GENERAL NOTES:

1. ALL CONSTRUCTION FOR UNIRAC'S "GROUND FIXED TILT" (GFT) RACKING SYSTEM AND FOUNDATION REQUIREMENTS SHALL CONFORM TO THE 2009, 2012, 2015 & 2018 EDITION OF THE INTERNATIONAL BUILDING CODE (IBC).
2. WHEREVER THE TERM CONTRACTOR IS USED IN THE CONSTRUCTION DOCUMENTS, IT SHALL BE DEFINED TO MEAN THE GENERAL CONTRACTOR AND ANY SUB-CONTRACTOR COLLECTIVELY AS APPLICABLE AND AS REQUIRED.
3. THE CONTRACT "STRUCTURAL RACKING" DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS, METHOD, OR SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND PROVIDE ALL MEASURES NECESSARY TO PROTECT THE RACKING SYSTEM FROM THE POINT OF MATERIAL DELIVERY THROUGH THE COMPLETION OF CONSTRUCTION. UNIRAC AND THE ENGINEER OF RECORD WILL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION. UNIRAC AND THE ENGINEER OF RECORD WILL NOT BE RESPONSIBLE FOR CONSTRUCTION SITE SAFETY, OR SAFETY PRECAUTIONS AND PROGRAMS INCIDENT HERETO.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT AND ENSURE THAT ALL WORK IS IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY STRUCTURAL INSPECTION/OBSERVATION PROVIDED BY OTHERS DOES NOT RELIEVE THE CONTRACTOR OF THIS RESPONSIBILITY.
5. ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS THAT ARE ENCOUNTERED AT A LATER DATE AND ARE DECLARED TO BE SIGNIFICANT BY THE RACKING DISTRIBUTOR SHALL BE CORRECTED BY THE CONTRACTOR (AT THE CONTRACTOR'S EXPENSE).
6. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND COORDINATE SITE CONDITIONS WITH THESE DRAWINGS PRIOR TO BIDDING OR THE START OF CONSTRUCTION. ANY CONFLICTS, DISCREPANCIES, OR OMISSIONS SHALL BE RESOLVED THROUGH YOUR RACKING DISTRIBUTOR PRIOR TO PROCEEDING.
7. DO NOT SCALE OFF OF THESE DRAWINGS. WRITTEN DIMENSIONS SHALL BE USED OR WHERE NO DIMENSION IS PROVIDED CONSULT WITH YOUR RACKING DISTRIBUTOR FOR CLARIFICATION BEFORE PROCEEDING WITH THE BID OR THE WORK.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE EQUIPMENT AND INSTALLATION PROCESS (MEANS AND METHODS) ARE APPROPRIATE FOR THE FOUNDATIONS AND THAT THE PILES ARE INSTALLED TO THE SPECIFIED TOLERANCES. UNIRAC IS NOT RESPONSIBLE FOR DAMAGED AND/OR OUT-OF-TOLERANCE PILES DUE TO IMPROPER INSTALLATION EQUIPMENT, METHODS, AND SOIL RELATED ISSUES INCLUDING DENSE SOILS, GRAVEL, OR BEDROCK.
9. WHERE ANY DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, STRUCTURAL NOTES AND SPECIFICATIONS, THE GREATER (MOST CONSERVATIVE) REQUIREMENTS SHALL GOVERN. WHERE NO SPECIFIC DETAIL IS SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, OR IF THERE IS NO SIMILAR WORK, THEN CONSTRUCTION SHALL CONFORM TO INDUSTRY STANDARDS. CONTRACTOR MUST INFORM UNIRAC OF ANY DISCREPANCIES.
10. REFER TO SITE PLAN, PILE LAYOUT DRAWING, ELECTRICAL DRAWINGS AND/OR OTHER CIVIL DRAWINGS FOR SPECIFIC PILE LOCATIONS, NORTH-SOUTH PILE SPACING, LOCATION AND DETAILS OF CURBS, INVERTER/EQUIPMENT PADS, TRENCHING/CONDUIT LOCATIONS, JUNCTION BOXES, SITE WORK ITEMS, ETC. AND DIMENSIONS NOT SHOWN ON STRUCTURAL RACKING DRAWINGS.
11. CONTRACTOR SHALL INVESTIGATE THE SITE DURING CLEARING AND EARTHWORK OPERATIONS FOR FILLED EXCAVATIONS OR BURIED STRUCTURES, SUCH AS CESSPOOLS, CISTERNS, EXISTING FOUNDATIONS, OR OTHER.
12. ASTM SPECIFICATIONS ON THE DRAWINGS SHALL BE OF THE LATEST ASTM STANDARD SPECIFICATION.
13. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF A PROFESSIONAL CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF THE LOCAL JURISDICTION.
14. THE FOLLOWING DESIGN CRITERIA ARE EXCLUDED FROM THE RACKING AND FOUNDATION DESIGN: FLOOD LOADING, DEBRIS LOADING, DYNAMIC ANALYSIS, ACTS OF GOD (TORNADO, HURRICANE, WATER INUNDATION LOADING, ETC.), EROSION, EXPANSIVE SOILS, FROST HEAVE, SOIL LIQUEFACTION, DYNAMIC LOADING FROM SEISMIC EVENTS AND CONDITIONS. THE DESIGN CAN CONSIDER THESE CRITERIA FOR SPECIFIC PROJECTS IN A SEPARATE DOCUMENT FROM UNIRAC OR BY A THIRD PARTY ENGINEER.
15. DESIGN CRITERIA PER ASCE 7-05, 7-10, OR ASCE 7-16*:
    DESIGN WIND SPEED = VARIES (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    GROUND SNOW LOAD = VARIES (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    ICE THICKNESS = VARIES (SEE DESIGN PACKAGE AND or UBUILDER DESIGN INPUTS)
    ICE LOAD WIND SPEED = VARIES (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    SEISMIC Ss = VARIES (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    SEISMIC S1 = VARIES (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    SOIL SITE CLASS = D
    WIND EXPOSURE CATEGORY = B OR C (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    HURRICANE ZONE = (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    RISK CATEGORY = I OR II (SEE DESIGN PACKAGE or UBUILDER DESIGN INPUTS)
    MINIMUM OF 20' OFFSET FROM NEAREST ADJACENT BUILDING (TO AVOID SNOW DRIFT.)

    *DESIGN WIND PRESSURES PER ASCE 7-05, SECTION 6.5.13,"WIND LOADS ON OPEN BUILDINGS WITH MONOSLOPE, PITCHED OR TROUGHED ROOFS", AND SECTION 6.5.13.3, "COMPONENTS AND CLADDING" FOR MONOSLOPE FREE ROOFS, ASCE 7-10, SECTION 27.4.3, "WIND LOAD ON OPEN BUILDING WITH MONOSLOPE, PITCHED OR TROUGHED FREE ROOFS", AND SECTION 30.7.1, "COMPONENTS AND CLADDING" FOR MONOSLOPED PITCHED OR TROUGHED ROOFS, OR ASCE 7-16, SECTION 27.3.2, "WIND LOAD ON OPEN BUILDING WITH MONOSLOPE, PITCHED OR TROUGHED ROOFS", AND SECTION 30.7.2, "COMPONENTS AND CLADDING" FOR MONOSLOPE, PITCHED OR TROUGHED ROOFS.
16. SOLAR REQUIREMENTS: FROM OWNER
17. CORROSION PROTECTION REQUIREMENTS:
    COLD-FORMED STEEL MEMBERS = SEE MEMBER SECTION TABLE
    HARDWARE = STAINLESS STEEL OR DELTA PROTEKT
18. ABOVE GRADE CORROSION PROTECTION WILL SUFFICE FOR MOST ENVIRONMENTAL CONDITIONS. BELOW GRADE CORROSION PROTECTION WILL SUFFICE FOR MOST SOILS WITH RESISTIVITY VALUES GREATER THAN 10,000 OHM/CM. IT IS THE OWNER'S RESPONSIBILITY TO DETERMINE IF THE SOILS ARE MORE CORROSIVE AND FURTHER CORROSION PROTECTION WILL BE REQUIRED.
19. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SPLICE EAST-WEST BEAMS (AS REQUIRED) TO COMPLETE THE TABLE AND AVOID SPLICE CONFLICTS SPECIFIED IN DETAIL 501 ON SHEET SR-500.
20. EACH ROW CANNOT EXCEED 100 FEET IN LENGTH WITHOUT HAVING A THERMAL BREAK.

SPECIAL INSPECTION (PER CHAPTER 17 OF THE IBC):

STRUCTURAL ONLY: SPECIAL INSPECTION IS TO BE PROVIDED FOR THE ITEMS LISTED BELOW IN ADDITION TO THE INSPECTIONS CONDUCTED BY THE BUILDING JURISDICTION. "SPECIAL STRUCTURAL INSPECTION" SHALL NOT RELIEVE THE OWNER OR THEIR AGENT FROM REQUESTING THE BUILDING JURISDICTION INSPECTIONS REQUIRED.

1. DRIVEN DEEP ELEMENTS: PERIODICALLY DURING THE PLACEMENT OF ALL DRIVEN DEEP FOUNDATION ELEMENTS ON STRUCTURAL DRAWINGS.
   A. VERIFICATION OF ELEMENT MATERIALS, SIZES, AND LENGTHS.
   B. OBSERVATION AND DOCUMENTATION OF DRIVING OPERATIONS. MAINTAIN A COMPLETE AND ACCURATE RECORD FOR EACH PILE DRIVEN.
   C. VERIFICATION OF PLACEMENT LOCATIONS AND PLUMBNESS, TYPE OF PILE DRIVER, ELEVATION OF TIP AND BUTT, ANY DAMAGE TO FOUNDATION ELEMENT, ETC.
2. BOLTING: VERIFICATION OF TORQUE PER TORQUE TABLE SHOWN.

| TORQUE REQUIREMENTS: | | |
|---|---|---|
| 1/4"Ø HARDWARE : | | SOCKET SIZE |
| BEAM CLAMP | = 9 - 11 FT-LBS | 9/16" |
| STANDARD MID 7 END CLAMPS | = 9 - 11 FT-LBS | 9/16" |
| PRO-SERIES MID-CLAMPS | = 10 - 12 FT-LBS | 1/2" |
| PRO-SERIES END CLAMP | = 3 FT-LBS | 1/2" |
| 5/8"Ø HARDWARE | = 54 - 66 FT-LBS | 15/16" |
| 3/4"Ø HARDWARE | = 99 - 121 FT-LBS | 1-1/8" |

3. CONCRETE: SEE CHAPTER 17 OF MOST CURRENT IBC FOR REQUIRED INSPECTIONS.

ALUMINUM:

1. ALL ALUMINUM EAST-WEST BEAM MEMBERS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE "ALUMINUM DESIGN MANUAL" BY THE ALUMINUM DESIGN ASSOCIATION, CURRENT EDITION.
2. ALL ALUMINUM EAST-WEST BEAMS CONFORM TO ONE OF THE FOLLOWING:
   ALLOY: 6005A TEMPER: T61 (Ftu = 38 KSI, Fcy = 35 KSI)
   ALLOY: 6351 TEMPER: T5 (Ftu = 38 KSI, Fcy = 35 KSI)
   ALLOY: 6061 TEMPER: T6 (Ftu = 38 KSI, Fcy = 35 KSI)
3. ALL ALUMINUM EAST-WEST BEAMS HAVE A MILL FINISH.
4. WELDING IS NOT REQUIRED OR PERMITTED UNLESS SPECIFICALLY APPROVED BY UNIRAC AND THE ENGINEER OF RECORD.
5. FIELD CUTTING OF ALUMINUM MEMBERS IS PERMITTED WHEN REQUIRED TO ACCOMMODATE PROJECT SPECIFIC MODULE WIDTHS.

HARDWARE:

1. ALL 1/4"Ø HARDWARE SHALL CONFORM TO 18/8 STAINLESS STEEL (AISI 300 SERIES STAINLESS, 304) OF DIMENSIONS PER ASME B18.2.1.
2. ALL 1/4"Ø SELF DRILLING SCREW HARDWARE SHALL CONFORM TO GRADE 5 SAE J429 AND ASTM A449.
3. ALL 5/8"Ø AND 3/4"Ø BOLTS SHALL CONFORM TO GRADE 2 SAE J429 OR ASTM A307.
4. ALL 5/8"Ø AND 3/4"Ø SERRATED FLANGE NUTS SHALL CONFORM TO ASME B.18.16.4.
5. ALL 5/8"Ø AND 3/4"Ø WASHERS SHALL CONFORM TO USS TYPE A WIDE OR ANSI TYPE A WIDE.
6. UNIRAC T-BOLTS, MID CLAMPS, AND END CLAMPS ARE PROPRIETARY. TECHNICAL DATA SHEETS WITH TESTED CAPACITIES CAN BE PROVIDED UPON REQUEST.
7. CORROSION PROTECTION FOR HARDWARE CAN BE FOUND IN THE GENERAL NOTES SECTION OF THIS DOCUMENT, NOTE 17.
8. ALL HARDWARE RECEIVED ON SITE SHALL BE CHECKED BY CONTRACTOR AGAINST THE SPECIFICATIONS ON THIS SHEET SR-100, DIAMETERS AND LENGTHS CALLED OUT ON RACKING DETAILS SHEET SR-500, AS WELL AS THE PROJECT BILL OF MATERIAL. ANY CONFLICTS, DISCREPANCIES, OR OMISSIONS MUST BE RESOLVED WITH THE RACKING DISTRIBUTOR AS SOON AS POSSIBLE AND PRIOR TO PROCEEDING.

SOLAR DESIGN:

UNIRAC IS NOT THE SOLAR DESIGN ENGINEER OF RECORD AND IS NOT RESPONSIBLE FOR ANY SOLAR DESIGN, OUTPUT EFFICIENCIES, SHADING, ROW SPACING, POWER PRODUCTION, ETC.

ELECTRICAL DESIGN:

UNIRAC IS NOT THE ELECTRICAL ENGINEER OF RECORD AND IS NOT RESPONSIBLE FOR THE ELECTRICAL DESIGN FOR THIS PROJECT. THE UNIRAC GFT RACKING SYSTEM IS CERTIFIED TO UL-2703 WHEN PROPERLY INSTALLED. SEE THE GFT INSTALLATION GUIDE FOR MORE DETAIL.

CIVIL/GRADING/SITE WORK:

UNIRAC IS NOT THE CIVIL ENGINEER OF RECORD FOR THIS PROJECT AND IS NOT RESPONSIBLE FOR ANY SITE GRADING, SURVEYING, TRENCHING, EARTHWORK, LAYOUT, STORM WATER POLLUTION PREVENTION PLANS, SURFACE WATER MITIGATION, PERMITTING, OR EROSION CONTROL PLANS.

MATERIAL MANAGEMENT:

PRIOR TO INSTALLATION, ALL MATERIALS MUST BE STORED PROPERLY. MATERIALS REMAINING IN PLACE FOR MORE THAN ONE WEEK MUST BE IN OPEN AIR CONDITIONS (I.E. OFF THE GROUND). IF TARPS OR OTHER PROTECTIVE COVERS ARE USED, THE ENDS SHALL BE LEFT OPEN FOR VENTILATION. TIGHT FITTING COVERINGS ARE NOT RECOMMENDED AS MATERIAL COATINGS ARE NOT DESIGNED FOR THIS CONDITION. LONG GOODS STORED HORIZONTALLY FOR MORE THAN ONE WEEK SHOULD NOT REMAIN BUNDLED TO PREVENT ACCELERATED CORROSION. BLOCKING IS REQUIRED BENEATH THE LONG GOODS AT PROPER INTERVALS TO ENSURE THE PRODUCT IS OFF THE GROUND.

FOUNDATION NOTES:

1. SEE THE "COLD FORMED STEEL" SECTION FOR STEEL AND GALVANIZATION REQUIREMENTS FOR FOUNDATIONS.
2. UNIRAC SHALL NOT BE HELD LIABLE FOR ANY UTILITY LINES DAMAGED DURING FOUNDATION INSTALLATION. IT SHALL BE THE RESPONSIBILITIES OF OTHERS TO DETERMINE THE PLACEMENT OF EXISTING AND NEW UTILITY LINES.
3. PILES ARE DESIGNED TO SOIL CONDITIONS STATED IN IBC. IT IS THE CLIENTS RESPONSIBILITY TO VERIFY SOILS MEET THE MINIMUM REQUIREMENTS. UNIRAC AND OR THE ENGINEER OF RECORD WILL NOT BE HELD RESPONSIBLE FOR FOUNDATIONS INSTALLED IN SOILS WITH LOWER CAPACITY OR FOR IMPROPER FOUNDATION INSTALLATION OR CHOICE.
4. SOIL CONDITIONS ARE ASSUMED TO HAVE PROPERTIES OF CLASS 4 OR BETTER STATED IN IBC.

NOTE: SEE GFT INSTALLATION GUIDE FOR SYSTEM ADJUSTMENTS AND TOLERANCES



# UNIRAC GFT GROUND FIXED TILT

COLD FORMED STEEL:

1. ALL COLD FORMED STRUCTURAL STEEL MEMBER CONSTRUCTION SHALL BE IN ACCORDANCE WITH AISI "SPECIFICATIONS FOR DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" CURRENT EDITION.
2. ALL COLD-FORMED STRUCTURAL MEMBERS SHALL BE PER ICC-ER-4943P.
3. ALL COLD-FORMED STEEL CONFORMS TO ONE OF THE FOLLOWING:
   A653 HSLAS 50 (Fy = 50 KSI, Fu = 60 KSI)
   A653 SS 50 CLASS 4 (Fy = 50 KSI, Fu = 60 KSI)
4. ALL COLD-FORMED STEEL MEMBERS ARE GALVANIZED PER ASTM A653 (MOST RECENT EDITION).
5. WELDING IS NOT REQUIRED OR PERMITTED UNLESS SPECIFICALLY APPROVED BY UNIRAC AND/OR THE ENGINEER OF RECORD.
6. FIELD CUTTING OF COLD-FORMED STEEL MEMBERS IS NOT REQUIRED OR PERMITTED UNLESS THE C-PILE IS BEING MODIFIED DUE TO ALTERNATIVE FOUNDATION REQUIREMENTS PROVIDED ON SHEET 400.
7. ALL CALCULATED COLD-FORMED MEMBER PROPERTIES PER AISI SPECIFICATIONS ARE BASED ON THE FOLLOWING MINIMUM THICKNESSES:
   14 GAGE (0.070" OR 70 MILS)
   11 GAGE (0.120" OR 120 MILS)

UNIRAC CUSTOM RACKING MEMBER SECTIONS

| RACKING MEMBER | | DEPTH | WIDTH | THICKNESS | MIN. CORROSION PROTECT |
|---|---|---|---|---|---|
| | ALUMINUM BEAM | 3.25 IN. | 2.0 IN. | 0.063-0.125 IN | AAMA 611-12 |
| | ALUMINUM SPLICE | 3.061 IN. | 1.818 IN. | 0.800-0.110 IN | AA-M12 |
| | TOP CHORD CHANNEL | 4.1 IN. | 3.42 IN. | 14 GAGE | G180 |
| | DIAGONAL BRACE | 3 IN. | 2 IN. | 14 GAGE | G180 |
| | C-PILE | 6 IN. | 4.5 IN. | 11 GAGE | G235 |

DRIVEN STEEL PILE NOTES:

1. STEEL PILES HAVE BEEN DESIGNED IN ACCORDANCE WITH THE DESIGN CRITERIA STATED IN THE GENERAL NOTES.
2. PILES SHALL BE INSTALLED TO THE PILE TOLERANCES IN THE UNIRAC GFT INSTALLATION GUIDE WITHOUT EXCESSIVE DEFORMATION. EXCESSIVE DEFORMATION IS DEFINED AS DISTORTION PREVENTS THE RACKING FROM CONNECTING FLUSH TO THE PILE.
3. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS OR IN AREAS WITH GROUND WATER WITHIN 12 FEET OF THE SURFACE.
4. IT IS THE OWNER OR CONTRACTORS RESPONSIBILITY TO DETERMINE WHICH FROST ZONE THEIR PROJECT IS LOCATED IN.
5. IF PILE REFUSAL IS ENCOUNTERED, AN ALTERNATE FOUNDATION DESIGN ON SHEET SR-400 CAN BE UTILIZED OR OTHER FOUNDATIONS APPROVED BY A REGISTERED PROFESSIONAL ENGINEER AND UNIRAC.
6. DRAINAGE SHALL BE DIRECTED AWAY FROM PILES. PILES SHALL NOT BE PLACED IN SWALES, DRAINAGE AREAS OR WHERE WATER MAY BE ALLOWED TO FLOW OR STAND WITHOUT SPECIFIC ALLOWANCE IN WRITING FROM UNIRAC. ALL POSSIBLE EFFORTS SHALL BE MADE TO PREVENT WATER FROM FLOWING OR PONDING AROUND OR NEAR TO THE PILES.
7. PILES MAY NOT BE PAINTED PRIOR TO INSTALLATION OF THE RACKING SYSTEM. AFTER INSTALLATION OF THE COMPLETE RACKING SYSTEM, PILES MAY BE PAINTED AT THE CONTRACTORS/CLIENTS DISCRETION. NO ADJUSTMENTS MAY BE MADE AFTER THE PILES HAVE BEEN PAINTED.
8. PILES DRIVEN TOO SHALLOW OR TOO DEEP WILL NEED TO BE ALTERED AT THE CONTRACTORS EXPENSE. UNIRAC HAS PROVIDED TOLERANCES IN THE GFT INSTALLATION GUIDE THAT SHALL BE FOLLOWED.
9. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE MEANS AND METHODS FOR DRIVING PILES. THE PILE INSTALLATION METHOD UTILIZED DURING ONSITE PILE TESTING SHALL BE THE SAME AS INSTALLATION. THE CONTRACTOR MUST INSTALL PILES UTILIZING A PILE DRIVING RIG WITH A PERCUSSION PNEUMATIC HAMMER. A VIBRATORY PILE DRIVER IS NOT RECOMMENDED. SEE PILE TEST PLAN FOR DETAILS.
10. THE RACKING DISTRIBUTOR SHALL NOT BE HELD RESPONSIBLE FOR DAMAGE TO THE PILE AFTER IT ARRIVES TO THE SITE OR THE POINT OF AGREED DROP OFF.
11. IF DAMAGE OCCURS WHERE GALVANIZATION IS REMOVED FROM THE PILE, THE PILE SHALL BE TOUCHED UP WITH GALVANIZATION OF EQUAL THICKNESS PRIOR TO INSTALLATION AT THE CONTRACTOR'S EXPENSE.
12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT VIBRATIONS FROM DRIVING EQUIPMENT AND PILE INSTALLATION DO NOT AFFECT ANY ADJACENT PROPERTY STRUCTURES. THE CONTRACTOR SHALL BE HELD LIABLE FOR DAMAGE TO THE ADJACENT PROPERTY IF DAMAGE OCCURS.
13. ANY EXCAVATIONS NEAR THE PILE SHALL NOT BE MADE CLOSER THAN 2 FEET FROM PILE OR DEEPER THAN 2 FEET FROM GRADE. IF EXCAVATIONS ARE NECESSARY, THEY SHALL BE ON THE EAST OR WEST SIDE OF THE PILE, SHALL BE TEMPORARY, AND SHALL BE COMPACTED PER THE ENGINEER OF RECORD'S RECOMMENDATIONS. NORTH SOUTH EXCAVATIONS SHALL BE A MINIMUM OF 3 FEET FROM THE PILE. IF EXCAVATIONS EXCEED THESE DIMENSIONAL REQUIREMENTS, THE CONTRACTOR SHALL NOTIFY UNIRAC. THE ENGINEER OF RECORD SHALL BE INFORMED OF ANY EXCAVATION AND COMPACTION EFFORTS ON THE SITE.
14. PILES MAY NOT BE ALTERED IN ANY WAY WITHOUT UNIRAC WRITTEN APPROVAL. UNLESS IT IS TO CUT A PILE FOR USE IN THE CONCRETE FOUNDATION OPTION.
15. PILES HAVE BEEN DESIGNED FOR STATIC LOADING UNDER THE DESIGN CRITERIA IN GENERAL NOTE 15.

QUALITY ASSURANCE AND SPECIAL INSPECTION:

1. TESTING LABORATORY: RETAINED BY OWNER AND SATISFACTORY TO ENGINEER OF RECORD (THROUGH UNIRAC) AND GOVERNING CODE AUTHORITY TO PERFORM REQUIRED TESTS AND INSPECTIONS OF THIS CONTRACT AND APPLICABLE CODE. THE TYPE AND FREQUENCY OF SPECIAL INSPECTION, STRUCTURAL TESTING AND SUBSEQUENT REPORTING SHALL CONFORM TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE (IBC).

CONCRETE:

1. ALL ASPECTS OF WORK PERTAINING TO THE CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318-14, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" AND THE LATEST EDITION OF "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" ACI 301, WITH MODIFICATIONS AS NOTED ON THE PROJECT DRAWINGS AND/OR SPECIFICATIONS.
2. HOT WEATHER CONCRETING SHALL CONFORM TO ACI 305, "HOT WEATHER CONCRETING".
3. COLD WEATHER CONCRETING SHALL CONFORM TO ACI 306, "COLD WEATHER CONCRETING".
4. ALL MIX DESIGNS SHALL BE DESIGNED BY A QUALIFIED TESTING LABORATORY AND SHALL BE WET STAMPED BY A CIVIL ENGINEER LICENSED IN THE JURISDICTION OF THE PROJECT, AS STIPULATED IN IBC CHAPTER 19.
5. TYPE II PORTLAND CEMENT SHALL BE USED AT ALL CONCRETE ALTERNATE FOUNDATION LOCATIONS FOR THE RACKING SYSTEM - WHERE CONCRETE IS REQUIRED AS AN ALTERNATE SOLUTION. (TYPE V CEMENT SHALL BE USED WHERE THE CONCRETE IS IN CONTACT WITH SOIL CONTAINING SULFATES IN EXCESS OF 3000 PPM. CONCRETE THAT WILL BE EXPOSED TO SULFATE-CONTAINING SOLUTIONS SHALL COMPLY WITH IBC CHAPTER 19 AND ACI 318 SEVERE AND VERY SEVERE SULFATE EXPOSURES AS IDENTIFIED IN THE PROJECT GEOTECHNICAL REPORT, THE WATER-CEMENT RATIO SHALL NOT EXCEED 0.44.)
6. IN THE PRESENCE OF REACTIVE AGGREGATE, CLASS F FLY ASH OR OTHER ASR MITIGATING ADMIXTURE SHALL BE INCORPORATED IN THE MIX SUCH THAT THE EXPANSION PRODUCED BY THE MORTAR-BAR METHOD (ASTM C1567) USING BLENDED AGGREGATES IS LESS THAN 0.1% AT 14 DAYS IMMERSED IN SOLUTION. WHERE CLASS F FLY ASH IS SELECTED AS A SUPPLEMENTAL ADMIXTURE, THE LOSS OF IGNITION SHALL BE LIMITED TO 2%. THE CONTRACTOR SHALL SUBMIT ALL CERTIFICATES SHOWING THE FLY ASH IS IN ACCORDANCE WITH ASTM 6618.
7. DO NOT USE CONCRETE OR GROUT CONTAINING CHLORIDES. WATER SHALL CONTAIN A CHLORIDE CONTENT LESS THAN 1000 PPM AS C1. DO NOT USE CONCRETE CONTAINING ALKALI-CARBONATE AND BICARBONATES PRESENT IN AGGREGATE IN EXCESS OF 1000 PPM. TESTS FOR THEIR EFFECT ON SETTING TIME AND 28-DAY STRENGTH SHALL BE EVALUATED.
8. HARD ROCK CONCRETE AGGREGATE SHALL CONFORM TO ALL REQUIREMENTS AND TESTS OF THE ASTM C33 CLASS DESIGNATION 35 AND PROJECT SPECIFICATIONS. EXCEPTIONS MAY BE USED ONLY WITH APPROVAL OF THE STRUCTURAL ENGINEER. PROVIDE CONCRETE MIX DESIGN WITH PROVEN SHRINKAGE CHARACTERISTICS OF LESS THAN 0.0005 INCHES/INCH.
9. MAXIMUM SIZED AGGREGATE OF 0.75".
10. SLUMP RANGE OF 3" ± 1" PER ASTM C143.
11. CONCRETE PLACEMENT SHALL BE IN ACCORDANCE WITH ACI STANDARD 304 AND PROJECT SPECIFICATIONS.
12. THE UNIRAC PILE SHALL BE CENTERED IN THE HOLE TO MAXIMIZE CONCRETE COVER AND THE HOLE SHALL BE CENTERED IN THE SPECIFIED LOCATION TO ALLOW FOR RACKING INSTALLABILITY.
13. THE TOP OF THE CONCRETE SHALL BE SMOOTHED AND SLOPED AT 2% TO FACILITATE POSITIVE DRAINAGE AWAY FROM THE UNIRAC PILE.
14. CONCRETE CHLORIDE PERMEABILITY SHALL BE CLASSIFIED AS HAVING "NEGLIGIBLE" TO "VERY LOW" CHLORIDE ION PERMEABILITY PER ASTM C1202.
15. CONCRETE SHOULD BE PLACED IN A CONTINUOUS FLOW WITHOUT SEGREGATING THE CONCRETE. DO NOT ALLOW CONCRETE TO FREE FALL MORE THAN 5 FEET UNLESS MEASURES ARE TAKEN TO ENSURE THAT CONCRETE DOES NOT HIT THE SIDES OF THE EXCAVATION DURING FREE FALL.
16. MECHANICALLY VIBRATE THE CONCRETE AT EACH PIER.
17. PRECAUTIONS SHOULD BE TAKEN DURING THE INSTALLATION OF PIERS TO MINIMIZE THE POSSIBILITY OF CAVING. PIER EXCAVATIONS SHOULD BE FILLED WITH CONCRETE AS SOON AFTER DRILLING AND INSPECTION AS POSSIBLE. SONOTUBES (OR EQUIVALENT) CAN BE UTILIZED, AS REQUIRED, ONLY IN THE UPPER 2 FT. OF THE AUGERED/DRILLED HOLE.
18. CONCRETE MIXING OPERATION SHALL CONFORM TO ASTM C-94.
19. AGGREGATE FOR HARDROCK CONCRETE SHALL CONFORM TO ALL REQUIREMENTS AND TESTS OF THE ASTM C-33 AND PROJECT SPECIFICATIONS. EXCEPTIONS MAY BE USED ONLY WITH THE PERMISSION OF THE ENGINEER OF RECORD.
20. THE DENSITY OF CONCRETE SHALL BE BETWEEN 140 PCF TO 150 PCF. THE 28-DAY STRENGTH OF CONCRETE SHALL BE 2500 PSI OR 4500 PSI IF IN A REGION WITH ANY SNOW LOAD WITH A MAXIMUM WATER-CEMENT RATIO OF 0.40.

## SHEET INDEX


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| SR - 201 | GFT E-W BEAM LOCATION OPTIONS (20 DEGREE TILT) |
| SR - 300 | GFT TABLE CROSS-SECTION AND PARTS LIST (30 DEGREE TILT) |
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| REVISION BLOCK | | |
|---|---|---|
| MARK | DATE | DESCRIPTION |
| 0 | 02/01/2023 | Original Release |

OWNER/CLIENT:
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ENGINEERING CONSULTANT:

PROFESSIONAL SEAL

SEE STATE SPECIFIC STAMPED & SIGNED GFT CERTIFICATION LETTER

UNIRAC'S GFT GROUND FIXED TILT STRUCTURAL RACKING DRAWINGS


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|---|---|
| PROJECT NUMBER: | GFT |
| ENGINEERED BY: | JRS |
| DRAFTED BY: | JRS |
| REVIEWED BY: | EP |
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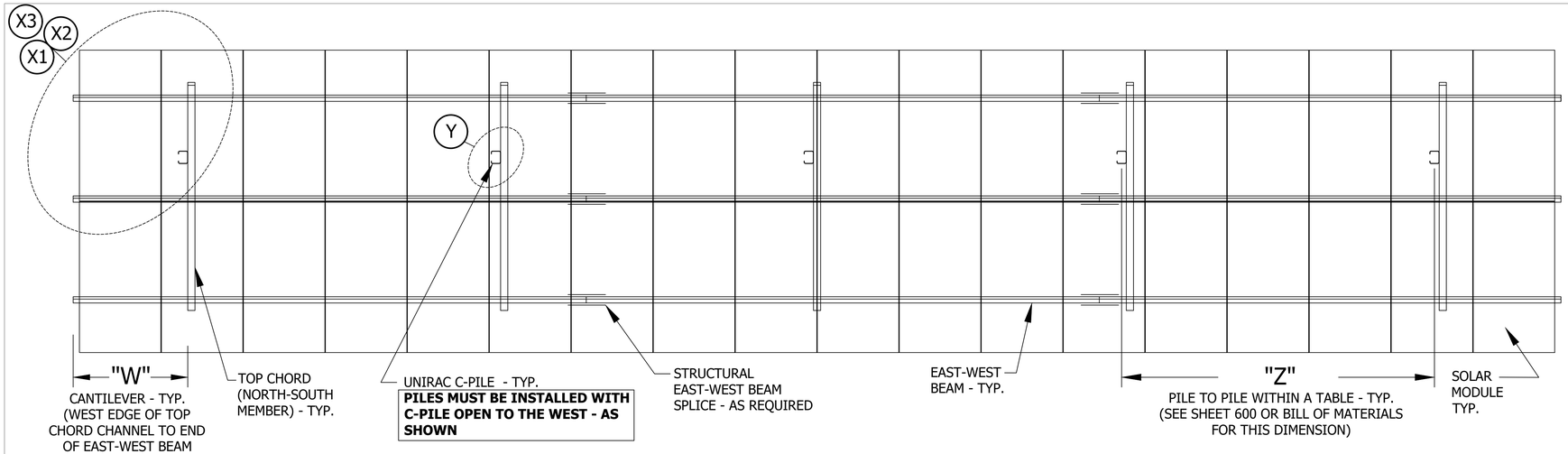
| DRAWING SHEET SIZE: | "D" - 24x36 |

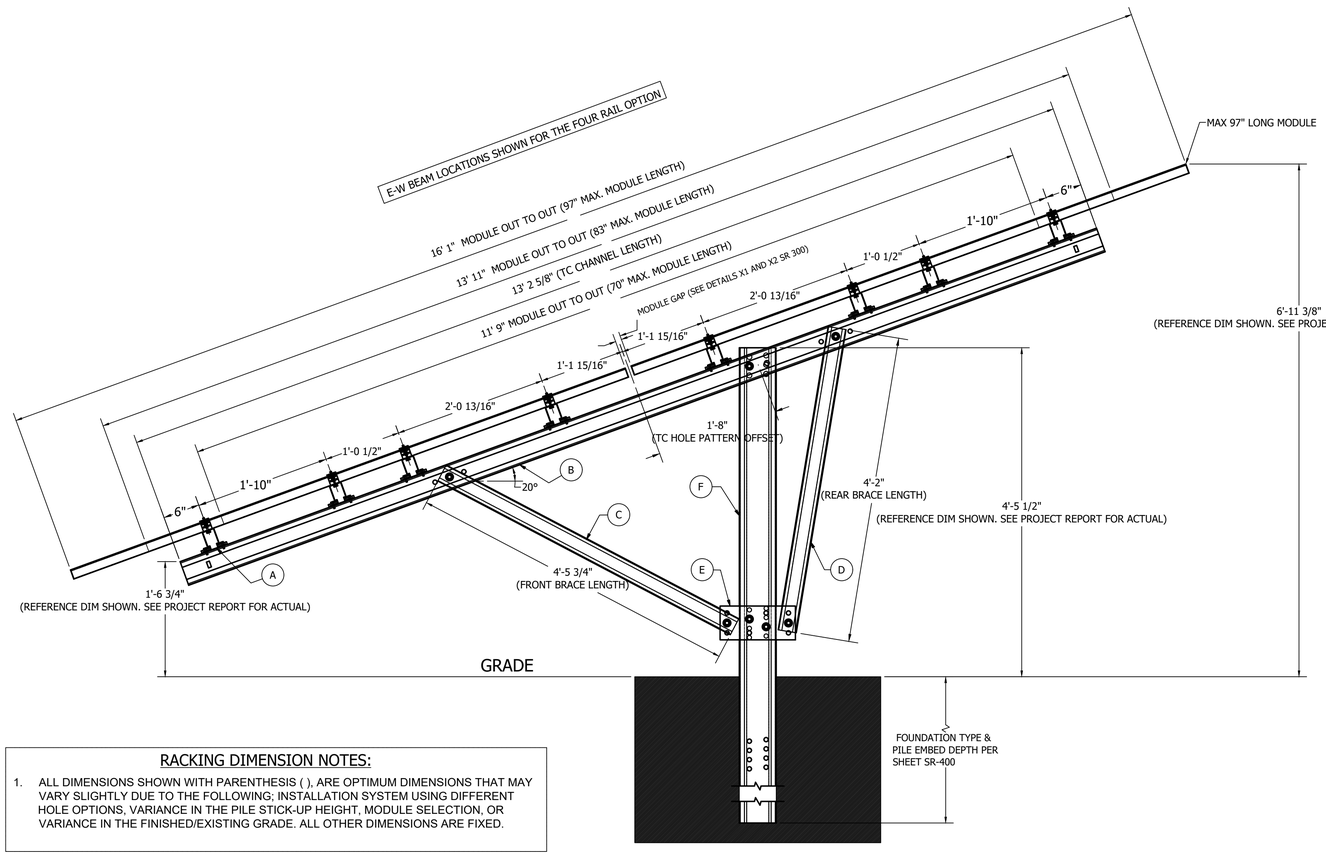
SHEET TITLE
GENERAL STRUCTURAL RACKING NOTES

SHEET NUMBER
SR-102




## PLAN VIEW OF TABLE

SEE SHEET 600 OR UBUILDER DESIGN OR UNIRAC BOM FOR PILE QUANTITY REQUIREMENT PER TABLE SIZE. TABLE SIZE CANNOT EXCEED 30 COLUMNS OF MODULES

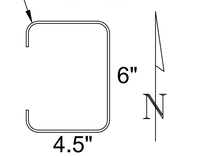



## SECTION VIEW OF GFT TABLE - 20° TILT

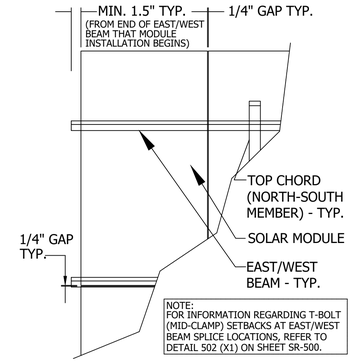
### RACKING DIMENSION NOTES:

1. ALL DIMENSIONS SHOWN WITH PARENTHESIS ( ), ARE OPTIMUM DIMENSIONS THAT MAY VARY SLIGHTLY DUE TO THE FOLLOWING; INSTALLATION SYSTEM USING DIFFERENT HOLE OPTIONS, VARIANCE IN THE PILE STICK-UP HEIGHT, MODULE SELECTION, OR VARIANCE IN THE FINISHED/EXISTING GRADE. ALL OTHER DIMENSIONS ARE FIXED.

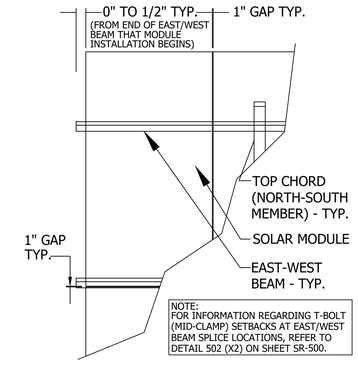
PILES MUST ALWAYS BE INSTALLED WITH C-PILES OPEN TO THE WEST



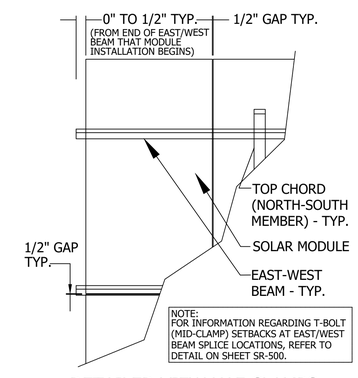

Y DETAILED VIEW




X1 DETAILED VIEW STANDARD CLAMPS
(SEE ALSO SHEET SR-500, DETAIL 501 (X1))




X2 DETAILED VIEW PRO SERIES CLAMPS
(SEE ALSO SHEET SR-500, DETAIL 501 (X2))




X3 DETAILED VIEW UAF CLAMPS
(SEE ALSO SHEET SR-500, DETAIL 502 (X3))

### GFT PARTS LIST

| REF NUMBER | PART DESCRIPTION | CATALOG # | GUAGE/ THICKNESS | FINISH |
|---|---|---|---|---|
| A | ALUMINUM E-W BEAM (168" OR 246") | 411168M OR 411246M | SEE SHEET SR-100 | |
| B | TOP CHORD CHANNEL | 404037 | SEE SHEET SR-100 | |
| C | FRONT DIAGONAL BRACE (20°) | 404031 | SEE SHEET SR-100 | |
| D | REAR DIAGONAL BRACE (20°) | | SEE SHEET SR-100 | |
| E | DIAGONAL BRACE PLATE | | SEE SHEET SR-100 | |
| F | C-PILE (12.5 FT OR 15 FT) | 404001 OR 404002 | SEE SHEET SR-100 | |

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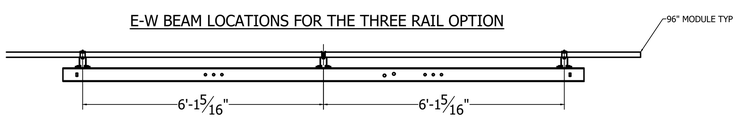
| PROJECT NUMBER: | GFT |
| ENGINEERED BY: | JRS |
| DRAFTED BY: | JRS |
| REVIEWED BY: | EP |
| ORIGINAL RELEASE DATE: | 02/01/2023 |
| DRAWING SHEET SIZE: | 'D' - 24x36 |

SHEET TITLE
GFT TABLE CROSS-SECTION AND PARTS LIST (20 DEGREE TILT)

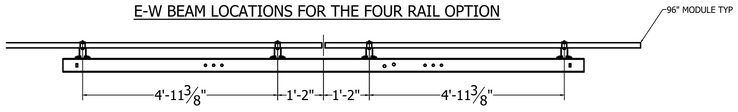
SHEET NUMBER
SR-200
SHEET 3 of 11

# E-W BEAM LOCATIONS UP TO 96 INCH

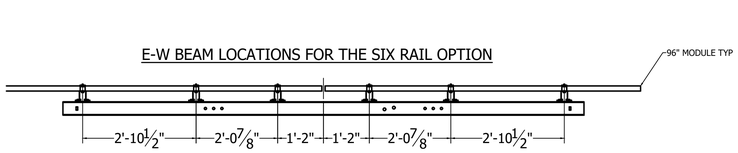
## E-W BEAM LOCATIONS FOR THE THREE RAIL OPTION



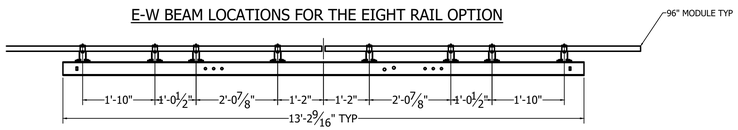

## E-W BEAM LOCATIONS FOR THE FOUR RAIL OPTION




## E-W BEAM LOCATIONS FOR THE SIX RAIL OPTION

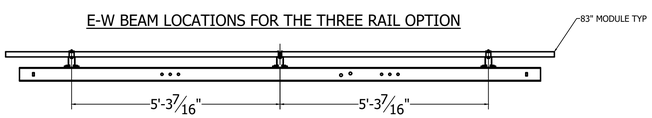



## E-W BEAM LOCATIONS FOR THE EIGHT RAIL OPTION

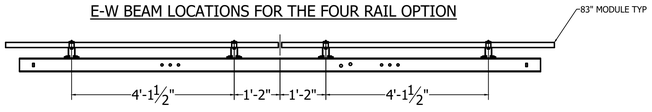



# E-W BEAM LOCATIONS UP TO 83 INCH

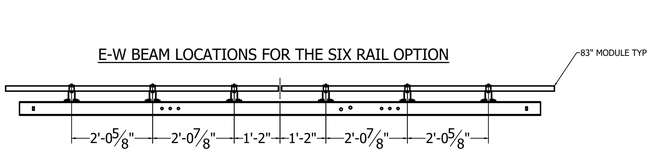
## E-W BEAM LOCATIONS FOR THE THREE RAIL OPTION



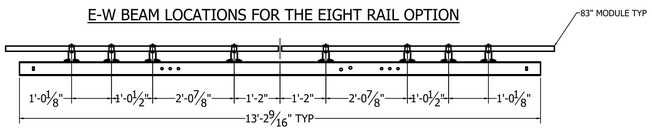

## E-W BEAM LOCATIONS FOR THE FOUR RAIL OPTION




## E-W BEAM LOCATIONS FOR THE SIX RAIL OPTION

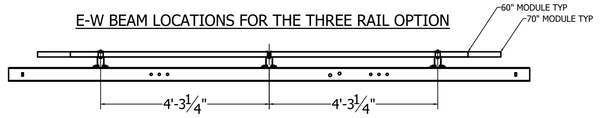



## E-W BEAM LOCATIONS FOR THE EIGHT RAIL OPTION

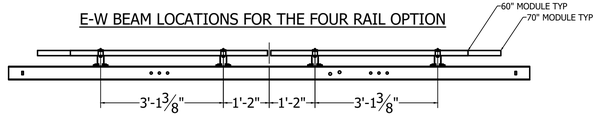



# E-W BEAM LOCATIONS UP TO 70 INCH

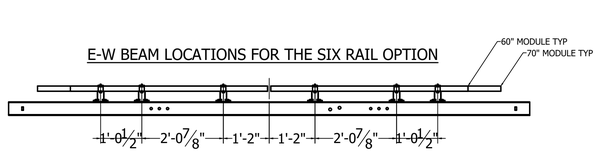
## E-W BEAM LOCATIONS FOR THE THREE RAIL OPTION



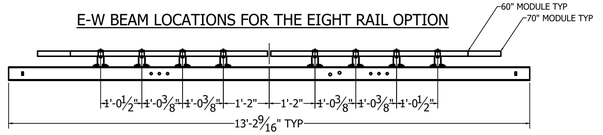

## E-W BEAM LOCATIONS FOR THE FOUR RAIL OPTION

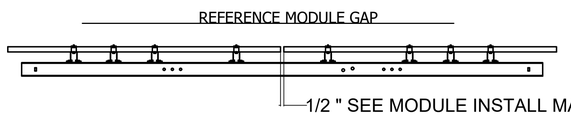



## E-W BEAM LOCATIONS FOR THE SIX RAIL OPTION




## E-W BEAM LOCATIONS FOR THE EIGHT RAIL OPTION

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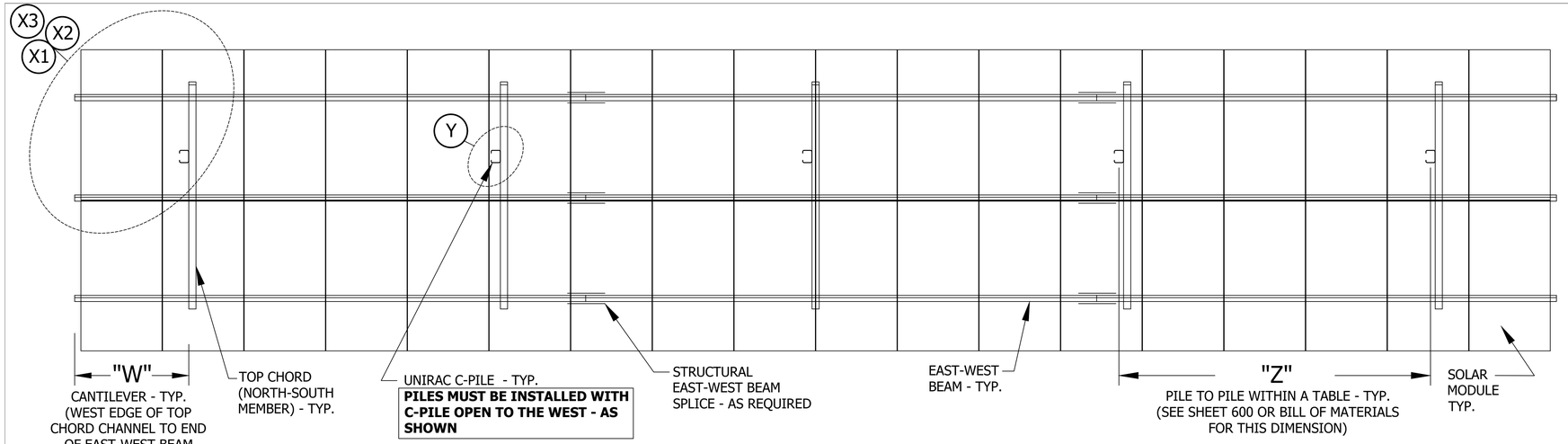
| PROJECT NUMBER: | GFT |
| ENGINEERED BY: | JRS |
| DRAFTED BY: | JRS |
| REVIEWED BY: | EP |
| ORIGINAL RELEASE DATE: | 02/01/2023 |
| DRAWING SHEET SIZE: | "D" - 24x36 |

SHEET TITLE
GFT E-W BEAM LOCATION OPTIONS (20 DEGREE TILT)

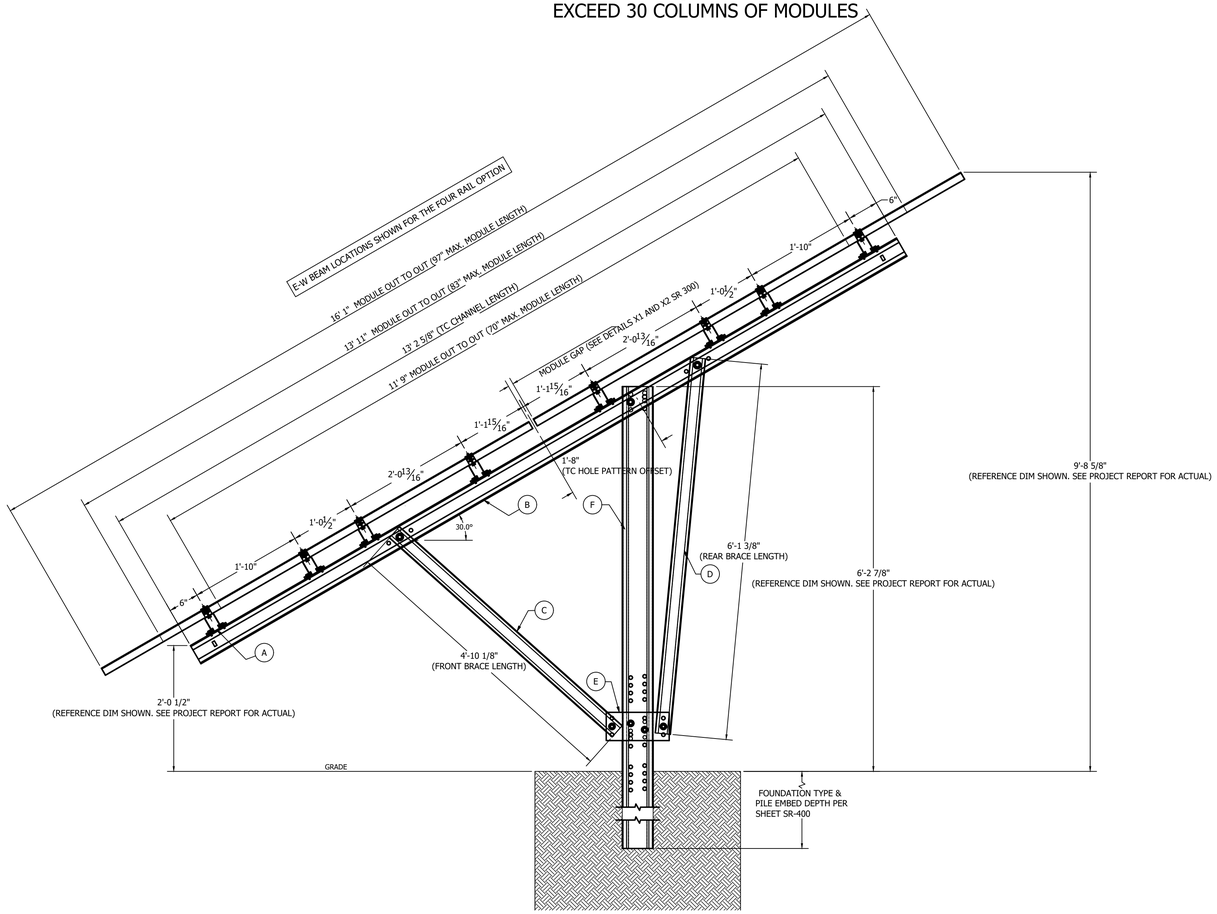
SHEET NUMBER
SR-201

SHEET 4 of 11



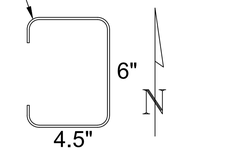

## PLAN VIEW OF TABLE

SEE SHEET 600 OR UBUILDER DESIGN OR UNIRAC BOM FOR PILE QUANTITY REQUIREMENT PER TABLE SIZE. TABLE SIZE CANNOT EXCEED 30 COLUMNS OF MODULES




## SECTION VIEW OF GFT TABLE - 30° TILT

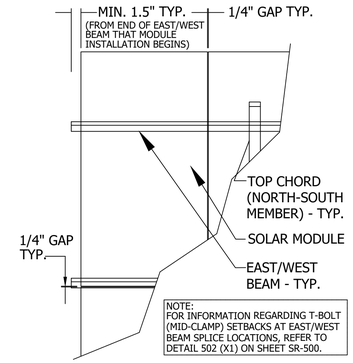
PILES MUST ALWAYS BE INSTALLED WITH C-PILES OPEN TO THE WEST



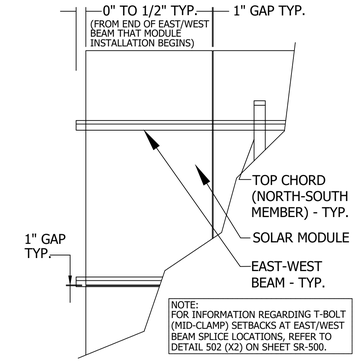

Y DETAILED VIEW

### RACKING DIMENSION NOTES:

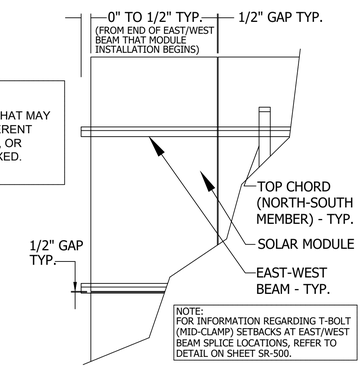
1. ALL DIMENSIONS SHOWN WITH PARENTHESIS ( ), ARE OPTIMUM DIMENSIONS THAT MAY VARY SLIGHTLY DUE TO THE FOLLOWING; INSTALLATION SYSTEM USING DIFFERENT HOLE OPTIONS, VARIANCE IN THE PILE STICK-UP HEIGHT, MODULE SELECTION, OR VARIANCE IN THE FINISHED/EXISTING GRADE. ALL OTHER DIMENSIONS ARE FIXED.




X1 DETAILED VIEW STANDARD CLAMPS
(SEE ALSO SHEET SR-500, DETAIL 501 (X1))




X2 DETAILED VIEW PRO SERIES CLAMPS
(SEE ALSO SHEET SR-500, DETAIL 501 (X2))




X3 DETAILED VIEW UAF CLAMPS
(SEE ALSO SHEET SR-500, DETAIL 502 (X3))

### GFT PARTS LIST

| REF NUMBER | PART DESCRIPTION | CATALOG # | GUAGE/ THICKNESS | FINISH |
|---|---|---|---|---|
| A | ALUMINUM E-W BEAM (168" OR 246") | 411168M OR 411246M | SEE SHEET SD-100 | |
| B | TOP CHORD CHANNEL | 404037 | SEE SHEET SD-100 | |
| C | FRONT DIAGONAL BRACE (30°) | 404032 | SEE SHEET SD-100 | |
| D | REAR DIAGONAL BRACE (30°) | | SEE SHEET SD-100 | |
| E | DIAGONAL BRACE PLATE | | SEE SHEET SD-100 | |
| F | C-PILE (12.5 FT OR 15 FT) | 404001 OR 404002 | SEE SHEET SD-100 | |

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| ENGINEERED BY: | JRS |
| DRAFTED BY: | JRS |
| REVIEWED BY: | EP |
| ORIGINAL RELEASE DATE: | 02/01/2023 |
| DRAWING SHEET SIZE: | 'D' - 24x36 |

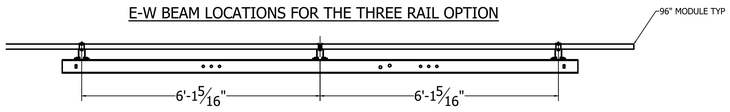
SHEET TITLE
GFT TABLE CROSS-SECTION AND PARTS LIST (30 DEGREE TILT)

SHEET NUMBER
SR-300

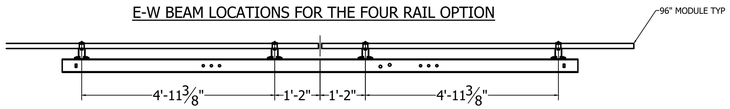
SHEET 3 of 11

## E-W BEAM LOCATIONS UP TO 96 INCH

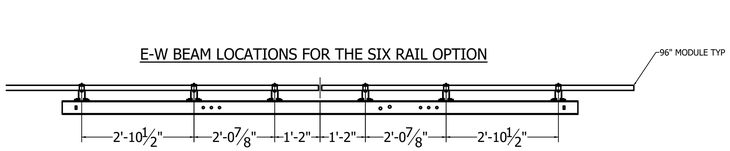
### E-W BEAM LOCATIONS FOR THE THREE RAIL OPTION



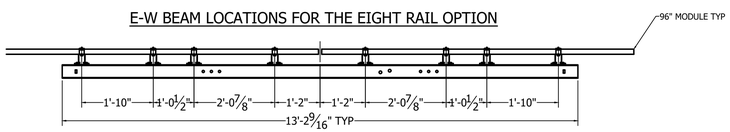

### E-W BEAM LOCATIONS FOR THE FOUR RAIL OPTION




### E-W BEAM LOCATIONS FOR THE SIX RAIL OPTION

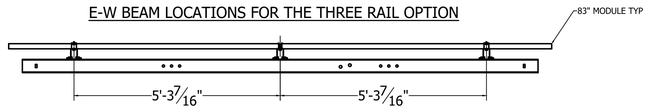



### E-W BEAM LOCATIONS FOR THE EIGHT RAIL OPTION

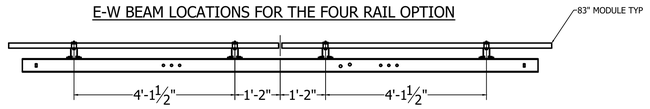



## E-W BEAM LOCATIONS UP TO 83 INCH

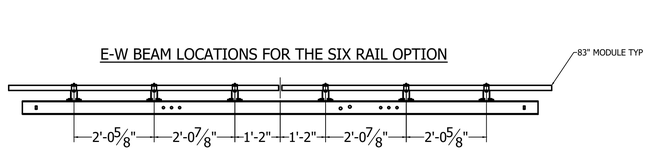
### E-W BEAM LOCATIONS FOR THE THREE RAIL OPTION



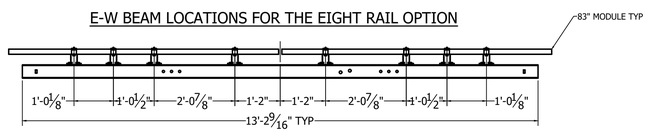

### E-W BEAM LOCATIONS FOR THE FOUR RAIL OPTION




### E-W BEAM LOCATIONS FOR THE SIX RAIL OPTION

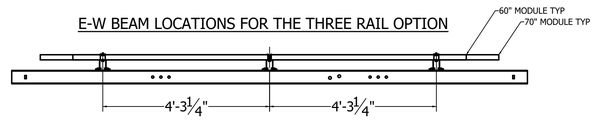



### E-W BEAM LOCATIONS FOR THE EIGHT RAIL OPTION

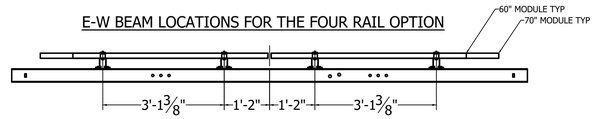



## E-W BEAM LOCATIONS UP TO 70 INCH

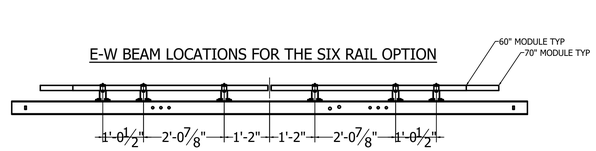
### E-W BEAM LOCATIONS FOR THE THREE RAIL OPTION



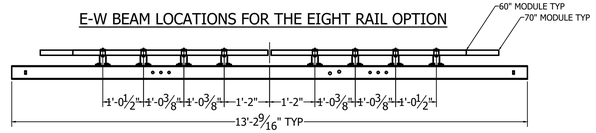

### E-W BEAM LOCATIONS FOR THE FOUR RAIL OPTION



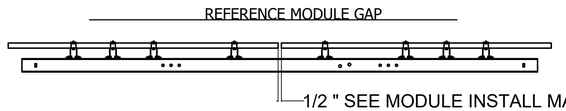

### E-W BEAM LOCATIONS FOR THE SIX RAIL OPTION




### E-W BEAM LOCATIONS FOR THE EIGHT RAIL OPTION




### REFERENCE MODULE GAP

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| PROJECT NUMBER: | GFT |
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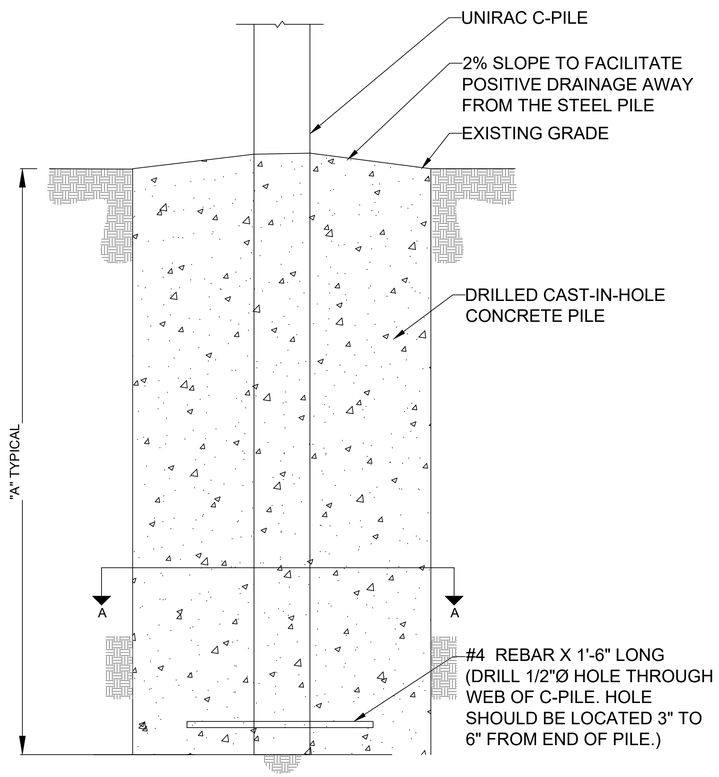
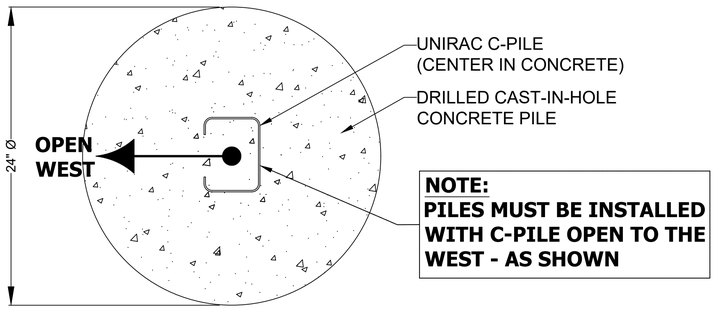
| DRAFTED BY: | JRS |
| REVIEWED BY: | EP |
| ORIGINAL RELEASE DATE: | 02/01/2023 |
| DRAWING SHEET SIZE: | 'D' - 24x36 |

SHEET TITLE
GFT E-W BEAM LOCATION OPTIONS (30 DEGREE TILT)

SHEET NUMBER
SR-301

SHEET
4 of 11




SECTION A-A
TOP VIEW

## 20 OR 30 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

(REFER TO SHEET SR-200 OR SR-300 FOR PILE STICK-UP HEIGHT) (c)

| FOUNDATION TYPE | DETAIL NUMBER | NO FROST DEPTH | FROST DEPTH = 3.5 FT OR LESS | FROST DEPTH = 5.0 FT |
|---|---|---|---|---|
| | | DIMENSION "A" | DIMENSION "A" | DIMENSION "A" |
| 24" FULL CAST IN-PLACE CONCRETE | 400 | 6'-0" (a) | 6'-0" (a) | 8'-0" |
| 18" FULL CAST IN-PLACE CONCRETE | 400 | 7'-0" | 7'-0" | 8'-0" |

(a) FOR 20 DEGREE DESIGNS THE 6'-0" EMBEDMENT REQUIRES CUTTING 24" OFF OF THE BOTTOM OF A 12'-6" LONG C-PILE. (DO NOT CUT THE END OF PILE WITH PRE-PUNCHED HOLES.) IF CUTTING IS NOT PREFERRED, AN 8'-0" CONCRETE FOUNDATION IS ACCEPTABLE.

(b) SHALLOWER EMBEDMENT DEPTHS ARE POSSIBLE, HOWEVER, PILE TESTING AND/OR APPROVAL FROM A GEOTECHNICAL OR PROFESSIONAL ENGINEER ARE REQUIRED.

(c) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 20 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 8'-1" OR GREATER, REQUIRE A 15 FT LONG PILE.

(d) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 30 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 6'-4" OR GREATER, REQUIRE A 15 FT LONG PILE.

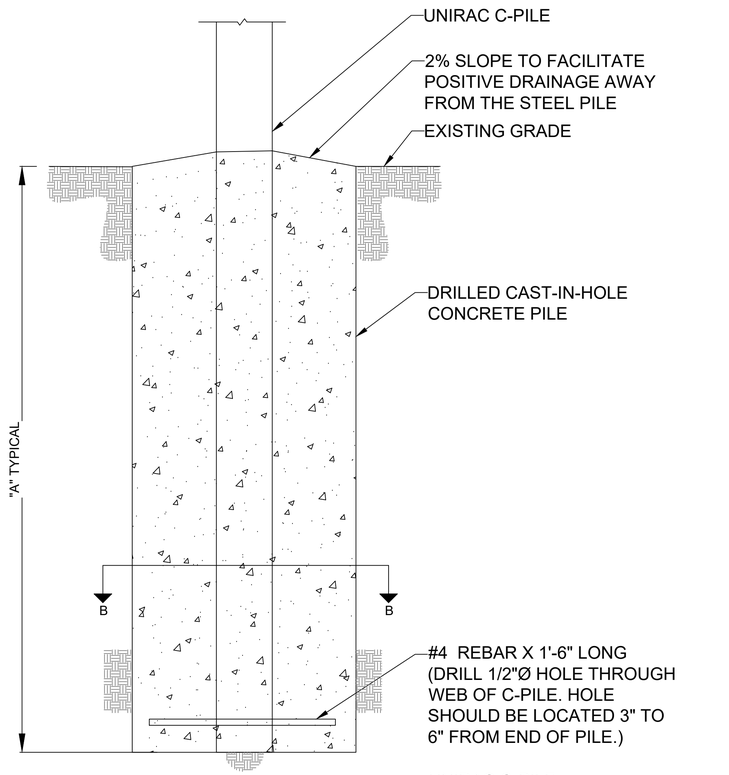
## 400 DRILLED CAST-IN-HOLE CONCRETE PILE FOUNDATION

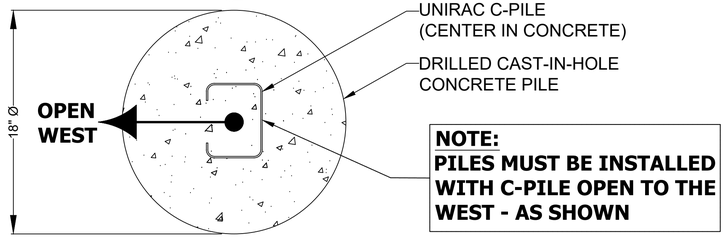
(ALTERNATE OPTION)

NOT TO SCALE

FOUNDATION 400: DRILLED CAST-IN-HOLE CONCRETE PILE FOUNDATION

1. THE FOUNDATION MUST BE EXCAVATED WITH LITTLE TO NO LOOSE MATERIAL IN THE BOTTOM.
2. THE FOUNDATION CANNOT BE BELOW THE GROUND WATER UNLESS WRITTEN APPROVAL FROM UNIRAC.
3. IN SOFT OR UNSTABLE SOILS, A TEMPORARY CASING TO STABILIZE THE EXCAVATION IS PERMITTED.
4. THE PILE SHALL HAVE A #4 REBAR PLACED THROUGH THE BOTTOM OF THE PILE.
5. THE PILE MUST BE CENTERED IN THE HOLE WITH EQUAL AMOUNTS OF CONCRETE AROUND THE CASING.
6. CONCRETE SHALL CONFORM TO THE CONCRETE SPECIFICATIONS LISTED ON SR-100.
7. CONCRETE DEPTH SHALL CONFORM TO THE DEPTHS LISTED IN THE TABLE ON THIS SHEET.
8. THE TOP OF THE CONCRETE MUST BE ABOVE GRADE.
9. THE CORE OF THE CONCRETE CAST-IN-DRILLED HOLE PILE WILL CONSIST OF THE UNIRAC C-PILES AS DEPICTED IN THE FIGURE.
10. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS .
11. DEPTH OF CONCRETE CAN BE +6/-2 INCHES.
12. UNIRAC C-PILE CAN EXTEND TO BOTTOM OF CONCRETE OR EXTEND DEEPER THAN THE CONCRETE.




SECTION B-B
TOP VIEW

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| REVIEWED BY: | EP |
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| DRAWING SHEET SIZE: | "D" - 24x36 |

SHEET TITLE
FOUNDATION EMBEDMENT AND FOUNDATION DETAILS

SHEET NUMBER
SR-400

SHEET
5 of 11

## 20 & 30 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

(REFER TO SHEET SR-200 AND SR-300 FOR PILE STICK-UP HEIGHT) (c)

| FOUNDATION TYPE | DETAIL NUMBER | NO FROST DEPTH | FROST DEPTH = 3.5 FT OR LESS | FROST DEPTH = 5.0 FT |
|---|---|---|---|---|
| | | DIMENSION "A" | DIMENSION "A" | DIMENSION "D" |
| PARTIAL CAST-IN-PLACE CONCRETE WITH FROST BREAK (b) | 402 | 6'-0" | 6'-0" | 8'-0" |

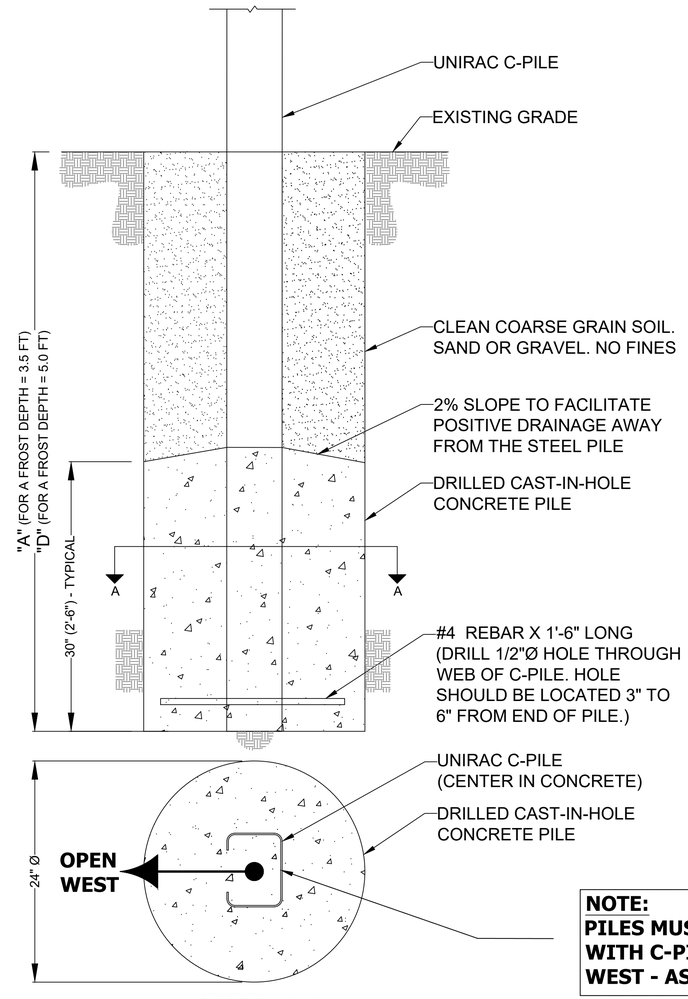
(a) FOR 20 DEGEE TILT, THIS 6'-0" EMBEDMENT REQUIRES CUTTING 24" OFF OF THE BOTTOM OF A 12'-6" LONG C-PILE. (DO NOT CUT THE END OF PILE WITH PRE-PUNCHED HOLES.) IF CUTTING IS NOT PREFERRED, AN 8'-0" CONCRETE FOUNDATION IS ACCEPTABLE.

(b) SHALLOWER EMBEDMENT DEPTHS ARE POSSIBLE, HOWEVER, PILE TESTING AND/OR APPROVAL FROM A GEOTECHNICAL OR PROFESSIONAL ENGINEER ARE REQUIRED.

(c) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 20 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 8'-1" OR GREATER, REQUIRE A 15 FT LONG PILE.

(d) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 30 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 6'-4" OR GREATER, REQUIRE A 15 FT LONG PILE.

(e) THIS DESIGN NEEDS TO BE DESIGNS AS DRIVEN PILE




SECTION A-A
TOP VIEW

## 401 DRILLED "PARTIAL" CAST-IN-HOLE CONCRETE PILE FOUNDATION

(ALTERNATE OPTION)

NOT TO SCALE

FOUNDATION 401: DRILLED "PARTIAL" CAST-IN-HOLE CONCRETE PILE FOUNDATION

1. THE FOUNDATION MUST BE EXCAVATED WITH LITTLE TO NO LOOSE MATERIAL IN THE BOTTOM.
2. THE FOUNDATION CANNOT BE BELOW THE GROUND WATER UNLESS WRITTEN APPROVAL FROM UNIRAC.
3. THE PILE SHALL HAVE A #4 REBAR PLACED THROUGH THE BOTTOM OF THE PILE.
4. THE PILE MUST BE CENTERED IN THE HOLE WITH EQUAL AMOUNTS OF CONCRETE AROUND THE CASING.
5. CONCRETE SHALL CONFORM TO THE CONCRETE SPECIFICATIONS LISTED ON SR-100.
6. CONCRETE DEPTH SHALL CONFIRM TO THE DEPTHS LISTED IN THE TABLE ON THIS SHEET.
7. THE TOP OF THE CONCRETE MUST BE BELOW THE DEPTH OF THE FROST ZONE.
8. THE CORE OF THE CONCRETE CAST-IN-DRILLED HOLE PILE WILL CONSIST OF THE UNIRAC C-PILES AS DEPICTED IN THE FIGURE.
9. THE BACKFILL MATERIAL MUST CONSIST OF MEDIUM TO COARSE SAND OR GRAVEL. NO CLAY OR ORGANICS MAY BE USED IN THE BACKFILL.
10. BACKFILL MUST BE COMPACTED TO THE CIVIL ENGINEERING SPECIFICATIONS.
11. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS .
10. DEPTH OF CONCRETE CAN BE +6/-2 INCHES
11. UNIRAC C-PILE CAN EXTEND TO BOTTOM OF CONCRETE OR EXTEND DEEPER THAN THE CONCRETE.
12. THIS DESIGN IS NOT CONSIDERED CAST-IN-PLACE AND SHOULD BE CHECKED BY UNIRAC.

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| REVIEWED BY: | EP |
| ORIGINAL RELEASE DATE: | 02/01/2023 |
| DRAWING SHEET SIZE: | 'D' - 24x36 |

SHEET TITLE
ADDITIONAL FOUNDATION DETAILS

SHEET NUMBER
SR-401

SHEET
6 of 11

## 20 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

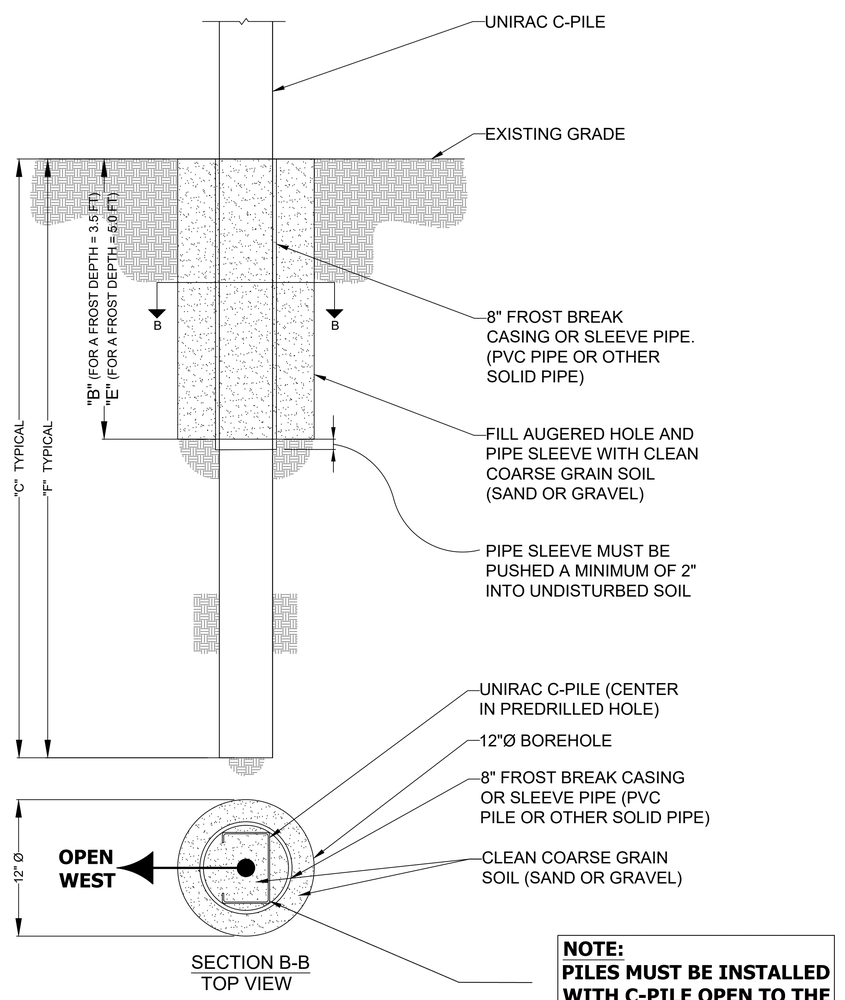
(REFER TO SHEET SR-200 FOR PILE STICK-UP HEIGHT) (c)

| FOUNDATION TYPE | DETAIL NUMBER | DIMENSION "B" | DIMENSION "C" | DIMENSION "E" | DIMENSION "F" |
|---|---|---|---|---|---|
| PARTIAL DRIVEN PILE WITH FROST BREAK (b) | 402 | FROST DEPTH 0' TO 3'-6" | | FROST DEPTH 3'-6" TO 5'-0" | |
| | | 3'-6" | 8'-0" | 5'-0" | 10'-0" |
| (d) EMBEDMENT DEPTH NEEDS TO BE VERIFIED BY PILE TESTING OR DESIGNED BY A GEOTECHNICAL OR PROFESSIONAL ENGINEER. | | | | | |
| (c) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 20 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 8'-1" OR GREATER, REQUIRE A 15 FT LONG PILE. | | | | | |

## 30 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

(REFER TO SHEET SR-300 FOR PILE STICK-UP HEIGHT) (e)

| FOUNDATION TYPE | DETAIL NUMBER | DIMENSION "B" | DIMENSION "C" | DIMENSION "E" | DIMENSION "F" |
|---|---|---|---|---|---|
| PARTIAL DRIVEN PILE WITH FROST BREAK (d) | 402 | FROST DEPTH 0' TO 3'-6" | | FROST DEPTH 3'-6" TO 5'-0" | |
| | | 3'-6" | 8'-6" | 5'-0" | 8'-6" |
| (d) EMBEDMENT DEPTH NEEDS TO BE VERIFIED BY PILE TESTING OR DESIGNED BY A GEOTECHNICAL OR PROFESSIONAL ENGINEER. | | | | | |
| (e) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 30 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 6'-4" OR GREATER, REQUIRE A 15 FT LONG PILE. | | | | | |




**NOTE:**
**PILES MUST BE INSTALLED WITH C-PILE OPEN TO THE WEST - AS SHOWN**

## 402 PARTIAL DRIVEN PILE WITH CLEAN COARSE BACKFILL

(ALTERNATE OPTION)

NOT TO SCALE

FOUNDATION 402: PARTIAL DRIVEN PILE WITH CLEAN COARSE BACKFILL.

1. EACH PILE LOCATION MUST BE EXCAVATED TO A MINIMUM OF THE DIMENSION SHOWN.
2. THE PILE MUST BE CENTERED IN THE HOLE WITH THE FROST BREAK CASING PLACED AROUND THE PILE PRIOR TO BACKFILLING THE EXCAVATION.
3. THE FROST BREAK CASING MUST NOT HAVE ANY CRACKS OR HOLES THAT MAY ALLOW WATER TO SEEP IN. THE CASING MUST BE SET A MINIMUM OF 2 INCHES INTO THE NATIVE SOIL IN THE BOTTOM OF THE EXCAVATION. THE CASING TOP MUST EXTEND TO THE GROUND SURFACE.
4. THE FILL MATERIAL MUST CONSIST OF SAND OR GRAVEL WITH LESS THAN 5 PERCENT SILT CONTENT. NO CLAY OR ORGANICS MAY BE USED IN THE BACKFILL MATERIAL.
5. THE PILE MUST BE INSTALLED TO THE FULL DEPTH INDICATED. PILES NOT DRIVEN TO THE FULL DEPTH ARE CONSIDERED FAILED AND THE CONCRETE OPTION MUST BE UTILIZED.
6. PILE EMBEDMENT NEEDS TO BE VERIFIED BY PILE TESTING WITH THE UPPER FROST SUSCEPTIBLE SOIL REMOVED OR BY AN APPROVED ENGINEERED DESIGN.
7. THE CASING MUST BE FILLED WITH THE SAME FILL MATERIAL AFTER THE PILE IS INSTALLED TO THE CORRECT DEPTH.
8. THE FILL SHALL BE FORMED TO DIRECT WATER AWAY FROM THE FOUNDATION.
9. IF THE CASING IS AFFECTED BY FROST HEAVE, THE CASING SHALL BE ATTEMPTED TO BE RE-EMBEDED TO THE PROPER DEPTH IN ORDER TO PROTECT THE C-PILE FROM FUTURE FROST HEAVE.
10. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS OR IN AREAS WITH GROUNDWATER NEAR THE SURFACE.
11. DEPTH OF CONCRETE CAN BE +6/-2 INCHES
12. UNIRAC C-PILE CAN EXTEND TO BOTTOM OF CONCRETE OR EXTEND DEEPER THAN THE CONCRETE.

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| DRAWING SHEET SIZE: | 'D' - 24x36 |

SHEET TITLE
ADDITIONAL FOUNDATION DETAILS

SHEET NUMBER
SR-402

SHEET 7 of 11

## 20 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

(REFER TO SHEET SR-200 FOR PILE STICK-UP HEIGHT) (c)

| FOUNDATION TYPE | DETAIL NUMBER | DIMENSION "C" |
|---|---|---|
| FULLY DRIVEN PILE (b) | 403 | 8'-0" |

(b) PILE EMBEDMENT DEPTH NEEDS TO BE VERIFIED BY PILE TESTING OR FROM A GEOTECHNICAL OR PROFESSIONAL ENGINEER.

(c) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 20 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 8'-1" OR GREATER, REQUIRE A 15 FT LONG PILE.

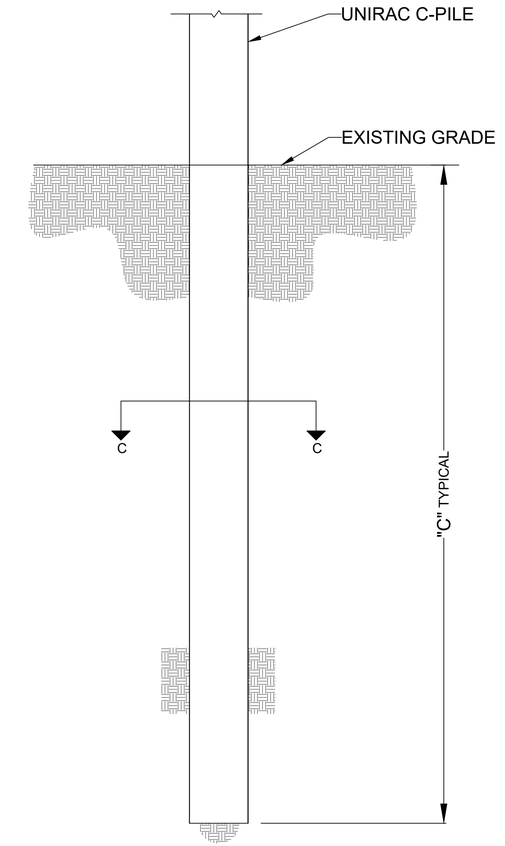
## 30 DEGREE UNIRAC STEEL C-PILE FOUNDATION DEPTHS

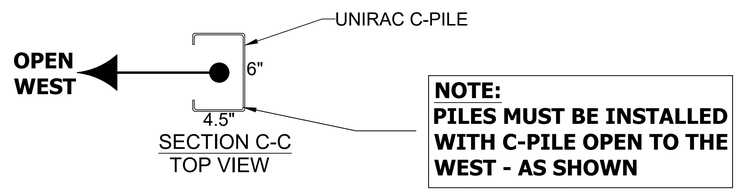
(REFER TO SHEET SR-300 FOR PILE STICK-UP HEIGHT) (e)

| FOUNDATION TYPE | DETAIL NUMBER | DIMENSION "C" |
|---|---|---|
| FULLY DRIVEN PILE (d) | 403 | 8'-6" |

(d) PILE EMBEDMENT DEPTH NEEDS TO BE VERIFIED BY PILE TESTING OR FROM A GEOTECHNICAL OR PROFESSIONAL ENGINEER.

(e) BASED ON THE PILE STICK-UP HEIGHT FOR A STANDARD 30 DEGREE GFT TABLE, ALL PILE EMBEDMENT DEPTHS THAT ARE 6'-4" OR GREATER, REQUIRE A 15 FT LONG PILE.




**NOTE:**
**PILES MUST BE INSTALLED WITH C-PILE OPEN TO THE WEST - AS SHOWN**

## 403 FULLY DRIVEN PILE

(ALTERNATE OPTION) NOT TO SCALE

FOUNDATION 403: FULLY DRIVEN PILE

1. DRIVEN PILE FOUNDATIONS MAY NOT BE USED IN SOILS THAT CONTAIN SILT OR CLAY WITH GROUNDWATER WITHIN 12 FEET OF THE SURFACE UNLESS APPROVED BY A GEOTECHNICAL ENGINEER. IT IS RECOMMENDED TO VERIFY GROUNDWATER IS NOT PRESENT IF USING THIS FOUNDATION TYPE IN FROST PRONE REGIONS.
2. PILES MUST BE INSTALLED TO THE FULL DEPTH. PILES NOT DRIVEN TO FULL DEPTH ARE CONSIDERED FAILED PILES AND A DIFFERENT FOUNDATION MUST BE UTILIZED.
3. FOUNDATIONS MUST NOT BE INSTALLED IN ORGANIC SOILS OR IN AREAS WITH GROUNDWATER NEAR THE SURFACE.
4. PILE EMBEDMENT MUST BE DETERMINED BY A LICENSED CIVIL ENGINEER OR BY SITE PILE TESTS.

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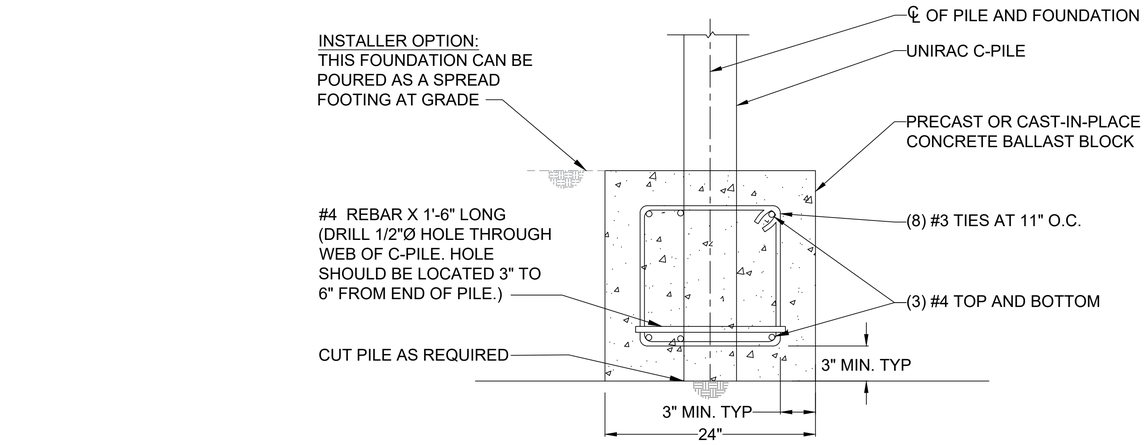
SHEET TITLE
FOUNDATION EMBEDMENT AND FOUNDATION DETAILS

SHEET NUMBER
SR-403

SHEET 8 of 11

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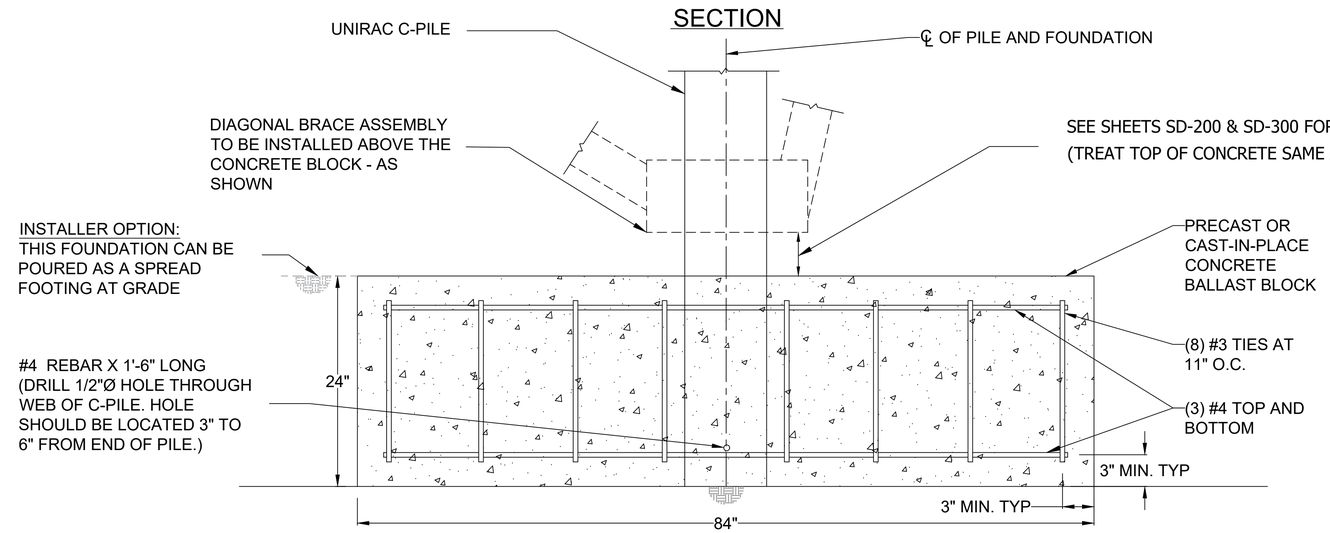


SIDE VIEW

## 404 CONCRETE BALLAST OR SPREAD FOOTING (PRECAST OR CAST-IN-PLACE)

(ALTERNATE FOUNDATION OPTION)

NOT TO SCALE

1. EXISTING GRADE MAY BE CLEARED/GRADED OR LEFT AS-IS. BLOCK DIMENSIONS SHOWN ABOVE ARE MINIMUM REQUIREMENTS.
2. THE PILE SHALL HAVE A #4 REBAR PLACED THROUGH THE BOTTOM OF THE PILE.
3. CONCRETE SHALL CONFORM TO THE CONCRETE SPECIFICATIONS LISTED ON SR-100.
4. UNIRAC AND THE ENGINEER OF RECORD ARE NOT RESPONSIBLE FOR DIFFERENTIAL SETTLEMENT OR DIFFERENTIAL FROST HEAVE FROM ONE PILE FOUNDATION TO THE NEXT. PERIODIC MONITORING OF THE INSTALLED PILES AND CONCRETE FOUNDATION IS RECOMMENDED.
5. PILES MUST BE INSTALLED WITH C-PILE OPEN TO THE WEST - AS SHOWN
6. MAINTENANCE REQUIRED WHERE C-PILE ENTERS THE CONCRETE BLOCK. CAULKING OR NON-SHRINK GROUT WILL HELP TO PREVENT MOISTURE FROM ENTERING THIS VOID (THUS AVOIDING CORROSION AND FREEZE-THAW BREAKDOWN.)
7. CONTACT UNIRAC FOR PRECAST BLOCK OPTION. AN 8" SQUARE LEAVE OUT AREA AND KEYED SLOT FOR THE CPILE TO BE INSTALLED IN THE FIELD. HIGH STRENGTH NON SHRINK GROUT REQUIRED TO SET CPILE.
8. ABOVE GRADE BALLAST BLOCKS ARE POSSIBLE. PLEASE CONTACT UNIRAC FOR CUSTOM ABOVE GRADE BALLAST BLOCK DESIGN.
9. BALLAST BLOCK DESIGN ASSUMES WIND SPEED IS LESS THAN 110 MPH. FOR WIND SPEEDS GREATER THAN 110 MPH, CONTACT UNIRAC FOR DESIGN.
10. BOTTOM OF BALLAST BLOCKS SHALL BE AT OR BELOW THE FROST DEPTH. CONTACT UNIRAC IF NOT POSSIBLE TO BELOW FROST DEPTH.

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| PROJECT NUMBER: | GFT |
| ENGINEERED BY: | JRS |
| DRAFTED BY: | JRS |
| REVIEWED BY: | EP |
| ORIGINAL RELEASE DATE: | 02/01/2023 |
| DRAWING SHEET SIZE: | 'D' - 24x36 |

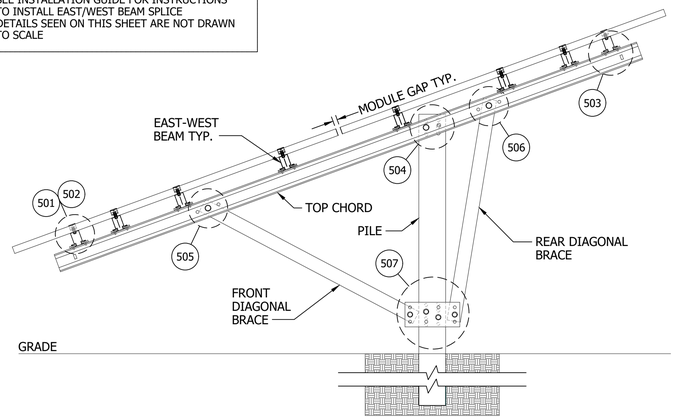
SHEET TITLE
FOUNDATION EMBEDMENT AND FOUNDATION DETAILS

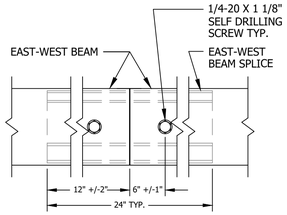
SHEET NUMBER
SR-404

SHEET 9 of 11

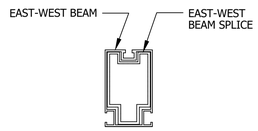
## RACKING DETAIL NOTES:

1. SEE INSTALLATION GUIDE FOR PILE TOLERANCES
2. SEE INSTALLATION GUIDE FOR CONNECTION ADJUSTMENT INSTRUCTIONS
3. SEE INSTALLATION GUIDE FOR INSTRUCTIONS TO INSTALL EAST/WEST BEAM SPLICE
4. DETAILS SEEN ON THIS SHEET ARE NOT DRAWN TO SCALE

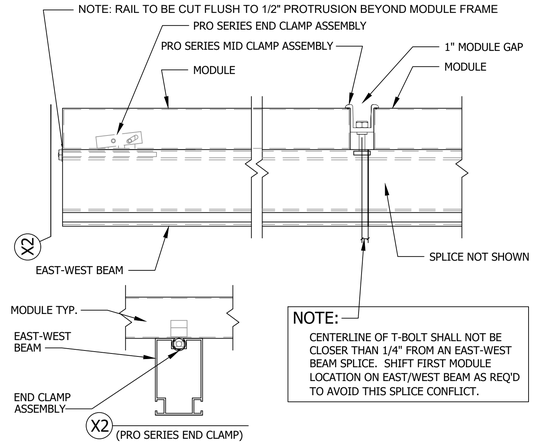


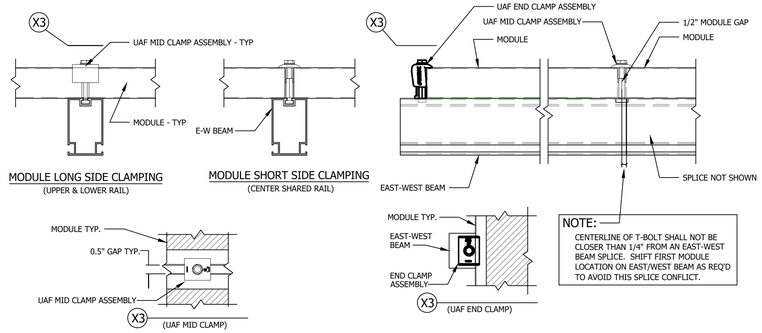

EAST-WEST BEAM WITH SPLICE
(TYPICAL ELEVATION)



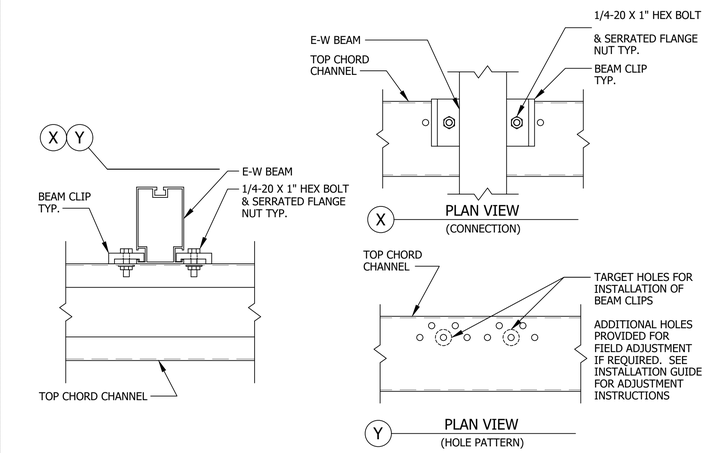

EAST-WEST BEAM WITH SPLICE
(TYPICAL SECTION)




501 MODULE TO EAST-WEST BEAM CLAMP CONNECTION

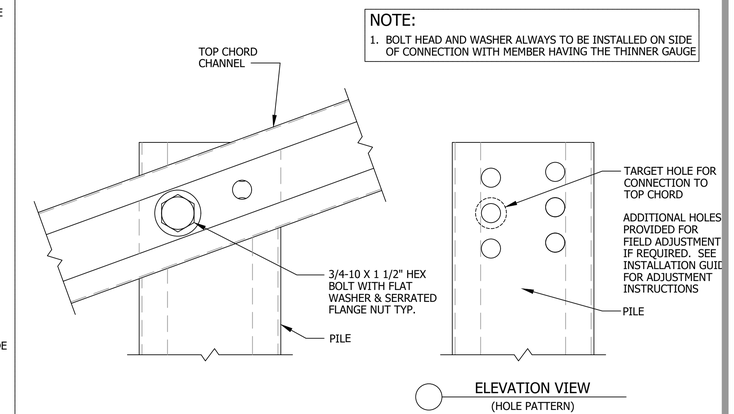



502 MODULE TO EAST-WEST BEAM CLAMP CONNECTION



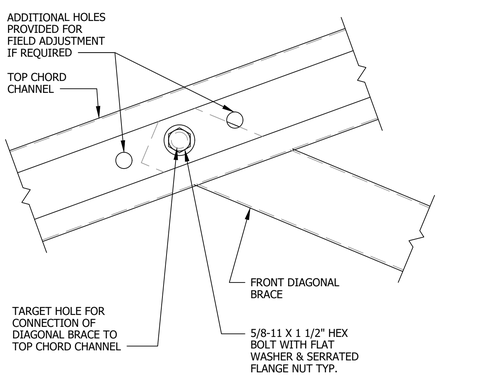

503 EAST-WEST BEAM TO TOP CHORD CONNECTION

NOTE:
1. BOLT HEAD AND WASHER ALWAYS TO BE INSTALLED ON SIDE OF CONNECTION WITH MEMBER HAVING THE THINNER GAUGE



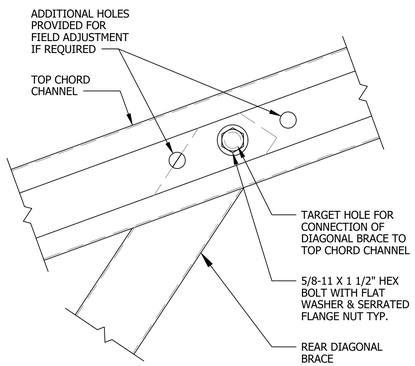

504 TOP CHORD TO PILE CONNECTION

NOTE:
1. BOLT HEAD AND WASHER ALWAYS TO BE INSTALLED ON SIDE OF CONNECTION WITH MEMBER HAVING THE THINNER GAUGE



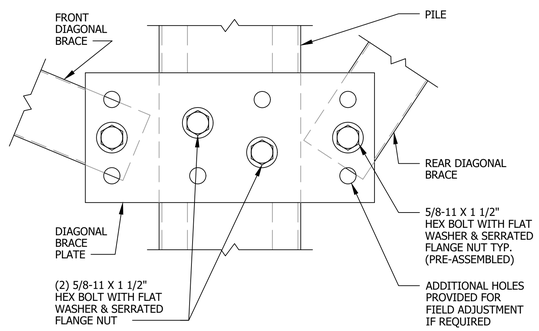

505 TOP CHORD TO DIAGONAL BRACE CONNECTION
(FRONT BRACE)

NOTE:
1. BOLT HEAD AND WASHER ALWAYS TO BE INSTALLED ON SIDE OF CONNECTION WITH MEMBER HAVING THE THINNER GAUGE




506 TOP CHORD TO DIAGONAL BRACE CONNECTION
(REAR BRACE)

NOTE:
1. BOLT HEAD AND WASHER ALWAYS TO BE INSTALLED ON SIDE OF CONNECTION WITH MEMBER HAVING THE THINNER GAUGE




507 DIAGONAL BRACE TO PILE CONNECTION

| REVISION BLOCK | | |
|---|---|---|
| MARK | DATE | DESCRIPTION |
| 0 | 02/01/2023 | Original Release |
| | | |
| | | |
| | | |
| | | |

OWNER/CLIENT:
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ENGINEERING CONSULTANT:

PROFESSIONAL SEAL

SEE STATE SPECIFIC STAMPED & SIGNED GFT CERTIFICATION LETTER

# UNIRAC'S GFT GROUND FIXED TILT STRUCTURAL RACKING DRAWINGS

UNIRAC®
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Albuquerque, New Mexico 87102
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SHEET TITLE
RACKING DETAILS

SHEET NUMBER
SR-500

SHEET
10 of 11