NOVI cityofnovi.org

CITY of NOVI CITY COUNCIL

Agenda Item15 May 21, 2018

SUBJECT: Approval to award a construction contract for the ITC Storage Facility construction project to Sole Building Company, the low bidder, in the amount of \$454,659, with the final form of the agreement to be reviewed and approved by the City Manager and City Attorney.

SUBMITTING DEPARTMENT: Integrated Solutions- Facilities Management Division

CITY MANAGER APPROVAL:

| EXPENDITURE REQUIRED | \$454,659 |
|------------------------|--------------------|
| AMOUNT BUDGETED | \$500,000 |
| APPROPRIATION REQUIRED | \$ 0 |
| LINE ITEM NUMBER | 101-265.10-976.103 |

BACKGROUND INFORMATION:

Each workday from April through November, Integrated Solutions staff deploys large mowers and other equipment from the DPS garage located on Lee BeGole Drive to ITC Community Sports Park and back, which is a round-trip distance of 16.2 miles. Equipment must be safely loaded onto trailers then transported to ITC Sports Park, where it is off-loaded for the day's use. At the end of the day, workers must re-load the equipment onto trailers and travel back to DPS's yard where it is off-loaded for nightly storage. This daily process results in lost productivity in terms of added labor and equipment costs. This new equipment storage building at ITC Community Sports Park will eliminate this costly and inefficient practice by allowing the storage of Parks Maintenance equipment. In addition, this facility will house a small storage location for Novi Youth Baseball League (NYBL) to store some of their equipment. Lastly, after working with PRCS, we have included a restroom that will serve as a trailhead for the new ITC trail.

The Facilities Management team collaborated with NSA Architects, members of the PRCS and Community Development staffs to develop a bid package that addressed the items listed above and the addition of renewable energy options.

Some of the sustainable options that will be incorporated into the project scope include:

- Twenty-eight solar panels that will provide an estimated 55% of facility energy generation during peak usage.
- Three rain gardens that will collect most of the site's storm water run-off.
- The addition of a trailhead that will promote Novi's pathways.
- The omission of refrigeration that promotes ozone protection.

The City held a non-mandatory pre-bid meeting on April 5th, 2018. The City received five bids for the project. Staff conducted interviews and validated that Sole, the low bidder is capable of completing this project. The Sole Building Co. bid is recommended as being in the best interest of the City as it is responsive, (i.e. Sole has complied with all requirements of the bidding instructions) and it is the lowest price. Construction is scheduled to begin late June 2018 and completion is anticipated in early fall.

RECOMMENDED ACTION:

Approval to award a construction contract for the ITC Storage Facility construction project to Sole Building Company, the low bidder, in the amount of \$454,659, with the final form of the agreement to be reviewed and approved by the City Manager and City Attorney.

CITY OF NOVI ITC CSP Park Storage Building Bid Tab "As Read" April 26, 2018 2:00 P.M.

This tabulation reflects submittal data by the following companies which have not been evaluated for accuracy of information. Final decision for award will be determined once the evaluation has been completed.

| | | | | | | Total Bas | e Bid + Alternate | |
|-------------------------|----------|----------|----------|------------|------------------|------------------|-------------------|-----------------|
| Company | Bid Bond | Addendum | Total Ba | se Bld | Alternate #1 | | #1 | Alternate #2 |
| Sole Building Company | Y | Y | \$ 2 | 296,903.00 | \$ 131,580.00 | \$ | 428,483.00 | \$ 26,176.00 |
| Envision Builders | Y | Υ | \$ 2 | 291,000.00 | \$ 144,000.00 | \$ | 435,000.00 | \$ 33,000.00 |
| Evangelista Corporation | Y | Υ | \$ 3 | 318,700.00 | \$ 141,000.00 | \$ | 459,700.00 | \$ 23,500.00 |
| Cross Renovation | Y | Υ | \$ 2 | 297,500.00 | \$ 165,000.00 | \$ | 462,500.00 | \$ 30,800.00 |
| Reliance Builders | Y | Υ | \$ 4 | 177,000.00 | \$ 180,000.00 | \$ | 657,000.00 | \$ 38,000.00 |

All alternate amounts are "ADD's"

DOCUMENT 004113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

| 1.1 | BID INFORMATION |
|-----|---|
| A. | Bidder: SOLE' BUILDING COMPANY. |
| В. | Project Name: ITC Community Sports Park – Park Storage Building. |
| C. | Project Location: 51000 Eight Mile Road, Novi, MI 48167. |
| D. | Owner: City of Novi. |
| E. | Architect: NSA Architects, Engineers, Planners. |
| F. | Architect Project Number: 216402.00. |
| 1.2 | CERTIFICATIONS AND BASE BID |
| Α. | Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by NSA Architects, Engineers, Planners and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of: |
| | Feb tuniones Justy Six Thousand will therenes Dollars (\$296,903.00). |
| 1.3 | ALTERNATES |
| Λ., | The undersigned Bidder proposes the amount below be added to or deducted from the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment. |
| В. | Alternate No. 1: Construct approximately 2,600 s.f. multiple-space building with toilet room, roof extension (over covered area) and four overhead doors. 1. Change to Proposal: |
| | a. ADD DEDUCT NO CHANGE NOT APPLICABLE. |
| | a. ADD DEDUCT NO CHANGE NOT APPLICABLE. b. ONE HANGES THAT UNE THOUAND FIVE WHATES ELEVED 13,580 90 c. ADD DEDUCT NO CHANGE calendar days to adjust the Contract Time |
| | c. ADD DEDUCT NO CHANGE calendar days to adjust the Contract Time for this alternate. |
| C. | Alternate No. 2: Electrical system with Solar Power component including, but not limited to, solar panels, storage batteries, additional panels, transfer switches, and all associated wiring and connections. |

1. Change to Proposal:

| | a. ADD DEDUCT NO CHANGE NOT APPLICABLE. |
|-----|---|
| | b. TWENTY SIX TANNOWS ONE ANALYSIS SEVERY SIX Dollars (\$ 26, 176 9). c. ADD DEDUCT NO CHANGE calendar days to adjust the Contract Time |
| | c. ADDDEDUCTNO CHANGE calendar days to adjust the Contract Time for this alternate. |
| 1.4 | BID GUARANTEE |
| A. | The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 60 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above: |
| | 1. RID BOND Dollars (\$). |
| В. | In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond. |
| 1.5 | SUBCONTRACTORS AND SUPPLIERS |
| A. | The following companies shall execute subcontracts for the portions of the Work indicated:Revise list below to suit Project. Architect should verify listed subcontractors' qualifications prior to issuing the Notice of Award. |
| | I. Site Work: Socie CONSTRUCTION |
| | 2. Concrete Work: SAUDNE CEMENT |
| | 3. Masonry Work: MARINA'S PROTHERS CONFRICTION TUC. |
| | 4. Framing Work: Mo CARTHY CONSTRUCTION |
| | 4. Framing Work: Mc CARTNY CONSTRUTION 5. Roofing Work: CEVIS PROFING. |
| | 6. Plumbing Work: CAILCUTT PLUMBING. |
| | 7. HVAC Work: TENSENATINE CONTROLL |
| | 8. Electrical Work: 3Any José Ecotoje |
| 1.6 | TIME OF COMPLETION |
| A. | The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents |
| | on a date specified in a written Notice to Proceed to be issued by Architect, and shall fully complete the |
| | Work within 120 calendar days. |

1.7 ACKNOWLEDGEMENT OF ADDENDA

| A. | The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of |
|----|---|
| | this Rid |

1. Addendum No. 1, dated 4-10-2018

2. Addendum No. 2, dated 4-23-2818

3. Addendum No. 3, dated

4. Addendum No. 4, dated _____

1.8 BID SUPPLEMENTS

A. The following supplement is a part of this Bid Form and are attached hereto.

1. Bid Form Supplement - Bid Bond Forms (City of Novi Forms).

1.9 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in the State of Michigan, City of Novi, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.10 SUBMISSION OF BID

| | | | ~ | | | |
|----|--------------|----------|------|-----------|-----------|---------|
| A. | Dagnorfulls | uhmittad | this | day of | APRIL | 2017 |
| Λ. | Respectiuity | Submined | uns | IN APPICA | /// / > / | , 401/, |

B. Submitted By: SIE BUILDING (Name of bidding firm or corporation).

C. Authorized Signature: (Handwritten signature).

D. Signed By: ABOUD ATTYEH (Type or print name).

E. Title: V.F. (Owner/Partner/President/Vice President).

F. Witness By: 16 (Handwritten signature).

G. Attest (Handwritten signature).

H. By: ATGICIAE A. BARACA (Type or print name).

I. Title: (Corporate Secretary or Assistant Secretary).

J. Street Address: 5740 COMMERCE DRIVE

K. City, State, Zip: WESTLAND, MZ 48185

L. Phone: 734-726-5455

M. License No.: 2/02202348

N. Federal ID No.: 300/63/75 (Affix Corporate Seal Here).

DOCUMENT 004393 - BID SUBMITTAL CHECKLIST

1.1 BID INFORMATION

A. Bidder: SOLE' BUILDING COMPANY

B. Prime Contract: JOE 120551

- C. Project Name: Department of Public Services Renovation and Addition.
- D. Project Location: 51000 Eight Mile Road, Novi, Michigan 48167.
- E. Owner: City of Novi.
- F. Architect: NSA Architects, Engineers, Planners.
- G. Architect Project Number: 216402.00.

1.2 BIDDER'S CHECKLIST

- A. In an effort to assist the Bidder in properly completing all documentation required, the following checklist is provided for the Bidder's convenience. The Bidder is solely responsible for verifying compliance with bid submittal requirements.
- B. Attach this completed checklist to the outside of the Submittal envelope.
 - 1. Used the Bid Form provided in the Project Manual.
 - 2. Prepared the Bid Form as required by the Instructions to Bidders.
 - · 3. Indicated on the Bid Form the Addenda received.
 - 4. Attached to the Bid Form: Proposed Schedule of Values Form.
 - 5. Attached to the Bid Form: City of Novi Bond Forms and a certified check for the amount required.
 - Bid envelope shows name and address of the Bidder.
 - •7. Bid envelope shows the Bidder's Contractor's License Number.
 - 8. Bid envelope shows name of Project being bid.
 - 9. Bid envelope shows name of Prime Contract being bid, if applicable.
 - •10. Bid envelope shows time and day of Bid Opening.
 - Verified that the Bidder can provide executed Performance Bond, Payment Bond and Maintenance and Guarantee Bond.
 - 12. Verified that the Bidder can provide Certificates of Insurance in the amounts indicated.

END OF DOCUMENT 004393

ITC Community Sports Park - Park Storage Building

Schedule of Value

AIA DOCUMENT G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing

Contractor's signed Certificate is attached.

In tabulations below, amounts are stated to the nearest dollar

Use column J where variable retainage for the items may apply.

APPLICATION:

PERIOD FROM:

TO:

| Α | В | С | D | E | F | G | | Н | 1 |
|-----|---------------------------|-------------------------------------|---------------------------------------|----------------|--|------------------------------------|-------|-------------------------------|---------------------|
| | | WORK COMPLETED | | MATERIALS | S TOTAL % | | | | |
| NO. | DESCRIPTION OF WORK | SCHEDULED VALUE | FROM PREVIOUS APPLICATION (D+E) | THIS PERIOD | PRESENTLY STORED (NOT IN D OR E) | COMPLETED AND STORED TO DATE | (G/C) | BALANCE TO FINISH (C-G) | RETENTION % OF G |
| 1 | Asphalt | \$10,000.00 | | | | | | | |
| 2 | Site Work | \$25,000.00 | | | 1 | | | | |
| 3 | Foundation | \$12,439.00 | | | | | | 1 | |
| 4 | Flat Work | \$10,595.00 | | | | | | | |
| 5 | Framing | \$15,000.00 | | | | | | | |
| 6 | Lumber/Trusses | \$16,051.00 | | | | | | | |
| 7 | Electrical | \$29,343.00 | i I | | | | | | |
| 8 | HVAC | \$9,322.00 | | | | | | | |
| 9 | Overhead Doors | \$7,272.00 | | | | | | | |
| 10 | Doors/Hardware | \$4,721.00 | | | | | | | |
| 11 | Insulation | \$2,250.00 | | | | | | | |
| 12 | Landscape/Restoration | \$6,460.00 | | | | | | | |
| 13 | Drywall | \$2,500.00 | | | | | | | |
| 14 | Termint Control | \$1,200.00 | | | | | | | |
| 15 | Paint | \$4,000.00 | | | | | | 7 | |
| 16 | Masonry Labor | \$28,700.00 | | | | | | | |
| 17 | Siding/Roofing/Mat/Labor | \$16,800.00 | | | | | | | |
| 18 | Gutters | \$2,800.00 | | | 1 | | | | |
| 19 | Directional Bore | \$11,250.00 | | | | | | | |
| 20 | Dumpsters | \$1,200.00 | | | | | | | |
| 21 | Bond/Insurance | \$8,000.00 | | | | | | | |
| 22 | Labor/Misc | \$12,000.00 | | | | | | | |
| 23 | Supervision | \$25,000.00 | | | | | | , | |
| 24 | Provfit/Overhead Base Bid | \$35,000.00 \$296,903.0 0 | | | | | | | |
| | Alternate 1 | \$131,580.00 | | | | | | | |
| | Alternate 2 | \$26,176.00 | | | | | | | |
| | TOTAL | 454,659.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0% | 0.00 | 0. |

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310 - MODIFIED

Bid Bond

| KNOW ALL MEN BY THESE PRESENTS, Sole Building Company, Inc. | that we lifere insert full name and address or legal title of Contractor |
|--|--|
| 5940 Commerce Drive, Westland, MI 48185 as Principal, hereinafter called the Principal, and U.S. Specialty Insurance Company | there insert full name and address or legal title of Surety |
| 13403 Northwest Freeway, Houston, TX 77040 | |
| a corporation duly organized under the laws of the | |
| as Surety, hereinafter called the Surety, are held and | firmly bound unto |
| City of Novi | there insert full name and address or legal title of Owner |
| 45175 W. Ten Mile Road, Novi, MI 48375-3024 | |
| as Obligee, hereinafter called the Obligee, in the su | m of |
| Five Percent (5% |) of Amount of Bid Dollars (5% |
| for the payment of which sum well and truly to be a ourselves, our heirs, executors, administrators, succe these presents. | |
| WHEREAS, the Principal has submitted a bid for | 52 // <u>E</u> |
| Novi ITC Community Sports Park Storage Building | |

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full lorce and effect.

Signed and sealed this 26th day of April, 2018 Sole Building Company, Inc. (Principal) (Seal) (Witness) (Title) U.S. Specialty Insurance Compa (Surety) (Seal) Susan L. Small (Title) Attorney-In-Fact

AIA DOCUMENT ASTO - SID BOND - AIA . FEBRUARY 1970 ED - THE AMERICAN INSTITUTE OF ARCHITECTS, 1735 N.Y. AVE., N.W., WASHINGTON, D. C. 20006

POWER OF ATTORNEY

AMERICAN CONTRACTORS INDEMNITY COMPANY TEXAS BONDING COMPANY UNITED STATES SURETY COMPANY U.S. SPECIALTY INSURANCE COMPANY

KNOW ALL MEN BY THESE PRESENTS: That American Contractors Indemnity Company, a California corporation, Texas Bonding Company, an assumed name of American Contractors Indemnity Company, United States Surety Company, a Maryland corporation and U.S. Specialty Insurance Company, a Texas corporation (collectively, the "Companies"), do by these presents make, constitute and appoint:

T J Griffin, Steven K. Brandon, Terence J. Griffin, John L. Budde or Susan L. Small of Farmington Hills, Michigan

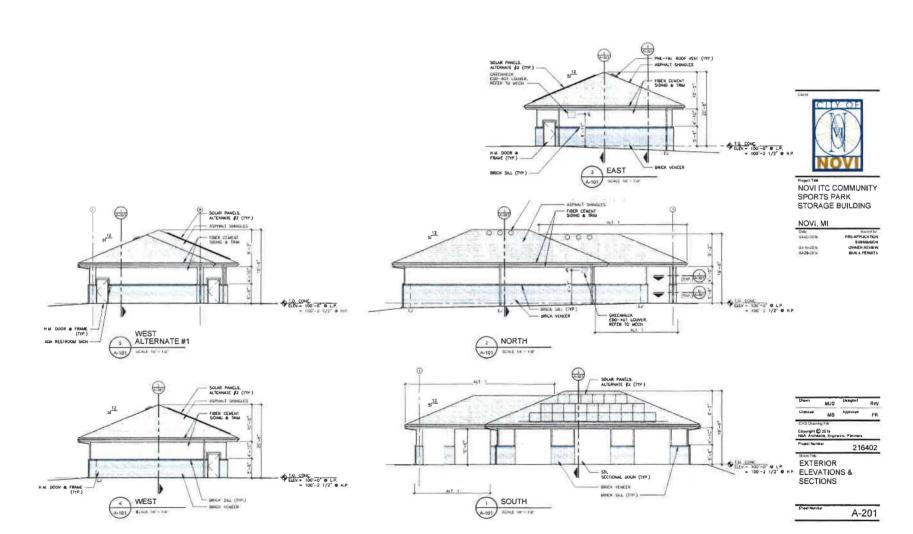
its true and lawful Attorney(s)-in-fact, each in their separate capacity if more than one is named above, with full power and authority hereby conferred in its name, place and stead, to execute, acknowledge and deliver any and all bonds, recognizances, undertakings or other instruments or contracts of suretyship to include riders, amendments, and consents of surety, providing the bond ******Ten Million***** penalty does not exceed Dollars (\$ *10,000,000.00*) This Power of Attorney shall expire without further action on November 3,2019. This Power of Attorney is granted under and by authority of the following resolutions adopted by the Boards of Directors of the Companies: Be it Resolved, that the President, any Vice-President, any Assistant Vice-President, any Secretary or any Assistant Secretary shall be and is hereby vested with full power and authority to appoint any one or more suitable persons as Attorney(s)-in-Fact to represent and act for and on behalf of the Company subject to the following provisions: Attorney-in-Fact may be given full power and authority for and in the name of and on behalf of the Company, to execute, acknowledge and deliver, any and all bonds, recognizances, contracts, agreements or indemnity and other conditional or obligatory undertakings, including any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts, and any and all notices and documents canceling or terminating the Company's liability thereunder, and any such instruments so executed by any such Attorney-in-Fact shall be binding upon the Company as if signed by the President and sealed and effected by the Comorate Secretary. Be it Resolved, that the signature of any authorized officer and seal of the Company heretofore or hereafter affixed to any power of attorney or any certificate relating thereto by facsimile, and any power of attorney or certificate bearing facsimile signature or facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached. IN WITNESS WIIEREOF, The Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 1st day of November, 2016. AMERICAN CONTRACTORS INDEMNITY COMPANY TEXAS BONDING COMPANY UNITED STATES SURETY COMPANY U.S. SPECIALTY INSURANCE COMPANY Corporate Seals Bv: Daniel P. Aguilar, Vice President A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document. State of California County of Los Angeles SS: On this 1st day of November, 2016, before me, Sabina Morgenstein, a notary public, personally appeared Daniel P. Aguilar, Vice President of American Contractors Indemnity Company, Texas Bonding Company, United States Surety Company and U.S. Specialty Insurance Company who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument. I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct WITNESS my hand and official seal SABINA MORGENSTEIN Commission # 2129258 Notary Public - California Signature Los Angeles County My Comm. Expires Nov 3, 2019 I. Kio Lo, Assistant Secretary of American Contractors Indefinity Company, Texas Bonding Company, United States Surety Company and U.S. Specialty Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney, executed by said Companies, which is still in full force and effect; furthermore, the resolutions of the Boards of Directors, set out in the Power of Attorney are in full In Witness Whereof, I have hereunto set my hand and affixed the seals of said Companies at Los Angeles, California this Corporate Seals Kio Lo, Assistant Secretary Bond No.

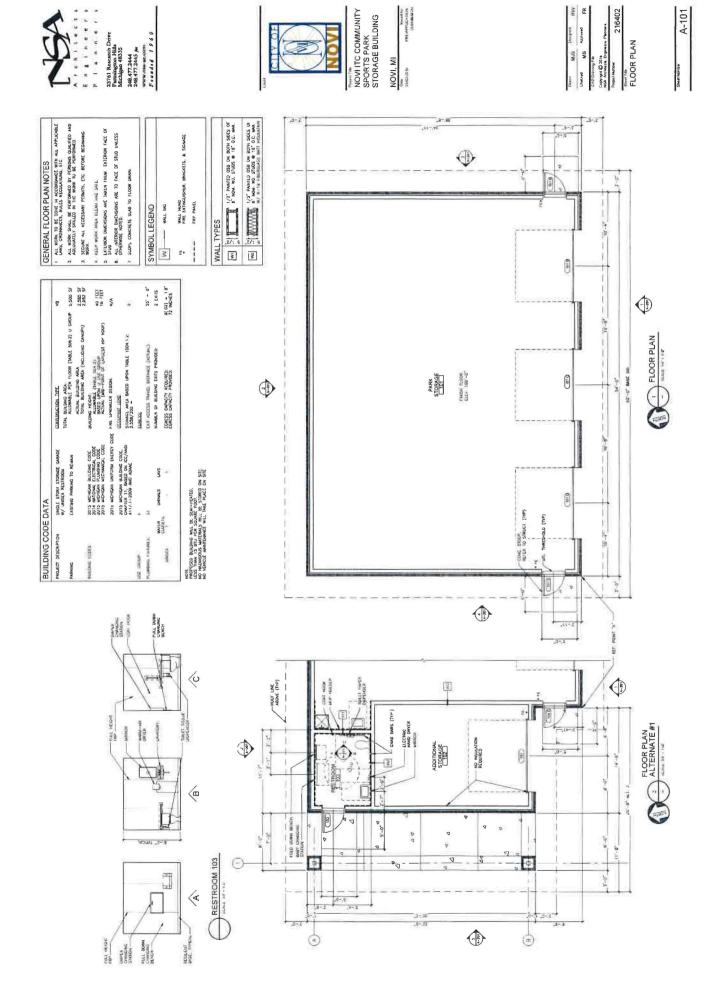
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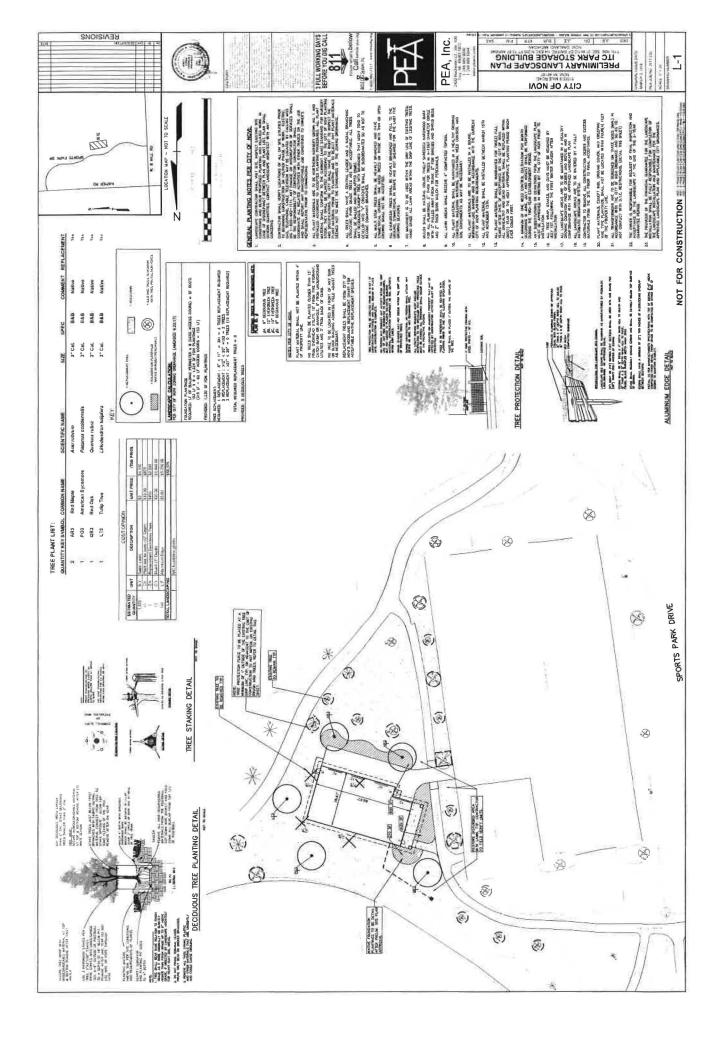
Agency No.

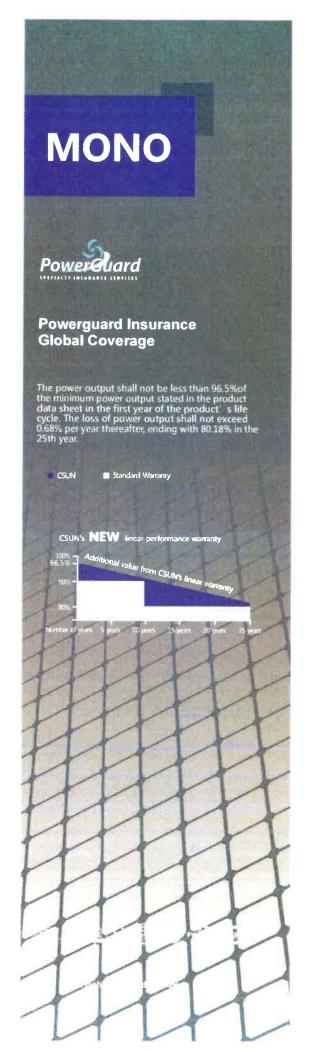


Founded 1960













CSUN340-72M

The Large Scale Project Solution

CSUN340-72M CSUN335-72M CSUN330-72M CSUN325-72M

17.56% Module efficiency

340W

Highest power output

 10_{years}

Material & Workmanship warranty

25_{years} Liner power output warranty

PID-free

World class mono efficiency

Tighter porduct performance distribution and current sorting reduces the mismatch power loss in system operation



Positive tolerance offer



Good temperature coefficient enables higher output in high temperature regions

Excellent performance under low light conditions



Certified for salt/ammonia corrosion resistance



Load certificates: wind to 2400Pa and snow to 5400Pa

- China Sunergy Co., Ltd. designs, manufactures and delivers high efficient solar cells and modules to the world from its production centers based in China, Turkey, South Korea and Vietnam.
- Founded in 2004, China Sunergy is well known for its advanced solar cell technology reliable product quality and excellent customer service.
- As one of leading PV enterprises, China Sunergy has delivered more than 4.0GW of solar products to residential, commercial, utility and off-grid projects all around the word.

All specifications, warranties, certifications about module of "CSUN" series also apply to that of "SST".

All information and data are subject to change without notice.

Right 2017



Electrical characteristics at Standard Test Conditions(STC)

| Module Type | CSUN340-72M | CSUN335-72M | CSUN330-72M | CSUN325-72M |
|----------------------------------|-------------|-------------|-------------|-------------|
| Maximum Power - Pmax (W) | 340 | 335 | 330 | 325 |
| Open Circuit Voltage - Voc (V) | 46.5 | 46.3 | 46.1 | 46 |
| Short Circuit Current - Isc (A) | 9.41 | 9.32 | 9.23 | 9.12 |
| Maximum Power Voltage - Vmpp (V) | 38.3 | 38,1 | 37.9 | 37.7 |
| Maximum Power Current - Impp (A) | 8.89 | 8.79 | 8.72 | 8.62 |
| Module Efficiency | 17.56% | 17.30% | 17.04% | 16.78% |

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1,5; module temperature 25°C, Tolerance of Pmpp: 0~+3%,

Measuring uncertainty of power. ±3%. Certified in accordance with IEC 61215, IEC 61730-1/2 and UL 1703.

Electrical Characteristics at Normal Operating Cell Temperature(NOCT)

| Module Type | CSUN340-72M | CSUN335-72M | CSUN330-72M | CSUN325-72M |
|----------------------------------|-------------|-------------|-------------|-------------|
| Maximum Power - Pmax (W) | 250 | 246 | 242 | 238 |
| Open Circuit Voltage - Voc (V) | 43.2 | 43 | 42.8 | 42.7 |
| Short Circuit Current - Isc (A) | 7.59 | 7.52 | 7.44 | 7.36 |
| Maximum Power Voltage - Vmpp (V) | 35.5 | 35.2 | 35.1 | 34.9 |
| Maximum Power Current - Impp (A) | 7.05 | 6.97 | 6.91 | 6.82 |
| | | | | |

Normal Operating Cell Temperature ((NOCT): irradiance 800W/m²; wind speed 1 m/s; cell temperature 45°C; ambient temperature 20°C.

Measuring uncertainty of power. ±3%. Certified in accordance with IEC 61215, IEC 61730-1/2 and UL 1703.

Temperature Characteristics

Maximum Ratings

| NOTC | 45°C (±2°C) | Maximum System Voltage [V] | 1000 |
|---------------------------------|---------------|----------------------------|------|
| Voltage Temperature Coefficient | -0.307%/K | Series Fuse Rating [A] | 20 |
| Current Temperature Coefficient | +0.039%/K | | |
| Power Temperature Coefficient | -0.423%/K | | |

Material Characteristics

| Dimensions | 1956×990×40mm (L×W×H) |
|--------------------|--|
| Weight | 22kg |
| Frame | Anodized aluminum profile |
| Front Glass | White toughened safety glass, 3.2 mm |
| Cell Encapsulation | EVA (Ethylene-Vinyl-Acetate) |
| Back Sheet | Composite film |
| Cells | 6×12 pieces monocrystalline solar cells series strings (156mm×156mm) |
| Junction Box | Rated current≥13A, IP≥67, TUV&UL |
| Cable&Connector | Length 900 mm, 1×4 mm², compatible film |
| | |

Packading

| System Design | m Design |
|---------------|----------|
|---------------|----------|

| Dimensions(L×W×H) | 1990×1120×112mm | Temperature Range | -40 °C to + 85 °C | |
|-------------------|-----------------|-------------------|-------------------|--|
| Container20' | 260 | Withstanding Hail | Maximum diameter | |
| Container40' | 624 | | | |
| Container40'HC | 684 | Maximum Surface | 5,400 Pa | |
| | | Application class | class A | |
| | | Safety class | class II | |

Dimensions

IV-Curves

