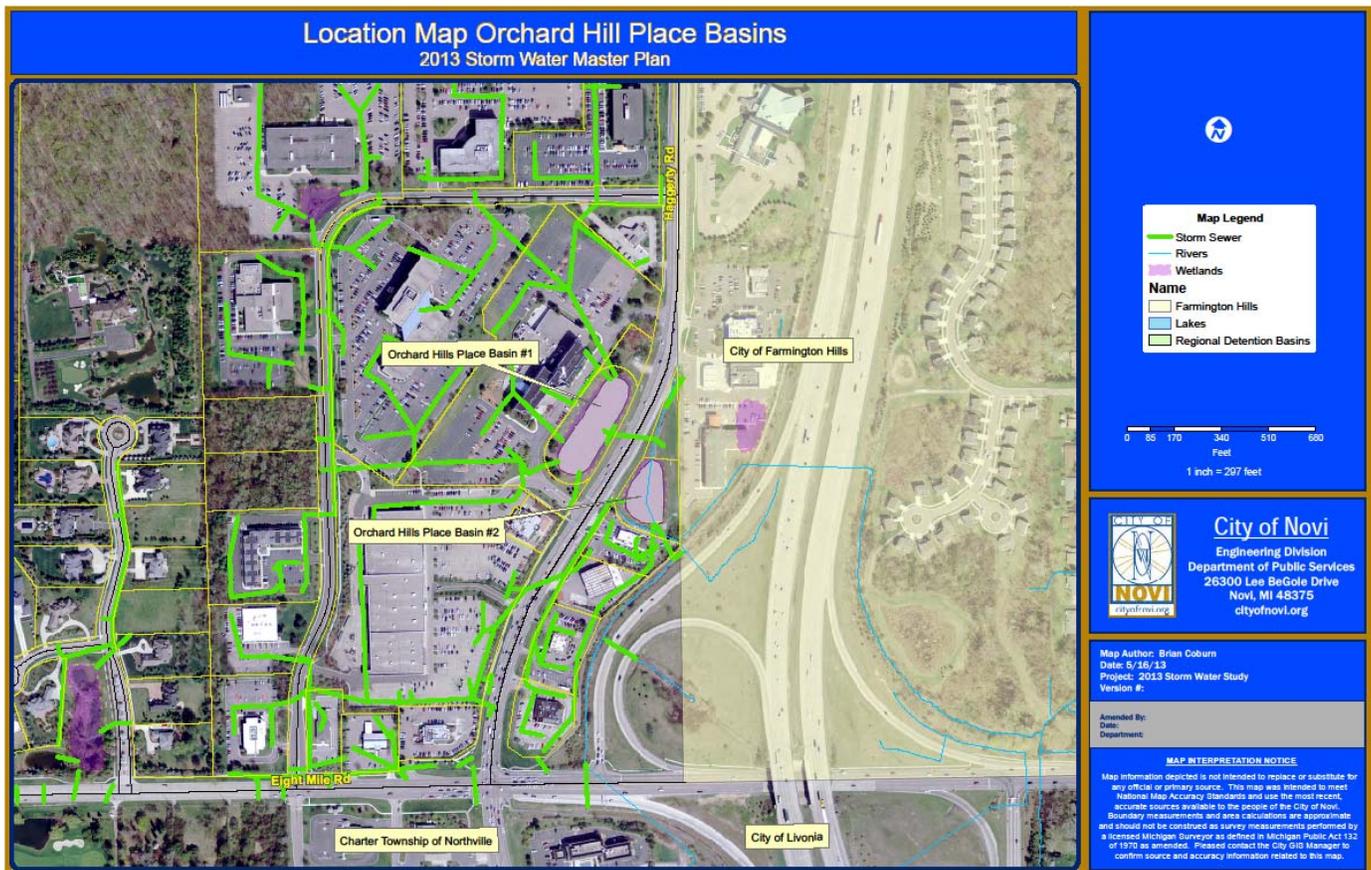


SECTION 4 – Orchard Hill Place Basins Condition and Capacity Concerns

INTRODUCTION AND BACKGROUND

This report focuses on two detention basins within the Orchard Hill Place development located west and east of Haggerty Road, north of Eight Mile Road. This report presents the identified problem areas, and recommends improvements to meet the City's expectations for storm water quality, while also reducing routine maintenance frequency.

These two storm water detention basins serve a commercial area in the southeasterly portion of Section 36. The westerly basin (Basin #1) is owned by the City of Novi, but is maintained by the Orchard Hill Place Association. The easterly basin (Basin #2) is owned by the Orchard Hill



Place Association, but maintained by the City of Novi. City of Novi Engineering staff have reviewed the history of this arrangement, but were unable to determine why the ownership and maintenance has traditionally occurred in this manner.

The on-going concerns with the basins include damage at inlet and outlet structures and pipes, sedimentation, and outlet pipe clogging.

FIELD INVESTIGATION

In August 2013, staff from Spalding DeDecker Associates, Inc. (SDA) and Environmental Consulting & Technology, Inc. (ECT) met on-site with the City of Novi Department of Public Services (DPS) staff, to perform a field review of the detention basins.



Basin #1 showed no apparent sediment accumulation. Only two small (~10' to 30' long) areas of shoreline erosion were observed, and they did not appear to be contributing significant amounts of sediment to the basin. DPS staff commented that the Sheraton hotel

See page thru South Slope Basin #1

had intentionally plugged the 6-inch outlet, to turn what would otherwise be a low or potentially dry basin into a pond in front of the hotel. Inlet pipes showed separation at the joints in several locations. Along the south slope side of the basin, the bank/slope was soft and there was



standing water from seepage through the basin side slope. Long term, this seepage could cause issues with bank erosion.

Basin #2 showed signs of a significant accumulation of sediment. Although flow through the outlet structure was observed, there is significant sediment and plant debris in the pond that adversely affects the storage volume and operation of the basin. DPS staff stated that they could not recall if the basin had ever been dredged.



Sediment Accumulation at Basin #2

The DPS staff also stated that the 6-inch diameter outlet pipe of Basin #2 clogs and requires frequent maintenance. There is also pipe separation at the southwest inlet of this basin.

RECOMMENDATIONS

Some conceptual remedial options have been developed for budgeting purposes. It should be noted that a combination of these options should be implemented to result in the most effective improvement. The conceptual remedial options are as follows:

1. Revise ownership and operations: Although this will not address any flooding issues, it will assist with future maintenance if both basins are owned and operated by a single entity. Alternatively, ownership or maintenance responsibilities of the basins could be corrected so Orchard Hill Place Association owns and maintains Basin #1, and the City owns and maintains Basin #2.



2. Dredge Detention Basin #2: Based on the field investigation, there appears to be a significant amount of sediment within the detention basin, reducing surge capacity and leading to maintenance issues with the outlet. Additional volume capacity can be achieved by dredging the basin. In addition, removing the sediment and debris will lower the chances of the outlet pipe becoming clogged.
3. Repair separated inlet pipes: Some pipe joints near the inlets to the basins have separated, which has likely led to surrounding erosion. These joints can be repaired by removal and replacement of pipe sections, or by lining.
4. Retrofit the outlet of Basin #2: The current outlet pipe has a history of clogging which requires frequent maintenance. The grate of the outlet structure should be retrofitted similar to the way other regional detention basin outlets have been retrofitted in the City. Although this does completely prevent the need for maintenance, this retrofit would reduce the maintenance issues that currently arise with this structure.
5. Retrofit outlet of Basin #1 to permit lower water levels: Remove the existing restriction on the outlet to allow the normal water level to be lower and install a standpipe with stone inlet cone. This would restore Basin #1 back to its original design and functionality as a detention basin, with storm surge capacity and fluctuating water levels. Prior to implementing this, it is recommended that the downstream hydraulics be reviewed to ensure that the increase in discharge will not adversely affect the downstream Basin and surrounding area.



6. Downstream Improvements: The area downstream of Detention Basin #2 is overgrown with vegetation and there are areas of sediment buildup. The ditch in this area should be cleaned out to allow for unobstructed discharge from the Basin. Note that portions of this area cross into the City of Farmington Hills and MDOT right-of-way for I-275.

PRELIMINARY ESTIMATES

Option 2. *Dredge Detention Basin #2*

Item Description	Unit	Unit Price	Quantity	Item Cost
Mobilization	LSum	\$5,000	1	\$5,000
Dredge Existing Pond	Cyd	\$10.00	2,600	\$26,000
Dewatering	LSum	\$7,500	1	\$7,500
Restoration	Syd	\$5.00	500	\$2,500
<i>Contingency (25%)</i>				\$10,250
Estimate =				\$51,250

Option 3. *Repair Inlet Pipes with Separation (Cost Included in Above Estimate)*

Item Description	Unit	Unit Price	Quantity	Item Cost
Pipe Repair	Each	\$2,000	4	\$8,000

Option 4. *Reconstruct Outlet of Basin #2 and Repair Separated Inlet Pipes*

Item Description	Unit	Unit Price	Quantity	Item Cost
Mobilization	LSum	\$2,500	1	\$2,500
Outlet Structure	LSum	\$7,500	1	\$7,500
Pipe Separation Repair	Each	\$2,000	4	\$8,000
Restoration	Syd	\$5.00	1,000	\$5,000
<i>Contingency (25%)</i>				\$5,750
Estimate =				\$28,750

Option 5. *Retrofit Outlet of Basin #1*

Item Description	Unit	Unit Price	Quantity	Item Cost
Mobilization	LSum	\$2,500	1	\$2,500
Dewatering	LSum	\$2,500	1	\$2,500
Remove restriction, install standpipe	LSum	\$8,000	1	\$8,000
Restoration	Syd	\$5.00	500	\$2,500
<i>Contingency (25%)</i>				\$3,875
Estimate =				\$19,375

Option 6. *Downstream Drainage Course Improvements*
(NOTE: partially in City of Farmington Hills)

Item Description	Unit	Unit Price	Quantity	Item Cost
Mobilization	LSum	\$3,000	1	\$3,000
Ditch Cleanout	Feet	\$15	500	\$7,500
Excavation of sediment	Cyd	\$10.00	500	\$5,000
Dewatering	LSum	\$2,500	1	\$2,500
Restoration	Syd	\$5.00	500	\$2,500
<i>Contingency (25%)</i>				\$5,125
Estimate =				\$25,625

Please note that the contingency is each of these estimates includes permitting costs, soil erosion control measures, and miscellaneous work items to complete the improvements. The costs do not include design engineering services.

