.5      | С              | 22.8 |  |  |  |
| Overal                                                            | C            | 28.1      | С              | 29.9 |  |  |  |
| Novi Road and Oaks Drive North (Sigi                              | nalized)     |           |                |      |  |  |  |
| EB Oaks Drive North                                               | D            | 41.5      | D              | 50.0 |  |  |  |
| WB Oaks Drive North                                               | D            | 39.8      | D              | 49.0 |  |  |  |
| NB Novi Road                                                      | В            | 11.1      | А              | 1.1  |  |  |  |
| SB Novi Road                                                      | A            | 9.9       | А              | 9.6  |  |  |  |
| Overal                                                            | В            | 13.7      | А              | 9.9  |  |  |  |
| Oaks Drive South and Karevich Drive                               | (Stop-Co     | ntrolled) |                |      |  |  |  |
| EB Oaks Drive South                                               | A            | 0.0       | А              | 0.0  |  |  |  |
| WB Oaks Drive South                                               | A            | 2.0       | А              | 2.2  |  |  |  |
| NB West Oaks Driveway                                             | В            | 12.3      | В              | 13.6 |  |  |  |
| SB Karevich Drive                                                 | D            | 25.6      | С              | 21.8 |  |  |  |
| Overal                                                            | A            | 2.8       | А              | 2.4  |  |  |  |
| Oaks Drive North and Karevich Drive (Stop-Controlled)             |              |           |                |      |  |  |  |
| EB Oaks Drive North                                               | A            | 0.0       | А              | 0.0  |  |  |  |
| WB Oaks Drive North                                               | A            | 0.5       | А              | 0.2  |  |  |  |
| NB Karevich Drive                                                 | A            | 9.7       | А              | 9.8  |  |  |  |
| Overal                                                            | A            | 0.3       | А              | 0.3  |  |  |  |

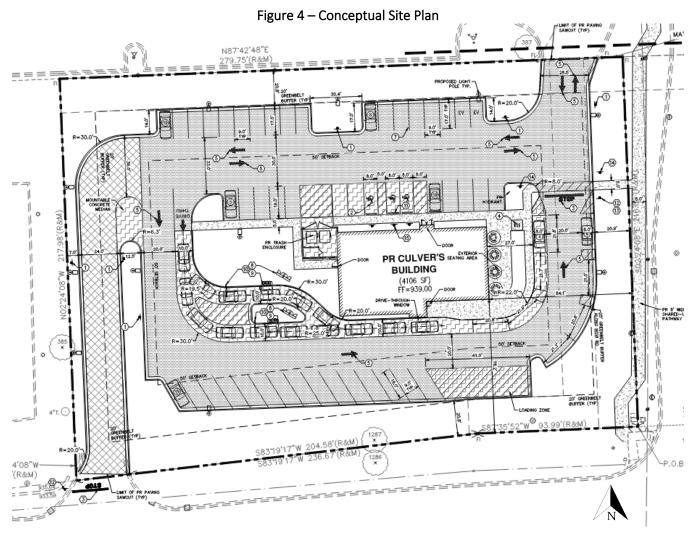
#### Table 4 – LOS Analysis for Existing Conditions

Further analysis of the LOS results for existing conditions revealed that all movements, approaches, and intersections are expected to operate at an acceptable LOS D or better during both the m.d. and p.m. peak hours.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For existing conditions, study network operations are acceptable, with no significant vehicle queues. No 95th percentile queue lengths for the turning movements exceed the provided storage length. See Appendix 2 for the existing conditions LOS reports and queueing analysis reports.

## 3.0 Site Traffic Characteristics

A representation of the current conceptual site plan is provided in Figure 4.



## 3.1 Trip Generation

Using the information and methodologies specified in the ITE *Trip Generation Manual*, Fishbeck forecast the weekday m.d. and p.m. peak hour trips associated with the proposed development.

A portion of the site-generated trips are anticipated to be pass-by in nature, meaning they already exist on the adjacent road network and are interrupted to visit the site. According to ITE methodology, new trips are assumed to return to their direction of origin whereas pass-by trips continue in their original direction of travel. The ITE *Trip Generation Manual* was used to calculate what percentage of the trips would be pass-by trips, meaning they are vehicles already on the network that would access the development and are not additional trips added to the network.

Table 5 presents the resulting trip generation for the development. Refer to Appendix 3 for additional information.

Table 5 – Trip Generation for Proposed Development

| ITE Land Use                                      |  | Units     | m.d. Peak Hour |     |       | p.m. Peak Hour |     |     | Weekday |
|---------------------------------------------------|--|-----------|----------------|-----|-------|----------------|-----|-----|---------|
|                                                   |  | UTILS     | In             | Out | Total | In             | Out |     | WEEKUdy |
| Fast Food Restaurant with Drive<br>Through Window |  | 4,106 sft | 115            | 115 | 230   | 71             | 65  | 136 | 1,919   |
| Total                                             |  |           |                | 115 | 230   | 71             | 65  | 136 |         |
| Pass-By Rates, LUC 934: 55% m.d.; 55% p.m.        |  |           | 63             | 63  | 126   | 39             | 36  | 75  |         |
| Total New Trips                                   |  |           | 52             | 52  | 104   | 32             | 29  | 61  | 1,919   |

## 3.2 Trip Distribution

The directions that site traffic will travel to and from were based upon existing traffic patterns during the m.d. and p.m. peak hours. The existing traffic patterns reflect the gravity between origins and destinations in the study area, and therefore an accurate indication of where the proposed trips would be coming from and going to. Table 6 provides the probable distribution based on existing traffic patterns.

#### Table 6 – Trip Distribution

|           |                       |                | New  | Trips          | Pass-By Trips |                |                |  |
|-----------|-----------------------|----------------|------|----------------|---------------|----------------|----------------|--|
| Direction | Via                   | m.d. Peak Hour |      | p.m. Peak Hour |               | m d Dook Hour  |                |  |
|           |                       | То             | From | То             | From          | m.d. Peak Hour | p.m. reak Hour |  |
| North     | Novi Road             | 30%            | 25%  | 31%            | 27%           | 65%            | 61%            |  |
| South     | Novi Road             | 44%            | 46%  | 48%            | 43%           | 35%            | 39%            |  |
| East      | Twelve Oaks Mall Road | 11%            | 15%  | 7%             | 13%           |                |                |  |
| West      | W Oaks Drive          | 15%            | 14%  | 14%            | 17%           |                |                |  |

The trip distribution for the site is indicated in Figure 5. The pass-by volumes are indicated in Figure 6. These trips were added to the existing volumes (Figure 3) to result in the future conditions volumes in Figure 7.

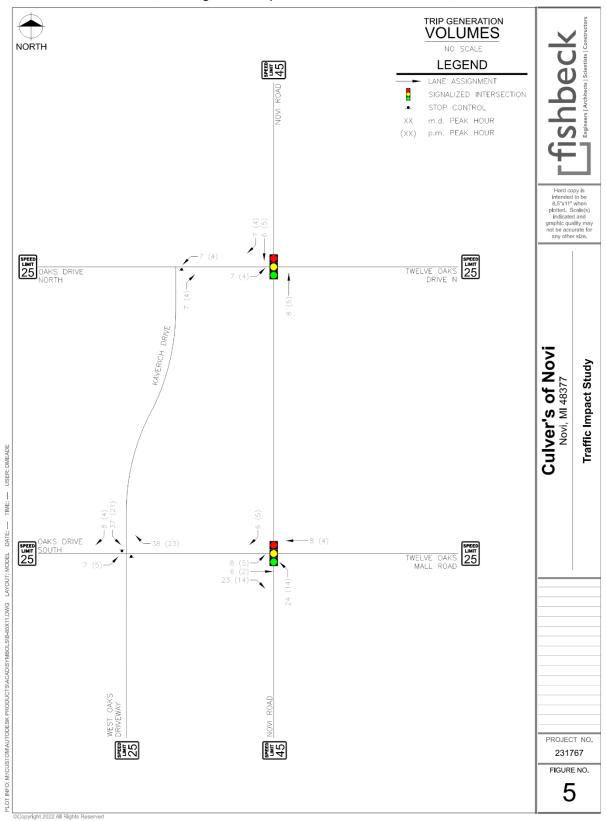


Figure 5 – Trip Generation Volumes

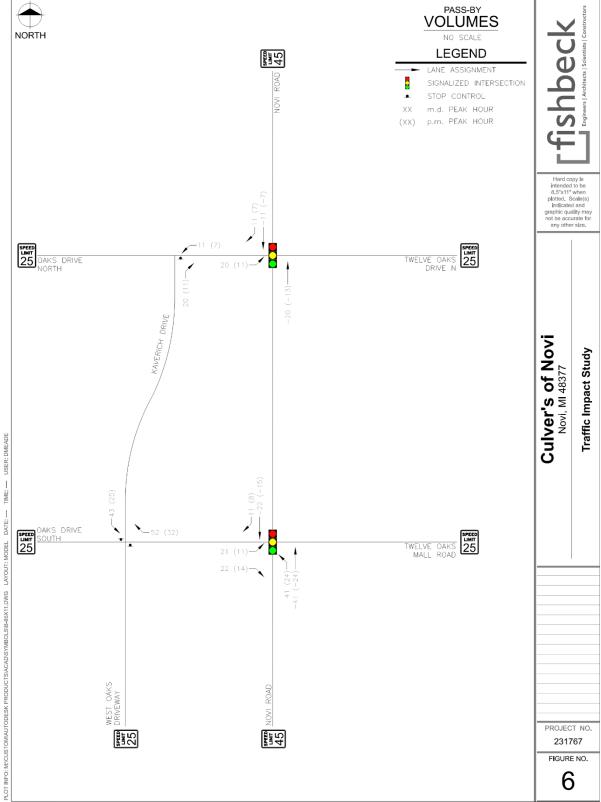


Figure 6 – Pass-By Volumes

pyright 2022 All Rights Reserved

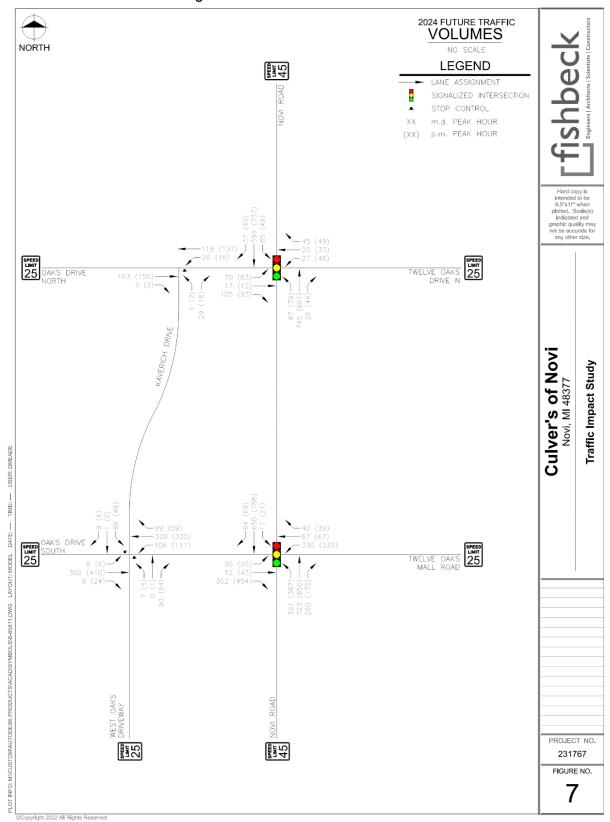


Figure 7 – 2024 Future Traffic Volumes

# 4.0 2024 Future Conditions Analysis

# 4.1 Turn Lane Warrants

An evaluation was performed in accordance with City requirements to determine if a right turn deceleration lane was required at the site driveway. A left turn lane for EB traffic already exists at the site driveway so this was not evaluated. The results of the analysis indicated a right turn taper is warranted at the Site Driveway. All turn lane warrant charts are provided in Appendix 4. The results of the analysis are presented in Table 7.

#### Table 7 – Turn Lane Warrants

| Intersection                                         | Movement            | Existing Treatment | Result                     |
|------------------------------------------------------|---------------------|--------------------|----------------------------|
| Oaks Drive South and Karevich<br>Drive/Site Driveway | WB Oaks Drive South | None               | Right Turn Taper Warranted |

# 4.2 Future Conditions Traffic Analysis

The resulting LOS and delay for the future conditions are presented in Table 8.

#### Table 8 – LOS Analysis for Future Conditions

| Approach                             |            | LOS/D         | elay(s)                |          |
|--------------------------------------|------------|---------------|------------------------|----------|
| Approach                             | m.d. P     | eak Hour      | p.m. Pe                | eak Hour |
| Novi Road and Twelve Oaks Mall Road  | d/Oaks Dr  | ive South (Si | gnalized) <sup>1</sup> |          |
| EB Oaks Drive South                  | С          | 28.3          | С                      | 33.7     |
| WB Twelve Oaks Mall Road             | D          | 37.1          | D                      | 44.3     |
| NB Novi Road                         | С          | 25.4          | С                      | 28.1     |
| SB Novi Road                         | С          | 30.0          | С                      | 29.4     |
| Overall                              | С          | 28.8          | С                      | 31.8     |
| Novi Road and Oaks Drive North (Sigr | alized)    |               |                        |          |
| EB Oaks Drive North                  | D          | 41.9          | D                      | 49.7     |
| WB Oaks Drive North                  | D          | 39.8          | D                      | 49.0     |
| NB Novi Road                         | В          | 11.2          | А                      | 1.1      |
| SB Novi Road                         | В          | 10.1          | А                      | 9.8      |
| Overall                              | В          | 14.3          | В                      | 10.3     |
| Oaks Drive South and Karevich Drive/ | Site Drive | way (Stop-Co  | ontrolled)             |          |
| EB Oaks Drive South                  | А          | 0.2           | А                      | 0.1      |
| WB Oaks Drive South                  | А          | 1.7           | А                      | 1.9      |
| NB West Oaks Driveway                | В          | 12.4          | В                      | 13.7     |
| SB Karevich Drive/Site Driveway      | F          | 137.2         | F                      | 79.3     |
| Overall                              | С          | 19.8          | А                      | 7.8      |
| Oaks Drive North and Karevich Drive  | Stop-Con   | trolled)      |                        |          |
| EB Oaks Drive North                  | А          | 0.0           | А                      | 0.0      |
| WB Oaks Drive North                  | А          | 1.4           | А                      | 0.8      |
| NB Karevich Drive                    | А          | 9.5           | А                      | 9.5      |
| Overall                              | А          | 1.5           | А                      | 1.2      |

<sup>1</sup>SCATS traffic signal timing was optimized

Further analysis of the LOS results for future conditions revealed that most movements, approaches, and intersections are expected to continue to operate at an acceptable LOS D or better during both the m.d. and p.m. peak hours, with the following exceptions:

- Oaks Drive South and Karevich Drive/Site Driveway:
  - The SB approach operates at LOS F in the m.d. and p.m. peak hours.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For future conditions, study network operations are acceptable. The 95th percentile queues for the SB approach of the Oaks Drive South and Karevich Drive/Site Driveway intersection are 96 feet (four vehicles) and 63 feet (three vehicles) during the m.d. and p.m. peak hours, respectively. No mitigation is recommended at this location. See Appendix 5 for the future conditions LOS reports and queueing analysis reports.

# 4.3 Access Management

An evaluation was performed in accordance with the City code of ordinances to determine if the driveway spacing of the site driveway is adequate on West Oaks Drive.

On a roadway with a speed limit of 25 mph, near approach curb to near approach curb distance between access points should be 105 feet. The proposed driveway location will meet this distance from the driveway to the west. Additionally, keeping the approach in this location will keep it lined up with the driveway to the south.

# 4.4 Parking Evaluation

An evaluation of the parking related to the proposed development was completed. In accordance with the City zoning ordinance, the parking requirements for a restaurant are one space for every two employees, plus one space for every two customers allowed under maximum capacity (including waiting areas). This calculates to 48 spaces. The development is proposing 48 parking spaces, which meets the City's zoning ordinance.

# 5.0 Findings and Recommendations

The analyses conducted for this TIS indicate the proposed development will not result in any significant operational impacts to the adjacent road network. The proposed site access configuration is appropriate and will facilitate site ingress and egress. These conclusions are supported by the following key findings:

- Existing storage lengths are adequate for all movements in existing and future conditions.
- Lane configurations and physical capacity are appropriate within the study area.
- The proposed number of parking spaces shown on the site plan are in accordance with the City's zoning ordinance.

Based on the findings of the HCM operational analyses and site traffic generation, no improvements are recommended to mitigate traffic impacts.

# **Appendix 1**

Traffic Volume Data

| Intersection                                           | Time period                | Year                                                                                    | Movement                                                                                                                                                                  | EBL                     | EBT                                                                                                   | EBR                          | WBL                                            | WBT                                                  | WBR                      | NBL                                         | NBT                                        | NBR                                                               | SBL                      | SBT                     | SBR                     | EBRR  | WBRR | NBRR | SBRR  |
|--------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------|------------------------------------------------------|--------------------------|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------|--------------------------|-------------------------|-------------------------|-------|------|------|-------|
|                                                        | m.d. Peak Hour             | Tear                                                                                    | PHF                                                                                                                                                                       | LDL                     | 0.92                                                                                                  | LDK                          | WDL                                            | 0.91                                                 | WDN                      | NDL                                         | 0.93                                       | NDN                                                               | JUL                      | 0.95                    | JDI                     | LDINK | WDRR | NDNN | JDINI |
| #1 - Novi Road & Oaks Drive South/Twelve Oaks          | 01/25/24                   |                                                                                         | % Heavy                                                                                                                                                                   |                         | 1%                                                                                                    |                              |                                                | 1%                                                   |                          |                                             | 2%                                         |                                                                   |                          | 1%                      |                         |       |      |      |       |
| Drive                                                  | 12:00 p.m 1:00 p.m.        | 2024                                                                                    | Existing                                                                                                                                                                  | 66                      | 46                                                                                                    | 307                          | 330                                            | 59                                                   | 40                       | 326                                         | 764                                        | 260                                                               | 17                       | 672                     | 47                      | 12    | 3    | 116  | 16    |
|                                                        |                            | 2024                                                                                    | Existing Adj.                                                                                                                                                             | 66                      | 46                                                                                                    | 307                          | 330                                            | 59                                                   | 40                       | 326                                         | 764                                        | 260                                                               | 17                       | 672                     | 47                      |       |      |      |       |
|                                                        |                            | 2024                                                                                    | Background                                                                                                                                                                | 66                      | 46                                                                                                    | 307                          | 330                                            | 59                                                   | 40                       | 326                                         | 764                                        | 260                                                               | 17                       | 672                     | 47                      |       |      |      |       |
|                                                        |                            | Bck                                                                                     | grd. Dev. A                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            | Bck                                                                                     | grd. Dev. B                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            |                                                                                         | grd. Dev. C                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            | Total                                                                                   | Background                                                                                                                                                                | 66                      | 46                                                                                                    | 307                          | 330                                            | 59                                                   | 40                       | 326                                         | 764                                        | 260                                                               | 17                       | 672                     | 47                      |       |      |      |       |
|                                                        |                            | Site                                                                                    | Generated                                                                                                                                                                 | 8                       | 6                                                                                                     | 23                           |                                                | 8                                                    |                          | 24                                          |                                            |                                                                   |                          |                         | 6                       |       |      |      |       |
|                                                        |                            |                                                                                         | Pass By                                                                                                                                                                   | 21                      |                                                                                                       | 22                           |                                                |                                                      |                          | 41                                          | -41                                        |                                                                   |                          | -22                     | 11                      |       |      |      |       |
|                                                        |                            |                                                                                         | al Site Gen                                                                                                                                                               | 29                      | 6                                                                                                     | 45                           | 0                                              | 8                                                    | 0                        | 65                                          | -41                                        | 0                                                                 | 0                        | -22                     | 17                      |       |      |      |       |
|                                                        |                            | To                                                                                      | tal Future                                                                                                                                                                | 95                      | 52                                                                                                    | 352                          | 330                                            | 67                                                   | 40                       | 391                                         | 723                                        | 260                                                               | 17                       | 650                     | 64                      |       |      |      |       |
|                                                        |                            |                                                                                         |                                                                                                                                                                           |                         |                                                                                                       |                              | -                                              |                                                      |                          |                                             |                                            |                                                                   | -                        |                         |                         | -     |      |      |       |
| Intersection                                           | Time period                | Year                                                                                    | Movement                                                                                                                                                                  | EBL                     | EBT                                                                                                   | EBR                          | WBL                                            | WBT                                                  | WBR                      | NBL                                         | NBT                                        | NBR                                                               | SBL                      | SBT                     | SBR                     | EBRR  | WBRR | NBRR | SBRF  |
|                                                        | m.d. Peak Hour             |                                                                                         | PHF                                                                                                                                                                       |                         | 0.92                                                                                                  |                              | L                                              | 0.80                                                 |                          |                                             | 0.91                                       |                                                                   | L                        | 0.92                    |                         |       |      |      |       |
| #2 - Novi Road & Oaks Drive North                      | 01/25/24                   |                                                                                         | % Heavy                                                                                                                                                                   |                         | 1%                                                                                                    |                              |                                                | 2%                                                   |                          |                                             | 3%                                         |                                                                   |                          | 1%                      |                         |       |      |      |       |
|                                                        | 12:00 p.m 1:00 p.m.        | 2024                                                                                    | Existing                                                                                                                                                                  | 43                      | 17                                                                                                    | 105                          | 27                                             | 20                                                   | 45                       | 87                                          | 757                                        | 26                                                                | 85                       | 604                     | 19                      | 58    | 25   | 1    | 0     |
|                                                        |                            | 2024                                                                                    | Existing Adj.                                                                                                                                                             | 43                      | 17                                                                                                    | 105                          | 27                                             | 20                                                   | 45                       | 87                                          | 757                                        | 26                                                                | 85                       | 604                     | 19                      | _     |      |      |       |
|                                                        |                            | 2024                                                                                    | Background                                                                                                                                                                | 43                      | 17                                                                                                    | 105                          | 27                                             | 20                                                   | 45                       | 87                                          | 757                                        | 26                                                                | 85                       | 604                     | 19                      |       |      |      |       |
|                                                        |                            |                                                                                         | grd. Dev. A                                                                                                                                                               |                         | <u> </u>                                                                                              |                              | l —                                            |                                                      |                          |                                             |                                            |                                                                   | l —                      |                         | -                       |       |      |      |       |
|                                                        |                            |                                                                                         | grd. Dev. B                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            |                                                                                         | grd. Dev. C<br>Background                                                                                                                                                 | 43                      | 17                                                                                                    | 105                          | 27                                             | 20                                                   | 45                       | 87                                          | 757                                        | 26                                                                | 85                       | 604                     | 19                      |       |      |      |       |
|                                                        |                            |                                                                                         | Generated                                                                                                                                                                 | 7                       | 17                                                                                                    | 105                          | - 27                                           | 20                                                   | 45                       | .,                                          | 8                                          | 20                                                                | 65                       | 6                       | 7                       |       |      |      |       |
|                                                        |                            |                                                                                         | Pass By                                                                                                                                                                   | 20                      |                                                                                                       |                              |                                                |                                                      |                          |                                             | -20                                        |                                                                   |                          | -11                     | 11                      |       |      |      |       |
|                                                        |                            |                                                                                         | al Site Gen                                                                                                                                                               | 20                      | 0                                                                                                     | 0                            | 0                                              | 0                                                    | 0                        | 0                                           | -12                                        | 0                                                                 | 0                        | -5                      | 18                      |       |      |      |       |
|                                                        |                            |                                                                                         | tal Future                                                                                                                                                                | 70                      | 17                                                                                                    | 105                          | 27                                             | 20                                                   | 45                       | 87                                          | 745                                        | 26                                                                | 85                       | 599                     | 37                      |       |      |      |       |
|                                                        |                            | 10                                                                                      | turrature                                                                                                                                                                 |                         |                                                                                                       | 105                          |                                                |                                                      | ~~                       | 0,                                          | 745                                        | 20                                                                |                          | 333                     | 57                      |       |      |      |       |
| Intersection                                           | Time period                | Year                                                                                    | Movement                                                                                                                                                                  | EBL                     | EBT                                                                                                   | EBR                          | WBL                                            | WBT                                                  | WBR                      | NBL                                         | NBT                                        | NBR                                                               | SBL                      | SBT                     | SBR                     | EBRR  | WBRR | NBRR | SBRF  |
|                                                        | m.d. Peak Hour             |                                                                                         | PHF                                                                                                                                                                       |                         | 0.82                                                                                                  |                              |                                                | 0.93                                                 |                          |                                             | 0.81                                       |                                                                   |                          | 0.60                    |                         |       |      |      |       |
| #3 - Oaks Drive South & Karevich Drive/Site DW         | 01/25/24                   |                                                                                         | % Heavy                                                                                                                                                                   |                         | 1%                                                                                                    |                              |                                                | 1%                                                   |                          |                                             | 1%                                         |                                                                   |                          | 0%                      |                         |       |      |      |       |
|                                                        | 12:00 p.m 1:00 p.m.        | 2024                                                                                    | Existing                                                                                                                                                                  | 1                       | 302                                                                                                   | 9                            | 106                                            | 320                                                  | 9                        | 7                                           | 0                                          | 90                                                                | 6                        | 1                       | 1                       |       |      |      |       |
|                                                        |                            | 2024                                                                                    | Existing Adj.                                                                                                                                                             | 1                       | 302                                                                                                   | 9                            | 106                                            | 320                                                  | 9                        | 7                                           | 0                                          | 90                                                                | 6                        | 1                       | 1                       |       |      |      |       |
|                                                        |                            | 2024                                                                                    | Background                                                                                                                                                                | 1                       | 302                                                                                                   | 9                            | 106                                            | 320                                                  | 9                        | 7                                           | 0                                          | 90                                                                | 6                        | 1                       | 1                       |       |      |      |       |
|                                                        |                            | Bck                                                                                     | grd. Dev. A                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            | Bck                                                                                     | grd. Dev. B                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            | Bck                                                                                     | grd. Dev. C                                                                                                                                                               |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   |                          |                         |                         |       |      |      |       |
|                                                        |                            | Total                                                                                   | Background                                                                                                                                                                | 1                       | 302                                                                                                   | 9                            | 106                                            | 320                                                  | 9                        | 7                                           | 0                                          | 90                                                                | 6                        | 1                       | 1                       |       |      |      |       |
|                                                        | 1                          | Site                                                                                    | Generated                                                                                                                                                                 | 7                       |                                                                                                       |                              |                                                |                                                      | 38                       |                                             |                                            |                                                                   | 37                       |                         | 8                       |       |      |      |       |
|                                                        |                            |                                                                                         |                                                                                                                                                                           |                         | . –                                                                                                   |                              |                                                |                                                      | 52                       |                                             |                                            |                                                                   | 43                       |                         |                         |       |      |      |       |
|                                                        |                            |                                                                                         | Pass By                                                                                                                                                                   |                         |                                                                                                       |                              |                                                |                                                      |                          |                                             |                                            |                                                                   | 80                       | 0                       |                         |       |      |      |       |
|                                                        |                            | Tot                                                                                     | al Site Gen                                                                                                                                                               | 7                       | 0                                                                                                     | 0                            | 0                                              | 0                                                    | 90                       | 0                                           | 0                                          | 0                                                                 |                          |                         | 8                       |       |      |      |       |
|                                                        |                            | Tot                                                                                     |                                                                                                                                                                           | 7                       | 0<br>302                                                                                              | 0<br>9                       | 0<br>106                                       | 0<br>320                                             | 90<br>99                 | 0<br>7                                      | 0                                          | 0<br>90                                                           | 86                       | 1                       | 8<br>9                  |       |      |      |       |
|                                                        |                            | Tot<br>To                                                                               | al Site Gen<br>tal Future                                                                                                                                                 | 8                       | 302                                                                                                   | 9                            | 106                                            | 320                                                  | 99                       | 7                                           | 0                                          | 90                                                                | 86                       | 1                       | 9                       |       |      |      |       |
| Intersection                                           | Time period                | Tot                                                                                     | al Site Gen<br>tal Future<br>Movement                                                                                                                                     |                         | <b>302</b><br>EBT                                                                                     |                              |                                                | 320<br>WBT                                           |                          |                                             | 0<br>NBT                                   |                                                                   |                          |                         |                         | EBRR  | WBRR | NBRR | SBRF  |
|                                                        | m.d. Peak Hour             | Tot<br>To                                                                               | al Site Gen<br>tal Future<br>Movement<br>PHF                                                                                                                              | 8                       | 302<br>EBT<br>0.83                                                                                    | 9                            | 106                                            | 320<br>WBT<br>0.81                                   | 99                       | 7                                           | 0<br>NBT<br>0.75                           | 90                                                                | 86                       | 1                       | 9                       | EBRR  | WBRR | NBRR | SBRI  |
| Intersection<br>#4 - Oaks Drive North & Karevich Drive | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year                                                                       | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy                                                                                                                   | 8<br>EBL                | 302<br>EBT<br>0.83<br>1%                                                                              | 9<br>EBR                     | <b>106</b><br>WBL                              | 320<br>WBT<br>0.81<br>1%                             | 99<br>WBR                | 7<br>NBL                                    | 0<br>NBT<br>0.75<br>0%                     | 90<br>NBR                                                         | 86                       | 1                       | 9                       | EBRR  | WBRR | NBRR | SBR   |
|                                                        | m.d. Peak Hour             | Tot<br>To<br>Year<br>2024                                                               | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing                                                                                                       | 8<br>EBL                | 302<br>EBT<br>0.83<br>1%<br>163                                                                       | 9<br>EBR<br>3                | 106<br>WBL                                     | 320<br>WBT<br>0.81<br>1%<br>118                      | 99<br>WBR<br>0           | 7<br>NBL                                    | 0<br>NBT<br>0.75<br>0%<br>0                | 90<br>NBR<br>2                                                    | SBL                      | 1<br>SBT                | 9<br>SBR                | EBRR  | WBRR | NBRR | SBR   |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024                                                       | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing<br>Adj.                                                                                               | 8<br>EBL<br>0           | 302<br>EBT<br>0.83<br>1%<br>163<br>163                                                                | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8                           | 320<br>WBT<br>0.81<br>1%<br>118<br>118               | 99<br>WBR<br>0           | 7<br>NBL<br>1                               | 0<br>NBT<br>0.75<br>0%<br>0                | 90<br>NBR<br>2<br>2                                               | SBL                      | 1<br>SBT<br>0           | 9<br>SBR                | EBRR  | WBRR | NBRR | SBRI  |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024                                               | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing<br>Existing Adj.<br>Background                                                                        | 8<br>EBL                | 302<br>EBT<br>0.83<br>1%<br>163                                                                       | 9<br>EBR<br>3                | 106<br>WBL                                     | 320<br>WBT<br>0.81<br>1%<br>118                      | 99<br>WBR<br>0           | 7<br>NBL                                    | 0<br>NBT<br>0.75<br>0%<br>0                | 90<br>NBR<br>2                                                    | SBL                      | 1<br>SBT                | 9<br>SBR                | EBRR  | WBRR | NBRR | SBRI  |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck                                | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing Adj.<br>Background<br>grd. Dev. A                                                                     | 8<br>EBL<br>0           | 302<br>EBT<br>0.83<br>1%<br>163<br>163                                                                | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8                           | 320<br>WBT<br>0.81<br>1%<br>118<br>118               | 99<br>WBR<br>0           | 7<br>NBL<br>1                               | 0<br>NBT<br>0.75<br>0%<br>0                | 90<br>NBR<br>2<br>2                                               | SBL                      | 1<br>SBT<br>0           | 9<br>SBR                | EBRR  | WBRR | NBRR | SBRI  |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck                         | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing Adj.<br>Background<br>grd. Dev. A<br>grd. Dev. B                                                      | 8<br>EBL<br>0           | 302<br>EBT<br>0.83<br>1%<br>163<br>163                                                                | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8                           | 320<br>WBT<br>0.81<br>1%<br>118<br>118               | 99<br>WBR<br>0           | 7<br>NBL<br>1                               | 0<br>NBT<br>0.75<br>0%<br>0                | 90<br>NBR<br>2<br>2                                               | SBL                      | 1<br>SBT<br>0           | 9<br>SBR                | EBRR  | WBRR | NBRR | SBR   |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Bck                  | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing Adj.<br>Backgroud<br>grd. Dev. A<br>grd. Dev. B<br>grd. Dev. C                                        | 8<br>EBL<br>0<br>0      | 302           EBT           0.83           1%           163           163                             | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8<br>8                      | 320<br>WBT<br>0.81<br>1%<br>118<br>118<br>118        | 99<br>WBR<br>0<br>0      | 7<br>NBL<br>1<br>1                          | 0<br>NBT<br>0.75<br>0%<br>0<br>0<br>0      | 90<br>NBR<br>2<br>2                                               | 86<br>SBL<br>0<br>0      | 1<br>SBT<br>0<br>0      | 9<br>SBR<br>0<br>0      | EBRR  | WBRR | NBRR | SBR   |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Total                | al Site Gen<br>tal Future<br>PHF<br>% Heavy<br>Existing Adj.<br>Background<br>grd. Dev. A<br>grd. Dev. C<br>Background                                                    | 8<br>EBL<br>0           | 302<br>EBT<br>0.83<br>1%<br>163<br>163                                                                | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8<br>8<br>8<br>8            | 320<br>WBT<br>0.81<br>1%<br>118<br>118               | 99<br>WBR<br>0           | 7<br>NBL<br>1                               | 0<br>NBT<br>0.75<br>0%<br>0<br>0           | 90<br>NBR<br>2<br>2<br>2                                          | SBL                      | 1<br>SBT<br>0           | 9<br>SBR                | EBRR  | WBRR | NBRR | SBR   |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Bck<br>Total<br>Site | al Site Gen<br>tal Future<br>PHF<br>% Heavy<br>Existing Adj.<br>Background<br>grd. Dev. A<br>grd. Dev. C<br>Background<br>Generated                                       | 8<br>EBL<br>0<br>0      | 302           EBT           0.83           1%           163           163                             | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8<br>8<br>8<br>8<br>8<br>7  | 320<br>WBT<br>0.81<br>1%<br>118<br>118<br>118        | 99<br>WBR<br>0<br>0      | 7<br>NBL<br>1<br>1                          | 0<br>NBT<br>0.75<br>0%<br>0<br>0<br>0      | 90<br>NBR<br>2<br>2<br>2<br>2<br>2<br>2<br>7                      | 86<br>SBL<br>0<br>0      | 1<br>SBT<br>0<br>0      | 9<br>SBR<br>0<br>0      | EBRR  | WBRR | NBRR | SBR   |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Bck<br>Total<br>Site | al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing Adj.<br>Background<br>grd. Dev. A<br>grd. Dev. A<br>grd. Dev. B<br>Background<br>Generated<br>Pass By | 8<br>EBL<br>0<br>0<br>0 | 302           EBT           0.83           1%           163           163           163           163 | 9<br>EBR<br>3<br>3<br>3<br>3 | 106<br>WBL<br>8<br>8<br>8<br>8<br>8<br>7<br>11 | 320<br>WBT<br>0.81<br>1%<br>118<br>118<br>118<br>118 | 99<br>WBR<br>0<br>0<br>0 | 7 NBL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 0<br>NBT<br>0.75<br>0%<br>0<br>0<br>0<br>0 | 90<br>NBR<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>7<br>20 | 86<br>SBL<br>0<br>0<br>0 | 1<br>SBT<br>0<br>0<br>0 | 9<br>SBR<br>0<br>0<br>0 | EBRR  | WBRR | NBRR | SBRF  |
|                                                        | m.d. Peak Hour<br>01/25/24 | Tot<br>To<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Bck<br>Bck<br>Total<br>Site          | al Site Gen<br>tal Future<br>PHF<br>% Heavy<br>Existing Adj.<br>Background<br>grd. Dev. A<br>grd. Dev. C<br>Background<br>Generated                                       | 8<br>EBL<br>0<br>0      | 302           EBT           0.83           1%           163           163                             | 9<br>EBR<br>3<br>3           | 106<br>WBL<br>8<br>8<br>8<br>8<br>8<br>8<br>7  | 320<br>WBT<br>0.81<br>1%<br>118<br>118<br>118        | 99<br>WBR<br>0<br>0      | 7<br>NBL<br>1<br>1                          | 0<br>NBT<br>0.75<br>0%<br>0<br>0<br>0      | 90<br>NBR<br>2<br>2<br>2<br>2<br>2<br>2<br>7                      | 86<br>SBL<br>0<br>0      | 1<br>SBT<br>0<br>0      | 9<br>SBR<br>0<br>0      | EBRR  | WBRR | NBRR | SBRF  |

Count Date: 1/25/2024 Count Year: 2024 Existing Adj. Year: 2024

Existing Adjustment Rate: 1.00 Growth Rate: 0.5% Buildout Year: 2024 Scenario: m.d. Peak Hour

Bckgrd. Dev. A: Bckgrd. Dev. B: Bckgrd. Dev. C:

| Intersection                                           | Time period                | Year                                                                                                                           | Movement                                                                                                                                                                                                                                    | EBL                               | EBT                                                       | EBR                                 | WBL                                                  | WBT                                                | WBR                                        | NBL                          | NBT                                             | NBR                                           | SBL                                        | SBT                     | SBR                                    | EBRR | WBRR | NBRR  | SBRR |
|--------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------|-------------------------------------|------------------------------------------------------|----------------------------------------------------|--------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------|--------------------------------------------|-------------------------|----------------------------------------|------|------|-------|------|
| intersection                                           | p.m. Peak Hour             | rear                                                                                                                           | PHF                                                                                                                                                                                                                                         | EDL                               | 0.87                                                      | EDR                                 | WDL                                                  | 0.84                                               | WDR                                        | INDL                         | 0.91                                            | INDR                                          | SDL                                        | 0.95                    | JDK                                    | EDAN | WDRR | INDAK | SDRK |
| #1 - Novi Road & Oaks Drive South/Twelve Oaks          | 01/25/24                   |                                                                                                                                | % Heavy                                                                                                                                                                                                                                     |                                   | 0.87                                                      |                                     |                                                      | 0.84                                               |                                            |                              | 1%                                              |                                               |                                            | 0.35                    |                                        |      |      |       |      |
| Drive                                                  | 4:45 p.m 5:45 p.m.         | 2024                                                                                                                           | Existing                                                                                                                                                                                                                                    | 79                                | 41                                                        | 426                                 | 339                                                  | 63                                                 | 39                                         | 349                          | 874                                             | 175                                           | 21                                         | 803                     | 56                                     | 90   | 7    | 65    | 15   |
|                                                        |                            | 2024                                                                                                                           | Existing Adj.                                                                                                                                                                                                                               | 79                                | 41                                                        | 426                                 | 339                                                  | 63                                                 | 39                                         | 349                          | 874                                             | 175                                           | 21                                         | 803                     | 56                                     |      | -    |       |      |
|                                                        |                            | 2024                                                                                                                           | Background                                                                                                                                                                                                                                  | 79                                | 41                                                        | 426                                 | 339                                                  | 63                                                 | 39                                         | 349                          | 874                                             | 175                                           | 21                                         | 803                     | 56                                     |      |      |       |      |
|                                                        |                            |                                                                                                                                | grd. Dev. A                                                                                                                                                                                                                                 |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            |                                                                                                                                | grd. Dev. B                                                                                                                                                                                                                                 |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            | Bck                                                                                                                            | grd. Dev. C                                                                                                                                                                                                                                 |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            | Total                                                                                                                          | Background                                                                                                                                                                                                                                  | 79                                | 41                                                        | 426                                 | 339                                                  | 63                                                 | 39                                         | 349                          | 874                                             | 175                                           | 21                                         | 803                     | 56                                     |      |      |       |      |
|                                                        |                            | Site                                                                                                                           | Generated                                                                                                                                                                                                                                   | 5                                 | 2                                                         | 14                                  |                                                      | 4                                                  |                                            | 14                           |                                                 |                                               |                                            |                         | 5                                      |      |      |       |      |
|                                                        |                            |                                                                                                                                | Pass By                                                                                                                                                                                                                                     | 11                                |                                                           | 14                                  |                                                      |                                                    |                                            | 24                           | -24                                             |                                               |                                            | -15                     | 8                                      |      |      |       |      |
|                                                        |                            |                                                                                                                                | al Site Gen                                                                                                                                                                                                                                 | 16                                | 2                                                         | 28                                  | 0                                                    | 4                                                  | 0                                          | 38                           | -24                                             | 0                                             | 0                                          | -15                     | 13                                     |      |      |       |      |
|                                                        |                            | To                                                                                                                             | tal Future                                                                                                                                                                                                                                  | 95                                | 43                                                        | 454                                 | 339                                                  | 67                                                 | 39                                         | 387                          | 850                                             | 175                                           | 21                                         | 788                     | 69                                     |      |      |       |      |
|                                                        |                            |                                                                                                                                |                                                                                                                                                                                                                                             |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
| Intersection                                           | Time period                | Year                                                                                                                           | Movement                                                                                                                                                                                                                                    | EBL                               | EBT                                                       | EBR                                 | WBL                                                  | WBT                                                | WBR                                        | NBL                          | NBT                                             | NBR                                           | SBL                                        | SBT                     | SBR                                    | EBRR | WBRR | NBRR  | SBRR |
| #2. Nevi Read & Oaks Drive Photo                       | p.m. Peak Hour             |                                                                                                                                | PHF                                                                                                                                                                                                                                         |                                   | 0.91                                                      |                                     |                                                      | 0.76                                               |                                            |                              | 0.88                                            |                                               |                                            | 0.93                    |                                        |      |      |       |      |
| #2 - Novi Road & Oaks Drive North                      | 01/25/24                   | 2026                                                                                                                           | % Heavy                                                                                                                                                                                                                                     |                                   | 1%                                                        |                                     |                                                      | 0%                                                 |                                            | 70                           | 1%                                              |                                               |                                            | 1%                      | - 20                                   |      |      |       |      |
|                                                        | 4:30 p.m 5:30 p.m.         | 2024                                                                                                                           | Existing                                                                                                                                                                                                                                    | 48                                | 12                                                        | 93                                  | 48                                                   | 33                                                 | 49                                         | 79                           | 869                                             | 44                                            | 49                                         | 739                     | 29                                     | 53   | 15   | 0     | 1    |
|                                                        |                            | 2024<br>2024                                                                                                                   | Existing Adj.<br>Background                                                                                                                                                                                                                 | 48<br>48                          | 12<br>12                                                  | 93<br>93                            | 48<br>48                                             | 33<br>33                                           | 49<br>49                                   | 79<br>79                     | 869<br>869                                      | 44<br>44                                      | 49<br>49                                   | 739<br>739              | 29<br>29                               |      |      |       |      |
|                                                        |                            |                                                                                                                                | grd. Dev. A                                                                                                                                                                                                                                 | 48                                | 12                                                        | 33                                  | 48                                                   | 23                                                 | 49                                         | 79                           | 009                                             | 44                                            | 49                                         | /39                     | 29                                     |      |      |       | _    |
|                                                        |                            |                                                                                                                                | grd. Dev. A<br>grd. Dev. B                                                                                                                                                                                                                  |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               | l —                                        |                         |                                        |      |      |       | _    |
|                                                        |                            |                                                                                                                                | grd. Dev. B<br>grd. Dev. C                                                                                                                                                                                                                  |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            |                                                                                                                                | Background                                                                                                                                                                                                                                  | 48                                | 12                                                        | 93                                  | 48                                                   | 33                                                 | 49                                         | 79                           | 869                                             | 44                                            | 49                                         | 739                     | 29                                     |      |      |       |      |
|                                                        |                            |                                                                                                                                | Generated                                                                                                                                                                                                                                   | 4                                 |                                                           |                                     |                                                      |                                                    |                                            |                              | 5                                               |                                               |                                            | 5                       | 4                                      |      |      |       |      |
|                                                        |                            |                                                                                                                                | Pass By                                                                                                                                                                                                                                     | 11                                |                                                           |                                     |                                                      |                                                    |                                            |                              | -13                                             |                                               |                                            | -7                      | 7                                      |      |      |       |      |
|                                                        |                            |                                                                                                                                | al Site Gen                                                                                                                                                                                                                                 | 15                                | 0                                                         | 0                                   | 0                                                    | 0                                                  | 0                                          | 0                            | -8                                              | 0                                             | 0                                          | -2                      | 11                                     |      |      |       |      |
|                                                        |                            |                                                                                                                                | tal Future                                                                                                                                                                                                                                  | 63                                | 12                                                        | 93                                  | 48                                                   | 33                                                 | 49                                         | 79                           | 861                                             | 44                                            | 49                                         | 737                     | 40                                     |      |      |       |      |
|                                                        |                            |                                                                                                                                |                                                                                                                                                                                                                                             |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        | •    |      |       |      |
| Intersection                                           | Time period                | Year                                                                                                                           | Movement                                                                                                                                                                                                                                    | EBL                               | EBT                                                       | EBR                                 | WBL                                                  | WBT                                                | WBR                                        | NBL                          | NBT                                             | NBR                                           | SBL                                        | SBT                     | SBR                                    | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour             |                                                                                                                                | PHF                                                                                                                                                                                                                                         |                                   | 0.85                                                      |                                     |                                                      | 0.95                                               |                                            |                              | 0.93                                            |                                               |                                            | 0.60                    |                                        |      |      |       |      |
| #3 - Oaks Drive South & Karevich Drive/Site DW         | 01/25/24                   |                                                                                                                                | % Heavy                                                                                                                                                                                                                                     |                                   | 1%                                                        |                                     |                                                      | 0%                                                 |                                            |                              | 0%                                              |                                               |                                            | 0%                      |                                        |      |      |       |      |
|                                                        | 4:15 p.m 5:15 p.m.         | 2024                                                                                                                           | Existing                                                                                                                                                                                                                                    | 1                                 | 410                                                       | 24                                  | 111                                                  | 335                                                | 4                                          | 5                            | 1                                               | 94                                            | 2                                          | 0                       | 2                                      |      |      |       |      |
|                                                        |                            | 2024                                                                                                                           | Existing Adj.                                                                                                                                                                                                                               | 1                                 | 410                                                       | 24                                  | 111                                                  | 335                                                | - 4                                        | 5                            | 1                                               | 94                                            | 2                                          | 0                       | 2                                      |      |      |       |      |
|                                                        |                            | 2024                                                                                                                           | Background                                                                                                                                                                                                                                  | 1                                 | 410                                                       | 24                                  | 111                                                  | 335                                                | 4                                          | 5                            | 1                                               | 94                                            | 2                                          | 0                       | 2                                      |      |      |       |      |
|                                                        | 1                          |                                                                                                                                |                                                                                                                                                                                                                                             |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            |                                                                                                                                | grd. Dev. A                                                                                                                                                                                                                                 |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            | Bck                                                                                                                            | grd. Dev. B                                                                                                                                                                                                                                 |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            | Bck<br>Bck                                                                                                                     | grd. Dev. B<br>grd. Dev. C                                                                                                                                                                                                                  |                                   |                                                           |                                     |                                                      |                                                    |                                            |                              |                                                 |                                               |                                            |                         |                                        |      |      |       |      |
|                                                        |                            | Bck<br>Bck<br>Total                                                                                                            | grd. Dev. B<br>grd. Dev. C<br>Background                                                                                                                                                                                                    | 1                                 | 410                                                       | 24                                  | 111                                                  | 335                                                | 4                                          | 5                            | 1                                               | 94                                            | 2                                          | 0                       | 2                                      |      |      |       |      |
|                                                        |                            | Bck<br>Bck<br>Total<br>Site                                                                                                    | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated                                                                                                                                                                                       | 1                                 |                                                           |                                     |                                                      | 335                                                | 23                                         | 5                            | 1                                               | 94                                            | 21                                         | 0                       | <b>2</b><br>4                          |      |      |       |      |
|                                                        |                            | Bck<br>Bck<br>Total<br>Site                                                                                                    | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By                                                                                                                                                                            | 5                                 | 410                                                       | 24                                  | 111                                                  |                                                    | 23<br>32                                   |                              | -                                               |                                               | 21<br>25                                   |                         | 4                                      |      |      |       |      |
|                                                        |                            | Bck<br>Bck<br>Total<br>Site<br>Tot                                                                                             | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen                                                                                                                                                             | 5                                 | <b>410</b><br>0                                           | 24                                  | <b>111</b><br>0                                      | 0                                                  | 23<br>32<br>55                             | 0                            | 0                                               | 0                                             | 21<br>25<br>46                             | 0                       | 4                                      |      |      |       |      |
|                                                        |                            | Bck<br>Bck<br>Total<br>Site<br>Tot                                                                                             | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By                                                                                                                                                                            | 5                                 | 410                                                       | 24                                  | 111                                                  |                                                    | 23<br>32                                   |                              | -                                               |                                               | 21<br>25                                   |                         | 4                                      |      |      |       |      |
| Intersection                                           | Time period                | Bck<br>Bck<br>Total<br>Site<br>Tot                                                                                             | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen                                                                                                                                                             | 5                                 | <b>410</b><br>0                                           | 24                                  | <b>111</b><br>0                                      | 0                                                  | 23<br>32<br>55                             | 0                            | 0                                               | 0                                             | 21<br>25<br>46                             | 0                       | 4                                      | EBRR | WBRR | NBRR  | SBRR |
| Intersection                                           |                            | Bck<br>Bck<br>Total<br>Site<br>Tot<br>Tot                                                                                      | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future                                                                                                                                               | 5                                 | 410<br>0<br>410<br>EBT                                    | 24<br>0<br>24                       | 111<br>0<br>111                                      | 0<br>335<br>WBT                                    | 23<br>32<br>55<br>59                       | 0                            | 0<br>1<br>NBT                                   | 0 94                                          | 21<br>25<br>46<br>48                       | 0                       | 4                                      | EBRR | WBRR | NBRR  | SBRR |
| Intersection<br>#4 - Oaks Drive North & Karevich Drive | p.m. Peak Hour             | Bck<br>Bck<br>Total<br>Site<br>Tot<br>Tot                                                                                      | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement                                                                                                                                   | 5                                 | 410<br>0<br>410                                           | 24<br>0<br>24                       | 111<br>0<br>111                                      | 0 335                                              | 23<br>32<br>55<br>59                       | 0                            | 0                                               | 0 94                                          | 21<br>25<br>46<br>48                       | 0                       | 4                                      | EBRR | WBRR | NBRR  | SBRR |
|                                                        |                            | Bck<br>Bck<br>Total<br>Site<br>Tot<br>Tot                                                                                      | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF                                                                                                                            | 5                                 | 410<br>0<br>410<br>EBT<br>0.86                            | 24<br>0<br>24                       | 111<br>0<br>111                                      | 0<br>335<br>WBT<br>0.81                            | 23<br>32<br>55<br>59                       | 0                            | 0<br>1<br>NBT<br>0.60                           | 0 94                                          | 21<br>25<br>46<br>48                       | 0                       | 4                                      | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>Year                                                                               | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy                                                                                                                 | 5<br>5<br>6<br>EBL                | 410<br>0<br>410<br>EBT<br>0.86<br>1%                      | 24<br>0<br>24<br>EBR                | 111<br>0<br>111<br>WBL                               | 0<br>335<br>WBT<br>0.81<br>2%                      | 23<br>32<br>55<br>59<br>WBR                | 0<br>5<br>NBL                | 0<br>1<br>NBT<br>0.60<br>0%                     | 0<br>94<br>NBR                                | 21<br>25<br>46<br>48                       | 0                       | 4                                      | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>Year<br>2024                                                                       | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing                                                                                                     | 5<br>5<br>6<br>EBL                | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150               | 24<br>0<br>24<br>EBR                | 111<br>0<br>111<br>WBL                               | 0<br>335<br>WBT<br>0.81<br>2%<br>137               | 23<br>32<br>55<br>59<br>WBR                | 0<br>5<br>NBL                | 0<br>1<br>NBT<br>0.60<br>0%<br>0                | 0<br>94<br>NBR                                | 21<br>25<br>46<br>48<br>SBL                | 0<br>0<br>SBT           | 4<br>4<br>6<br>SBR                     | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Total<br>Site<br>Tot<br>To<br>Year<br>2024<br>2024<br>2024                                                              | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing Adj.                                                                                                | 5<br>5<br>6<br>EBL<br>0<br>0      | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150        | 24<br>0<br>24<br>EBR                | 111<br>0<br>111<br>WBL                               | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137        | 23<br>32<br>55<br>59<br>WBR                | 0<br>5<br>NBL<br>2<br>2      | 0<br>1<br>NBT<br>0.60<br>0%<br>0                | 0<br>94<br>NBR<br>3<br>3                      | 21<br>25<br>46<br>48<br>SBL                | 0<br>0<br>58T           | 4<br>4<br>6<br>SBR                     | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>Tot<br>Year<br>2024<br>2024<br>2024<br>2024<br>2024                                      | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing Adj.<br>Background                                                                                  | 5<br>5<br>6<br>EBL<br>0<br>0      | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150        | 24<br>0<br>24<br>EBR                | 111<br>0<br>111<br>WBL                               | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137        | 23<br>32<br>55<br>59<br>WBR                | 0<br>5<br>NBL<br>2<br>2      | 0<br>1<br>NBT<br>0.60<br>0%<br>0                | 0<br>94<br>NBR<br>3<br>3                      | 21<br>25<br>46<br>48<br>SBL                | 0<br>0<br>58T           | 4<br>4<br>6<br>SBR                     | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck                                 | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing<br>Atheravy<br>Existing Adj<br>Background<br>grd. Dev. A                                            | 5<br>5<br>6<br>EBL<br>0<br>0      | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150        | 24<br>0<br>24<br>EBR                | 111<br>0<br>111<br>WBL                               | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137        | 23<br>32<br>55<br>59<br>WBR                | 0<br>5<br>NBL<br>2<br>2      | 0<br>1<br>NBT<br>0.60<br>0%<br>0                | 0<br>94<br>NBR<br>3<br>3                      | 21<br>25<br>46<br>48<br>SBL                | 0<br>0<br>58T           | 4<br>4<br>6<br>SBR                     | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Bck                  | grd. Dev. B<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing<br>Ackground<br>grd. Dev. A<br>grd. Dev. B                                                                         | 5<br>5<br>6<br>EBL<br>0<br>0      | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150        | 24<br>0<br>24<br>EBR                | 111<br>0<br>111<br>WBL<br>4<br>4<br>4                | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137        | 23<br>32<br>55<br>59<br>WBR                | 0<br>5<br>NBL<br>2<br>2      | 0<br>1<br>NBT<br>0.60<br>0%<br>0                | 0<br>94<br>NBR<br>3<br>3<br>3                 | 21<br>25<br>46<br>48<br>SBL                | 0<br>0<br>58T           | 4<br>4<br>6<br>SBR                     | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>Year<br>2024<br>2024<br>2024<br>2024<br>2024<br>2024<br>Bck<br>Bck<br>Bck<br>Total | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing<br>Background<br>grd. Dev. A<br>grd. Dev. C<br>Background<br>Generated                              | 5<br>5<br>6<br>EBL<br>0<br>0<br>0 | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150        | 24<br>0<br>24<br>EBR<br>3<br>3<br>3 | 111<br>0<br>111<br>WBL<br>4<br>4<br>4<br>4<br>4<br>4 | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137<br>137 | 23<br>32<br>55<br>59<br>WBR<br>0<br>0      | 0<br>5<br>NBL<br>2<br>2<br>2 | 0<br>1<br>0.60<br>0%<br>0<br>0<br>0             | 0<br>94<br>NBR<br>3<br>3<br>3<br>3<br>4       | 21<br>25<br>46<br>48<br>SBL<br>0<br>0      | 0<br>0<br>SBT<br>0<br>0 | 4<br>4<br>6<br>SBR<br>0<br>0           | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>2024<br>2024<br>2024<br>2024<br>2024<br>2024<br>2024<br>202                        | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>al Site Gen<br>al Future<br>Wovement<br>PHF<br>% Heavy<br>Existing d2;<br>Background<br>grd. Dev. A<br>grd. Dev. C<br>Background<br>Generated<br>Pass By | -<br>5<br>6<br>EBL<br>0<br>0<br>0 | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150<br>150 | 24<br>0<br>24<br>EBR<br>3<br>3<br>3 | 111<br>0<br>111<br>WBL<br>4<br>4<br>4<br>4<br>4<br>7 | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137<br>137 | 23<br>32<br>55<br>59<br>WBR<br>0<br>0<br>0 | 0<br>5<br>NBL<br>2<br>2<br>2 | 0<br>1<br>NBT<br>0.60<br>0%<br>0<br>0<br>0<br>0 | 0<br>94<br>NBR<br>3<br>3<br>3<br>3<br>4<br>11 | 21<br>25<br>46<br>48<br>SBL<br>0<br>0<br>0 | 0<br>0<br>SBT<br>0<br>0 | 4<br>4<br>5BR<br>0<br>0<br>0<br>0<br>0 | EBRR | WBRR | NBRR  | SBRR |
|                                                        | p.m. Peak Hour<br>01/25/24 | Bck<br>Bck<br>Total<br>Site<br>Tot<br>To<br>To<br>2024<br>2024<br>2024<br>2024<br>2024<br>2024<br>2024<br>202                  | grd. Dev. B<br>grd. Dev. C<br>Background<br>Generated<br>Pass By<br>al Site Gen<br>tal Future<br>Movement<br>PHF<br>% Heavy<br>Existing<br>Background<br>grd. Dev. A<br>grd. Dev. C<br>Background<br>Generated                              | 5<br>5<br>6<br>EBL<br>0<br>0<br>0 | 410<br>0<br>410<br>EBT<br>0.86<br>1%<br>150<br>150        | 24<br>0<br>24<br>EBR<br>3<br>3<br>3 | 111<br>0<br>111<br>WBL<br>4<br>4<br>4<br>4<br>4<br>4 | 0<br>335<br>WBT<br>0.81<br>2%<br>137<br>137<br>137 | 23<br>32<br>55<br>59<br>WBR<br>0<br>0      | 0<br>5<br>NBL<br>2<br>2<br>2 | 0<br>1<br>0.60<br>0%<br>0<br>0<br>0             | 0<br>94<br>NBR<br>3<br>3<br>3<br>3<br>4       | 21<br>25<br>46<br>48<br>SBL<br>0<br>0      | 0<br>0<br>SBT<br>0<br>0 | 4<br>4<br>6<br>SBR<br>0<br>0           | EBRR | WBRR | NBRR  | SBRR |

| Count Date:         | 1/25/2024 |
|---------------------|-----------|
| Count Year:         | 2024      |
| Existing Adj. Year: | 2024      |
|                     |           |
| ng Adjustment Rate: | 1.00      |

Existing Adjustment Rate: 1.00 Growth Rate: 0.5% Buildout Year: 2024 Scenario: p.m. Peak Hour

Bckgrd. Dev. A: Bckgrd. Dev. B: Bckgrd. Dev. C:

## Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC

Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg                           | Twelve Oa      | ıks Dr |       |    |      |       |      | Twelve Oa | ıks Dr |       |      |      |       |      |
|-------------------------------|----------------|--------|-------|----|------|-------|------|-----------|--------|-------|------|------|-------|------|
| Direction                     | Eastbound      |        |       |    |      |       |      | Westbound | 1      |       |      |      |       |      |
| Time                          | L              | Т      | R     | U  | RR   | Арр   | Ped* | L         | Т      | R     | U    | RR   | Арр   | Ped* |
| 2024-01-25 11:00AN            | 1 9            | 13     | 44    | 0  | 10   | 76    | 0    | 61        | 17     | 4     | 0    | 0    | 82    | C    |
| 11:15A1                       | <i>A</i> 6     | 14     | 44    | 0  | 6    | 70    | 0    | 61        | 17     | 5     | 0    | 0    | 83    | C    |
| 11:30AN                       | 1 16           | 13     | 53    | 0  | 12   | 94    | 0    | 68        | 8      | 5     | 0    | 1    | 82    | C    |
| 11:45A1                       | И 10           | 16     | 47    | 0  | 11   | 84    | 0    | 79        | 8      | 7     | 0    | 3    | 97    | C    |
| Hourly Tota                   | ıl 41          | 56     | 188   | 0  | 39   | 324   | 0    | 269       | 50     | 21    | 0    | 4    | 344   | C    |
| 12:00PI                       | A 18           | 10     | 56    | 0  | 5    | 89    | 0    | 77        | 12     | 5     | 0    | 1    | 95    | C    |
| 12:15PI                       | A 10           | 14     | 77    | 0  | 2    | 103   | 0    | 79        | 18     | 10    | 0    | 1    | 108   | C    |
| 12:30PI                       | A 20           | 10     | 81    | 0  | 3    | 114   | 0    | 91        | 18     | 9     | 0    | 0    | 118   | C    |
| 12:45PI                       | И 18           | 12     | 81    | 0  | 2    | 113   | 0    | 83        | 11     | 13    | 0    | 1    | 108   | C    |
| Hourly Tota                   | ıl 66          | 46     | 295   | 0  | 12   | 419   | 0    | 330       | 59     | 37    | 0    | 3    | 429   | C    |
| 4:00PI                        | A 24           | 11     | 81    | 0  | 5    | 121   | 0    | 86        | 23     | 13    | 0    | 1    | 123   | C    |
| 4:15PI                        | A 34           | 16     | 105   | 0  | 4    | 159   | 0    | 72        | 29     | 16    | 1    | 0    | 118   | C    |
| 4:30PI                        | A 23           | 11     | 92    | 0  | 0    | 126   | 0    | 85        | 15     | 14    | 0    | 2    | 116   | C    |
| 4:45PI                        | A 17           | 7      | 91    | 0  | 4    | 119   | 0    | 74        | 22     | 8     | 0    | 2    | 106   | C    |
| Hourly Tota                   | ıl 98          | 45     | 369   | 0  | 13   | 525   | 0    | 317       | 89     | 51    | 1    | 5    | 463   | C    |
| 5:00PI                        | A 25           | 13     | 78    | 0  | 32   | 148   | 0    | 100       | 22     | 6     | 0    | 3    | 131   | C    |
| 5:15PI                        | 4 25           | 9      | 92    | 0  | 28   | 154   | 0    | 91        | 12     | 4     | 0    | 1    | 108   | C    |
| 5:30PI                        | A 12           | 12     | 75    | 0  | 26   | 125   | 0    | 74        | 7      | 14    | 0    | 1    | 96    | (    |
| 5:45PI                        | И 9            | 6      | 71    | 0  | 27   | 113   | 0    | 84        | 13     | 12    | 0    | 0    | 109   | (    |
| Hourly Tota                   | ıl 71          | 40     | 316   | 0  | 113  | 540   | 0    | 349       | 54     | 36    | 0    | 5    | 444   | (    |
| Tota                          | al 276         | 187    | 1168  | 0  | 177  | 1808  | 0    | 1265      | 252    | 145   | 1    | 17   | 1680  | (    |
| % Approac                     | <b>h</b> 15.3% | 10.3%  | 64.6% | 0% | 9.8% | -     | -    | 75.3%     | 15.0%  | 8.6%  | 0.1% | 1.0% | -     |      |
| % Tota                        | l 2.4%         | 1.6%   | 10.2% | 0% | 1.5% | 15.8% | -    | 11.0%     | 2.2%   | 1.3%  | 0%   | 0.1% | 14.7% |      |
| Light                         | s 274          | 186    | 1157  | 0  | 177  | 1794  | -    | 1259      | 249    | 142   | 1    | 17   | 1668  |      |
| % Light                       | s 99.3%        | 99.5%  | 99.1% | 0% | 100% | 99.2% | -    | 99.5%     | 98.8%  | 97.9% | 100% | 100% | 99.3% |      |
| Articulated Truck             | <b>s</b> 0     | 0      | 1     | 0  | 0    | 1     | -    | 1         | 0      | 0     | 0    | 0    | 1     |      |
| % Articulated Truck           | s 0%           | 0%     | 0.1%  | 0% | 0%   | 0.1%  | -    | 0.1%      | 0%     | 0%    | 0%   | 0%   | 0.1%  |      |
| Buses and Single-Unit Truck   | <b>s</b> 2     | 1      | 10    | 0  | 0    | 13    | -    | 5         | 3      | 3     | 0    | 0    | 11    |      |
| % Buses and Single-Unit Truck | s 0.7%         | 0.5%   | 0.9%  | 0% | 0%   | 0.7%  | -    | 0.4%      | 1.2%   | 2.1%  | 0%   | 0%   | 0.7%  |      |
| Pedestriar                    | s -            | -      | -     | -  | -    | -     | 0    | -         | -      | -     | -    | -    | -     | C    |
| % Pedestriar                  | s -            | -      | -     | -  | -    | -     | -    | -         | -      | -     | -    | -    | -     |      |
| Bicycles on Crosswal          | k -            | -      | -     | -  | -    | -     | 0    | -         | -      | -     | -    | -    | -     | C    |
| % Bicycles on Crosswal        | k -            | -      | -     | -  | -    | -     | -    | -         | -      | -     | -    | -    | -     |      |

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

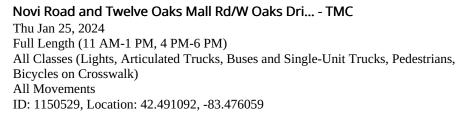
#### Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

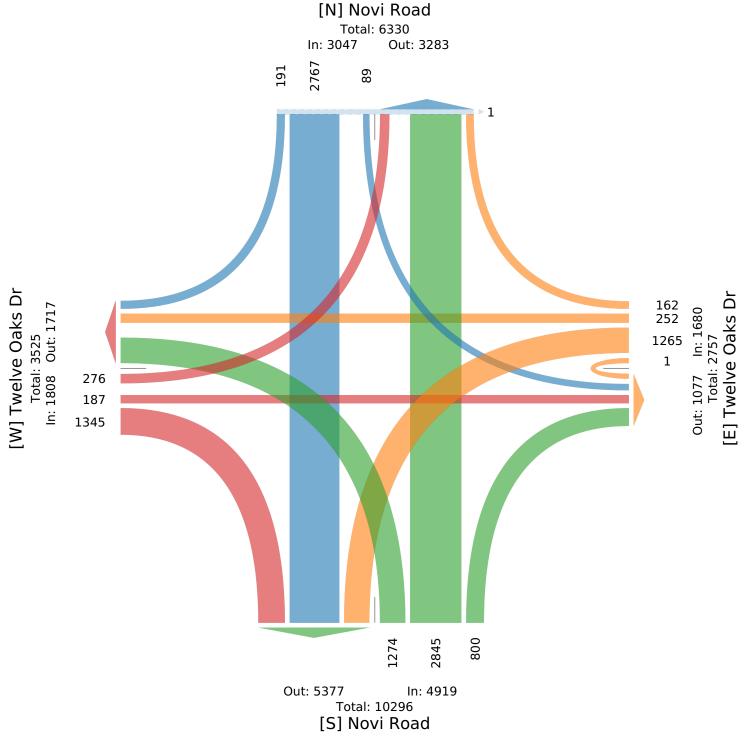
| Leg                       |         | Novi Road |       |      |    |       |       |      | Novi Roa |       |       |    |      |       |      |       |
|---------------------------|---------|-----------|-------|------|----|-------|-------|------|----------|-------|-------|----|------|-------|------|-------|
| Direction                 |         | Northbour |       |      |    |       |       |      | Southbou |       |       |    |      |       |      |       |
| Time                      |         | L         | Т     | R    | U  | RR    | Арр   | Ped* | L        | Т     | R     | U  | RR   | Арр   | Ped* | Int   |
| 2024-01-25 11:0           | DOAM    | 62        | 105   | 33   | 0  | 18    | 218   | 0    | 3        | 121   | 6     | 0  | 2    | 132   | 0    | 508   |
| 11:                       | 15AM    | 86        | 108   | 36   | 0  | 23    | 253   | 0    | 6        | 132   | 4     | 0  | 0    | 142   | 0    | 548   |
| 11:                       | 30AM    | 63        | 108   | 32   | 0  | 13    | 216   | 0    | 5        | 136   | 12    | 0  | 2    | 155   | 0    | 547   |
|                           | 45AM    | 90        | 134   | 42   | 0  | 15    | 281   | 0    | 7        | 152   | 14    | 0  | 5    | 178   | 0    | 640   |
| Hourly                    | Total   | 301       | 455   | 143  | 0  | 69    | 968   | 0    | 21       | 541   | 36    | 0  | 9    | 607   | 0    | 2243  |
| 12:                       | 00PM    | 87        | 150   | 36   | 0  | 22    | 295   | 0    | 4        | 170   | 11    | 0  | 3    | 188   | 0    | 667   |
| 12:                       | 15PM    | 87        | 191   | 31   | 0  | 24    | 333   | 0    | 4        | 161   | 5     | 0  | 5    | 175   | 0    | 719   |
| 12:                       | 30PM    | 79        | 216   | 34   | 0  | 35    | 364   | 0    | 6        | 162   | 6     | 0  | 6    | 180   | 0    | 776   |
| 12:                       | 45PM    | 73        | 207   | 43   | 0  | 35    | 358   | 0    | 3        | 169   | 8     | 0  | 2    | 182   | 0    | 761   |
| Hourly                    | Total   | 326       | 764   | 144  | 0  | 116   | 1350  | 0    | 17       | 662   | 30    | 0  | 16   | 725   | 0    | 2923  |
| 4:                        | 00PM    | 68        | 208   | 16   | 0  | 9     | 301   | 0    | 7        | 197   | 7     | 0  | 6    | 217   | 0    | 762   |
| 4:                        | 15PM    | 71        | 174   | 19   | 0  | 16    | 280   | 0    | 9        | 192   | 10    | 0  | 0    | 211   | 0    | 768   |
| 4:                        | 30PM    | 72        | 191   | 17   | 0  | 26    | 306   | 0    | 8        | 183   | 5     | 0  | 7    | 203   | 1    | 751   |
| 4:                        | 45PM    | 94        | 199   | 22   | 0  | 11    | 326   | 0    | 6        | 194   | 10    | 0  | 3    | 213   | 0    | 764   |
| Hourly                    | Total   | 305       | 772   | 74   | 0  | 62    | 1213  | 0    | 30       | 766   | 32    | 0  | 16   | 844   | 1    | 3045  |
| 5:                        | 00PM    | 84        | 250   | 33   | 0  | 17    | 384   | 0    | 8        | 205   | 12    | 0  | 3    | 228   | 0    | 891   |
| 5:                        | 15PM    | 82        | 215   | 31   | 0  | 17    | 345   | 0    | 6        | 210   | 7     | 0  | 2    | 225   | 0    | 832   |
| 5:                        | 30PM    | 89        | 210   | 24   | 0  | 20    | 343   | 0    | 1        | 194   | 12    | 0  | 7    | 214   | 0    | 778   |
| 5:                        | 45PM    | 87        | 179   | 26   | 0  | 24    | 316   | 0    | 6        | 189   | 7     | 0  | 2    | 204   | 0    | 742   |
| Hourly                    | Total   | 342       | 854   | 114  | 0  | 78    | 1388  | 0    | 21       | 798   | 38    | 0  | 14   | 871   | 0    | 3243  |
|                           | Total   | 1274      | 2845  | 475  | 0  | 325   | 4919  | 0    | 89       | 2767  | 136   | 0  | 55   | 3047  | 1    | 11454 |
| % Ap                      | broach  | 25.9%     | 57.8% | 9.7% | 0% | 6.6%  | -     | -    | 2.9%     | 90.8% | 4.5%  | 0% | 1.8% | -     | -    | -     |
| %                         | Total   | 11.1%     | 24.8% | 4.1% | 0% | 2.8%  | 42.9% | -    | 0.8%     | 24.2% | 1.2%  | 0% | 0.5% | 26.6% | -    | -     |
|                           | Lights  | 1263      | 2788  | 475  | 0  | 322   | 4848  | -    | 89       | 2739  | 135   | 0  | 55   | 3018  | -    | 11328 |
|                           | Lights  | 99.1%     | 98.0% | 100% | 0% | 99.1% | 98.6% | -    | 100%     | 99.0% | 99.3% | 0% | 100% | 99.0% | -    | 98.9% |
| Articulated 7             | rucks   | 1         | 16    | 0    | 0  | 1     | 18    | -    | 0        | 7     | 0     | 0  | 0    | 7     | -    | 27    |
| % Articulated 1           | rucks   | 0.1%      | 0.6%  | 0%   | 0% | 0.3%  | 0.4%  | -    | 0%       | 0.3%  | 0%    | 0% | 0%   | 0.2%  | -    | 0.2%  |
| Buses and Single-Unit T   | rucks   | 10        | 41    | 0    | 0  | 2     | 53    | -    | 0        | 21    | 1     | 0  | 0    | 22    | -    | 99    |
| % Buses and Single-Unit T |         | 0.8%      | 1.4%  | 0%   | 0% | 0.6%  | 1.1%  | -    | 0%       | 0.8%  | 0.7%  | 0% | 0%   | 0.7%  | -    | 0.9%  |
| -                         | strians | -         | -     | -    | -  | -     | -     | 0    | -        | -     | -     | -  | -    | -     | 1    |       |
| % Pedes                   | strians | -         | -     | -    | -  | -     | -     | -    | -        | -     | -     | -  | -    | -     | 100% | -     |
| Bicycles on Cros          |         | -         | -     | -    | -  | -     | -     | 0    | -        | -     | -     | -  | -    | -     | 0    |       |
| % Bicycles on Cros        |         | -         | -     | -    | -  | -     | -     | -    | -        | -     | -     | -  | -    | -     | 0%   | -     |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn





Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



#### Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg       |                                | Twelve Oa | ks Dr |       |    |       |       |      | Twelve Oa | ks Dr |       |    |       |       |      |
|-----------|--------------------------------|-----------|-------|-------|----|-------|-------|------|-----------|-------|-------|----|-------|-------|------|
| Direction |                                | Eastbound |       |       |    |       |       |      | Westbound | l     |       |    |       |       |      |
| Time      |                                | L         | Т     | R     | U  | RR    | Арр   | Ped* | L         | Т     | R     | U  | RR    | Арр   | Ped* |
|           | 2024-01-25 12:00PM             | 18        | 10    | 56    | 0  | 5     | 89    | 0    | 77        | 12    | 5     | 0  | 1     | 95    | 0    |
|           | 12:15PM                        | 10        | 14    | 77    | 0  | 2     | 103   | 0    | 79        | 18    | 10    | 0  | 1     | 108   | 0    |
|           | 12:30PM                        | 20        | 10    | 81    | 0  | 3     | 114   | 0    | 91        | 18    | 9     | 0  | 0     | 118   | 0    |
|           | 12:45PM                        | 18        | 12    | 81    | 0  | 2     | 113   | 0    | 83        | 11    | 13    | 0  | 1     | 108   | 0    |
|           | Total                          | 66        | 46    | 295   | 0  | 12    | 419   | 0    | 330       | 59    | 37    | 0  | 3     | 429   | 0    |
|           | % Approach                     | 15.8%     | 11.0% | 70.4% | 0% | 2.9%  | -     | -    | 76.9%     | 13.8% | 8.6%  | 0% | 0.7%  | -     | -    |
|           | % Total                        | 2.3%      | 1.6%  | 10.1% | 0% | 0.4%  | 14.3% | -    | 11.3%     | 2.0%  | 1.3%  | 0% | 0.1%  | 14.7% | -    |
|           | PHF                            | 0.825     | 0.821 | 0.910 | -  | 0.600 | 0.919 | -    | 0.907     | 0.819 | 0.712 | -  | 0.750 | 0.909 | -    |
|           | Lights                         | 66        | 46    | 291   | 0  | 12    | 415   | -    | 327       | 59    | 35    | 0  | 3     | 424   | -    |
|           | % Lights                       | 100%      | 100%  | 98.6% | 0% | 100%  | 99.0% | -    | 99.1%     | 100%  | 94.6% | 0% | 100%  | 98.8% | -    |
|           | Articulated Trucks             | 0         | 0     | 0     | 0  | 0     | 0     | -    | 0         | 0     | 0     | 0  | 0     | 0     | -    |
|           | % Articulated Trucks           | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    |
|           | Buses and Single-Unit Trucks   | 0         | 0     | 4     | 0  | 0     | 4     | -    | 3         | 0     | 2     | 0  | 0     | 5     | -    |
| %         | 6 Buses and Single-Unit Trucks | 0%        | 0%    | 1.4%  | 0% | 0%    | 1.0%  | -    | 0.9%      | 0%    | 5.4%  | 0% | 0%    | 1.2%  | -    |
|           | Pedestrians                    | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | 0    |
|           | % Pedestrians                  | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     | -    |
|           | Bicycles on Crosswalk          | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | 0    |
|           | % Bicycles on Crosswalk        | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     | -    |

Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

#### Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

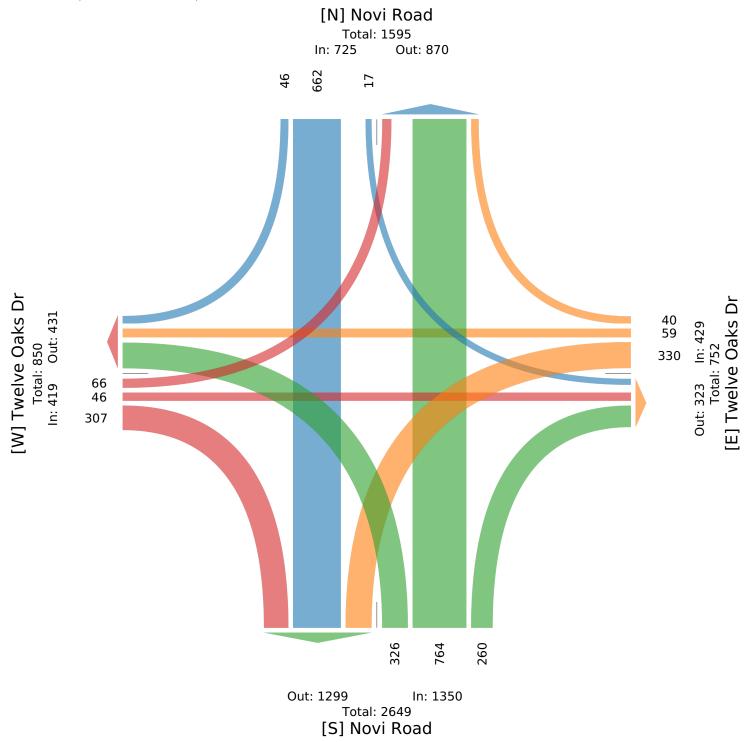
| Leg                            | Novi Road | 1     |       |    |       |       |      | Novi Roa | ıd    |       |    |       |       |      |       |
|--------------------------------|-----------|-------|-------|----|-------|-------|------|----------|-------|-------|----|-------|-------|------|-------|
| Direction                      | Northbour | nd    |       |    |       |       |      | Southbou | ind   |       |    |       |       |      |       |
| Time                           | L         | Т     | R     | U  | RR    | Арр   | Ped* | L        | Т     | R     | U  | RR    | Арр   | Ped* | Int   |
| 2024-01-25 12:00PM             | 87        | 150   | 36    | 0  | 22    | 295   | 0    | 4        | 170   | 11    | 0  | 3     | 188   | 0    | 667   |
| 12:15PM                        | 87        | 191   | 31    | 0  | 24    | 333   | 0    | 4        | 161   | 5     | 0  | 5     | 175   | 0    | 719   |
| 12:30PM                        | 79        | 216   | 34    | 0  | 35    | 364   | 0    | 6        | 162   | 6     | 0  | 6     | 180   | 0    | 776   |
| 12:45PM                        | 73        | 207   | 43    | 0  | 35    | 358   | 0    | 3        | 169   | 8     | 0  | 2     | 182   | 0    | 761   |
| Tota                           | 326       | 764   | 144   | 0  | 116   | 1350  | 0    | 17       | 662   | 30    | 0  | 16    | 725   | 0    | 2923  |
| % Approach                     | 24.1%     | 56.6% | 10.7% | 0% | 8.6%  | -     | -    | 2.3%     | 91.3% | 4.1%  | 0% | 2.2%  | -     | -    | -     |
| % Tota                         | 11.2%     | 26.1% | 4.9%  | 0% | 4.0%  | 46.2% | -    | 0.6%     | 22.6% | 1.0%  | 0% | 0.5%  | 24.8% | -    | -     |
| PHI                            | 0.937     | 0.884 | 0.837 | -  | 0.829 | 0.927 | -    | 0.708    | 0.974 | 0.682 | -  | 0.667 | 0.964 | -    | 0.942 |
| Lights                         | 321       | 739   | 144   | 0  | 115   | 1319  | -    | 17       | 652   | 30    | 0  | 16    | 715   | -    | 2873  |
| % Lights                       | 98.5%     | 96.7% | 100%  | 0% | 99.1% | 97.7% | -    | 100%     | 98.5% | 100%  | 0% | 100%  | 98.6% | -    | 98.3% |
| Articulated Trucks             | 1         | 9     | 0     | 0  | 0     | 10    | -    | 0        | 3     | 0     | 0  | 0     | 3     | -    | 13    |
| % Articulated Trucks           | 0.3%      | 1.2%  | 0%    | 0% | 0%    | 0.7%  | -    | 0%       | 0.5%  | 0%    | 0% | 0%    | 0.4%  | -    | 0.4%  |
| Buses and Single-Unit Trucks   | 4         | 16    | 0     | 0  | 1     | 21    | -    | 0        | 7     | 0     | 0  | 0     | 7     | -    | 37    |
| % Buses and Single-Unit Trucks | 1.2%      | 2.1%  | 0%    | 0% | 0.9%  | 1.6%  | -    | 0%       | 1.1%  | 0%    | 0% | 0%    | 1.0%  | -    | 1.3%  |
| Pedestrians                    | -         | -     | -     | -  | -     | -     | 0    | -        | -     | -     | -  | -     | -     | 0    |       |
| % Pedestrians                  | -         | -     | -     | -  | -     | -     | -    | -        | -     | -     | -  | -     | -     | -    | -     |
| Bicycles on Crosswalk          | -         | -     | -     | -  | -     | -     | 0    | -        | -     | -     | -  | -     | -     | 0    |       |
| % Bicycles on Crosswalk        | -         | -     | -     | -  | -     | -     | -    | -        | -     | -     | -  | -     | -     | -    |       |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



#### Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC

Thu Jan 25, 2024 PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg             |                  | Twelve Oa | ks Dr |       |    |       |       |      | Twelve Oa | ks Dr |       |    |       |       |      |
|-----------------|------------------|-----------|-------|-------|----|-------|-------|------|-----------|-------|-------|----|-------|-------|------|
| Direction       |                  | Eastbound |       |       |    |       |       |      | Westbound |       |       |    |       |       |      |
| Time            |                  | L         | Т     | R     | U  | RR    | Арр   | Ped* | L         | Т     | R     | U  | RR    | Арр   | Ped* |
| 202             | 4-01-25 4:45PM   | 17        | 7     | 91    | 0  | 4     | 119   | 0    | 74        | 22    | 8     | 0  | 2     | 106   | C    |
|                 | 5:00PM           | 25        | 13    | 78    | 0  | 32    | 148   | 0    | 100       | 22    | 6     | 0  | 3     | 131   | C    |
|                 | 5:15PM           | 25        | 9     | 92    | 0  | 28    | 154   | 0    | 91        | 12    | 4     | 0  | 1     | 108   | 0    |
|                 | 5:30PM           | 12        | 12    | 75    | 0  | 26    | 125   | 0    | 74        | 7     | 14    | 0  | 1     | 96    | C    |
|                 | Total            | . 79      | 41    | 336   | 0  | 90    | 546   | 0    | 339       | 63    | 32    | 0  | 7     | 441   | С    |
|                 | % Approach       | 14.5%     | 7.5%  | 61.5% | 0% | 16.5% | -     | -    | 76.9%     | 14.3% | 7.3%  | 0% | 1.6%  | -     | -    |
|                 | % Total          | 2.4%      | 1.3%  | 10.3% | 0% | 2.8%  | 16.7% | -    | 10.4%     | 1.9%  | 1.0%  | 0% | 0.2%  | 13.5% | -    |
|                 | PHF              | 0.790     | 0.788 | 0.913 | -  | 0.703 | 0.886 | -    | 0.848     | 0.716 | 0.571 | -  | 0.583 | 0.842 | -    |
|                 | Lights           | 79        | 41    | 335   | 0  | 90    | 545   | -    | 339       | 63    | 32    | 0  | 7     | 441   | -    |
|                 | % Lights         | 100%      | 100%  | 99.7% | 0% | 100%  | 99.8% | -    | 100%      | 100%  | 100%  | 0% | 100%  | 100%  | -    |
| Aı              | ticulated Trucks | 0         | 0     | 0     | 0  | 0     | 0     | -    | 0         | 0     | 0     | 0  | 0     | 0     | -    |
| % Aı            | ticulated Trucks | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    |
| Buses and Sin   | gle-Unit Trucks  | 0         | 0     | 1     | 0  | 0     | 1     | -    | 0         | 0     | 0     | 0  | 0     | 0     | -    |
| % Buses and Sin | gle-Unit Trucks  | 0%        | 0%    | 0.3%  | 0% | 0%    | 0.2%  | -    | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    |
|                 | Pedestrians      | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | C    |
|                 | % Pedestrians    | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     |      |
| Bicycl          | es on Crosswalk  | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | C    |
| % Bicycl        | es on Crosswalk  | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     |      |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

#### Novi Road and Twelve Oaks Mall Rd/W Oaks Dri... - TMC

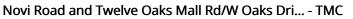
Thu Jan 25, 2024 PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg                          | Novi Ro         | ad      |       |    |       |       |      | Novi Roa | ıd    |       |    |       |       |      |       |
|------------------------------|-----------------|---------|-------|----|-------|-------|------|----------|-------|-------|----|-------|-------|------|-------|
| Direction                    | Northbo         | und     |       |    |       |       |      | Southbou | nd    |       |    |       |       |      |       |
| Time                         | I               | . Т     | R     | U  | RR    | Арр   | Ped* | L        | Т     | R     | U  | RR    | Арр   | Ped* | Int   |
| 2024-01-25 4:45              | PM 94           | 199     | 22    | 0  | 11    | 326   | 0    | 6        | 194   | 10    | 0  | 3     | 213   | 0    | 764   |
| 5:00                         | PM 84           | 250     | 33    | 0  | 17    | 384   | 0    | 8        | 205   | 12    | 0  | 3     | 228   | 0    | 891   |
| 5:15                         | PM 82           | 215     | 31    | 0  | 17    | 345   | 0    | 6        | 210   | 7     | 0  | 2     | 225   | 0    | 832   |
| 5:30                         | PM 89           | ) 210   | 24    | 0  | 20    | 343   | 0    | 1        | 194   | 12    | 0  | 7     | 214   | 0    | 778   |
| Тс                           | tal 349         | 874     | 110   | 0  | 65    | 1398  | 0    | 21       | 803   | 41    | 0  | 15    | 880   | 0    | 3265  |
| % Approx                     | <b>ch</b> 25.0% | 62.5%   | 7.9%  | 0% | 4.6%  | -     | -    | 2.4%     | 91.3% | 4.7%  | 0% | 1.7%  | -     | -    | -     |
| % To                         | tal 10.7%       | 26.8%   | 3.4%  | 0% | 2.0%  | 42.8% | -    | 0.6%     | 24.6% | 1.3%  | 0% | 0.5%  | 27.0% | -    | -     |
| Р                            | HF 0.928        | 0.874   | 0.833 | -  | 0.813 | 0.910 | -    | 0.656    | 0.956 | 0.854 | -  | 0.536 | 0.965 | -    | 0.916 |
| Lig                          | nts 349         | 865     | 110   | 0  | 65    | 1389  | -    | 21       | 800   | 41    | 0  | 15    | 877   | -    | 3252  |
| % Lig                        | nts 100%        | 5 99.0% | 100%  | 0% | 100%  | 99.4% | -    | 100%     | 99.6% | 100%  | 0% | 100%  | 99.7% | -    | 99.6% |
| Articulated True             | ks (            | ) 2     | 0     | 0  | 0     | 2     | -    | 0        | 1     | 0     | 0  | 0     | 1     | -    | 3     |
| % Articulated True           | <b>ks</b> 0%    | 6 0.2%  | 0%    | 0% | 0%    | 0.1%  | -    | 0%       | 0.1%  | 0%    | 0% | 0%    | 0.1%  | -    | 0.1%  |
| Buses and Single-Unit True   | ks (            | ) 7     | 0     | 0  | 0     | 7     | -    | 0        | 2     | 0     | 0  | 0     | 2     | -    | 10    |
| % Buses and Single-Unit True | <b>ks</b> 0%    | 6 0.8%  | 0%    | 0% | 0%    | 0.5%  | -    | 0%       | 0.2%  | 0%    | 0% | 0%    | 0.2%  | -    | 0.3%  |
| Pedestria                    | ns              |         | -     | -  | -     | -     | 0    | -        | -     | -     | -  | -     | -     | 0    |       |
| % Pedestria                  | ns              |         | -     | -  | -     | -     | -    | -        | -     | -     | -  | -     | -     | -    | -     |
| Bicycles on Crossw           | ılk             |         | -     | -  | -     | -     | 0    | -        | -     | -     | -  | -     | -     | 0    |       |
| % Bicycles on Crossw         | ılk             |         | -     | -  | -     | -     | -    | -        | -     | -     | -  | -     | -     | -    | -     |

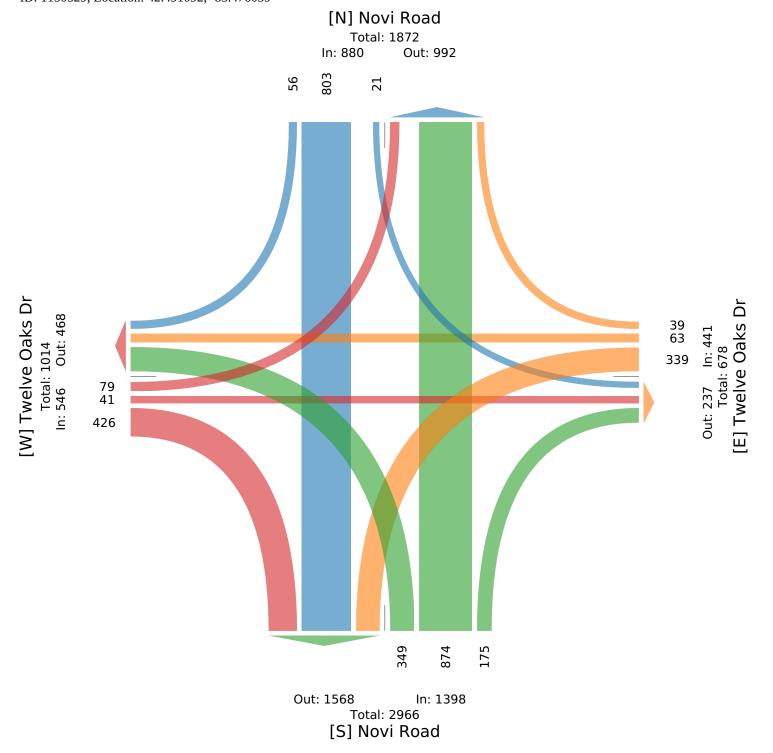
\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn



Thu Jan 25, 2024 PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150529, Location: 42.491092, -83.476059



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg                            | Twelve Oa | aks Dr |       |    |       |       |      | Twelve Oa | ks Dr |       |      |       |       |      |
|--------------------------------|-----------|--------|-------|----|-------|-------|------|-----------|-------|-------|------|-------|-------|------|
| Direction                      | Eastbound | l      |       |    |       |       |      | Westbound | l     |       |      |       |       |      |
| Time                           | L         | Т      | R     | U  | RR    | Арр   | Ped* | L         | Т     | R     | U    | RR    | Арр   | Ped* |
| 2024-01-25 11:00AM             | 6         | 2      | 7     | 0  | 13    | 28    | 0    | 7         | 1     | 2     | 0    | 8     | 18    | 0    |
| 11:15AM                        | 14        | 5      | 7     | 0  | 5     | 31    | 0    | 7         | 6     | 5     | 1    | 10    | 29    | 0    |
| 11:30AM                        | 11        | 4      | 5     | 0  | 10    | 30    | 0    | 11        | 4     | 4     | 0    | 6     | 25    | 0    |
| 11:45AM                        | 8         | 0      | 2     | 0  | 21    | 31    | 0    | 9         | 2     | 3     | 0    | 4     | 18    | 0    |
| Hourly Total                   | 39        | 11     | 21    | 0  | 49    | 120   | 0    | 34        | 13    | 14    | 1    | 28    | 90    | 0    |
| 12:00PM                        | 7         | 9      | 14    | 0  | 13    | 43    | 0    | 9         | 3     | 4     | 0    | 9     | 25    | 0    |
| 12:15PM                        | 14        | 3      | 10    | 0  | 18    | 45    | 0    | 9         | 3     | 5     | 0    | 2     | 19    | 0    |
| 12:30PM                        | 11        | 2      | 16    | 0  | 10    | 39    | 0    | 5         | 10    | 7     | 0    | 6     | 28    | 0    |
| 12:45PM                        | 11        | 3      | 7     | 0  | 17    | 38    | 0    | 4         | 2     | 4     | 0    | 8     | 18    | 0    |
| Hourly Total                   | 43        | 17     | 47    | 0  | 58    | 165   | 0    | 27        | 18    | 20    | 0    | 25    | 90    | 0    |
| 4:00PM                         | 16        | 0      | 7     | 0  | 5     | 28    | 0    | 11        | 4     | 4     | 0    | 7     | 26    | 0    |
| 4:15PM                         | 11        | 1      | 3     | 0  | 19    | 34    | 0    | 8         | 4     | 6     | 0    | 7     | 25    | 0    |
| 4:30PM                         | 14        | 4      | 10    | 0  | 14    | 42    | 0    | 10        | 4     | 4     | 0    | 6     | 24    | 1    |
| 4:45PM                         | 10        | 3      | 9     | 0  | 10    | 32    | 0    | 12        | 5     | 10    | 0    | 4     | 31    | 0    |
| Hourly Total                   | 51        | 8      | 29    | 0  | 48    | 136   | 0    | 41        | 17    | 24    | 0    | 24    | 106   | 1    |
| 5:00PM                         | 10        | 3      | 7     | 0  | 17    | 37    | 0    | 11        | 17    | 13    | 0    | 2     | 43    | 0    |
| 5:15PM                         | 14        | 2      | 13    | 0  | 12    | 41    | 0    | 15        | 7     | 7     | 0    | 3     | 32    | 0    |
| 5:30PM                         | 6         | 4      | 2     | 0  | 5     | 17    | 0    | 9         | 4     | 9     | 0    | 6     | 28    | 0    |
| 5:45PM                         | 14        | 3      | 9     | 0  | 14    | 40    | 0    | 7         | 2     | 6     | 0    | 7     | 22    | 0    |
| Hourly Total                   | 44        | 12     | 31    | 0  | 48    | 135   | 0    | 42        | 30    | 35    | 0    | 18    | 125   | 0    |
| Total                          | 177       | 48     | 128   | 0  | 203   | 556   | 0    | 144       | 78    | 93    | 1    | 95    | 411   | 1    |
| % Approach                     | 31.8%     | 8.6%   | 23.0% | 0% | 36.5% | -     | -    | 35.0%     | 19.0% | 22.6% | 0.2% | 23.1% | -     | -    |
| % Total                        | 2.5%      | 0.7%   | 1.8%  | 0% | 2.9%  | 7.9%  | -    | 2.0%      | 1.1%  | 1.3%  | 0%   | 1.3%  | 5.8%  | -    |
| Lights                         | 175       | 46     | 126   | 0  | 203   | 550   | -    | 144       | 78    | 93    | 1    | 91    | 407   | -    |
| % Lights                       | 98.9%     | 95.8%  | 98.4% | 0% | 100%  | 98.9% | -    | 100%      | 100%  | 100%  | 100% | 95.8% | 99.0% | -    |
| Articulated Trucks             | 1         | 0      | 0     | 0  | 0     | 1     | -    | 0         | 0     | 0     | 0    | 1     | 1     | -    |
| % Articulated Trucks           | 0.6%      | 0%     | 0%    | 0% | 0%    | 0.2%  | -    | 0%        | 0%    | 0%    | 0%   | 1.1%  | 0.2%  | -    |
| Buses and Single-Unit Trucks   | 1         | 2      | 2     | 0  | 0     | 5     | -    | 0         | 0     | 0     | 0    | 3     | 3     | -    |
| % Buses and Single-Unit Trucks | 0.6%      | 4.2%   | 1.6%  | 0% | 0%    | 0.9%  | -    | 0%        | 0%    | 0%    | 0%   | 3.2%  | 0.7%  | -    |
| Pedestrians                    | -         | -      | -     | -  | -     | -     | 0    | -         | -     | -     | -    | -     | -     | 1    |
| % Pedestrians                  | -         | -      | -     | -  | -     | -     | -    | -         | -     | -     | -    | -     | -     | 100% |
| Bicycles on Crosswalk          | -         | -      | -     | -  | -     | -     | 0    | -         | -     | -     | -    | -     | -     | 0    |
| % Bicycles on Crosswalk        | -         | -      | -     | -  | -     | -     | -    | -         | -     | -     | -    | -     | -     | 0%   |

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

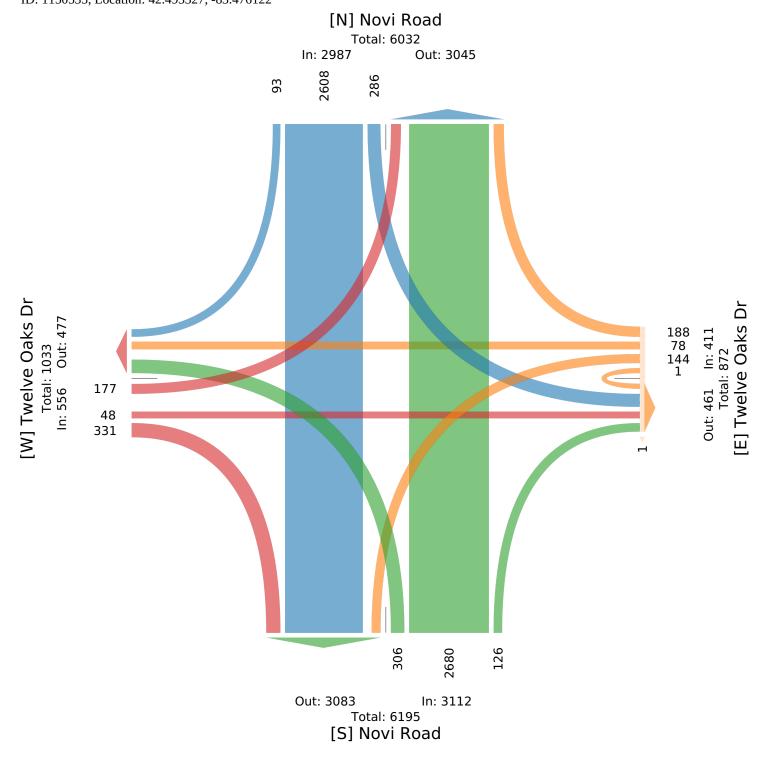
| Leg                           | Novi Roa      | d     |       |    |      |       |      | Novi Roa | nd    |       |    |      |       |      |       |
|-------------------------------|---------------|-------|-------|----|------|-------|------|----------|-------|-------|----|------|-------|------|-------|
| Direction                     | Northbou      | nd    |       |    |      |       |      | Southbou | ınd   |       |    |      |       |      |       |
| Time                          | L             | Т     | R     | U  | RR   | Арр   | Ped* | L        | Т     | R     | U  | RR   | Арр   | Ped* | Int   |
| 2024-01-25 11:00AN            | 1 16          | 90    | 6     | 0  | 0    | 112   | 0    | 19       | 102   | 7     | 0  | 0    | 128   | 0    | 286   |
| 11:15AN                       | A 21          | 78    | 8     | 0  | 1    | 108   | 0    | 19       | 125   | 4     | 0  | 0    | 148   | 0    | 316   |
| 11:30AN                       | A 23          | 92    | 8     | 0  | 0    | 123   | 0    | 24       | 135   | 3     | 0  | 0    | 162   | 0    | 340   |
| 11:45AN                       | A 26          | 114   | 6     | 0  | 0    | 146   | 0    | 25       | 151   | 11    | 0  | 0    | 187   | 0    | 382   |
| Hourly Tota                   | al 86         | 374   | 28    | 0  | 1    | 489   | 0    | 87       | 513   | 25    | 0  | 0    | 625   | 0    | 1324  |
| 12:00PI                       | M 21          | 141   | 6     | 0  | 1    | 169   | 0    | 20       | 144   | 5     | 0  | 0    | 169   | 0    | 406   |
| 12:15PI                       | A 18          | 184   | 7     | 0  | 0    | 209   | 0    | 21       | 137   | 0     | 0  | 0    | 158   | 0    | 431   |
| 12:30PI                       | A 22          | 197   | 6     | 0  | 0    | 225   | 0    | 27       | 154   | 5     | 0  | 0    | 186   | 0    | 478   |
| 12:45PI                       | M 17          | 206   | 6     | 0  | 0    | 229   | 0    | 17       | 169   | 7     | 0  | 0    | 193   | 0    | 478   |
| Hourly Tota                   | al 78         | 728   | 25    | 0  | 1    | 832   | 0    | 85       | 604   | 17    | 0  | 0    | 706   | 0    | 1793  |
| 4:00PI                        | M 17          | 196   | 9     | 0  | 0    | 222   | 0    | 18       | 203   | 6     | 0  | 0    | 227   | 0    | 503   |
| 4:15PI                        | И 5           | 193   | 4     | 0  | 0    | 202   | 0    | 13       | 185   | 6     | 0  | 0    | 204   | 0    | 465   |
| 4:30PI                        | A 20          | 198   | 13    | 0  | 0    | 231   | 0    | 13       | 178   | 5     | 0  | 0    | 196   | 0    | 493   |
| 4:45PI                        | И 15          | 191   | 7     | 0  | 0    | 213   | 0    | 17       | 191   | 11    | 0  | 0    | 219   | 0    | 495   |
| Hourly Tota                   | al 57         | 778   | 33    | 0  | 0    | 868   | 0    | 61       | 757   | 28    | 0  | 0    | 846   | 0    | 1956  |
| 5:00PI                        | A 26          | 227   | 13    | 0  | 0    | 266   | 0    | 6        | 184   | 3     | 0  | 0    | 193   | 0    | 539   |
| 5:15PI                        | И 14          | 208   | 9     | 0  | 0    | 231   | 0    | 13       | 180   | 9     | 0  | 1    | 203   | 0    | 507   |
| 5:30PI                        | И 19          | 197   | 10    | 0  | 0    | 226   | 0    | 11       | 198   | 4     | 0  | 0    | 213   | 0    | 484   |
| 5:45PI                        | A 26          | 168   | 6     | 0  | 0    | 200   | 0    | 23       | 172   | 6     | 0  | 0    | 201   | 0    | 463   |
| Hourly Tota                   | al 85         | 800   | 38    | 0  | 0    | 923   | 0    | 53       | 734   | 22    | 0  | 1    | 810   | 0    | 1993  |
| Tota                          | al 306        | 2680  | 124   | 0  | 2    | 3112  | 0    | 286      | 2608  | 92    | 0  | 1    | 2987  | 0    | 7066  |
| % Approac                     | <b>h</b> 9.8% | 86.1% | 4.0%  | 0% | 0.1% | -     | -    | 9.6%     | 87.3% | 3.1%  | 0% | 0%   | -     | -    | -     |
| % Tota                        | al 4.3%       | 37.9% | 1.8%  | 0% | 0%   | 44.0% | -    | 4.0%     | 36.9% | 1.3%  | 0% | 0%   | 42.3% | -    | -     |
| Light                         | <b>s</b> 303  | 2630  | 122   | 0  | 2    | 3057  | -    | 286      | 2578  | 88    | 0  | 1    | 2953  | -    | 6967  |
| % Light                       | s 99.0%       | 98.1% | 98.4% | 0% | 100% | 98.2% | -    | 100%     | 98.8% | 95.7% | 0% | 100% | 98.9% | -    | 98.6% |
| Articulated Truck             | <b>s</b> 0    | 15    | 0     | 0  | 0    | 15    | -    | 0        | 6     | 0     | 0  | 0    | 6     | -    | 23    |
| % Articulated Truck           | s 0%          | 0.6%  | 0%    | 0% | 0%   | 0.5%  | -    | 0%       | 0.2%  | 0%    | 0% | 0%   | 0.2%  | -    | 0.3%  |
| Buses and Single-Unit Truck   | <b>s</b> 3    | 35    | 2     | 0  | 0    | 40    | -    | 0        | 24    | 4     | 0  | 0    | 28    | -    | 76    |
| % Buses and Single-Unit Truck | s 1.0%        | 1.3%  | 1.6%  | 0% | 0%   | 1.3%  | -    | 0%       | 0.9%  | 4.3%  | 0% | 0%   | 0.9%  | -    | 1.1%  |
| Pedestriar                    | s -           | -     | -     | -  | -    | -     | 0    | -        | -     | -     | -  | -    | -     | 0    |       |
| % Pedestriar                  | s -           | -     | -     | -  | -    | -     | -    | -        | -     | -     | -  | -    | -     | -    | -     |
| Bicycles on Crosswal          | k -           | -     | -     | -  | -    | -     | 0    | -        | -     | -     | -  | -    | -     | 0    |       |
| % Bicycles on Crosswal        | k -           | -     | -     | -  | -    | -     | -    | -        | -     | -     | -  | -    | -     | -    | -     |

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg                |               | Twelve Oa | ks Dr |       |    |       |       |      | Twelve Oa | ks Dr |       |    |       |       |      |
|--------------------|---------------|-----------|-------|-------|----|-------|-------|------|-----------|-------|-------|----|-------|-------|------|
| Direction          |               | Eastbound |       |       |    |       |       |      | Westbound | 1     |       |    |       |       |      |
| Time               |               | L         | Т     | R     | U  | RR    | Арр   | Ped* | L         | Т     | R     | U  | RR    | Арр   | Ped* |
| 2024-01            | -25 12:00PM   | 7         | 9     | 14    | 0  | 13    | 43    | 0    | 9         | 3     | 4     | 0  | 9     | 25    | 0    |
|                    | 12:15PM       | 14        | 3     | 10    | 0  | 18    | 45    | 0    | 9         | 3     | 5     | 0  | 2     | 19    | 0    |
|                    | 12:30PM       | 11        | 2     | 16    | 0  | 10    | 39    | 0    | 5         | 10    | 7     | 0  | 6     | 28    | 0    |
|                    | 12:45PM       | 11        | 3     | 7     | 0  | 17    | 38    | 0    | 4         | 2     | 4     | 0  | 8     | 18    | 0    |
|                    | Total         | 43        | 17    | 47    | 0  | 58    | 165   | 0    | 27        | 18    | 20    | 0  | 25    | 90    | 0    |
|                    | % Approach    | 26.1%     | 10.3% | 28.5% | 0% | 35.2% | -     | -    | 30.0%     | 20.0% | 22.2% | 0% | 27.8% | -     | -    |
|                    | % Total       | 2.4%      | 0.9%  | 2.6%  | 0% | 3.2%  | 9.2%  | -    | 1.5%      | 1.0%  | 1.1%  | 0% | 1.4%  | 5.0%  | -    |
|                    | PHF           | 0.768     | 0.472 | 0.734 | -  | 0.806 | 0.917 | -    | 0.750     | 0.450 | 0.714 | -  | 0.694 | 0.804 | -    |
|                    | Lights        | 43        | 16    | 46    | 0  | 58    | 163   | -    | 27        | 18    | 20    | 0  | 23    | 88    | -    |
|                    | % Lights      | 100%      | 94.1% | 97.9% | 0% | 100%  | 98.8% | -    | 100%      | 100%  | 100%  | 0% | 92.0% | 97.8% | -    |
| Artic              | ulated Trucks | 0         | 0     | 0     | 0  | 0     | 0     | -    | 0         | 0     | 0     | 0  | 0     | 0     | -    |
| % Articu           | ulated Trucks | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    |
| Buses and Single   | -Unit Trucks  | 0         | 1     | 1     | 0  | 0     | 2     | -    | 0         | 0     | 0     | 0  | 2     | 2     | -    |
| % Buses and Single | -Unit Trucks  | 0%        | 5.9%  | 2.1%  | 0% | 0%    | 1.2%  | -    | 0%        | 0%    | 0%    | 0% | 8.0%  | 2.2%  | -    |
|                    | Pedestrians   | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | 0    |
| ç                  | % Pedestrians | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     | -    |
| Bicycles           | on Crosswalk  | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | 0    |
| % Bicycles         | on Crosswalk  | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     | -    |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

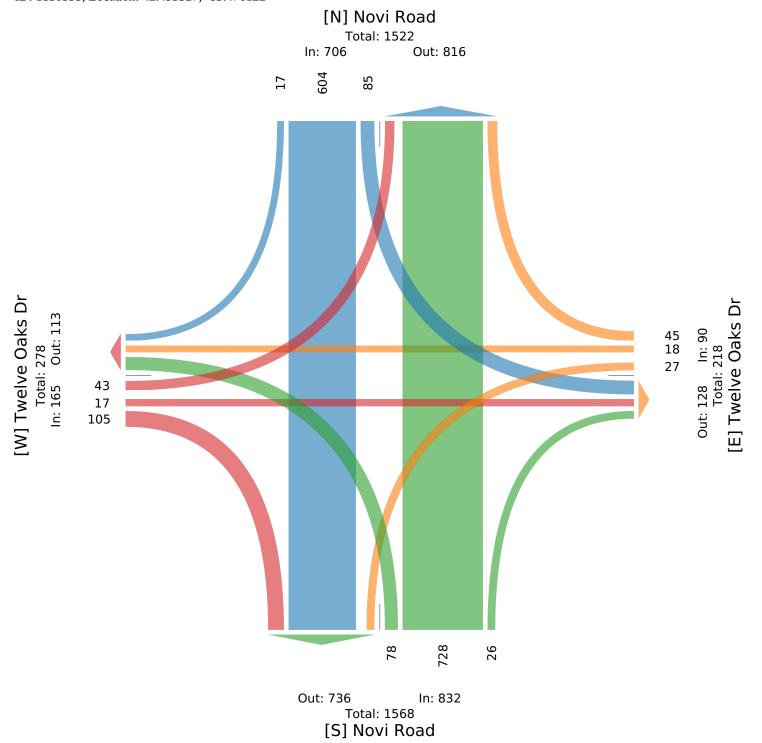
| Leg                        | Novi R    | oad     |       |    |       |       |      | Novi Road |       |       |    |    |       |      |       |
|----------------------------|-----------|---------|-------|----|-------|-------|------|-----------|-------|-------|----|----|-------|------|-------|
| Direction                  | Northbo   | ound    |       |    |       |       |      | Southboun | d     |       |    |    |       |      |       |
| Time                       |           | L T     | R     | U  | RR    | Арр   | Ped* | L         | Т     | R     | U  | RR | Арр   | Ped* | Int   |
| 2024-01-25 12:0            | PM 2      | 1 141   | 6     | 0  | 1     | 169   | 0    | 20        | 144   | 5     | 0  | 0  | 169   | 0    | 406   |
| 12:1                       | 5PM 1     | .8 184  | - 7   | 0  | 0     | 209   | 0    | 21        | 137   | 0     | 0  | 0  | 158   | 0    | 431   |
| 12:3                       | PM 2      | 2 197   | 6     | 0  | 0     | 225   | 0    | 27        | 154   | 5     | 0  | 0  | 186   | 0    | 478   |
| 12:4                       | 5PM 1     | .7 206  | 6     | 0  | 0     | 229   | 0    | 17        | 169   | 7     | 0  | 0  | 193   | 0    | 478   |
| 1                          | 'otal 7   | '8 728  | 25    | 0  | 1     | 832   | 0    | 85        | 604   | 17    | 0  | 0  | 706   | 0    | 1793  |
| % Appr                     | oach 9.4  | % 87.5% | 3.0%  | 0% | 0.1%  | -     | -    | 12.0%     | 85.6% | 2.4%  | 0% | 0% | -     | -    | -     |
| % ]                        | otal 4.4  | % 40.6% | 1.4%  | 0% | 0.1%  | 46.4% | -    | 4.7%      | 33.7% | 0.9%  | 0% | 0% | 39.4% | -    | -     |
|                            | PHF 0.88  | 6 0.883 | 0.893 | -  | 0.250 | 0.908 | -    | 0.787     | 0.893 | 0.607 | -  | -  | 0.915 | -    | 0.938 |
| Li                         | ghts 7    | 7 703   | 25    | 0  | 1     | 806   | -    | 85        | 594   | 17    | 0  | 0  | 696   | -    | 1753  |
| % Li                       | ghts 98.7 | % 96.6% | 100%  | 0% | 100%  | 96.9% | -    | 100%      | 98.3% | 100%  | 0% | 0% | 98.6% | -    | 97.8% |
| Articulated Tr             | ıcks      | 0 6     | 0     | 0  | 0     | 6     | -    | 0         | 3     | 0     | 0  | 0  | 3     | -    | 9     |
| % Articulated Tr           | icks 0    | % 0.8%  | 0%    | 0% | 0%    | 0.7%  | -    | 0%        | 0.5%  | 0%    | 0% | 0% | 0.4%  | -    | 0.5%  |
| Buses and Single-Unit Tr   | cks       | 1 19    | 0     | 0  | 0     | 20    | -    | 0         | 7     | 0     | 0  | 0  | 7     | -    | 31    |
| % Buses and Single-Unit Tr | cks 1.3   | % 2.6%  | 0%    | 0% | 0%    | 2.4%  | -    | 0%        | 1.2%  | 0%    | 0% | 0% | 1.0%  | -    | 1.7%  |
| Pedest                     | ians      |         |       | -  | -     | -     | 0    | -         | -     | -     | -  | -  | -     | 0    |       |
| % Pedest                   | ians      |         |       | -  | -     | -     | -    | -         | -     | -     | -  | -  | -     | -    | -     |
| Bicycles on Cross          | valk      |         |       | -  | -     | -     | 0    | -         | -     | -     | -  | -  | -     | 0    |       |
| % Bicycles on Cross        | valk      |         | -     | -  | -     | -     | -    | -         | -     | -     | -  | -  | -     | -    | -     |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Novi Road and Twelve Oaks Drive N - TMC Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Thu Jan 25, 2024 PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg       |                              | Twelve Oa | ks Dr |       |    |       |       |      | Twelve Oa | ks Dr |       |    |       |       |      |
|-----------|------------------------------|-----------|-------|-------|----|-------|-------|------|-----------|-------|-------|----|-------|-------|------|
| Direction |                              | Eastbound |       |       |    |       |       |      | Westbound | l     |       |    |       |       |      |
| Time      |                              | L         | Т     | R     | U  | RR    | Арр   | Ped* | L         | Т     | R     | U  | RR    | Арр   | Ped* |
|           | 2024-01-25 4:30PM            | 14        | 4     | 10    | 0  | 14    | 42    | 0    | 10        | 4     | 4     | 0  | 6     | 24    | 1    |
|           | 4:45PM                       | 10        | 3     | 9     | 0  | 10    | 32    | 0    | 12        | 5     | 10    | 0  | 4     | 31    | 0    |
|           | 5:00PM                       | 10        | 3     | 7     | 0  | 17    | 37    | 0    | 11        | 17    | 13    | 0  | 2     | 43    | 0    |
|           | 5:15PM                       | 14        | 2     | 13    | 0  | 12    | 41    | 0    | 15        | 7     | 7     | 0  | 3     | 32    | C    |
|           | Total                        | 48        | 12    | 39    | 0  | 53    | 152   | 0    | 48        | 33    | 34    | 0  | 15    | 130   | 1    |
|           | % Approach                   | 31.6%     | 7.9%  | 25.7% | 0% | 34.9% | -     | -    | 36.9%     | 25.4% | 26.2% | 0% | 11.5% | -     | -    |
|           | % Total                      | 2.4%      | 0.6%  | 1.9%  | 0% | 2.6%  | 7.5%  | -    | 2.4%      | 1.6%  | 1.7%  | 0% | 0.7%  | 6.4%  | -    |
|           | PHF                          | 0.857     | 0.750 | 0.750 | -  | 0.779 | 0.905 | -    | 0.800     | 0.485 | 0.654 | -  | 0.625 | 0.756 | -    |
|           | Lights                       | 47        | 12    | 39    | 0  | 53    | 151   | -    | 48        | 33    | 34    | 0  | 15    | 130   | -    |
|           | % Lights                     | 97.9%     | 100%  | 100%  | 0% | 100%  | 99.3% | -    | 100%      | 100%  | 100%  | 0% | 100%  | 100%  | -    |
|           | Articulated Trucks           | 0         | 0     | 0     | 0  | 0     | 0     | -    | 0         | 0     | 0     | 0  | 0     | 0     | -    |
|           | % Articulated Trucks         | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    |
|           | Buses and Single-Unit Trucks | 1         | 0     | 0     | 0  | 0     | 1     | -    | 0         | 0     | 0     | 0  | 0     | 0     | -    |
| %         | Buses and Single-Unit Trucks | 2.1%      | 0%    | 0%    | 0% | 0%    | 0.7%  | -    | 0%        | 0%    | 0%    | 0% | 0%    | 0%    | -    |
|           | Pedestrians                  | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | 1    |
|           | % Pedestrians                | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     | 100% |
|           | Bicycles on Crosswalk        | -         | -     | -     | -  | -     | -     | 0    | -         | -     | -     | -  | -     | -     | 0    |
|           | % Bicycles on Crosswalk      | -         | -     | -     | -  | -     | -     | -    | -         | -     | -     | -  | -     | -     | 0%   |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Thu Jan 25, 2024 PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

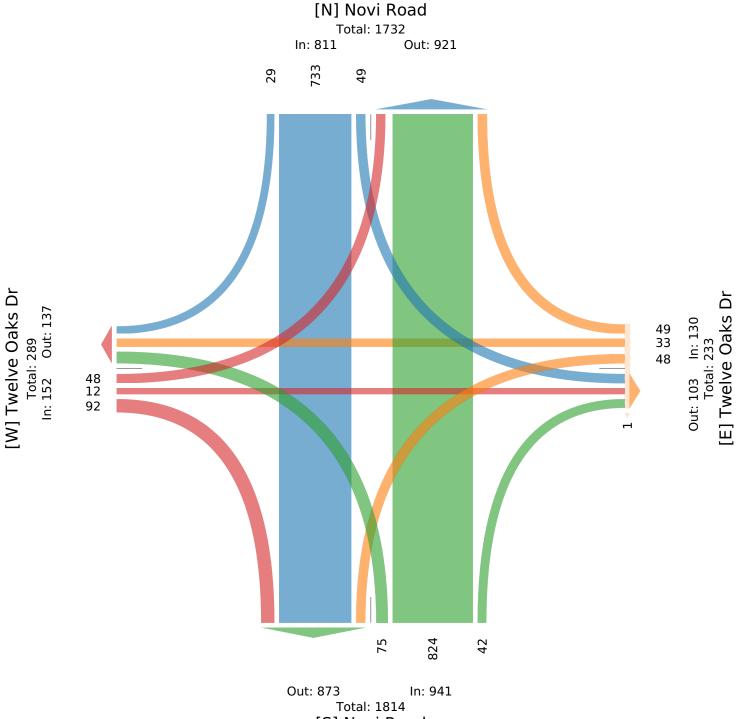
| Leg                          | Novi Ro        | ad    |       |    |    |       |      | Novi Roa | d     |       |    |       |       |      |       |
|------------------------------|----------------|-------|-------|----|----|-------|------|----------|-------|-------|----|-------|-------|------|-------|
| Direction                    | Northbo        | ınd   |       |    |    |       |      | Southbou | nd    |       |    |       |       |      | 1     |
| Time                         | L              | Т     | R     | U  | RR | Арр   | Ped* | L        | Т     | R     | U  | RR    | Арр   | Ped* | Int   |
| 2024-01-25 4:30              | PM 20          | 198   | 13    | 0  | 0  | 231   | 0    | 13       | 178   | 5     | 0  | 0     | 196   | 0    | 493   |
| 4:45                         | PM 15          | 191   | 7     | 0  | 0  | 213   | 0    | 17       | 191   | 11    | 0  | 0     | 219   | 0    | 495   |
| 5:00                         | PM 26          | 227   | 13    | 0  | 0  | 266   | 0    | 6        | 184   | 3     | 0  | 0     | 193   | 0    | 539   |
| 5:15                         | PM 14          | 208   | 9     | 0  | 0  | 231   | 0    | 13       | 180   | 9     | 0  | 1     | 203   | 0    | 507   |
| Т                            | tal 75         | 824   | 42    | 0  | 0  | 941   | 0    | 49       | 733   | 28    | 0  | 1     | 811   | 0    | 2034  |
| % Appro                      | <b>ch</b> 8.0% | 87.6% | 4.5%  | 0% | 0% | -     | -    | 6.0%     | 90.4% | 3.5%  | 0% | 0.1%  | -     | -    | -     |
| % T                          | tal 3.7%       | 40.5% | 2.1%  | 0% | 0% | 46.3% | -    | 2.4%     | 36.0% | 1.4%  | 0% | 0%    | 39.9% | -    | -     |
| F                            | HF 0.721       | 0.907 | 0.808 | -  | -  | 0.884 | -    | 0.721    | 0.959 | 0.636 | -  | 0.250 | 0.926 | -    | 0.943 |
| Lig                          | hts 75         | 818   | 42    | 0  | 0  | 935   | -    | 49       | 731   | 26    | 0  | 1     | 807   | -    | 2023  |
| % Lig                        | hts 100%       | 99.3% | 100%  | 0% | 0% | 99.4% | -    | 100%     | 99.7% | 92.9% | 0% | 100%  | 99.5% | -    | 99.5% |
| Articulated Tru              | <b>ks</b> 0    | 2     | 0     | 0  | 0  | 2     | -    | 0        | 0     | 0     | 0  | 0     | 0     | -    | 2     |
| % Articulated Tru            | ks 0%          | 0.2%  | 0%    | 0% | 0% | 0.2%  | -    | 0%       | 0%    | 0%    | 0% | 0%    | 0%    | -    | 0.1%  |
| Buses and Single-Unit True   | <b>ks</b> 0    | 4     | 0     | 0  | 0  | 4     | -    | 0        | 2     | 2     | 0  | 0     | 4     | -    | 9     |
| % Buses and Single-Unit True | ks 0%          | 0.5%  | 0%    | 0% | 0% | 0.4%  | -    | 0%       | 0.3%  | 7.1%  | 0% | 0%    | 0.5%  | -    | 0.4%  |
| Pedestri                     | ins -          | -     | -     | -  | -  | -     | 0    | -        | -     | -     | -  | -     | -     | 0    |       |
| % Pedestri                   | ins -          | -     | -     | -  | -  | -     | -    | -        | -     | -     | -  | -     | -     | -    | -     |
| Bicycles on Crossw           | alk -          | -     | -     | -  | -  | -     | 0    | -        | -     | -     | -  | -     | -     | 0    |       |
| % Bicycles on Crossw         | alk -          | -     | -     | -  | -  | -     | -    | -        | -     | -     | -  | -     | -     | -    | -     |

Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn

Thu Jan 25, 2024 PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150533, Location: 42.493327, -83.476122



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



W Oaks Dr and Karevich Drive/Proposed Site DW - TMC

Thu Jan 25, 2024

Full Length (11 AM-1 PM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks) All Movements

ID: 1150537, Location: 42.491062, -83.477498



Provided by: Fishbeck-Main Account

1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg       |                        | W Oal  | ks Dr |       |      |       | W Oak  | s Dr  |      |      |       | N Kare | evich E | Dr    |    |       | N Kare | vich D | r     |    |      |       |
|-----------|------------------------|--------|-------|-------|------|-------|--------|-------|------|------|-------|--------|---------|-------|----|-------|--------|--------|-------|----|------|-------|
| Direction |                        | Eastbo | ound  |       |      |       | Westbo | ound  |      |      |       | Northb | ound    |       |    |       | Southb | ound   |       |    |      |       |
| Time      |                        | L      | Т     | R     | U    | Арр   | L      | Т     | R    | U    | Арр   | L      | Т       | R     | U  | Арр   | L      | Т      | R     | U  | Арр  | Int   |
|           | 2024-01-25 11:00AM     | 0      | 59    | 6     | 0    | 65    | 22     | 58    | 2    | 0    | 82    | 0      | 0       | 13    | 0  | 13    | 1      | 0      | 1     | 0  | 2    | 162   |
|           | 11:15AM                | 0      | 49    | 3     | 0    | 52    | 21     | 75    | 0    | 0    | 96    | 0      | 0       | 18    | 0  | 18    | 0      | 1      | 0     | 0  | 1    | 167   |
|           | 11:30AM                | 1      | 67    | 6     | 0    | 74    | 26     | 62    | 3    | 0    | 91    | 1      | 0       | 28    | 0  | 29    | 0      | 0      | 0     | 0  | 0    | 194   |
|           | 11:45AM                | 1      | 64    | 6     | 0    | 71    | 29     | 83    | 2    | 1    | 115   | 0      | 0       | 16    | 0  | 16    | 1      | 0      | 0     | 0  | 1    | 203   |
|           | Hourly Total           | 2      | 239   | 21    | 0    | 262   | 98     | 278   | 7    | 1    | 384   | 1      | 0       | 75    | 0  | 76    | 2      | 1      | 1     | 0  | 4    | 726   |
|           | 12:00PM                | 0      | 67    | 3     | 0    | 70    | 42     | 74    | 1    | 0    | 117   | 1      | 0       | 18    | 0  | 19    | 1      | 1      | 0     | 0  | 2    | 208   |
|           | 12:15PM                | 1      | 70    | 0     | 0    | 71    | 15     | 99    | 1    | 1    | 116   | 3      | 0       | 27    | 0  | 30    | 0      | 0      | 1     | 0  | 1    | 218   |
|           | 12:30PM                | 0      | 90    | 5     | 0    | 95    | 27     | 73    | 2    | 2    | 104   | 1      | 0       | 19    | 0  | 20    | 1      | 0      | 0     | 0  | 1    | 220   |
|           | 12:45PM                | 0      | 75    | 1     | 0    | 76    | 22     | 74    | 0    | 2    | 98    | 2      | 0       | 26    | 0  | 28    | 4      | 0      | 0     | 0  | 4    | 206   |
|           | Hourly Total           | 1      | 302   | 9     | 0    | 312   | 106    | 320   | 4    | 5    | 435   | 7      | 0       | 90    | 0  | 97    | 6      | 1      | 1     | 0  | 8    | 852   |
|           | 4:00PM                 | 0      | 87    | 5     | 0    | 92    | 27     | 75    | 0    | 0    | 102   | 0      | 0       | 28    | 0  | 28    | 0      | 0      | 1     | 0  | 1    | 223   |
|           | 4:15PM                 | 0      | 119   | 9     | 0    | 128   | 29     | 85    | 2    | 0    | 116   | 0      | 0       | 24    | 0  | 24    | 1      | 0      | 1     | 0  | 2    | 270   |
|           | 4:30PM                 | 0      | 92    | 5     | 0    | 97    | 34     | 75    | 0    | 0    | 109   | 3      | 1       | 21    | 0  | 25    | 0      | 0      | 0     | 0  | 0    | 231   |
|           | 4:45PM                 | 1      | 86    | 7     | 0    | 94    | 25     | 87    | 0    | 0    | 112   | 1      | 0       | 26    | 0  | 27    | 1      | 0      | 0     | 0  | 1    | 234   |
|           | Hourly Total           | 1      | 384   | 26    | 0    | 411   | 115    | 322   | 2    | 0    | 439   | 4      | 1       | 99    | 0  | 104   | 2      | 0      | 2     | 0  | 4    | 958   |
|           | 5:00PM                 | 0      | 113   | 3     | 0    | 116   | 23     | 88    | 2    | 0    | 113   | 1      | 0       | 23    | 0  | 24    |        | 0      | 1     | 0  | 1    |       |
|           | 5:15PM                 | 2      | 117   | 4     | 0    | 123   | 21     | 79    | 0    | 1    | 101   | 0      | 0       | 25    | 0  | 25    | 3      | 0      | 0     | 0  | 3    | 252   |
|           | 5:30PM                 | 0      | 95    | 4     | 0    | 99    | 30     | 78    | 1    | 0    | 109   | 4      | 0       | 29    | 0  | 33    | 2      | 0      | 0     | 0  | 2    |       |
|           | 5:45PM                 | 0      | 98    | 6     | 0    | 104   | 29     | 79    | 1    | 0    | 109   | 1      | 0       | 18    | 0  | 19    | 3      | 0      | 0     | 0  | 3    |       |
|           | Hourly Total           | 2      | 423   | 17    | 0    | 442   | 103    | 324   | 4    | 1    | 432   | 6      | 0       | 95    | 0  | 101   | 8      | 0      | 1     | 0  | 9    | 984   |
|           | Total                  | 6      | 1348  | 73    | 0    | 1427  | 422    | 1244  | 17   | 7    | 1690  | 18     | 1       | 359   | 0  | 378   | 18     | 2      | 5     | 0  | 25   | 3520  |
|           | % Approach             | 0.4%   | 94.5% | 5.1%  | 0%   | -     | 25.0%  | 73.6% | 1.0% | 0.4% | -     | 4.8%   | 0.3%    | 95.0% | 0% | -     | 72.0%  | 8.0%   | 20.0% | 0% | -    | -     |
|           | % Total                | 0.2%   | 38.3% | 2.1%  | 0% 4 | 40.5% | 12.0%  | 35.3% | 0.5% | 0.2% | 48.0% | 0.5%   | 0%      | 10.2% | 0% | 10.7% | 0.5%   | 0.1%   | 0.1%  | 0% | 0.7% | -     |
|           | Lights                 | 6      | 1343  | 72    | 0    | 1421  | 419    | 1236  | 17   | 7    | 1679  | 18     | 1       | 355   | 0  | 374   | 18     | 2      | 5     | 0  | 25   | 3499  |
|           | % Lights               | 100%   | 99.6% | 98.6% | 0% 9 | 99.6% | 99.3%  | 99.4% | 100% | 100% | 99.3% | 100%   | 100%    | 98.9% | 0% | 98.9% | 100%   | 100%   | 100%  | 0% | 100% | 99.4% |
|           | Articulated Trucks     | 0      | 0     | 0     | 0    | 0     | 1      | 3     | 0    | 0    | 4     | 0      | 0       | 1     | 0  | 1     | 0      | 0      | 0     | 0  | 0    | 5     |
|           | % Articulated Trucks   | 0%     | 0%    | 0%    | 0%   | 0%    | 0.2%   | 0.2%  | 0%   | 0%   | 0.2%  | 0%     | 0%      | 0.3%  | 0% | 0.3%  | 0%     | 0%     | 0%    | 0% | 0%   | 0.1%  |
| Buses a   | and Single-Unit Trucks | 0      | 5     | 1     | 0    | 6     | 2      | 5     | 0    | 0    | 7     | 0      | 0       | 3     | 0  | 3     | 0      | 0      | 0     | 0  | 0    | 16    |
| % Buses a | nd Single-Unit Trucks  | 0%     | 0.4%  | 1.4%  | 0%   | 0.4%  | 0.5%   | 0.4%  | 0%   | 0%   | 0.4%  | 0%     | 0%      | 0.8%  | 0% | 0.8%  | 0%     | 0%     | 0%    | 0% | 0%   | 0.5%  |

<sup>\*</sup>L: Left, R: Right, T: Thru, U: U-Turn



Thu Jan 25, 2024

Full Length (11 AM-1 PM, 4 PM-6 PM)

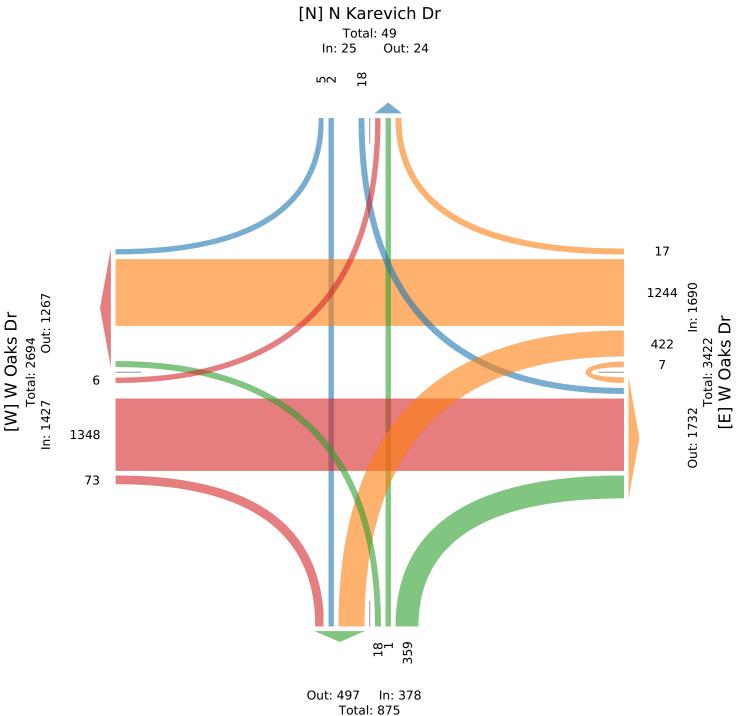
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1150537, Location: 42.491062, -83.477498



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



W Oaks Dr and Karevich Drive/Proposed Site DW - TMC

Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks) All Movements

ID: 1150537, Location: 42.491062, -83.477498



Provided by: Fishbeck-Main Account

1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

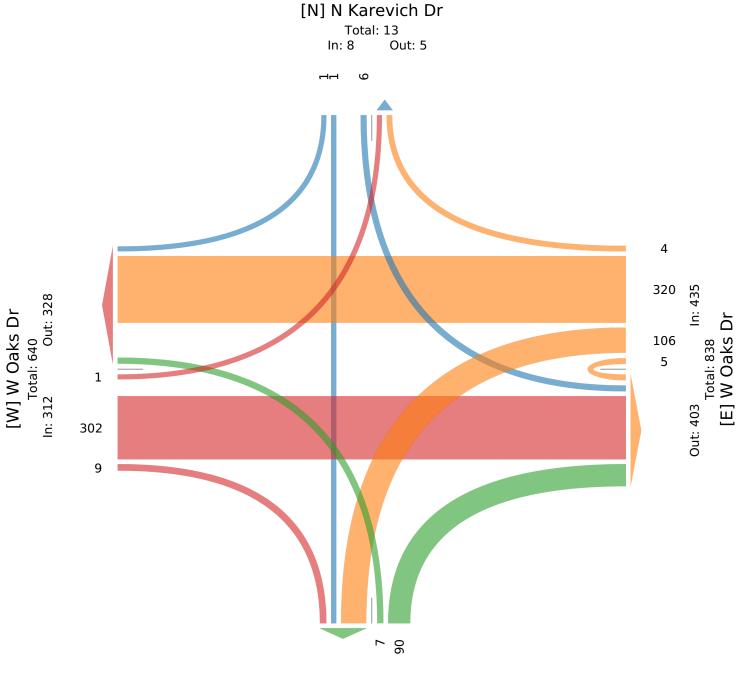
| Leg                     |         | W Oak  | s Dr  |       |    |       | W Oak  | s Dr  |       |       |       | N Kar  | evicl | ı Dr  |      |       | N Kare  | vich Dr |       |    |       |       |
|-------------------------|---------|--------|-------|-------|----|-------|--------|-------|-------|-------|-------|--------|-------|-------|------|-------|---------|---------|-------|----|-------|-------|
| Direction               |         | Eastbo | und   |       |    |       | Westbo | und   |       |       |       | Northl | ooun  | d     |      |       | Southbo | ound    |       |    |       |       |
| Time                    |         | L      | Т     | R     | U  | Арр   | L      | Т     | R     | U     | Арр   | L      | Т     | R     | U    | Арр   | L       | Т       | R     | U  | Арр   | Int   |
| 2024-01-25 12           | 2:00PM  | 0      | 67    | 3     | 0  | 70    | 42     | 74    | 1     | 0     | 117   | 1      | 0     | 18    | 0    | 19    | 1       | 1       | 0     | 0  | 2     | 208   |
| 12                      | 2:15PM  | 1      | 70    | 0     | 0  | 71    | 15     | 99    | 1     | 1     | 116   | 3      | 0     | 27    | 0    | 30    | 0       | 0       | 1     | 0  | 1     | 218   |
| 12                      | 2:30PM  | 0      | 90    | 5     | 0  | 95    | 27     | 73    | 2     | 2     | 104   | 1      | 0     | 19    | 0    | 20    | 1       | 0       | 0     | 0  | 1     | 220   |
| 12                      | 2:45PM  | 0      | 75    | 1     | 0  | 76    | 22     | 74    | 0     | 2     | 98    | 2      | 0     | 26    | 0    | 28    | 4       | 0       | 0     | 0  | 4     | 206   |
|                         | Total   | 1      | 302   | 9     | 0  | 312   | 106    | 320   | 4     | 5     | 435   | 7      | 0     | 90    | 0    | 97    | 6       | 1       | 1     | 0  | 8     | 852   |
| % Ap                    | pproach | 0.3%   | 96.8% | 2.9%  | 0% | -     | 24.4%  | 73.6% | 0.9%  | 1.1%  | -     | 7.2%   | 0%    | 92.8% | 0%   | -     | 75.0%   | 12.5%   | 12.5% | 0% | -     | -     |
| 9                       | % Total | 0.1%   | 35.4% | 1.1%  | 0% | 36.6% | 12.4%  | 37.6% | 0.5%  | 0.6%  | 51.1% | 0.8%   | 0%    | 10.6% | 0% : | 11.4% | 0.7%    | 0.1%    | 0.1%  | 0% | 0.9%  | -     |
|                         | PHF     | 0.250  | 0.839 | 0.450 | -  | 0.821 | 0.631  | 0.808 | 0.500 | 0.625 | 0.929 | 0.583  | -     | 0.833 | -    | 0.808 | 0.375   | 0.250   | 0.250 | -  | 0.500 | 0.968 |
|                         | Lights  | 1      | 301   | 8     | 0  | 310   | 105    | 317   | 4     | 5     | 431   | 7      | 0     | 89    | 0    | 96    | 6       | 1       | 1     | 0  | 8     | 845   |
| %                       | Lights  | 100%   | 99.7% | 88.9% | 0% | 99.4% | 99.1%  | 99.1% | 100%  | 100%  | 99.1% | 100%   | 0%    | 98.9% | 0% 9 | 99.0% | 100%    | 100%    | 100%  | 0% | 100%  | 99.2% |
| Articulated             | Trucks  | 0      | 0     | 0     | 0  | 0     | 1      | 0     | 0     | 0     | 1     | 0      | 0     | 0     | 0    | 0     | 0       | 0       | 0     | 0  | 0     | 1     |
| % Articulated           | Trucks  | 0%     | 0%    | 0%    | 0% | 0%    | 0.9%   | 0%    | 0%    | 0%    | 0.2%  | 0%     | 0%    | 0%    | 0%   | 0%    | 0%      | 0%      | 0%    | 0% | 0%    | 0.1%  |
| Buses and Single-Unit   | Trucks  | 0      | 1     | 1     | 0  | 2     | 0      | 3     | 0     | 0     | 3     | 0      | 0     | 1     | 0    | 1     | 0       | 0       | 0     | 0  | 0     | 6     |
| % Buses and Single-Unit | Trucks  | 0%     | 0.3%  | 11.1% | 0% | 0.6%  | 0%     | 0.9%  | 0%    | 0%    | 0.7%  | 0%     | 0%    | 1.1%  | 0%   | 1.0%  | 0%      | 0%      | 0%    | 0% | 0%    | 0.7%  |

\*L: Left, R: Right, T: Thru, U: U-Turn

W Oaks Dr and Karevich Drive/Proposed Site DW - TMC Thu Jan 25, 2024 Midday Peak (12 PM - 1 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks) All Movements ID: 1150537, Location: 42.491062, -83.477498



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Out: 116 In: 97 Total: 213 [S] N Karevich Dr

## W Oaks Dr and Karevich Drive/Proposed Site DW - TMC

Thu Jan 25, 2024

PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks) All Movements

All Movements

ID: 1150537, Location: 42.491062, -83.477498



Provided by: Fishbeck-Main Account

1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

| Leg                            | W Oal  | ks Dr |        |    |       | W Oak  | s Dr  |       |    |       | N Kare | evich D | )r    |    |       | N Kare  | vich | Dr    |    |       |       |
|--------------------------------|--------|-------|--------|----|-------|--------|-------|-------|----|-------|--------|---------|-------|----|-------|---------|------|-------|----|-------|-------|
| Direction                      | Eastbo | ound  |        |    |       | Westbo | und   |       |    |       | Northb | ound    |       |    |       | Southbo | ound |       |    |       |       |
| Time                           | L      | Т     | R      | U  | Арр   | L      | Т     | R     | U  | Арр   | L      | Т       | R     | U  | Арр   | L       | Т    | R     | U  | Арр   | Int   |
| 2024-01-25 4:15PM              | 0      | 119   | 9      | 0  | 128   | 29     | 85    | 2     | 0  | 116   | 0      | 0       | 24    | 0  | 24    | 1       | 0    | 1     | 0  | 2     | 270   |
| 4:30PM                         | 0      | 92    | 5      | 0  | 97    | 34     | 75    | 0     | 0  | 109   | 3      | 1       | 21    | 0  | 25    | 0       | 0    | 0     | 0  | 0     | 231   |
| 4:45PM                         | 1      | 86    | 7      | 0  | 94    | 25     | 87    | 0     | 0  | 112   | 1      | 0       | 26    | 0  | 27    | 1       | 0    | 0     | 0  | 1     | 234   |
| 5:00PM                         | 0      | 113   | 3      | 0  | 116   | 23     | 88    | 2     | 0  | 113   | 1      | 0       | 23    | 0  | 24    | 0       | 0    | 1     | 0  | 1     | 254   |
| Total                          | 1      | 410   | 24     | 0  | 435   | 111    | 335   | 4     | 0  | 450   | 5      | 1       | 94    | 0  | 100   | 2       | 0    | 2     | 0  | 4     | 989   |
| % Approach                     | 0.2%   | 94.3% | 5.5% ( | )% | -     | 24.7%  | 74.4% | 0.9%  | 0% | -     | 5.0%   | 1.0%    | 94.0% | 0% | -     | 50.0%   | 0%   | 50.0% | 0% | -     | -     |
| % Total                        | 0.1%   | 41.5% | 2.4% ( | )% | 44.0% | 11.2%  | 33.9% | 0.4%  | 0% | 45.5% | 0.5%   | 0.1%    | 9.5%  | 0% | 10.1% | 0.2%    | 0%   | 0.2%  | 0% | 0.4%  | -     |
| PHF                            | 0.250  | 0.861 | 0.667  | -  | 0.850 | 0.816  | 0.952 | 0.500 | -  | 0.970 | 0.417  | 0.250   | 0.904 | -  | 0.926 | 0.500   | -    | 0.500 | -  | 0.500 | 0.916 |
| Lights                         | 1      | 407   | 24     | 0  | 432   | 111    | 334   | 4     | 0  | 449   | 5      | 1       | 94    | 0  | 100   | 2       | 0    | 2     | 0  | 4     | 985   |
| % Lights                       | 100%   | 99.3% | 100% ( | 0% | 99.3% | 100%   | 99.7% | 100%  | 0% | 99.8% | 100%   | 100%    | 100%  | 0% | 100%  | 100%    | 0%   | 100%  | 0% | 100%  | 99.6% |
| Articulated Trucks             | 0      | 0     | 0      | 0  | 0     | 0      | 0     | 0     | 0  | 0     | 0      | 0       | 0     | 0  | 0     | 0       | 0    | 0     | 0  | 0     | 0     |
| % Articulated Trucks           | 0%     | 0%    | 0% (   | 0% | 0%    | 0%     | 0%    | 0%    | 0% | 0%    | 0%     | 0%      | 0%    | 0% | 0%    | 0%      | 0%   | 0%    | 0% | 0%    | 0%    |
| Buses and Single-Unit Trucks   | 0      | 3     | 0      | 0  | 3     | 0      | 1     | 0     | 0  | 1     | 0      | 0       | 0     | 0  | 0     | 0       | 0    | 0     | 0  | 0     | 4     |
| % Buses and Single-Unit Trucks | 0%     | 0.7%  | 0% (   | 0% | 0.7%  | 0%     | 0.3%  | 0%    | 0% | 0.2%  | 0%     | 0%      | 0%    | 0% | 0%    | 0%      | 0%   | 0%    | 0% | 0%    | 0.4%  |

\*L: Left, R: Right, T: Thru, U: U-Turn

W Oaks Dr and Karevich Drive/Proposed Site DW - TMC Thu Jan 25, 2024 PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour

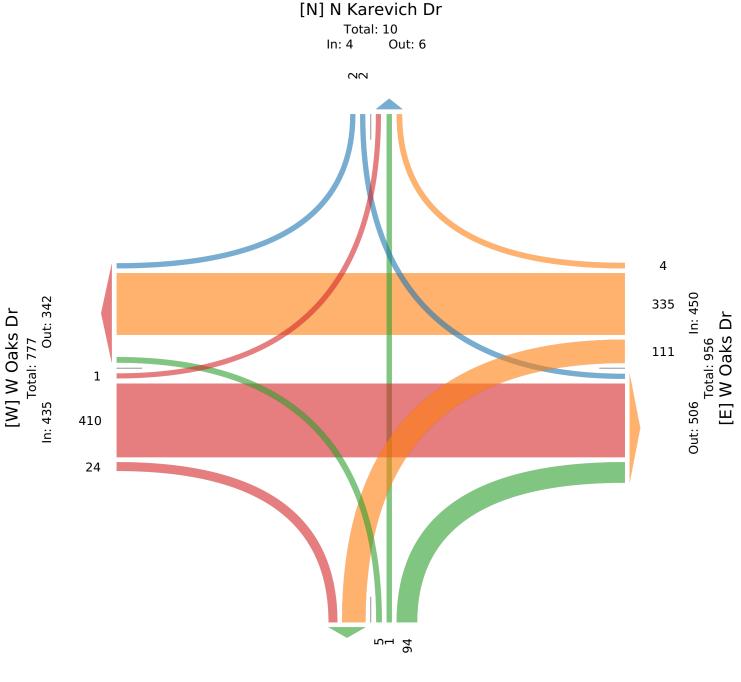
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1150537, Location: 42.491062, -83.477498



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Out: 135 In: 100 Total: 235 [S] N Karevich Dr

#### Twelve Oaks Drive N and Karevich Drive - TMC Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150500, Location: 42.49327, -83.476748



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

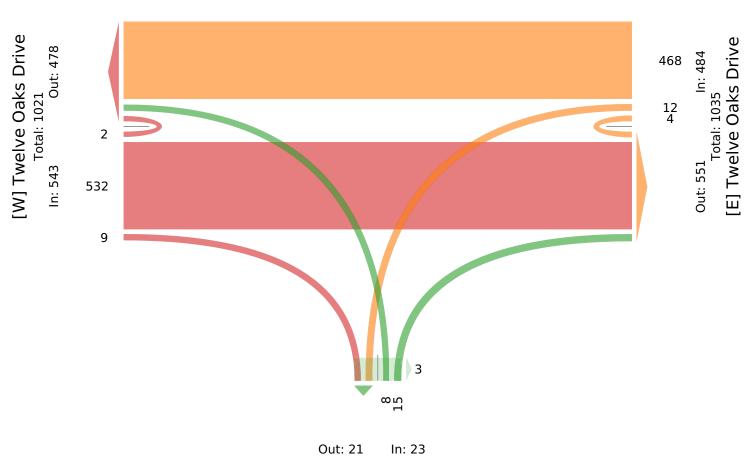
| Leg                       |         | Twelve C | Daks Dri | ve   |       |      | Twelve  | Oaks Driv | ve   |       |      | N Karevi | ch Drive |    |      |      |       |
|---------------------------|---------|----------|----------|------|-------|------|---------|-----------|------|-------|------|----------|----------|----|------|------|-------|
| Direction                 |         | Eastboun | d        |      |       |      | Westbou | ınd       |      |       |      | Northbou | nd       |    |      |      |       |
| Time                      |         | Т        | R        | U    | Арр   | Ped* | L       | Т         | U    | Арр   | Ped* | L        | R        | U  | Арр  | Ped* | Int   |
| 2024-01-25 11:0           | DOAM    | 32       | 1        | 1    | 34    | 0    | 0       | 24        | 0    | 24    | 0    | 2        | 0        | 0  | 2    | 0    | 60    |
| 11:                       | 15AM    | 27       | 1        | 0    | 28    | 0    | 0       | 30        | 0    | 30    | 0    | 0        | 0        | 0  | 0    | 0    | 58    |
| 11:                       | 30AM    | 29       | 0        | 0    | 29    | 0    | 1       | 30        | 0    | 31    | 0    | 1        | 1        | 0  | 2    | 0    | 62    |
| 11:                       | 45AM    | 32       | 0        | 0    | 32    | 0    | 2       | 36        | 1    | 39    | 0    | 0        | 1        | 0  | 1    | 0    | 72    |
| Hourly                    | ' Total | 120      | 2        | 1    | 123   | 0    | 3       | 120       | 1    | 124   | 0    | 3        | 2        | 0  | 5    | 0    | 252   |
| 12:                       | 00PM    | 45       | 2        | 0    | 47    | 0    | 2       | 27        | 0    | 29    | 0    | 0        | 0        | 0  | 0    | 0    | 76    |
| 12:                       | 15PM    | 41       | 0        | 0    | 41    | 0    | 2       | 19        | 0    | 21    | 0    | 1        | 0        | 0  | 1    | 0    | 63    |
| 12:                       | 30PM    | 35       | 1        | 0    | 36    | 0    | 0       | 36        | 1    | 37    | 0    | 0        | 1        | 0  | 1    | 1    | 74    |
| 12:                       | 45PM    | 38       | 0        | 0    | 38    | 0    | 1       | 24        | 1    | 26    | 0    | 0        | 1        | 0  | 1    | 2    | 65    |
| Hourly                    | Total   | 159      | 3        | 0    | 162   | 0    | 5       | 106       | 2    | 113   | 0    | 1        | 2        | 0  | 3    | 3    | 278   |
| 4:                        | 00PM    | 24       | 0        | 0    | 24    | 0    | 0       | 33        | 0    | 33    | 0    | 0        | 2        | 0  | 2    | 0    | 59    |
| 4:                        | 15PM    | 33       | 0        | 0    | 33    | 0    | 1       | 27        | 0    | 28    | 0    | 1        | 1        | 0  | 2    | 0    | 63    |
| 4:                        | 30PM    | 38       | 0        | 0    | 38    | 0    | 1       | 22        | 1    | 24    | 0    | 1        | 0        | 0  | 1    | 0    | 63    |
| 4:                        | 45PM    | 31       | 1        | 0    | 32    | 0    | 1       | 31        | 0    | 32    | 0    | 0        | 0        | 0  | 0    | 0    | 64    |
| Hourly                    | ' Total | 126      | 1        | 0    | 127   | 0    | 3       | 113       | 1    | 117   | 0    | 2        | 3        | 0  | 5    | 0    | 249   |
| 5:                        | 00PM    | 33       | 1        | 1    | 35    | 0    | 1       | 38        | 0    | 39    | 0    | 0        | 3        | 0  | 3    | 0    | 77    |
| 5:                        | 15PM    | 42       | 1        | 0    | 43    | 0    | 0       | 32        | 0    | 32    | 0    | 1        | 0        | 0  | 1    | 0    | 76    |
| 5:                        | 30PM    | 16       | 0        | 0    | 16    | 0    | 0       | 27        | 0    | 27    | 0    | 0        | 2        | 0  | 2    | 0    | 45    |
| 5:                        | 45PM    | 36       | 1        | 0    | 37    | 0    | 0       | 32        | 0    | 32    | 0    | 1        | 3        | 0  | 4    | 0    | 73    |
| Hourly                    | ' Total | 127      | 3        | 1    | 131   | 0    | 1       | 129       | 0    | 130   | 0    | 2        | 8        | 0  | 10   | 0    | 271   |
|                           | Total   | 532      | 9        | 2    | 543   | 0    | 12      | 468       | 4    | 484   | 0    | 8        | 15       | 0  | 23   | 3    | 1050  |
| % Ар                      | broach  | 98.0%    | 1.7%     | 0.4% | -     | -    | 2.5%    | 96.7%     | 0.8% | -     | -    | 34.8%    | 65.2%    | 0% | -    | -    | -     |
| %                         | Total   | 50.7%    | 0.9%     | 0.2% | 51.7% | -    | 1.1%    | 44.6%     | 0.4% | 46.1% | -    | 0.8%     | 1.4%     | 0% | 2.2% | -    | -     |
|                           | Lights  | 527      | 9        | 2    | 538   | -    | 12      | 461       | 4    | 477   | -    | 8        | 15       | 0  | 23   | -    | 1038  |
| %                         | Lights  | 99.1%    | 100%     | 100% | 99.1% | -    | 100%    | 98.5%     | 100% | 98.6% | -    | 100%     | 100%     | 0% | 100% | -    | 98.9% |
| Articulated 7             | rucks   | 1        | 0        | 0    | 1     | -    | 0       | 0         | 0    | 0     | -    | 0        | 0        | 0  | 0    | -    | 1     |
| % Articulated 1           | rucks   | 0.2%     | 0%       | 0%   | 0.2%  | -    | 0%      | 0%        | 0%   | 0%    | -    | 0%       | 0%       | 0% | 0%   | -    | 0.1%  |
| Buses and Single-Unit T   | rucks   | 4        | 0        | 0    | 4     | -    | 0       | 7         | 0    | 7     | -    | 0        | 0        | 0  | 0    | -    | 11    |
| % Buses and Single-Unit T | rucks   | 0.8%     | 0%       | 0%   | 0.7%  | -    | 0%      | 1.5%      | 0%   | 1.4%  | -    | 0%       | 0%       | 0% | 0%   | -    | 1.0%  |
| Pede                      | strians | -        | -        | -    | -     | 0    | -       | -         | -    | -     | 0    | -        | -        | -  | -    | 3    |       |
| % Pede                    | strians | -        | -        | -    | -     | -    | -       | -         | -    | -     | -    | -        | -        | -  | -    | 100% | -     |
| Bicycles on Cros          | swalk   | -        | -        | -    | -     | 0    | -       | -         | -    | -     | 0    | -        | -        | -  | -    | 0    |       |
| % Bicycles on Cros        | swalk   | -        | -        | -    | -     | -    | -       | -         | -    | -     | -    | -        | -        | -  | -    | 0%   | -     |

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Thu Jan 25, 2024 Full Length (11 AM-1 PM, 4 PM-6 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150500, Location: 42.49327, -83.476748



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Total: 44 [S] N Karevich Drive

Thu Jan 25, 2024 Midday Peak (11:45 AM - 12:45 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150500, Location: 42.49327, -83.476748



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

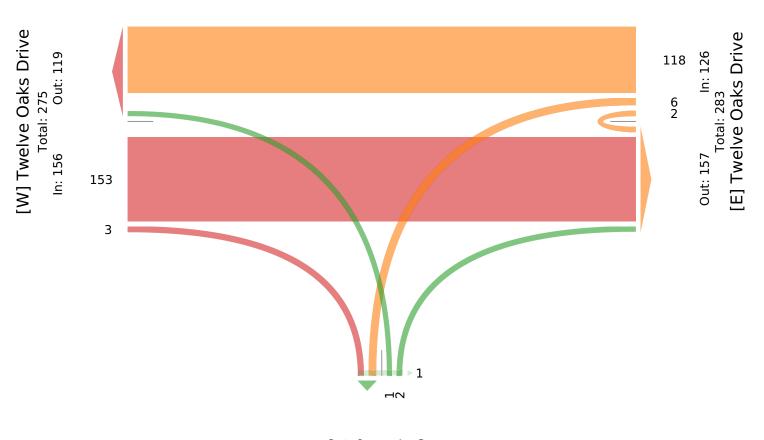
| Leg                            | Twelve O  | aks Driv | ve |       |      | Twelve ( | Daks Driv | ve    |       |      | N Karevi | ch Drive |    |       |      | 1     |
|--------------------------------|-----------|----------|----|-------|------|----------|-----------|-------|-------|------|----------|----------|----|-------|------|-------|
| Direction                      | Eastbound | ł        |    |       |      | Westbou  | nd        |       |       |      | Northbou | nd       |    |       |      | 1     |
| Time                           | Т         | R        | U  | Арр   | Ped* | L        | Т         | U     | Арр   | Ped* | L        | R        | U  | Арр   | Ped* | Int   |
| 2024-01-25 11:45AM             | 32        | 0        | 0  | 32    | 0    | 2        | 36        | 1     | 39    | 0    | 0        | 1        | 0  | 1     | 0    | 72    |
| 12:00PM                        | 45        | 2        | 0  | 47    | 0    | 2        | 27        | 0     | 29    | 0    | 0        | 0        | 0  | 0     | 0    | 76    |
| 12:15PM                        | 41        | 0        | 0  | 41    | 0    | 2        | 19        | 0     | 21    | 0    | 1        | 0        | 0  | 1     | 0    | 63    |
| 12:30PM                        | 35        | 1        | 0  | 36    | 0    | 0        | 36        | 1     | 37    | 0    | 0        | 1        | 0  | 1     | 1    | 74    |
| Total                          | 153       | 3        | 0  | 156   | 0    | 6        | 118       | 2     | 126   | 0    | 1        | 2        | 0  | 3     | 1    | 285   |
| % Approach                     | 98.1%     | 1.9%     | 0% | -     | -    | 4.8%     | 93.7%     | 1.6%  | -     | -    | 33.3%    | 66.7%    | 0% | -     | -    | -     |
| % Total                        | 53.7%     | 1.1%     | 0% | 54.7% | -    | 2.1%     | 41.4%     | 0.7%  | 44.2% | -    | 0.4%     | 0.7%     | 0% | 1.1%  | -    | -     |
| PHF                            | 0.850     | 0.375    | -  | 0.830 | -    | 0.750    | 0.819     | 0.500 | 0.808 | -    | 0.250    | 0.500    | -  | 0.750 | -    | 0.938 |
| Lights                         | 152       | 3        | 0  | 155   | -    | 6        | 117       | 2     | 125   | -    | 1        | 2        | 0  | 3     | -    | 283   |
| % Lights                       | 99.3%     | 100%     | 0% | 99.4% | -    | 100%     | 99.2%     | 100%  | 99.2% | -    | 100%     | 100%     | 0% | 100%  | -    | 99.3% |
| Articulated Trucks             | 0         | 0        | 0  | 0     | -    | 0        | 0         | 0     | 0     | -    | 0        | 0        | 0  | 0     | -    | 0     |
| % Articulated Trucks           | 0%        | 0%       | 0% | 0%    | -    | 0%       | 0%        | 0%    | 0%    | -    | 0%       | 0%       | 0% | 0%    | -    | 0%    |
| Buses and Single-Unit Trucks   | 1         | 0        | 0  | 1     | -    | 0        | 1         | 0     | 1     | -    | 0        | 0        | 0  | 0     | -    | 2     |
| % Buses and Single-Unit Trucks | 0.7%      | 0%       | 0% | 0.6%  | -    | 0%       | 0.8%      | 0%    | 0.8%  | -    | 0%       | 0%       | 0% | 0%    | -    | 0.7%  |
| Pedestrians                    | -         | -        | -  | -     | 0    | -        | -         | -     | -     | 0    | -        | -        | -  | -     | 1    |       |
| % Pedestrians                  | -         | -        | -  | -     | -    | -        | -         | -     | -     | -    | -        | -        | -  | -     | 100% | -     |
| Bicycles on Crosswalk          | -         | -        | -  | -     | 0    | -        | -         | -     | -     | 0    | -        | -        | -  | -     | 0    |       |
| % Bicycles on Crosswalk        | -         | -        | -  | -     | -    | -        | -         | -     | -     | -    | -        | -        | -  | -     | 0%   | -     |

<sup>\*</sup>Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Thu Jan 25, 2024 Midday Peak (11:45 AM - 12:45 PM) - Overall Peak Hour All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150500, Location: 42.49327, -83.476748



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Out: 9 In: 3 Total: 12 [S] N Karevich Drive

#### Twelve Oaks Drive N and Karevich Drive - TMC Thu Jan 25, 2024 PM Peak (4:30 PM - 5:30 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150500, Location: 42.49327, -83.476748



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US

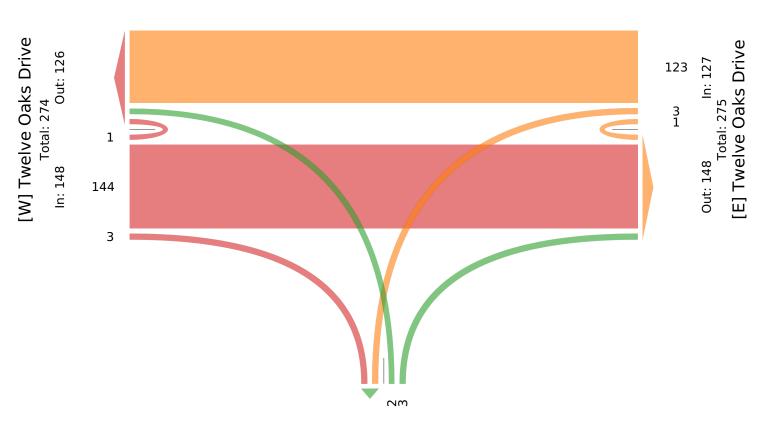
| Leg                            | Twelve C | Daks Dri | ve    |       |      | Twelve  | Daks Driv | /e    |       |      | N Karevi | ch Drive |    |       |      | 1     |
|--------------------------------|----------|----------|-------|-------|------|---------|-----------|-------|-------|------|----------|----------|----|-------|------|-------|
| Direction                      | Eastboun | d        |       |       |      | Westbou | nd        |       |       |      | Northbou | nd       |    |       |      | 1     |
| Time                           | Т        | R        | U     | Арр   | Ped* | L       | Т         | U     | Арр   | Ped* | L        | R        | U  | Арр   | Ped* | Int   |
| 2024-01-25 4:30PM              | 38       | 0        | 0     | 38    | 0    | 1       | 22        | 1     | 24    | 0    | 1        | 0        | 0  | 1     | 0    | 63    |
| 4:45PM                         | 31       | 1        | 0     | 32    | 0    | 1       | 31        | 0     | 32    | 0    | 0        | 0        | 0  | 0     | 0    | 64    |
| 5:00PM                         | 33       | 1        | 1     | 35    | 0    | 1       | 38        | 0     | 39    | 0    | 0        | 3        | 0  | 3     | 0    | 77    |
| 5:15PM                         | 42       | 1        | 0     | 43    | 0    | 0       | 32        | 0     | 32    | 0    | 1        | 0        | 0  | 1     | 0    | 76    |
| Total                          | 144      | 3        | 1     | 148   | 0    | 3       | 123       | 1     | 127   | 0    | 2        | 3        | 0  | 5     | 0    | 280   |
| % Approach                     | 97.3%    | 2.0%     | 0.7%  | -     | -    | 2.4%    | 96.9%     | 0.8%  | -     | -    | 40.0%    | 60.0%    | 0% | -     | -    | -     |
| % Total                        | 51.4%    | 1.1%     | 0.4%  | 52.9% | -    | 1.1%    | 43.9%     | 0.4%  | 45.4% | -    | 0.7%     | 1.1%     | 0% | 1.8%  | -    | -     |
| PHF                            | 0.857    | 0.750    | 0.250 | 0.860 | -    | 0.750   | 0.809     | 0.250 | 0.814 | -    | 0.500    | 0.250    | -  | 0.417 | -    | 0.909 |
| Lights                         | 143      | 3        | 1     | 147   | -    | 3       | 121       | 1     | 125   | -    | 2        | 3        | 0  | 5     | -    | 277   |
| % Lights                       | 99.3%    | 100%     | 100%  | 99.3% | -    | 100%    | 98.4%     | 100%  | 98.4% | -    | 100%     | 100%     | 0% | 100%  | -    | 98.9% |
| Articulated Trucks             | 0        | 0        | 0     | 0     | -    | 0       | 0         | 0     | 0     | -    | 0        | 0        | 0  | 0     | -    | 0     |
| % Articulated Trucks           | 0%       | 0%       | 0%    | 0%    | -    | 0%      | 0%        | 0%    | 0%    | -    | 0%       | 0%       | 0% | 0%    | -    | 0%    |
| Buses and Single-Unit Trucks   | 1        | 0        | 0     | 1     | -    | 0       | 2         | 0     | 2     | -    | 0        | 0        | 0  | 0     | -    | 3     |
| % Buses and Single-Unit Trucks | 0.7%     | 0%       | 0%    | 0.7%  | -    | 0%      | 1.6%      | 0%    | 1.6%  | -    | 0%       | 0%       | 0% | 0%    | -    | 1.1%  |
| Pedestrians                    | -        | -        | -     | -     | 0    | -       | -         | -     | -     | 0    | -        | -        | -  | -     | 0    |       |
| % Pedestrians                  | -        | -        | -     | -     | -    | -       | -         | -     | -     | -    | -        | -        | -  | -     | -    | -     |
| Bicycles on Crosswalk          | -        | -        | -     | -     | 0    | -       | -         | -     | -     | 0    | -        | -        | -  | -     | 0    |       |
| % Bicycles on Crosswalk        | -        | -        | -     | -     | -    | -       | -         | -     | -     | -    | -        | -        | -  | -     | -    | -     |

Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Thu Jan 25, 2024 PM Peak (4:30 PM - 5:30 PM) All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk) All Movements ID: 1150500, Location: 42.49327, -83.476748



Provided by: Fishbeck-Main Account 1515 Arboretum Drive SE, Grand Rapids, MI, 49546, US



Out: 6 In: 5 Total: 11 [S] N Karevich Drive

# Appendix 2

**Existing LOS Output Reports** 

## HCM 6th Signalized Intersection Summary 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

|                              | ≯    | -        | *    | 4    | Ļ    | *    | •    | Ť    | 1    | *        | Ŧ    | ~    |
|------------------------------|------|----------|------|------|------|------|------|------|------|----------|------|------|
| Movement                     | EBL  | EBT      | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL      | SBT  | SBR  |
| Lane Configurations          | ሻ    | <b>↑</b> | 11   | ካካ   | ef 👘 |      | ካካ   | ***  | 1    | <u>۲</u> | ***  | 1    |
| Traffic Volume (veh/h)       | 66   | 46       | 307  | 330  | 59   | 40   | 326  | 764  | 260  | 17       | 672  | 47   |
| Future Volume (veh/h)        | 66   | 46       | 307  | 330  | 59   | 40   | 326  | 764  | 260  | 17       | 672  | 47   |
| Initial Q (Qb), veh          | 0    | 0        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0        | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00     |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 |
| Work Zone On Approach        |      | No       |      |      | No   |      |      | No   |      |          | No   |      |
| Adj Sat Flow, veh/h/ln       | 1984 | 1984     | 1984 | 1984 | 1984 | 1984 | 1969 | 1969 | 1969 | 1984     | 1984 | 1984 |
| Adj Flow Rate, veh/h         | 72   | 50       | 321  | 363  | 65   | 41   | 351  | 822  | 155  | 18       | 707  | 32   |
| Peak Hour Factor             | 0.92 | 0.92     | 0.92 | 0.91 | 0.91 | 0.91 | 0.93 | 0.93 | 0.93 | 0.95     | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 1    | 1        | 1    | 1    | 1    | 1    | 2    | 2    | 2    | 1        | 1    | 1    |
| Cap, veh/h                   | 189  | 198      | 664  | 474  | 147  | 93   | 453  | 1989 | 617  | 171      | 1822 | 566  |
| Arrive On Green              | 0.10 | 0.10     | 0.10 | 0.13 | 0.13 | 0.13 | 0.12 | 0.37 | 0.37 | 0.03     | 0.11 | 0.11 |
| Sat Flow, veh/h              | 1890 | 1984     | 2960 | 3666 | 1138 | 718  | 3638 | 5375 | 1668 | 1890     | 5417 | 1682 |
| Grp Volume(v), veh/h         | 72   | 50       | 321  | 363  | 0    | 106  | 351  | 822  | 155  | 18       | 707  | 32   |
| Grp Sat Flow(s),veh/h/ln     | 1890 | 1984     | 1480 | 1833 | 0    | 1855 | 1819 | 1792 | 1668 | 1890     | 1806 | 1682 |
| Q Serve(g_s), s              | 2.9  | 1.9      | 7.5  | 7.7  | 0.0  | 4.2  | 7.5  | 9.1  | 5.2  | 0.7      | 9.7  | 1.4  |
| Cycle Q Clear(g_c), s        | 2.9  | 1.9      | 7.5  | 7.7  | 0.0  | 4.2  | 7.5  | 9.1  | 5.2  | 0.7      | 9.7  | 1.4  |
| Prop In Lane                 | 1.00 |          | 1.00 | 1.00 |      | 0.39 | 1.00 |      | 1.00 | 1.00     |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 189  | 198      | 664  | 474  | 0    | 240  | 453  | 1989 | 617  | 171      | 1822 | 566  |
| V/C Ratio(X)                 | 0.38 | 0.25     | 0.48 | 0.77 | 0.00 | 0.44 | 0.78 | 0.41 | 0.25 | 0.10     | 0.39 | 0.06 |
| Avail Cap(c_a), veh/h        | 189  | 198      | 664  | 596  | 0    | 301  | 618  | 1989 | 617  | 171      | 1822 | 566  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.33     | 0.33 | 0.33 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97     | 0.97 | 0.97 |
| Uniform Delay (d), s/veh     | 33.7 | 33.2     | 27.0 | 33.7 | 0.0  | 32.2 | 33.9 | 18.7 | 17.5 | 35.6     | 27.9 | 24.2 |
| Incr Delay (d2), s/veh       | 1.3  | 0.7      | 0.5  | 4.6  | 0.0  | 1.3  | 4.2  | 0.6  | 1.0  | 1.2      | 0.6  | 0.2  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/In     | 1.4  | 0.9      | 2.7  | 3.7  | 0.0  | 2.0  | 3.4  | 3.5  | 1.9  | 0.4      | 4.4  | 0.5  |
| Unsig. Movement Delay, s/veh |      |          | 07.5 |      |      | 00.4 |      | 10.1 | 10 5 |          | 00 F | 04.4 |
| LnGrp Delay(d),s/veh         | 34.9 | 33.9     | 27.5 | 38.3 | 0.0  | 33.4 | 38.2 | 19.4 | 18.5 | 36.8     | 28.5 | 24.4 |
| LnGrp LOS                    | С    | C        | С    | D    | A    | С    | D    | B    | В    | D        | С    | C    |
| Approach Vol, veh/h          |      | 443      |      |      | 469  |      |      | 1328 |      |          | 757  |      |
| Approach Delay, s/veh        |      | 29.5     |      |      | 37.2 |      |      | 24.2 |      |          | 28.5 |      |
| Approach LOS                 |      | С        |      |      | D    |      |      | С    |      |          | С    |      |
| Timer - Assigned Phs         | 1    | 2        |      | 4    | 5    | 6    |      | 8    |      |          |      |      |
| Phs Duration (G+Y+Rc), s     | 13.7 | 36.0     |      | 16.3 | 16.4 | 33.3 |      | 14.0 |      |          |      |      |
| Change Period (Y+Rc), s      | 6.4  | 6.4      |      | 6.0  | 6.4  | 6.4  |      | 6.0  |      |          |      |      |
| Max Green Setting (Gmax), s  | 4.6  | 29.6     |      | 13.0 | 13.6 | 20.6 |      | 8.0  |      |          |      |      |
| Max Q Clear Time (g_c+I1), s | 2.7  | 11.1     |      | 9.7  | 9.5  | 11.7 |      | 9.5  |      |          |      |      |
| Green Ext Time (p_c), s      | 0.0  | 5.5      |      | 0.7  | 0.5  | 3.0  |      | 0.0  |      |          |      |      |
| Intersection Summary         |      |          |      |      |      |      |      |      |      |          |      |      |
| HCM 6th Ctrl Delay           |      |          | 28.1 |      |      |      |      |      |      |          |      |      |
| HCM 6th LOS                  |      |          | С    |      |      |      |      |      |      |          |      |      |
|                              |      |          |      |      |      |      |      |      |      |          |      |      |

Notes

User approved pedestrian interval to be less than phase max green.

## メッシュ チャメイ トッシナイ

| Movomont                                      | EBL            | EBT            | EBR  | WBL  | WBT             | WBR      | NBL            | NBT              | NBR            | SBL            | SBT                | SBR  |  |
|-----------------------------------------------|----------------|----------------|------|------|-----------------|----------|----------------|------------------|----------------|----------------|--------------------|------|--|
| Movement                                      | <u></u>        |                | EDK  | VVDL |                 | VVDR     |                |                  |                |                |                    | JDK  |  |
| Lane Configurations<br>Traffic Volume (veh/h) | <b>1</b><br>43 | <b>₽</b><br>17 | 105  | 27   | <b>ፋጉ</b><br>20 | 45       | <b>1</b><br>87 | <b>↑↑</b><br>757 | <b>°</b><br>26 | <b>1</b><br>85 | <b>††1•</b><br>604 | 19   |  |
| Future Volume (veh/h)                         | 43             | 17             | 105  | 27   | 20              | 45<br>45 | 87             | 757              | 20             | 85             | 604<br>604         | 19   |  |
| Initial Q (Qb), veh                           | 43             | 0              | 0    | 0    | 20              | 45       | 07             | 0                | 20             | 0              | 004                | 0    |  |
| Ped-Bike Adj(A_pbT)                           | 1.00           | 0              | 1.00 | 1.00 | 0               | 1.00     | 1.00           | 0                | 1.00           | 1.00           | 0                  | 1.00 |  |
| Parking Bus, Adj                              | 1.00           | 1.00           | 1.00 | 1.00 | 1.00            | 1.00     | 1.00           | 1.00             | 1.00           | 1.00           | 1.00               | 1.00 |  |
| Work Zone On Approac                          |                | No             | 1.00 | 1.00 | No              | 1.00     | 1.00           | No               | 1.00           | 1.00           | No                 | 1.00 |  |
| Adj Sat Flow, veh/h/ln                        | 1984           | 1984           | 1984 | 1969 | 1969            | 1969     | 1953           | 1953             | 1953           | 1984           | 1984               | 1984 |  |
| Adj Flow Rate, veh/h                          | 47             | 18             | 51   | 34   | 25              | 25       | 96             | 832              | 28             | 92             | 657                | 21   |  |
| Peak Hour Factor                              | 0.92           | 0.92           | 0.92 | 0.80 | 0.80            | 0.80     | 0.91           | 0.91             | 0.91           | 0.92           | 0.92               | 0.92 |  |
| Percent Heavy Veh, %                          | 1              | 1              | 1    | 2    | 2               | 2        | 3              | 3                | 3              | 1              | 1                  | 1    |  |
| Cap, veh/h                                    | 114            | 28             | 78   | 77   | 58              | 59       | 530            | 1998             | 891            | 435            | 2900               | 92   |  |
| Arrive On Green                               | 0.06           | 0.06           | 0.06 | 0.05 | 0.05            | 0.05     | 0.04           | 0.54             | 0.54           | 0.04           | 0.54               | 0.54 |  |
| Sat Flow, veh/h                               | 1890           | 457            | 1295 | 1457 | 1095            | 1112     | 1860           | 3711             | 1655           | 1890           | 5393               | 172  |  |
| Grp Volume(v), veh/h                          | 47             | 0              | 69   | 44   | 0               | 40       | 96             | 832              | 28             | 92             | 439                | 239  |  |
| Grp Sat Flow(s), veh/h/lr                     |                | 0              | 1751 | 1896 | 0               | 1769     | 1860           | 1856             | 1655           | 1890           | 1806               | 1953 |  |
| Q Serve(g_s), s                               | 1.9            | 0.0            | 3.1  | 1.8  | 0.0             | 1.7      | 1.8            | 10.7             | 0.6            | 1.7            | 5.1                | 5.1  |  |
| Cycle Q Clear(g_c), s                         | 1.9            | 0.0            | 3.1  | 1.8  | 0.0             | 1.7      | 1.8            | 10.7             | 0.6            | 1.7            | 5.1                | 5.1  |  |
| Prop In Lane                                  | 1.00           | 0.0            | 0.74 | 0.77 | 0.0             | 0.63     | 1.00           | 10.7             | 1.00           | 1.00           | 0.1                | 0.09 |  |
| Lane Grp Cap(c), veh/h                        |                | 0              | 106  | 100  | 0               | 93       | 530            | 1998             | 891            | 435            | 1942               | 1051 |  |
| V/C Ratio(X)                                  | 0.41           | 0.00           | 0.65 | 0.44 | 0.00            | 0.43     | 0.18           | 0.42             | 0.03           | 0.21           | 0.23               | 0.23 |  |
| Avail Cap(c_a), veh/h                         | 213            | 0.00           | 197  | 308  | 0.00            | 287      | 699            | 1998             | 891            | 607            | 1942               | 1051 |  |
| HCM Platoon Ratio                             | 1.00           | 1.00           | 1.00 | 1.00 | 1.00            | 1.00     | 1.00           | 1.00             | 1.00           | 1.00           | 1.00               | 1.00 |  |
| Upstream Filter(I)                            | 1.00           | 0.00           | 1.00 | 1.00 | 0.00            | 1.00     | 0.94           | 0.94             | 0.94           | 1.00           | 1.00               | 1.00 |  |
| Uniform Delay (d), s/veł                      |                | 0.0            | 36.8 | 36.7 | 0.0             | 36.7     | 7.6            | 11.0             | 8.7            | 8.2            | 9.7                | 9.7  |  |
| Incr Delay (d2), s/veh                        | 2.4            | 0.0            | 6.7  | 3.0  | 0.0             | 3.0      | 0.2            | 0.6              | 0.1            | 0.2            | 0.3                | 0.5  |  |
| Initial Q Delay(d3),s/veh                     |                | 0.0            | 0.0  | 0.0  | 0.0             | 0.0      | 0.0            | 0.0              | 0.0            | 0.0            | 0.0                | 0.0  |  |
| %ile BackOfQ(50%),veh                         |                | 0.0            | 1.5  | 0.9  | 0.0             | 0.8      | 0.6            | 3.8              | 0.2            | 0.6            | 1.8                | 2.0  |  |
| Unsig. Movement Delay                         |                |                |      |      |                 |          |                |                  |                |                |                    |      |  |
| LnGrp Delay(d),s/veh                          | 38.6           | 0.0            | 43.4 | 39.8 | 0.0             | 39.8     | 7.7            | 11.6             | 8.7            | 8.4            | 10.0               | 10.2 |  |
| LnGrp LOS                                     | D              | A              | D    | D    | A               | D        | А              | В                | A              | A              | A                  | В    |  |
| Approach Vol, veh/h                           |                | 116            |      |      | 84              |          |                | 956              |                |                | 770                |      |  |
| Approach Delay, s/veh                         |                | 41.5           |      |      | 39.8            |          |                | 11.1             |                |                | 9.9                |      |  |
| Approach LOS                                  |                | D              |      |      | D               |          |                | В                |                |                | A                  |      |  |
| Timer - Assigned Phs                          | 1              | 2              |      | 4    | 5               | 6        |                | 8                |                |                |                    |      |  |
| Phs Duration (G+Y+Rc)                         |                | 49.3           |      | 10.2 | 9.7             | 49.2     |                | 10.8             |                |                |                    |      |  |
| Change Period (Y+Rc),                         |                | * 6.2          |      | 6.0  | * 6.2           | * 6.2    |                | 6.0              |                |                |                    |      |  |
| Max Green Setting (Gm                         |                | * 23           |      | 13.0 | * 11            | * 23     |                | 9.0              |                |                |                    |      |  |
| Max Q Clear Time (g_c                         |                | 12.7           |      | 3.8  | 3.8             | 7.1      |                | 5.1              |                |                |                    |      |  |
| Green Ext Time (p_c), s                       |                | 3.8            |      | 0.2  | 0.1             | 3.5      |                | 0.1              |                |                |                    |      |  |
| u = 7:                                        |                | 0.0            |      | 0.2  | 0.1             | 0.0      |                | 0.1              |                |                |                    |      |  |
| ntersection Summary                           |                |                | 12.7 |      |                 |          |                |                  |                |                |                    |      |  |
| HCM 6th Ctrl Delay                            |                |                | 13.7 |      |                 |          |                |                  |                |                |                    |      |  |
| HCM 6th LOS                                   |                |                | В    |      |                 |          |                |                  |                |                |                    |      |  |

#### Notes

User approved pedestrian interval to be less than phase max green.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

2.8

#### Intersection

Int Delay, s/veh

| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    | ۲    | 4    |      | ٦    | ۴Þ   |      |      | 4    |      | -    | 4    | -    |
| Traffic Vol, veh/h     | 1    | 302  | 9    | 106  | 320  | 9    | 7    | 0    | 90   | 6    | 1    | 1    |
| Future Vol, veh/h      | 1    | 302  | 9    | 106  | 320  | 9    | 7    | 0    | 90   | 6    | 1    | 1    |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control           | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized         | -    | -    | None |
| Storage Length         | 115  | -    | -    | 115  | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, | ,# - | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %               | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor       | 82   | 82   | 82   | 93   | 93   | 93   | 81   | 81   | 81   | 60   | 60   | 60   |
| Heavy Vehicles, %      | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 0    | 0    | 0    |
| Mvmt Flow              | 1    | 368  | 11   | 114  | 344  | 10   | 9    | 0    | 111  | 10   | 2    | 2    |

| Major/Minor          | Major1 |   | Major2   |   | Minor1     |               | Minor2 |     |     |  |
|----------------------|--------|---|----------|---|------------|---------------|--------|-----|-----|--|
| Conflicting Flow All | 354    | 0 | 0 379    | 0 | 0 777      | 958 374       | 1008   | 958 | 177 |  |
| Stage 1              | -      | - |          | - | - 376      | 376 -         | 577    | 577 | -   |  |
| Stage 2              | -      | - |          | - | - 401      | 582 -         | 431    | 381 | -   |  |
| Critical Hdwy        | 4.115  | - | - 4.115  | - | - 7.315    | 6.515 6.215   | 7.3    | 6.5 | 6.9 |  |
| Critical Hdwy Stg 1  | -      | - |          | - | - 6.115    | 5.515 -       | 6.5    | 5.5 | -   |  |
| Critical Hdwy Stg 2  | -      | - |          | - | - 6.515    | 5.515 -       | 6.1    | 5.5 | -   |  |
| Follow-up Hdwy       | 2.2095 | - | - 2.2095 | - | - 3.5095 4 | 1.0095 3.3095 | 3.5    | 4   | 3.3 |  |
| Pot Cap-1 Maneuver   | 1209   | - | - 1184   | - | - 302      | 258 674       | 209    | 259 | 842 |  |
| Stage 1              | -      | - |          | - | - 647      | 618 -         | 474    | 505 | -   |  |
| Stage 2              | -      | - |          | - | - 600      | 500 -         | 607    | 617 | -   |  |
| Platoon blocked, %   |        | - | -        | - | -          |               |        |     |     |  |
| Mov Cap-1 Maneuver   | 1209   | - | - 1184   | - | - 278      | 233 674       | 162    | 234 | 842 |  |
| Mov Cap-2 Maneuver   | r –    | - |          | - | - 278      | 233 -         | 162    | 234 | -   |  |
| Stage 1              | -      | - |          | - | - 646      | 617 -         | 474    | 457 | -   |  |
| Stage 2              | -      | - |          | - | - 539      | 452 -         | 507    | 616 | -   |  |
|                      |        |   |          |   |            |               |        |     |     |  |
| Approach             | EB     |   | WB       |   | NB         |               | SB     |     |     |  |
| HCM Control Delay, s | s 0    |   | 2        |   | 12.3       |               | 25.6   |     |     |  |
| HCM LOS              |        |   |          |   | В          |               | D      |     |     |  |

| HCM LOS               |       |       |     |     |       | В   |           | D |  |
|-----------------------|-------|-------|-----|-----|-------|-----|-----------|---|--|
|                       |       |       |     |     |       |     |           |   |  |
|                       |       |       |     |     |       |     |           |   |  |
| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR SBLn1 |   |  |
| Capacity (veh/h)      | 611   | 1209  | -   | -   | 1184  | -   | - 188     |   |  |
| HCM Lane V/C Ratio    | 0.196 | 0.001 | -   | -   | 0.096 | -   | - 0.071   |   |  |
| HCM Control Dolay (c) | 12.3  | Q     |     |     | Q /   |     | 25.6      |   |  |

| HCM Control Delay (s) | 12.3 | 8 | - | - | 8.4 | - | - | 25.6 |
|-----------------------|------|---|---|---|-----|---|---|------|
| HCM Lane LOS          | В    | Α | - | - | Α   | - | - | D    |
| HCM 95th %tile Q(veh) | 0.7  | 0 | - | - | 0.3 | - | - | 0.2  |

#### Intersection

| Int Delay, s/veh       | 0.3  |      |      |      |      |      |
|------------------------|------|------|------|------|------|------|
| Movement               | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations    | el 🗧 |      | ٦    | 1    | Y    |      |
| Traffic Vol, veh/h     | 163  | 3    | 8    | 118  | 1    | 2    |
| Future Vol, veh/h      | 163  | 3    | 8    | 118  | 1    | 2    |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control           | Free | Free | Free | Free | Stop | Stop |
| RT Channelized         | -    | None | -    | None | -    | None |
| Storage Length         | -    | -    | 0    | -    | 0    | -    |
| Veh in Median Storage, | # 0  | -    | -    | 0    | 0    | -    |
| Grade, %               | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor       | 83   | 83   | 81   | 81   | 75   | 75   |
| Heavy Vehicles, %      | 1    | 1    | 1    | 1    | 0    | 0    |
| Mvmt Flow              | 196  | 4    | 10   | 146  | 1    | 3    |

| Major/Minor I         | Major1 | Ν     | /lajor2 | I   | Minor1 |     |
|-----------------------|--------|-------|---------|-----|--------|-----|
| Conflicting Flow All  | 0      | 0     | 200     | 0   | 364    | 198 |
| Stage 1               | -      | -     | -       | -   | 198    | -   |
| Stage 2               | -      | -     | -       | -   | 166    | -   |
| Critical Hdwy         | -      | -     | 4.11    | -   | 6.4    | 6.2 |
| Critical Hdwy Stg 1   | -      | -     | -       | -   | 5.4    | -   |
| Critical Hdwy Stg 2   | -      | -     | -       | -   | 5.4    | -   |
| Follow-up Hdwy        | -      | -     | 2.209   | -   | 3.5    | 3.3 |
| Pot Cap-1 Maneuver    | -      | -     | 1378    | -   | 639    | 848 |
| Stage 1               | -      | -     | -       | -   | 840    | -   |
| Stage 2               | -      | -     | -       | -   | 868    | -   |
| Platoon blocked, %    | -      | -     |         | -   |        |     |
| Mov Cap-1 Maneuver    | -      | -     | 1378    | -   | 635    | 848 |
| Mov Cap-2 Maneuver    | -      | -     | -       | -   | 635    | -   |
| Stage 1               | -      | -     | -       | -   | 840    | -   |
| Stage 2               | -      | -     | -       | -   | 862    | -   |
|                       |        |       |         |     |        |     |
| Approach              | EB     |       | WB      |     | NB     |     |
| HCM Control Delay, s  | 0      |       | 0.5     |     | 9.7    |     |
| HCM LOS               |        |       |         |     | А      |     |
|                       |        |       |         |     |        |     |
| Minor Lane/Major Mvm  | nt     | NBLn1 | EBT     | EBR | WBL    | WBT |
| Capacity (veh/h)      |        | 763   | -       | -   | 1378   | -   |
| HCM Lane V/C Ratio    |        | 0.005 | -       | -   | 0.007  | -   |
| HCM Control Delay (s) |        | 9.7   | -       | -   | 7.6    | -   |

А

0

-

-

-

-

HCM Lane LOS

HCM 95th %tile Q(veh)

А

0

-

\_

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Movement              | EB | EB | EB | EB | WB  | WB  | WB  | NB  | NB  | NB  | NB  | NB  |
|-----------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | Т  | R  | R  | L   | L   | TR  | L   | L   | Т   | Т   | Т   |
| Maximum Queue (ft)    | 51 | 49 | 66 | 48 | 219 | 174 | 105 | 250 | 301 | 243 | 223 | 151 |
| Average Queue (ft)    | 39 | 29 | 47 | 15 | 145 | 66  | 47  | 136 | 178 | 135 | 115 | 21  |
| 95th Queue (ft)       | 63 | 56 | 62 | 39 | 207 | 157 | 88  | 236 | 272 | 212 | 197 | 85  |
| Link Distance (ft)    | 49 | 49 | 49 | 49 | 230 | 230 | 230 |     |     | 427 | 427 | 427 |
| Upstream Blk Time (%) | 22 | 11 | 14 | 0  | 0   |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 23 | 11 | 15 | 0  | 0   |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |    |    |    |    |     |     |     | 400 | 400 |     |     |     |
| Storage Blk Time (%)  |    |    |    |    |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |    |    |    |    |     |     |     |     |     |     |     |     |

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Mayamant              | ND  | CD  | CD. | CD. | CD  | CD. |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Movement              | NB  | SB  | SB  | SB  | SB  | SB  |
| Directions Served     | R   | L   | Т   | Т   | Т   | R   |
| Maximum Queue (ft)    | 76  | 91  | 190 | 179 | 167 | 105 |
| Average Queue (ft)    | 38  | 14  | 121 | 105 | 79  | 29  |
| 95th Queue (ft)       | 65  | 53  | 177 | 163 | 148 | 78  |
| Link Distance (ft)    |     |     | 694 | 694 | 694 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 350 | 115 |     |     |     | 80  |
| Storage Blk Time (%)  |     |     | 14  |     | 8   | 0   |
| Queuing Penalty (veh) |     |     | 3   |     | 4   | 0   |

## Intersection: 2: Novi Road & Oaks Drive North

| Movement              | EB | EB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | TR  | LT  | TR  | L   | Т   | Т   | R   | L   | Т   | Т   | TR  |
| Maximum Queue (ft)    | 82 | 100 | 74  | 100 | 89  | 200 | 246 | 42  | 108 | 178 | 132 | 98  |
| Average Queue (ft)    | 30 | 54  | 22  | 35  | 35  | 72  | 85  | 7   | 33  | 73  | 40  | 23  |
| 95th Queue (ft)       | 66 | 96  | 58  | 73  | 72  | 180 | 201 | 29  | 79  | 148 | 109 | 68  |
| Link Distance (ft)    |    | 95  | 166 | 166 |     | 694 | 694 | 694 |     | 408 | 408 | 408 |
| Upstream Blk Time (%) | 0  | 2   |     |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 0  | 3   |     |     |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 80 |     |     |     | 275 |     |     |     | 100 |     |     |     |
| Storage Blk Time (%)  | 0  | 4   |     |     |     | 0   |     |     | 0   | 4   |     |     |
| Queuing Penalty (veh) | 1  | 2   |     |     |     | 0   |     |     | 0   | 3   |     |     |

## Intersection: 3: Karevich Drive & Oaks Drive South

| Movement              | EB  | EB  | WB  | WB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | TR  | L   | TR  | LTR | LTR |
| Maximum Queue (ft)    | 6   | 17  | 67  | 4   | 74  | 31  |
| Average Queue (ft)    | 0   | 0   | 27  | 0   | 34  | 6   |
| 95th Queue (ft)       | 4   | 8   | 61  | 3   | 60  | 26  |
| Link Distance (ft)    |     | 286 |     | 179 | 77  | 651 |
| Upstream Blk Time (%) |     |     |     |     | 0   |     |
| Queuing Penalty (veh) |     |     |     |     | 0   |     |
| Storage Bay Dist (ft) | 115 |     | 115 |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |

## Intersection: 4: Karevich Drive & Oaks Drive North

| Movement              | EB  | WB | NB  |
|-----------------------|-----|----|-----|
| Directions Served     | TR  | L  | LR  |
| Maximum Queue (ft)    | 75  | 31 | 30  |
| Average Queue (ft)    | 6   | 2  | 4   |
| 95th Queue (ft)       | 40  | 16 | 20  |
| Link Distance (ft)    | 229 | 95 | 179 |
| Upstream Blk Time (%) |     |    |     |
| Queuing Penalty (veh) |     |    |     |
| Storage Bay Dist (ft) |     |    |     |
| Storage Blk Time (%)  |     |    |     |
| Queuing Penalty (veh) |     |    |     |
|                       |     |    |     |

## Zone Summary

Zone wide Queuing Penalty: 65

## HCM 6th Signalized Intersection Summary 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

|                                                  | ۶           | -           | $\mathbf{r}$ | ∢           | +             | •           | 1           | 1            | 1           | 1           | ţ            | ~           |
|--------------------------------------------------|-------------|-------------|--------------|-------------|---------------|-------------|-------------|--------------|-------------|-------------|--------------|-------------|
| Movement                                         | EBL         | EBT         | EBR          | WBL         | WBT           | WBR         | NBL         | NBT          | NBR         | SBL         | SBT          | SBR         |
| Lane Configurations                              | <u>۲</u>    | <b>↑</b>    | 11           | ካካ          | ef 👘          |             | ካካ          | <u> </u>     | 1           | <u>۲</u>    | ***          | 1           |
| Traffic Volume (veh/h)                           | 79          | 41          | 426          | 339         | 63            | 39          | 349         | 874          | 175         | 21          | 803          | 56          |
| Future Volume (veh/h)                            | 79          | 41          | 426          | 339         | 63            | 39          | 349         | 874          | 175         | 21          | 803          | 56          |
| Initial Q (Qb), veh                              | 0           | 0           | 0            | 0           | 0             | 0           | 0           | 0            | 0           | 0           | 0            | 0           |
| Ped-Bike Adj(A_pbT)                              | 1.00        |             | 1.00         | 1.00        |               | 1.00        | 1.00        |              | 1.00        | 1.00        |              | 1.00        |
| Parking Bus, Adj                                 | 1.00        | 1.00        | 1.00         | 1.00        | 1.00          | 1.00        | 1.00        | 1.00         | 1.00        | 1.00        | 1.00         | 1.00        |
| Work Zone On Approach                            |             | No          |              |             | No            |             | 1001        | No           | 1001        |             | No           |             |
| Adj Sat Flow, veh/h/ln                           | 2000        | 2000        | 2000         | 2000        | 2000          | 2000        | 1984        | 1984         | 1984        | 2000        | 2000         | 2000        |
| Adj Flow Rate, veh/h                             | 91          | 47          | 387          | 404         | 75            | 38          | 384         | 960          | 121         | 22          | 845          | 43          |
| Peak Hour Factor                                 | 0.87        | 0.87        | 0.87         | 0.84        | 0.84          | 0.84        | 0.91        | 0.91         | 0.91        | 0.95        | 0.95         | 0.95        |
| Percent Heavy Veh, %                             | 0           | 0           | 0            | 0           | 0             | 0           | 1           | 1            | 1           | 0           | 0            | 0           |
| Cap, veh/h                                       | 180         | 189         | 671          | 514         | 174           | 88          | 477         | 2144         | 666         | 208         | 2047         | 635         |
| Arrive On Green                                  | 0.09        | 0.09        | 0.09         | 0.14        | 0.14          | 0.14        | 0.13        | 0.40         | 0.40        | 0.11        | 0.37         | 0.37        |
| Sat Flow, veh/h                                  | 1905        | 2000        | 2983         | 3695        | 1252          | 634         | 3666        | 5417         | 1682        | 1905        | 5460         | 1695        |
| Grp Volume(v), veh/h                             | 91          | 47          | 387          | 404         | 0             | 113         | 384         | 960          | 121         | 22          | 845          | 43          |
| Grp Sat Flow(s),veh/h/ln                         | 1905        | 2000        | 1492         | 1848        | 0             | 1886        | 1833        | 1806         | 1682        | 1905        | 1820         | 1695        |
| Q Serve(g_s), s                                  | 4.3         | 2.1         | 9.0          | 10.0        | 0.0           | 5.2         | 9.7         | 12.4         | 4.5         | 1.0         | 10.9         | 1.5         |
| Cycle Q Clear(g_c), s                            | 4.3         | 2.1         | 9.0          | 10.0        | 0.0           | 5.2         | 9.7         | 12.4         | 4.5         | 1.0         | 10.9         | 1.5         |
| Prop In Lane                                     | 1.00        | 400         | 1.00         | 1.00        | 0             | 0.34        | 1.00        | 0444         | 1.00        | 1.00        | 0047         | 1.00        |
| Lane Grp Cap(c), veh/h                           | 180         | 189         | 671          | 514         | 0             | 263         | 477         | 2144         | 666         | 208         | 2047         | 635         |
| V/C Ratio(X)                                     | 0.50<br>180 | 0.25<br>189 | 0.58<br>671  | 0.79<br>700 | 0.00<br>0     | 0.43<br>357 | 0.80<br>679 | 0.45<br>2144 | 0.18<br>666 | 0.11<br>208 | 0.41<br>2047 | 0.07<br>635 |
| Avail Cap(c_a), veh/h<br>HCM Platoon Ratio       | 1.00        | 1.00        | 1.00         | 1.00        | 1.00          | 1.00        | 1.00        | 1.00         | 1.00        | 1.00        | 1.00         | 1.00        |
| Upstream Filter(I)                               | 1.00        | 1.00        | 1.00         | 1.00        | 0.00          | 1.00        | 1.00        | 1.00         | 1.00        | 0.97        | 0.97         | 0.97        |
| Uniform Delay (d), s/veh                         | 40.9        | 39.9        | 32.8         | 39.5        | 0.00          | 37.4        | 40.1        | 21.1         | 18.7        | 38.1        | 22.0         | 19.0        |
| Incr Delay (d2), s/veh                           | 2.2         | 0.7         | 1.2          | 4.1         | 0.0           | 1.1         | 40.1        | 0.7          | 0.6         | 1.0         | 0.6          | 0.2         |
| Initial Q Delay(d3),s/veh                        | 0.0         | 0.7         | 0.0          | 4.1<br>0.0  | 0.0           | 0.0         | 0.0         | 0.0          | 0.0         | 0.0         | 0.0          | 0.2         |
| %ile BackOfQ(50%),veh/ln                         | 2.1         | 1.1         | 4.1          | 4.8         | 0.0           | 2.5         | 4.5         | 4.9          | 1.7         | 0.5         | 4.4          | 0.0         |
| Unsig. Movement Delay, s/veh                     |             | 1.1         | 7.1          | 4.0         | 0.0           | 2.5         | 4.5         | 4.5          | 1.7         | 0.0         | 7.7          | 0.0         |
| LnGrp Delay(d),s/veh                             | 43.1        | 40.5        | 34.0         | 43.7        | 0.0           | 38.6        | 44.8        | 21.8         | 19.3        | 39.1        | 22.6         | 19.2        |
| LnGrp LOS                                        | -0.1<br>D   | 0.0<br>D    | C            | D           | A             | D           | -+0<br>D    | 21.0<br>C    | В           | D           | C            | B           |
| Approach Vol, veh/h                              |             | 525         | <u> </u>     |             | 517           |             |             | 1465         |             |             | 910          |             |
| Approach Delay, s/veh                            |             | 36.2        |              |             | 42.5          |             |             | 27.6         |             |             | 22.8         |             |
| Approach LOS                                     |             | 00.2<br>D   |              |             | ч <u>г</u> .0 |             |             | C            |             |             | C            |             |
| ••                                               | 1           | 2           |              | Λ           | 5             | 6           |             | 8            |             |             | Ū            |             |
| Timer - Assigned Phs<br>Phs Duration (G+Y+Rc), s | 16.8        | 44.0        |              | 4<br>19.2   | 18.8          | 42.0        |             | 15.0         |             |             |              |             |
| Change Period (Y+Rc), s                          | 6.4         | 6.4         |              | 6.0         | 6.4           | 42.0<br>6.4 |             | 6.0          |             |             |              |             |
| Max Green Setting (Gmax), s                      | 5.6         | 37.6        |              | 18.0        | 17.6          | 25.6        |             | 9.0          |             |             |              |             |
| Max Q Clear Time (g_c+l1), s                     | 3.0         | 14.4        |              | 12.0        | 11.7          | 12.9        |             | 9.0<br>11.0  |             |             |              |             |
| Green Ext Time (p_c), s                          | 0.0         | 6.9         |              | 1.2         | 0.7           | 4.4         |             | 0.0          |             |             |              |             |
| Intersection Summary                             |             |             |              |             |               |             |             |              |             |             |              |             |
| HCM 6th Ctrl Delay                               |             |             | 29.9         |             |               |             |             |              |             |             |              |             |
| HCM 6th LOS                                      |             |             | C            |             |               |             |             |              |             |             |              |             |
|                                                  |             |             | -            |             |               |             |             |              |             |             |              |             |

Notes

User approved pedestrian interval to be less than phase max green.

## メッシュ チャメイ トッシナイ

| Movement         EBL         EBR         WBL         WBT         WBR         NBL         NBT         NBR         SBL         SBT         SBR           Lane Configurations         1         2         93         48         33         49         79         869         44         49         739         29           Future Volume (veh/h)         48         12         93         48         33         49         79         869         44         49         739         29           Initial Q (Qb), veh         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Traffic Volume (veh/h)       48       12       93       48       33       49       79       869       44       49       739       29         Future Volume (veh/h)       48       12       93       48       33       49       79       869       44       49       739       29         Initial Q (Qb), veh       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 </th <th></th>                                                                                                                                               |  |
| Future Volume (veh/h)       48       12       93       48       33       49       79       869       44       49       739       29         Initial Q (Qb), veh       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0                                                                                                                                                                           |  |
| Ped-Bike Adj(A_pbT)       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.01 <th1< td=""><td></td></th1<> |  |
| Parking Bus, Adj       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.0                       |  |
| Work Zone On Approach         No         No </td <td></td>  |  |
| Adj Sat Flow, veh/h/ln       1984       1984       1984       2000       2000       1984       1984       1984       1984       1984         Adj Flow Rate, veh/h       53       13       44       63       43       44       90       988       50       53       795       30         Peak Hour Factor       0.91       0.91       0.76       0.76       0.76       0.88       0.88       0.88       0.93       0.93       0.93         Percent Heavy Veh, %       1       1       1       0       0       0       1       1       1       1       1         Cap, veh/h       98       21       70       97       68       71       495       2249       1003       459       3161       119         Arrive On Green       0.05       0.05       0.06       0.06       0.08       1.00       1.00       0.03       0.59       0.59         Sat Flow, veh/h       1890       397       1345       1528       1075       1119       1890       3770       1682       1890       5358       202         Grp Volume(v), veh/h       53       0       57       79       0       71       90       988<                                                                               |  |
| Adj Flow Rate, veh/h       53       13       44       63       43       44       90       988       50       53       795       30         Peak Hour Factor       0.91       0.91       0.91       0.76       0.76       0.76       0.88       0.88       0.88       0.93       0.93       0.93         Percent Heavy Veh, %       1       1       1       0       0       0       1       1       1       1       1         Cap, veh/h       98       21       70       97       68       71       495       2249       1003       459       3161       119         Arrive On Green       0.05       0.05       0.06       0.06       0.08       1.00       1.00       0.03       0.59       0.59         Sat Flow, veh/h       1890       397       1345       1528       1075       1119       1890       3770       1682       1890       5358       202         Grp Volume(v), veh/h       53       0       57       79       0       71       90       988       50       53       535       290         Grp Sat Flow(s), veh/h/In1890       0       1742       1924       0       1799                                                                                     |  |
| Peak Hour Factor       0.91       0.91       0.91       0.76       0.76       0.76       0.88       0.88       0.88       0.93       0.93       0.93         Percent Heavy Veh, %       1       1       1       0       0       0       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <td></td>                                                                                                                                                       |  |
| Percent Heavy Veh, %       1       1       1       0       0       0       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1                                                                                                                                                                                      |  |
| Cap, veh/h       98       21       70       97       68       71       495       2249       1003       459       3161       119         Arrive On Green       0.05       0.05       0.05       0.06       0.06       0.08       1.00       1.00       0.03       0.59       0.59         Sat Flow, veh/h       1890       397       1345       1528       1075       1119       1890       3770       1682       1890       5358       202         Grp Volume(v), veh/h       53       0       57       79       0       71       90       988       50       53       535       290         Grp Sat Flow(s),veh/h/In1890       0       1742       1924       0       1799       1880       1885       1682       1890       1806       1948                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Arrive On Green0.050.050.050.060.060.060.081.001.000.030.590.59Sat Flow, veh/h1890397134515281075111918903770168218905358202Grp Volume(v), veh/h5305779071909885053535290Grp Sat Flow(s), veh/h/ln189001742192401799189018851682189018061948                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Sat Flow, veh/h         1890         397         1345         1528         1075         1119         1890         3770         1682         1890         5358         202           Grp Volume(v), veh/h         53         0         57         79         0         71         90         988         50         53         535         290           Grp Sat Flow(s),veh/h/In1890         0         1742         1924         0         1799         1890         1885         1682         1890         1806         1948                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Grp Volume(v), veh/h         53         0         57         79         0         71         90         988         50         53         535         290           Grp Sat Flow(s),veh/h/ln1890         0         1742         1924         0         1799         1885         1682         1800         1806         1948                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Grp Sat Flow(s),veh/h/ln1890 0 1742 1924 0 1799 1890 1885 1682 1890 1806 1948                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Q Serve(g_s), s 2.6 0.0 3.0 3.8 0.0 3.6 1.8 0.0 0.0 1.0 6.8 6.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Cycle Q Clear(g_c), s 2.6 0.0 3.0 3.8 0.0 3.6 1.8 0.0 0.0 1.0 6.8 6.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Prop In Lane 1.00 0.77 0.79 0.62 1.00 1.00 1.00 0.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Lane Grp Cap(c), veh/h 98 0 90 122 0 114 495 2249 1003 459 2131 1149                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| V/C Ratio(X) 0.54 0.00 0.63 0.65 0.00 0.62 0.18 0.44 0.05 0.12 0.25 0.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Avail Cap(c_a), veh/h 199 0 183 223 0 208 697 2249 1003 673 2131 1149                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 2.00 2.00 2.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Upstream Filter(I) 1.00 0.00 1.00 1.00 0.00 1.00 0.92 0.92 0.92 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Uniform Delay (d), s/veh 43.9 0.0 44.2 43.5 0.0 43.4 6.9 0.0 0.0 7.0 9.4 9.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Incr Delay (d2), s/veh 4.6 0.0 7.1 5.7 0.0 5.4 0.2 0.6 0.1 0.1 0.3 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Initial Q Delay(d3),s/veh 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| %ile BackOfQ(50%),veh/ln1.3 0.0 1.5 2.0 0.0 1.8 0.6 0.2 0.0 0.4 2.4 2.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Unsig. Movement Delay, s/veh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| LnGrp Delay(d),s/veh 48.6 0.0 51.3 49.2 0.0 48.8 7.1 0.6 0.1 7.1 9.7 9.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| LnGrp LOS D A D D A D A A A A A A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Approach Vol, veh/h 110 150 1128 878                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Approach Delay, s/veh         50.0         49.0         1.1         9.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Approach LOS D D A A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Timer - Assigned Phs 1 2 4 5 6 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Phs Duration (G+Y+Rc), s9.2 62.9 12.0 9.8 62.2 10.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Change Period (Y+Rc), s* 6.2 * 6.2 6.0 * 6.2 * 6.2 6.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Max Green Setting (Gmax)14 * 36 11.0 * 14 * 36 10.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Max Q Clear Time (g_c+113), 0s 2.0 5.8 3.8 8.8 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Green Ext Time (p_c), s 0.1 7.7 0.3 0.1 5.2 0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Intersection Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| HCM 6th Ctrl Delay 9.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| HCM 6th LOS A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |

#### Notes

User approved pedestrian interval to be less than phase max green.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

2.4

#### Intersection

Int Delay, s/veh

| Movement               | EBL      | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |  |
|------------------------|----------|------|------|------|------|------|------|------|------|------|------|------|--|
| Lane Configurations    | <u> </u> | 4    |      | ۲.   | đ₽   |      |      | 4    |      |      | 4    |      |  |
| Traffic Vol, veh/h     | 1        | 410  | 24   | 111  | 335  | 4    | 5    | 1    | 94   | 2    | 0    | 2    |  |
| Future Vol, veh/h      | 1        | 410  | 24   | 111  | 335  | 4    | 5    | 1    | 94   | 2    | 0    | 2    |  |
| Conflicting Peds, #/hr | 0        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |  |
| Sign Control           | Free     | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |  |
| RT Channelized         | -        | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |  |
| Storage Length         | 115      | -    | -    | 115  | -    | -    | -    | -    | -    | -    | -    | -    |  |
| Veh in Median Storage, | # -      | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |  |
| Grade, %               | -        | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |  |
| Peak Hour Factor       | 85       | 85   | 85   | 95   | 95   | 95   | 93   | 93   | 93   | 60   | 60   | 60   |  |
| Heavy Vehicles, %      | 1        | 1    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |  |
| Mvmt Flow              | 1        | 482  | 28   | 117  | 353  | 4    | 5    | 1    | 101  | 3    | 0    | 3    |  |

| Major/Minor          | Major1 |   | Ν | /lajor2 |   | Ν | 1inor1 |      | 1   | Minor2 |      |     |  |
|----------------------|--------|---|---|---------|---|---|--------|------|-----|--------|------|-----|--|
| Conflicting Flow All | 357    | 0 | 0 | 510     | 0 | 0 | 909    | 1089 | 496 | 1138   | 1101 | 179 |  |
| Stage 1              | -      | - | - | -       | - | - | 498    | 498  | -   | 589    | 589  | -   |  |
| Stage 2              | -      | - | - | -       | - | - | 411    | 591  | -   | 549    | 512  | -   |  |
| Critical Hdwy        | 4.115  | - | - | 4.1     | - | - | 7.3    | 6.5  | 6.2 | 7.3    | 6.5  | 6.9 |  |
| Critical Hdwy Stg 1  | -      | - | - | -       | - | - | 6.1    | 5.5  | -   | 6.5    | 5.5  | -   |  |
| Critical Hdwy Stg 2  | -      | - | - | -       | - | - | 6.5    | 5.5  | -   | 6.1    | 5.5  | -   |  |
| Follow-up Hdwy       | 2.2095 | - | - | 2.2     | - | - | 3.5    | 4    | 3.3 | 3.5    | 4    | 3.3 |  |
| Pot Cap-1 Maneuver   | 1206   | - | - | 1065    | - | - | 245    | 217  | 578 | 169    | 214  | 839 |  |
| Stage 1              | -      | - | - | -       | - | - | 558    | 548  | -   | 466    | 499  | -   |  |
| Stage 2              | -      | - | - | -       | - | - | 594    | 498  | -   | 524    | 540  | -   |  |
| Platoon blocked, %   |        | - | - |         | - | - |        |      |     |        |      |     |  |
| Mov Cap-1 Maneuver   | 1206   | - | - | 1065    | - | - | 223    | 193  | 578 | 127    | 190  | 839 |  |
| Mov Cap-2 Maneuver   | · -    | - | - | -       | - | - | 223    | 193  | -   | 127    | 190  | -   |  |
| Stage 1              | -      | - | - | -       | - | - | 557    | 547  | -   | 466    | 444  | -   |  |
| Stage 2              | -      | - | - | -       | - | - | 527    | 443  | -   | 431    | 539  | -   |  |
|                      |        |   |   |         |   |   |        |      |     |        |      |     |  |
| Approach             | EB     |   |   | WB      |   |   | NB     |      |     | SB     |      |     |  |
| HCM Control Delay, s | s 0    |   |   | 2.2     |   |   | 13.6   |      |     | 21.8   |      |     |  |
| HCM LOS              |        |   |   |         |   |   | В      |      |     | С      |      |     |  |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL  | WBT | WBR S | SBLn1 |
|-----------------------|-------|-------|-----|-----|------|-----|-------|-------|
| Capacity (veh/h)      | 526   | 1206  | -   | -   | 1065 | -   | -     | 221   |
| HCM Lane V/C Ratio    | 0.204 | 0.001 | -   | -   | 0.11 | -   | -     | 0.03  |
| HCM Control Delay (s) | 13.6  | 8     | -   | -   | 8.8  | -   | -     | 21.8  |
| HCM Lane LOS          | В     | А     | -   | -   | А    | -   | -     | С     |
| HCM 95th %tile Q(veh) | 0.8   | 0     | -   | -   | 0.4  | -   | -     | 0.1   |

#### Intersection

| Int Delay, s/veh       | 0.3  |      |      |      |      |      |
|------------------------|------|------|------|------|------|------|
| Movement               | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations    | et 👘 |      | ٦    | 1    | Y    |      |
| Traffic Vol, veh/h     | 150  | 3    | 4    | 137  | 2    | 3    |
| Future Vol, veh/h      | 150  | 3    | 4    | 137  | 2    | 3    |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control           | Free | Free | Free | Free | Stop | Stop |
| RT Channelized         | -    | None | -    | None | -    | None |
| Storage Length         | -    | -    | 0    | -    | 0    | -    |
| Veh in Median Storage, | # 0  | -    | -    | 0    | 0    | -    |
| Grade, %               | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor       | 86   | 86   | 81   | 81   | 60   | 60   |
| Heavy Vehicles, %      | 1    | 1    | 2    | 2    | 0    | 0    |
| Mvmt Flow              | 174  | 3    | 5    | 169  | 3    | 5    |

| Major/Minor N         | 1ajor1 | M    | ajor2 | Ν   | Minor1   |     |
|-----------------------|--------|------|-------|-----|----------|-----|
|                       | -      |      |       |     |          | 170 |
| Conflicting Flow All  | 0      | 0    | 177   | 0   | 355      | 176 |
| Stage 1               | -      | -    | -     | -   | 176      | -   |
| Stage 2               | -      | -    | -     | -   | 179      | -   |
| Critical Hdwy         | -      | -    | 4.12  | -   | 6.4      | 6.2 |
| Critical Hdwy Stg 1   | -      | -    | -     | -   | 5.4      | -   |
| Critical Hdwy Stg 2   | -      | -    | -     | -   | 5.4      | -   |
| Follow-up Hdwy        | -      | - 2  | 2.218 | -   | 3.5      | 3.3 |
| Pot Cap-1 Maneuver    | -      |      | 1399  | -   | 647      | 872 |
| Stage 1               | -      | -    | -     | -   | 859      | -   |
| Stage 2               | -      | -    | -     | -   | 857      | -   |
| Platoon blocked, %    | -      | -    |       | -   | 001      |     |
| Mov Cap-1 Maneuver    | -      |      | 1399  | -   | 644      | 872 |
| Mov Cap-2 Maneuver    | -      |      | 1000  | -   | 644      | -   |
| Stage 1               | -      | -    | _     | -   | 859      | -   |
|                       | -      | -    | -     |     |          |     |
| Stage 2               | -      | -    | -     | -   | 854      | -   |
|                       |        |      |       |     |          |     |
| Approach              | EB     |      | WB    |     | NB       |     |
| HCM Control Delay, s  | 0      |      | 0.2   |     | 9.8      |     |
| HCM LOS               | U      |      | 0.2   |     | 0.0<br>A |     |
|                       |        |      |       |     | ~        |     |
|                       |        |      |       |     |          |     |
| Minor Lane/Major Mvmt | N      | BLn1 | EBT   | EBR | WBL      | WBT |
| Capacity (veh/h)      |        | 764  | _     | _   | 1399     | _   |
| HCM Lane V/C Ratio    | 0      | 011  |       | _   | 0.004    | _   |

| HCM Lane V/C Ratio    | 0.011 | - | - 0.004 | - |  |
|-----------------------|-------|---|---------|---|--|
| HCM Control Delay (s) | 9.8   | - | - 7.6   | - |  |
| HCM Lane LOS          | А     | - | - A     | - |  |
| HCM 95th %tile Q(veh) | 0     | - | - 0     | - |  |

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Movement              | EB | EB | EB | EB | WB  | WB  | WB  | NB  | NB  | NB  | NB  | NB  |
|-----------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | Т  | R  | R  | L   | L   | TR  | L   | L   | Т   | Т   | Т   |
| Maximum Queue (ft)    | 52 | 49 | 66 | 48 | 231 | 177 | 122 | 283 | 324 | 242 | 234 | 131 |
| Average Queue (ft)    | 43 | 28 | 49 | 23 | 146 | 77  | 43  | 148 | 186 | 147 | 134 | 31  |
| 95th Queue (ft)       | 63 | 58 | 62 | 46 | 216 | 167 | 93  | 260 | 298 | 226 | 212 | 98  |
| Link Distance (ft)    | 49 | 49 | 49 | 49 | 230 | 230 | 230 |     |     | 427 | 427 | 427 |
| Upstream Blk Time (%) | 33 | 11 | 25 | 1  | 0   |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 45 | 15 | 34 | 1  | 0   |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |    |    |    |    |     |     |     | 400 | 400 |     |     |     |
| Storage Blk Time (%)  |    |    |    |    |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |    |    |    |    |     |     |     |     |     |     |     |     |

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| N 4                   | ND  | 00  | 00  | 00  | 00  | 00  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Movement              | NB  | SB  | SB  | SB  | SB  | SB  |
| Directions Served     | R   | L   | Т   | Т   | Т   | R   |
| Maximum Queue (ft)    | 72  | 138 | 231 | 214 | 187 | 101 |
| Average Queue (ft)    | 29  | 19  | 138 | 122 | 90  | 27  |
| 95th Queue (ft)       | 57  | 70  | 205 | 185 | 155 | 72  |
| Link Distance (ft)    |     |     | 694 | 694 | 694 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 350 | 115 |     |     |     | 80  |
| Storage Blk Time (%)  |     |     | 22  |     | 8   | 0   |
| Queuing Penalty (veh) |     |     | 5   |     | 5   | 0   |

## Intersection: 2: Novi Road & Oaks Drive North

| Movement              | EB | EB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | TR  | LT  | TR  | L   | Т   | Т   | R   | L   | Т   | Т   | TR  |
| Maximum Queue (ft)    | 83 | 100 | 109 | 108 | 69  | 246 | 268 | 39  | 84  | 176 | 138 | 69  |
| Average Queue (ft)    | 36 | 46  | 38  | 44  | 31  | 65  | 80  | 10  | 23  | 90  | 48  | 24  |
| 95th Queue (ft)       | 71 | 88  | 80  | 87  | 60  | 180 | 201 | 32  | 62  | 161 | 113 | 59  |
| Link Distance (ft)    |    | 95  | 166 | 166 |     | 694 | 694 | 694 |     | 408 | 408 | 408 |
| Upstream Blk Time (%) | 0  | 2   |     |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 0  | 3   |     |     |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 80 |     |     |     | 275 |     |     |     | 100 |     |     |     |
| Storage Blk Time (%)  | 1  | 3   |     |     |     | 0   |     |     |     | 5   |     |     |
| Queuing Penalty (veh) | 1  | 1   |     |     |     | 0   |     |     |     | 2   |     |     |

## Intersection: 3: Karevich Drive & Oaks Drive South

| Movement              | EB  | WB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | TR  | L   | LTR | LTR |
| Maximum Queue (ft)    | 12  | 81  | 74  | 29  |
| Average Queue (ft)    | 1   | 33  | 32  | 4   |
| 95th Queue (ft)       | 8   | 68  | 56  | 22  |
| Link Distance (ft)    | 286 |     | 77  | 651 |
| Upstream Blk Time (%) |     |     | 0   |     |
| Queuing Penalty (veh) |     |     | 0   |     |
| Storage Bay Dist (ft) |     | 115 |     |     |
| Storage Blk Time (%)  |     | 0   |     |     |
| Queuing Penalty (veh) |     | 0   |     |     |

## Intersection: 4: Karevich Drive & Oaks Drive North

| TR  |         |             |
|-----|---------|-------------|
| IR  | L       | LR          |
| 47  | 6       | 30          |
| 3   | 1       | 4           |
| 25  | 8       | 20          |
| 229 | 95      | 179         |
|     |         |             |
|     |         |             |
|     |         |             |
|     |         |             |
|     |         |             |
|     | 3<br>25 | 3 1<br>25 8 |

## Zone Summary

Zone wide Queuing Penalty: 113

# **Appendix 3**

**Trip Generation Calculations** 

|          |                                                |            |                 |             |           |         |         |        |       |         | Fishbe | ck   1 of |
|----------|------------------------------------------------|------------|-----------------|-------------|-----------|---------|---------|--------|-------|---------|--------|-----------|
|          |                                                | 1          | Frip Generation | n - Weekda  | y Summary |         |         |        |       |         |        |           |
|          |                                                |            | ]               |             | MD        |         |         | PM     |       |         | WD     |           |
| ITE Code | ITE Rate Description                           | Unit       | Amount          | Ingress     | Egress    | Total   | Ingress | Egress | Total | Ingress | Egress | Total     |
| ITE 934  | Fast Food Restaurant with Drive Through Window | SFT        | 4106            | 115         | 115       | 230     | 71      | 65     | 136   | 959     | 960    | 1919      |
|          |                                                |            | Pass-by         | 63          | 63        | 126     | 39      | 36     | 75    |         |        |           |
|          |                                                |            | Total Trips     | 52          | 52        | 104     | 32      | 29     | 61    | 959     | 960    | 1919      |
|          |                                                |            |                 |             |           |         |         |        |       |         |        |           |
|          |                                                | I          | TE Trip Genera  | ation Rates | - Weekday |         |         |        |       |         |        |           |
| ITE Code | ITE Rate Description                           | Unit       | Amount          | R2          | Rate      | Pass-by |         |        |       |         |        |           |
| ITE 934  | Fast Food Restaurant with Drive Through Window | SFT        | 4,106           |             |           |         |         |        |       |         |        |           |
| MD       | N/A                                            |            | 230             | N/A         | 12% WD    | 55%     |         |        |       |         |        |           |
| PM       | N/A                                            |            | 136             | N/A         | 33.03     | 55%     |         |        |       |         |        |           |
| WD       | N/A                                            |            | 1919            | N/A         | 467.48    |         |         |        |       |         |        |           |
|          |                                                |            |                 |             | AM        |         |         | PM     |       |         | WD     |           |
|          |                                                |            |                 | Ingress     | Egress    | Total   | Ingress | Egress | Total | Ingress | Egress | Total     |
|          |                                                | Directiona | al Distribution | 50%         | 50%       | 100%    | 52%     | 48%    | 100%  | 50%     | 50%    | 100%      |
|          |                                                | Volume     | e Distribution  | 115         | 115       | 230     | 71      | 65     | 136   | 959     | 960    | 1919      |



Turn Lane Warrants

Add Right Turn Lane/Deceleration Lane p.m. peak hour 59 vph Add Taper Radius Only 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 m.d. peak hour PEAK HOUR RIGHT TURNS 99 vph

### WARRANT FOR RIGHT TURN DECELERATION LANE OR TAPER

FIGURE 6-3

# **Appendix 5**

Future LOS Output Reports

## HCM 6th Signalized Intersection Summary 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

|                              | ≯        | +        | *    | 4    | +    | •    | •    | 1          | 1    | *    | Ŧ       | ~        |
|------------------------------|----------|----------|------|------|------|------|------|------------|------|------|---------|----------|
| Movement                     | EBL      | EBT      | EBR  | WBL  | WBT  | WBR  | NBL  | NBT        | NBR  | SBL  | SBT     | SBR      |
| Lane Configurations          | <u> </u> | <b>↑</b> | 11   | ካካ   | ef 👘 |      | ካካ   | <b>†††</b> | 1    | - ኘ  | <u></u> | 1        |
| Traffic Volume (veh/h)       | 95       | 52       | 352  | 330  | 67   | 40   | 391  | 723        | 260  | 17   | 650     | 64       |
| Future Volume (veh/h)        | 95       | 52       | 352  | 330  | 67   | 40   | 391  | 723        | 260  | 17   | 650     | 64       |
| Initial Q (Qb), veh          | 0        | 0        | 0    | 0    | 0    | 0    | 0    | 0          | 0    | 0    | 0       | 0        |
| Ped-Bike Adj(A_pbT)          | 1.00     |          | 1.00 | 1.00 |      | 1.00 | 1.00 |            | 1.00 | 1.00 |         | 1.00     |
| Parking Bus, Adj             | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00       | 1.00 | 1.00 | 1.00    | 1.00     |
| Work Zone On Approach        |          | No       |      |      | No   |      |      | No         |      |      | No      |          |
| Adj Sat Flow, veh/h/ln       | 1984     | 1984     | 1984 | 1984 | 1984 | 1984 | 1969 | 1969       | 1969 | 1984 | 1984    | 1984     |
| Adj Flow Rate, veh/h         | 103      | 57       | 370  | 363  | 74   | 41   | 420  | 777        | 155  | 18   | 684     | 50       |
| Peak Hour Factor             | 0.92     | 0.92     | 0.92 | 0.91 | 0.91 | 0.91 | 0.93 | 0.93       | 0.93 | 0.95 | 0.95    | 0.95     |
| Percent Heavy Veh, %         | 1        | 1        | 1    | 1    | 1    | 1    | 2    | 2          | 2    | 1    | 1       | 1        |
| Cap, veh/h                   | 213      | 223      | 762  | 475  | 155  | 86   | 527  | 1921       | 596  | 171  | 1642    | 510      |
| Arrive On Green              | 0.11     | 0.11     | 0.11 | 0.13 | 0.13 | 0.13 | 0.14 | 0.36       | 0.36 | 0.03 | 0.10    | 0.10     |
| Sat Flow, veh/h              | 1890     | 1984     | 2960 | 3666 | 1200 | 665  | 3638 | 5375       | 1668 | 1890 | 5417    | 1682     |
| Grp Volume(v), veh/h         | 103      | 57       | 370  | 363  | 0    | 115  | 420  | 777        | 155  | 18   | 684     | 50       |
| Grp Sat Flow(s),veh/h/ln     | 1890     | 1984     | 1480 | 1833 | 0    | 1865 | 1819 | 1792       | 1668 | 1890 | 1806    | 1682     |
| Q Serve(g_s), s              | 4.1      | 2.1      | 8.5  | 7.7  | 0.0  | 4.6  | 8.9  | 8.7        | 5.3  | 0.7  | 9.5     | 2.2      |
| Cycle Q Clear(g_c), s        | 4.1      | 2.1      | 8.5  | 7.7  | 0.0  | 4.6  | 8.9  | 8.7        | 5.3  | 0.7  | 9.5     | 2.2      |
| Prop In Lane                 | 1.00     |          | 1.00 | 1.00 |      | 0.36 | 1.00 |            | 1.00 | 1.00 |         | 1.00     |
| Lane Grp Cap(c), veh/h       | 213      | 223      | 762  | 475  | 0    | 241  | 527  | 1921       | 596  | 171  | 1642    | 510      |
| V/C Ratio(X)                 | 0.48     | 0.26     | 0.49 | 0.76 | 0.00 | 0.48 | 0.80 | 0.40       | 0.26 | 0.11 | 0.42    | 0.10     |
| Avail Cap(c_a), veh/h        | 213      | 223      | 762  | 596  | 0    | 303  | 709  | 1921       | 596  | 171  | 1642    | 510      |
| HCM Platoon Ratio            | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00       | 1.00 | 0.33 | 0.33    | 0.33     |
| Upstream Filter(I)           | 1.00     | 1.00     | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00       | 1.00 | 0.97 | 0.97    | 0.97     |
| Uniform Delay (d), s/veh     | 33.3     | 32.4     | 25.2 | 33.6 | 0.0  | 32.3 | 33.1 | 19.3       | 18.2 | 35.7 | 29.4    | 26.1     |
| Incr Delay (d2), s/veh       | 1.7      | 0.6      | 0.5  | 4.6  | 0.0  | 1.5  | 4.6  | 0.6        | 1.1  | 1.2  | 0.8     | 0.4      |
| Initial Q Delay(d3),s/veh    | 0.0      | 0.0      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0        | 0.0  | 0.0  | 0.0     | 0.0      |
| %ile BackOfQ(50%),veh/In     | 2.0      | 1.0      | 3.0  | 3.7  | 0.0  | 2.1  | 4.0  | 3.4        | 2.0  | 0.4  | 4.3     | 0.9      |
| Unsig. Movement Delay, s/veh |          | 00.0     | 05.7 | 00.0 | 0.0  | 00.0 | 07.7 | 10.0       | 10.0 | 00.0 | 00.4    | 00.4     |
| LnGrp Delay(d),s/veh         | 35.0     | 33.0     | 25.7 | 38.2 | 0.0  | 33.8 | 37.7 | 19.9       | 19.3 | 36.8 | 30.1    | 26.4     |
| LnGrp LOS                    | D        | C        | С    | D    | A    | С    | D    | B          | В    | D    | C       | <u> </u> |
| Approach Vol, veh/h          |          | 530      |      |      | 478  |      |      | 1352       |      |      | 752     |          |
| Approach Delay, s/veh        |          | 28.3     |      |      | 37.1 |      |      | 25.4       |      |      | 30.0    |          |
| Approach LOS                 |          | С        |      |      | D    |      |      | С          |      |      | С       |          |
| Timer - Assigned Phs         | 1        | 2        |      | 4    | 5    | 6    |      | 8          |      |      |         |          |
| Phs Duration (G+Y+Rc), s     | 13.6     | 35.0     |      | 16.4 | 18.0 | 30.6 |      | 15.0       |      |      |         |          |
| Change Period (Y+Rc), s      | 6.4      | 6.4      |      | 6.0  | 6.4  | 6.4  |      | 6.0        |      |      |         |          |
| Max Green Setting (Gmax), s  | 4.6      | 28.6     |      | 13.0 | 15.6 | 17.6 |      | 9.0        |      |      |         |          |
| Max Q Clear Time (g_c+I1), s | 2.7      | 10.7     |      | 9.7  | 10.9 | 11.5 |      | 10.5       |      |      |         |          |
| Green Ext Time (p_c), s      | 0.0      | 5.1      |      | 0.7  | 0.7  | 2.3  |      | 0.0        |      |      |         |          |
| Intersection Summary         |          |          |      |      |      |      |      |            |      |      |         |          |
| HCM 6th Ctrl Delay           |          |          | 28.8 |      |      |      |      |            |      |      |         |          |
| HCM 6th LOS                  |          |          | С    |      |      |      |      |            |      |      |         |          |
| Nataa                        |          |          |      |      |      |      |      |            |      |      |         |          |

Notes

User approved pedestrian interval to be less than phase max green.

## メッシュ チャメイ トレントイ

| Movement EBL                                  | . EBT |      |            | WBT        | WBR      | NBL            | NDT        |                | SBL      | ODT               | SBR  |  |
|-----------------------------------------------|-------|------|------------|------------|----------|----------------|------------|----------------|----------|-------------------|------|--|
|                                               |       | EBR  | WBL        |            | WDR      |                | NBT        | NBR            |          | SBT               | SDK  |  |
| Lane Configurations Traffic Volume (veh/h) 70 |       | 105  | 27         | 4 <b>î</b> | 45       | <b>*</b><br>87 | <b>*</b>   | <b>7</b><br>26 | <b>أ</b> | <b>↑↑ኁ</b><br>599 | 37   |  |
| Future Volume (veh/h) 70                      |       | 105  | 27         | 20<br>20   | 45<br>45 | 87             | 745<br>745 | 20<br>26       | 85<br>85 | 599<br>599        | 37   |  |
| Initial Q (Qb), veh                           |       | 0    | 0          | 20         | 45       | 07             | 0          | 20             | 0        | 099               | 0    |  |
| Ped-Bike Adj(A_pbT) 1.00                      |       | 1.00 | 1.00       | 0          | 1.00     | 1.00           | 0          | 1.00           | 1.00     | 0                 | 1.00 |  |
| Parking Bus, Adj 1.00                         |       | 1.00 | 1.00       | 1.00       | 1.00     | 1.00           | 1.00       | 1.00           | 1.00     | 1.00              | 1.00 |  |
| Work Zone On Approach                         | No    | 1.00 | 1.00       | No         | 1.00     | 1.00           | No         | 1.00           | 1.00     | No                | 1.00 |  |
| Adj Sat Flow, veh/h/ln 1984                   |       | 1984 | 1969       | 1969       | 1969     | 1953           | 1953       | 1953           | 1984     | 1984              | 1984 |  |
| Adj Flow Rate, veh/h 76                       |       | 51   | 34         | 25         | 25       | 96             | 819        | 28             | 92       | 651               | 40   |  |
| Peak Hour Factor 0.92                         |       | 0.92 | 0.80       | 0.80       | 0.80     | 0.91           | 0.91       | 0.91           | 0.92     | 0.92              | 0.92 |  |
| Percent Heavy Veh, % 1                        |       | 1    | 2          | 2          | 2        | 3              | 3          | 3              | 1        | 1                 | 1    |  |
| Cap, veh/h 120                                |       | 83   | 77         | 58         | 59       | 521            | 1985       | 885            | 437      | 2789              | 170  |  |
| Arrive On Green 0.06                          |       | 0.06 | 0.05       | 0.05       | 0.05     | 0.04           | 0.53       | 0.53           | 0.04     | 0.53              | 0.53 |  |
| Sat Flow, veh/h 1890                          |       | 1295 | 1457       | 1095       | 1112     | 1860           | 3711       | 1655           | 1890     | 5220              | 319  |  |
| Grp Volume(v), veh/h 76                       |       | 69   | 44         | 0          | 40       | 96             | 819        | 28             | 92       | 449               | 242  |  |
| Grp Sat Flow(s), veh/h/ln1890                 |       | 1751 | 1896       | 0          | 1769     | 1860           | 1856       | 1655           | 1890     | 1806              | 1927 |  |
| Q Serve( $g_s$ ), s 3.1                       |       | 3.1  | 1.8        | 0.0        | 1.7      | 1.8            | 10.5       | 0.6            | 1.7      | 5.3               | 5.3  |  |
| Cycle Q Clear( $g_c$ ), s 3.1                 |       | 3.1  | 1.8        | 0.0        | 1.7      | 1.8            | 10.5       | 0.6            | 1.7      | 5.3               | 5.3  |  |
| Prop In Lane $1.00$                           |       | 0.74 | 0.77       | 0.0        | 0.63     | 1.00           | 10.0       | 1.00           | 1.00     | 0.0               | 0.17 |  |
| Lane Grp Cap(c), veh/h 120                    |       | 112  | 100        | 0          | 93       | 521            | 1985       | 885            | 437      | 1930              | 1030 |  |
| V/C Ratio(X) 0.63                             |       | 0.62 | 0.44       | 0.00       | 0.43     | 0.18           | 0.41       | 0.03           | 0.21     | 0.23              | 0.23 |  |
| Avail Cap(c_a), veh/h 213                     |       | 197  | 308        | 0.00       | 287      | 690            | 1985       | 885            | 609      | 1930              | 1030 |  |
| HCM Platoon Ratio 1.00                        |       | 1.00 | 1.00       | 1.00       | 1.00     | 1.00           | 1.00       | 1.00           | 1.00     | 1.00              | 1.00 |  |
| Upstream Filter(I) 1.00                       |       | 1.00 | 1.00       | 0.00       | 1.00     | 0.93           | 0.93       | 0.93           | 1.00     | 1.00              | 1.00 |  |
| Uniform Delay (d), s/veh 36.5                 |       | 36.5 | 36.7       | 0.0        | 36.7     | 7.7            | 11.1       | 8.8            | 8.3      | 9.9               | 9.9  |  |
| Incr Delay (d2), s/veh 5.3                    |       | 5.5  | 3.0        | 0.0        | 3.0      | 0.2            | 0.6        | 0.1            | 0.2      | 0.3               | 0.5  |  |
| Initial Q Delay(d3),s/veh 0.0                 |       | 0.0  | 0.0        | 0.0        | 0.0      | 0.0            | 0.0        | 0.0            | 0.0      | 0.0               | 0.0  |  |
| %ile BackOfQ(50%),veh/In1.6                   |       | 1.5  | 0.9        | 0.0        | 0.8      | 0.6            | 3.7        | 0.2            | 0.6      | 1.8               | 2.0  |  |
| Unsig. Movement Delay, s/ve                   |       |      |            |            |          |                |            |                |          |                   |      |  |
| LnGrp Delay(d),s/veh 41.9                     |       | 42.0 | 39.8       | 0.0        | 39.8     | 7.9            | 11.7       | 8.9            | 8.5      | 10.2              | 10.5 |  |
| LnGrp LOS D                                   |       | D    | D          | А          | D        | А              | В          | А              | А        | В                 | В    |  |
| Approach Vol, veh/h                           | 145   |      |            | 84         |          |                | 943        |                |          | 783               |      |  |
| Approach Delay, s/veh                         | 41.9  |      |            | 39.8       |          |                | 11.2       |                |          | 10.1              |      |  |
| Approach LOS                                  | D     |      |            | D          |          |                | В          |                |          | В                 |      |  |
| ••                                            | 2     |      | 4          | E          | 6        |                | 8          |                |          |                   |      |  |
| Timer Accigned The                            |       | _    |            | 5          |          |                |            |                |          |                   |      |  |
| Phs Duration (G+Y+Rc), s9.7                   |       |      | 10.2       | 9.7        | 48.9     |                | 11.1       |                |          |                   |      |  |
| Change Period (Y+Rc), s* 6.2                  |       |      | 6.0        | * 6.2      | * 6.2    |                | 6.0        |                |          |                   |      |  |
| Max Green Setting (Gmax)1                     |       |      | 13.0       | * 11       | * 23     |                | 9.0        |                |          |                   |      |  |
| Max Q Clear Time (g_c+I13,7                   |       |      | 3.8<br>0.2 | 3.8<br>0.1 | 7.3      |                | 5.1        |                |          |                   |      |  |
| Green Ext Time (p_c), s 0.1                   | 3.8   |      | 0.2        | 0.1        | 3.6      |                | 0.2        |                |          |                   |      |  |
| Intersection Summary                          |       |      |            |            |          |                |            |                |          |                   |      |  |
| HCM 6th Ctrl Delay                            |       | 14.3 |            |            |          |                |            |                |          |                   |      |  |
| HCM 6th LOS                                   |       |      |            |            |          |                |            |                |          |                   |      |  |

#### Notes

User approved pedestrian interval to be less than phase max green.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

19.8

#### Intersection

Int Delay, s/veh

| Movement               | EBL  | EBT  | EBR  | WBL  | WBT         | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |  |
|------------------------|------|------|------|------|-------------|------|------|------|------|------|------|------|--|
| Lane Configurations    | ۲.   | et   |      | ۲.   | <b>∱î</b> ≽ |      |      | \$   |      |      | \$   |      |  |
| Traffic Vol, veh/h     | 8    | 302  | 9    | 106  | 320         | 99   | 7    | 0    | 90   | 86   | 1    | 9    |  |
| Future Vol, veh/h      | 8    | 302  | 9    | 106  | 320         | 99   | 7    | 0    | 90   | 86   | 1    | 9    |  |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0    | 0           | 0    | 0    | 0    | 0    | 0    | 0    | 0    |  |
| Sign Control           | Free | Free | Free | Free | Free        | Free | Stop | Stop | Stop | Stop | Stop | Stop |  |
| RT Channelized         | -    | -    | None | -    | -           | None | -    | -    | None | -    | -    | None |  |
| Storage Length         | 115  | -    | -    | 115  | -           | -    | -    | -    | -    | -    | -    | -    |  |
| Veh in Median Storage, | # -  | 0    | -    | -    | 0           | -    | -    | 0    | -    | -    | 0    | -    |  |
| Grade, %               | -    | 0    | -    | -    | 0           | -    | -    | 0    | -    | -    | 0    | -    |  |
| Peak Hour Factor       | 82   | 82   | 82   | 93   | 93          | 93   | 81   | 81   | 81   | 60   | 60   | 60   |  |
| Heavy Vehicles, %      | 1    | 1    | 1    | 1    | 1           | 1    | 1    | 1    | 1    | 0    | 0    | 0    |  |
| Mvmt Flow              | 10   | 368  | 11   | 114  | 344         | 106  | 9    | 0    | 111  | 143  | 2    | 15   |  |
|                        |      |      |      |      |             |      |      |      |      |      |      |      |  |

| Major/Minor          | Major1 |   | Major2   |   | Minor1     |         | Ν      | /linor2 |      |     |  |
|----------------------|--------|---|----------|---|------------|---------|--------|---------|------|-----|--|
| Conflicting Flow All | 450    | 0 | 0 379    | 0 | 0 795      | 1072    | 374    | 1074    | 1024 | 225 |  |
| Stage 1              | -      | - |          | - | - 394      | 394     | -      | 625     | 625  | -   |  |
| Stage 2              | -      | - |          | - | - 401      | 678     | -      | 449     | 399  | -   |  |
| Critical Hdwy        | 4.115  | - | - 4.115  | - | - 7.315    | 6.515   | 6.215  | 7.3     | 6.5  | 6.9 |  |
| Critical Hdwy Stg 1  | -      | - |          | - | - 6.115    | 5.515   | -      | 6.5     | 5.5  | -   |  |
| Critical Hdwy Stg 2  | -      | - |          | - | - 6.515    | 5.515   | -      | 6.1     | 5.5  | -   |  |
| Follow-up Hdwy       | 2.2095 | - | - 2.2095 | - | - 3.5095 4 | 4.00953 | 3.3095 | 3.5     | 4    | 3.3 |  |
| Pot Cap-1 Maneuver   | 1115   | - | - 1184   | - | - 293      | 221     | 674    | 188     | 237  | 784 |  |
| Stage 1              | -      | - |          | - | - 633      | 607     | -      | 444     | 480  | -   |  |
| Stage 2              | -      | - |          | - | - 600      | 453     | -      | 593     | 606  | -   |  |
| Platoon blocked, %   |        | - | -        | - | -          |         |        |         |      |     |  |
| Mov Cap-1 Maneuver   | · 1115 | - | - 1184   | - | - 263      | 198     | 674    | 144     | 212  | 784 |  |
| Mov Cap-2 Maneuver   | · -    | - |          | - | - 263      | 198     | -      | 144     | 212  | -   |  |
| Stage 1              | -      | - |          | - | - 627      | 602     | -      | 440     | 434  | -   |  |
| Stage 2              | -      | - |          | - | - 530      | 410     | -      | 491     | 601  | -   |  |
|                      |        |   |          |   |            |         |        |         |      |     |  |
| Approach             | EB     |   | WB       |   | NB         |         |        | SB      |      |     |  |
| HCM Control Delay, s | s 0.2  |   | 1.7      |   | 12.4       |         |        | 137.2   |      |     |  |
| HCM LOS              |        |   |          |   | В          |         |        | F       |      |     |  |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR S | SBLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-------|-------|
| Capacity (veh/h)      | 606   | 1115  | -   | -   | 1184  | -   | -     | 156   |
| HCM Lane V/C Ratio    | 0.198 | 0.009 | -   | -   | 0.096 | -   | -     | 1.026 |
| HCM Control Delay (s) | 12.4  | 8.3   | -   | -   | 8.4   | -   | -     | 137.2 |
| HCM Lane LOS          | В     | А     | -   | -   | А     | -   | -     | F     |
| HCM 95th %tile Q(veh) | 0.7   | 0     | -   | -   | 0.3   | -   | -     | 8     |

#### Intersection

| Int Delay, s/veh       | 1.5      |      |      |      |      |      |
|------------------------|----------|------|------|------|------|------|
| Movement               | EBT      | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations    | el<br>el |      | ۲.   | •    | Y    |      |
| Traffic Vol, veh/h     | 163      | 3    | 26   | 118  | 1    | 29   |
| Future Vol, veh/h      | 163      | 3    | 26   | 118  | 1    | 29   |
| Conflicting Peds, #/hr | 0        | 0    | 0    | 0    | 0    | 0    |
| Sign Control           | Free     | Free | Free | Free | Stop | Stop |
| RT Channelized         | -        | None | -    | None | -    | None |
| Storage Length         | -        | -    | 0    | -    | 0    | -    |
| Veh in Median Storage, | # 0      | -    | -    | 0    | 0    | -    |
| Grade, %               | 0        | -    | -    | 0    | 0    | -    |
| Peak Hour Factor       | 83       | 83   | 81   | 81   | 75   | 75   |
| Heavy Vehicles, %      | 1        | 1    | 1    | 1    | 0    | 0    |
| Mvmt Flow              | 196      | 4    | 32   | 146  | 1    | 39   |

| Major/Minor N         | /lajor1 | Ν     | Major2 |     | Minor1 |     |   |
|-----------------------|---------|-------|--------|-----|--------|-----|---|
| Conflicting Flow All  | 0       | 0     | 200    | 0   | 408    | 198 | ; |
| Stage 1               | -       | -     | -      | -   | 198    | -   |   |
| Stage 2               | -       | -     | -      | -   | 210    | -   |   |
| Critical Hdwy         | -       | -     | 4.11   | -   |        | 6.2 | ) |
| Critical Hdwy Stg 1   | -       | -     | _      | -   | 5.4    |     |   |
| Critical Hdwy Stg 2   | -       | -     | -      | -   | 5.4    | -   |   |
| Follow-up Hdwy        | -       | -     | 2.209  | -   | 3.5    | 3.3 | ; |
| Pot Cap-1 Maneuver    | -       | -     | 1378   | -   | 603    | 848 |   |
| Stage 1               | -       | -     | -      | -   | 840    | -   |   |
| Stage 2               | -       | -     | -      | -   | 830    | -   |   |
| Platoon blocked, %    | -       | -     |        | -   |        |     |   |
| Mov Cap-1 Maneuver    | -       | -     | 1378   | -   | 589    | 848 | ; |
| Mov Cap-2 Maneuver    | -       | -     | -      | -   | 589    | -   |   |
| Stage 1               | -       | -     | -      | -   | 840    | -   |   |
| Stage 2               | -       | -     | -      | -   | 811    | -   |   |
|                       |         |       |        |     |        |     |   |
| Approach              | EB      |       | WB     |     | NB     |     |   |
|                       | 0       |       | 1.4    |     |        |     |   |
| HCM Control Delay, s  | U       |       | 1.4    |     | 9.5    |     |   |
| HCM LOS               |         |       |        |     | A      |     |   |
|                       |         |       |        |     |        |     |   |
| Minor Lane/Major Mvmt | t NI    | BLn1  | EBT    | EBR | WBL    | WBT | - |
| Capacity (veh/h)      |         | 836   | -      | -   | 1378   | -   |   |
| HCM Lane V/C Ratio    | C       | 0.048 | -      | -   | 0.023  | -   |   |
| HCM Control Delay (s) |         | 9.5   | -      | -   | 7.7    | -   | • |
| HCM Lane LOS          |         | Α     | _      | -   | А      | -   |   |

-

0.2

-

0.1

HCM 95th %tile Q(veh)

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Movement              | EB | EB | EB | EB | WB  | WB  | WB  | NB  | NB  | NB  | NB  | NB  |
|-----------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | Т  | R  | R  | L   | L   | TR  | L   | L   | Т   | Т   | Т   |
| Maximum Queue (ft)    | 50 | 49 | 61 | 50 | 227 | 173 | 109 | 382 | 405 | 378 | 299 | 219 |
| Average Queue (ft)    | 44 | 28 | 48 | 18 | 146 | 65  | 44  | 273 | 312 | 232 | 145 | 31  |
| 95th Queue (ft)       | 62 | 56 | 62 | 43 | 211 | 160 | 89  | 435 | 459 | 477 | 307 | 133 |
| Link Distance (ft)    | 49 | 49 | 49 | 49 | 230 | 230 | 230 |     |     | 427 | 427 | 427 |
| Upstream Blk Time (%) | 28 | 8  | 14 | 1  | 0   |     |     | 0   | 6   | 13  | 0   |     |
| Queuing Penalty (veh) | 35 | 10 | 17 | 1  | 0   |     |     | 0   | 0   | 0   | 0   |     |
| Storage Bay Dist (ft) |    |    |    |    |     |     |     | 400 | 400 |     |     |     |
| Storage Blk Time (%)  |    |    |    |    |     |     |     | 2   | 18  | 6   |     | 0   |
| Queuing Penalty (veh) |    |    |    |    |     |     |     | 4   | 42  | 26  |     | 1   |

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Movement              | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Directions Served     | R   | L   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 106 | 111 | 194 | 179 | 157 | 101 |
| Average Queue (ft)    | 45  | 18  | 125 | 107 | 81  | 35  |
| 95th Queue (ft)       | 92  | 67  | 179 | 160 | 138 | 83  |
| Link Distance (ft)    |     |     | 694 | 694 | 694 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 350 | 115 |     |     |     | 80  |
| Storage Blk Time (%)  |     |     | 17  |     | 7   | 0   |
| Queuing Penalty (veh) |     |     | 3   |     | 4   | 1   |

## Intersection: 2: Novi Road & Oaks Drive North

| Movement              | EB | EB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | TR  | LT  | TR  | L   | Т   | Т   | R   | L   | Т   | Т   | TR  |
| Maximum Queue (ft)    | 90 | 104 | 66  | 87  | 93  | 224 | 255 | 56  | 116 | 147 | 133 | 86  |
| Average Queue (ft)    | 40 | 55  | 22  | 33  | 31  | 83  | 100 | 10  | 39  | 72  | 37  | 25  |
| 95th Queue (ft)       | 80 | 99  | 57  | 67  | 68  | 193 | 217 | 35  | 86  | 140 | 98  | 64  |
| Link Distance (ft)    |    | 95  | 166 | 166 |     | 694 | 694 | 694 |     | 408 | 408 | 408 |
| Upstream Blk Time (%) | 0  | 3   |     |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 0  | 6   |     |     |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 80 |     |     |     | 275 |     |     |     | 100 |     |     |     |
| Storage Blk Time (%)  | 2  | 5   |     |     |     | 0   |     |     | 0   | 4   |     |     |
| Queuing Penalty (veh) | 2  | 3   |     |     |     | 0   |     |     | 0   | 3   |     |     |

## Intersection: 3: Karevich Drive & Oaks Drive South

| Movement              | EB  | EB  | WB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | L   | TR  | L   | LTR | LTR |
| Maximum Queue (ft)    | 30  | 10  | 58  | 79  | 120 |
| Average Queue (ft)    | 3   | 1   | 24  | 33  | 43  |
| 95th Queue (ft)       | 18  | 7   | 55  | 62  | 96  |
| Link Distance (ft)    |     | 286 |     | 77  | 651 |
| Upstream Blk Time (%) |     |     |     | 0   |     |
| Queuing Penalty (veh) |     |     |     | 0   |     |
| Storage Bay Dist (ft) | 115 |     | 115 |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

## Intersection: 4: Karevich Drive & Oaks Drive North

| Movement              | EB  | WB | NB  |
|-----------------------|-----|----|-----|
| Directions Served     | TR  | L  | LR  |
| Maximum Queue (ft)    | 37  | 31 | 39  |
| Average Queue (ft)    | 3   | 4  | 18  |
| 95th Queue (ft)       | 19  | 21 | 42  |
| Link Distance (ft)    | 229 | 95 | 179 |
| Upstream Blk Time (%) |     |    |     |
| Queuing Penalty (veh) |     |    |     |
| Storage Bay Dist (ft) |     |    |     |
| Storage Blk Time (%)  |     |    |     |
| Queuing Penalty (veh) |     |    |     |
|                       |     |    |     |

### Zone Summary

Zone wide Queuing Penalty: 159

## HCM 6th Signalized Intersection Summary 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

|                                                         | ≯          | -          | *         | 4           | ł           | •           | •         | 1           | 1         | *         | Ŧ           | ~         |
|---------------------------------------------------------|------------|------------|-----------|-------------|-------------|-------------|-----------|-------------|-----------|-----------|-------------|-----------|
| Movement                                                | EBL        | EBT        | EBR       | WBL         | WBT         | WBR         | NBL       | NBT         | NBR       | SBL       | SBT         | SBR       |
| Lane Configurations                                     | <u>۲</u>   |            | 11        | ሻሻ          | ef 👘        |             | ሻሻ        | <u> </u>    | 1         | ٦.        | ተተተ         | 1         |
| Traffic Volume (veh/h)                                  | 95         | 43         | 454       | 339         | 67          | 39          | 387       | 850         | 175       | 21        | 788         | 69        |
| Future Volume (veh/h)                                   | 95         | 43         | 454       | 339         | 67          | 39          | 387       | 850         | 175       | 21        | 788         | 69        |
| Initial Q (Qb), veh                                     | 0          | 0          | 0         | 0           | 0           | 0           | 0         | 0           | 0         | 0         | 0           | 0         |
| Ped-Bike Adj(A_pbT)                                     | 1.00       | 4.00       | 1.00      | 1.00        | 4.00        | 1.00        | 1.00      | 1.00        | 1.00      | 1.00      | 1.00        | 1.00      |
| Parking Bus, Adj                                        | 1.00       | 1.00       | 1.00      | 1.00        | 1.00        | 1.00        | 1.00      | 1.00        | 1.00      | 1.00      | 1.00        | 1.00      |
| Work Zone On Approach<br>Adj Sat Flow, veh/h/ln         | 2000       | No<br>2000 | 2000      | 2000        | No<br>2000  | 2000        | 1984      | No<br>1984  | 1984      | 2000      | No<br>2000  | 2000      |
| Adj Sat Flow, ven/h/h                                   | 2000       | 2000<br>49 | 419       | 404         | 2000        | 2000        | 425       | 934         | 1904      | 2000      | 829         | 2000      |
| Peak Hour Factor                                        | 0.87       | 0.87       | 0.87      | 0.84        | 0.84        | 0.84        | 0.91      | 0.91        | 0.91      | 0.95      | 0.95        | 0.95      |
| Percent Heavy Veh, %                                    | 0.07       | 0.07       | 0.07      | 0.04        | 0.04        | 0.04        | 0.51      | 0.01        | 1         | 0.55      | 0.55        | 0.35      |
| Cap, veh/h                                              | 221        | 232        | 769       | 504         | 175         | 83          | 520       | 2144        | 666       | 173       | 1883        | 585       |
| Arrive On Green                                         | 0.12       | 0.12       | 0.12      | 0.14        | 0.14        | 0.14        | 0.14      | 0.40        | 0.40      | 0.06      | 0.23        | 0.23      |
| Sat Flow, veh/h                                         | 1905       | 2000       | 2983      | 3695        | 1282        | 609         | 3666      | 5417        | 1682      | 1905      | 5460        | 1695      |
| Grp Volume(v), veh/h                                    | 109        | 49         | 419       | 404         | 0           | 118         | 425       | 934         | 121       | 22        | 829         | 57        |
| Grp Sat Flow(s),veh/h/ln                                | 1905       | 2000       | 1492      | 1848        | 0           | 1890        | 1833      | 1806        | 1682      | 1905      | 1820        | 1695      |
| Q Serve(g_s), s                                         | 5.1        | 2.1        | 11.0      | 10.1        | 0.0         | 5.5         | 10.7      | 12.0        | 4.5       | 1.0       | 12.3        | 2.5       |
| Cycle Q Clear(g_c), s                                   | 5.1        | 2.1        | 11.0      | 10.1        | 0.0         | 5.5         | 10.7      | 12.0        | 4.5       | 1.0       | 12.3        | 2.5       |
| Prop In Lane                                            | 1.00       |            | 1.00      | 1.00        |             | 0.32        | 1.00      |             | 1.00      | 1.00      |             | 1.00      |
| Lane Grp Cap(c), veh/h                                  | 221        | 232        | 769       | 504         | 0           | 258         | 520       | 2144        | 666       | 173       | 1883        | 585       |
| V/C Ratio(X)                                            | 0.49       | 0.21       | 0.55      | 0.80        | 0.00        | 0.46        | 0.82      | 0.44        | 0.18      | 0.13      | 0.44        | 0.10      |
| Avail Cap(c_a), veh/h                                   | 221        | 232        | 769       | 622         | 0           | 318         | 718       | 2144        | 666       | 173       | 1883        | 585       |
| HCM Platoon Ratio                                       | 1.00       | 1.00       | 1.00      | 1.00        | 1.00        | 1.00        | 1.00      | 1.00        | 1.00      | 0.67      | 0.67        | 0.67      |
| Upstream Filter(I)                                      | 1.00       | 1.00       | 1.00      | 1.00        | 0.00        | 1.00        | 1.00      | 1.00        | 1.00      | 0.96      | 0.96        | 0.96      |
| Uniform Delay (d), s/veh                                | 39.4       | 38.1       | 30.4      | 39.8        | 0.0         | 37.8        | 39.6      | 21.0        | 18.7      | 41.0      | 28.7        | 24.9      |
| Incr Delay (d2), s/veh                                  | 1.7        | 0.5        | 0.8       | 6.1         | 0.0         | 1.3         | 5.2       | 0.6         | 0.6       | 1.4       | 0.7         | 0.3       |
| Initial Q Delay(d3),s/veh                               | 0.0        | 0.0        | 0.0       | 0.0         | 0.0         | 0.0         | 0.0       | 0.0         | 0.0       | 0.0       | 0.0         | 0.0       |
| %ile BackOfQ(50%),veh/In                                | 2.5        | 1.1        | 4.2       | 5.0         | 0.0         | 2.6         | 5.0       | 4.8         | 1.7       | 0.5       | 5.5         | 1.0       |
| Unsig. Movement Delay, s/veh                            | 41.1       | 38.5       | 31.3      | 45.9        | 0.0         | 39.1        | 44.8      | 21.6        | 19.3      | 42.5      | 29.4        | 25.2      |
| LnGrp Delay(d),s/veh<br>LnGrp LOS                       | 41.1<br>D  | 30.5<br>D  | 31.3<br>C | 45.9<br>D   | 0.0<br>A    | 39.1<br>D   | 44.0<br>D | 21.0<br>C   | 19.3<br>B | 42.5<br>D | 29.4<br>C   | 25.2<br>C |
| Approach Vol, veh/h                                     | D          | 577        | U         | D           | 522         | D           | D         | 1480        | D         | D         | 908         | <u> </u>  |
| Approach Delay, s/veh                                   |            | 33.7       |           |             | 522<br>44.3 |             |           | 28.1        |           |           | 908<br>29.4 |           |
| Approach LOS                                            |            | 55.7<br>C  |           |             | 44.3<br>D   |             |           | 20.1<br>C   |           |           | 29.4<br>C   |           |
|                                                         |            |            |           |             |             |             |           |             |           |           | U           |           |
| Timer - Assigned Phs                                    | 1          | 2          |           | 4           | 5           | 6           |           | 8           |           |           |             |           |
| Phs Duration (G+Y+Rc), s                                | 15.0       | 44.0       |           | 19.0        | 19.9        | 39.2        |           | 17.0        |           |           |             |           |
| Change Period (Y+Rc), s                                 | 6.4        | 6.4        |           | 6.0         | 6.4         | 6.4         |           | 6.0         |           |           |             |           |
| Max Green Setting (Gmax), s                             | 5.6        | 37.6       |           | 16.0        | 18.6        | 24.6        |           | 11.0        |           |           |             |           |
| Max Q Clear Time (g_c+I1), s<br>Green Ext Time (p_c), s | 3.0<br>0.0 | 14.0       |           | 12.1<br>0.9 | 12.7<br>0.8 | 14.3<br>3.9 |           | 13.0<br>0.0 |           |           |             |           |
| <b>u</b> = 7:                                           | 0.0        | 6.7        |           | 0.9         | 0.0         | 3.9         |           | 0.0         |           |           |             |           |
| Intersection Summary                                    |            |            |           |             |             |             |           |             |           |           |             |           |
| HCM 6th Ctrl Delay                                      |            |            | 31.8      |             |             |             |           |             |           |           |             |           |
| HCM 6th LOS                                             |            |            | С         |             |             |             |           |             |           |           |             |           |
|                                                         |            |            |           |             |             |             |           |             |           |           |             |           |

Notes

User approved pedestrian interval to be less than phase max green.

## メッシュー イイ イントナイ

|                           |         |       | -    | -    |       |       |         | •    | •    |      | •           |      |  |
|---------------------------|---------|-------|------|------|-------|-------|---------|------|------|------|-------------|------|--|
| Movement                  | EBL     | EBT   | EBR  | WBL  | WBT   | WBR   | NBL     | NBT  | NBR  | SBL  | SBT         | SBR  |  |
| Lane Configurations       | ሻ       | f)    |      |      | 4 Þ   |       | <u></u> | - 44 | 1    |      | <u>ተተ</u> ኈ |      |  |
| Traffic Volume (veh/h)    | 63      | 12    | 93   | 48   | 33    | 49    | 79      | 861  | 44   | 49   | 737         | 40   |  |
| Future Volume (veh/h)     | 63      | 12    | 93   | 48   | 33    | 49    | 79      | 861  | 44   | 49   | 737         | 40   |  |
| Initial Q (Qb), veh       | 0       | 0     | 0    | 0    | 0     | 0     | 0       | 0    | 0    | 0    | 0           | 0    |  |
| Ped-Bike Adj(A_pbT)       | 1.00    |       | 1.00 | 1.00 |       | 1.00  | 1.00    |      | 1.00 | 1.00 |             | 1.00 |  |
| Parking Bus, Adj          | 1.00    | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00    | 1.00 | 1.00 | 1.00 | 1.00        | 1.00 |  |
| Work Zone On Approac      |         | No    |      |      | No    |       |         | No   |      |      | No          |      |  |
| Adj Sat Flow, veh/h/ln    | 1984    | 1984  | 1984 | 2000 | 2000  | 2000  | 1984    | 1984 | 1984 | 1984 | 1984        | 1984 |  |
| Adj Flow Rate, veh/h      | 69      | 13    | 44   | 63   | 43    | 44    | 90      | 978  | 50   | 53   | 792         | 42   |  |
| Peak Hour Factor          | 0.91    | 0.91  | 0.91 | 0.76 | 0.76  | 0.76  | 0.88    | 0.88 | 0.88 | 0.93 | 0.93        | 0.93 |  |
| Percent Heavy Veh, %      | 1       | 1     | 1    | 0    | 0     | 0     | 1       | 1    | 1    | 1    | 1           | 1    |  |
| Cap, veh/h                | 107     | 22    | 76   | 97   | 68    | 71    | 487     | 2231 | 995  | 459  | 3082        | 163  |  |
| Arrive On Green           | 0.06    | 0.06  | 0.06 | 0.06 | 0.06  | 0.06  | 0.08    | 1.00 | 1.00 | 0.03 | 0.59        | 0.59 |  |
| Sat Flow, veh/h           | 1890    | 397   | 1345 | 1528 | 1075  | 1119  | 1890    | 3770 | 1682 | 1890 | 5267        | 278  |  |
| Grp Volume(v), veh/h      | 69      | 0     | 57   | 79   | 0     | 71    | 90      | 978  | 50   | 53   | 542         | 292  |  |
| Grp Sat Flow(s),veh/h/lr  | 1890    | 0     | 1742 | 1924 | 0     | 1799  | 1890    | 1885 | 1682 | 1890 | 1806        | 1934 |  |
| Q Serve(g_s), s           | 3.4     | 0.0   | 3.0  | 3.8  | 0.0   | 3.6   | 1.8     | 0.0  | 0.0  | 1.1  | 7.0         | 7.0  |  |
| Cycle Q Clear(g_c), s     | 3.4     | 0.0   | 3.0  | 3.8  | 0.0   | 3.6   | 1.8     | 0.0  | 0.0  | 1.1  | 7.0         | 7.0  |  |
| Prop In Lane              | 1.00    |       | 0.77 | 0.79 |       | 0.62  | 1.00    |      | 1.00 | 1.00 |             | 0.14 |  |
| Lane Grp Cap(c), veh/h    |         | 0     | 98   | 122  | 0     | 114   | 487     | 2231 | 995  | 459  | 2113        | 1132 |  |
| V/C Ratio(X)              | 0.65    | 0.00  | 0.58 | 0.65 | 0.00  | 0.62  | 0.18    | 0.44 | 0.05 | 0.12 | 0.26        | 0.26 |  |
| Avail Cap(c_a), veh/h     | 199     | 0     | 183  | 223  | 0     | 208   | 690     | 2231 | 995  | 674  | 2113        | 1132 |  |
| HCM Platoon Ratio         | 1.00    | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 2.00    | 2.00 | 2.00 | 1.00 | 1.00        | 1.00 |  |
| Upstream Filter(I)        | 1.00    | 0.00  | 1.00 | 1.00 | 0.00  | 1.00  | 0.92    | 0.92 | 0.92 | 1.00 | 1.00        | 1.00 |  |
| Uniform Delay (d), s/veł  | n 43.9  | 0.0   | 43.7 | 43.5 | 0.0   | 43.4  | 7.1     | 0.0  | 0.0  | 7.2  | 9.6         | 9.6  |  |
| Incr Delay (d2), s/veh    | 6.4     | 0.0   | 5.3  | 5.7  | 0.0   | 5.4   | 0.2     | 0.6  | 0.1  | 0.1  | 0.3         | 0.6  |  |
| Initial Q Delay(d3),s/veh | n 0.0   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0     | 0.0  | 0.0  | 0.0  | 0.0         | 0.0  |  |
| %ile BackOfQ(50%),veł     | n/In1.8 | 0.0   | 1.5  | 2.0  | 0.0   | 1.8   | 0.6     | 0.2  | 0.0  | 0.4  | 2.5         | 2.7  |  |
| Unsig. Movement Delay     | , s/veh |       |      |      |       |       |         |      |      |      |             |      |  |
| LnGrp Delay(d),s/veh      | 50.3    | 0.0   | 49.0 | 49.2 | 0.0   | 48.8  | 7.2     | 0.6  | 0.1  | 7.3  | 9.9         | 10.2 |  |
| LnGrp LOS                 | D       | Α     | D    | D    | Α     | D     | Α       | Α    | Α    | Α    | Α           | В    |  |
| Approach Vol, veh/h       |         | 126   |      |      | 150   |       |         | 1118 |      |      | 887         |      |  |
| Approach Delay, s/veh     |         | 49.7  |      |      | 49.0  |       |         | 1.1  |      |      | 9.8         |      |  |
| Approach LOS              |         | D     |      |      | D     |       |         | А    |      |      | А           |      |  |
| Timer - Assigned Phs      | 1       | 2     |      | 4    | 5     | 6     |         | 8    |      |      |             |      |  |
| Phs Duration (G+Y+Rc)     | , s9.2  | 62.4  |      | 12.0 | 9.8   | 61.8  |         | 11.4 |      |      |             |      |  |
| Change Period (Y+Rc),     |         | * 6.2 |      | 6.0  | * 6.2 | * 6.2 |         | 6.0  |      |      |             |      |  |
| Max Green Setting (Gm     |         | * 36  |      | 11.0 | * 14  | * 36  |         | 10.0 |      |      |             |      |  |
| Max Q Clear Time (g_c-    |         | 2.0   |      | 5.8  | 3.8   | 9.0   |         | 5.4  |      |      |             |      |  |
| Green Ext Time (p_c), s   |         | 7.6   |      | 0.3  | 0.1   | 5.3   |         | 0.2  |      |      |             |      |  |
| Intersection Summary      |         |       |      |      |       |       |         |      |      |      |             |      |  |
| HCM 6th Ctrl Delay        |         |       | 10.3 |      |       |       |         |      |      |      |             |      |  |
| HCM 6th LOS               |         |       | В    |      |       |       |         |      |      |      |             |      |  |
|                           |         |       |      |      |       |       |         |      |      |      |             |      |  |

#### Notes

User approved pedestrian interval to be less than phase max green.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

7.8

#### Intersection

Int Delay, s/veh

| Movement               | EBL  | EBT  | EBR  | WBL  | WBT         | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR   |
|------------------------|------|------|------|------|-------------|------|------|------|------|------|------|-------|
| Lane Configurations    | 1    | ¢,   |      | 3    | <b>≜</b> †₽ |      |      | 4    |      | 002  | 4    | 0.011 |
| Traffic Vol, veh/h     | 6    | 410  | 24   | 111  | 335         | 59   | 5    | 1    | 94   | 48   | 0    | 6     |
| Future Vol, veh/h      | 6    | 410  | 24   | 111  | 335         | 59   | 5    | 1    | 94   | 48   | 0    | 6     |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0    | 0           | 0    | 0    | 0    | 0    | 0    | 0    | 0     |
| Sign Control           | Free | Free | Free | Free | Free        | Free | Stop | Stop | Stop | Stop | Stop | Stop  |
| RT Channelized         | -    | -    | None | -    | -           | None | -    | -    | None | -    | -    | None  |
| Storage Length         | 115  | -    | -    | 115  | -           | -    | -    | -    | -    | -    | -    | -     |
| Veh in Median Storage, | # -  | 0    | -    | -    | 0           | -    | -    | 0    | -    | -    | 0    | -     |
| Grade, %               | -    | 0    | -    | -    | 0           | -    | -    | 0    | -    | -    | 0    | -     |
| Peak Hour Factor       | 85   | 85   | 85   | 95   | 95          | 95   | 93   | 93   | 93   | 60   | 60   | 60    |
| Heavy Vehicles, %      | 1    | 1    | 1    | 0    | 0           | 0    | 0    | 0    | 0    | 0    | 0    | 0     |
| Mvmt Flow              | 7    | 482  | 28   | 117  | 353         | 62   | 5    | 1    | 101  | 80   | 0    | 10    |

| Major/Minor          | Major1 |   | Ν | /lajor2 |   | Ν | linor1 |      | 1   | Minor2 |      |     |  |
|----------------------|--------|---|---|---------|---|---|--------|------|-----|--------|------|-----|--|
| Conflicting Flow All | 415    | 0 | 0 | 510     | 0 | 0 | 921    | 1159 | 496 | 1179   | 1142 | 208 |  |
| Stage 1              | -      | - | - | -       | - | - | 510    | 510  | -   | 618    | 618  | -   |  |
| Stage 2              | -      | - | - | -       | - | - | 411    | 649  | -   | 561    | 524  | -   |  |
| Critical Hdwy        | 4.115  | - | - | 4.1     | - | - | 7.3    | 6.5  | 6.2 | 7.3    | 6.5  | 6.9 |  |
| Critical Hdwy Stg 1  | -      | - | - | -       | - | - | 6.1    | 5.5  | -   | 6.5    | 5.5  | -   |  |
| Critical Hdwy Stg 2  | -      | - | - | -       | - | - | 6.5    | 5.5  | -   | 6.1    | 5.5  | -   |  |
| Follow-up Hdwy       | 2.2095 | - | - | 2.2     | - | - | 3.5    | 4    | 3.3 | 3.5    | 4    | 3.3 |  |
| Pot Cap-1 Maneuver   | 1148   | - | - | 1065    | - | - | 241    | 197  | 578 | 158    | 202  | 804 |  |
| Stage 1              | -      | - | - | -       | - | - | 550    | 541  | -   | 448    | 484  | -   |  |
| Stage 2              | -      | - | - | -       | - | - | 594    | 469  | -   | 516    | 533  | -   |  |
| Platoon blocked, %   |        | - | - |         | - | - |        |      |     |        |      |     |  |
| Mov Cap-1 Maneuver   | r 1148 | - | - | 1065    | - | - | 217    | 174  | 578 | 118    | 179  | 804 |  |
| Mov Cap-2 Maneuver   | r -    | - | - | -       | - | - | 217    | 174  | -   | 118    | 179  | -   |  |
| Stage 1              | -      | - | - | -       | - | - | 547    | 538  | -   | 445    | 431  | -   |  |
| Stage 2              | -      | - | - | -       | - | - | 522    | 417  | -   | 422    | 530  | -   |  |
|                      |        |   |   |         |   |   |        |      |     |        |      |     |  |
| Approach             | EB     |   |   | WB      |   |   | NB     |      |     | SB     |      |     |  |
| HCM Control Delay, s | s 0.1  |   |   | 1.9     |   |   | 13.7   |      |     | 79.3   |      |     |  |
| HCM LOS              |        |   |   |         |   |   | В      |      |     | F      |      |     |  |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL  | WBT | WBR S | SBLn1 |
|-----------------------|-------|-------|-----|-----|------|-----|-------|-------|
| Capacity (veh/h)      | 522   | 1148  | -   | -   | 1065 | -   | -     | 130   |
| HCM Lane V/C Ratio    | 0.206 | 0.006 | -   | -   | 0.11 | -   | -     | 0.692 |
| HCM Control Delay (s) | 13.7  | 8.2   | -   | -   | 8.8  | -   | -     | 79.3  |
| HCM Lane LOS          | В     | А     | -   | -   | А    | -   | -     | F     |
| HCM 95th %tile Q(veh) | 0.8   | 0     | -   | -   | 0.4  | -   | -     | 3.8   |

#### Intersection

| Int Delay, s/veh       | 1.2  |      |      |          |      |      |
|------------------------|------|------|------|----------|------|------|
| Movement               | EBT  | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations    | ef 👘 |      | - ሽ  | <b>↑</b> | - Y  |      |
| Traffic Vol, veh/h     | 150  | 3    | 15   | 137      | 2    | 18   |
| Future Vol, veh/h      | 150  | 3    | 15   | 137      | 2    | 18   |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0        | 0    | 0    |
| Sign Control           | Free | Free | Free | Free     | Stop | Stop |
| RT Channelized         | -    | None | -    | None     | -    | None |
| Storage Length         | -    | -    | 0    | -        | 0    | -    |
| Veh in Median Storage, | # 0  | -    | -    | 0        | 0    | -    |
| Grade, %               | 0    | -    | -    | 0        | 0    | -    |
| Peak Hour Factor       | 86   | 86   | 81   | 81       | 60   | 60   |
| Heavy Vehicles, %      | 1    | 1    | 2    | 2        | 0    | 0    |
| Mvmt Flow              | 174  | 3    | 19   | 169      | 3    | 30   |

| Major/Minor          | Major1 |       | Major2 | ľ   | Minor1   |     |
|----------------------|--------|-------|--------|-----|----------|-----|
| Conflicting Flow All | 0      | 0     | 177    | 0   | 383      | 176 |
| Stage 1              | -      | -     | -      | -   | 176      | -   |
| Stage 2              | -      | -     | -      | -   | 207      | -   |
| Critical Hdwy        | -      | -     | 4.12   | -   | 6.4      | 6.2 |
| Critical Hdwy Stg 1  | -      | -     | -      | -   | 5.4      | -   |
| Critical Hdwy Stg 2  | -      | -     | -      | -   | 5.4      | -   |
| Follow-up Hdwy       | -      | -     | 2.218  | -   | 3.5      | 3.3 |
| Pot Cap-1 Maneuver   | -      | -     | 1399   | -   | 624      | 872 |
| Stage 1              | -      | -     | -      | -   | 859      | -   |
| Stage 2              | -      | -     | -      | -   | 832      | -   |
| Platoon blocked, %   | -      | -     |        | -   |          |     |
| Mov Cap-1 Maneuver   | -      | -     | 1399   | -   | 615      | 872 |
| Mov Cap-2 Maneuver   | -      | -     | -      | -   | 615      | -   |
| Stage 1              | -      | -     | -      | -   | 859      | -   |
| Stage 2              | -      | -     | -      | -   | 820      | -   |
|                      |        |       |        |     |          |     |
| Approach             | EB     |       | WB     |     | NB       |     |
| HCM Control Delay, s |        |       | 0.8    |     | 9.5      |     |
| HCM LOS              | 0      |       | 0.0    |     | 9.5<br>A |     |
|                      |        |       |        |     | ~        |     |
|                      |        |       |        |     |          |     |
| Minor Lane/Major Mvn | nt     | NBLn1 | EBT    | EBR | WBL      | WBT |
| Capacity (veh/h)     |        | 837   | -      | -   | 1399     | -   |
| HCM Lane V/C Ratio   |        | 0.04  | -      | -   | 0.013    | -   |

| HCM Lane V/C Ratio    | 0.04 | - | - 0.013 | - |  |  |
|-----------------------|------|---|---------|---|--|--|
| HCM Control Delay (s) | 9.5  | - | - 7.6   | - |  |  |
| HCM Lane LOS          | А    | - | - A     | - |  |  |
| HCM 95th %tile Q(veh) | 0.1  | - | - 0     | - |  |  |

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Movement              | EB | EB | EB | EB | WB  | WB  | WB  | NB  | NB  | NB  | NB  | NB  |
|-----------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | Т  | R  | R  | L   | L   | TR  | L   | L   | Т   | Т   | Т   |
| Maximum Queue (ft)    | 52 | 49 | 68 | 55 | 242 | 183 | 128 | 371 | 396 | 382 | 319 | 218 |
| Average Queue (ft)    | 47 | 25 | 51 | 27 | 153 | 78  | 53  | 251 | 286 | 222 | 156 | 42  |
| 95th Queue (ft)       | 59 | 53 | 63 | 49 | 222 | 174 | 105 | 414 | 435 | 436 | 283 | 141 |
| Link Distance (ft)    | 49 | 49 | 49 | 49 | 230 | 230 | 230 |     |     | 427 | 427 | 427 |
| Upstream Blk Time (%) | 45 | 7  | 24 | 1  | 1   |     |     | 0   | 4   | 7   | 0   | 0   |
| Queuing Penalty (veh) | 67 | 10 | 36 | 2  | 0   |     |     | 0   | 0   | 0   | 0   | 0   |
| Storage Bay Dist (ft) |    |    |    |    |     |     |     | 400 | 400 |     |     |     |
| Storage Blk Time (%)  |    |    |    |    |     |     |     | 1   | 11  | 2   |     |     |
| Queuing Penalty (veh) |    |    |    |    |     |     |     | 3   | 31  | 6   |     |     |

## Intersection: 1: Novi Road & Oaks Drive South/Twelve Oaks Drive

| Movement              | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Directions Served     | R   | L   | Т   | Т   | Т   | R   |
| Maximum Queue (ft)    | 64  | 121 | 235 | 220 | 200 | 105 |
| Average Queue (ft)    | 29  | 21  | 144 | 130 | 103 | 38  |
| 95th Queue (ft)       | 54  | 80  | 205 | 189 | 171 | 92  |
| Link Distance (ft)    |     |     | 694 | 694 | 694 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 350 | 115 |     |     |     | 80  |
| Storage Blk Time (%)  |     | 0   | 27  |     | 13  | 0   |
| Queuing Penalty (veh) |     | 0   | 6   |     | 9   | 0   |

## Intersection: 2: Novi Road & Oaks Drive North

| Movement              | EB | EB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  | SB  | SB  |
|-----------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L  | TR  | LT  | TR  | L   | Т   | Т   | R   | L   | Т   | Т   | TR  |
| Maximum Queue (ft)    | 92 | 104 | 104 | 129 | 89  | 279 | 321 | 70  | 125 | 187 | 166 | 87  |
| Average Queue (ft)    | 42 | 48  | 40  | 46  | 34  | 76  | 93  | 13  | 26  | 92  | 53  | 29  |
| 95th Queue (ft)       | 80 | 85  | 84  | 95  | 72  | 208 | 240 | 44  | 69  | 169 | 130 | 70  |
| Link Distance (ft)    |    | 95  | 166 | 166 |     | 694 | 694 | 694 |     | 408 | 408 | 408 |
| Upstream Blk Time (%) | 1  | 1   |     | 0   |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 0  | 2   |     | 0   |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 80 |     |     |     | 275 |     |     |     | 100 |     |     |     |
| Storage Blk Time (%)  | 3  | 2   |     |     |     |     |     |     | 0   | 7   |     |     |
| Queuing Penalty (veh) | 3  | 1   |     |     |     |     |     |     | 0   | 3   |     |     |

## Intersection: 3: Karevich Drive & Oaks Drive South

| Movement              | EB  | EB  | WB  | WB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | TR  | L   | TR  | LTR | LTR |
| Maximum Queue (ft)    | 24  | 23  | 66  | 4   | 82  | 74  |
| Average Queue (ft)    | 2   | 2   | 26  | 0   | 35  | 32  |
| 95th Queue (ft)       | 14  | 13  | 57  | 3   | 61  | 63  |
| Link Distance (ft)    |     | 286 |     | 179 | 77  | 651 |
| Upstream Blk Time (%) |     |     |     |     | 0   |     |
| Queuing Penalty (veh) |     |     |     |     | 0   |     |
| Storage Bay Dist (ft) | 115 |     | 115 |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |

## Intersection: 4: Karevich Drive & Oaks Drive North

| Movement              | EB  | WB | NB  |
|-----------------------|-----|----|-----|
| Directions Served     | TR  | L  | LR  |
| Maximum Queue (ft)    | 57  | 31 | 42  |
| Average Queue (ft)    | 3   | 3  | 14  |
| 95th Queue (ft)       | 29  | 16 | 40  |
| Link Distance (ft)    | 229 | 95 | 179 |
| Upstream Blk Time (%) |     |    |     |
| Queuing Penalty (veh) |     |    |     |
| Storage Bay Dist (ft) |     |    |     |
| Storage Blk Time (%)  |     |    |     |
| Queuing Penalty (veh) |     |    |     |
| duoung ronaly (ron)   |     |    |     |

### Zone Summary

Zone wide Queuing Penalty: 181

## **APPLICANT'S RESPONSE LETTER**



June 20, 2024

James Hill, Planner City of Novi 45175 Ten Mile Road Novi, Michigan 48375

#### RE: City of Novi Planning Review Culver's Novi JSP 23-27

Dear James:

Please see attached/enclosed for our resubmittal to your office's review comments on behalf of the applicant, Culver's. The resubmittal includes the following documents:

#### 2024-0222 - PLANNING REVIEW CHART: RC WITH PD-2 OPTION COMMENTS

| Item                                            | Required Code                                                                    | Proposed                                   | Meet<br>Code | Comments                                                                                                                                                                                                      | Response                                                                                                                                           |  |  |  |  |  |
|-------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| Zoning and Use Requirements                     |                                                                                  |                                            |              |                                                                                                                                                                                                               |                                                                                                                                                    |  |  |  |  |  |
| Master Plan<br>(adopted July 27, 2017)          | Regional Commercial                                                              | PD-2: Planned<br>Development               | Yes          | PD-2 Option would<br>require the Planning<br>Commission's<br>recommendation to City<br>Council – concurrent with<br>site plan/special land use                                                                | The applicant<br>understands this<br>requirement and<br>will submit the<br>required<br>applications and<br>documents to<br>support this<br>request |  |  |  |  |  |
| Area Study                                      | None                                                                             |                                            | NA           |                                                                                                                                                                                                               |                                                                                                                                                    |  |  |  |  |  |
| <b>Zoning</b><br>(Effective January 8,<br>2015) | RC: Regional<br>Commercial                                                       | RC with PD-2<br>Option                     | Yes          |                                                                                                                                                                                                               | Comment<br>acknowledged                                                                                                                            |  |  |  |  |  |
| Uses Permitted<br>(Sec 3.1.24. B & C)           | Sec 3.1.24.B Principal<br>Uses Permitted.<br>Sec 3.1.24.C Special<br>Land Uses   | Restaurant:<br>Fast food drive-<br>through | Yes          | Subject to City Council<br>approval upon Planning<br>Commission's<br>recommendation<br>The public hearing from<br>the previous Planning<br>Commission meeting<br>remained open so a<br>notice is not required | The applicant<br>understands this<br>requirement and<br>will submit the<br>required<br>applications and<br>documents to<br>support this<br>request |  |  |  |  |  |
| Phasing                                         | Provide phases lines<br>and detail description<br>of activities in each<br>phase | Phasing not<br>proposed                    | NA           |                                                                                                                                                                                                               | No response<br>required                                                                                                                            |  |  |  |  |  |
| <b>Planned Development S</b>                    | ite Plan Submittal Require                                                       | ments (Sec. 3.31.4.A                       | A)           |                                                                                                                                                                                                               |                                                                                                                                                    |  |  |  |  |  |
| Special Land Use<br>(Sec. 3.31.4.A.ii)          | Special Land use<br>requirements listed in<br>Sec. 6.1.2.C.                      |                                            | Yes          |                                                                                                                                                                                                               | Comment<br>acknowledged                                                                                                                            |  |  |  |  |  |

kimley-horn.com 1000 Town Center. Southfield, MI 48075

## Kimley **»Horn**

|                                                                            | of Michigan, Inc.                                                                                                                                                                                                                                                                  |                                                                           |           |                                                                                                                                                                                                     |                                                                                                                                                    |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Impact<br>Statement<br>(Sec. 3.31.4.A.iii)                       | Required according to<br>site plan manual (SDM<br>link: Site development<br>Manual)                                                                                                                                                                                                | Included                                                                  | Yes       |                                                                                                                                                                                                     | Comment<br>acknowledged                                                                                                                            |
| Traffic Study<br>(Sec. 3.31.4.A.iii)                                       | Required according to<br>site plan manual (SDM<br>link: Site development<br>Manual)                                                                                                                                                                                                | Included                                                                  | Yes       |                                                                                                                                                                                                     | No response<br>required                                                                                                                            |
| Planning Commission<br>Findings for Site plan<br>review<br>(Sec. 3.31.4.A) | The proposed site plan<br>meets the intent of<br>other items listed in<br>Section                                                                                                                                                                                                  |                                                                           | TBD       | PD Option and PSP can<br>proceed simultaneously –<br>Review conditions listed<br>in this section                                                                                                    | No response<br>required                                                                                                                            |
| Use Conditions for Allow                                                   | vable uses under PD-2 Option                                                                                                                                                                                                                                                       | on (Sec. 3.31.7.B)                                                        |           |                                                                                                                                                                                                     |                                                                                                                                                    |
| Fast food drive-thru<br>(Sec. 3.31.7.B.v.a)                                | When restaurants are<br>independently<br>freestanding uses and<br>not attached to or<br>otherwise clearly<br>accessory to a<br>principle use, they shall<br>be located no closer<br>than one-thousand<br>(1,000) feet from any<br>other such use on the<br>same side of the street | Carabba's<br>(south of site)<br>appears to be<br>closer than<br>1000 feet | Νο        | Deviation will be required<br>Deviation will be subject<br>to the Planning<br>Commission's<br>recommendation, which<br>will then go to City<br>Council for approval                                 | The applicant<br>understands this<br>requirement and<br>will submit the<br>required<br>applications and<br>documents to<br>support this<br>request |
| Minimum parcel size<br>(Sec. 3.31.7.B.v.b)                                 | 1.25 acres.                                                                                                                                                                                                                                                                        | 1.4 acres as<br>two separate<br>parcels<br>1.69 acres<br>proposed         | Yes       |                                                                                                                                                                                                     | No response<br>required                                                                                                                            |
| Traffic Circulation<br>(Sec. 3.31.7.B.v.c)                                 | The site plan shall be<br>designed to achieve<br>traffic circulation<br>features both within<br>the site and in relation<br>to access streets that<br>assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic.                                             | Traffic<br>recommends<br>approval                                         | Yes       | See Traffic Review for<br>comments<br>Deviation required for<br>mountable concrete<br>median drive approach<br>Sheet C5.4 shows the fire<br>truck path through<br>parking spaces – please<br>revise | See updated traffic<br>study dated May<br>13, 2024 and<br>responses to Traffic<br>Review comments<br>below                                         |
| Restaurant in the Chara                                                    | cter of a Fast Food Carryout                                                                                                                                                                                                                                                       | . Drive-In. Fast Foc                                                      | d Drive-T | hrough, or Fast Food Sit Down                                                                                                                                                                       | (Sec 4 40)                                                                                                                                         |
| Noise Impact<br>Statement<br>(Sec. 4.40.1)                                 | A noise impact<br>statement is required<br>subject to the<br>standards of Sec.<br>5.14.10.B.                                                                                                                                                                                       | Included                                                                  | Yes       |                                                                                                                                                                                                     | No response<br>required                                                                                                                            |
| Drive-through Lanes (Se                                                    | c. 5.3.11)                                                                                                                                                                                                                                                                         |                                                                           |           |                                                                                                                                                                                                     |                                                                                                                                                    |
| Drive-through Lanes<br>Separation (Sec.<br>5.3.11.A)                       | Drive-through lanes<br>shall be separate from<br>the circulation routes &<br>lanes necessary for<br>ingress to & egress from<br>the property                                                                                                                                       | Shown                                                                     |           |                                                                                                                                                                                                     | No response<br>required                                                                                                                            |
| Drive-through<br>setbacks<br>(Sec. 5.3.11.A,B)                             | Drive through shall<br>follow parking setback<br>requirements and<br>applicable parking lot<br>landscaping<br>requirements                                                                                                                                                         | Complies                                                                  |           |                                                                                                                                                                                                     | See responses to<br>Traffic Review and<br>Landscape Review<br>below                                                                                |



|                                                                                                 | of Michigan, Inc.                                                                                                                                                                                                                                              |                                                                                        | 1   |                                                                                                                                               | 7                                                                                                                                      |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Drive-through lanes<br>parking access (Sec.<br>5.3.11.C)                                        | Drive-through lanes<br>shall not utilize any<br>space which is<br>necessary for<br>adequate access to<br>parking spaces from<br>internal maneuvering<br>lanes                                                                                                  | 20' one-way<br>maneuvering<br>lane along<br>drive thru lane                            | Yes | See Traffic Review for<br>further details                                                                                                     | Maneuvering lanes<br>have been updated<br>to be a minimum of<br>20' wide. See<br>dimensions on<br>sheet C3.0.                          |
| Bypass Lane for<br>Drive-through (Sec.<br>5.3.11.D)                                             | Drive-through facilities<br>shall provide 1 bypass<br>lane, min. of 18 ft. in<br>width, unless otherwise<br>determined by the Fire<br>Marshal                                                                                                                  | Bypass lane<br>shown to be 20<br>feet wide                                             | Yes |                                                                                                                                               | See responses to<br>Fire Review and<br>Traffic Review<br>below                                                                         |
| Width & Centerline<br>Radius of Drive-<br>through Lanes<br>(Sec. 5.3.11.E,F,H)                  | Drive-through lanes<br>shall have a minimum<br>9 ft. width, centerline<br>radius of 25 ft. and a<br>minimum length of 19<br>ft.                                                                                                                                | 10 ft wide<br>25 ft centerline<br>radius                                               | yes | See Traffic Review for<br>additional comments                                                                                                 | Drive-through lanes<br>centerline radii<br>have been updated<br>to be 25'. See sheet<br>C3.0.                                          |
| Drive-Thru Stacking<br>Spaces<br>(Sec. 5.3.11.1)                                                | The distance between<br>the order board and<br>the pick-up window<br>shall store four (4)<br>vehicles, and four (4)<br>vehicles shall be stored<br>in advance of the<br>menu board (not<br>including the vehicles<br>at the pick-up window<br>and menu board). | Two menu<br>boards shown<br>Cars sketched<br>in to show<br>stacking                    | Yes | See Traffic Review for<br>additional comments –<br>although sketches are<br>provided, please<br>dimension the length of<br>the stacking space | See responses to<br>Traffic Review<br>comments below<br>Dimensions for the<br>stacking spaces has<br>been provided. See<br>sheet C3.0. |
| Drive-through Lane<br>Delineated<br>(Sec. 5.3.11.G)                                             | Drive-through lanes<br>shall be striped,<br>marked, or otherwise<br>delineated                                                                                                                                                                                 | Appears to<br>comply<br>Drive-through<br>lane<br>delineated by<br>concrete<br>pavement | Yes |                                                                                                                                               | To be provided<br>with Final Site Plan<br>submittal                                                                                    |
| Height, bulk, density an                                                                        | d area limitations (Sec 3.1.2                                                                                                                                                                                                                                  |                                                                                        |     |                                                                                                                                               |                                                                                                                                        |
| Frontage on a Public<br>Street<br>(Sec. 5.12)<br>Access To Major<br>Thoroughfare<br>(Sec. 5.13) | Frontage on a Public<br>Street is required.                                                                                                                                                                                                                    | Frontage on W<br>Oaks Drive and<br>Novi Road(due<br>to street<br>vacation)             | Yes | If you vacate Karevich Dr.<br>this site would be<br>considered a double<br>frontage lot (West Oaks Dr<br>and Novi Road)                       | Comment<br>acknowledged                                                                                                                |
| Minimum Zoning Lot<br>Size For each Unit in<br>Acres<br>(Sec 3.6.2.D)                           | Except where<br>otherwise provided in<br>this Ordinance, the<br>minimum lot area and                                                                                                                                                                           |                                                                                        | NA  |                                                                                                                                               |                                                                                                                                        |
| Minimum Zoning Lot<br>Size<br>For each Unit: Width<br>in Feet<br>(Sec 3.6.2.D)                  | width, and the<br>maximum percent of<br>lot coverage shall be<br>determined on the<br>basis of off-street<br>parking, loading<br>greenbelt screening,<br>yard setback, or<br>usable open space.                                                                |                                                                                        | NA  |                                                                                                                                               |                                                                                                                                        |
| Open Space Area                                                                                 |                                                                                                                                                                                                                                                                |                                                                                        | NA  |                                                                                                                                               |                                                                                                                                        |
| Maximum % of Lot<br>Area Covered                                                                | (Sec 3.6.2.D)                                                                                                                                                                                                                                                  | Building lot<br>coverage: 5.6%                                                         | Yes |                                                                                                                                               |                                                                                                                                        |

# Kimley »Horn

| (Dy All Puildings)             | of Michigan, Inc.                   |                  |     |                      |
|--------------------------------|-------------------------------------|------------------|-----|----------------------|
| (By All Buildings)             | 45ft. or 3 stories                  | 23 ft            | Yes |                      |
| Building Height<br>(Sec. 3.20) | whichever is less                   | 23 11            | 162 |                      |
| Outdoor Restaurants (Se        |                                     |                  |     |                      |
| Accessory Use                  | Outdoor seating as an               | 315 sq ft        |     |                      |
| (Sec. 4.84)                    | accessory use is                    | exterior seating | Yes |                      |
| (360. 4.04)                    | allowed per section                 | area             | 163 |                      |
|                                | 4.84.                               | aroa             |     |                      |
| Site Plan Review               | If the seating area is              |                  | TBD | Comment              |
| (Sec. 4.84.1)                  | proposed as part of a               |                  |     | acknowledged         |
| ( )                            | site plan application it            |                  |     | acknowledged         |
|                                | shall require site plan             |                  |     |                      |
|                                | review and approval                 |                  |     |                      |
|                                | by the Planning                     |                  |     |                      |
|                                | Commission                          |                  |     |                      |
| Building and fire              | Outdoor seating areas               |                  | TBD | Comment              |
| codes                          | shall also comply with              |                  |     | acknowledged         |
| (Sec. 4.84.1)                  | all applicable building             |                  |     |                      |
| Timings                        | and fire codes<br>Permitted between | Details          | Yes |                      |
| (Sec. 4.84.2)                  | March 1st and                       | included         | 162 |                      |
| [JEC. 4.04.2]                  | November 30 <sup>th</sup>           |                  |     |                      |
| Pathway                        | Outdoor seating areas               | 315 sq ft patio  | Yes | Sidewalk             |
| (Sec. 4.84.4)                  | shall be located in a               | area             |     | dimensions have      |
| ()                             | manner to maintain a                |                  |     | been added. See      |
|                                | minimum pathway                     |                  |     | sheet C3.0           |
|                                | width of six (6) feet               |                  |     | sneet C3.0           |
|                                | (clear of structures                |                  |     |                      |
|                                | such as light poles,                |                  |     |                      |
|                                | trees and hydrants)                 |                  |     |                      |
|                                | along the sidewalk                  |                  |     |                      |
| Enclosure                      | It shall be enclosed                |                  | NA  |                      |
| (Sec. 4.84.4)                  | where there is alcohol              |                  |     |                      |
| Location                       | service<br>If located in public,    |                  | NA  |                      |
| (Sec 4.84.5)                   | ROW, then approval                  |                  | INA |                      |
| (300 4.04.0)                   | from all relate                     |                  |     |                      |
|                                | agencies is required.               |                  |     |                      |
|                                | Additional                          |                  |     |                      |
|                                | requirements may                    |                  |     |                      |
|                                | apply.                              |                  |     |                      |
| Parking                        | For more than 20                    | Approximately    | Yes | 16 outdoor seats     |
| (Sec. 4.84.6)                  | seating, parking shall              | 15 seats         |     | are shown on sheet   |
|                                | be calculated.                      | appear to be     |     | C3.0 including one   |
|                                |                                     | shown            |     | ADA-accessible       |
|                                |                                     |                  |     | outdoor seat         |
| Hours of Operation             | Hours of operation                  | To be provided   | TBD | To be provided       |
| (Sec. 4.84.7)                  | same as inside                      | with FSP         |     | with Final Site Plan |
|                                | restaurant.                         | submittal        |     | submittal            |
| Building Setbacks (Sec. 3      | 3170)                               |                  |     | Subilitu             |
| Front @ W Oaks Drive           | 50 ft                               | 50.52 ft.        | Yes |                      |
| (South)                        | 0011                                | 00.02 11.        | .03 |                      |
| Exterior Side Yard @           | 50 ft                               | 80.52 ft.        | Yes |                      |
| Novi Road (East)               |                                     |                  |     |                      |
| Exterior Side Yard @ N         | 50 ft                               | 114.88 ft.       | Yes |                      |
| Karevich Drive                 |                                     |                  |     |                      |
| (North)                        |                                     |                  |     |                      |
| Exterior Side Yard @ N         | 50 ft                               | 161.78 ft.       | Yes |                      |
| Karevich Dr (West)             |                                     |                  |     |                      |
| Parking Setback (Sec. 3.3      |                                     |                  |     |                      |

## Kimley »Horn

|                                                                     | of Michigan, Inc.                                                                                                                                         |                                                                                                                                                                                                                |      |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Front @ W Oaks Drive<br>(South)                                     | 20ft.                                                                                                                                                     | 21 ft.                                                                                                                                                                                                         | Yes  |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Exterior side yard @ N<br>Karevich Drive (West)                     | 20ft.                                                                                                                                                     | Greater than 20 ft.                                                                                                                                                                                            | Yes  |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Exterior side yard @ N<br>Karevich Drive<br>(North)                 | 20ft.                                                                                                                                                     | 20.8 ft.                                                                                                                                                                                                       | Yes  |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Exterior Side Yard @                                                | 20ft.                                                                                                                                                     | 20.9 ft.                                                                                                                                                                                                       | Yes  | •                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                  |
| Novi Road (East)                                                    | ds for RC District (Sec. 3.6.2                                                                                                                            |                                                                                                                                                                                                                |      |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Exterior Side Yard                                                  | All exterior side yards                                                                                                                                   | Shown                                                                                                                                                                                                          | NA   | See comments above                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                  |
| Abutting a Street<br>(Sec 3.6.2.C)                                  | abutting a street shall<br>be provided with a<br>setback equal to front<br>yard.                                                                          |                                                                                                                                                                                                                |      |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Off-Street Parking in<br>Front Yard<br>(Sec 3.6.2.E)                | Off-Street parking is allowed in front yard                                                                                                               | Shown                                                                                                                                                                                                          | Yes  |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Distance Between<br>Buildings<br>(Sec 3.6.2.H)                      | It is governed be sec.<br>3.8.2 or by the<br>minimum setback<br>requirements,<br>whichever is greater.                                                    | Only one<br>proposed<br>building                                                                                                                                                                               | NA   |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Wetland/Watercourse<br>Setback<br>(Sec 3.6.2.M)                     | A setback of 25ft from<br>wetlands and from<br>high watermark course<br>shall be maintained.                                                              | No wetlands<br>present                                                                                                                                                                                         | NA   |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Additional Building<br>Height<br>(Sec 3.6.2.0)                      | Additional height up to<br>65ft may be allowed<br>for propertied within<br>1200ft form a freeway<br>subject to additional<br>conditions                   |                                                                                                                                                                                                                | NA   |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Parking setback<br>screening<br>(Sec 3.6.2.P)                       | Required parking<br>setback area shall be<br>landscaped per sec<br>5.5.3.                                                                                 | Landscape<br>plan provided                                                                                                                                                                                     | TBD  | See Landscape Review                                                                                                                                                                                                                                                 | See responses to<br>Landscape Review<br>below                                                                                                                                                                                                                                                    |
| Modification of<br>parking setback<br>requirements (Sec<br>3.6.2.Q) | The Planning<br>Commission may<br>modify parking<br>setback requirements<br>based on its<br>determination<br>according to Sec<br>3.6.2.Q.                 | Does not apply                                                                                                                                                                                                 | NA   |                                                                                                                                                                                                                                                                      | Comment<br>acknowledged                                                                                                                                                                                                                                                                          |
| Parking, Loading and Du                                             |                                                                                                                                                           |                                                                                                                                                                                                                | 1.52 |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                  |
| Number of Parking<br>Spaces<br>Sec. 5.2.12.C                        | Fast Food Restaurants<br>1 for every 2<br>employees, plus<br>1 for every 2 customers<br>allowed under<br>maximum capacity<br>(including waiting<br>areas) | 6 employees<br>per shift: 3<br>spaces<br>90 seats: 45<br>spaces<br>Total required:<br>3+ 45 = 48<br>Total provided:<br>53 (according<br>to site data<br>table)<br>It appears that<br>56 spaces are<br>provided | Yes  | See Traffic Review for<br>additional comments<br>Since 8 spaces are<br>provided in excess, the<br>applicant could consider<br>removing the parallel<br>parking spaces in from of<br>the pickup window on<br>either side of the drive isle<br>for better traffic flow | Site plan has been<br>revised to 48 spaces<br>total including 3<br>H/C parking spaces.<br>The landscape<br>review required<br>removal of 2<br>spaces. 2 of the<br>parallel spaces will<br>be dedicated to<br>order delivery and<br>2 spaces dedicated<br>to parallel parking.<br>See sheet C3.0. |

|                                                                                                          | of Michigan, Inc.                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                |                                                         | -                                                                                                       | •                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parking Space<br>Dimensions and<br>Maneuvering Lanes                                                     | 90° spaces: 9 ft. x 19 ft.<br>parking spaces with 24<br>ft. drives<br>45° spaces: 9 ft. x 18 ft.                                                                                                                                                                                                                                                                                   | 9 ft x 19 ft<br>proposed with<br>24 ft. drive                                                                                                  | Yes                                                     | See Traffic Review for<br>additional comments                                                           | 2 parallel parking<br>spaces are<br>proposed, the                                                                                                             |
| (Sec. 5.3.2)                                                                                             | with 15 ft. drives wide x 18 ft.<br>with 20 ft. drive                                                                                                                                                                                                                                                                                                                              | Also see comment above                                                                                                                         | parking spaces<br>layouts have been<br>revised to match |                                                                                                         |                                                                                                                                                               |
|                                                                                                          | 9 ft. x 17 ft. parking<br>spaces along 7 ft.<br>interior sidewalks,<br>provided a 4 in. curb<br>at these locations &<br>along landscaping                                                                                                                                                                                                                                          | 19 spaces, 9 ft.<br>x 17ft, not<br>along sidewalk                                                                                              | Yes                                                     |                                                                                                         | the parallel parking<br>requirements. See<br>sheet C3.0.<br>See responses to                                                                                  |
|                                                                                                          | O° Parallel parking<br>spaces: 8 ft x 23 ft with<br>13 ft drives and 6 ft<br>buffers                                                                                                                                                                                                                                                                                               | Varied lengths<br>for parallel<br>parking spaces<br>– all deficient<br>of the required<br>23 feet                                              | TBD                                                     |                                                                                                         | Traffic Review<br>below                                                                                                                                       |
| Parking stall located<br>adjacent to a<br>parking lot<br>entrance(public or<br>private)<br>(Sec. 5.3.13) | -shall not be located<br>closer than twenty-five<br>(25) feet from the<br>street right-of-<br>way(ROW) line, street<br>easement or sidewalk,<br>whichever is closer                                                                                                                                                                                                                | Parking spot<br>located in the<br>northwestern<br>corner of the<br>site appears to<br>be closer than<br>25 feet from<br>the street<br>easement | TBD                                                     | Please either revise the<br>plan so that this space is<br>shifted to the east or<br>request a deviation | The site has been<br>revised and shifted<br>west so the parallel<br>spaces are no<br>longer in violation<br>of the setback<br>requirement. See<br>sheet C3.0. |
| End Islands<br>(Sec. 5.3.12)                                                                             | -End Islands with<br>landscaping and<br>raised curbs are<br>required at the end of<br>all parking bays that<br>abut traffic circulation<br>aisles.<br>-The end islands shall<br>generally be at least 8<br>feet wide, have an<br>outside radius of 15<br>feet, and be<br>constructed 3' shorter<br>than the adjacent<br>parking stall as<br>illustrated in the Zoning<br>Ordinance | End islands are<br>3' shorter then<br>adjacent<br>parking stall<br>and appear to<br>comply with<br>the other<br>requirements                   | Yes                                                     | See Landscape Review<br>and Traffic Review for<br>additional comments                                   | Comment<br>acknowledged                                                                                                                                       |
| Barrier Free Spaces<br>Barrier Free Code                                                                 | For 51 to 75 spaces, 3<br>BF spaces are required                                                                                                                                                                                                                                                                                                                                   | 3 BF shown, 1<br>van accessible                                                                                                                | Yes                                                     |                                                                                                         |                                                                                                                                                               |
| <b>Barrier Free Space</b><br><b>Dimensions</b><br>Barrier Free Code                                      | <ul> <li>- 8' wide with an 8'</li> <li>wide access aisle got</li> <li>van accessible spaces</li> <li>- 8'wide with a 5' wide</li> <li>access aisle for regular</li> <li>accessible spaces</li> </ul>                                                                                                                                                                               | Shown                                                                                                                                          | Yes                                                     |                                                                                                         |                                                                                                                                                               |
| Barrier Free Signs<br>Barrier Free Code                                                                  | One sign for each<br>accessible parking<br>space.                                                                                                                                                                                                                                                                                                                                  | Signs Shown,<br>details and<br>dimensions<br>provided on<br>attachment                                                                         | Yes                                                     | See Traffic Review for<br>additional comments                                                           |                                                                                                                                                               |
| Minimum number of<br>Bicycle Parking<br>(Sec. 5.16.1)                                                    | 4 spaces required                                                                                                                                                                                                                                                                                                                                                                  | 3 bike hoops<br>proposed,<br>details of hoop<br>provided, but<br>not foundation                                                                | TBD                                                     | Please include bicycle<br>parking details in the next<br>submittal                                      | Bicycle parking<br>details have been<br>added for next                                                                                                        |

| of | Mich | igan | Inc. |
|----|------|------|------|

|                                                                                           | of Michigan, Inc.                                                                                                                                                                                                                                                                                                                               | r                                                                                                                                  |     |                                                                                                             | -                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                           |                                                                                                                                                                                                                                                                                                                                                 | and layout<br>(distance<br>between<br>hoops)                                                                                       |     | See Sec. 5.16 for bicycle<br>parking requirements                                                           | submittal. See<br>detail sheet, C8.1                                                                                                                                                                                        |
| <b>Bicycle Parking</b><br><b>General requirements</b><br>(Sec. 5.16)                      | No farther than 120 ft.<br>from the entrance<br>being served<br>When 4 or more<br>spaces are required for<br>a building with multiple<br>entrances, the spaces<br>shall be provided in<br>multiple locations                                                                                                                                    | Yes<br>One entrance<br>served                                                                                                      | Yes |                                                                                                             | Bicycle parking<br>details to be<br>provided in Final<br>Site Plan submittal                                                                                                                                                |
|                                                                                           | Spaces to be paved<br>and the bike rack shall<br>be inverted "U" design<br>Shall be accessible via<br>6 ft. paved sidewalk                                                                                                                                                                                                                      | sidewalk                                                                                                                           |     |                                                                                                             |                                                                                                                                                                                                                             |
| Bicycle Parking Lot<br>layout<br>(Sec 5.16.6)                                             | Parking space width: 7<br>ft.<br>One tier width: 11 ft.<br>Two tier width: 18 ft.<br>Maneuvering lane<br>width: 4 ft.<br>Parking space depth:<br>32 in.                                                                                                                                                                                         | Please provide<br>details in the<br>next submittal                                                                                 | TBD | See Comments Above                                                                                          | Bicycle parking<br>details to be<br>provided in Final<br>Site Plan submittal                                                                                                                                                |
| Loading Spaces<br>(Sec 5.16.6)                                                            | Within the RC districts,<br>loading, unloading<br>space shall be:<br>-provided in the rear<br>yard at a ratio of ten<br>(10) square feet for<br>each front foot of<br>building<br>-in the case of a<br>double frontage lot, in<br>the interior side yard,<br>beyond the minimum<br>side yard setback<br>requirement of the<br>district.         | Loading space:<br>10.5 ft. x 50ft.<br>(500 sq ft)                                                                                  | Yes |                                                                                                             |                                                                                                                                                                                                                             |
| Dumpster<br>Sec 4.19.2.F                                                                  | <ul> <li>Located in rear yard</li> <li>Attached to the<br/>building or</li> <li>No closer than 10 ft.<br/>from building if not<br/>attached</li> <li>Not located in<br/>parking setback</li> <li>If no setback, then it<br/>cannot be any closer<br/>than 10 ft., from<br/>property line.</li> <li>Away from Barrier<br/>free spaces</li> </ul> | Dumpster<br>shown and<br>enclosure is<br>attached to<br>the building<br>Located in<br>exterior side<br>yard<br>Details<br>provided | Yes | Location in the exterior<br>side yard will require a<br>deviation (3.6.2.C)<br>Acknowledged by<br>applicant | Dumpster and<br>enclosure is<br>provided in exterior<br>side yard away<br>from barrier-free<br>parking spaces<br>Details to be<br>provided with next<br>submittal<br>Comment about<br>required deviation<br>is acknowledged |
| <b>Dumpster Enclosure</b><br>Sec. 21-145. (c)<br>Chapter 21 of City<br>Code of Ordinances | <ul> <li>Screened from public view</li> <li>A wall or fence 1 ft. higher than height of refuse bin</li> <li>And no less than 5 ft. on three sides</li> </ul>                                                                                                                                                                                    | Screening<br>indicated                                                                                                             | Yes |                                                                                                             |                                                                                                                                                                                                                             |



|                                                                                                                                                                                                                      | of Michigan, Inc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                      | - Posts or bumpers to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | protect the screening                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | - Hard surface pad.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | - Screening Materials:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | Masonry, wood or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | evergreen shrubbery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | evergreensniobbery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                          | Yes        |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Accessory Structures                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          | res        |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Sec. 4.19                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          | X          |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Exterior lighting                                                                                                                                                                                                    | Photometric plan and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Photometric                                                                                                              | Yes        |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Sec. 5.7                                                                                                                                                                                                             | exterior lighting details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Plan included                                                                                                            |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | needed at time of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | Final Site Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | submittal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Roof top equipment                                                                                                                                                                                                   | -All roof top equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | None proposed                                                                                                            | Yes        |                                                                                                                                                   |                                                                                                                                                                                                                    |
| and wall mounted                                                                                                                                                                                                     | must be screened and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| equipment                                                                                                                                                                                                            | all wall mounted utility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Sec. 4.19.2.E.ii                                                                                                                                                                                                     | equipment must be                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | enclosed and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | integrated into the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | design and color of the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| <b>D</b> (1)                                                                                                                                                                                                         | building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Roof top                                                                                                                                                                                                             | Roof top                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| appurtenances                                                                                                                                                                                                        | appurtenances shall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| screening                                                                                                                                                                                                            | be screened in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | accordance with                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | applicable façade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | regulations, and shall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | not be visible from any                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | street, road, or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      | adjacent property                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Non-Motorized Facilitie                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |            |                                                                                                                                                   |                                                                                                                                                                                                                    |
| Non-Motorized Facilitie                                                                                                                                                                                              | s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <sup>9</sup> ' sidowalk                                                                                                  | Xoc        | Soo Engineering Poview                                                                                                                            | Coo more another                                                                                                                                                                                                   |
| Article XI. Off-Road                                                                                                                                                                                                 | s<br>A 6 foot sidewalk is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8' sidewalk                                                                                                              | Yes        | See Engineering Review                                                                                                                            | See responses to                                                                                                                                                                                                   |
| Article XI. Off-Road<br>Non-Motorized                                                                                                                                                                                | s<br>A 6 foot sidewalk is<br>required along                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | proposed                                                                                                                 | Yes        | See Engineering Review                                                                                                                            | See responses to<br>Engineering Review                                                                                                                                                                             |
| Article XI. Off-Road                                                                                                                                                                                                 | A 6 foot sidewalk is<br>required along<br>collector and arterial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | proposed<br>along Novi                                                                                                   | Yes        | See Engineering Review                                                                                                                            |                                                                                                                                                                                                                    |
| Article XI. Off-Road<br>Non-Motorized                                                                                                                                                                                | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | proposed                                                                                                                 | Yes        | See Engineering Review                                                                                                                            | Engineering Review                                                                                                                                                                                                 |
| Article XI. Off-Road<br>Non-Motorized                                                                                                                                                                                | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be                                                                                                                                                                                                                                                                                                                                                                                                                                              | proposed<br>along Novi                                                                                                   | Yes        | See Engineering Review                                                                                                                            | Engineering Review                                                                                                                                                                                                 |
| Article XI. Off-Road<br>Non-Motorized                                                                                                                                                                                | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | proposed<br>along Novi                                                                                                   | Yes        | See Engineering Review                                                                                                                            | Engineering Review                                                                                                                                                                                                 |
| Article XI. Off-Road<br>Non-Motorized                                                                                                                                                                                | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be<br>connected to sidewalk                                                                                                                                                                                                                                                                                                                                                                                                                     | proposed<br>along Novi<br>Road                                                                                           | Yes        | See Engineering Review                                                                                                                            | Engineering Review                                                                                                                                                                                                 |
| Article XI. Off-Road<br>Non-Motorized                                                                                                                                                                                | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be                                                                                                                                                                                                                                                                                                                                                                                                                                              | proposed<br>along Novi<br>Road<br>Exits are                                                                              | Yes        | See Engineering Review                                                                                                                            | Engineering Review                                                                                                                                                                                                 |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities                                                                                                                                                                  | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be<br>connected to sidewalk<br>system or parking lot.                                                                                                                                                                                                                                                                                                                                                                                           | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks                                                 |            |                                                                                                                                                   | Engineering Review<br>below.                                                                                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian                                                                                                                                                    | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be<br>connected to sidewalk<br>system or parking lot.<br>Assure safety and                                                                                                                                                                                                                                                                                                                                                                      | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   | Yes<br>TBD | See Traffic Review for                                                                                                                            | Engineering Review<br>below.                                                                                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities                                                                                                                                                                  | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be<br>connected to sidewalk<br>system or parking lot.<br>Assure safety and<br>convenience of both                                                                                                                                                                                                                                                                                                                                               | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks                                                 |            |                                                                                                                                                   | Engineering Review<br>below.                                                                                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian                                                                                                                                                    | s<br>A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads<br>Building exits must be<br>connected to sidewalk<br>system or parking lot.<br>Assure safety and<br>convenience of both<br>vehicular and                                                                                                                                                                                                                                                                                                                              | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.                                                                                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian                                                                                                                                                    | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both                                                                                                                                                                                                                                                                                                            | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.                                                                                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian                                                                                                                                                    | S         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in                                                                                                                                                                                                                                                          | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian                                                                                                                                                    | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access                                                                                                                                                                                                                                                                  | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity                                                                                                                                    | S         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in                                                                                                                                                                                                                                                          | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian                                                                                                                                                    | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access                                                                                                                                                                                                                                                                  | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity                                                                                                                                    | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access                                                                                                                                                                                                                                                                  | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to                                   |            | See Traffic Review for                                                                                                                            | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review                                                                                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements                                                                                                              | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets                                                                                                                                                                                                                                                          | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments                                                                                                     | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.                                                                                                             |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and                                                                                                | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes                                                                                                                                                                                                          | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments                                                                                                     | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be                                                                            |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction                                                                                | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for                                                                                                                                                                                           | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments                                                                                                     | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction                                                                                | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot                                                                                                                                                                       | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals                                  |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction                                                                                | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and                                                                                                                                                 | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments                                                                                                     | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in                                                       |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction                                                                                | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot                                                                                                                                                                       | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel                   |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction                                                                                | S         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and                                                                                                                                                 | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual                                                            | S         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in<br>relation to access<br>streets         Land description,<br>Sidwell number (metes<br>and bounds for<br>acreage parcel, lot<br>number(s), Liber, and<br>page for subdivisions).                                                                         | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel                   |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and                                      | S         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in<br>relation to access<br>streets         Land description,<br>Sidwell number (metes<br>and bounds for<br>acreage parcel, lot<br>number(s), Liber, and<br>page for subdivisions).         Location of all existing                                        | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply<br>Appears to<br>comply | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and<br>dimension of                      | S         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in<br>relation to access<br>streets         Land description,<br>Sidwell number (metes<br>and bounds for<br>acreage parcel, lot<br>number(s), Liber, and<br>page for subdivisions).         Location of all existing<br>and proposed                        | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply                         | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and                                      | s         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in<br>relation to access<br>streets         Land description,<br>Sidwell number (metes<br>and bounds for<br>acreage parcel, lot<br>number(s), Liber, and<br>page for subdivisions).         Location of all existing<br>and proposed<br>buildings, proposed | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply<br>Appears to<br>comply | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and<br>dimension of                      | S         A 6 foot sidewalk is<br>required along<br>collector and arterial<br>roads         Building exits must be<br>connected to sidewalk<br>system or parking lot.         Assure safety and<br>convenience of both<br>vehicular and<br>pedestrian traffic both<br>within the site and in<br>relation to access<br>streets         Land description,<br>Sidwell number (metes<br>and bounds for<br>acreage parcel, lot<br>number(s), Liber, and<br>page for subdivisions).         Location of all existing<br>and proposed                        | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply<br>Appears to<br>comply | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and<br>dimension of<br>proposed physical | s         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and page for subdivisions).         Location of all existing and proposed buildings, proposed building heights,                                     | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply<br>Appears to<br>comply | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and<br>dimension of<br>proposed physical | s         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and page for subdivisions).         Location of all existing and proposed buildings, proposed building layouts, (floor                              | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply<br>Appears to<br>comply | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |
| Article XI. Off-Road<br>Non-Motorized<br>Facilities<br>Pedestrian<br>Connectivity<br>Other Requirements<br>Design and<br>Construction<br>Standards Manual<br>General layout and<br>dimension of<br>proposed physical | s         A 6 foot sidewalk is required along collector and arterial roads         Building exits must be connected to sidewalk system or parking lot.         Assure safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets         Land description, Sidwell number (metes and bounds for acreage parcel, lot number(s), Liber, and page for subdivisions).         Location of all existing and proposed buildings, proposed building heights,                                     | proposed<br>along Novi<br>Road<br>Exits are<br>connected to<br>sidewalks<br>Appears to<br>comply<br>Appears to<br>comply | TBD        | See Traffic Review for<br>additional comments<br>New Sidwell number will<br>need to be used once<br>parcel combination and<br>street vacation are | Engineering Review<br>below.<br>See responses to<br>Traffic Review and<br>Engineering Review<br>below.<br>New sidwell<br>number will be<br>added to plans in<br>future submittals<br>once parcel<br>combination is |



|                                      | of Michigan, Inc.                         |                  | 1   |                               | I                  |
|--------------------------------------|-------------------------------------------|------------------|-----|-------------------------------|--------------------|
|                                      | parking and parking                       |                  |     |                               |                    |
|                                      | layout, streets, and                      |                  |     |                               |                    |
|                                      | drives, and indicate                      |                  |     |                               |                    |
|                                      | square footage of                         |                  |     |                               |                    |
|                                      | pavement area                             |                  |     |                               |                    |
|                                      | (indicate public or private).             |                  |     |                               |                    |
| Economic Impact                      | - Total cost of the                       | Not Included     | No  | Please include the total      | To be included as  |
|                                      | proposed building &                       | NOTIFICIOLEU     | NO  | cost and number of            |                    |
|                                      | site improvements                         |                  |     | anticipated jobs with the     | part of Final Site |
|                                      | - Number of                               |                  |     | Final Site Plan submittal     | Plan submittal     |
|                                      | anticipated jobs                          |                  |     |                               |                    |
|                                      | created (during                           |                  |     |                               |                    |
|                                      | construction & after                      |                  |     |                               |                    |
|                                      | building is occupied, if                  |                  |     |                               |                    |
|                                      | known)                                    |                  |     |                               |                    |
| Development/                         | - Signage if proposed                     | Proposed         | TBD | For further information       | Comment            |
| Business Sign & Street               | requires a permit.                        | signage not      |     | contact Ordinance             | acknowledged.      |
| addressing                           | - The applicant should                    | reviewed at this |     | <u>248-347-0438 if a sign</u> | Applicant and/ or  |
|                                      | contact the Building                      | time             |     | permit is required.           | engineer will      |
|                                      | Division for an address                   |                  |     |                               | contact Ordinance  |
|                                      | prior to applying for a                   |                  |     |                               | Department at the  |
|                                      | building permit.                          |                  |     |                               | number listed if a |
|                                      |                                           |                  |     |                               | sign is proposed   |
| Project and Street                   | Some projects may                         |                  | TBD |                               | Comment            |
| naming                               | need approval from                        |                  |     |                               | acknowledged       |
| U U                                  | the Street and Project                    |                  |     |                               | ucknowledged       |
|                                      | Naming Committee.                         |                  |     |                               |                    |
| Property Split                       | The proposed property                     | No split         | NA  | Parcels 22-15-200-097         | To be completed    |
|                                      | split must be submitted                   | proposed         |     | and 22-15-200-098 will        | concurrent with    |
|                                      | to the Assessing                          |                  |     | need to be combined           | Final Site Plan    |
|                                      | Department for                            |                  |     | prior to final approval       |                    |
|                                      | approval.                                 |                  |     | Acknowledged by               |                    |
|                                      |                                           |                  |     | applicant                     |                    |
| Lighting and Photometri              | ic Plan (Sec. 5.7)                        | <u> </u>         |     |                               |                    |
| Intent (Sec. 5.7.1)                  | Establish appropriate                     |                  | Yes |                               |                    |
|                                      | minimum levels,                           |                  |     |                               |                    |
|                                      | prevent unnecessary                       |                  |     |                               |                    |
|                                      | glare, reduce spillover                   |                  |     |                               |                    |
|                                      | onto adjacent                             |                  |     |                               |                    |
|                                      | properties, & reduce                      |                  |     |                               |                    |
|                                      | unnecessary<br>transmission of light into |                  |     |                               |                    |
|                                      | the night sky.                            |                  |     |                               |                    |
|                                      | Site plan showing                         |                  | Yes |                               |                    |
|                                      | location of all existing                  |                  |     |                               |                    |
|                                      | & proposed buildings,                     |                  |     |                               |                    |
|                                      | landscaping, streets,                     |                  |     |                               |                    |
|                                      | drives, parking areas &                   |                  |     |                               |                    |
|                                      | exterior lighting fixtures.               |                  | L   |                               |                    |
| Security Lighting                    | - All fixtures shall be                   | Provided         | Yes |                               |                    |
| (Sec. 5.7.3.H)                       | located, shielded, and                    |                  |     |                               |                    |
| Lighting for security                | aimed at the areas to                     |                  |     |                               |                    |
| purposes shall be                    | be secured.                               |                  |     |                               |                    |
| directed only onto<br>the area to be | - Fixtures mounted on the building and    |                  |     |                               |                    |
|                                      | designed to illuminate                    |                  |     |                               |                    |
|                                      |                                           |                  |     | 1                             |                    |
| secured.                             |                                           |                  |     |                               |                    |
| securea.                             | the facade are preferred.                 |                  |     |                               |                    |

|                                                | of Michigan, Inc.                                                                                                                                                                                                                                                                                        |                                                                              |            |   |  |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------|---|--|
| Building Lighting<br>(Sec. 5.7.2.A.iii)        | Relevant building<br>elevation drawings<br>showing all fixtures, the<br>portions of the walls to<br>be illuminated,<br>illuminance levels of<br>walls and the aiming<br>points of any remote<br>fixtures.                                                                                                | Lighting shown<br>on building<br>elevations                                  | Yes        |   |  |
| Lighting Standards<br>(Sec.5.7.A.2)            | Specifications for all<br>proposed & existing<br>lighting fixtures.                                                                                                                                                                                                                                      | Included                                                                     | Yes        |   |  |
|                                                | Photometric data                                                                                                                                                                                                                                                                                         | Included                                                                     | Yes        |   |  |
|                                                | Fixture height                                                                                                                                                                                                                                                                                           | Included                                                                     | Yes        |   |  |
|                                                | Mounting & design                                                                                                                                                                                                                                                                                        | Included                                                                     | Yes        |   |  |
|                                                | Glare control devices                                                                                                                                                                                                                                                                                    | Included                                                                     | Yes        |   |  |
|                                                | Type & color rendition<br>of lamps                                                                                                                                                                                                                                                                       | Included                                                                     | Yes        |   |  |
|                                                | Hours of operation                                                                                                                                                                                                                                                                                       | Included                                                                     | Yes        |   |  |
|                                                | Photometric plan<br>illustrating all light<br>sources that impact<br>the subject site,<br>including spill-over<br>information from<br>neighboring properties.                                                                                                                                            | Included                                                                     | Yes        |   |  |
| Maximum Height                                 | Height not exceed                                                                                                                                                                                                                                                                                        | Max is 25 feet                                                               | Yes        |   |  |
| (Sec 5.7.3.A)                                  | maximum height of<br>zoning district (or 25 ft),<br>where adjacent to<br>residential districts or<br>uses.                                                                                                                                                                                               | Not adjacent<br>to residential                                               |            |   |  |
| Standard Notes<br>(Sec. 5.7.3.B)               | <ul> <li>Electrical service to<br/>light fixtures shall be<br/>placed underground</li> <li>Flashing light shall not<br/>be permitted</li> <li>Only necessary<br/>lighting for security<br/>purposes &amp; limited<br/>operations shall be<br/>permitted after a site's<br/>hours of operation</li> </ul> | Included                                                                     | Yes        |   |  |
| Average Light level                            | Average light level of                                                                                                                                                                                                                                                                                   | 3.6:1 in exterior                                                            | Yes        |   |  |
| ratio (Sec. 5.7.3.E)                           | the surface being lit to<br>the lowest light of the<br>surface being lit shall<br>not exceed 4:1.                                                                                                                                                                                                        | area and 3.9:1<br>in parking lot                                             |            |   |  |
| Color Spectrum<br>Management<br>(Sec. 5.7.3.F) | For all permanent<br>lighting installations –<br>minimum Color<br>Rendering Index of 70<br>and Correlated Color<br>Temperature of no<br>greater than 3000<br>Kelvin                                                                                                                                      | All products<br>show<br>compliance<br>with minimum<br>CRI and<br>maximum CCT | Yes        |   |  |
| Min. Illumination<br>(Sec. 5.7.3.k)            | Parking areas: 0.2 min<br>Loading & unloading<br>areas: 0.4 min                                                                                                                                                                                                                                          | All in<br>compliance                                                         | Yes<br>Yes | - |  |
|                                                | Walkways: 0.2 min                                                                                                                                                                                                                                                                                        |                                                                              | Yes        |   |  |

|                                                                        | of Michigan, Inc.                                                                                                                                                                    |                                |     |  |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----|--|
|                                                                        | Building entrances,<br>frequent use: 1.0 min                                                                                                                                         |                                | Yes |  |
|                                                                        | Building entrances,<br>infrequent use: 0.2 min                                                                                                                                       |                                | Yes |  |
| Max. Illumination<br>adjacent to Non-<br>Residential<br>(Sec. 5.7.3.K) | When site abuts a non-<br>residential district:<br>- Maximum illumination<br>at the property line<br>shall not exceed 1 foot<br>candle.                                              | Appears to<br>comply           | Yes |  |
| Cut off Angles<br>(Sec. 5.7.3.L)                                       | When adjacent to<br>residential districts:<br>-All cut off angles of<br>fixtures must be 90°<br>-Maximum illumination<br>at the property line<br>shall not exceed 0.5<br>foot candle | Not adjacent<br>to residential | NA  |  |

### 2024-0229 - ENGINEERING REVIEW (JSP23-0037) COMMENTS

### **General Comments**

- North Karevich ROW vacation will be needed. The draft maintenance/access easement has been submitted. The access agreement should also include the cross access for the Value City customers. This can all be included into the one agreement. The draft maintenance/access easement agreement has been revised to include cross access for Value City customers.
- Provide at least two reference benchmarks at intervals no greater than 1,200 feet. At least one referenced benchmark must be a City-established benchmark, refer to City of Novi Survey Benchmarks Arch Map. Benchmark 1522 is located at the crossing of West Oaks Drive and S Karevich Drive.
   The benchmark 1522 will be added to the list of benchmarks in the future for incorporation

The benchmark 1522 will be added to the list of benchmarks in the future for incorporation into the plans.

- Provide a note on the plans that all work shall conform to the current City of Novi standards and specifications.
   The note has been added to the plan set, see sheet C3.0.
- 4. Only at the time of the printed Stamping Set submittal, provide the City's standard detail sheets for water main (5 sheets), sanitary sewer (3 sheets), storm sewer (2 sheets), and paving (2 sheets). The most updated details can be found on the City's website under Engineering Standards and Construction Details. The standard detail sheets will be provided during the stamping set submittal process.
- 5. A Right-of-Way Permit will be required from the City of Novi for proposed sidewalk. A right of way permit will be submitted for the proposed walk.
- Provide sight distance measurements for the West Oaks Drive entrance in accordance with Figure VIII-E of the Design and Construction Standards, Chapter 11 of the City of Novi Code of Ordinances.
   Site distance triangles have been added to the landscape plan, see sheet L.1.1
- 7. Provide a traffic control sign table listing the quantities of each **permanent** sign type proposed for the development. Provide a note along with the table stating all traffic signage will comply with the



current MMUTCD standards.

A sheet has been added for detailing the site signage and quantities as mentioned, see sheet C9.0

- Provide a note that compacted sand backfill (MDOT sand Class II) Shall be provided for all utilities within the influence of paved area; illustrate and label on the profiles.
   The note mentioned has been added to the utility plan, see sheet C5.0
- Provide construction materials table on the utility plan listing the quantity and material type for each utility (water, sanitary and storm) being proposed.
   The note mentioned has been added to the utility plan, see sheet C5.0
- Provide a utility crossing table indicating that at least 18-inch vertical clearance will be provided, or that additional bedding measures will be utilized at points of conflict where adequate clearance cannot be maintained.
   The approximate table mentioned has been added to the utility plan, and about C5.0

The crossing table mentioned has been added to the utility plan, see sheet C5.0

- 11. Provide a note stating if dewatering is anticipated or encountered during construction, then a dewatering plan must be submitted to the Engineering Division for review. The note mentioned has been added to the utility plan, see sheet C5.0
- 12. The grading and SESC sheets shall show the tree fence at least as far from the trunk as the critical root zone, defined as a circular area around a tree with a radius measured to the tree's longest dripline radius plus one (1) foot. No grading shall occur within the dripline. If the critical root zone is not fully protected, then replacements for that tree may be required. The grading and associated SESC measures have been revised as mentioned, see sheet C6.0

### Water Main

- 13. All water main easements shall be 20-feet wide. Revise the proposed easement accordingly. The proposed water main easements have been revised accordingly to 20' width. See sheet C5.0
- 14. Place the hydrants at least 7 feet off back of curb (allowing 3-foot clearance from sidewalk). The proposed hydrant has been revised to 7' off the back of curb, see sheet C5.0
- 15. A tapping sleeve, valve and well is required at the connection to the existing water main. The connections at the main have notes as mentioned, see sheet C5.0
- 16. Per current EGLE requirement, provide a profile for all proposed water main 8-inch and larger. An 8-inch main is required for the proposed hydrant, additionally a 20-foot easement should be shown around the main and the hydrant. The proposed water main profiles have been added as mentioned, see the new sheet C5.5.
- 17. 6-inch hydrant leads are allowed for leads less than or equal to 25 feet in length. 8-inch leads are required for leads greater than 25 feet in length.
   The hydrant leads have been revised to 6 inch within 25' and a reducer for any longer length to 8 inch.
- 18. All gate valves 6" or larger shall be places in a well with the exception of a hydrant shut off valve. A valve shall be placed in a box for water main smaller than 6". Comment acknowledged, see sheet C5.0, the valves are shown in wells as mentioned.

of Michigan, Inc.

- 19. Indicate why 2 water service leads are shown on the plans, label fire suppression. The plans have been revised to include a single service lead, see sheet C5.0. A label has been added to label fire suppression.
- 20. A sealed set of utility plans along with the Michigan Department of Environment, Great Lakes & Energy (EGLE) permit application for mater main construction, the Streamlined Water Main Permit Checklist, Contaminated Site Evaluation Checklist, and an electronic version of the utility plan should be submitted to the Engineering Division for review, assuming no further design changes are anticipated. Utility plan sets shall include only the cover sheet, and applicable utility sheets, and the standard detail sheets.

The permit application as mentioned will be provided as mentioned for submittal to EGELE.

### Irrigation Comments

21. Irrigation plans are not approved see attached letter dated 6/7/2024 The irrigation plans have been revised per the attached letter, see sheets 18 and 20.

### Sanitary Sewer

- Provide a sanitary sewer monitoring manhole, unique to this site, within a dedicated access easement or within the road right-of-way. Label Monitoring Manhole.
   The monitoring manhole has been added to replace the cleanout, see sheet C5.0 and sheet C5.3
- 23. Provide a sanitary sewer basis of design for the development on the utility plan sheet. (Calculations should use peaking factor of 4.0 and 3.2 People/REU)? The basis of design for the sanitary sewer has been added to sheet C5.3.
- 24. Provide a note on the Utility Plan and sanitary profile stating the sanitary leads will be buried at least 5 feet deep where under the influence of pavement. The note has been added to the sanitary sewer sheet as mentioned, see sheet C5.3.
- 25. For 8-inch and larger extensions Provide a testing bulkhead immediately upstream of the sanitary connection point. Additionally, provide a temporary 1-foot-deep sump in the first sanitary structure proposed upstream of the connection point, and provide a secondary water tight bulkhead in the downstream side of this structure. A note has been added to the Sanitary Utility Plan sheet as mentioned, see sheet C5.3.
- 26. Provide an internal drop connection if inlet pipe enters the manhole at an invert elevation 18 inches or greater above the invert elevation of the outlet pipe. Internal drop connections require a minimum 5-foot diameter structure. Internal drops have been added as required, see sheet C5.3.
- Illustrate all pipes intersecting with manholes on the sanitary profiles.
   All intersecting pipes have been added to the manholes on the sanitary profiles, see sheet C5.3.
- 28. Three (3) sealed sets of revised utility plans along with the Michigan Department of Environment, Great Lakes & Energy (EGLE) permit application, electronic utility plan for sanitary sewer construction, and the Streamlined Sanitary Sewer Permit Certification Checklist should be submitted to the Engineering Division for review, assuming no further design changes are anticipated. Utility plan sets shall include only the cover sheet, any applicable utility sheets, and the standard detail sheets. It should be indicated with the application if an expedited EGLE review is requested. EGLE will charge a fee that can be paid directly to the State.

of Michigan, Inc.

The permit application as mentioned will be provided as mentioned for submittal to EGELE.

### Storm Sewer

- 29. Provide a 0.1-foot drop in the downstream, invert of all storm structures where a change in direction of 30 degrees or greater occurs.
  0.1 foot drop has been added as mentioned where necessary, see plan sheets C5.1 and C5.2.
- 30. Match the 0.80 diameter depth above invert for pipe size increases. Pipes have been revised to match 0.8 inverts for pipe size increases as mentioned, see plan sheets C5.1 and C5.2.
- Storm manholes with differences in invert elevations exceeding two feet shall contain a 2-footdeep plunge pool.
   Structures have been revised for sumps as mentioned, see plan sheets C5.1 and C5.2.
- Provide a four-foot-deep sump and an oil/gas separator in the last storm structure prior to discharge off-site/to the storm water basin.
   The last downstream structure layout has been revised as mentioned, see plan sheets C5.1 and C5.2.
- 33. Label all inlet storm structures on the profiles. Inlets are only permitted on paved areas and when followed by a catch basin within 50-feet. The labels for the storm structures have add to the profile sheets, see plan sheets C5.1 and C5.2.
- Label the 10-year HGL on the storm sewer profiles and ensure the HGL remains at least 1-foot below the rim of each structure.
   The HGL and label have been added to the profile sheets, see plan sheets C5.1 and C5.2.
- 35. Illustrate all pipes intersecting storm structures on the storm profiles. Existing water amin and sanitary lead not shown on profiles.
   All intersecting pipes have been added the storm sewer profile sheets, see plan sheets C5.1 and C5.2.
- 36. Provide a schedule listing the casting type, rim elevation, diameter, and invert sizes/elevations for each proposed, adjusted, or modified storm structure on the utility plan. Round castings shall be provided on all catch basins except curb inlet structures.
  A storm sewer structure schedules has been added All intersecting pipes have been added the storm sewer profile sheets, see plan sheets C5.1 and C5.2.
- 37. Show and label all roof conductors and show where they tie into the storm sewer. All roof drains have been added to the plan and profile views and structure tables, see sheets C5.1 and C5.2
- Provide the storm sewer design table for this site.
   A storm sewer capacity design table has been added the storm sewer profile sheet, see plan sheet C5.2.

### Storm Water Management Plan



- The Storm Water Management Plan (SWMP) for this development shall be designed in accordance with the Storm Water Ordinance and Chapter 5 of the Engineering Design Manual. The SWMP sheet has been added for supporting calcs and information, see plan sheet C6.1.
- 40. This site will ultimately discharge into the West Oaks Regional Detention Basin, provide total amount of pervious vs impervious area. This is needed to calculate the Stormwater Detention fees.

The calculations as mentioned have been provided on the SWMP sheet has been added for supporting calcs and information, see plan sheet C6.1.

- 41. As part of the Storm Drainage Facility Maintenance Easement Agreement, provide an access easement for maintenance over the pretreatment structure. Also, include an access easement to the detention area from the public road right-of-way. An access easement for maintenance of the pretreatment structure will be submitted to the City. There is no defined detention area for this site, therefore an access easement to the public road right of way may not apply in this instance.
- 42. Provide manufacturer's details and sizing calculations for the pretreatment structure(s) on the plans. Provide drainage area and runoff coefficient calculations specific to the area tributary to each treatment structure. The treated floe rate should be based on the 1-year storm event intensity (~1.6 In/Hr). Higher flows shall be bypassed.
  Manufacturer details and sizing for the pretreatment structure have been added on a separate sheet from the Stormwater Management sheet. See plan sheet C6.2. Tributary area calcs for each structure can be found on sheet C6.0.
- Provide supporting calculations for the runoff coefficient determination. A runoff coefficient of 0.35 shall be used for all turf grass lawns (mowed lawns) and 0.95 shall be used for all impervious surfaces. Provide overall C factor for site.
   Runoff coefficient calcs can be seen on sheet C6.1.

### Paving & Grading

- 44. Provide a construction materials table on the Paving Plan listing the quantity and material type for each pavement cross-section being proposed. Tables as mentioned have been added to the site plan, see sheet C3.0.
- 45. Provide grades for the proposed sidewalk along North Karevich Drive. Grades and elevations for the proposed sidewalk can be found on sheet C4.1.
- 46. Provide a minimum of 6 spot elevations where the pathway crosses each driveway (one at each corner and two in the center of the driveway on each side of the pathway). Spot elevations shall be provided to demonstrate a level landing adjacent to each side of the pathway crossing. The grading plan has been revised to include the spot elevations as mentioned, see sheet C4.0.
- 47. No more than ¼" vertical obstacle shall be allowed at each transition between the pathway and the drive approach.
  A note has been added to the grading plan, see sheet C4.0.
- 48. Indicate the heavy-duty pavement is proposed, city standard asphalt and concrete detail can support truck load. If a non-standard cross-section is being proposed show cross section on plans.

The pavement cross section and labels have been revised to a city standard cross section,



- 49. Provide dumpster pad cross-section or refer to city standard. The plans have been revised to include the City standard for the dumpster pad.
- 50. Provide spot elevations at the intersection of the proposed pathway with the existing pathway. The proposed pathway will match the existing elevations of the existing pathway. See "Match Existing" grades shown on sheet C4.1.
- 51. Detectable warning plates are required at all barrier free ramps, hazardous vehicular crossings and other areas where the sidewalk is flush with the adjacent drive or parking pavement. The barrier-free ramps shall comply with current MDOT specifications for ADA Sidewalk Ramps. Provide the latest version of MDOT standard detail for detectable surfaces. Warning plates have been added as mentioned, see sheet C3.0.
- Label specific ramps locations on the plans where the detectable warning surface is to be installed.
   Warning plates have been added as mentioned, see sheet C3.0.
- 53. Specify the product proposed and provide a detail for the detectable warning surface for barrier free ramps. The product shall be the concrete-embedded detectable warning plates, or equal, and shall be approved by the Engineering Division. Stamped concrete will not be acceptable. Warning plates and specs have been added as mentioned, see sheet C3.0.
- 54. Verify slopes along the ingress/egress routing to the building from the barrier-free stalls. All barrier-free stalls shall comply with Michigan Barrier-Free regulations. See sheet C4.1 for more detail around the barrier-free stalls.
- 55. Provide existing and proposed contours on the Grading Plan at the time of the Final Site Plan submittal.
  Comment acknowledged; this information will be provided in Final Site Plan submittal.
- 56. Provide a note on the grading plan stating that the proposed pathway within the road right-of-way shall match existing grades at both ends. The note has been added as mentioned, see sheet C4.0.
- 57. Provide at least 3-foot of buffer distance between the sidewalk and any fixed objects, including hydrants and irrigation backflow devices. Include a note on the plan where the 3-foot separation cannot be provided. The buffer has been verified and a note has been added to the plans, see sheet C4.0.
- 58. Show proposed grades for al adjusted sanitary, water, and storm structures. Proposed rim elevations have been added for all structures, see sheet C4.0.
- Site grading shall be limited to 1V:4H (25-percent), excluding landscaping berms. Numerous area appear to exceed this standard.
   Site grading labels have been added to perimeter grading areas, see sheet C4.0.
- Provide spot grades along property lines adjacent to perimeter curb at 200-foot intervals to demonstrate site drainage is self-contained.
   Spot elevations have been added to perimeter grading areas, see sheet C4.0.
- 61. Provide additional spot grades as necessary to demonstrate that a minimum 5-percent slope



away from the building is provided for a minimum distance of ten feet around the perimeter of the building.

Spot elevations have been added to perimeter of the building, see sheet C4.0.

- The City standard straight-faced curb (MDOT F-4 curb detail) shall be provided. Remove detail and attach City standard paving details.
   see sheet C4.0.
- 63. Provide top of curb/walk and pavement/gutter grades to indicate height of curb adjacent to parking stall or drive areas. Spot elevations have been added as mentioned, see sheet C4.0.
- 64. Dimensions of parking stall abutting a curb or sidewalk are to the face of curb or walk. All other dimensions are back of curb unless otherwise indicated. Dimensions have been revised accordingly, see sheet C3.0.
- 65. Curbing and walks adjacent to the end of 17-foot stalls shall be reduced to 4-inches high. The grading sheet shows that the curb on the north side of the property is 6-inches adjacent to the 17-foot stalls. Show 2-foot overhang on the paving sheets. The grading for curbs and walks has been revised as mentioned, see sheet C4.0.

#### Soil Erosion and Sediment Control

66. A SESC permit is required. A full review has not been completed at this time. A review will be done then a completed packet is submitted to Sarah Marchioni at Community Development. A SESC permit will be submitted for review as mentioned.

#### **Off-Site Easements**

- 67. Any off-site utility easements anticipated must be executed **prior to Stamping Set Approval**. If you have not already done so, drafts of the easements and a recent title search shall be submitted to the Community Development Department as soon as possible for review and shall be approved by the Engineering Division and the City Attorney prior to executing the easements. **Drafts of the mentioned easements have been submitted to the City for review**.
- 68. Off-site Sanitary Sewer Easement A draft of the sanitary sewer easement have been submitted to the City for review.
- 69. North Karevich maintenance Agreement/ Access Agreement. A draft of the maintenance/access agreement has been submitted to the City for review.

#### The following must be submitted with the Final Site Plan:

- 70. A letter from either the applicant or the applicant's engineer must be submitted with the Stamping Set highlighting the changes made to the plans addressing each of the comments listed above <u>and indicating the revised sheets involved</u>. Additionally, a statement must be provided stating that all changes to the plan have been discussed in the applicant's response letter. Comment acknowledged; This information will be addressed in the final site plan submittal.
- 71. An itemized construction cost estimate must be submitted to the Community Development Department for the determination of plan review and construction inspection fees. This estimate should only include the civil sitework and not any costs associated with construction of the building or any demolition work. <u>The estimate must be itemized</u> for each utility (water, sanitary, storm sewer), on-site paving (square yardage, should include number do detectable warning



plates), right-of-way paving (including proposed right-of-way), grading, and the storm water basin (basin construction, control structure, pre- treatment structure and restoration). Comment acknowledged; This information will be addressed in the final site plan submittal.

72. Due to the above comments, the itemized construction cost estimate should be revises and resubmitted to the Community Development Department for the determination of plan review and construction inspection fees.
Comment acknowledged; This information will be addressed in the final site plan submittal.

### The following must be submitted with the Stamping Set:

(Please note that all documents must be submitted together as a package with the Stamping Set submittal with a legal review transmittal form. Partial submittals will not be accepted. Links to the PDF copy of the easements are below, word document versions of each legal document can be found on the City's Website under Forms and Permits)

73. A draft copy of the Storm Drainage Facility Maintenance Easement Agreement (SDFMEA), as outlined in the Storm Water Management Ordinance, must be submitted to the Community Development Department. Once the agreement is approved by the City's Legal Counsel, this agreement will then be sent to City Council for approval/acceptance. The SDFMEA will then be recorded at the office of the Oakland County Register of Deeds. This document is available on our website.

Comment acknowledged; This information will be addressed in the stamping set submittal.

- 74. A draft copy of the 20-foot-wide Watermain System Easement onsite must be submitted to the Community Development Department. Comment acknowledged; This information will be addressed in the stamping set submittal.
- 75. A draft copy of the 20-foot-wide Sanitary Sewer Easement onsite must be submitted to the Community Development Department. Comment acknowledged; This information will be addressed in the stamping set submittal.
- 76. A draft sidewalk easement will be needed for the portion of the sidewalk along Novi Road that is on private property. 8-foot-wide pathways need a 12-foot wide easement. Comment acknowledged; This information will be addressed in the stamping set submittal.
- 77. Executed copies of approved off-site utility easements must be submitted. Comment acknowledged; This information will be addressed in the stamping set submittal.

#### The following must be addressed prior to construction:

- 78. A pre-construction meeting shall be required prior to any site work being started. Please contact Sarah Marchioni in the Community Development Department to set up a meeting (248-347-0430). Be advised that scheduling the pre-construction meeting can take 2-4 weeks. Comment acknowledged; This information will be addressed prior to construction.
- 79. A City of Novi Grading Permit will be required prior to any grading on the site. This permit will be issued at the pre-construction meeting (no application required). No fee is required for this permit. Comment acknowledged; This information will be addressed prior to construction.
- 80. Material certifications must be submitted to Spalding DeDecker for review prior to the construction of any onsite utilities. Contact Ted Meadows at 248-844- 5400 for more information.



Comment acknowledged; This information will be addressed prior to construction.

- Construction inspection fees in the amount of \$TBD must be paid to the Community Development Department. \*\*fees are subject to change.
   Comment acknowledged.
- Off-Site Legal exhibit review fees in the amount of \$1,320.00 must be paid to the Community Development Department.
   Comment acknowledged.
- 83. Legal escrow fees in the amount of **\$1,725.00** must be depositied with the Community Development Department. **All unused escrow will be returned to the payee at the end of the project** (except for escrows that are \$50 or less). This amount includes engineering legal fees only. There may be additional legal fees for planning legal documents. **\*\*fees are subject to change**.

Comment acknowledged.

- Legal fees for off-site easements should be paid as soon as possible so that documents can be approved.
   Comment acknowledged.
- 85. A storm water performance guarantee in the amount of **\$TBD** (Equal to 120% of the cost required to complete the storm water management facilities) as specified in the Storm Water Management Ordinance must be posted at the Community Development Department. Comment acknowledged.
- 86. Storm water detention tap fees in the amount of \$TBD for the proposed discharge to an off-site regional detention basin must be paid to the Community Development Department. \*\*fees are subject to change. Comment acknowledged.
- 87. Water and Sanitary Sewer Fees must be paid prior to the pre-construction meeting. Contact the Treasury Department at 248-347-0498 to determine the amount of these fees. Comment acknowledged.
- A street sign financial guarantee in the amount of \$5,200.00 (\$400 per traffic control sign proposed) must be posted at the Community Development Department. Signs must be installed in accordance with MMUTCD standards.
   Comment acknowledged.
- 89. A traffic control inspection fee of \$605.00 must be paid to Community Development. This fee is the inspection of traffic control items such as signs, striping, curbs, parking stalls, sidewalk, detectable warning surfaces, and temporary pavement markings. Comment acknowledged.
- 90. A Soil Erosion Control Permit must be obtained from the City of Novi. Contact Sarah Marchioni in the Community Development Department, Building Division (248-347-0430) for forms and information. The financial guarantee and inspection fees will be determined during the SESC review. Comment acknowledged.
- 91. A permit for all proposed work activities within the road right-of-way must be obtained from the City of Novi. This application is available from the City Engineering Division or on the city website



(Right-of-Way Permit Application) and can be filed once the Final Site Plan has been submitted. Please contact the Engineering Division at 248-347-0454 for further information. Please submit the cover sheet, standard details, and plan sheets applicable to the permit only. Comment acknowledged.

- 92. Act 399 Permit for Community Water Supply Systems for water main construction must be obtained from EGLE. This permit application must be submitted through the Engineering Division after the water main plans have been approved. Please submit the cover sheet, overall utility sheet, standard details, and plan/profile sheets applicable to the permit. Comment acknowledged.
- 93. A Part 41 Permit For Wastewater Systems for sanitary sewer construction must be obtained from EGLE. This permit application must be submitted through the Engineering Division after the sanitary sewer plans have been approved. Please submit the cover sheet, overall utility sheet, standard details, and plan/profile sheets applicable to the permit. Be aware that approval by both (1) Oakland County Water Resources Commissioner (OCWRC) and (2) Wayne County Department of Public Services (WCDPS) are required prior to submittal to EGLE. Comment acknowledged.
- 94. An inspection permit for the sanitary sewer tap must be obtained from the Oakland County Water Resources Commissioner (OCWRC). Comment acknowledged.

### 2024-0212 – PRELIMINARY SITE PLAN LANDSCAPING JSP23-0037) COMMENTS

### **Ordinance Considerations**

Existing Trees (Sec 37 Woodland Protection, Preliminary Site Plan checklist #17 and LDM 2.3 (2))

- 1. A complete tree survey is provided. Comment acknowledged; No response required.
- 2. No wetlands exist on the site. Comment acknowledged; No response required.
- Two trees are shown as being preserved but also one appears to be impacted by grading. Please add tree protection fencing around the tree to be saved.
   The grading has been revised to save the tree impacted by grading. See sheet C4.0.
- Please add a note stating that any off-site trees negatively impacted by its construction shall be replaced.
   The note mentioned has been added to sheets C3.1, L1.0, and L1.2 stating that any off-site trees negatively impacted by construction shall be replaced.

Adjacent to Public Rights-of-Way – Berm/Wall, Buffer and Street Trees (Zoning Sec. 5.5.3.B.ii, iii)

- A landscape waiver is required for the lack of berms along both West Oaks Drive and Novi Road. It would be supported by staff because hedges are provided to screen the drive-thru lanes from both roads.
   The landscape waiver is still being requested for this site plan package in lieu of hedges for screening.
- 2. A landscape waiver to not provide trees within the watermain easement along West Oaks Drive should be requested.

of Michigan, Inc.

A waiver for trees in the watermain easement is not necessary with the revised site plan.

Parking Lot Landscaping (Zoning Sec. 5.5.3.C.)

- 1. Per the vehicular use area, the required landscape area and interior trees are not provided but it appears that they could be with correct labeling and identification. Please correct the calculation as shown on the landscape chart, label interior islands and corners with interior trees with their SF, and add the required trees if necessary. Vehicular use area calculation has been corrected on sheet L1.1, and interior islands and corners with interior trees have been label with their SF on sheet L1.1.
- 2. See the detailed discussion regarding parking lot perimeter trees and accessway perimeter tree placement. Comment Acknowledged; see detailed discussion for more response.
- 3. A landscape waiver to not plant accessway perimeter trees within the watermain easement would be supported by staff.

A landscape waiver as mentioned is not being requested for the revised plans.

- 4. A landscape waiver for the deficient perimeter depth between the west drive and west property line is required. It would be supported by staff if Engineering and/or Traffic require that the curb cut remain as it is. A waiver for the deficient perimeter depth will still be required for the west property line and access drive.
- 5. The bay just north of the building is in effect 17 spaces (the dumpster access way is 2 spaces). plus 2 accessible spaces aisles extend the bay even further. This required a landscape waiver. It would not be supported by staff. Please add a 200sf island on the east or west side of the dumpster access way.

The plans have been revised to include a 200+ SF island the east side of the dumpster access way with any additional trees required, see sheet C3.0.

### Building Foundation Landscaping (Zoning Section 5.5.3.D)

- 1. Calculations and hatched area showing proposed landscape areas are provided. **Comment Acknowledged**
- 2. Please add labels showing the SF of the different foundation landscaping areas. Labels showing SF of building foundation plantings added to sheet L1.1

#### Plant List (LDM 4, 10)

- 1. 14 of 19 species used (74%) are native to Michigan. Comment Acknowledged.
- 2. The number of red maples used exceeds the 15% maximum. Please reduce the number of red maples to meet the diversity requirement. The number of Red Maples reduced to 12, with Thornless Honey Locust increased to 10 and Tupelo increased to 11, see sheet L1.0.

### Planting Notations and Details (LDM 10)

- 1. All required notes are provided. Comment Acknowledged.
- 2. Please add any additional planting details that may be required.



Storm Basin Landscape (Zoning Sec 5.5.3.E.iv and LDM 3)

- 1. No above-ground detention is proposed. Correct, no response required.
- 2. If above-ground detention is required by Engineering, the basin must be landscaped per the current ordinance. Comment acknowledged. Above-ground detention is not required.

### Irrigation (LDM 10)

- 1. An irrigation system plan is provided. Comment acknowledged.
- 2. It will be reviewed by our cross-connection specialist. Comment acknowledged.

### 2024-0212 - LANDSCAPE REVIEW SUMMARY CHART COMMENTS

Note: for clarity in responses, comment items where the Meets Code column was marked "Yes" or "NA" have been omitted in the table below.

| 1                      | Proposed                                                                                                                                                                                                                                                                                                                   | Meets                                                                                                                                                                                                                                                                                                                      | Comments                                                                                                                                                                                                                                                                                                                                                                                                            | Response                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        |                                                                                                                                                                                                                                                                                                                            | Code                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| ements (Landscape Des  | ign manual (LDM)                                                                                                                                                                                                                                                                                                           | and Zoning                                                                                                                                                                                                                                                                                                                 | g Ordinance (Zoning Sec))                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                           |
| -New commercial or     | Scale: 1" = 20"                                                                                                                                                                                                                                                                                                            | Yes                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                     | Comment                                                                                                                                                                                                                                                                                                                                                                                   |
| residential            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     | Acknowledged                                                                                                                                                                                                                                                                                                                                                                              |
| developments           |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                         |
|                        |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| -Addition to existing  |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| building greater than  |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| 25% increase in        |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| _                      |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| SF whichever is less.  |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| -1" = 20" minimum      |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| with proper North.     |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| Variations from this   |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| scale can be           |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| approved by LA         |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| -Consistent with plans |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| throughout set         |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
| Name and Address       | Yes                                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                     | Comment                                                                                                                                                                                                                                                                                                                                                                                   |
|                        |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     | Acknowledged                                                                                                                                                                                                                                                                                                                                                                              |
|                        |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |
|                        | -New commercial or<br>residential<br>developments<br>-Addition to existing<br>building greater than<br>25% increase in<br>overall footage or 400<br>SF whichever is less.<br>-1" = 20" minimum<br>with proper North.<br>Variations from this<br>scale can be<br>approved by LA<br>-Consistent with plans<br>throughout set | -New commercial or<br>residential<br>developments<br>-Addition to existing<br>building greater than<br>25% increase in<br>overall footage or 400<br>SF whichever is less.<br>-1" = 20" minimum<br>with proper North.<br>Variations from this<br>scale can be<br>approved by LA<br>-Consistent with plans<br>throughout set | -New commercial or<br>residential<br>developments       Scale: 1" = 20"       Yes         -Addition to existing<br>building greater than<br>25% increase in<br>overall footage or 400<br>SF whichever is less.       S       Image: Commercial or<br>yes         -1" = 20" minimum<br>with proper North.       Yes         Variations from this<br>scale can be<br>approved by LA       Image: Commercial or<br>yes | ements (Landscape Design manual (LDM) and Zoning Ordinance (Zoning Sec))         -New commercial or residential developments         -Addition to existing building greater than 25% increase in overall footage or 400 SF whichever is less.         -1" = 20" minimum with proper North. Variations from this scale can be approved by LA         -Consistent with plans throughout set |

| ltem                                                                  | Required                                                                                                                                     | Proposed                                                                                                                                                                     | Meets                        | Comments                                                                                                                                                                                                                                                                                                                                                                                | Response                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                       |                                                                                                                                              |                                                                                                                                                                              | Code                         |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                        |
| Owner/Developer<br>Contact Information<br>(LDM 10)                    | Name, Address, and<br>telephone number of<br>the owner and<br>developer or<br>association                                                    | Only on cover<br>sheet                                                                                                                                                       | No                           | Please add the<br>information to the title<br>block of the landscape<br>plan and other sheets.                                                                                                                                                                                                                                                                                          | Name, address,<br>and number of<br>owner/developer<br>has been added<br>to title block                                                                                                                                                                                 |
| Landscape Architect<br>contact information<br>(LDM 10)                | Name, address and<br>telephone number of<br>RLA/PLA/LLA who<br>created the plan                                                              | John Ackerman,<br>PLA – Kimley-<br>Horn of<br>Michigan                                                                                                                       | Yes                          |                                                                                                                                                                                                                                                                                                                                                                                         | Comment<br>Acknowledged                                                                                                                                                                                                                                                |
| Sealed by LA.<br>(LDM 10)                                             | Requires original<br>signature                                                                                                               | None                                                                                                                                                                         |                              | Signature and seal of LA<br>is required on the printed<br>stamping sets.                                                                                                                                                                                                                                                                                                                | Signature and<br>seal of LA will be<br>provided on<br>printed stamped<br>sets                                                                                                                                                                                          |
| <b>Miss Dig Note</b><br>(800) 482-7171 (LDM<br>10)                    | Show on all plan<br>sheets                                                                                                                   | Yes                                                                                                                                                                          | Yes                          |                                                                                                                                                                                                                                                                                                                                                                                         | Comment<br>Acknowledged                                                                                                                                                                                                                                                |
| Zoning (LDM 10)                                                       | Include all adjacent<br>zoning                                                                                                               | - <u>Parcel</u> : R-C with<br>PD-2 option<br>- <u>North South,<br/>East, West</u> : R-C                                                                                      | Yes/No                       | Please show the zoning<br>of the parcels north and<br>south of the site.                                                                                                                                                                                                                                                                                                                | RC Zoning<br>labeled on<br>parcels north and<br>south of site                                                                                                                                                                                                          |
| Survey Information<br>(LDM 10)                                        | -Legal description of<br>boundary line survey<br>-Existing topography                                                                        | -Legal<br>description on<br>Sheet 1<br>-Topographical<br>survey is on<br>sheet C-2.0                                                                                         | Yes                          |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                        |
| Existing plant material<br>Existing woodlands or<br>wetlands (LDM 10) | <u>-Show location type</u><br><u>and size. Label to be</u><br><u>saved or removed.</u><br><u>-Plan shall state if</u><br><u>none exists.</u> | -Tree survey is<br>shown on Sheet<br>C2.0 -Removals are<br>indicated on<br>same sheet<br>-Tree Chart is<br>shown on Sheet<br>L-1.0 -There are no<br>wetlands or<br>regulated | -Yes<br>-Yes<br>-Yes<br>-Yes | <ol> <li>As there are no<br/>regulated trees being<br/>removed (not 36" dbh or<br/>greater and not in a<br/>regulated woodland), no<br/>replacements are<br/>required for any trees<br/>removed from the site.</li> <li>Trees #1286 and #<br/>1287 are shown as being<br/>saved, but it appears<br/>that #1287 will be<br/>significantly impacted by<br/>the grading. Please</li> </ol> | <ol> <li>Comment<br/>Acknowledged</li> <li>Grading has<br/>been revised to<br/>avoid Tree #1287</li> <li>Note added on<br/>sheets C3.1, L1.0<br/>and L1.2 noting<br/>that any off-site<br/>trees that are<br/>negatively<br/>impacted by the<br/>sewer line</li> </ol> |

| ltem                                                | Required                                                                                                                        | Proposed                                                                                                        | Meets<br>Code | Comments                                                                                                                                                                                                                                                                                                         | Response                                                                                                                                                                |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                                                                                                                                 | woodlands on<br>the site                                                                                        |               | revise the grading or<br>show it as being<br>removed.<br>3. Any of those off-site<br>trees that are negatively<br>impacted by the sewer<br>line construction must be<br>replaced with similar<br>plant material. Please<br>add a note to that effect<br>to the relevant plan<br>sheet and the landscape<br>plan. | construction shall<br>be replaced in<br>kind by<br>contractor                                                                                                           |
| Soil Types (LDM 10)                                 | - <u>As determined by</u><br>soils survey of<br>Oakland county<br>- <u>Show types,</u><br>boundaries                            | -Sheet L-1.0<br>-Entire site is<br>Marlette sandy<br>loom                                                       | Yes           |                                                                                                                                                                                                                                                                                                                  | Comment<br>Acknowledged                                                                                                                                                 |
| Existing and Proposed<br>Improvements (LDM<br>10)   | Existing and proposed<br>buildings, easements,<br>parking spaces,<br>vehicular use areas,<br>and R.O.W                          | Yes                                                                                                             | Yes           | Please extend the 'finger'<br>between the west drive<br>and the drive-thru lanes<br>as much as possible to<br>the north to increase the<br>amount of greenspace<br>on the site.                                                                                                                                  | See sheet C3.0,<br>the landscape<br>island has been<br>extended as<br>mentioned.                                                                                        |
| Existing and Proposed<br>Utilities (LDM 10)         | -Overhead and<br>underground utilities,<br>including hydrants<br>-Show all existing and<br>proposed light posts<br>on the site. | -All utility lines<br>and structures<br>are shown on<br>the landscape<br>plan<br>-Proposed<br>lighting is shown | -Yes<br>-Yes  | Please show the utility<br>easement boundary lines<br>on the landscape plan<br>so it is clear where trees<br>shouldn't be planted.                                                                                                                                                                               | Utility easement<br>boundary lines<br>have been<br>labeled and<br>dimensioned<br>more clearly on<br>sheet L1.2                                                          |
| Proposed grading. 2'<br>contour minimum<br>(LDM 10) | Provide proposed<br>contours at 2' interval                                                                                     | <ul> <li>Sheets 4 and</li> <li>4.1</li> <li>No berms are proposed</li> </ul>                                    | • Yes<br>• No | A landscape waiver is<br>requested for the lack of<br>the required berms.                                                                                                                                                                                                                                        | Applicant and<br>Engineer are<br>aware of this<br>requirement, and<br>comments<br>above say that<br>screening may<br>be provided in<br>lieu of<br>landscaping<br>berms. |

| ltem                                                        | ichigan, Inc.<br>Required                                                                                                                                                  | Proposed                                                                                                                           | Meets    | Comments                                                                                                                                                                                                                                                                                                                                                                                                     | Response                                                                                                                                                                                     |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| nem                                                         | Kequireu                                                                                                                                                                   | Froposeu                                                                                                                           | Code     | Comments                                                                                                                                                                                                                                                                                                                                                                                                     | Response                                                                                                                                                                                     |
| Snow deposit (LDM<br>10)                                    | Show snow deposit<br>areas on plan                                                                                                                                         | Yes                                                                                                                                | Yes      |                                                                                                                                                                                                                                                                                                                                                                                                              | Snow deposit<br>areas have been<br>added to the<br>plans. See Sheet<br>L1.2.                                                                                                                 |
| Parking Area Landscap                                       | <b>De Requirements</b> (Zonin                                                                                                                                              | g Sec 5.5.3.C and LI                                                                                                               | DM 5)    |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                              |
| General Requirements<br>(LDM 5)                             | -Clear sight distance<br>within parking islands<br>-No evergreen trees                                                                                                     | Clear vision<br>zones shown for<br>all entries                                                                                     | Yes      | <u>The clear zone is not</u><br>required at the drive-thru<br>lanes for this layout                                                                                                                                                                                                                                                                                                                          | Clear zone line<br>has been<br>removed at the<br>drive-thru lanes<br>on sheet L1.2                                                                                                           |
| Name, type and<br>number of ground<br>cover (LDM 5)         | As proposed on planting islands                                                                                                                                            | Groundcovers<br>for all areas are<br>indicated with<br>different<br>hatching<br>patterns.                                          | Yes      |                                                                                                                                                                                                                                                                                                                                                                                                              | Comment<br>Acknowledged                                                                                                                                                                      |
| General (Zoning Sec 5.                                      | 5.3.C)                                                                                                                                                                     |                                                                                                                                    | <u> </u> |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                              |
| Parking Lot Islands                                         | -A minimum of 200 SF<br>to qualify<br>-A minimum of 200 SF<br>unpaved area per<br>tree planted in an<br>island<br>-6" curbs<br>-Islands minimum<br>width 10' BOC to<br>BOC | All islands<br>appear to be<br>sufficiently large<br>but their areas in<br>SF are not<br>provided                                  | Yes/No   | <ol> <li>Please add SF area<br/>tags for all area to be<br/>counted toward the<br/>parking lot interior<br/>requirement</li> <li>The island at the<br/>northeast corner of he<br/>building with the hydrant<br/>does not provide<br/>enough room for the tree<br/>there. Please move the<br/>sidewalk or enlarge the<br/>island to provide<br/>sufficient room and<br/>green space for that tree.</li> </ol> | <ol> <li>Landscape SF<br/>has been labeled<br/>on sheet L1.1 to<br/>show interior<br/>landscape areas</li> <li>Island has<br/>been enlarged to<br/>provide more<br/>room for tree</li> </ol> |
| Curbs and Parking<br>stall reduction (Zoning<br>Sec 5.3.12) | Parking stall can be<br>reduced to 17' and<br>the curb to 4"<br>adjacent to a<br>sidewalk of minimum<br>7 ft.                                                              | Spaces are<br>shown as 17'<br>long where they<br>abut<br>greenspace and<br>19 feet long<br>when they abut<br>a 5-foot<br>sidewalk. | Yes      |                                                                                                                                                                                                                                                                                                                                                                                                              | Comment<br>Acknowledged                                                                                                                                                                      |

| Item                                                                                                                       | Required                                                                                                                                                                                                                                                                | Proposed                                                                                                                                                                                                                                               | Meets<br>Code | Comments                                                                                                                                                                                                                                                                                          | Response                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Contiguous space<br>limit (Zoning sec<br>5.5.3.C)                                                                          | Maximum of 15<br>contiguous spaces                                                                                                                                                                                                                                      | 15 spaces plus<br>the 2-space<br>access way for<br>the dumpster, is<br>the maximum<br>bay legnth                                                                                                                                                       | No            | <ol> <li>Please add a 200 SF<br/>landscaped island on the<br/>long bay north of the<br/>building, east or west of<br/>the dumpster entry, to<br/>break up the long bay.</li> <li>A landscape waiver<br/>would be required for the<br/>long bay. It would not be<br/>supported by staff</li> </ol> | A 200+ SF<br>landscape island<br>has been added<br>to the east of the<br>dumpster entry<br>along with<br>required<br>landscape |
| Plantings around Fire<br>Hydrant (Zoning Sec<br>5.5.3.C)                                                                   | -No plantings with<br>matured height<br>greater than 12'<br>within 10ft. of fire<br>hydrants<br>-Plant trees at least 5ft<br>from water and storm<br>lines and 10 feet from<br>sanitary lines<br>-Plantings near<br>hydrants or FDCs<br>should be no taller<br>than 12" | -One hydrant is<br>shown northeast<br>of the building<br>-A Fire<br>Department<br>Connection is<br>shown on the<br>north side of the<br>building with a<br>note indication<br>that the<br>plantings in front<br>of it shall not be<br>taller than 12". | -Yes          |                                                                                                                                                                                                                                                                                                   | Comments<br>Acknowledged                                                                                                       |
| Landscaped Area<br>(Zoning Sec 5.5.3.C)                                                                                    | Areas not dedicated<br>to parking use or<br>driveways exceeding<br>100 sq. ft. shall be<br>landscaped                                                                                                                                                                   | Yes                                                                                                                                                                                                                                                    | Yes           |                                                                                                                                                                                                                                                                                                   | Comment<br>Acknowledged                                                                                                        |
| Category 1: For OS-1,<br>use in any R district (Z                                                                          |                                                                                                                                                                                                                                                                         | 2, B-3, NCC, EXPO,                                                                                                                                                                                                                                     | FS, TC, TC-   | 1, RC, Special Land Use or n                                                                                                                                                                                                                                                                      | on-residential                                                                                                                 |
| A = total square<br>footage of vehicular<br>use area up to 50,000<br>SF x 7.5%                                             | -A = x SF * 7.5% = A SF<br>-11911 * 7.5% = 893 SF                                                                                                                                                                                                                       | Calculations<br>proposed                                                                                                                                                                                                                               | No            | Please correct the<br>calculation to remove<br>the subtraction part. That<br>is incorrect.                                                                                                                                                                                                        | Calculation has<br>been corrected<br>and shown on<br>sheet L1.1                                                                |
| B = Total square<br>footage of additional<br>paved vehicular use<br>area (not including A<br>or B ) over 50,000 SF x<br>1% | -B = x SF * 1% = B sf<br>- (xxx - 50000) * 1% =<br>xx SF                                                                                                                                                                                                                | NA                                                                                                                                                                                                                                                     |               |                                                                                                                                                                                                                                                                                                   |                                                                                                                                |
| Category 2: For: I-1 an                                                                                                    | <b>d I-2</b> (Zoning Sec 5.5.3.C                                                                                                                                                                                                                                        | 2)                                                                                                                                                                                                                                                     | 1             |                                                                                                                                                                                                                                                                                                   |                                                                                                                                |

| ltem                                                                                               | lichigan, Inc.<br>Required                                                                                                                                                           | Proposed N                                                                                              | Meets                                                                     | Comments                                                                                                                                                                                                                                                                             | Response                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                    | Requireu                                                                                                                                                                             | Toposed                                                                                                 | Code                                                                      | connicitis                                                                                                                                                                                                                                                                           | Response                                                                                                                                                                         |
| A = Total square<br>footage of vehicular<br>use area up to 50,000<br>SF x 5%                       | A = x sf * 6% = A sf                                                                                                                                                                 | NA                                                                                                      |                                                                           |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                  |
| B = Total square<br>footage of additional<br>paved vehicular use<br>areas over 50,000 SF x<br>0.5% | B = 0.5% x 0 SF                                                                                                                                                                      | NA                                                                                                      |                                                                           |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                  |
| All Categories                                                                                     |                                                                                                                                                                                      |                                                                                                         |                                                                           |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                  |
| C = A + B<br>Total square footage<br>of landscaped islands                                         | - C = A + B<br>- C = 893 + 0<br>= 893 SF                                                                                                                                             | 514 SF                                                                                                  | No                                                                        | <ol> <li>A waiver is required for<br/>the deficiency. It would<br/>not be supported by<br/>staff.</li> <li>Please provide all of<br/>the required area.</li> </ol>                                                                                                                   | Additional<br>landscape has<br>been added to<br>meet<br>requirement and<br>calculations<br>have been<br>updated on<br>sheet L1.1                                                 |
| D = C/200<br>Number if canopy<br>trees required                                                    | - D = C/200<br>- 893/200 = 4<br>trees                                                                                                                                                | 3 trees                                                                                                 | No                                                                        | <ol> <li>A Waiver is required for<br/>the deficiency. It would<br/>not be supported by<br/>staff.</li> <li>Please provide all of<br/>the required trees.</li> </ol>                                                                                                                  | 1 additional tree<br>has been added<br>to meet<br>requirement                                                                                                                    |
| Perimeter Green<br>space (Zoning Sec<br>5.5.3.C)                                                   | <ul> <li>1 Canopy tree per<br/>35 If</li> <li>North side: 192/35 =<br/>5 trees</li> <li>South side: 65/35 =<br/>2 trees</li> </ul>                                                   | North side: 8<br>trees<br>South side: 1<br>tree                                                         | • Yes<br>• No                                                             | Please move one of the<br>northern perimeter trees<br>so there are two<br>perimeter trees west of<br>the dumpster.                                                                                                                                                                   | Plans have been<br>adjusted per this<br>comment. See<br>Sheet L1.2.                                                                                                              |
| Accessway perimeter<br>(Zoning Sec 5.5.3.C)                                                        | 1 canopy tree per 35<br>If on each side of<br>road, less widths of<br>access drives.<br>West accessway:<br>(228+150)/35 = 11<br>trees<br>Drive-thru accessway<br>including east edge | Exterior<br>accessway<br>• Only 6 feet od<br>provided<br>between the<br>drive and the<br>property line. | <ul> <li>No</li> <li>Yes</li> <li>Yes</li> <li>Yes</li> <li>No</li> </ul> | 1. Please shift the drive<br>over 4 feet to provide the<br>required 10 feet of<br>space. A waiver for the<br>space deficiency is<br>required for the<br>proposed layout. It<br>would only be supported<br>of Engineering and/or<br>Traffic determine the<br>entry cannot be shifted. | <ol> <li>A waiver is<br/>being requested<br/>for the<br/>deficiency.</li> <li>Trees along<br/>western access<br/>drive have been<br/>spread out and<br/>spaced evenly</li> </ol> |

| Item                                             | ichigan, Inc.<br><b>Required</b>                                                                    | Proposed                                                     | Meets | Comments                                                                                                                                                             | Response                                                                                                |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| item                                             | Required                                                                                            | Fioposeu                                                     | Code  | comments                                                                                                                                                             | Response                                                                                                |
|                                                  |                                                                                                     |                                                              | coue  |                                                                                                                                                                      |                                                                                                         |
|                                                  | of northeastern<br>accessway:                                                                       | 11 trees are provided along                                  |       | 2 <u>. Please spread the</u><br>trees along the western                                                                                                              | 3. The Red Oak near the north                                                                           |
|                                                  | • Inner edge: (128 +                                                                                | the drive                                                    |       | access drive out so they reach the start of the                                                                                                                      | entrance has<br>been moved                                                                              |
|                                                  | 36+35+95)/35 = 6                                                                                    | Drive-thru                                                   |       | <u>clear vision zone, are</u>                                                                                                                                        | further east to be                                                                                      |
|                                                  | trees<br>• Outer edge: 530/35                                                                       | • Inner edge                                                 |       | fairly equally spaced<br>and don't crows the tree<br>on the adjoining                                                                                                | 10 feet from<br>accessway curb                                                                          |
|                                                  | = 15 trees                                                                                          | • Outer edge:                                                |       | property.                                                                                                                                                            | 4. Interior drive thru island has                                                                       |
|                                                  | Northeastern<br>accessway:                                                                          | 18 trees (3<br>shared with                                   |       | 3. Please remove the red oak near the north                                                                                                                          | been extended<br>in place of                                                                            |
|                                                  | • 95.35 = 2 trees                                                                                   | western outer<br>drive)                                      |       | entrance east to within<br>10 feet of the accessway                                                                                                                  | striped pavement                                                                                        |
|                                                  |                                                                                                     |                                                              |       | curb.                                                                                                                                                                | 5. This waiver is<br>not necessary for                                                                  |
|                                                  |                                                                                                     | Northeastern<br>accessway                                    |       | 4. If possible, please<br>extend the greenspace<br>in the interior drive-thru                                                                                        | the revised site<br>plan layout.                                                                        |
|                                                  |                                                                                                     | • West side of<br>northeastern<br>accessway<br>drive: 1 tree |       | island in place of at least<br>some of the striped<br>pavement west of the<br>island to increase the                                                                 |                                                                                                         |
|                                                  |                                                                                                     | dive. Thee                                                   |       | site's green space.                                                                                                                                                  |                                                                                                         |
|                                                  |                                                                                                     |                                                              |       | 5. A waiver to not<br>provide 1 tree along the<br>outer edge of the interior<br>drive within the<br>watermain easement<br>would be supported by<br>staff.            |                                                                                                         |
| Residential Adjacent to                          | o Non-residential (sec 5                                                                            | .5.3.A & LDM 1.a)                                            |       |                                                                                                                                                                      |                                                                                                         |
| Berm Requirements<br>(Zoning Sec 5.5.A)          | The site is not<br>adjacent to<br>residential property so<br>this screening berm is<br>not required | None                                                         | Yes   |                                                                                                                                                                      | Comment<br>Acknowledged                                                                                 |
| Adjacent to Public Rig                           | hts-of-Way (Sec 5.5.3.B                                                                             | and LDM 1.b)                                                 |       |                                                                                                                                                                      |                                                                                                         |
| Berm requirements<br>(Zoning Sec<br>5.5.3.A.(5)) | An undulating berm a<br>minimum 2 feet high<br>with a 3 foot wide<br>crest is required              | No berm is<br>proposed                                       | No    | A landscape waiver is<br>required for the lack of a<br>berm. As a screening<br>hedge is proposed for<br>most of the frontages, it<br>would be supported by<br>staff. | No berm is<br>proposed and a<br>waiver will be<br>provided to have<br>a screening<br>hedge in lieu of a |

|                                 | lichigan, Inc.                           | Dropood                  | Macto | Commonte | Decrement                             |
|---------------------------------|------------------------------------------|--------------------------|-------|----------|---------------------------------------|
| Item                            | Required                                 | Proposed                 | Meets | Comments | Response                              |
|                                 |                                          |                          | Code  |          |                                       |
|                                 |                                          |                          |       |          | proposed                              |
|                                 |                                          |                          |       |          | screening berm.                       |
|                                 |                                          |                          |       |          | Ŭ                                     |
| Cross-Section of Berm           | s (LDM 10)                               |                          |       |          |                                       |
| Slope, height and               | Label contour lines                      | No berms are             |       |          |                                       |
| width                           |                                          | proposed                 |       |          |                                       |
|                                 | • Maximum 33%                            |                          |       |          |                                       |
|                                 | • Min. 3 feet flat                       |                          |       |          |                                       |
|                                 | horizontal area                          |                          |       |          |                                       |
|                                 |                                          |                          |       |          |                                       |
|                                 | Minimum 3 feet                           |                          |       |          |                                       |
|                                 | high                                     |                          |       |          |                                       |
|                                 | Constructed of                           |                          |       |          |                                       |
|                                 | loam with 6' top layer                   |                          |       |          |                                       |
|                                 | of topsoil                               |                          |       |          |                                       |
|                                 |                                          |                          |       |          |                                       |
| Type of Ground Cover            |                                          | NA                       |       |          |                                       |
| Walls (Zoning Sec 5.5.3         |                                          |                          |       |          |                                       |
|                                 |                                          | Lu a                     | T     |          |                                       |
| Material, height and            | Freestanding walls                       | No walls are             | TBD   |          | No walls are                          |
| type of construction<br>footing | should have brick or stone exterior with | indicated                |       |          | proposed except<br>at the dumpster    |
| loomig                          | masonry or concrete                      |                          |       |          | enclosure.                            |
|                                 | interior                                 |                          |       |          |                                       |
|                                 |                                          |                          |       |          |                                       |
| Walls greater than 4 ft.        |                                          | NA                       |       |          |                                       |
| should be designed              |                                          |                          |       |          |                                       |
| and sealed by an                |                                          |                          |       |          |                                       |
| Engineer                        |                                          |                          |       |          |                                       |
| ROW Landscape Scree             | ning Requirements (Zor                   | ning sec 5.5.3.B.ii)     |       |          |                                       |
|                                 |                                          |                          |       |          |                                       |
| Greenbelt width                 | Adj to Parking: 20 ft.                   | • Novi Road: 25          | • Yes |          | Novi Road: the                        |
|                                 |                                          | ft                       |       |          | site plan has                         |
|                                 |                                          |                          | • Yes |          | been adjusted so                      |
|                                 |                                          | • West Oaks Dr:<br>20 ft |       |          | that the asphalt                      |
|                                 |                                          | 2011                     |       |          | parking is not                        |
|                                 |                                          |                          |       |          | located within                        |
|                                 |                                          |                          |       |          | the 25' greenbelt.<br>See Sheet C3.0. |
|                                 |                                          |                          |       |          | see sheet Co.U.                       |
|                                 |                                          |                          |       |          | West Oaks: the                        |
|                                 |                                          |                          |       |          | site plan has                         |
|                                 |                                          |                          |       |          | been adjusted so                      |
|                                 |                                          |                          |       |          | the asphalt                           |
|                                 |                                          |                          |       |          | parking is not                        |
|                                 | 1                                        | 1                        | 1     |          | located within                        |



| Item                                                           | lichigan, Inc.<br>Required                                                                                                                                                         | Proposed                                                                                                                                                                                         | Meets<br>Code  | Comments                                                                                                                                                                                                                                           | Response                                                                                                                              |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|                                                                |                                                                                                                                                                                    |                                                                                                                                                                                                  |                |                                                                                                                                                                                                                                                    | the 20 ft.<br>greenbelt. See<br>Sheet C3.0.                                                                                           |
| Min. berm crest width                                          | Adj to Parking: 2 ft.                                                                                                                                                              | None                                                                                                                                                                                             | No             | As noted above, a<br>landscape waiver is<br>required for the lack of a<br>berm. As a screening<br>hedge is proposed for<br>most of the frontage, it<br>would be supported by<br>staff                                                              | See response to<br>berm comment<br>above.                                                                                             |
| Minimum berm height                                            | Adj to Parking: 3 ft.                                                                                                                                                              | None                                                                                                                                                                                             | No             | See above                                                                                                                                                                                                                                          | See response to<br>berm comment<br>above.                                                                                             |
| 3' Wall                                                        | (2) (3) (4)                                                                                                                                                                        | No                                                                                                                                                                                               |                |                                                                                                                                                                                                                                                    |                                                                                                                                       |
| Canopy deciduous or<br>large evergreen trees                   | <ul> <li>Adj to Parking: 1<br/>tree per 35 lf</li> <li>Novi Road: 217/35 =<br/>6 trees</li> <li>West Oaks Dr:<br/>285/35 = 8 trees</li> </ul>                                      | <ul> <li>Novi road: 7<br/>trees (double-<br/>counted<br/>accessway<br/>perimeter trees)</li> <li>West Oaks Dr:<br/>8 trees ( 8<br/>double-counted<br/>accessway<br/>perimeter trees).</li> </ul> | • Yes<br>• Yes |                                                                                                                                                                                                                                                    | Comment<br>Acknowledged                                                                                                               |
| Sub-canopy<br>deciduous trees)                                 | <ul> <li>Adj to Parking: 1<br/>tree per 20 lf</li> <li>Novi Road: 217/20 =<br/>11 trees</li> <li>West Oaks Dr:<br/>286/20 = 14 trees</li> </ul>                                    | Novi Road: 11<br>trees     West Oaks Dr:<br>11 trees                                                                                                                                             | • Yes<br>• No  | A waiver to not plant<br>trees within the 75 feet of<br>West Oaks frontage<br>occupied by the water<br>main easement would<br>be supported by staff.                                                                                               | Novi Road: no<br>response<br>required<br>West Oaks: a<br>waiver to this<br>effect will be<br>requested.                               |
| Canopy deciduous<br>trees in area between<br>sidewalk and curb | <ul> <li>Parking &amp; No<br/>Parking 1 tree per 45<br/>If</li> <li>Novi Road: (217-<br/>120)/45 = 3 trees (120<br/>If is shown as in the<br/>RCOC "no plant"<br/>zone)</li> </ul> | <ul> <li>Novi road: 5<br/>subcanopy trees<br/>near overhead<br/>wires</li> <li>West oaks Dr: 6<br/>trees</li> </ul>                                                                              | • Yes<br>• Yes | As the Road Commission<br>does not allow plantings<br>between the sidewalk<br>and road along Novi<br>Road, those trees do not<br>need to be provided at<br>all, but correspondence<br>from RCOC showing that<br>should be provided to<br>the City. | The five sub-<br>canopy trees<br>along Novi Road<br>have been<br>removed and<br>therefore the<br>waiver is no<br>longer<br>necessary. |

| Item                                                                                                  | lichigan, Inc.<br>Required                                                                                                                                                                                       | Proposed                                                                                                              | Meets<br>Code | Comments                                                                                                                                                                                                                                                                                                                                                                                               | Response                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                       | • West Oaks Dr: (307-<br>70)/45 = 5 trees                                                                                                                                                                        |                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                |
| Screening of outdoor<br>storage,<br>loading/unloading<br>(Zoning Sec. 3.14,<br>3.15, 4.55, 4.56, 5.5) | The loading zone<br>must be screened<br>from roads                                                                                                                                                               | The proposed<br>loading zone is<br>partially blocked<br>by greenbelt<br>plantings from<br>view of West<br>Oaks Drive. | TBD           | <ol> <li>The proposed shrubs<br/>will not attain a height<br/>sufficient to screen trucks<br/>in the loading zone from<br/>West Oaks and Novi<br/>Road.</li> <li>Please switch those<br/>plantings to taller, fuller<br/>species that will provide<br/>the required screening.</li> <li>As they were, a<br/>landscape waiver would<br/>be required. It would not<br/>be supported by staff.</li> </ol> | Height and<br>species of<br>proposed shrubs<br>are tall enough<br>to screen a<br>vehicle in the<br>proposed<br>loading zone.                   |
| Transformers/Utility<br>boxes (LDM 6)                                                                 | <ul> <li>A minimum of 2ft.<br/>separation between<br/>box and the plants</li> <li>Ground cover<br/>below 4" is allowed<br/>up to pad.</li> <li>No plant materials<br/>within 8 ft. from the<br/>doors</li> </ul> | No transformer is<br>shown                                                                                            | TBD           | 1. When transformer         locations are finalized,         screening shrubs per         standard detail are         required.         2. Please add the City         utility box screening         detail to plans.         3. City of Landscape         Note #13 should read 4         sides should be         screened, not 3                                                                      | <ol> <li>Comments         <ul> <li>acknowledged,</li> <li>and will be             <ul></ul></li></ul></li></ol>                                |
| Building Foundation L                                                                                 | andscape Requirement                                                                                                                                                                                             | (Zoning Sec 5.5.3.D                                                                                                   | ))            |                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                |
| Interior Site<br>Landscaping SF<br>(Zoning Sec 5.5.3.D)                                               | <ul> <li>Equal t the entire perimeter of the building x 8.</li> <li>A: (283-16.42) If x 8ft = 2,133 SF</li> <li>Plantings beds should have a minimum width of 4 ft</li> </ul>                                    | 2192 sf – not<br>noted                                                                                                | TBD           | <ol> <li>Shaded areas indicate<br/>that sufficient area is<br/>provided but the areas'<br/>SF is not provided</li> <li>Please label all<br/>foundation landscaped<br/>area with their SF so the<br/>calculation can be<br/>verified.</li> </ol>                                                                                                                                                        | <ol> <li>SF of<br/>landscape has<br/>been labeled to<br/>show sufficient<br/>proposed<br/>landscape</li> <li>SF has been<br/>added.</li> </ol> |

|                                                                        | lichigan, Inc.                                                                                                                                                                                                                                                                                                                                                                               | · ·                                                                               |                |                                                                                                                                                                  | _                                                           |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Item                                                                   | Required                                                                                                                                                                                                                                                                                                                                                                                     | Proposed                                                                          | Meets<br>Code  | Comments                                                                                                                                                         | Response                                                    |
| Building Frontage<br>Landscaping (Zoning<br>Sec 5.5.3.D)               | If visible from public<br>street minimum of<br>60% of the exterior<br>building perimeter<br>should be covered in<br>green space                                                                                                                                                                                                                                                              | <ul> <li>Novi Road:</li> <li>100%</li> <li>West Oaks DR:</li> <li>100%</li> </ul> | • Yes<br>• Yes | The greenbelt hedge<br>may be included in the<br>West oaks Drive frontage<br>calculation since it<br>blocks the view of the<br>building from West Oaks<br>Drive. | Comment<br>Acknowledged                                     |
| Detention/Retention                                                    | Basin Requirements (Zo                                                                                                                                                                                                                                                                                                                                                                       | ning Sec 5.5.3.E &                                                                | LDM 3)         |                                                                                                                                                                  |                                                             |
| Planting requirements<br>(Zoning Sec 5.5.3.E &<br>LDM 3)               | <ul> <li>Clusters of large<br/>native shrubs shall<br/>cover 70-75% of the<br/>basin rim area at 10 lf<br/>from permanent<br/>water level</li> <li>10" to 14" tall grass<br/>along sides of basin</li> <li>Refer to wetland for<br/>basin mix</li> <li>Deciduous canopy<br/>tree 1/35 of east,<br/>south and west sides<br/>of pond at 10 feet<br/>from permanent<br/>water level</li> </ul> | No above-<br>ground<br>detention is<br>shown                                      | TBD            | If above-ground<br>detention is provided, it<br>must be landscaped per<br>the current ordinance.                                                                 | No above-<br>ground detention<br>is proposed.               |
| Phragmites and<br>Japanese Knotweed<br>Control (Zoning Sec<br>5.5.6.B) | <ul> <li>Any and all<br/>populations of<br/>Phragmites australis<br/>and/or Japanese<br/>Knotweed on site<br/>shall be included on<br/>tree survey.</li> <li>Treat populations<br/>per MDEQ guidelines<br/>and requirements to<br/>eradicate the weed<br/>from the site.</li> </ul>                                                                                                          | A note indicates<br>there is none of<br>either weed on<br>the site                | Yes            |                                                                                                                                                                  | Comment<br>acknowledged.<br>See comment 2<br>on Sheet L1.0. |
|                                                                        | ilize City of Novi Standa                                                                                                                                                                                                                                                                                                                                                                    |                                                                                   |                |                                                                                                                                                                  |                                                             |
| Installation Date (LDM<br>10)                                          | Provide intended<br>date                                                                                                                                                                                                                                                                                                                                                                     | Between March<br>15 and Nov 15                                                    | Yes            |                                                                                                                                                                  |                                                             |

| Comments                     | Response          |
|------------------------------|-------------------|
| comments                     | Response          |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
| The irrigation plan will be  | See Sheets IR-1   |
| reviewed by our cross-       | through IR-3 for  |
| connection specialist.       | the revised       |
|                              | irrigation plans. |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
| If the developer does        | Landscape Note    |
| <u>only require a 1-year</u> | #7 has been       |
| guarantee from their         | adjusted to show  |
| <u>contractor, then</u>      | 2-year guarantee  |
|                              | z-year goaramee   |
| Landscape Note #7 can        |                   |
| remain as is, but the        |                   |
| developer is responsible     |                   |
| for a 2-year guarantee.      |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              |                   |
|                              | Comment           |
|                              | Acknowledged      |
|                              | . WILLIOW CUBCU   |
|                              | Comment           |
|                              | Acknowledged      |
|                              | Acknowledged      |
| _                            |                   |

| Item                                          | ichigan, Inc.<br>Required                                        | Proposed                                                                                                                                                | Meets         | Comments                                                                                                                                                                                                                                                                                                                               | Response                                                                                                                                                                                          |
|-----------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               |                                                                  |                                                                                                                                                         | Code          |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                   |
| Botanical and<br>common names (LDM<br>4 & 11) | LDM Section 4                                                    | <ul> <li>14 of 19<br/>species (74%)<br/>are native to<br/>Michigan</li> <li>Too many red<br/>maples are used<br/>(21%)</li> </ul>                       | • Yes<br>• No | <ul> <li><u>1. Please reduce the</u><br/><u>number of red maples</u><br/><u>used to no more than 12</u><br/>(<u>15%</u>).</li> <li><u>2. This can be done by</u><br/><u>adding a species or</u><br/><u>using more of the species</u><br/><u>with less than 12 trees on</u><br/><u>site.</u></li> </ul>                                 | 1. Quantity of<br>Red Maples has<br>been reduced to<br>no more than 12                                                                                                                            |
| Type and amount of<br>lawn                    |                                                                  | <ul> <li>Different<br/>groundcovers<br/>are indicated<br/>with hatching</li> <li>Areas (in SF) of<br/>seed and sod<br/>are not<br/>indicated</li> </ul> | Yes           |                                                                                                                                                                                                                                                                                                                                        | Comment<br>Acknowledged                                                                                                                                                                           |
| Cost estimate (LDM<br>10)                     | For all new plantings,<br>mulch and sod as<br>listed on the plan | No                                                                                                                                                      |               | 1. Please add to final site plan.         2. Areas and costs of seed, sod and mulch should be included in the cost estimate         3. Use these standard costs:         • Canopy tree: \$400 ea         • Lg evergreen: \$375 ea         • Ornamental: #375 ea         • Shrub: \$50 ea         • Perennial/ornamental grass: \$15 ea | <ol> <li>Approximate<br/>SF of sod and<br/>mulch has been<br/>added to plans</li> <li>Cost estimate<br/>table has been<br/>added using the<br/>suggested cost<br/>estimate<br/>numbers</li> </ol> |
| Planting Details/ Info (                      | LDM Prat III) <b>– Utilize C</b>                                 | ity of Novi Standar                                                                                                                                     | d Details     |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                   |
| Canopy Deciduous<br>Tree                      | Refer to LDM for<br>detail drawings                              | Yes                                                                                                                                                     | Yes           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                   |

| Item                                                                   | lichigan, Inc.<br>Required                                                                                                                                                                                                     | Proposed                                                                                                                 | Meets<br>Code | Comments                                                                                                                                                                                                                                                              | Response                                                                            |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Evergreen Tree                                                         |                                                                                                                                                                                                                                | No                                                                                                                       | No            | Please add if any<br>evergreen trees will be<br>used.                                                                                                                                                                                                                 | No evergreens<br>are proposed.                                                      |
| Multi-stem Tree                                                        | -                                                                                                                                                                                                                              | No                                                                                                                       | TBD           | Please add if any multi-<br>stem trees will be used.                                                                                                                                                                                                                  | None proposed.                                                                      |
| Shrub                                                                  | -                                                                                                                                                                                                                              | Yes                                                                                                                      | Yes           |                                                                                                                                                                                                                                                                       |                                                                                     |
| Perennial/ Ground<br>Cover                                             |                                                                                                                                                                                                                                | Yes                                                                                                                      | Yes           |                                                                                                                                                                                                                                                                       |                                                                                     |
| Tree stakes and guys.<br>(Wood stakes, fabric<br>guys)                 |                                                                                                                                                                                                                                | Yes                                                                                                                      | Yes           |                                                                                                                                                                                                                                                                       |                                                                                     |
| Tree protection<br>fencing                                             | Located at Critical<br>Root Zone (1' outside<br>of dripline)                                                                                                                                                                   | <ul> <li>2 on-site trees<br/>are shown as<br/>being saved</li> <li>Tree<br/>protection detail<br/>is on L-1.0</li> </ul> | •No<br>•Yes   | Please show protective<br>tree fence on the<br>Demolition and/or Soil<br>Erosion Control plan to<br>protect any saved trees<br>or trees on adjacent<br>properties within 50 feet<br>of disturbance, including<br>off-site trees near the<br>sanitary sewer extension. | Tree protection<br>fencing has been<br>shown around<br>Tree #1286 on<br>sheet C6.0? |
| Other Plant Material F                                                 | Requirements (LDM 11)                                                                                                                                                                                                          | <u> </u>                                                                                                                 |               |                                                                                                                                                                                                                                                                       | 1                                                                                   |
| General Conditions                                                     | Plant materials shall<br>not be planted within<br>4 ft. of property line                                                                                                                                                       | The trees west of<br>the west drive<br>are within 4 feet                                                                 | No            | Please move the drive<br>eastward to provide the<br>required spacing                                                                                                                                                                                                  | Waiver for plant<br>materials will be<br>requested.                                 |
| Landscape tree credit<br>(LDM 11)                                      | <ul> <li>Substitutions to<br/>landscape standards<br/>for preserved canopy<br/>trees outside<br/>woodlands/ wetlands<br/>should be approved<br/>by LA.</li> <li>Refer to Landscape<br/>tree Credit Chart in<br/>LDM</li> </ul> | None proposed                                                                                                            |               |                                                                                                                                                                                                                                                                       | This project does<br>not propose any<br>Landscape Tree<br>Credit at this<br>time.   |
| Plant Sizes for ROW,<br>Woodland<br>replacement and<br>others (LDM 11) | • Size determined by<br>use detailed in LDM<br>Table 11.b.(2)a.i                                                                                                                                                               | On plant list                                                                                                            | Yes           |                                                                                                                                                                                                                                                                       |                                                                                     |

| ltem                                                                      | lichigan, Inc.<br>Required                                                                                                                                                                                                 | Proposed                                                                                                                                     | Meets<br>Code | Comments                                                                                                                       | Response                                                                                                                                                  |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                           | Indicate on plant list                                                                                                                                                                                                     |                                                                                                                                              |               |                                                                                                                                |                                                                                                                                                           |
| Plant size credit (LDM<br>11)                                             | NA                                                                                                                                                                                                                         | No                                                                                                                                           |               |                                                                                                                                | This project does<br>not propose any<br>Landscape Tree<br>Credit at this<br>time.                                                                         |
| Prohibited Plants (LDM 11.b)                                              | No plants on City<br>Invasive Species List                                                                                                                                                                                 | No prohibited<br>plants are<br>proposed                                                                                                      | Yes           |                                                                                                                                |                                                                                                                                                           |
| Recommended trees<br>for planting under<br>overhead utilities<br>(LDM 11) | Label the distance<br>from the overhead<br>utilities                                                                                                                                                                       | <ul> <li>Overhead lines<br/>are shown along<br/>Novi Road</li> <li>Subcanopy<br/>trees are<br/>proposed as<br/>street trees there</li> </ul> | Yes           | The subcanopy street<br>trees are not required if<br>the RCOC does not allow<br>street trees between the<br>sidewalk and road. | The five sub-<br>canopy trees<br>along Novi Road<br>have been<br>removed and<br>correspondence<br>from RCOC<br>showing this<br>waiver will be<br>provided |
| Nonliving Durable<br>Material: Mulch (LDM<br>11)                          | <ul> <li>Trees shall be<br/>mulched to 3" depth<br/>and shrubs,<br/>groundcovers to 2"<br/>depth</li> <li>Specify natural<br/>color, finely shredded<br/>hardwood bark<br/>mulch. Include in cost<br/>estimate.</li> </ul> | On details                                                                                                                                   | Yes           |                                                                                                                                |                                                                                                                                                           |

### **Irrigation System Requirements**

- Any booster pump installed to connect the project's irrigation system to an existing irrigation system must be downstream of the RPZ.
   See the revised irrigation plans IR-1 through IR-3.
- 2. The RPZ must be installed in accordance with the 2015 Michigan Plumbing Code. See the revised irrigation plans IR-1 through IR-3.
- The RPZ must be installed in accordance with the manufacture installation instructions for winterization that includes drain ports and blowout ports.
   See the revised irrigation plans IR-1 through IR-3.

### Kimley **Whorn**

of Michigan, Inc.

- 4. The RPZ must be installed a minimum of 12-inches above FINISHED grade. See the revised irrigation plans IR-1 through IR-3.
- 5. Attached is a handout that addresses winterization installation requirements to assist with this. See the revised irrigation plans IR-1 through IR-3.
- 6. A plumbing permit is required. A plumbing permit will be submitted.
- 7. The assembly must be tested after installation with results recorded on the City of Novi test report form. See the revised irrigation plans IR-1 through IR-3.

### 2024-0227 – REVISED PRELIMINARY TRAFFIC REVIEW (JSP23-37) COMMENTS

### General

- 1. The applicant, PEA Group, is proposing a 4,106 SF Culver's restaurant. PEA Group is no longer the applicant.
- 2. The development is located on the south side of Karevich Drive, north of West Oaks Drive and west of Novi Road. Karevick Drive and West Oaks Drive are under the jurisdiction of the City of Novi. Novi Road is under the jurisdiction of the Road Commission for Oakland County. Comment acknowledged. No response required.
- 3. The site is zoned RC (Regional Center). Comment acknowledged. No response required.
- 4. There following traffic related deviations may be required if plans are not revised:
  - Below standard radius at one driveway.

#### Response: Plans have been revised to avoid a deviation for this item. See Sheet C3.0.

b. Below standard bicycle parking layout.

#### Response: Plans have been revised to avoid a deviation for this item. See Sheet C3.0.

c. Below minimum clear path width to bicycle parking.

#### Response: minimum clear path width will be adjusted as part of Final Site Plan.

d. Inconclusive if the required stacking spaces in drive-through are met.

### Response: Passenger cars have been added to the Site Plan. See sheet C3.0.

- 5. 5. The applicant has indicated the following deviations will be requested:
  - a. Dumpster location.

#### Response: no response required.

b. Front setback below standard.



### Traffic Impacts

1. AECOM performed an initial trip generation based on the ITE Trip Generation Manual, 11th Edition, as follows.

ITE Code: 934 – Fast-Food Restaurant with Drive-Through Window Development-specific Quantity: 4,106 GLA

| Trip Generation Summary       | Estimated Trips | Estimated Peak-<br>Direction Trips | City of Novi<br>Threshold | Above<br>Threshold? |
|-------------------------------|-----------------|------------------------------------|---------------------------|---------------------|
| AM Peak-Hour Trips            | 183             | 93                                 | 100                       | No                  |
| PM Peak-Hour Trips            | 135             | 70                                 | 100                       | No                  |
| Daily (One-Directional) Trips | 1,917           | N/A                                | 750                       | Yes                 |

2. The City of Novi generally requires a traffic impact study/statement if the number of trips generated by the proposed development exceeds the City's threshold of more than 750 trips per day or 100 trips per either the AM or PM peak hour, or if the project meets other specified criteria.

|                         | Trip Impact Study Recommendation                                                                                                                                                                                                                                                                                                        |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of Study:          | Justification                                                                                                                                                                                                                                                                                                                           |
| Traffic Impact<br>Study | A revised traffic study was submitted and approved with no pending comments.<br>Revised TIS: An evaluation of the parking related to the proposed development was completed following the city zoning ordinance. This calculates to 48 spaces. The development is proposing 48 parking spaces, which meets the City's zoning ordinance. |

### **TRAFFIC REVIEW**

The following table identifies the aspects of the plan that were reviewed. Items marked O are listed in the City's Code of Ordinances. Items marked with ZO are listed in the City's Zoning Ordinance. Items marked with ADA are listed in the Americans with Disabilities Act. Items marked with MMUTCD are listed in the Michigan Manual on Uniform Traffic Control Devices.

The values in the 'Compliance' column read as 'met' for plan provision meeting the standard it refers to, 'not met' stands for provision not meeting the standard and 'inconclusive' indicates applicant to provide data or information for review and 'NA' stands for not applicable for subject Project. The 'remarks' column covers any comments reviewer has and/or 'requested/required variance' and 'potential variance'. A potential variance indicates a variance that will be required if modifications are not made or further information provided to show compliance with the standards and ordinances. The applicant should put effort into complying with the standards; the variances should be the last resort after all avenues for complying have been exhausted. Indication of a potential variance does not imply support unless explicitly stated.



| EXT | EXTERNAL SITE ACCESS AND OPERATIONS                           |                                     |               |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
|-----|---------------------------------------------------------------|-------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| No. | Item                                                          | Proposed                            | Compliance    | Remarks                                                                                                                                                                                                                                                                                                                            | Response                                                                                                                                                                                                                       |  |  |
| 1   | Driveway Radii   O <u>Figure IX.3</u>                         | 6', 30' and<br>matching<br>existing | Partially Met | 6' does not meet 15'<br>minimum<br>requirement. A<br>mountable concrete<br>median drive<br>approach has been<br>added. The applicant<br>has not indicated if<br>they will be<br>requesting a<br>deviation. Provide<br>truck turning<br>movements for<br>anticipated delivery<br>trucks that need to<br>get to<br>the loading zone. | Driveway radii have<br>been revised to meet<br>min. 15', except at<br>mountable concrete<br>median drive<br>approach, where<br>large majority of<br>turns will be lefts<br>from the relocated N<br>Karevich Dr access<br>drive |  |  |
| 2   | Driveway Width   O Figure IX.3                                | 24'                                 | Met           | Within range.                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                |  |  |
| 3   | Driveway Taper   O Figure IX.11                               |                                     |               |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 3a  | Taper length                                                  | -                                   | N/A           |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 3b  | Tangent                                                       | -                                   | N/A           |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 4   | Emergency Access   O <u>11-</u><br><u>194.a.19</u>            | 2 access<br>points                  | Met           |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 5   | Driveway sight distance   O<br><u>Figure</u><br><u>VIII-E</u> | Not indicated                       | N/A           | For major through roads.                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                |  |  |
| 6   | Driveway spacing                                              |                                     |               |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 6a  | Same-side   O <u>11.216.d.1.d</u>                             | -                                   | N/A           |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 6b  | Opposite side   O <u>11.216.d.1.e</u>                         | -                                   | N/A           |                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                |  |  |
| 7   | External coordination (Road agency)                           | -                                   | N/A           | No changes proposed to Novi Road.                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                |  |  |

| EXTERNAL | EXTERNAL SITE ACCESS AND OPERATIONS             |                |               |                                                            |                         |  |  |
|----------|-------------------------------------------------|----------------|---------------|------------------------------------------------------------|-------------------------|--|--|
| No.      | Item                                            | Proposed       | Compliance    | Remarks                                                    | Response                |  |  |
| 8        | External Sidewalk   Master Plan &               | Proposed<br>8' | Met           |                                                            |                         |  |  |
|          | EDM                                             | walk along     |               |                                                            |                         |  |  |
|          |                                                 | Novi Road      |               |                                                            |                         |  |  |
|          |                                                 | and 5'         |               |                                                            |                         |  |  |
|          |                                                 | connection     |               |                                                            |                         |  |  |
|          |                                                 | to             |               |                                                            |                         |  |  |
|          |                                                 | site           |               |                                                            |                         |  |  |
| 9        | Sidewalk Ramps   <u>EDM 7.4</u> & <u>R-28-K</u> | Indicated      | Partially Met | Include standard<br>detail R- 28-K in<br>future submittal. | Will be<br>submitted    |  |  |
|          |                                                 |                |               |                                                            | in future<br>submittals |  |  |

313-572-1560

| Kim | ey≫   | Horn         |
|-----|-------|--------------|
|     | of Mi | chigan, Inc. |

| INTE | INTERNAL SITE OPERATIONS                                   |                                                                        |            |                                                                                                                         |                                                                          |  |  |  |
|------|------------------------------------------------------------|------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--|--|--|
| No.  | Item                                                       | Proposed                                                               | Compliance | Remarks                                                                                                                 | Response                                                                 |  |  |  |
| 11   | Loading zone   <u>ZO 5.4</u>                               | 500 SF<br>required,<br>1,010<br>proposed                               | Met        |                                                                                                                         |                                                                          |  |  |  |
| 12   | Trash receptacle   <u>ZO 5.4.4</u>                         | Proposed<br>directly next<br>to the<br>building on<br>the west<br>side | Not Met    | The applicant is<br>requesting a<br>deviation for<br>location of<br>dumpster.                                           | Deviation is still being requested.                                      |  |  |  |
| 13   | Emergency Vehicle Access                                   | Turning<br>movements<br>provided                                       | Met        |                                                                                                                         |                                                                          |  |  |  |
| 14   | Maneuvering Lane   <u>ZO 5.3.2</u>                         | 20' and 30'                                                            | Met        |                                                                                                                         |                                                                          |  |  |  |
| 15   | End islands   <u>ZO 5.3.12</u>                             |                                                                        |            |                                                                                                                         |                                                                          |  |  |  |
| 15a  | Adjacent to a<br>travel way                                | Dimensioned                                                            | Met        | 3' shorter than adjacent space.                                                                                         |                                                                          |  |  |  |
| 15b  | Internal to<br>parking bays                                | Provided                                                               | Met        | Internal islands not<br>required to be 3'<br>shorter than adjacent<br>parking.                                          |                                                                          |  |  |  |
| 16   | Parking spaces   <u>ZO 5.2.12</u>                          | 56 including<br>3 accessible<br>spaces                                 |            | See Planning review<br>letter. The site data<br>table lists 53<br>spaces but the site<br>plan total shows 56<br>spaces. | A total of 48 spaces are proposed<br>with the revised site, as required. |  |  |  |
| 17   | Adjacent parking spaces   <u>ZO</u><br><u>5.5.3.C.ii.i</u> | <15 spaces<br>in all<br>parking<br>bays                                | Met        |                                                                                                                         |                                                                          |  |  |  |

| 1. |    |                                  | lichigan, Inc. |               |                    |                                  |
|----|----|----------------------------------|----------------|---------------|--------------------|----------------------------------|
|    | 18 | Parking space length   <u>ZO</u> | 17' and 19'    | Partially Met | Dimension parallel | Paralllel spaces are             |
|    |    | <u>5.3.2</u>                     | perpendicul    |               | parking spaces in  | dimensioned, seet the site plan, |
|    |    |                                  | ar spaces,     |               | future submittal.  | sheet C3.0                       |
|    |    |                                  | 18' angled     |               |                    |                                  |
|    |    |                                  | spaces,        |               |                    |                                  |
|    |    |                                  | parallel       |               |                    |                                  |
|    |    |                                  | spaces not     |               |                    |                                  |
|    |    |                                  | dimensione     |               |                    |                                  |
|    |    |                                  | d              |               |                    |                                  |
|    | 19 | Parking space Width   ZO 5.3.2   | 8' parallel    | Met           |                    |                                  |
|    |    |                                  | spaces and     |               |                    |                                  |
|    |    |                                  | 9'             |               |                    |                                  |

| INTE | INTERNAL SITE OPERATIONS                                    |                           |              |                               |                                                    |  |  |  |
|------|-------------------------------------------------------------|---------------------------|--------------|-------------------------------|----------------------------------------------------|--|--|--|
| No.  | Item                                                        | Proposed                  | Compliance   | Response                      |                                                    |  |  |  |
| 20   | Parking space front curb height   <u>ZO</u><br><u>5.3.2</u> | Not Indicated             | Inconclusive | 6" standard in front of 19    | This will be<br>provided in a<br>future submittal. |  |  |  |
| 21   | Accessible parking – number   <u>ADA</u>                    | 3                         | Met          |                               | No response<br>required.                           |  |  |  |
| 22   | Accessible parking – size   <u>ADA</u>                      | 8' with 5' or 8'<br>aisle | Met          |                               | No response<br>required                            |  |  |  |
| 23   | Number of Van-accessible space   <u>ADA</u>                 | 1                         | Met          |                               | No response required.                              |  |  |  |
| 24   | Bicycle parking                                             |                           |              |                               |                                                    |  |  |  |
| 24a  | Requirement   <u>ZO 5.16.1</u>                              | 4 required, 4 proposed    | Met          |                               | No response<br>required.                           |  |  |  |
| 24b  | Location   <u>ZO 5.16.1</u>                                 | Provided                  | Met          |                               |                                                    |  |  |  |
| 24c  | Clear path from Street   <u>ZO 5.16.1</u>                   | 6' required               | Inconclusive | sidewalk from the crosswalk   | site plan, sheet                                   |  |  |  |
| 24d  | Height of rack   <u>ZO 5.16.5.B</u>                         | 3' required               | Met          | include in plan set in future | This will be<br>provided in a<br>future submittal. |  |  |  |

|     | of Michigan, Inc.                               |                                     |               |                                                                       |                                                                                                                                                       |  |  |  |
|-----|-------------------------------------------------|-------------------------------------|---------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| 24e | Other (Covered / Layout)   <u>ZO 5.16.1</u>     | Partially<br>dimensioned            | Not Met       | Refer to Text Amendment<br>18.301 for updated layout<br>requirements. |                                                                                                                                                       |  |  |  |
| 25  | Sidewalk – min 5' wide   <u>Master Plan</u>     | 5'                                  | Met           |                                                                       |                                                                                                                                                       |  |  |  |
| 26  | Sidewalk ramps   <u>EDM 7.4</u> & <u>R-28-K</u> | Not indicated at accessible spaces. | Inconclusive  | detail in future submittal.                                           | This will be<br>provided in a<br>future submittal.                                                                                                    |  |  |  |
| 27  | Sidewalk – distance back of curb   $EDM$<br>7.4 | -                                   | N/A           |                                                                       |                                                                                                                                                       |  |  |  |
| 28  | Cul-De-Sac   O <u>Figure VIII-F</u>             | -                                   | N/A           |                                                                       |                                                                                                                                                       |  |  |  |
| 29  | EyeBrow   O Figure VIII-G                       | -                                   | N/A           |                                                                       |                                                                                                                                                       |  |  |  |
| 30  | Stacking Spaces   <u>ZO 5.3.11.1</u>            | Partially<br>dimensioned            | Partially Met | Dimension length of<br>stacking space in future<br>submittal          | The site plan<br>has been<br>updated to<br>show cars<br>stacking<br>between the<br>board and<br>window and<br>before the<br>board. See<br>Sheet C3.0. |  |  |  |

| INT | ERNAL SITE OPERATIONS |                                                              |                                                             |                                                                                                                                     |                                                                                                                       |
|-----|-----------------------|--------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| No. | Item                  | Proposed                                                     | Compliance                                                  | Remarks                                                                                                                             | Response                                                                                                              |
| 31  | Any Other Comments:   | provided. 48<br>applicant co<br>spaces alon<br>right in from | parking spaces a<br>buld remove the &<br>ig the back of the | e centerline radius<br>are required; the<br>8 parallel parking<br>9 site (or at least the 4<br>u) since those spaces<br>ru traffic. | Comment<br>acknowledged. The<br>site plan has been<br>updated with a new<br>parking configuration.<br>See Sheet C3.0. |

| SIG | SIGNING AND STRIPING                                                                                            |                                               |                  |                                                           |                                                                                   |  |  |  |
|-----|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------|--|--|--|
| No. | Item                                                                                                            | Proposed                                      | Compliance       | Remarks                                                   | Response                                                                          |  |  |  |
| 32  | Signing: Sizes   <u>MMUTCD</u>                                                                                  | No Parking<br>Fire Lane sign<br>included      | Partially<br>Met | Include all proposed<br>signs in future<br>submittal.     | See sheet C3.0 for<br>proposed signs<br>and C9.0 for the<br>new signage<br>sheet. |  |  |  |
| 33  | Signing table: quantities and sizes                                                                             | Not included                                  | Not Met          | Include in future<br>submittal.                           | Will include in final site plan submittal.                                        |  |  |  |
| 34  | Signs 12" x 18" or smaller in size<br>shall be mounted on a galvanized<br>2 lb. U- channel post   <u>MMUTCD</u> | Indicated for<br>No Parking<br>Fire Lane sign | Partially<br>Met | Include for all<br>proposed signs in<br>future submittal. | See site plan notes<br>#3 on sheet C3.0                                           |  |  |  |
| 35  | Signs greater than 12" x 18" shall<br>be mounted on a galvanized 3 lb.<br>or                                    | Indicated for<br>No Parking<br>Fire           | Partially<br>Met | Include for all<br>proposed signs in<br>future submittal. | See site plan notes<br>#3 on sheet C3.0                                           |  |  |  |

|    | of Michigan, Inc.                                                                                                                 |                                                                          |                  |                                                                    |                                                                                          |
|----|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|    | greater U-channel post   <u>MMUTCD</u>                                                                                            | Lane sign                                                                |                  |                                                                    |                                                                                          |
| 36 | Sign bottom height of 7' from final grade   <u>MMUTCD</u>                                                                         | Indicated for<br>No Parking<br>Fire Lane sign                            | Partially<br>Met | Include for all<br>proposed signs in<br>future submittal.          | See site plan notes<br>#3 on sheet C3.0                                                  |
| 37 | Signing shall be placed 2' from the face of the curb or edge of the nearest sidewalk to the near edge of the sign   <u>MMUTCD</u> | Not included                                                             | Not Met          | Include in future<br>submittal.                                    | Included on sheet<br>C3.0                                                                |
| 38 | FHWA Standard Alphabet series<br>used for all sign language  <br><u>MMUTCD</u>                                                    | Not included                                                             | Not Met          | Include in future submittal.                                       | See site plan notes<br>#3 on sheet C3.0                                                  |
| 39 | High-Intensity Prismatic (HIP)<br>sheeting to meet FHWA retro-<br>reflectivity   <u>MMUTCD</u>                                    | Not included                                                             | Not Met          | Include in future<br>submittal.                                    | See site plan notes<br>#3 on sheet C3.0                                                  |
| 40 | Parking space striping notes                                                                                                      | 4" proposed                                                              | Partially<br>Met | Indicate color of all<br>proposed markings in<br>future submittal. | Will include in final site plan submittal.                                               |
| 41 | The international symbol for<br>accessibility pavement markings  <br>ADA                                                          | Not included                                                             | Not Met          | Include in future<br>submittal.                                    | The proposed ADA<br>spaces will utilize<br>the international<br>pavt markings for<br>ADA |
| 42 | Crosswalk pavement marking detail                                                                                                 | Not included                                                             | Not Met          | Include in future<br>submittal.                                    | Will be included in future submittal.                                                    |
| 43 | Any Other Comments:                                                                                                               | Provide details<br>hatched pavem<br>indicate the rea<br>the drive-thru w |                  |                                                                    |                                                                                          |

### **Traffic Impact Review - AECOM**

The Traffic Impact Study was reviewed to the level of detail provided and AECOM recommends denial of the Traffic Impact Study (parking evaluation); the applicant should review the comments provided below and provide a revised study to the City.

\*\* Some review information omitted since response is not necessary \*\*

### **SITE TRIP GENERATION**

- 1. A total of 1,919 daily trips are anticipated based on the ITE trip generation for 'Fast Food Restaurant with Drive Through Window' code 934.
- 2. A total of 55% of trips are considered pass-by trips during the afternoon peak hours (m.d. and p.m.). And a net increase of approx. 104 trips during the afternoon peak hour (m.d.) and approx. 61 trips during the evening peak hour (p.m.) are considered for a traffic impact study on the surrounding road network.

### SITE TRAFFIC ASSIGNMENT

1. The largest portion of the traffic is assumed to be coming from/going to Novi Road followed

by Twelve Oaks Mall Road and W Oaks Drive. The directions that site traffic will travel to and from were based upon existing traffic patterns during the m.d. and p.m. peak hours.

### **FUTURE CONDITIONS**

1. Operations at the signalized intersections are not expected to deteriorate significantly at the study area intersections except at Oaks Drive South and Karevich Drive/Site Driveway (stop-controlled).

2. Excessive delay (LOS F) at Karevich Drive/Site driveway. However, the 95th percentile queues for the SB approach of the Oaks Drive South and Karevich Drive/Site Driveway intersection are 96 feet (four vehicles) and 63 feet (three vehicles) during the m.d. and p.m. peak hours, respectively.

### Parking Evaluation

The report includes the parking requirements for a restaurant one space for every two employees, plus one space for every two customers allowed under maximum capacity (including waiting areas) following the City ordinance. This calculates to 48 spaces. The development is proposing 42 parking spaces, which is a deficit of 6 spaces per the City's zoning ordinance. The report also anticipated parking demand calculated using the methodologies presented in the ITE Parking Generation Manual, 5th Edition resulting in a peak parking demand of 38 parking spaces.

We do not agree with the TIS preparer's conclusion for the parking evaluation suggesting a peak parking demand of 38 spaces. The study has not considered the peak parking demand for Friday which is 51 spaces per ITE 5th Edition.

In accordance with the City zoning ordinance, the parking requirements for a restaurant are one space for every two employees, plus one space for every two customers allowed under maximum capacity (including waiting areas). This calculates to 48 spaces. The development is proposing 48 parking spaces, which meets the City's zoning ordinance.

### **CONCLUSIONS**

1. The study concluded with excessive delay (LOS F) at Karevich Drive/Site driveway. However, the 95th percentile queues for the SB approach of the Oaks Drive South and Karevich Drive/Site Driveway intersection are 96 feet (four vehicles) and 63 feet (three vehicles) during the m.d. and p.m. peak hours, respectively.

Response: Analysis of the LOS results for future conditions revealed that most movements, approaches, and intersections are expected to continue to operate at an acceptable LOS D or better during both the m.d. and p.m. peak hours, with the following exceptions at Oaks Drive South and Karevich Drive/Site Driveway:

- The SB approach operates at LOS F in the m.d. and p.m. peak hours.
- 2. The study has not considered the peak parking demand for Friday which is 51 spaces per ITE 5<sup>th</sup> Edition.

### Response: See above response.

### <u>City of Novi Fire Department</u>: Kevin S. Pierce, Fire Marshal

### IRRIGATION SYSTEM / CONNECTION TO PUBLIC WATER SUPPLY (Dated 6/07/2024)

PSP# 23-055

PreApp# 23-0018

### **Project Description:**

Build a 4,060 Sq. Ft. structure off West Oaks Dr.

Comments:

- All fire hydrants MUST be installed and operational prior to any combustible material is brought on site. IFC 2015 3312.1
- For new buildings and existing buildings, you MUST comply with the International Fire Code Section 510 for Emergency Radio Coverage. This shall be completed by the time the final inspection of the fire alarm and fire suppression permits.
- Completed 6-3-24 KSP- The minimum width of a posted fire lane is 20 feet. The minimum height of a posted fire lane is 14 feet. (D.C.S Sec. 158-99(a).)
- Completed 6-3-24 KSP- Fire apparatus access drives to and from buildings through parking lots shall have a minimum fifty (50) feet outside turning radius and designed to support a minimum of thirty-five (35) tons. (D.C.S. Sec 11-239(b)(5))
- RECEIVED 12/22/23 A hazardous chemical survey is required to be submitted to the Planning & Community Development Department for distribution to the Fire Department at the time any Preliminary Site Plan is submitted for review and approval. Definitions of chemical types can be obtained from the Fire Department at (248) 735-5674.
- COMPLETED 12/22/23 Watermains and fire hydrant shall be put on the plans for review.
- Water mains greater than 25', shall be at least 8" in diameter. Shall be put on plans for review. (D.S.C. Sec.11-68(C)(1)(c)

### City of Novi Department of Public Services Water & Sewer Division:

Linda Slepetski, Water & Sewer Division

### IRRIGATION SYSTEM / CONNECTION TO PUBLIC WATER SUPPLY (Dated 6/07/2024)

Project Name: Culver's W. Oaks Dr at Novi Rd

Drawings and Revision Dates Reviewed:

- Revision date: 5/09/2024
- List of Drawings: IR-1, IR-3

Plan Review: Not Approved

\*\* For all irrigation plan comments see the revised irrigation plans IR-1 through IR-3.

Point of Connection [POC] Identified: Yes, 1 <sup>1</sup>/<sub>2</sub>" line tapped from domestic water supply. Please clarify the notation on plans means before building containment RPZ. Irrigation to have own RPZ.

Expansion of existing irrigation system or new system:

New

RPZ's must be installed as the required protective assembly unless circumstances warrant the installation of a Pressure Vacuum Breaker (PVB) assembly for protection of the public water supply. PVB's must have specific approval from the Water & Sewer Cross Connection Specialist or Water & Sewer Manager for such installations and such approval with conditions of approval documented on the drawings.



Comments: Febco 1 1/2" 825Y RPZ in legend on IR-1

Backflow preventer attached to building or common area: Building

Backflow preventer riser diagram provided: Yes

Comments: IR-3

Detail provided showing installation meets manufacturer winterization requirements per city handout:

Yes

Comments: IR-1 reference notes 3.

The following notation provided: No

Required RPZ must be ASSE 1013 listed as a complete assembly including shutoff valves. Assembly required to be installed by a licensed plumbing contractor. Plumbing permit is required. New assembly must be tested after installation by a licensed plumber also ASSE 5110 Certified to test. Results must be recorded on the City of Novi test report form with a copy sent to the Novi Water & Sewer Division. RPZ must be installed not less than 12-inches above FINISHED GRADE measured from the bottom of the pressure relieve valve. Assemblies must be incompliance with the Michigan Plumbing Code, manufacturer installation instructions including winterization and ASSE listing approvals for orientation, valves, etc

<u>City of Novi Department of Public Services Water & Sewer Division:</u> Dated 06/07/2024 Kevin Roby, Cross Connection Specialist

Pursuant to the Safe Drinking Water Act, P.A. 399, Part 14 Rules (Rule 1406) and the City of Novi Cross

Connection Control Program (CCCP) please be advised of the following requirements.

The Water and Sewer Division is requiring an ASSE 1013 listed and approved Reduced Pressure Zone Assembly (RPZ) to be installed immediately downstream of the water meter in addition to the below requirements.

- The assembly shall be provided in an accessible location with access through a swing door if installed in an enclosed location.
- Access shall be approved by the Water & Sewer Division.
- A floor drain shall be provided in accordance with the Michigan Plumbing Code or Michigan Residential Code and approved by the Community Development Department Plumbing Division.
- Thermal Expansion requirements must be considered in accordance with the Michigan Plumbing Code or Michigan Residential Code and approved by the Community Development Department Plumbing Division.
- If a booster pump is necessary, low pressure cutoff requirements must be addressed in accordance with the Michigan Plumbing Code



Sincerely, **KIMLEY-HORN OF MICHIGAN, INC.** 

Syler Smith

Tyler Smith, P.E. Project Manager

CC: Charles Paisley Mike Sabrosky