

# Northfield Community Solar Gardens

2300 NORTH AVE.  
NORTHFIELD, MN 55057  
Dakota County  
Civil Plans

## PROJECT OWNER/DEVELOPER

NORTHFIELD CSG1, LLC  
NORTHFIELD CSG2, LLC  
NORTHFIELD CSG3, LLC  
NORTHFIELD CSG4, LLC

## EPC CONTRACTOR

GEHRLICHER SOLAR AMERICA CORP.  
A COMPANY OF THE M+W GROUP  
21 FADEM ROAD  
SPRINGFIELD, NJ. 07081  
CONTACT: JAMES GAHAN  
PHONE: (510) 703-9180

## GENERAL CONTRACTOR

HUNT ELECTRICAL CORPORATION  
2300 TERRITORIAL ROAD  
ST. PAUL, MN 55114  
PHONE: (651) 646-2911

## PID NO.

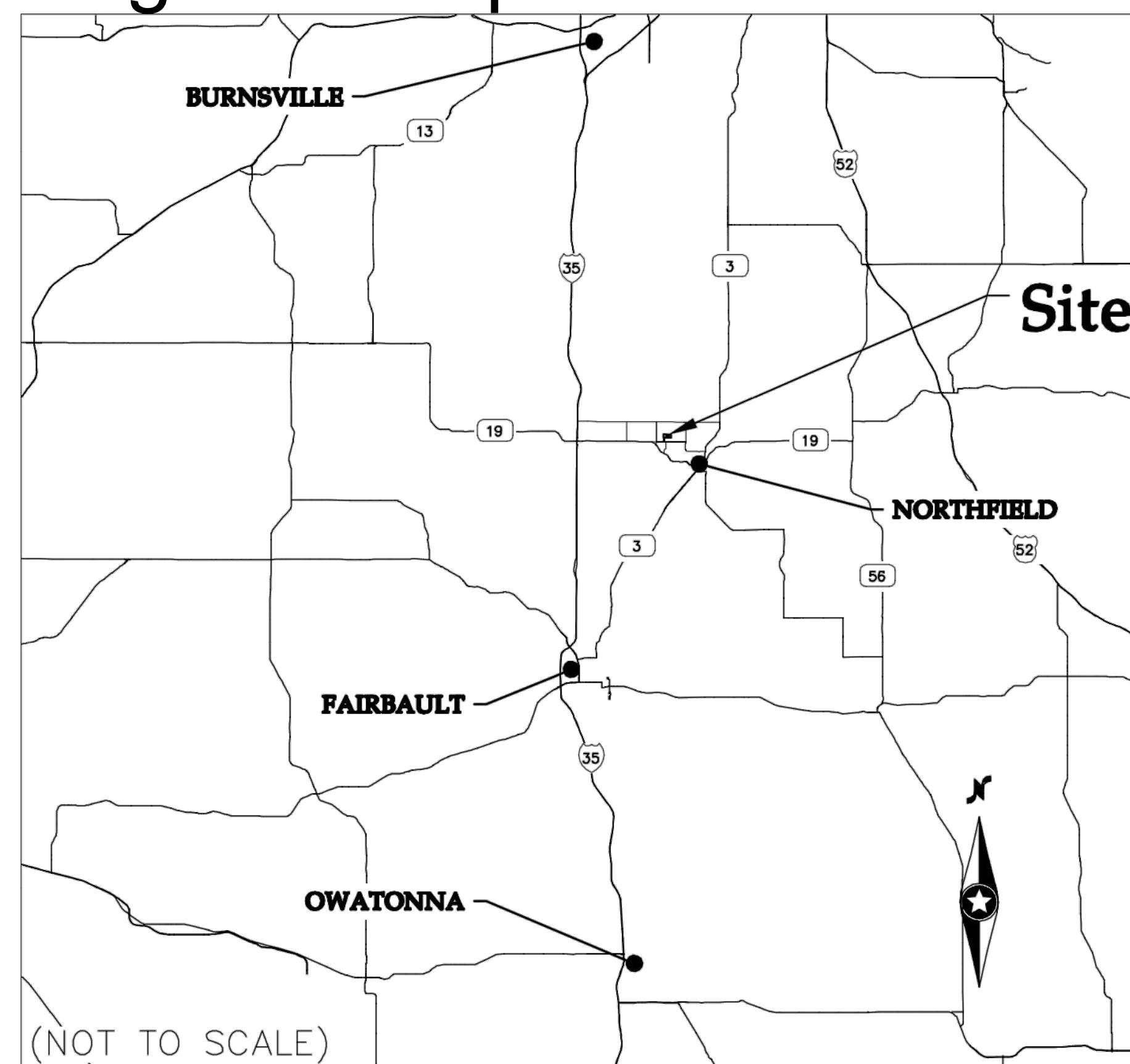
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PROJECT QUANTITIES	
ITEM	QUANTITY
SITE PREPARATION AREA	32 acres
ACCESS ROAD CENTERLINE LENGTH	4,313 LF
SECURITY FENCE LENGTH	5,650 LF
16' GATE	1 EA
SILT FENCE LENGTH	4,300 LF
CLASS II RIPRAP	CY
SEEDING AREA	30.5 AC
36" CULVERTS	1 EA
18" CULVERTS	3 EA
RIPRAP CLASS III	79 CY
ENGINEERED SOIL	567 CY
EROSION CONTROL BLANKET	4,064 SY
MNDOT CONDUIT AGGREGATE BEDDING	18 CY

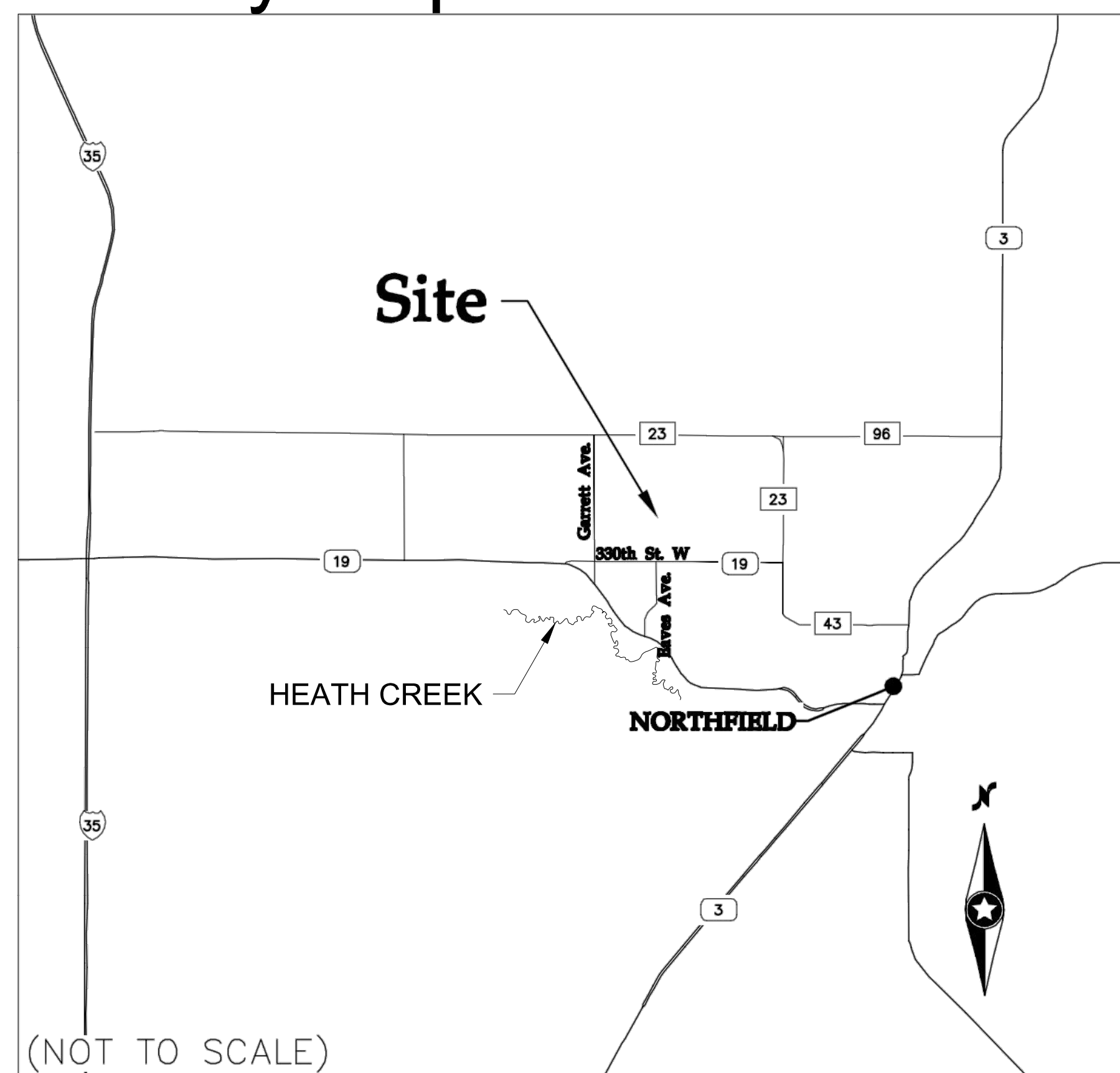
EARTHWORK		
ITEM	CUT	FILL
ACCESS ROADS	1319 CY	191 CY
DRY POND	1425 CY	3276 CY
STORM WATER SWALES	400 CY	0 CY
SITE GRADING	2441 CY	1167 CY
TOTAL	5585 CY	4634 CY

A FILL EXPANSION FACTOR OF 1.2 WAS APPLIED.

## Regional Map



## Vicinity Map



## SHEET LIST TABLE

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PE Seal:  
PROFESSIONAL ENGINEER  
I hereby certify that this plan, specification,  
or report was prepared by me or under my  
direct supervision and that I am a duly  
Licensed Professional Engineer under the laws  
of the state of Minnesota.  
Signature: *Karen Wiemen*  
Typed or Printed Name: Karen Wiemen  
Date: 07/07/2016 License Number: 21122

DRAWING ISSUE  
 Preliminary  Construction  
 Customer Approval  As-built  
 Permitting  Other

REVISIONS			
Rev	By	App	Description
0	JAK	***	ISSUE FOR CONSTRUCTION

Project Name:  
NORTHFIELD COMMUNITY  
SOLAR GARDENS  
Site Address:  
2300 NORTH AVE.  
NORTHFIELD, MN  
55057

Sheet Name:  
COVER SHEET,  
SHEET INDEX &  
MAPS

Scale: Project ID: 19774

Sheet No:  
**C-101**



LAND FEATURE CHANGES (ACRES)	
PRE-CONSTRUCTION TOTAL IMPERVIOUS SURFACE AREA	0.000 AC
POST-CONSTRUCTION TOTAL IMPERVIOUS SURFACE AREA	8.571 AC
TOTAL AREA EXPECTED TO BE DISTURBED BY CONSTRUCTION ACTIVITIES	32.000 AC

**PROJECT LOCATION: NORTH OF THE INTERSECTION OF EAVES AVENUE AND 330 STREET WEST NEAR THE CITY OF NORTHFIELD, DAKOTA COUNTY, MINNESOTA.**

**1. AGENCY CONTACTS:**

AGENCY	PERMIT	CONTACT NAME	PHONE NUMBER
MPCA	NPDES	LAUREN EZZNER	(218) 316-3889
MPCA	SWPPP	JEREMY SANOS	(218) 316-3888
MPCA	CONTAMINATION	STATE DUTY OFFICER	(800) 422-0798
MPCA	SECTION 401	MARK GERNES	(651) 757-2387
EROSION CONTROL SUPERVISOR (CONTINUED)	NPDES	TO BE DETERMINED	TBD

- IT WILL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO COMPLY WITH THE REQUIREMENTS OF THE NPDES PERMIT AT ALL TIMES UNTIL THE NOTICE OF TERMINATION HAS BEEN FILED WITH THE MPCA. THE CONTRACTOR WILL IMPLEMENT THE SWPPP DURING CONSTRUCTION AND MAINTAIN A QUALITY CONTROL PROGRAM. THE TIMING OF INSTALLATION OF BMP'S MAY BE ADJUSTED TO ACCOMMODATE SHORT-TERM ACTIVITIES. THE EROSION CONTROL SUPERVISOR AND THE DUTIES ARE DEFINED IN MnDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2016 EDITION, 2573 STORM WATER MANAGEMENT.
- IF SEDIMENT DEPOSITS IN WATERS OF THE STATE, THE MATERIAL MUST BE REMOVED AND STABILIZED WITHIN 7 DAYS. SEE NPDES PERMIT PART IV.E.4.C.
- ALL POTENTIAL STORM WATER CONTAMINANTS WILL BE PROPERLY CONTAINED.
- ALL EXPOSED SOIL AREAS MUST BE TEMPORARILY OR PERMANENTLY STABILIZED WITH TYPE 3 MULCH. NO MORE THAN 14 DAYS AFTER NO CONSTRUCTION ACTIVITY. TEMPORARY SEED MIX 22-111 WILL BE USED ONLY IN CASES WHERE DISTURBED SOIL AREAS ARE TO REMAIN UNWORKED IN EXCESS OF 14 DAYS PRIOR TO PLACEMENT OF TYPE 3 MULCH. THE NORMAL WETTED PERIMETER OR ANY TEMPORARY OR PERMANENT DRAINAGE DITCH THAT DRAINS WATER FROM THE CONSTRUCTION SITE, OR DIVERTS WATER AROUND A CONSTRUCTION SITE, MUST BE STABILIZED WITHIN 200 FEET FROM THE PROPERTY EDGE TO THE POINT OF DISCHARGE TO ANY SURFACE WATER. STABILIZATION MUST OCCUR WITHIN 24 HOURS OF CONNECTION TO A SURFACE WATER OR OTHER STORM WATER CONVEYANCE SYSTEM.
- THE MN DNR FWI SHOWS THAT THE NEAREST PUBLIC WATERS FEATURE IS HEATH CREEK, LOCATED APPROXIMATELY 0.5 MILES SOUTHWEST OF THE PROJECT AREA. IMPAIRMENT OF HEATH CREEK - ESCHERICHIA COLI TURBIDITY.
- THE PREDOMINANT SOIL TYPES WITHIN THIS PROJECT ARE NEBISH AND BELTRAMI.
- STOCKPILES SHALL BE PROVIDED WITH EFFECTIVE SEDIMENT CONTROLS AND SHALL NOT BE PLACED IN ANY TYPE OF SURFACE WATERS. STOCKPILES MUST HAVE SILT FENCE OR OTHER SEDIMENT CONTROLS.
- A TEMPORARY ROCK CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AS NECESSARY, TO REDUCE VEHICLE TRACKING OF SEDIMENTS ONTO PAVED SURFACES. IN LIEU OF COARSE AGGREGATE, THE CONTRACTOR MAY USE TYPE 5 MULCH (RAW WOOD SLASH). THE CONTRACTOR MAY SUBMIT AN ALTERNATE METHOD TO REDUCE VEHICLE TRACKING TO THE ENGINEER FOR APPROVAL.
- AS PER MN/DOT SPECIFICATION 2573, THE CONTRACTOR SHALL PREPARE AND SUBMIT A WRITTEN WEEKLY SCHEDULE OF PROPOSED EROSION CONTROL ACTIVITIES. THE WEEKLY EROSION CONTROL SCHEDULE WILL INCLUDE, IN ADDITION TO THE NPDES INSPECTION ISSUES, A DISCUSSION OF PROPOSED EROSION CONTROL INSTALLATIONS AND WHEN THEY WILL BE INSTALLED, AREAS READY FOR PERMANENT TURF ESTABLISHMENT AND WHEN IT WILL BE ACCOMPLISHED, GRADING OPERATIONS AND HOW EROSION CONTROL WILL BE INCORPORATED INTO THE WORK, REPAIR OR MAINTENANCE REQUIRED ON EROSION CONTROL INSTALLATIONS AND WHEN IT WILL BE ACCOMPLISHED, ANY NECESSARY CHANGES THAT NEED TO BE DISCUSSED, DOCUMENTED CHANGES TO THE PLAN AND PROPOSED EROSION CONTROL MEASURES DURING PERIODS OF SUSPENSION OF WORK.

- COORDINATION OF BMP'S WITH CONSTRUCTION ACTIVITIES:
  - THE SILT FENCE SHALL BE INSTALLED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND CAPTURE SEDIMENT ON SITE.
  - CLEARING AND GRADING WILL NOT OCCUR IN AN AREA UNTIL IT IS NECESSARY FOR CONSTRUCTION TO PROCEED.
  - THE TEMPORARY ROCK CONSTRUCTION ENTRANCES WILL BE CONSTRUCTED BEFORE CLEARING AND GRADING BEGINS.
  - ONCE CONSTRUCTION ACTIVITY CEASES IN AN AREA, THAT AREA WILL BE STABILIZED WITHIN THE TIME FRAMES LISTED IN THIS DOCUMENT.
  - THE SILT FENCE WILL REMAIN IN PLACE UNTIL ALL CONSTRUCTION ACTIVITIES AT THE SITE ARE COMPLETE AND SOILS HAVE BEEN STABILIZED TO 70% VEGETATIVE COVER.
- ALL NON-HAZARDOUS WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER OR OTHER APPROVED CONTAINMENT METHOD AT THE END OF EACH DAY. ANY ALTERNATIVE TO A METAL DUMPSTER WILL BE SUBMITTED IN WRITING FOR APPROVAL BY THE ENGINEER.
- ALL HAZARDOUS MATERIALS, INCLUDING OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCE MUST BE PROPERLY STORED, INCLUDING SECONDARY CONTAINMENT, TO PREVENT SPILLS, LEAKS OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM.
- ALL LIQUID AND SOLID WASTES GENERATED BY CONCRETE WASHOUT OPERATIONS ON SITE MUST BE CONTAINED IN A LEAK-PROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER.
- THE CONTRACTOR SHALL HAVE SPILL KITS INCLUDED WITH ALL FUELING SOURCES AND MAINTENANCE ACTIVITIES. SECONDARY CONTAINMENT MEASURES SHALL BE INSTALLED AND MAINTAINED BY THE OPERATOR.
- GOOD HOUSEKEEPING AND SPILL CONTROL PRACTICES WILL BE FOLLOWED DURING CONSTRUCTION TO MINIMIZE STORM WATER CONTAMINATION FROM PETROLEUM PRODUCTS, FERTILIZERS, PAINTS AND CONCRETE. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY UPON DISCOVERY. SPILLS LARGE ENOUGH TO REACH THE STORM CONVEYANCE SYSTEM WILL BE REPORTED TO THE MPCA STATE DUTY OFFICER AT 800-422-0798.
- ALL AREAS WILL BE KEPT IN A ROUGH GRADE CONDITION THAT WILL ALLOW SHEET FLOW OF STORM WATER WHEREVER PRACTICAL AND ALWAYS READY FOR SURFACE APPLICATION OF DEGRADABLE OR NON-DEGRADABLE BLANKETS, MULCH OR OTHER PROTECTIVE COVERS.
- DUMP TRUCKS HAULING MATERIAL FROM THE CONSTRUCTION SITE WILL BE COVERED WITH A TARPULIN.
- ALL RUTS CAUSED BY EQUIPMENT USED FOR ANY OPERATION WITHIN THE DRAINAGE CONVEYANCE SYSTEM WILL BE FILLED IN AND/OR STABILIZED.
- VISUAL INSPECTIONS OF ALL EXPOSED SOIL AREAS OF THE CONSTRUCTION SITE SHALL BE PERFORMED DAILY AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS. INSPECTIONS OF THE ENTIRE CONSTRUCTION SITE, EROSION PREVENTION AND SEDIMENT CONTROL BMP'S WILL BE DONE A MINIMUM OF ONCE PER WEEK, IN ACCORDANCE WITH THE NPDES PERMIT. THE CONTRACTOR SHALL KEEP A SUMMARY MAINTENANCE / CONSTRUCTION OBSERVATION REPORT TO BE UPDATED AFTER EACH SITE VISIT / OBSERVATION. THE CONTRACTOR SHALL SUBMIT A COPY OF THE WRITTEN INSPECTIONS MONTHLY TO THE OWNER.
- THE FOLLOWING INSPECTION AND MAINTENANCE PRACTICES WILL BE USED TO MAINTAIN EROSION AND SEDIMENT CONTROLS:
  - BUILT UP SEDIMENT WILL BE REMOVED FROM SILT CONTROL DEVICES WHEN IT HAS REACHED 1/3 THE HEIGHT OF THE SILT CONTROL DEVICE. REPAIRS MUST BE MADE WITHIN 24 HOURS OF DISCOVERY.
  - SILT CONTROL DEVICES WILL BE INSPECTED FOR DEPTH OF SEDIMENT, FOR TEARS OR OTHER DAMAGE THAT RENDERS THE DEVICE INEFFECTIVE. DEVICES SHALL BE REPAIRED OR REPLACED AS NEEDED.
  - TEMPORARY AND PERMANENT SEEDING WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS AND HEALTHY GROWTH.
  - THE STABILIZED CONSTRUCTION ENTRANCE WILL BE INSPECTED FOR SEDIMENT TRACKED ON THE ROAD AND IT WILL BE CLEANED AS NECESSARY. WITHIN 24 HOURS OF DISCOVERY, REPLACE STONE IF PLUGGED/COATED WITH SEDIMENT.
  - THE OUTLETS OF ALL CULVERTS WILL BE INSPECTED TO VERIFY THEY ARE INTACT AND FUNCTIONING AS DESIGNED.
  - THE MAINTENANCE INSPECTION REPORT SHALL BE MADE AFTER EACH INSPECTION.
  - IF CONSTRUCTION ACTIVITIES OR DESIGN MODIFICATIONS ARE MADE TO THE SITE PLAN, WHICH COULD IMPACT STORM WATER, THE PROJECT PLAN SWPPP WILL BE AMENDED APPROPRIATELY. THE AMENDED SWPPP SHALL HAVE A DESCRIPTION OF THE NEW ACTIVITIES THAT CONTRIBUTE TO THE INCREASED POLLUTANT LOADING AND THE PLANNED SOURCE CONTROL ACTIVITIES. THE AMENDED SWPPP WILL BE SUBJECT TO APPROVAL BY THE ENGINEER.
- THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT AN EMPLOYEE TRAINING PROGRAM TO EDUCATE THEIR EMPLOYEES AND SUB-CONTRACTOR EMPLOYEES ABOUT THE REQUIREMENTS OF THE SWPPP. THIS EDUCATION PROGRAM WILL INCLUDE BACKGROUND ON THE COMPONENTS AND GOALS OF THE SWPPP AND HANDS-ON TRAINING IN EROSION CONTROLS, SPILL PREVENTION AND RESPONSE, GOOD HOUSEKEEPING, PROPER MATERIAL HANDLING, DISPOSAL AND CONTROL OF WASTE, EQUIPMENT FUELING AND PROPER STORAGE, WASHING AND INSPECTION PROCEDURES. ALL EMPLOYEES WILL BE TRAINED PRIOR TO THEIR FIRST DAY ON THE SITE. ALL SUBCONTRACTORS PRESENT ON THE PROJECT SITE, EXCEPT THE TURF ESTABLISHMENT CONTRACTOR, WILL HAVE AT LEAST ONE MEMBER WHO CAN DOCUMENT CERTIFICATION IN CONSTRUCTION SITE MANAGEMENT. THE TURF ESTABLISHMENT CONTRACTOR WILL SUBMIT DOCUMENTATION THAT AT LEAST ONE MEMBER OF THEIR TEAM ON THE PROJECT IS CERTIFIED AS AN INSPECTOR/INSTALLER.
- ALL EROSION PREVENTION AND SEDIMENT CONTROL BMP'S MUST BE INSPECTED. ALL NONFUNCTIONAL BMP'S MUST BE REPAIRED, REPLACED, OR SUPPLEMENTED WITH FUNCTIONAL BMP'S WITHIN 24 HOURS OF DISCOVERY.

LOCATIONS AND TYPES OF TEMPORARY AND PERMANENT EROSION PREVENTION AND SEDIMENT CONTROL BMP'S SEE SHEET C-107  
 ESTIMATE QUANTITIES TABULATION SEE SHEET C-101  
 LOCATIONS OF AREAS NOT TO BE DISTURBED SEE SHEET C-105  
 SITE VICINITY MAP SHOWING SURFACE WATERS SEE SHEET C-101  
 METHODS TO BE USED FOR FINAL STABILIZATION OF ALL EXPOSED SOIL AREAS SEE SHEET C-108

**OWNER'S REPRESENTATIVE:**

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 TITLE: SENIOR VICE PRESIDENT AND CHIEF FINANCIAL OFFICER  
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**PROFESSIONAL ENGINEER**  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

**DRAWING ISSUE**

- Preliminary  Construction  
 Customer Approval  As-built  
 Permitting  Other

**REVISIONS**

Rev	By	App	Description	Date
0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

**Project Name:**  
 NORTHFIELD COMMUNITY  
 SOLAR GARDENS

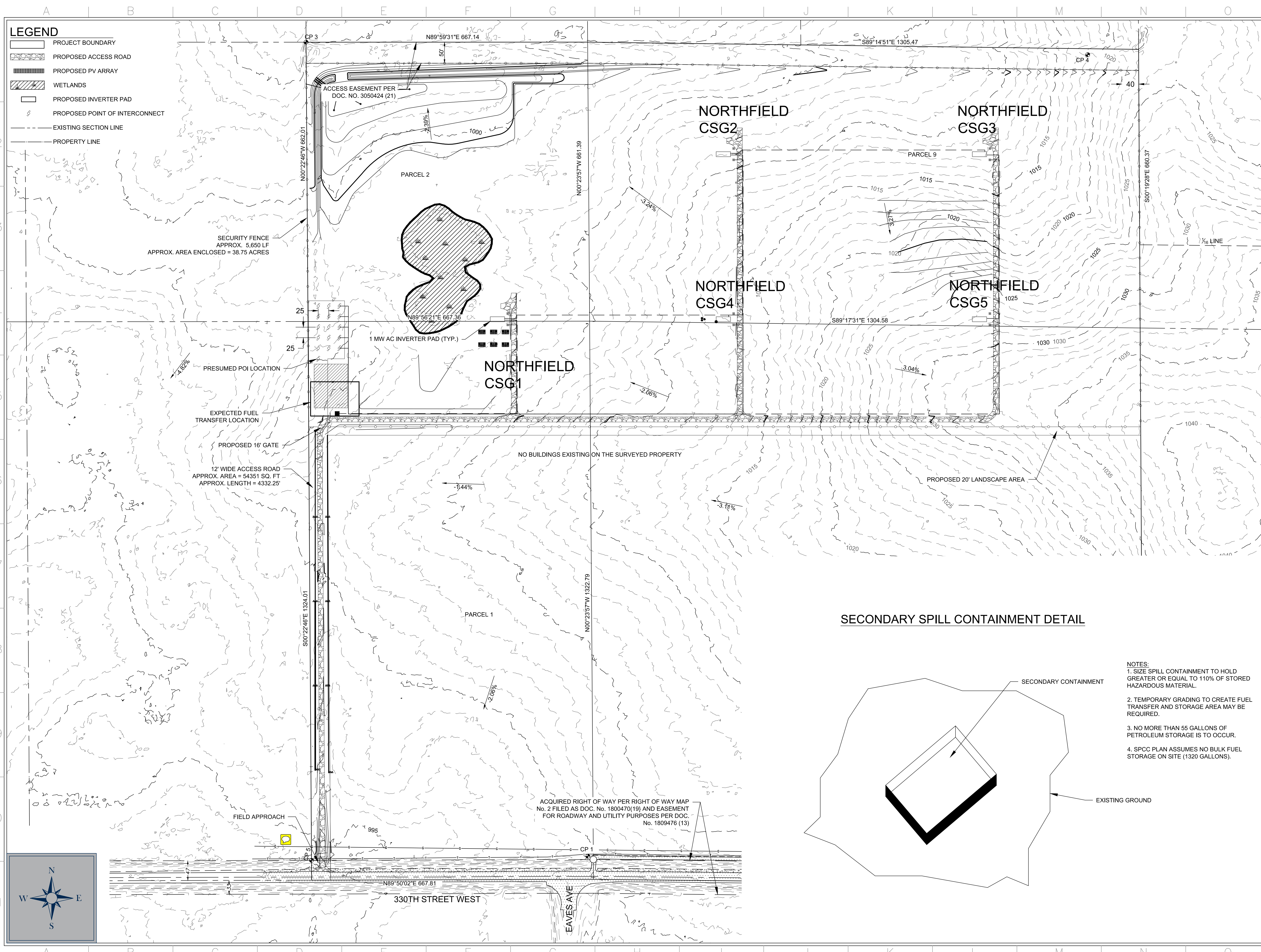
**Site Address:**  
 2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057

**Sheet Name:**  
 STORM WATER  
 POLLUTION  
 PREVENTION PLAN

**Scale:** **Project ID:** 19774

**Sheet No:**  
 C-102





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 Typed or Printed Name: Karen Wiemen  
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**REVISIONS**

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0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

Project Name:  
 NORTHFIELD COMMUNITY  
 SOLAR GARDENS

Site Address:  
 2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057

Sheet Name:  
 SPILL PREVENTION,  
 CONTROL AND  
 COUNTER MEASURE

Scale: 1"=100' | Project ID: 19774  
 Sheet No:  
**C-103**

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**SPECIFICATIONS TO BE USED**

- THIS SHEET IS AN ABRIDGEMENT OF THE SPECIFICATION, AND IN CASE OF CONFLICT, THE SPECIFICATIONS SHALL GOVERN.
- ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT MNDOT SPECIFICATIONS.
- THE PROJECT SHALL CONFORM TO THE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AS NOTED FOR THE SECTIONS BELOW:  
**SPECS:**  
 2101 CLEARING AND GRUBBING  
 2105 EXCAVATION AND EMBANKMENT  
 2111 TEST ROLLING  
 2112 SUBGRADE PREPARATION  
 2118 AGGREGATE SURFACING  
 2211 AGGREGATE BASE  
 2501 PIPE CULVERTS  
 2511 RIPRAP  
 2557 FENCING  
 2571 PLANT INSTALLATION AND ESTABLISHMENT  
 2573 STORM WATER MANAGEMENT  
 2574 SOIL PREPARATION  
 2575 ESTABLISHING TURF AND CONTROLLING EROSION  
 3226 CORRUGATED STEEL PIPE  
 3376 FENCE WIRE  
 3379 FENCE GATES  
 3403 HOT-ROLLED STEEL FENCE POSTS  
 3406 STRUCTURAL METAL FENCE POSTS  
 3413 WOOD FENCE POSTS (TREATED)

**QUANTITIES**  
 ALL QUANTITIES SHOWN ON THESE PLANS ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL QUANTITIES NECESSARY FOR THE WORK.

**UTILITIES**  
 THE INFORMATION ON THESE PLANS CONCERNING THE TYPE, SIZE AND LOCATION OF UTILITIES HAS BEEN SHOWN BASED UPON THE BEST INFORMATION AVAILABLE. THE UTILITY LOCATIONS SHOWN WERE BASED ON SURFACE FEATURES LOCATED BY THE SURVEYORS AND OWNER'S RECORDS. THE EXACT SIZE AND LOCATION OF UNDERGROUND UTILITIES WAS NOT VERIFIED. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES IN PLACE. CONTRACTOR IS REQUIRED TO CONTACT GOPHER STATE ONE CALL FOR LOCATES.

**GENERAL SURVEY NOTES**  
 THE TOPOGRAPHIC SURVEY SHOWN HEREIN WAS COMPLETED IN APRIL 2016. CHANGES IN UTILITIES AND OTHER SITE FEATURES SINCE THE SURVEY WAS COMPLETED MAY HAVE OCCURRED.

**DEMOLITION**  
 IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD INSPECT AND VERIFY THE PROJECT LIMITS PRIOR TO BIDDING TO DETERMINE SIZE, NUMBER AND LIMITS OF VISIBLE OBSTRUCTIONS WHICH ARE TO BE REMOVED, RELOCATED OR SALVAGED INCLUDING TREES, UTILITIES, ETC.

**TRAFFIC CONTROL**  
 CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL TRAFFIC CONTROL MEASURES, TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE CURRENT VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

**CONSTRUCTION LIMITS**  
 IN GENERAL, THE CONSTRUCTION LIMITS FOR THIS PROJECT ARE SHOWN ON THE PLANS AND SHALL BE DEFINED AS FOLLOWS:  
 1. CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO THE PROJECT LIMITS SHOWN ON THE PLANS UNLESS PRIOR APPROVAL IS RECEIVED FROM THE OWNER. USE OF PROPERTY OTHER THAN THOSE DESIGNATED FOR STAGING AREAS, MATERIAL STORAGE, AND/OR TOPSOIL STOCKPILING WILL NOT BE ALLOWED. ANY DAMAGES AND RESTORATION OUTSIDE OF THE CONSTRUCTION LIMITS SHALL BE AT THE CONTRACTOR'S EXPENSE.  
 2. THE CONTRACTOR SHALL TAKE CARE TO PROTECT EXISTING IMPROVEMENTS. ALL EXISTING IMPROVEMENTS DISTURBED, WHETHER NOTED ON THESE PLANS OR NOT, SHALL BE REPLACED IN KIND. ANY COSTS FOR SUCH REPLACEMENT SHALL BE CONSIDERED INCIDENTAL TO THIS PROJECT.

**DIFFERING SITE CONDITIONS**  
 SHOULD THE CONTRACTOR IDENTIFY SITE OR MATERIAL CONDITIONS WHICH WARRANT A MODIFICATION, A REQUEST FOR A CHANGE IN THE DESIGN MAY BE SUBMITTED.  
 IF CONTAMINATED SOILS OR ANY UNUSUAL BURIED DEBRIS ARE ENCOUNTERED DURING EXCAVATION, CONTRACTOR SHALL CEASE WORK AND CONTACT THE ENGINEER.

**CONSTRUCTION SURVEY STAKING**  
 THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKING AND SHOULD PROTECT ALL CONSTRUCTION STAKES. THE CONTRACTOR SHALL PROVIDE A MINNESOTA REGISTERED LAND SURVEYOR TO OVERSEE THE STAKING OF THE PROPOSED IMPROVEMENTS.

**GRADING OPERATIONS**  
 THE CONTRACTOR SHALL BE RESPONSIBLE TO DISPOSE OF ALL ROCKS, RUBBLE, AND EXCESS SOIL. SEED IN COMPLIANCE WITH EROSION CONTROL PLAN REQUIREMENTS. ALL TRANSPORTATION LOADING AND UNLOADING AND TEMPORARY DRAINAGE DURING CONSTRUCTION IS THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL BE AWARE OF EXISTING DRAINAGE CONDITIONS AND FACILITIES, AND SHALL PROVIDE FOR DRAINAGE AND EROSION CONTROL DURING ALL PHASES OF CONSTRUCTION. DAMAGE CAUSED BY IMPROPER TEMPORARY DRAINAGE FACILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

**SALVAGE AND PLACE TOPSOIL**  
 TOPSOIL WITHIN THE CONSTRUCTION LIMITS SHALL BE STRIPPED AND STOCKPILED ON THE PROJECT SITE. ALL TRANSPORTATION, LOADING AND UNLOADING AND TEMPORARY DRAINAGE DURING CONSTRUCTION IS THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL NOT REMOVE ANY EXISTING TOPSOIL FROM THE SITE.  
 FOLLOWING COMPLETION OF GRADING OPERATIONS, THE SALVAGED TOPSOIL SHALL BE SPREAD EVENLY AT FOUR (4) INCHES MINIMUM FINISHED DEPTH OVER THE DISTURBED AREAS WITHIN THE WORK LIMITS AND PREPARED FOR SEED IN ACCORDANCE WITH THE SPECIFICATIONS. RESTORATION OF DISTURBED AREAS CREATED DURING CONSTRUCTION OUTSIDE OF THE CONSTRUCTION LIMITS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR IS REQUIRED TO IMPORT ANY ADDITIONAL TOPSOIL REQUIRED TO PROVIDE THE MINIMUM 4" DEPTH.

**SEEDING**  
 STORM WATER PONDING AREAS AND DRY PONDING AREAS SHALL BE RESTORED WITH MNDOT MIX #33-261 MODIFIED TO NOT INCLUDE ANY GRASSES, SEDGES, RUSHES, AND FORBS 4 FEET OR OVER. WETLAND AREAS DISTURBED SHALL BE RESTORED WITH MNDOT SEED MIX #34-271 MODIFIED TO NOT INCLUDE GRASSES, SEDGES & RUSHES, AND FORBS OVER 4' IN HEIGHT.  
 SEED MIXTURES SHALL CONFORM TO MNDOT SPECIFICATION 2575.2.

**EXISTING UTILITY CROSSINGS**  
 AT ALL LOCATIONS WHERE THE PROPOSED UTILITY IMPROVEMENT CROSSES OR IS ADJACENT TO EXISTING UTILITIES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING THE EXISTING UTILITY TO ENSURE THAT THEY ARE NOT DISTURBED DURING THE WORK. TEMPORARY STRUCTURAL SUPPORT FOR THE UTILITIES MAY BE REQUIRED. ANY REPAIR WORK NECESSARY TO A CROSSED UTILITY RESULTING FROM THE CONTRACTOR'S ACTIVITY SHALL BE AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL MAINTAIN EXISTING UTILITIES AND PROTECT THEM AGAINST DAMAGE DURING DEMOLITION OPERATIONS. ANY DISRUPTION IN SERVICE SHALL BE COORDINATED WITH THE ENGINEER. THE CONTRACTOR SHALL PROVIDE A METHOD OF TEMPORARY SERVICE DURING PERIODS OF DISRUPTION.  
 THE CONTRACTOR MAY USE CONTROLLED LOW STRENGTH BACKFILL MATERIAL AT THE ENGINEER'S DISCRETION.

**SITE CLEAN-UP**  
 ALL PAVED ROADS ADJACENT TO THE PROJECT SHALL BE CLEANED OF CONSTRUCTION DEBRIS AT THE END OF EACH DAY OR MORE FREQUENTLY IF NEEDED. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR SWEEPING AND BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA.

**TRAFFIC CONTROL GENERAL NOTES**  
 CONSTRUCTION SIGNING AND TRAFFIC CONTROL SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AND AS DIRECTED BY THE CONTRACTING OFFICER.

ALL TEMPORARY FIXED LOCATION SIGNS AND APPLICABLE TRAFFIC CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF WORK IN THE APPLICABLE PHASE.

ALL EQUIPMENT AND VEHICLES SHALL DISPLAY A FLASHING AMBER LIGHT VISIBLE FROM ALL DIRECTIONS FOR A MINIMUM DISTANCE OF 1/4 MILE.

DURING NON-WORKING HOURS, NON-APPLICABLE TRAFFIC CONTROL SIGNS AND DEVICES SHALL BE REMOVED FROM VIEW AND LAID FLAT OR TURNED AWAY FROM TRAFFIC AND STORED A MINIMUM DISTANCE OF TEN (10) FEET FROM THE TRAVELED WAY.

CONSTRUCTION SIGNS THAT ARE TO BE INSTALLED SHALL NOT BLOCK THE VIEW OF EXISTING APPLICABLE TRAFFIC SIGNS. NON-APPLICABLE SIGNING WILL BE COVERED OR REMOVED DURING PERIODS OF INACTIVITY.

**INFILTRATION BASIN EXECUTION**

- INSTALL INFILTRATION AFTER THE SITE HAS BEEN COMPLETELY STABILIZED AFTER VEGETATION ESTABLISHED AND PAVEMENT IS INSTALLED.
- PROTECT INFILTRATION AREA FROM CONSTRUCTION EQUIPMENT DURING CONSTRUCTION TO PREVENT COMPACTION.
- EXCAVATE TO THE BOTTOM OF THE INFILTRATION BASIN TO THE ELEVATIONS SHOWN ON THE PLANS. MIX SAND INTO THE EXISTING SOIL TO A MINIMUM DEPTH OF 3 INCHES. DO NOT COMPACT THE SUBGRADE MATERIAL.
- PLACE SAND IN 3 INCH LIFTS.
- PLACE DRAINTILE AS INDICATED.
- PLACE GEOTEXTILE FILTER FABRIC AROUND THE PEA GRAVEL THAT SURROUNDS THE DRAINTILE PIPE.
- PLACE ENGINEERED SOIL EVENLY IN LIFTS OF 6-12 INCHES. ALLOW TIME FOR THE ENGINEERED SOIL TO SETTLE OR OVERFILL TO ALLOW FOR SETTLING.
- THE ENGINEERED SOIL MAY BE ROLLED WITH A HAND ROLLER WEIGHING NO MORE THAN 100 POUNDS PER FOOT OF WIDTH.
- ALL DEPRESSED AREAS AS A RESULT OF ROLLING OR SETTLING SHALL BE FILLED TO THE GRADES SPECIFIED ON THE PLANS.
- CONTRACTOR SHALL NOT ALLOW TRACKING BY HEAVY EQUIPMENT IN BOTTOM OF INFILTRATION BASIN. IF EQUIPMENT IS REQUIRED WITHIN THE BOTTOM OF THE INFILTRATION FACILITY FOR MATERIAL PLACEMENT, IT SHALL HAVE A MAXIMUM OPERATING GROUND PRESSURE OF 5.0 PSI. EXAMPLES OF EQUIPMENT WITH A 5.0 PSI GROUND PRESSURE INCLUDE A CATERPILLAR D6N WITH A 34 INCH TRACK OR A CATERPILLAR D5N WITH 30 INCH TRACKS.
- PROTECT INFILTRATION BASIN FROM CONSTRUCTION SITE OR OFF-SITE RUNOFF DURING CONSTRUCTION, ESPECIALLY DURING SAND AND ENGINEERED SOIL PLACEMENT. INSTALL SILT FENCE AROUND THE BOUNDARY OF THE ENGINEERED SOIL AFTER IT IS INSTALLED FOR PROTECTION.
- DO NOT COMPACT ENGINEERED SOIL OR SAND IN INFILTRATION BASIN.
- IF ENGINEERED SOIL OR SAND BECOMES CONTAMINATED WITH SEDIMENT FROM OFF-SITE RUNOFF, CONTRACTOR SHALL REMOVE SEDIMENT OR REPLACE MATERIALS AS NEEDED TO RESTORE INFILTRATING CAPABILITY OF THE SOIL.
- IF MATERIAL BECOMES COMPACTED DURING PLACEMENT, SCARIFY THE AFFECTED AREA AND CONTINUE TO FILL.
- IF MATERIAL BECOMES COMPACTED AND CANNOT BE CORRECTED, IT SHALL BE REMOVED AND RE-PLACED.

**EXECUTION**

- SITE PREPARATION**
  - THE CONTRACTOR WILL CLEAR AND GRUB ALL AREAS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER OR OWNERS REPRESENTATIVE. SEE MNDOT SPEC 2101.
  - AREAS NOT REQUIRING CLEARING AND GRUBBING ARE TO HAVE ALL VEGETATION MOWED TO A MAXIMUM HEIGHT OF 3-INCHES
  - THE CONTRACTOR IS RESPONSIBLE FOR PRESERVING EXISTING VEGETATION THAT IS NOT DIRECTLY INSIDE THE PROJECT LIMITS. EXTREME CARE IS TO BE GIVEN NEAR VEGETATION TO BE SAVED. PROJECT AREAS THAT ARE TO BE PROTECTED CAN BE SEPARATED WITH THE USE OF A CONSTRUCTION FENCE.
  - BURNING OF VEGETATION AND DEBRIS IS NOT ALLOWED UNLESS THE PROPER PERMITS ARE OBTAINED FROM THE LOCAL GOVERNING AUTHORITIES AND THE LAND OWNERS APPROVAL.
- FILL MATERIALS AND PLACEMENT**
  - EXCAVATED ON-SITE MATERIAL IS TO BE USED AS FILL FOR SITE GRADING.
  - FILL MATERIAL IS TO BE PLACED IN LOOSE LIFT AT A MAXIMUM DEPTH OF 6-INCHES.

**INTERNAL/ACCESS ROAD CONSTRUCTION AND SITE GRADING**

- TOPSOIL MANAGEMENT**
  - CONTRACTOR IS TO STRIP TOPSOIL FROM PROPOSED ROADWAY AREAS TO THE FULL DEPTH PRESENT.
  - STRIPPED TOPSOIL IS TO BE STOCKPILED IN A LOCATION SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER OR THE LAND OWNER. ALL STOCKPILES ARE TO BE PROTECTED USING PROPER EROSION CONTROL MEASURES AS DESCRIBED IN THE PROJECT SWPPP. STOCKPILED TOPSOIL IS TO BE REDISTRIBUTED TO LANDSCAPED AREAS AND NEWLY GRADED SLOPES AS NEEDED. SHOULD ANY STOCKPILED TOPSOIL NEED TO BE WASTED IT SHOULD BE PLACED IN AREAS AWAY FROM PROPOSED ROADWAYS AND CONCRETE PADS.
- SITE GRADING**
  - AFTER THE PROJECT AREA HAS BEEN CLEARED AND GRUBBED AND TOPSOIL HAS BEEN STOCKPILED, THE CONTRACTOR IS TO GRADE THE SITE TO THE PROPOSED ELEVATIONS AND CONTOURS SHOWN IN THE PLANS. ALL ELEVATIONS AND CONTOURS SHOWN ARE TO FINISHED GRADE UNLESS NOTED OTHERWISE.
  - THE SUBGRADE OF THE PROPOSED ACCESS ROAD/S IS TO BE COMPACTED TO MEET MNDOT SPEC 2105.
  - ALL CUT MATERIAL THAT IS UNSUITABLE FOR STRUCTURAL BACKFILL IS TO BE USED AS FILL IN AREAS WHERE SITE GRADING IS SHOWN ON THE PLANS.
  - ANY CUT MATERIAL THAT IS CLEAN AND ORGANIC FREE MAY BE USED AS SUBGRADE MATERIAL FOR ROADWAY AREAS.
- SUBGRADE PREPARATION**
  - ONCE GRADING OF ROADWAY SUBGRADE IS COMPLETE, THE CONTRACTOR IS TO SCARIFY THE SOIL TO A MINIMUM DEPTH OF 2-INCHES. THE SOIL IS THEN TO BE COMPACTED TO MEET MNDOT SPEC 2105.
  - AFTER COMPACTION THE SUBGRADE IS TO BE PROOF ROLLED AND INSPECTED BY AN ENGINEER TO DETERMINE IF ANY SOFT AREAS EXIST. IF DETECTED, PROBLEM AREAS ARE ALLOWED TO BE RE-SCARIFIED COMPACTED, AND TESTED ONCE AGAIN. SHOULD SOFT SOILS STILL EXIST, THE PROBLEM AREA SOILS ARE TO BE REMOVED AND REPLACED WITH CLEAN, ORGANIC FREE FILL MATERIAL TAKEN FORM ON-SITE. CONFORM TO MNDOT SPECS 2111 AND 2112.
  - COMPACTION OF THE ROADWAY SUBGRADE IS TO EXTEND A MINIMUM OF 2-FEET HORIZONTALLY FROM THE EDGE OF THE ROADWAY. COMPACTION OF THE NATIVE SOILS IS TO EXTEND A MINIMUM OF 10-FEET FROM THE EDGE OF THE GRAVEL ACCESS ROADWAY.
  - THE MOISTURE CONTENT AND COMPACTION OF THE PREPARED SUBGRADE IS TO BE MAINTAINED UNTIL THE ROADWAY BASE MATERIAL CAN BE PLACED.
  - ANY CUT MATERIAL THAT IS CLEAN AND ORGANIC FREE MAY BE USED AS SUBGRADE MATERIAL FOR ROADWAY AREAS.
- AGGREGATE PLACEMENT**
  - AFTER THE SUBGRADE HAS BEEN PREPARED, THE CONTRACTOR IS TO PLACE AND COMPACT THE BASE AGGREGATE. PLACE AND COMPACT THE BASE AGGREGATE TO MEET MNDOT SPECS 2118 AND 2211.
- TOPSOIL REDISTRIBUTION AND EROSION CONTROL**
  - AFTER BASE AGGREGATE PLACEMENT AND SITE GRADING IS COMPLETE, STOCKPILED TOPSOIL IS TO BE REDISTRIBUTED OVER THE NEWLY GRADED AREAS.
  - REDISTRIBUTED TOPSOIL CAN BE USED TO BRING SITE GRADING UP TO FINISHED GRADE ELEVATIONS SHOWN IN THE PLANS.
  - ONCE TOPSOIL HAS BEEN PLACED, EROSION PREVENTION AND SEDIMENT CONTROL ITEMS ARE TO BE IMPLEMENTED. SEE THE PROJECT SWPPP FOR DETAILS.

**LAYDOWN/STORAGE YARD**

- PREPARATION**
  - THE CONTRACTOR IS TO COMPACT THE NATIVE MATERIAL IN THE AREA OF THE LAYDOWN/STORAGE YARD. COMPACTION MUST MEET STANDARDS SET IN THE MNDOT SPEC 2105 FOR NON STRUCTURAL AREAS.
  - WHEN CONSTRUCTION ACTIVITIES REACH A POINT WHERE THE LAYDOWN/STORAGE YARD IS NO LONGER NEEDED, THE AREA IS TO BE DECOMPACTED AND STABILIZED USING EROSION PREVENTION AND SEDIMENT CONTROL ITEMS. SEE THE PROJECT SWPPP FOR DETAILS.

**FINAL GRADING**

- INTENT**
  - WHERE EXCAVATION DEPTHS ARE LESS THAN THE THICKNESS OF THE SURROUNDING TOPSOIL, THE SURFACE IS ALLOWED TO BE GRADED TO FINAL ELEVATION WITHOUT THE STRIPING AND REDISTRIBUTING OF TOPSOIL.
- SMOOTHING**
  - THE CONTRACTOR MAY USE EXCAVATING EQUIPMENT TO ADJUST GRADE VARIATIONS THAT EXIST ON THE EXISTING SURFACE.
  - ALL SURFACE SMOOTHING IS TO REMAIN INSIDE THE PROJECT LIMITS AND BE IN ACCORDANCE WITH THE GRADES INDICATED IN THE PLANS.
- EROSION PREVENTION AND SEDIMENT CONTROL ITEMS ARE TO BE IMPLEMENTED IN ALL AREAS SUBJECT TO SURFACE SMOOTHING. SEE THE PROJECT SWPPP FOR DETAILS.**

**CONCRETE (INVERTER) PAD CONSTRUCTION**

- TOPSOIL MANAGEMENT**
  - CONTRACTOR IS TO STRIP TOPSOIL FROM PROPOSED CONCRETE PAD AREAS TO THE DEPTH OF THE ROOT SYSTEM OF SURROUNDING VEGETATION.
- STRIPPED TOPSOIL IS TO BE STOCKPILED IN A LOCATION SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER OR THE LAND OWNER. ALL STOCKPILES ARE TO BE PROTECTED USING PROPER EROSION CONTROL MEASURES AS DESCRIBED IN THE PROJECT SWPPP. STOCKPILED TOPSOIL IS TO BE REDISTRIBUTED TO LANDSCAPED AREAS AND NEWLY GRADED SLOPES AS NEEDED. SHOULD ANY STOCKPILED TOPSOIL NEED TO BE WASTED IT SHOULD BE PLACED IN AREAS AWAY FROM PROPOSED ROADWAYS AND CONCRETE PADS.**
- CONCRETE PAD GRADING**
  - AFTER THE CONCRETE PAD AREA HAS BEEN CLEARED AND GRUBBED AND TOPSOIL HAS BEEN STOCKPILED, THE CONTRACTOR IS TO GRADE THE PAD AREA TO THE PROPOSED ELEVATIONS AND CONTOURS SHOWN IN THE PLANS. ALL ELEVATIONS AND CONTOURS SHOWN ARE TO FINISHED GRADE UNLESS NOTED OTHERWISE. SLOPES SURROUNDING THE CONCRETE PAD ARE TO BE NO STEEPER THAN A 3:1 SLOPE.
  - CLEAN AND ORGANIC FREE ONSITE MATERIAL IS ALLOWED TO BE USED IN ORDER TO BUILD UP THE CONCRETE PAD SUBGRADE. THIS FILL IS TO BE PLACED IN MAXIMUM LOOSE LIFT THICKNESS' OF 6-INCHES.
  - COMPACTION OF THE CONCRETE PAD SITES AND SURROUNDING SLOPES SHALL MEET CRITERIA STATED IN MNDOT SPEC 2105.
- SUBGRADE PREPARATION**
  - ONCE GRADING OF THE CONCRETE PAD IS COMPLETE, THE CONTRACTOR IS TO SCARIFY THE SOIL OF THE CONCRETE PAD SUBGRADE TO A MINIMUM DEPTH OF 2-INCHES. THE SOIL IS THEN TO BE COMPACTED TO MEET MNDOT SPEC 2105.
  - AFTER COMPACTION THE SUBGRADE IS TO BE PROOF ROLLED AND INSPECTED BY AN ENGINEER TO DETERMINE IF ANY SOFT AREAS EXIST. IF DETECTED, PROBLEM AREAS ARE ALLOWED TO BE RE-SCARIFIED COMPACTED, AND TESTED ONCE AGAIN. SHOULD SOFT SOILS STILL EXIST, THE PROBLEM AREA SOILS ARE TO BE REMOVED AND REPLACED WITH CLEAN, ORGANIC FREE FILL MATERIAL TAKEN FORM ON-SITE. CONFORM TO MNDOT SPECS 2111 AND 2112.
  - THE MOISTURE CONTENT AND COMPACTION OF THE PREPARED SUBGRADE IS TO BE MAINTAINED UNTIL THE CONCRETE PAD CAN BE PLACED.
  - ANY CUT MATERIAL THAT IS CLEAN AND ORGANIC FREE MAY BE USED AS SUBGRADE MATERIAL FOR CONCRETE PAD AREAS.
- TOPSOIL REDISTRIBUTION AND EROSION CONTROL**
  - AFTER THE CONCRETE PAD IS PLACED AND SITE GRADING IS COMPLETE, STOCKPILED TOPSOIL IS TO BE REDISTRIBUTED OVER THE NEWLY GRADED AREAS.
  - REDISTRIBUTED TOPSOIL CAN BE USED TO BRING SITE GRADING UP TO FINISHED GRADE ELEVATIONS SHOWN IN THE PLANS.
  - ONCE TOPSOIL HAS BEEN PLACED, EROSION PREVENTION AND SEDIMENT CONTROL ITEMS ARE TO BE IMPLEMENTED. SEE THE PROJECT SWPPP FOR DETAILS.

**INFILTRATION BASIN MATERIALS**

- PEA GRAVEL: SHALL BE MNDOT CONDUIT AGGREGATE BEDDING, AASHTO #57 OR WASHED PEA GRAVEL 1" OR LESS IN SIZE WITH NO PARTICLES SMALLER THAN THE NO. 4 SIEVE
- GEOTEXTILE: SHALL CONFORM TO MNDOT SPEC SECTION 3733.2, TYPE 5
- EROSION CONTROL BLANKET: SHALL CONFORM TO MNDOT SPEC SECTION 3885, CATEGORY 3 OR 4
- PERFORATED DRAIN TILE: SHALL BE AASHTO M252 AND M294, TYPE S AND ASTM F2648. PERFORATIONS SHALL BE CLASS II AND CONFORM TO AASHTO M252 WITH 3 PERFORATIONS EVENLY SPACE AND THE TWO PERFORATIONS ON THE BOTTOM HALF AND THIRD FACING UP. CLEANOUT WYES, PLUGS, COUPLINGS, BENDS AND OTHER FITTINGS SHALL BE MANUFACTURED CONFORMING TO THE 14 REQUIREMENTS OF ASTM F2648
- SEED MIX: SHALL BE MNDOT 33-261
- SAND: SHALL BE CLEAN GRANULAR MATERIAL MEETING THE REQUIREMENT IN SECTION 501.2.5.3.4 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, ASTM C33 OR USDA COARSE SAND (0.02 - 0.04 INCHES). THE SAND SHALL BE 97% S102 AND SHALL BE WASHED TO REMOVE CLAY AND SILT PARTICLES. USE OF CALCIUM CARBONATED SAND, SOLOMITIC SAND, MANUFACTURED SAND AND STONE DUST IS NOT PERMISSIBLE.
- COMPOST: CERTIFIED COMPOST AND MEET THE STANDARDS OF THE UNITED COMPOSTING COUNCIL FOR CERTIFIED COMPOST AND THE COMPOST SPECIFICATIONS OF S100 LISTED BELOW:
  - PARTICLE SIZE - 98% OF THE COMPOST SHALL PASS THROUGH A 0.75-INCH SCREEN.
  - PHYSICAL CONTAMINANTS - LESS THAN 1% COMBINED GLASS, METAL AND PLASTIC.
  - ORGANIC MATTER/WASH CONTENT - AT LEAST 40% ORGANIC MATTER; LESS THAN 60% ASH CONTENT.
  - CARBON TO NITROGEN RATIO - 10-20:1 C:N RATIO.
  - PH - BETWEEN 6 AND 8.
  - SOLUBLE SALTS - ELECTRICAL CONDUCTIVITY BELOW 10 DS M-1 (MMHOS CM -1)
  - MOISTURE CONTENT - BETWEEN 35% AND 50% BY WEIGHT.
  - MATURITY - THE COMPOST SHALL BE RESISTANT TO FURTHER DECOMPOSITION AND FREE OF COMPOUNDS, SUCH
    - AS AMMONIA AND ORGANIC ACIDS, IN CONCENTRATIONS TOXIC TO PLANT GROWTH.
    - RESIDUAL SEEDS & PATHOGENS - PATHOGENS AND NOXIOUS SEEDS SHALL BE MINIMIZED.
    - CHEMICAL CONTAMINANTS - THE COMPOST SHALL NOT CONTAIN CHEMICAL CONTAMINANTS OR PATHOGENS
  - ENGINEERED SOIL: ENGINEERED SOIL MIXES SHALL BE MIXED BY VOLUME WITH THE FOLLOWING COMPOSITION: 70-85% SAND, 15-30% COMPOST. GYPSUM MAY BE ADDED TO THE ENGINEERED SOIL MIX AT THE PLANT TO MITIGATE FOR SALT CONCENTRATION IN THE RUNOFF FOR WINTER SNOW MELT.



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PE Seal:  
**PROFESSIONAL ENGINEER**  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen L. Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

**DRAWING ISSUE**

Preliminary  Construction  
 Customer Approval  As-built  
 Permitting  Other

REVISIONS			
Rev	By	App	Description
0	JAK	***	ISSUE FOR CONSTRUCTION

Date
07/07/2016



Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

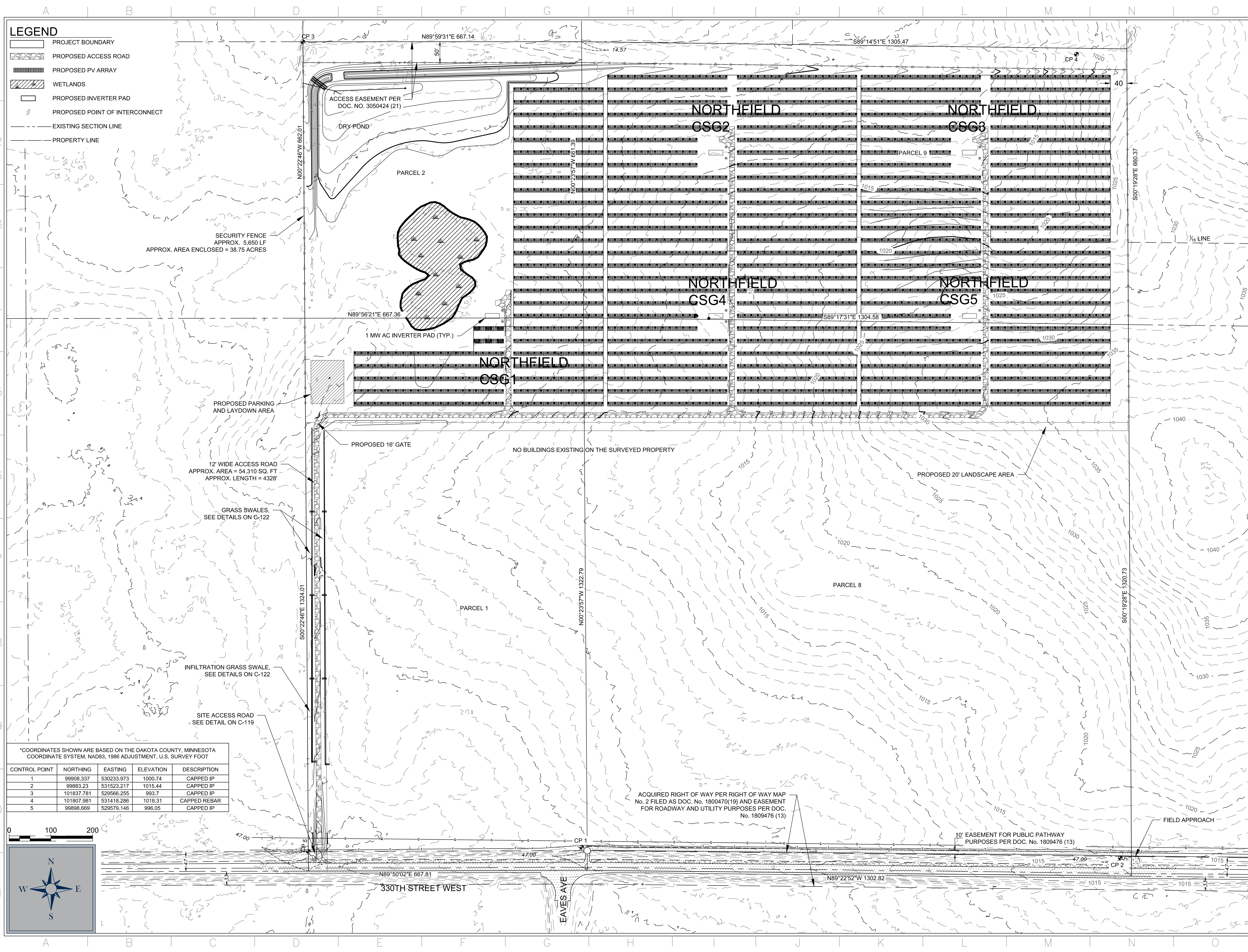
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**2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057**

Sheet Name:  
**GENERAL NOTES**

Scale: Project ID: 19774


Sheet No:  
**C-104**





\*COORDINATES SHOWN ARE BASED ON THE DAKOTA COUNTY, MINNESOTA COORDINATE SYSTEM, NAD83, 1986 ADJUSTMENT, U.S. SURVEY FOOT

CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	99908.337	530233.973	1000.74	CAPPED IP
2	99883.23	531523.217	1015.44	CAPPED IP
3	101837.781	529566.255	993.7	CAPPED IP
4	101807.981	531418.286	1018.31	CAPPED REBAR
5	99898.669	529579.146	996.05	CAPPED IP



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Mead & Hunt

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PE Seal:  
**PROFESSIONAL ENGINEER**  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

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DRAWING ISSUE

Preliminary     Construction  
 Customer Approval     As-built  
 Permitting     Other

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REVISIONS

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Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

Site Address:  
**2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057**

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Sheet Name:  
**OVERALL SITE PLAN**

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Scale: 1"=100'    Project ID: 19774

Sheet No:  
C-105

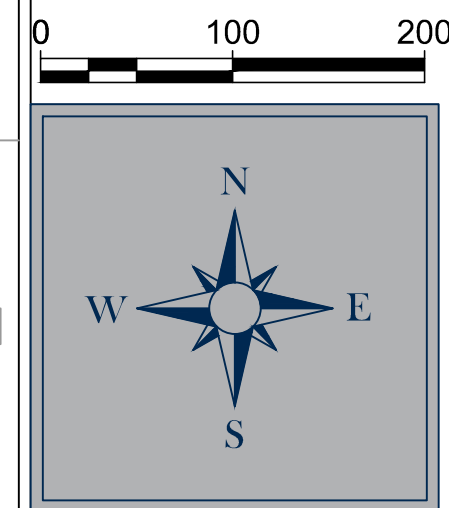
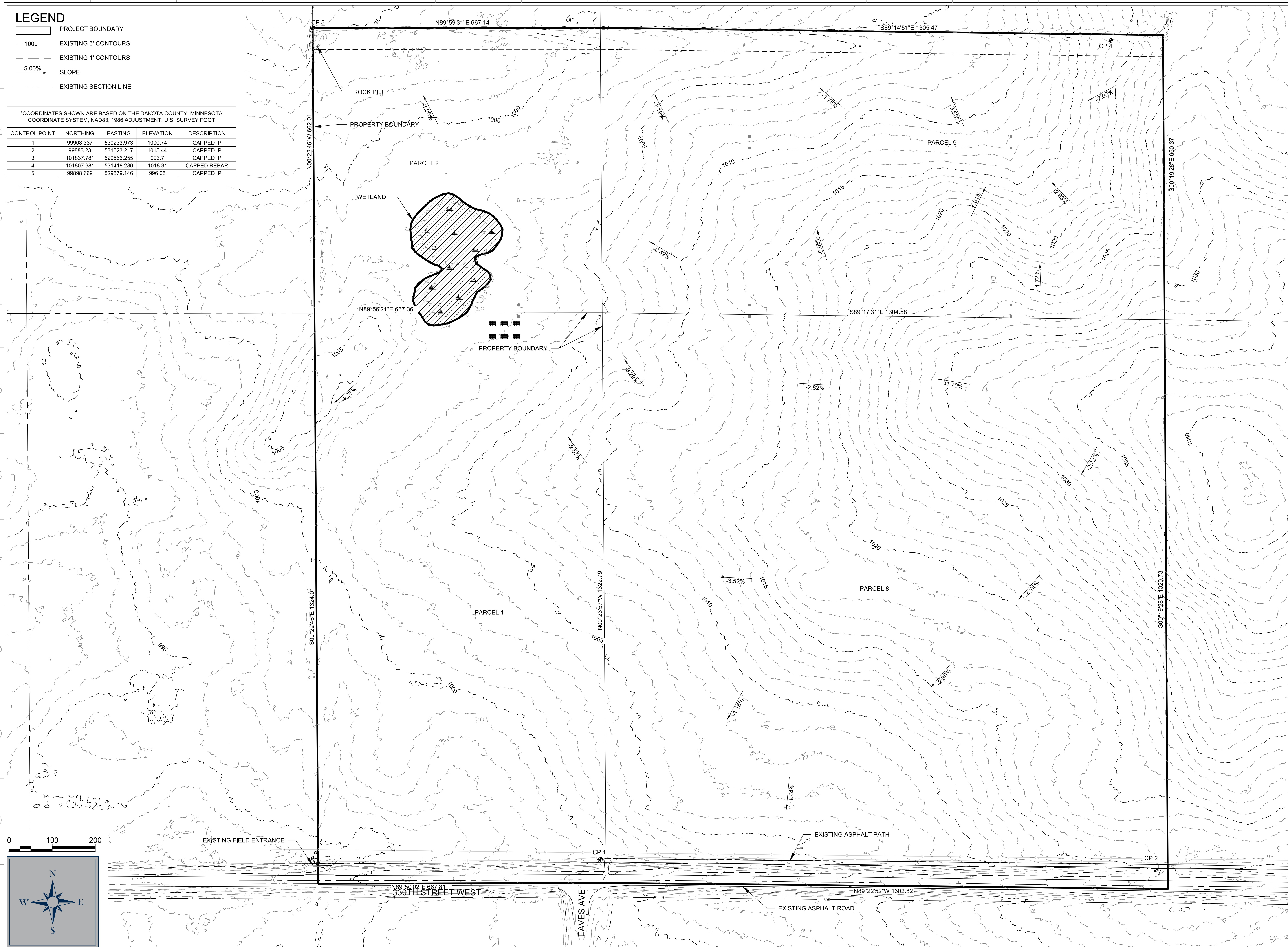
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- LEGEND**
- PROJECT BOUNDARY
  - EXISTING 5' CONTOURS
  - EXISTING 1' CONTOURS
  - SLOPE
  - EXISTING SECTION LINE

\*COORDINATES SHOWN ARE BASED ON THE DAKOTA COUNTY, MINNESOTA COORDINATE SYSTEM, NAD83, 1986 ADJUSTMENT, U.S. SURVEY FOOT

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**PROFESSIONAL ENGINEER**  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

**DRAWING ISSUE**

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<input type="checkbox"/> Customer Approval	<input type="checkbox"/> As-built
<input type="checkbox"/> Permitting	<input type="checkbox"/> Other

**REVISIONS**

Rev	By	App	Description	Date
0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

Project Name:  
 NORTHFIELD COMMUNITY  
 SOLAR GARDENS

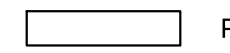


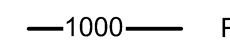
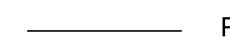
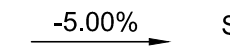
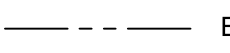
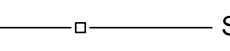



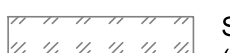
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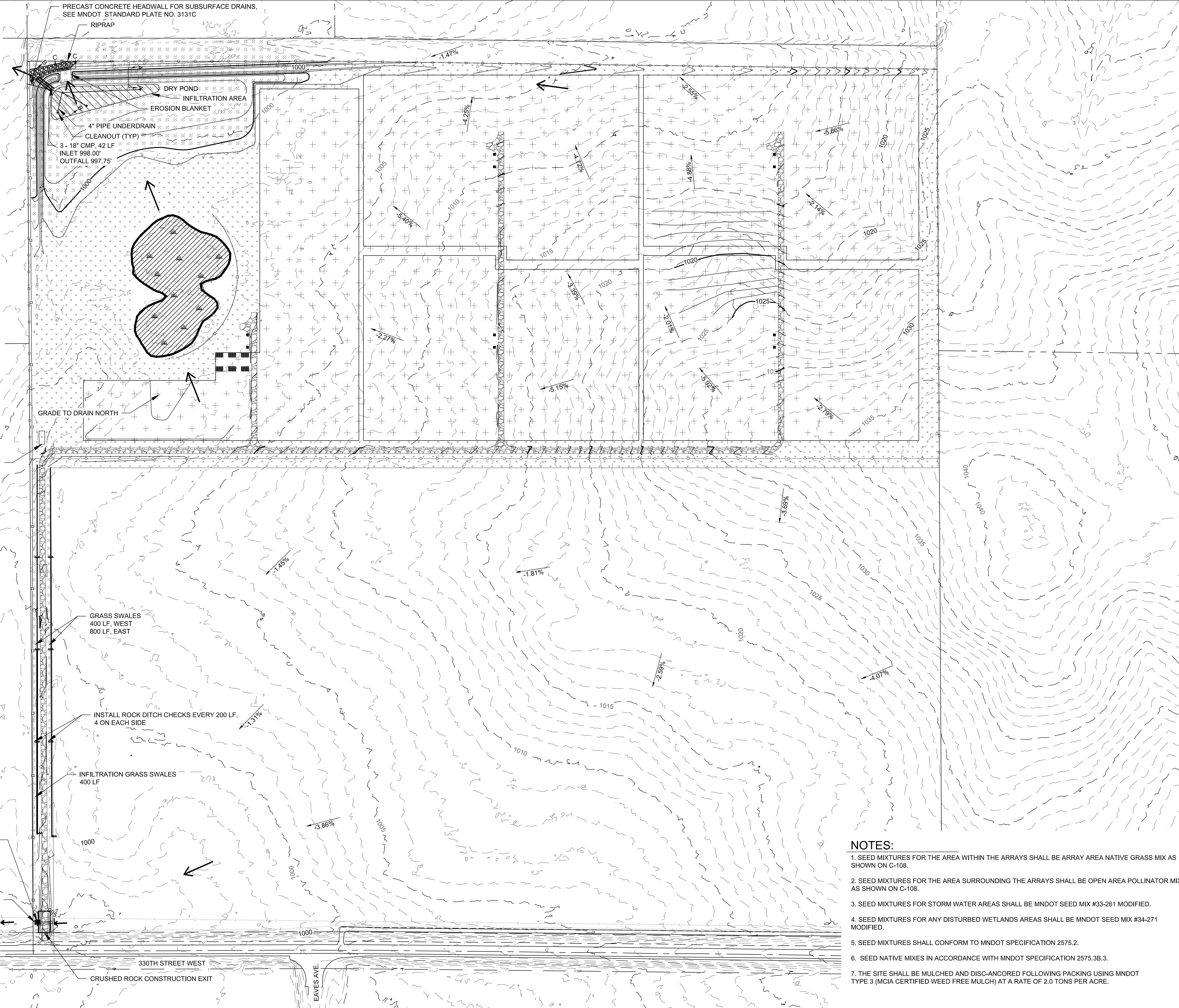
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 Sheet No:  
**C-106**

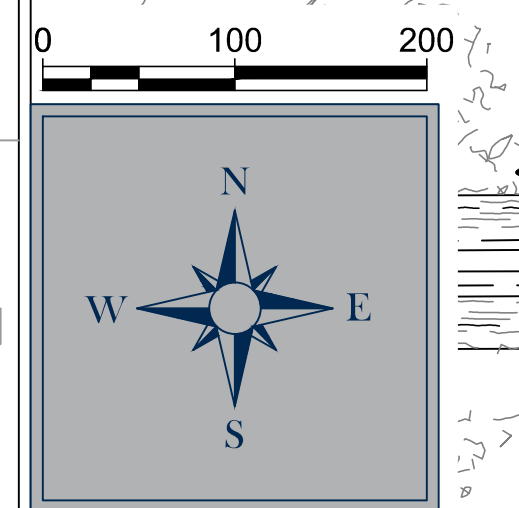


**LEGEND**

-  PROJECT BOUNDARY
-  EXISTING 5' CONTOURS
-  EXISTING 1' CONTOURS
-  PROPOSED 5' CONTOURS
-  PROPOSED 1' CONTOURS
-  -5.00% SLOPE
-  EXISTING SECTION LINE
-  SILT FENCE
-  SEED AND MULCH (ARRAY AREA NATIVE GRASS)
-  SEED AND MULCH (OPEN AREA POLLINATOR)
-  SEEDING AND MULCH (MNDOT #33-261 MODIFIED)
-  FLOW ARROW




- NOTES:**
1. SEED MIXTURES FOR THE AREA WITHIN THE ARRAYS SHALL BE ARRAY AREA NATIVE GRASS MIX AS SHOWN ON C-108.
  2. SEED MIXTURES FOR THE AREA SURROUNDING THE ARRAYS SHALL BE OPEN AREA POLLINATOR MIX AS SHOWN ON C-108.
  3. SEED MIXTURES FOR STORM WATER AREAS SHALL BE MNDOT SEED MIX #33-261 MODIFIED.
  4. SEED MIXTURES FOR ANY DISTURBED WETLANDS AREAS SHALL BE MNDOT SEED MIX #34-271 MODIFIED.
  5. SEED MIXTURES SHALL CONFORM TO MNDOT SPECIFICATION 2575.2.
  6. SEED NATIVE MIXES IN ACCORDANCE WITH MNDOT SPECIFICATION 2575.3B.3.
  7. THE SITE SHALL BE MULCHED AND DISC-ANORED FOLLOWING PACKING USING MNDOT TYPE 3 (MCIA CERTIFIED WEED FREE MULCH) AT A RATE OF 2.0 TONS PER ACRE.



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 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

**DRAWING ISSUE**

<input type="checkbox"/> Preliminary	<input checked="" type="checkbox"/> Construction
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<input type="checkbox"/> Permitting	<input type="checkbox"/> Other

**REVISIONS**

Rev	By	App	Description	Date
0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

Site Address:  
**2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057**

Sheet Name:  
**GRADING, DRAINAGE, EROSION CONTROL PLAN**

Scale: 1"=100' | Project ID: 19774  
 Sheet No:  
**C-107**



**OPEN AREA POLLINATOR MIX**

GRASS SPECIES		% OF MIX	PLS (LBS/ACRE)
BOUTELOUA CURTIPENDULA	SIDE OATS GRAMA	25.00	1.75
BOUTELOUA GRACILIS	BLUE GRAMA	10.00	0.70
BROMUS KALMII	PRAIRIE BROME	2.50	0.18
ELYMUS VILLOSUS	SILKY WILD RYE	10.00	0.70
KOELERIA MACRANTHA	JUNEGRASS	1.50	0.11
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	20.00	1.40
SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED	6.00	0.42
<b>FORB SPECIES</b>			
ACHILLEA MILLEFOLIUM	YARROW	0.50	0.04
AGASTACHE FOENICULUM	FRAGRANT HYSSOP	0.75	0.05
ALLIUM STELLATUM	PRAIRIE ONION	0.50	0.04
ASCLEPIAS INCARNATA	MARSH MILKWEED	1.00	0.07
ASCLEPIAS SYRIACA	COMMON MILKWEED	1.00	0.07
ASCLEPIAS TEBEROSA	BUTTERFLY MILKWEED	1.00	0.07
ASTER OLENTANGIENSIS	SKY BLUE ASTER	1.25	0.09
ASTER LATERIFLORUS	CALICO ASTER	1.00	0.07
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	0.75	0.05
ASTRAGALUS CANADENSIS	CANADA MILK VETCH	1.00	0.07
DALEA CANDIDUM	WHITE PRAIRIE CLOVER	2.00	0.14
DALEA PURPUREA	PURPLE PRAIRIE CLOVER	2.00	0.14
DESMODIUM CANADENSE	CANADA TICK TREFOIL	1.00	0.07
LIATRIS PYCNOSTACHYA	PRAIRIE BLAZING STAR	1.00	0.07
MONARDA FISTULOSA	WILD BERGAMOT	0.75	0.05
PENSTEMON GRACILIS	SLENDER BEARDOUANGE	0.50	0.04
POTENTILLA ARGUTA	PRAIRIE CINQUEFOIL	0.50	0.04
PHYCANTHEMUM VIRGINIANUM	MOUNTAIN MINT	1.00	0.07
RATIBIDA PINNATA	YELLOW CONEFLOWER	0.75	0.05
RUBECKIA HIRTA	BLACK-EYED SUSAN	1.50	0.11
SOLIDAGO RIGIDA	STIFF GOLDENROD	1.75	0.12
TRADESCANTIA BRACTEATA	PRAIRIE SPIDERWORT	0.50	0.04
VERBENA HASTATA	BLUE VERVAIN	1.00	0.07
VERBENA STRICTA	HOARY VERVAIN	1.00	0.07
ZIZIA AUREA	GOLDEN ALEXANDERS	1.00	0.07
<b>COVER CROP</b>			
TRITICUM AESTIVUM	WINTER WHEAT	--	10.0

NOTES:  
 1. SPECIAL SEED MIX DESIGNED BY MINNESOTA NATIVE LANDSCAPES  
 2. SEE IF CHANGES ARE NECESSARY FOR SPECIFIC LOCATION  
 MINNESOTA NATIVE LANDSCAPES  
 8740 77TH STREET NE  
 OTSEGO, MN 55362

**ARRAY AREA NATIVE GRASS MIX**

GRASS SPECIES		% OF MIX	PLS (LBS/ACRE)
BOUTELOUA CURTIPENDULA	SIDE OATS GRAMA	58.00	3.48
BOUTELOUA GRACILIS	BLUE GRAMA	35.00	2.10
CAREX BICKENLLI	BICKNELL'S SEDGE	1.00	0.06
CAREX RADJATA	EASTERN STAR SEDGE	1.00	0.06
CAREX VULPINOIDEA	FOX SEDGE	1.00	0.06
KOELERIA MACRANTHA	JUNEGRASS	1.00	0.06
SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED	3.00	0.18
<b>COVER CROP</b>			
TRITICUM AESTIVUM	WINTER WHEAT	--	10.0

NOTES:  
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 MINNESOTA NATIVE LANDSCAPES  
 8740 77TH STREET NE  
 OTSEGO, MN 55362

**SEEDING NOTES**

- SEEDING TO BE COMPLETED USING A DRILL SEED METHOD WHERE FEASIBLE. WHERE DRILL SEEDING IS NOT FEASIBLE THE APPLICATION OF SEED VIA ALTERNATE METHODS INCLUDING BUT NOT LIMITED TO, BROADCAST OR HYDROSEEDING.
- BROADCAST SEEDING SHALL BE COMPLETED IF AMBIENT SOIL TEMPERATURE IS CONSISTENTLY 80 DEGREES F OR LOWER.
- IF NOT FROST SEEDING, DRILLING SHOULD OCCUR BETWEEN APRIL 1ST AND JUNE 1ST.
- THE CONTRACTOR SHALL NOT TILL OR FERTILIZE THE FIELDS, IF THE GROUND NEEDS TO BE TILLED, CONTRACTOR SHALL USE A VERTICAL PLOW.
- SEEDING TO BE COMPLETED AFTER ARRAY CONSTRUCTION.

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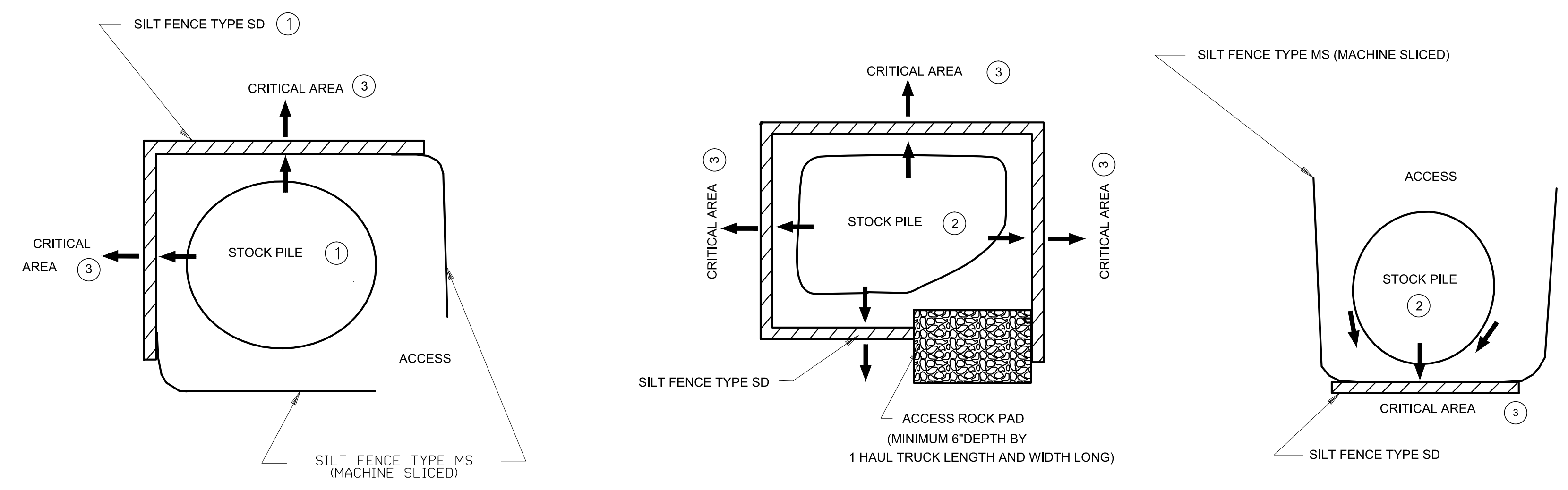
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REVISIONS			
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**TEMPORARY SEDIMENT CONTROL**  
SILT FENCE



**STOCK PILE CONTAINMENT**

- NOTES:  
 SEE MNDOT SPECS. 2533, 2573 & 3886.
- SILT FENCE TYPE SD USED TO PROTECT CRITICAL AREAS FROM SHEET FLOW, AND AREAS WHERE OTHER SILT FENCES CANNOT BE PLACED. MAXIMUM CONTRIBUTING AREA: 1 ACRE. PLACE SILT FENCE TYPE SD ALONG A CONSTANT ELEVATION.
- SILT FENCE TYPE SD SHALL BE 2 ROWS OF TYPE MS SPACED 5' APART.
  - PLACING STOCK PILES NEXT TO AN ENVIRONMENTALLY SENSITIVE AREA IS NOT RECOMMENDED. WHEN THERE ARE NO FEASIBLE ALTERNATIVES, PLACE SILT FENCE SD AS SHOWN.
  - CRITICAL AREAS INCLUDE WETLANDS, JUDICIAL DITCHES, STREAMS, WATER BODIES, AND OTHER AREAS REQUIRING PROTECTION.

Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

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 NORTHFIELD, MN  
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Sheet Name:  
**EROSION CONTROL DETAILS**

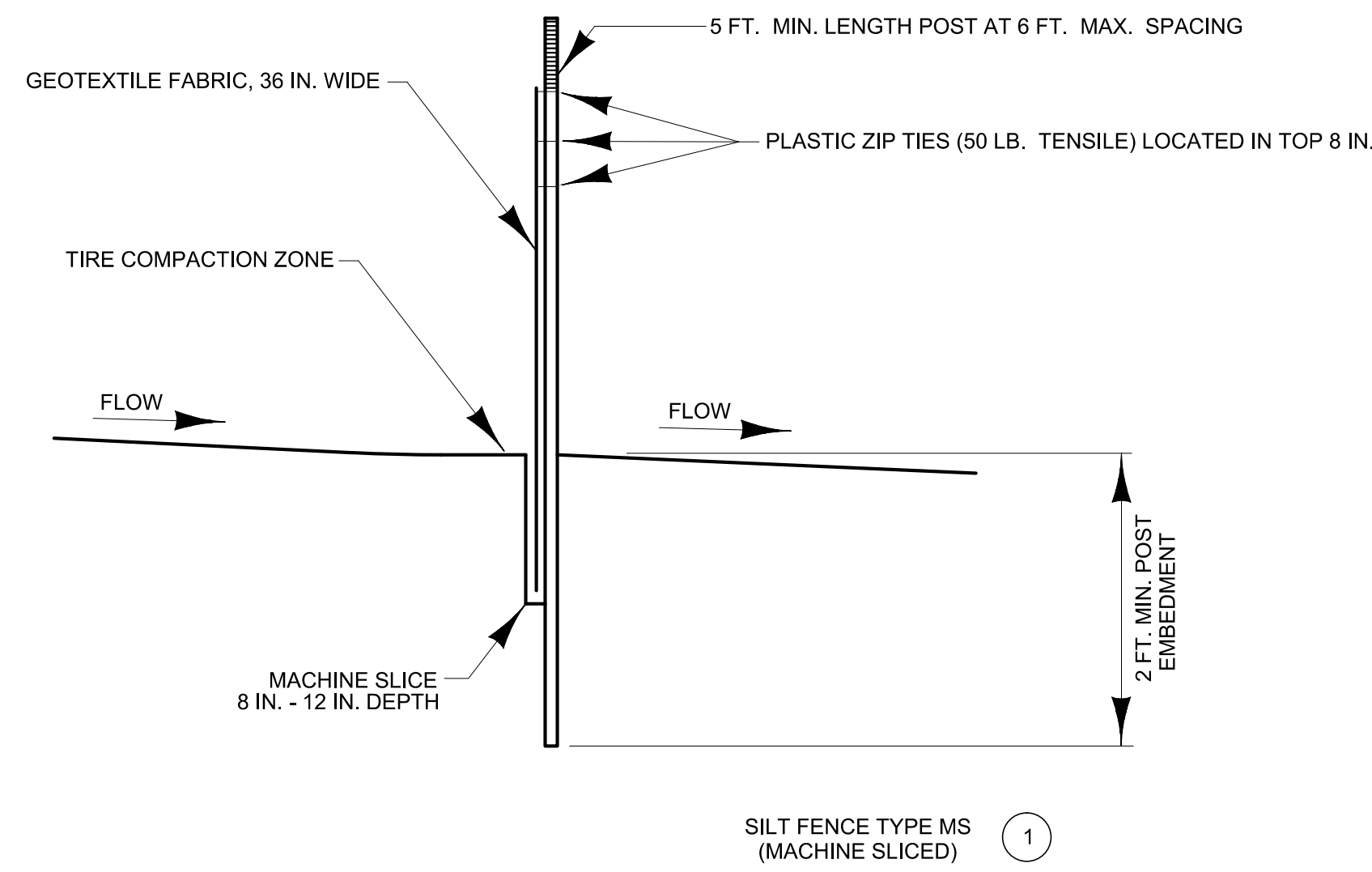
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 Sheet No:  
**C-108**



**EROSION CONTROL GENERAL NOTES:**

1. THE EXACT LOCATION AND EXTENT OF EROSION CONTROL IS TO BE DETERMINED IN THE FIELD AS APPROVED BY THE PROJECT ENGINEER. ALL EROSION CONTROL AND LANDSCAPING ITEMS SHALL CONFORM TO MNDOT SPECIFICATIONS.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL BMP'S UNTIL WORK HAS BEEN COMPLETED. SITE HAS GONE UNDER FINAL STABILIZATION, AND THE NOTICE OF TERMINATION HAS BEEN SUBMITTED TO THE MPCA. EROSION CONTROL DEVICES SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE DURATION OF THE PROJECT AND SHALL BE REPAIRED OR REPLACED AT THE DISCRETION OF THE ENGINEER.
3. SILT FENCE TO BE INSTALLED CONTINUOUSLY ALONG A SINGLE CONTOUR WHERE SHOWN ON PLAN. MAXIMUM LENGTH OF SINGLE STRETCH TO BE 600 LINEAR FEET. WITH A J-HOOK CONSTRUCTED AT THE END OF EACH STRETCH. IF SEDIMENT DEPOSITS IN WATER OF THE STATE, THE MATERIAL MUST BE REMOVED WITHIN SEVEN DAYS.
4. SILT FENCE TO BE INSTALLED AROUND ALL STAGING AND STOCKPILE AREAS. ANY STOCKPILES REMAINING MORE THAN 14 DAYS SHALL BE SEEDED AND MULCHED.
5. LIMIT VEGETATION REMOVAL TO IMMEDIATE WORK AREA AND MAINTAIN A VEGETATED BUFFER ON THE DOWNSTREAM SLOPE WHERE EVER POSSIBLE.
6. ALL TRENCHES SHALL BE BACKFILLED AT THE END OF EACH WORKDAY UNLESS PRIOR APPROVAL IS GRANTED BY THE ENGINEER.
7. DITCH CHECKS SHALL BE PLACED WITHIN 24 HOURS OF DITCH CONSTRUCTION.
8. TEMPORARY SEED SHALL BE PLACED ON ALL DISTURBED AND TOPSOILED AREAS AS DIRECTED BY THE ENGINEER.
9. PERMANENT SEED, FERTILIZER AND MULCH SHALL BE PLACED ON ALL TOPSOILED AREAS AND DISTURBED AREAS.
10. EROSION CONTROL BLANKET CATEGORY 3 SHALL BE PLACED IN ALL DITCHES DESIGNATED ON THE PLANS AND IN ACCORDANCE WITH THE SPECIFICATIONS.
11. EROSION CONTROL BLANKET STAPLES TO BE BIODEGRADABLE ONLY.
12. ALL EROSION CONTROL MATERIAL SHALL BE INSPECTED WEEKLY AND WITHIN 24 HOURS AFTER A RAINFALL OF 0.5 INCHES OR MORE.
13. DEWATERING DISTURBED AREAS SHALL BE ACCOMPLISHED BY TREATING WATER THROUGH AN ACCEPTED FILTER BAG OR OTHER ENGINEER/MPCA APPROVED PROCEDURE. TREATED WATER FROM DEWATERING OPERATIONS MUST BE DISCHARGED OVERLAND PRIOR TO ENTERING STORM SEWER OR ANY SURFACE WATER. ALL DEWATERING IS INCIDENTAL TO THE PROJECT.

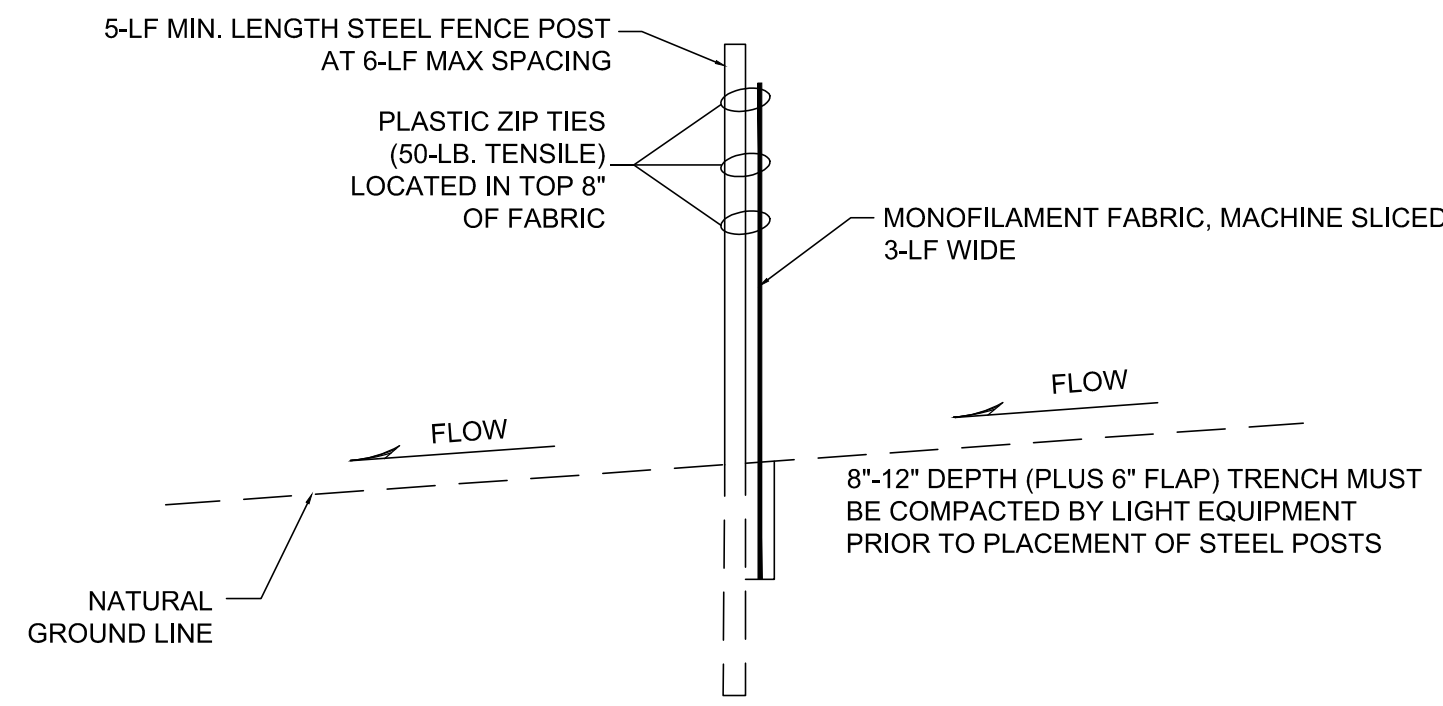
**TEMPORARY SEDIMENT CONTROL**



**NOTES:**

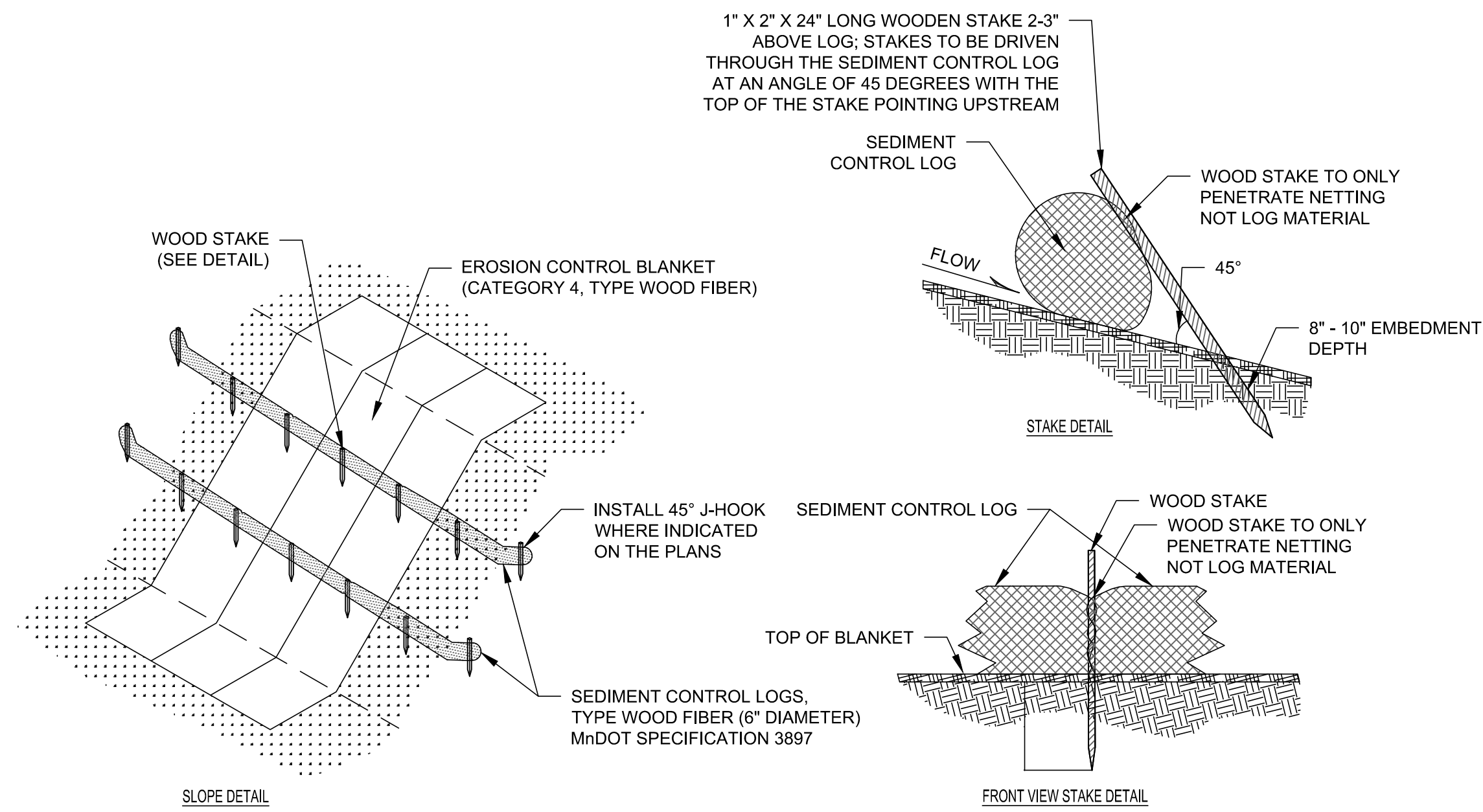
SEE MNDOT SPECS. 2573, 3149 & 3886.

- 1 TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 1 ACRE. COARSE FILTER



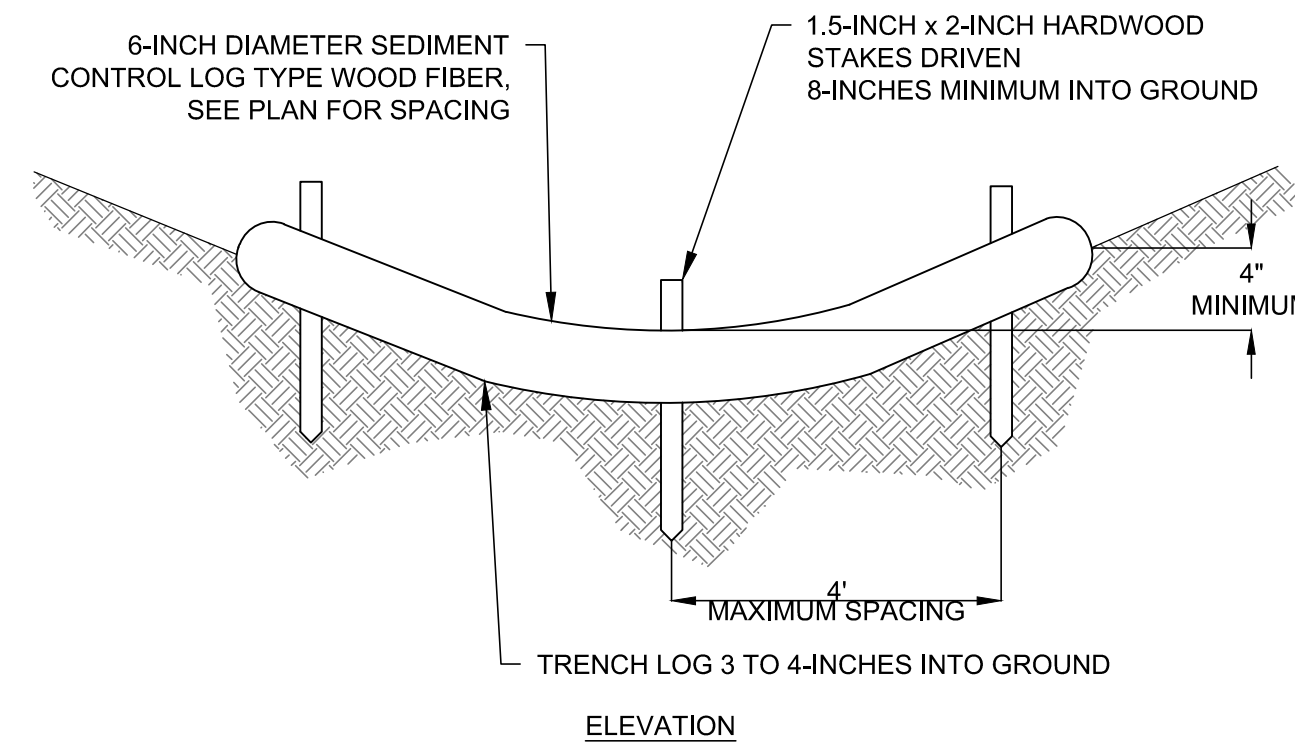
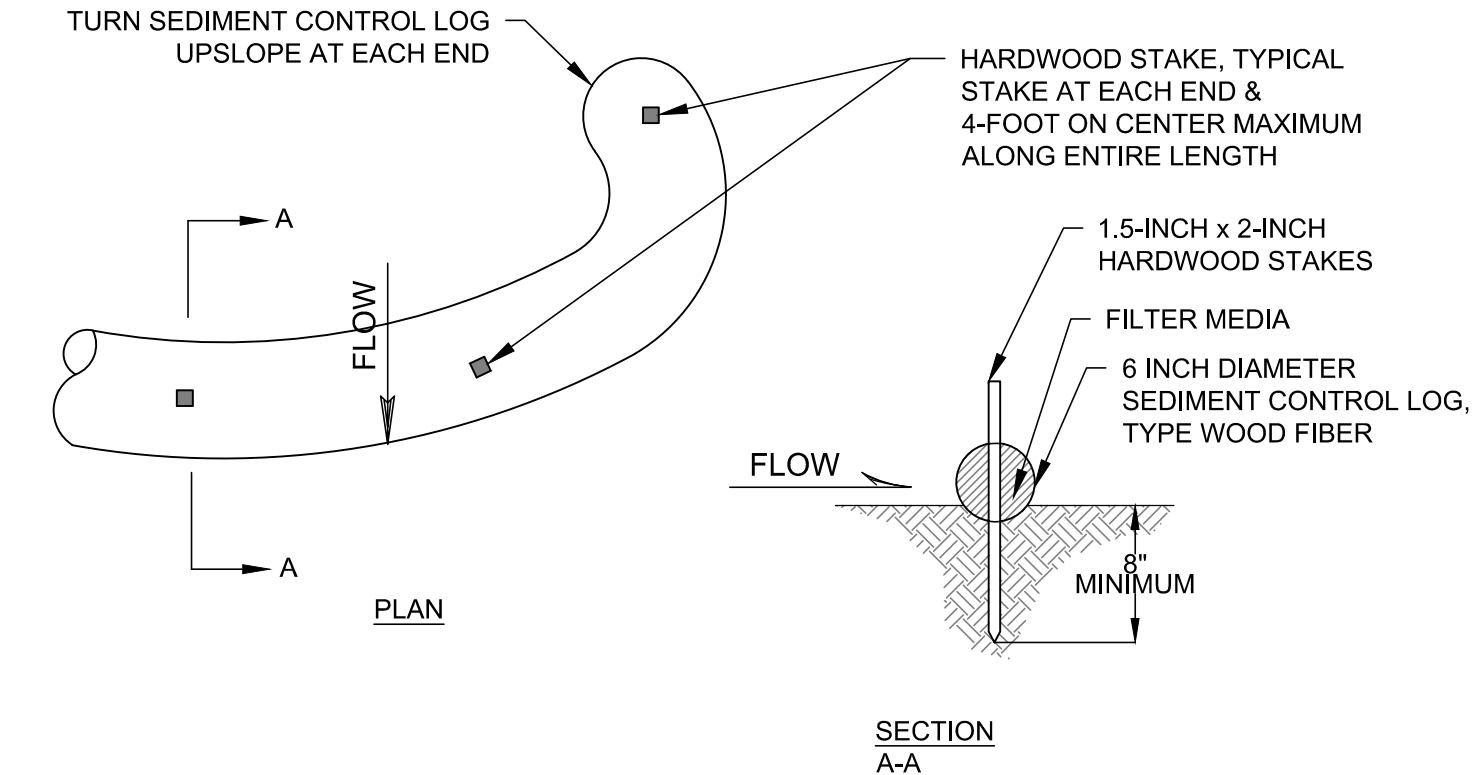
**SILT FENCE, TYPE MACHINE SLICED**

NOT TO SCALE



**SEDIMENT CONTROL LOG**

NOT TO SCALE



**DITCH CHECK**

NOT TO SCALE



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**REVISIONS**

Rev	By	App	Description	Date
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Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

Site Address:  
**2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057**

Sheet Name:  
**EROSION CONTROL DETAILS - 2**

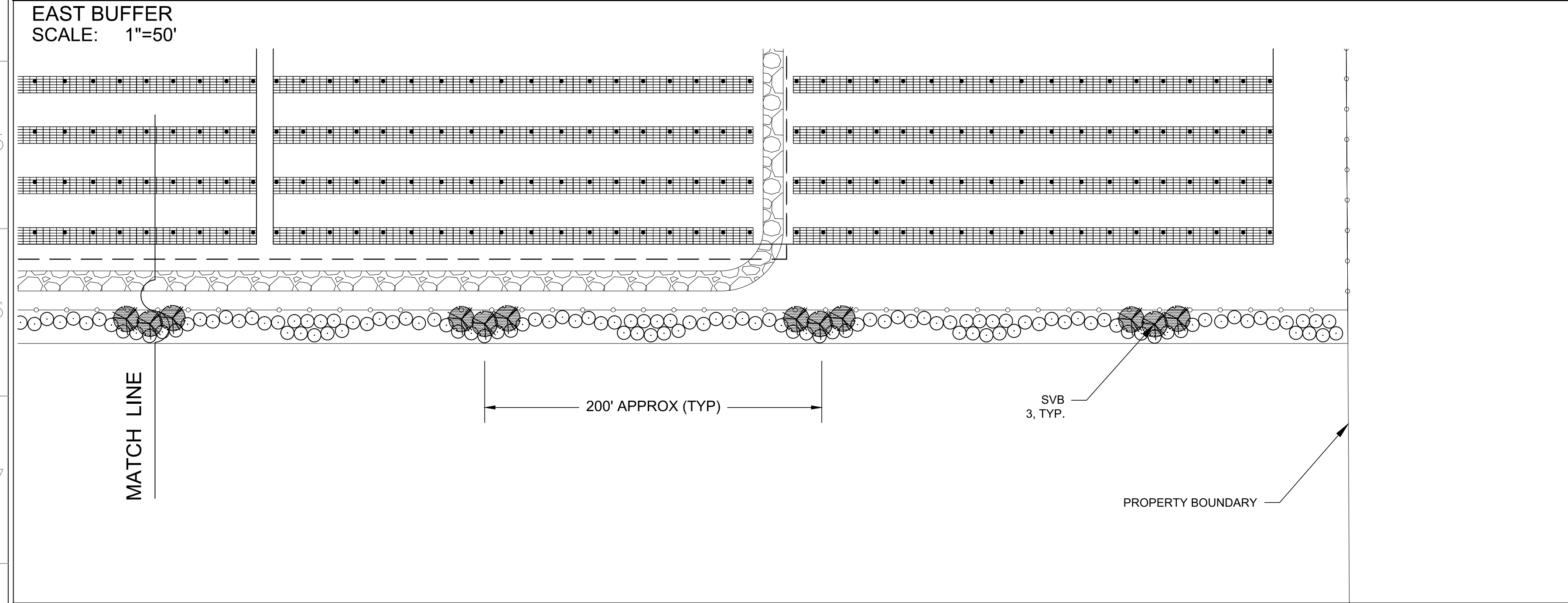
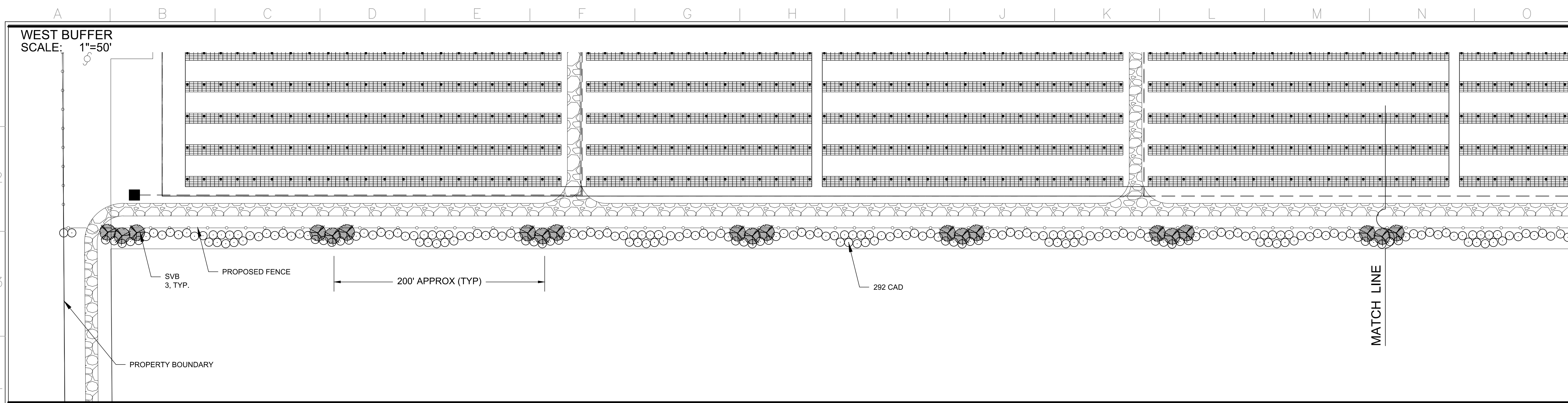
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Sheet No:  
**C-109**



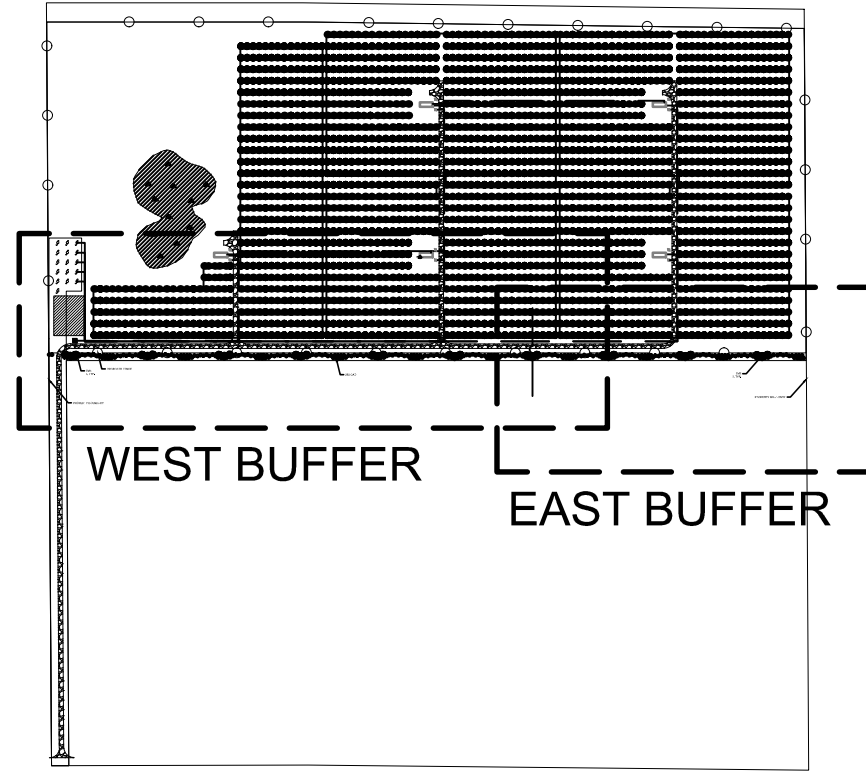






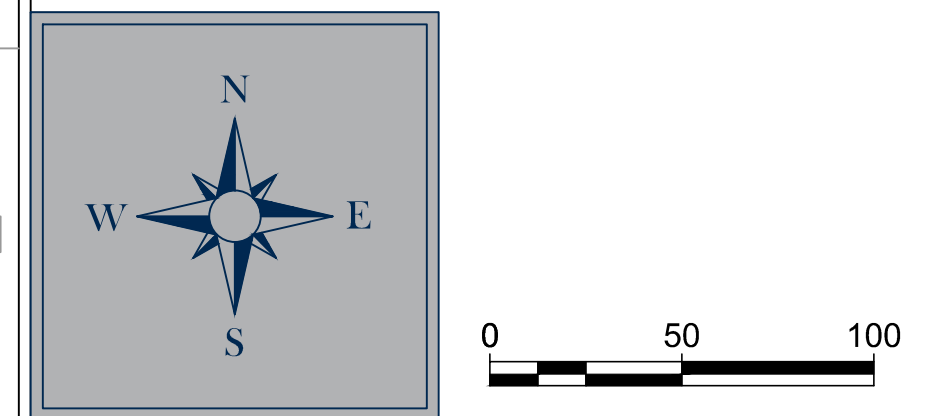
- PLANTING NOTES**
- CONTACT GOPHER STATE ONE CALL AT 811 OR GOPHERSTATEONECALL.ORG TO VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY PLANTS OR LANDSCAPE MATERIAL.
  - ACTUAL LOCATION OF PLANT MATERIAL IS SUBJECT TO FIELD AND SITE CONDITIONS.
  - NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
  - ALL SUBSTITUTIONS MUST BE APPROVED BY THE ENGINEER. PROVIDE SUBSTITUTIONS EQUAL OR BETTER THAN INITIALLY SPECIFIED
  - NURSERY PLANT STOCK SHALL CONFORM TO MNDOT SPECIFICATION 2571.
  - PLANTS TO MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2004 OR MOST CURRENT VERSION) REQUIREMENTS FOR SIZE AND TYPE SPECIFIED.
  - PLANTS SHALL BE IMMEDIATELY PLANTED UPON ARRIVAL AT SITE. PROPERLY HEEL-IN MATERIALS IF NECESSARY; TEMPORARY ONLY.
  - REMOVE POT ON POTTED PLANTS; SPLIT AND BREAK APART PEAT POTS.
  - PRUNE PLANTS AS NECESSARY - PER STANDARD NURSERY PRACTICE AND TO CORRECT POOR BRANCHING OF PROPOSED TREES.
  - BACKFILL SOIL AND TOPSOIL TO ADHERE TO MNDOT STANDARD SPECIFICATION 3877 (COMMON TOPSOIL BORROW) AND TO BE EXISTING TOP SOIL FROM SITE FREE OF ROOTS, ROCKS LARGER THAN ONE INCH, SUBSOIL DEBRIS, AND LARGE WEEDS UNLESS SPECIFIED OTHERWISE. MINIMUM 4" DEPTH TOPSOIL REQUIRED FOR ALL SEEDING AREAS. MINIMUM 12" DEPTH BACKFILL TOPSOIL IS REQUIRED FOR SHRUB PLANTINGS.
  - PROVIDE 4" MIN MULCH FOR ALL TREE & SHRUB PLANTINGS PER DETAIL. MULCH TO BE SHREDDED HARDWOOD AND FREE OF DELETERIOUS MATERIAL.
  - EDGING TO BE SPADED EDGE, UNLESS OTHERWISE INDICATED. SPADED EDGE TO PROVIDE V-SHAPED DEPTH AND WIDTH TO CREATE SEPARATION BETWEEN MULCH AND GRASS.
  - KEEP PLANTS IN A HEALTHY GROWING CONDITION IN ACCORDANCE WITH THE CURRENT EDITION OF THE ICAMMLP THROUGHOUT THE ESTABLISHMENT PERIOD. THE ESTABLISHMENT PERIOD BEGINS ON THE DATE THAT INITIAL PLANTING OPERATION BEGINS AND CONTINUES UNTIL FINAL ACCEPTANCE OF THE PROJECT.

**OVERALL MAP KEY NTS**



- LEGEND**
- PROPOSED SECURITY FENCE
  - PROPOSED AUTUMN BRILLIANCE SERVICEBERRY
  - PROPOSED CARDINAL DOGWOOD

PLANT SCHEDULE CODE	QTY	COMMON/BOTANICAL NAME	SIZE	SPACING O.C.
SVB	30	AUTUMN BRILLIANCE SERVICEBERRY / AMERICAN X GRANDIFLORA	1.5" BB	12" - 15"
CAD	292	CARDINAL DOGWOOD / CORNUS SERICEA 'CARDINAL'	#5 CONTAINER	8'-0" O.C. TYP.



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Project Name:  
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Sheet Name:  
 LANDSCAPE PLAN

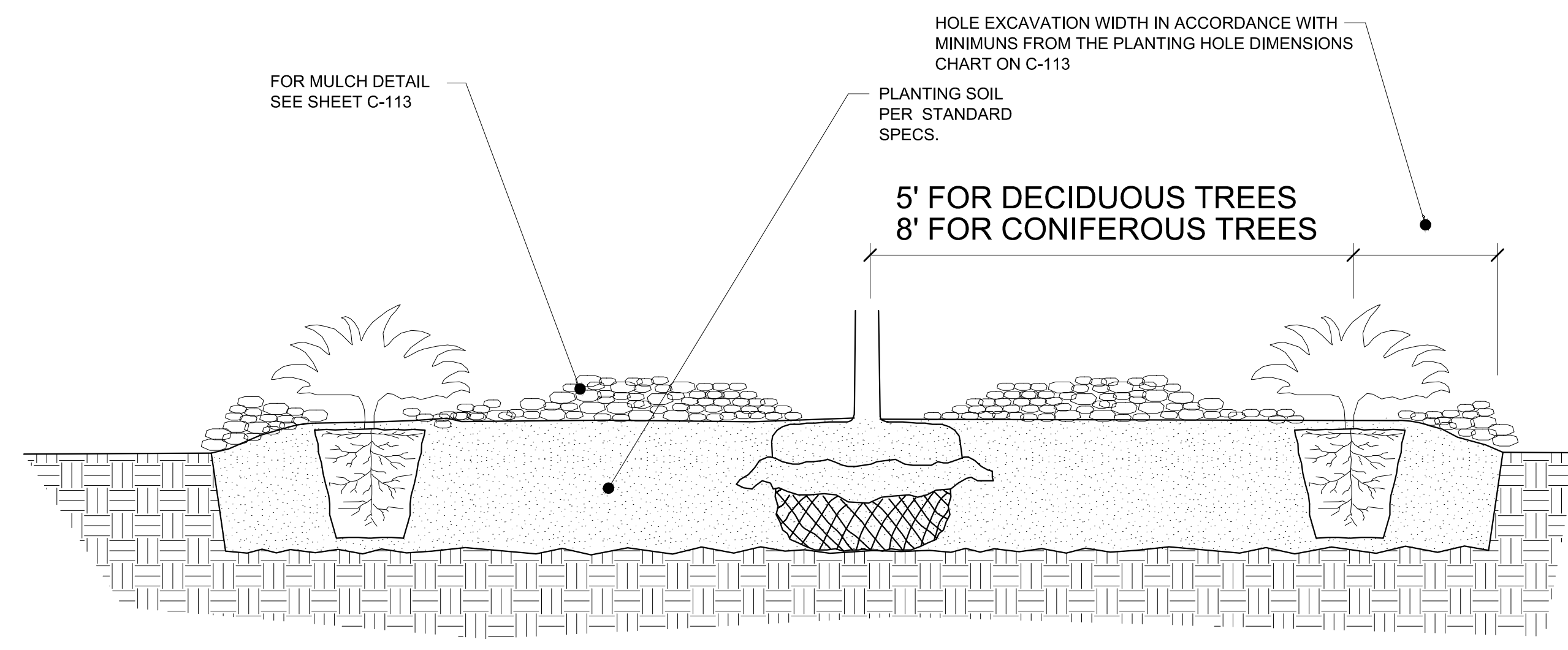
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Sheet No:  
**C-111**

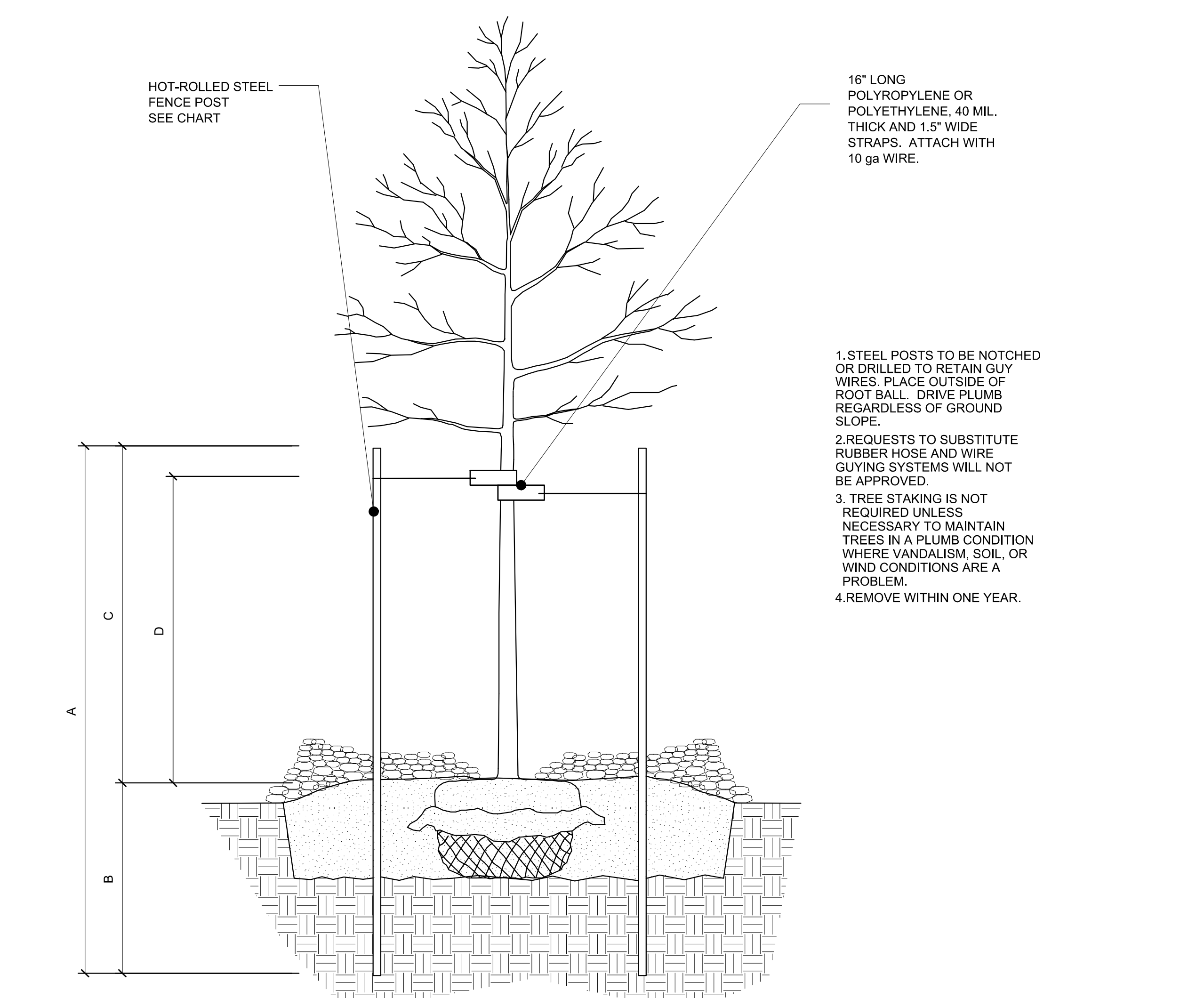








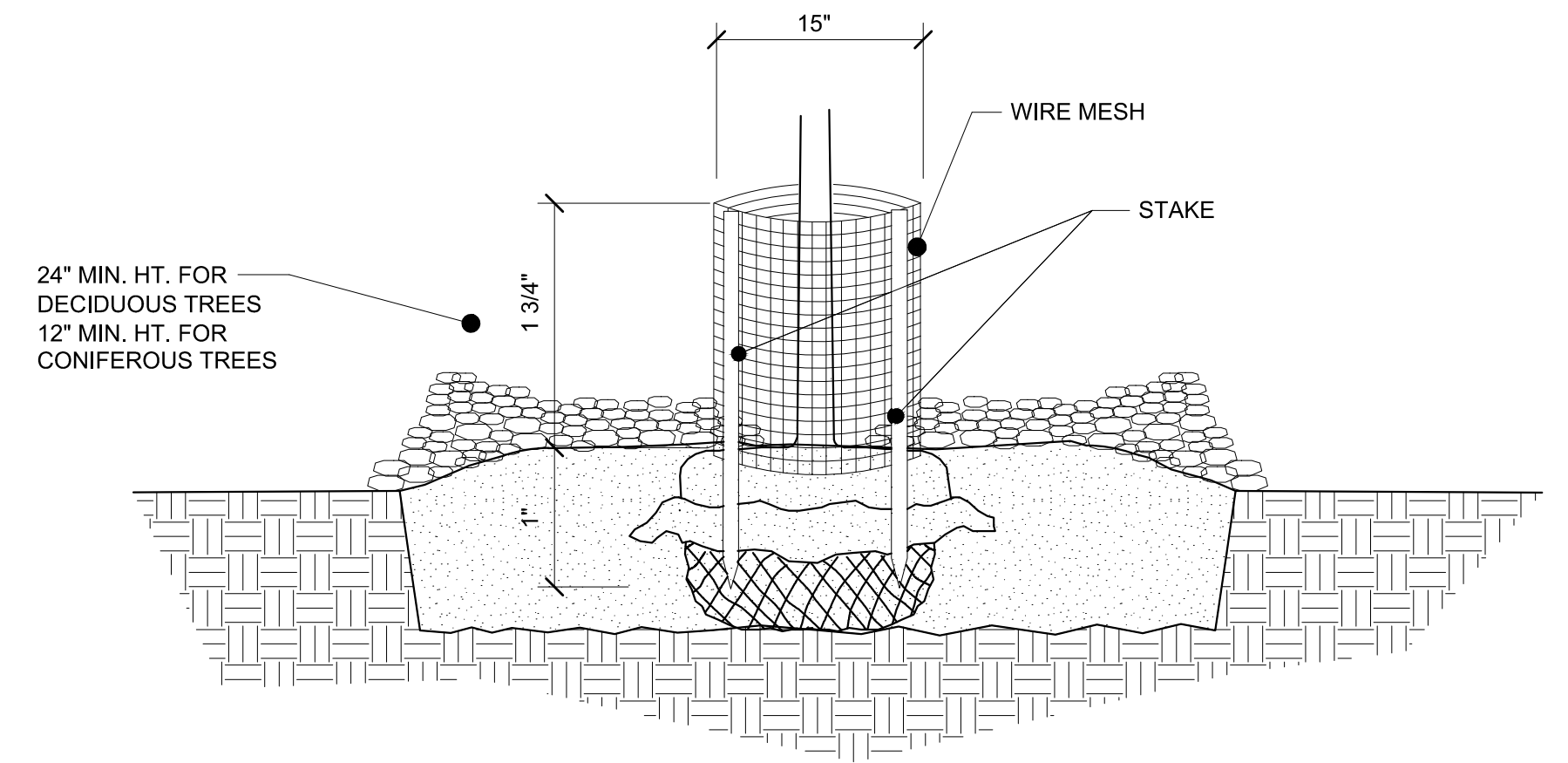
**PLANT SPACING IN MASS BEDS**



STEEL POST SIZING					
CALIPER	STEEL POST TYPE	A	B	C	D
LESS THAN 4 INCHES	HOT-ROLLED STEEL FENCE POST (Mn/DOT 3403) OR APPROVED EQUAL.	7'-0"	3'-0" MIN.	4'-0"	3'-0"
GREATER THAN 4 INCHES	10', 2.2 LB. FLANGED CHANNEL SIGN POST (Mn/DOT 3401) OR APPROVED EQUAL.	10'-0"	4'-0" MIN.	6'-0"	5'-0"

**STAKING AND GUYING**

(MnDOT 2571.31.1)



- FORM A DOUBLE-LAYERED CYLINDER USING 0.25" GRID GALVANIZED WELDED WIRE MESH (HARDWARE CLOTH). OVERLAP THE CUT END 2".
- DRIVE TWO 1" x 1" OPPOSING HEARTWOOD WHITE OAK STAKES INTO THE GROUND, 7" FROM THE CENTER OF THE TREE STEM.
- SECURE THE MESH CYLINDER TO THE OUTSIDE OF THE STAKES USING EITHER, SCREWS AND WASHERS OR CABLE-TIES ALONG THE OVERLAP. SPACE APPROXIMATELY 4" ON CENTER ALONG THE OVERLAP.
  - SCREWS SHALL BE ROUND HEAD GALVANIZED 1/8" DIA. x 3/4" LONG WITH WASHERS. OR
  - CABLE-TIES SHALL BE NYLON, AT LEAST 8" LONG AND BETWEEN 75LB TO 120LB TENSILE STRENGTH.
- EMBED THE LOWER EDGE OF THE MESH CYLINDER 1" BELOW THE SOIL SURFACE WITHOUT DISTURBING THE TREE ROOTS.
- CUT EDGES WILL NOT BE PERMITTED AT THE TOP OF THE CYLINDER. STAKE WILL BE FLUSH WITH THE TOP OF THE CYLINDER.
- MULCH WITHIN THE CYLINDER SHALL NOT EXCEED 3" DEPTH AND SHALL BE PULLED BACK FROM THE TRUNK AS SPECIFIED IN MULCH PLACEMENT DETAIL.
- THE BOTTOM WHORL OF PINE AND LARCH BRANCHES MAY HAVE TO BE REMOVED TO PERMIT INSTALLATION OF 12" MIN. HEIGHT RODENT GUARDS.
- INSTALL ON ALL DECIDUOUS, PINE AND LARCH TREES, DO NOT PLACE ON SPRUCE TREES.

**RODENT PROTECTION**

(MnDOT 2571.31.2)

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Sheet Name:  
 LANDSCAPE DETAILS  
 - 2

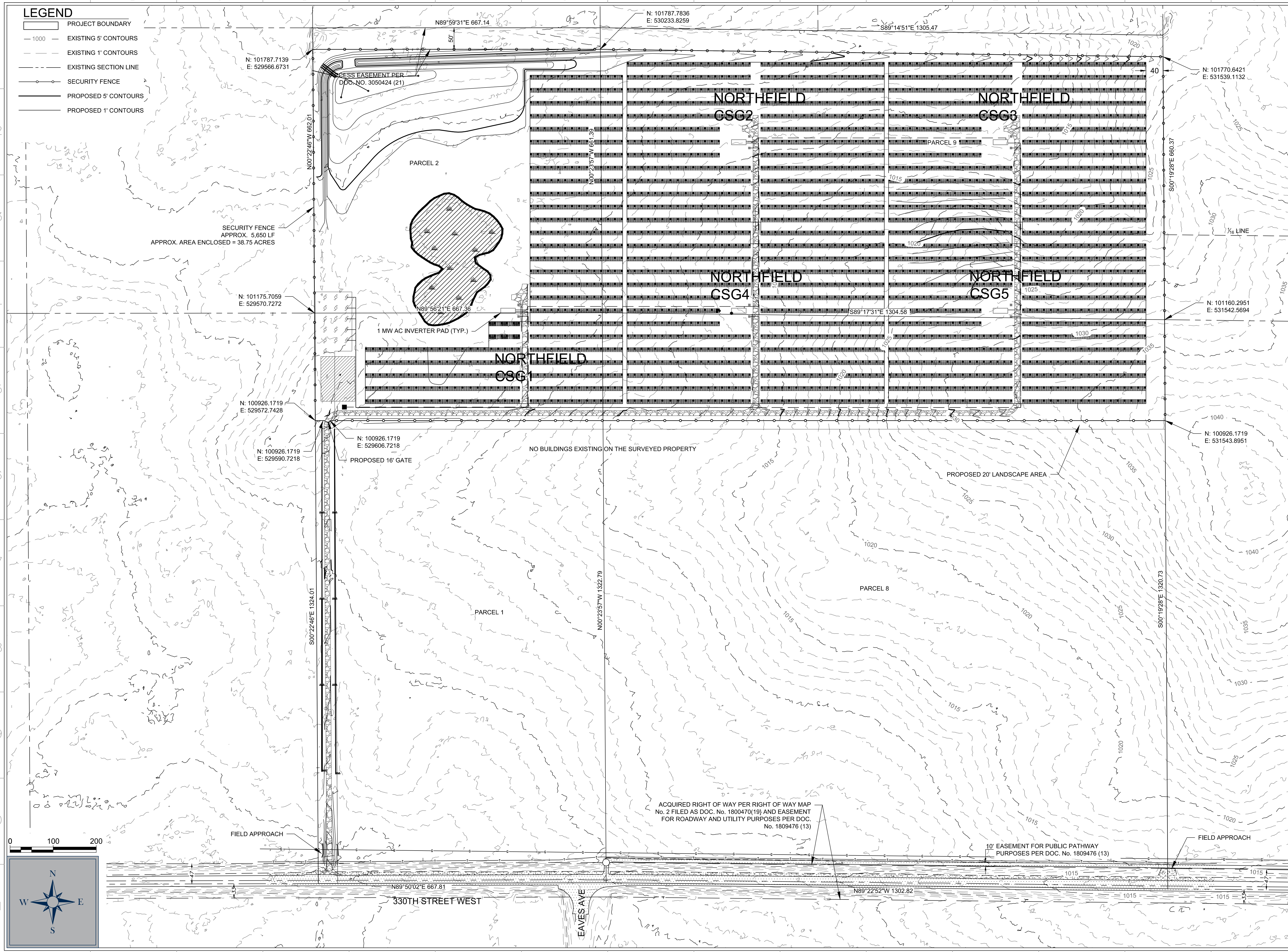
Scale: Project ID: 19774

Sheet No:  
**C-113**

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- LEGEND**
- PROJECT BOUNDARY
  - - - EXISTING 5' CONTOURS
  - - - EXISTING 1' CONTOURS
  - - - EXISTING SECTION LINE
  - SECURITY FENCE
  - PROPOSED 5' CONTOURS
  - PROPOSED 1' CONTOURS



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 NORTHFIELD, MN  
 55057**

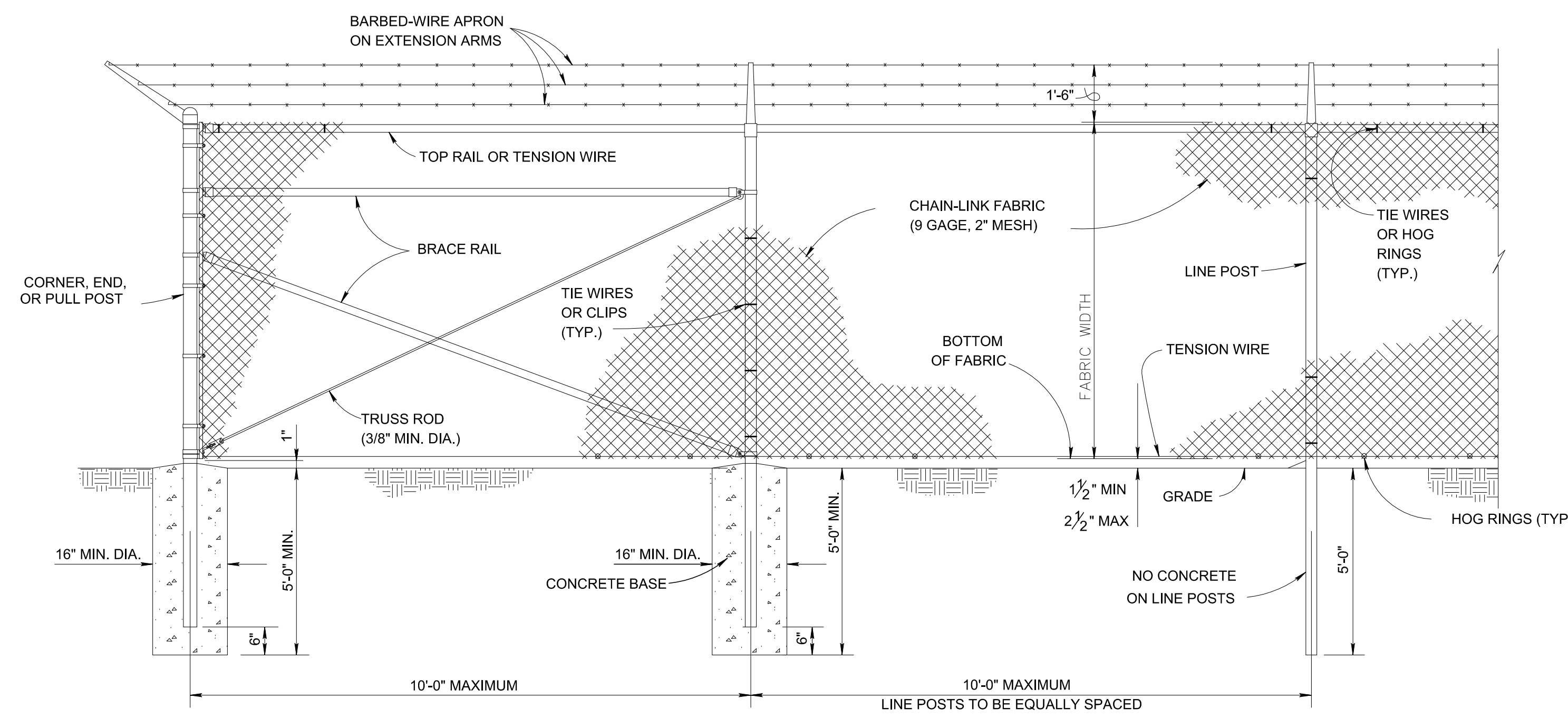
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**FENCE PLAN**

Scale: 1"=100' | Project ID: 19774  
 Sheet No:

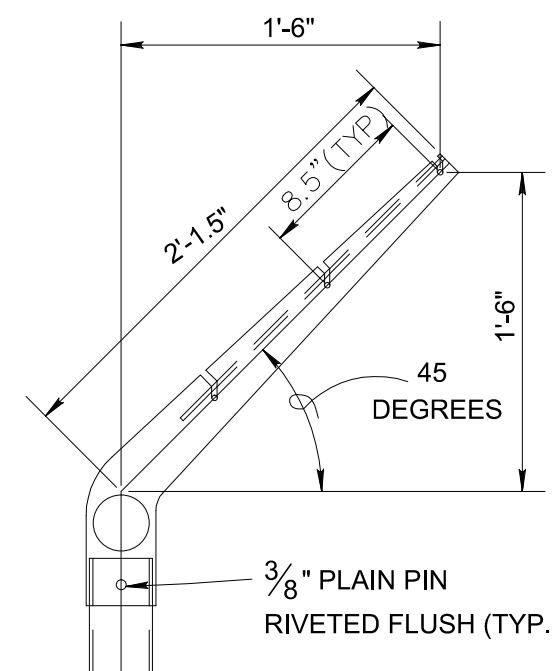
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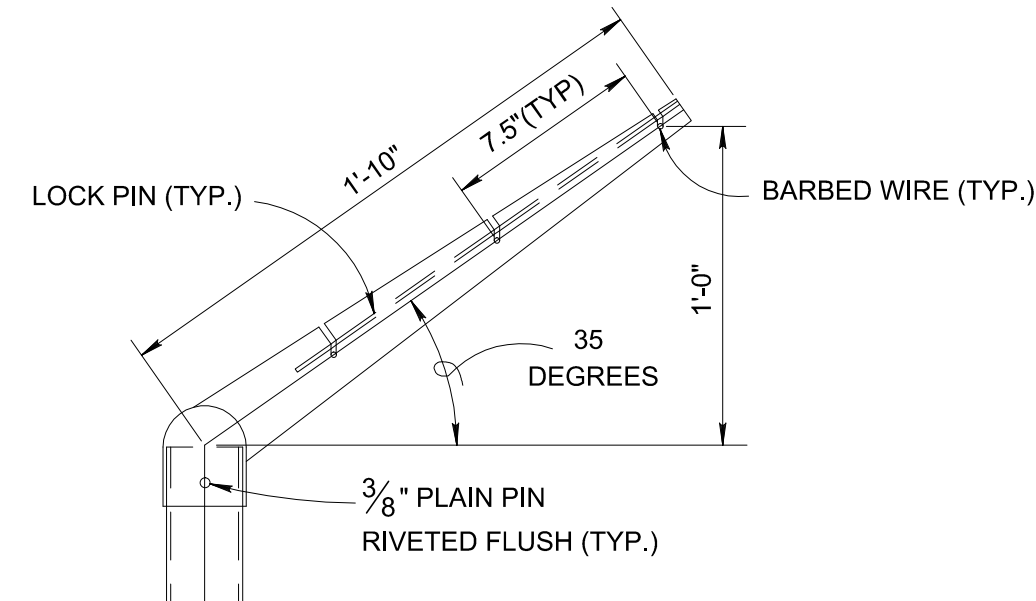




**CHAIN-LINK SECURITY FENCE DETAIL**  
NO SCALE



**LINE POST**

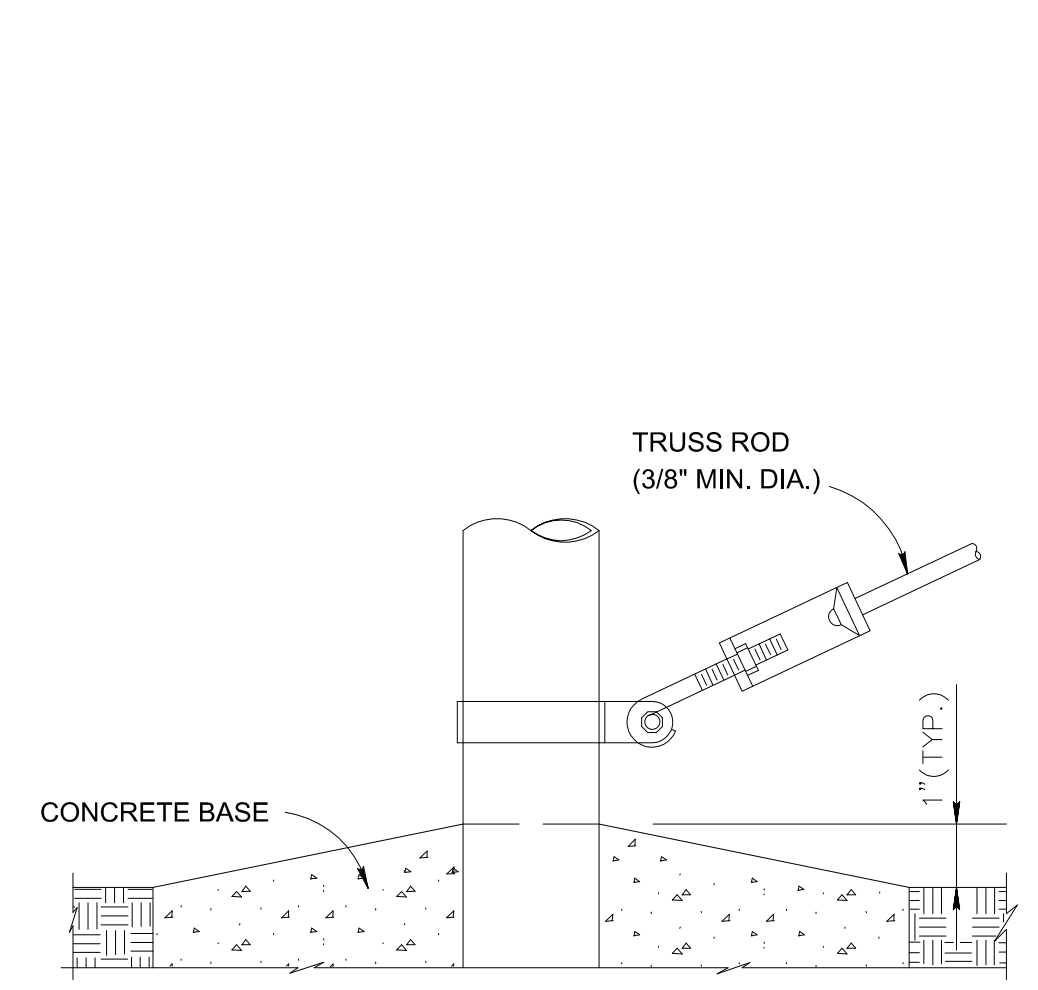


**CORNER POST**

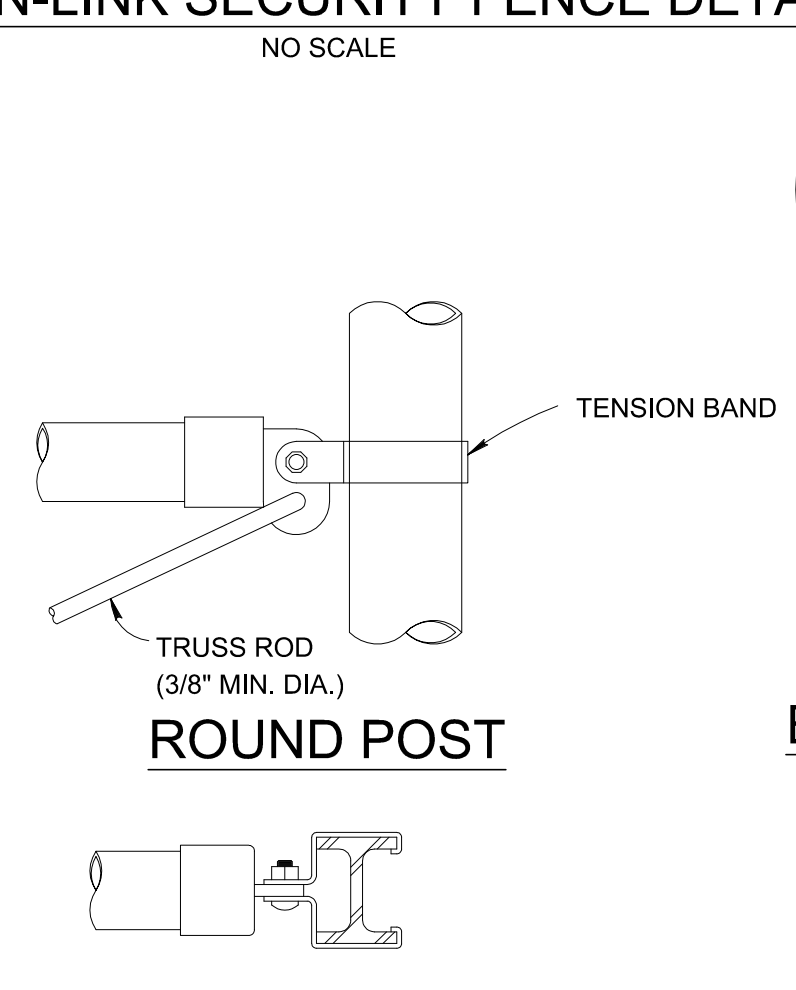
**EXTENSION ARM DETAILS**  
NO SCALE

USE AND SECTION	STEEL POST SCHEDULE MINIMUM OUTSIDE DIMENSIONS (NOMINAL)		
	FABRIC WIDTH 72" INCHES OR LESS	FABRIC WIDTH 84" TO 96"	FABRIC WIDTH 108" AND OVER
<b>CORNER, END &amp; PULL POSTS</b>			
TUBULAR - ROUND	2.375" O.D.	2.875" O.D.	4.00" O.D.
TUBULAR - SQUARE	2.00" SQ.	2.50" SQ.	3.00" SQ.
C-SECTION (ROLL-FORMED)	3.50" x 3.50"	3.50" x 3.50"	---
<b>LINE POSTS</b>			
TUBULAR - ROUND	1.90" O.D.	2.375" O.D.	2.875" O.D.
H-SECTION	2.25" x 1.70"	2.25" x 1.70"	2.25" x 1.70"
C-SECTION (ROLL-FORMED)	1.875" x 1.625"	2.25" x 1.70"	---
<b>TOP, BOTTOM &amp; BRACE RAILS</b>			
TUBULAR - ROUND		1.66" O.D.	---
TUBULAR - SQUARE		1.50" SQ.	---
H-SECTION		1.625" x 1.50"	---
C-SECTION (ROLL-FORMED)		1.625" x 1.25"	---

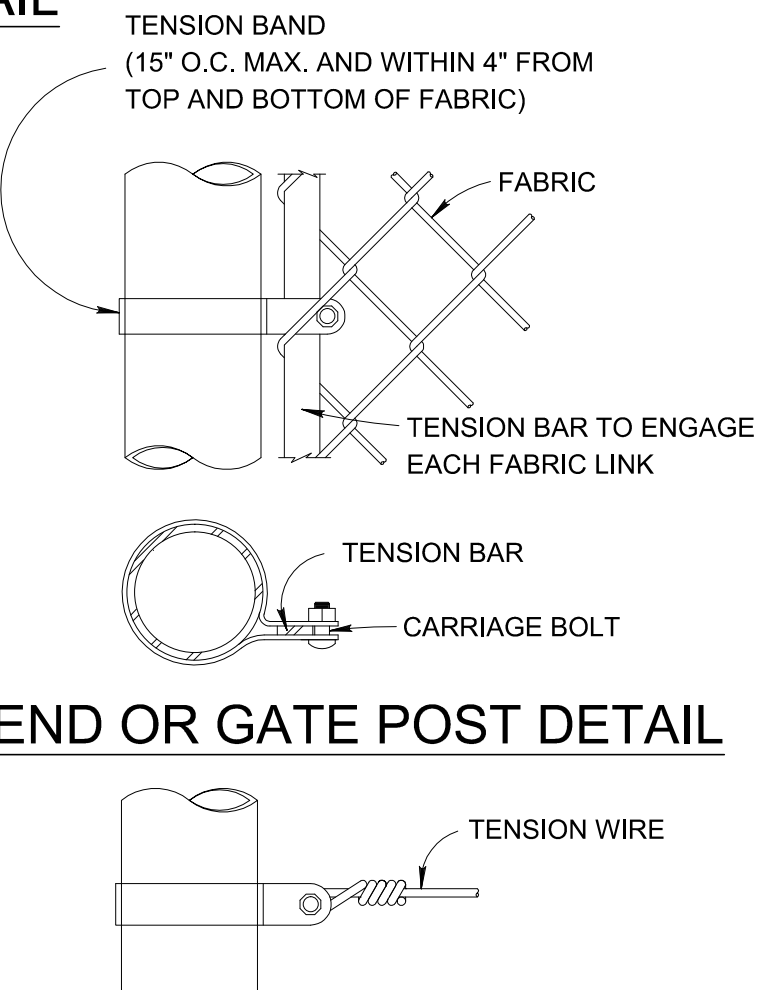
- NOTES:**
1. DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPES OF FENCE SECTIONS AND METHODS OF INSTALLATION THAT COMPLY WITH MNDOT SPECIFICATIONS.
  2. WIRE TIES, RAILS, POSTS, AND BRACES SHALL BE CONSTRUCTED ON THE SECURE SIDE OF THE FENCE ALIGNMENT. CHAIN-LINK FABRIC SHALL BE PLACED ON THE SIDE OPPOSITE THE SECURE AREA.
  3. UNLESS SPECIFICALLY SHOWN OR SPECIFIED, ALL FENCE SHALL HAVE APRON EXTENDED OUTWARD FROM THE AREA BEING PROTECTED.
  4. C-SECTION POSTS SHALL BE INSTALLED SO THAT THE VOID INSIDE THE POST IS COMPLETELY FILLED WITH CONCRETE UP TO THE TOP OF THE FOUNDATION.



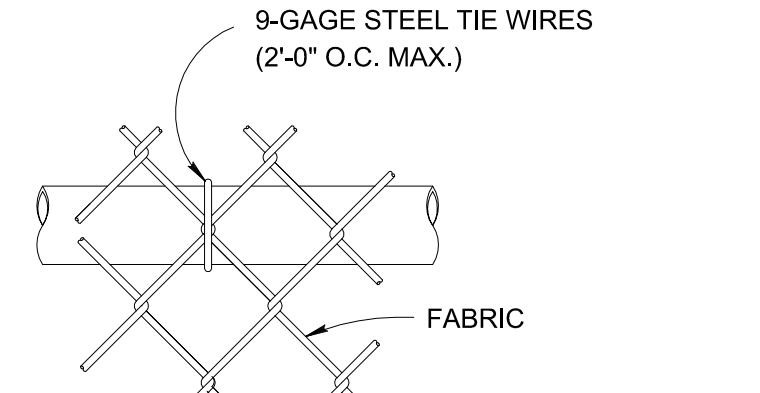
**TRUSS ROD AND BAND**



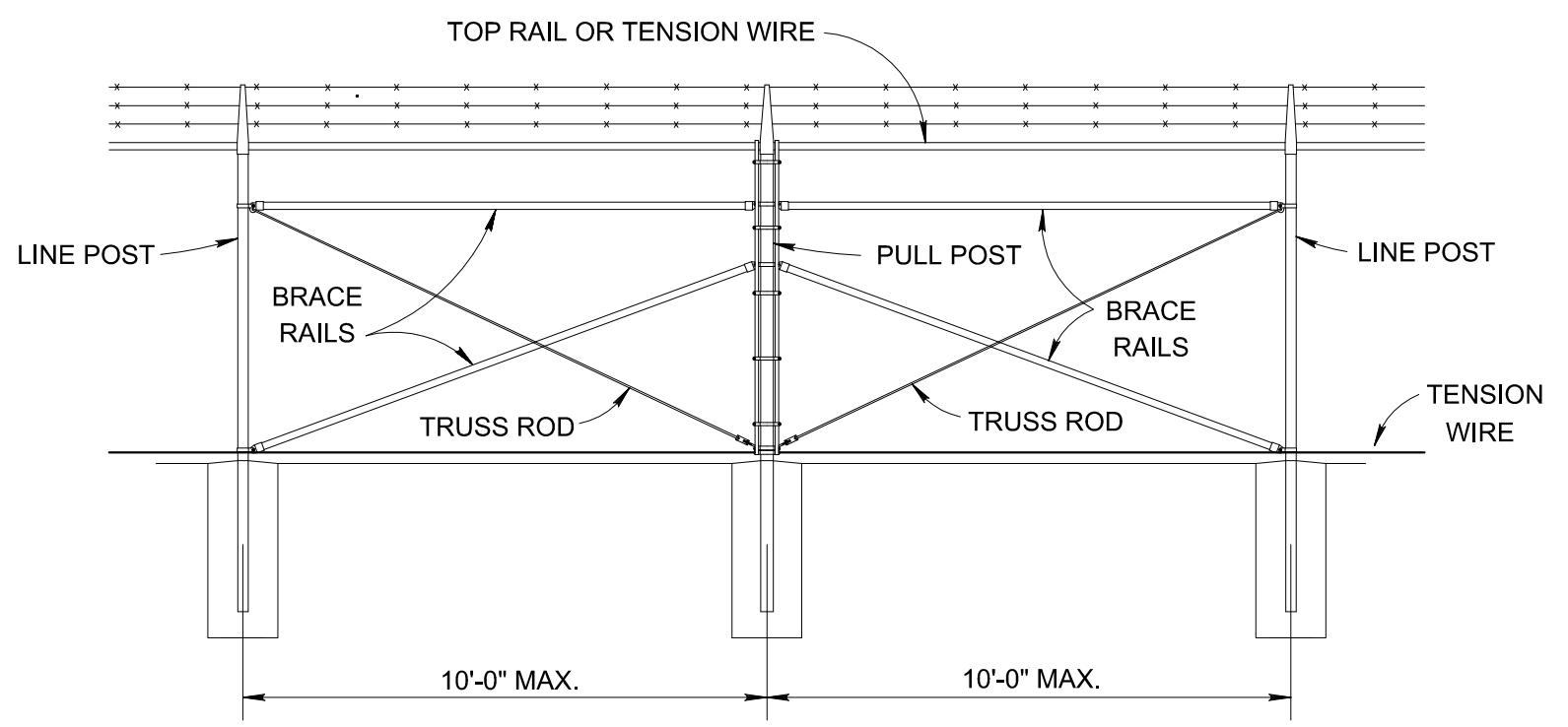
**BRACE RAIL CLAMP DETAILS**



**FASTENING DETAILS**  
NO SCALE

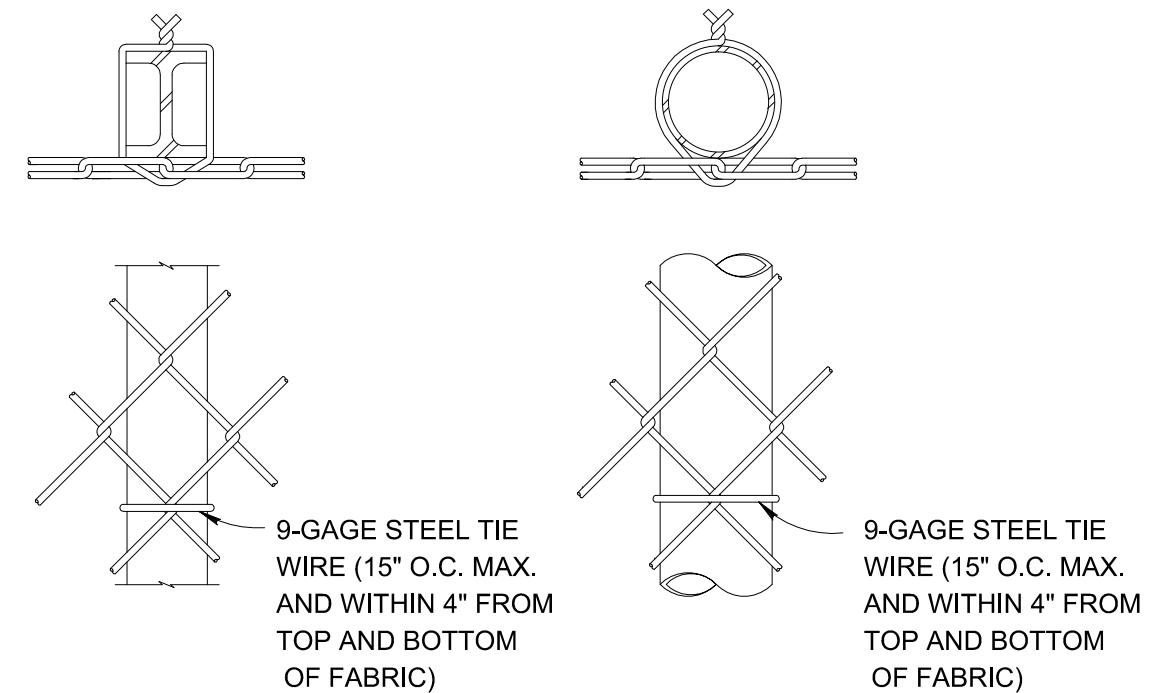


**TOP OR BRACE RAIL ATTACHMENT**



**BRACE PANEL DETAIL**  
NO SCALE

NOTE:  
 PROVIDE BRACE PANEL WHENEVER STRAIGHT RUNS EXCEED 500 FEET.



**LINE POST ATTACHMENTS**  
NO SCALE

Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

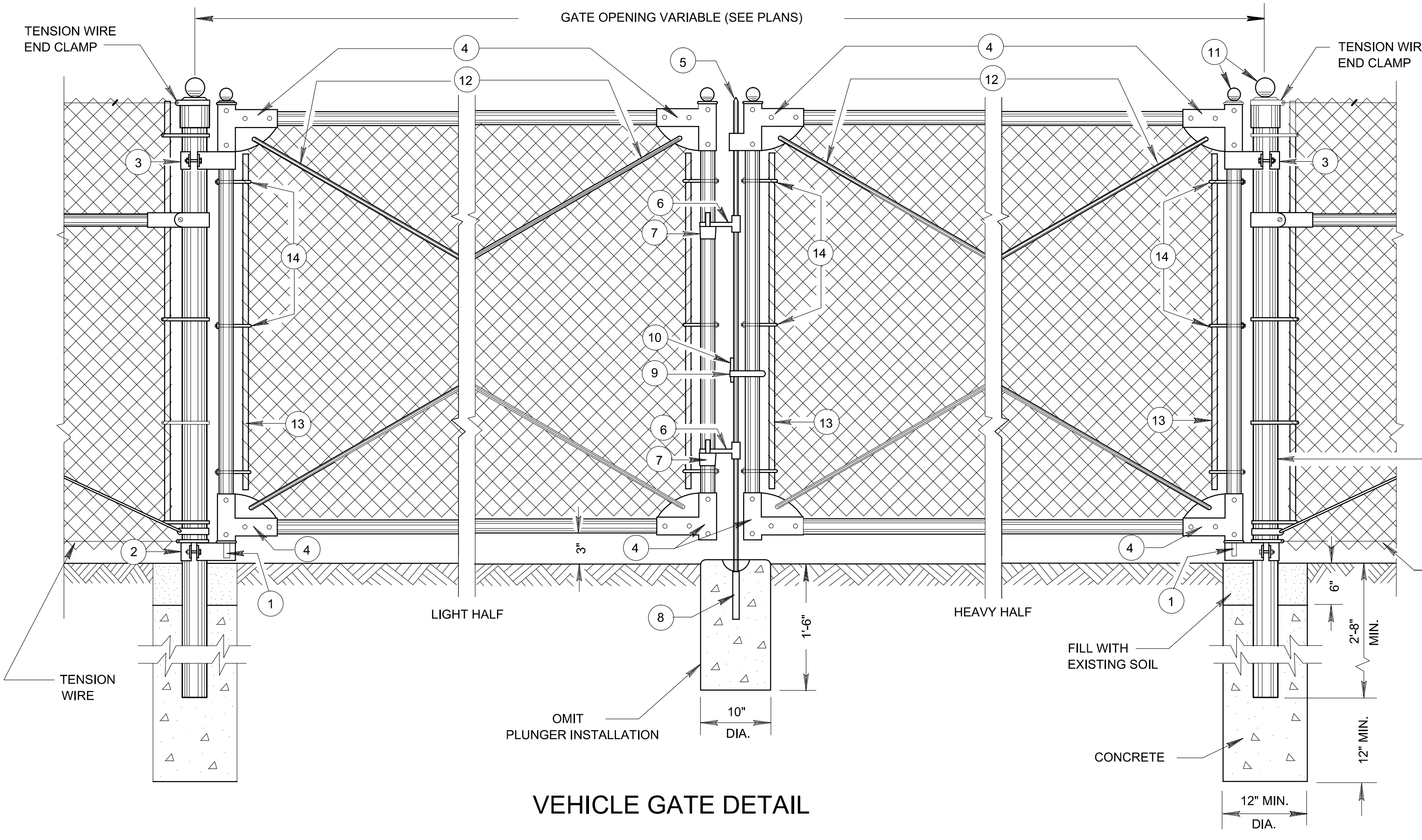
Site Address:  
**2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057**

Sheet Name:  
**FENCE DETAILS**

Scale: Project ID: 19774

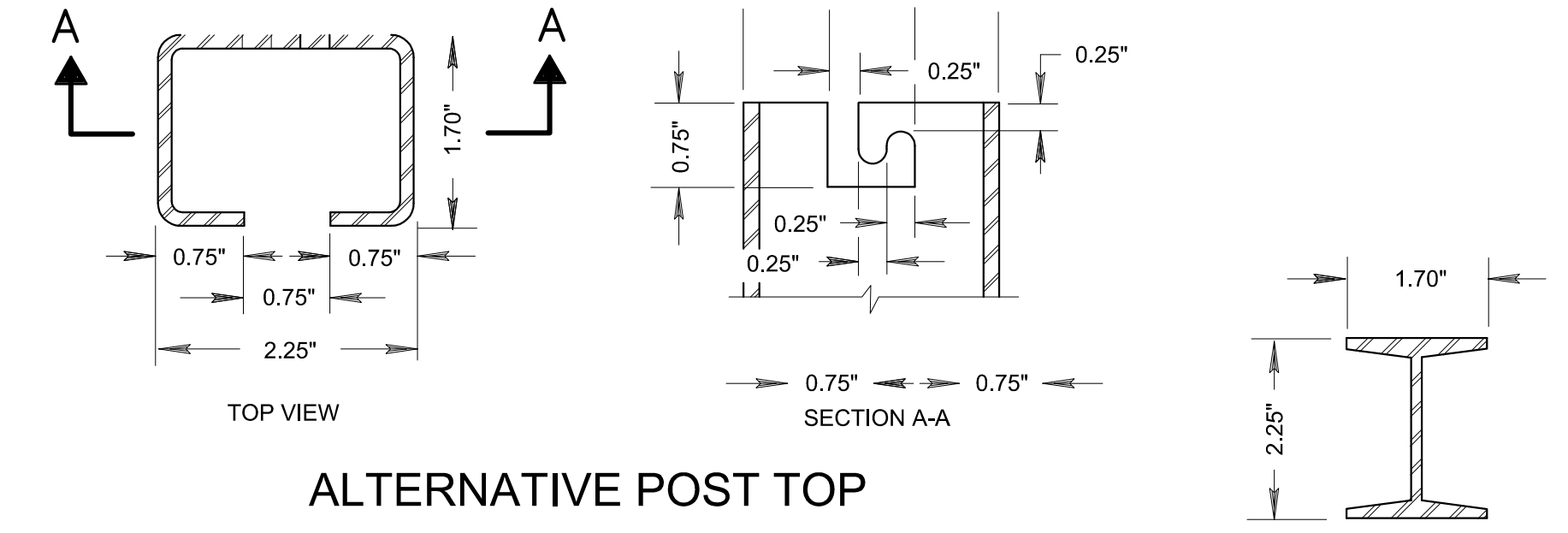
Sheet No:  
**C-115**



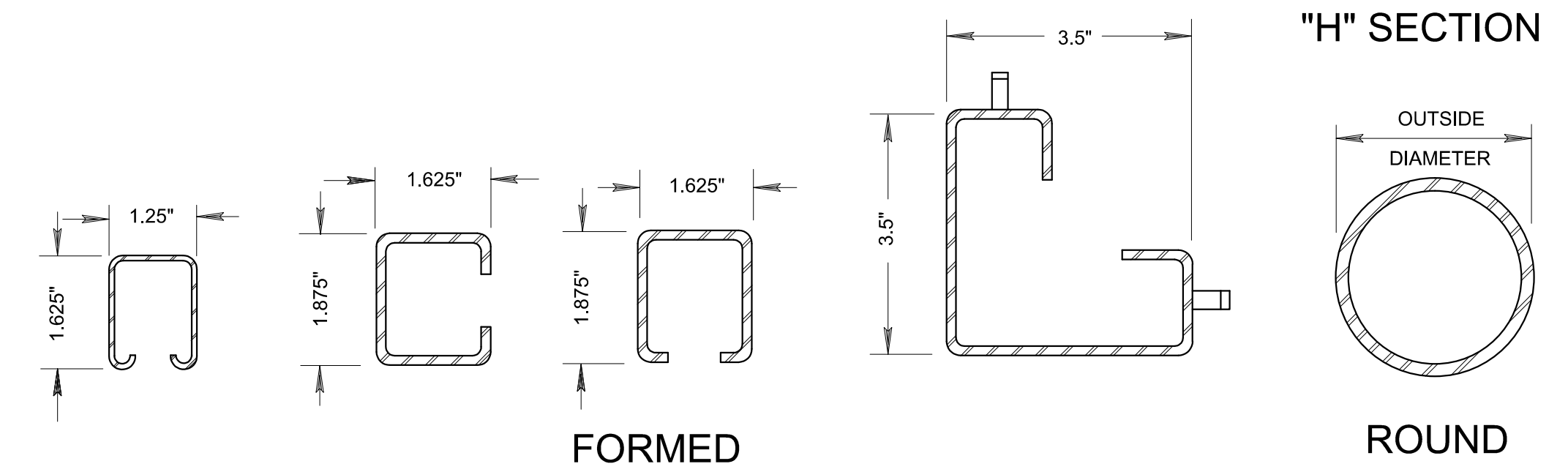


**VEHICLE GATE DETAIL**

- LEGEND**
1. STRAIGHT PLUG
  2. BOTTOM HINGE
  3. TOP HINGE
  4. CORNER ELBOW
  5. PLUNGER ROD
  6. LATCH FORK
  7. FORK CATCH
  8. PLUNGER ROD CATCH
  9. LOCK KEEPER GUIDE
  10. LOCK KEEPER
  11. ORNAMENTAL TOPS
  12. TRUSS RODS
  13. TENSION BAR
  14. HOOK BOLTS



**ALTERNATIVE POST TOP**



**CROSS SECTIONS OF POSTS AND RAILS**

**SHAPE, SIZE AND WEIGHT REQUIREMENTS FOR FENCE POSTS AND RAILS**

USE	FENCE HT. FEET	SHAPE	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./L.F.
TERMINAL POSTS	6 AND LESS	ROUND	2.375	3.65
	6 AND LESS	*ROUND	2.375	3.12
	OVER 6	ROUND	2.875	5.79
	OVER 6	*ROUND	2.875	4.64
	ALL HEIGHTS	FORMED	3.5 X 3.5	5.14
LINE POSTS	6 AND LESS	ROUND	1.90	2.72
		*ROUND	1.90	2.28
		"H" SECTION	2.25 X 1.70	3.26
	OVER 6	FORMED	1.875 X 1.625	1.65
		ROUND	2.375	3.65
		*ROUND	2.375	3.12
OVER 6	"H" SECTION	2.25 X 1.70	3.26	
	FORMED	1.875 X 1.625	2.28	
	FORMED	1.625 X 1.25	1.35	
BRACE RAIL	X	ROUND	1.66	2.27
		*ROUND	1.66	1.84
		FORMED	1.625 X 1.25	1.35

\* HIGH STRENGTH STEEL  
 \*\* INCLUDES END, CORNER, ANGLE, INTERSECTION AND INTERMEDIATE BRACED POSTS

**GATE FRAME MEMBERS, SIZE AND WEIGHT**

GATE FABRIC HEIGHT (FEET)	OUTSIDE DIMENSION (INCHES)	WEIGHT LBS./L.F.
6 OR LESS	Round	1.66
	Rectangular	1.50
	Rectangular	1.50
OVER 6	Round	1.90
	Round	1.90
	Rectangular	2.00
INTERIOR BRACING	Round	1.66
	Round	1.66
	Rectangular	1.50

\* HIGH STRENGTH STEEL

**CHAIN LINK FENCE**

**GATE POST SIZE AND WEIGHT**

GATE LEAF WIDTH (FEET)	POST SIZE (INCHES)	
	OUTSIDE DIAMETER (INCHES)	WEIGHT LBS./L.F.
6 AND UNDER	2.875	5.79
	2.875	* 4.64
OVER 6 TO 12	4.00	9.10
	4.00	* 8.65
OVER 12 TO 18	6.62	18.97
	6.62	* 18.02

\* HIGH STRENGTH STEEL

**GENERAL NOTES:**

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS. DETAILS NOT COVERED BY ANY OF THE ABOVE SHALL CONFORM TO THE MANUFACTURERS SPECIFICATIONS. USE FENCE FABRIC KNUCKLED AT BOTH SELVAGES. OMIT PLUNGER INSTALLATION

Project Name:  
**NORTHFIELD COMMUNITY SOLAR GARDENS**

Site Address:  
 2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057

Sheet Name:  
**FENCE DETAILS - 2**

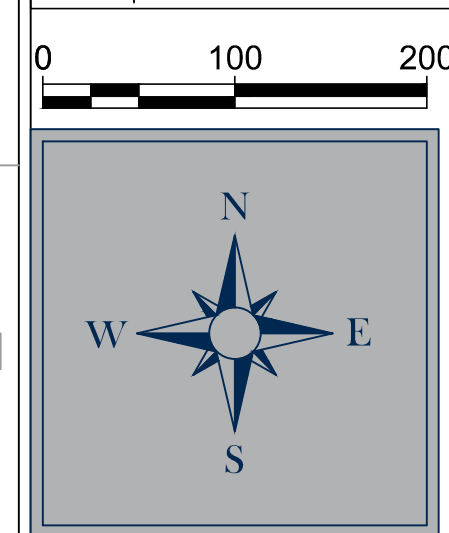
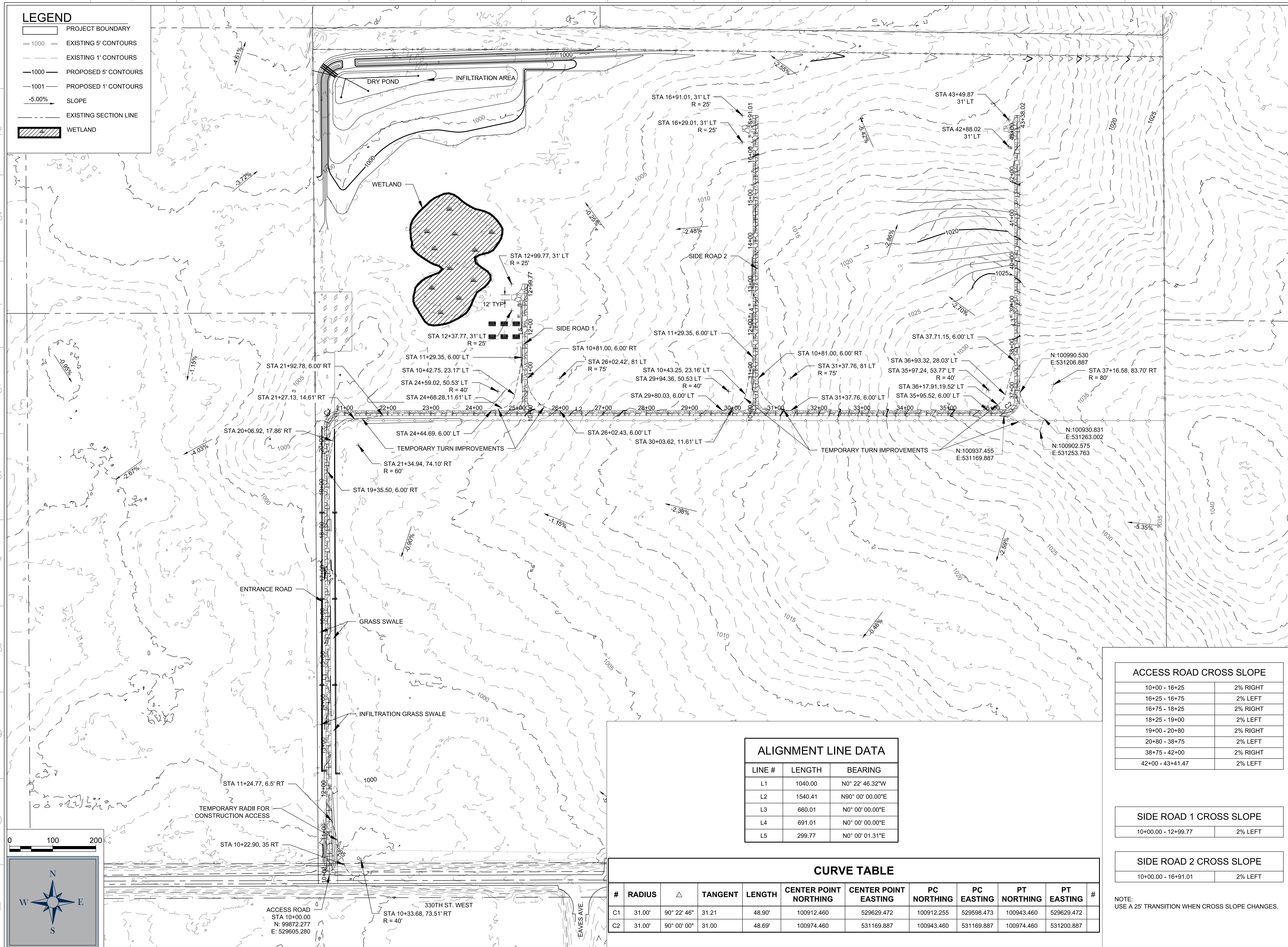
Scale: Project ID: 19774

Sheet No:  
**C-116**



**LEGEND**

	PROJECT BOUNDARY
	EXISTING 5' CONTOURS
	EXISTING 1' CONTOURS
	PROPOSED 5' CONTOURS
	PROPOSED 1' CONTOURS
	SLOPE
	EXISTING SECTION LINE
	WETLAND



**ALIGNMENT LINE DATA**

LINE #	LENGTH	BEARING
L1	1040.00	N0° 22' 46.32"W
L2	1540.41	N90° 00' 00.00"E
L3	660.01	N0° 00' 00.00"E
L4	691.01	N0° 00' 00.00"E
L5	299.77	N0° 00' 01.31"E

**CURVE TABLE**

#	RADIUS	Δ	TANGENT	LENGTH	CENTER POINT NORTHING	CENTER POINT EASTING	PC NORTHING	PC EASTING	PT NORTHING	PT EASTING	#
C1	31.00'	90° 22' 46"	31.21	48.90'	100912.460	529629.472	100912.255	529598.473	100943.460	529629.472	
C2	31.00'	90° 00' 00"	31.00	48.69'	100974.460	531169.887	100943.460	531169.887	100974.460	531200.887	

**ACCESS ROAD CROSS SLOPE**

10+00 - 16+25	2% RIGHT
16+25 - 16+75	2% LEFT
16+75 - 18+25	2% RIGHT
18+25 - 19+00	2% LEFT
19+00 - 20+80	2% RIGHT
20+80 - 38+75	2% LEFT
38+75 - 42+00	2% RIGHT
42+00 - 43+41.47	2% LEFT

**SIDE ROAD 1 CROSS SLOPE**

10+00.00 - 12+99.77	2% LEFT
---------------------	---------

**SIDE ROAD 2 CROSS SLOPE**

10+00.00 - 16+91.01	2% LEFT
---------------------	---------

NOTE:  
USE A 25' TRANSITION WHEN CROSS SLOPE CHANGES.

**M+W GROUP**  
 Gehrlcher Solar America Corp.  
 21 FADEM ROAD  
 SPRINGFIELD, NJ 07081  
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 Toll Free: +1 877 844 9174  
 Fax: +1 908 219 4375  
 Homepage: www.gehrlcher.us

Professional Engineer:  
**Mead & Hunt**  
 7900 West 78th Street,  
 Suite 370  
 Minneapolis, MN 55439  
 phone: 952-941-5619  
 meadhunt.com

PE Seal:  
**PROFESSIONAL ENGINEER**  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

**DRAWING ISSUE**

<input type="checkbox"/> Preliminary	<input checked="" type="checkbox"/> Construction
<input type="checkbox"/> Customer Approval	<input type="checkbox"/> As-built
<input type="checkbox"/> Permitting	<input type="checkbox"/> Other

**REVISIONS**

Rev	By	App	Description	Date
0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

Project Name:  
 NORTHFIELD COMMUNITY  
 SOLAR GARDENS

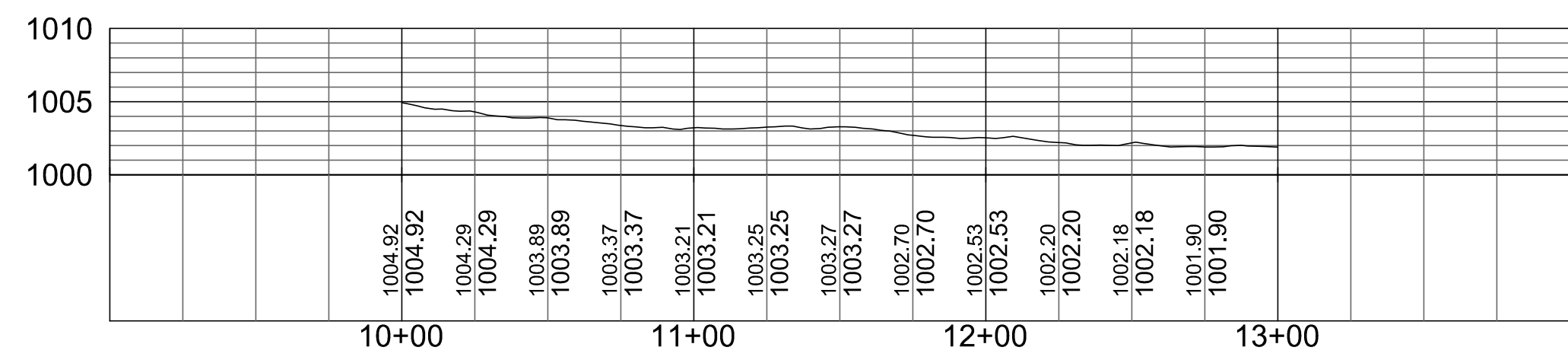
Site Address:  
 2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057

Sheet Name:  
 SITE PLAN

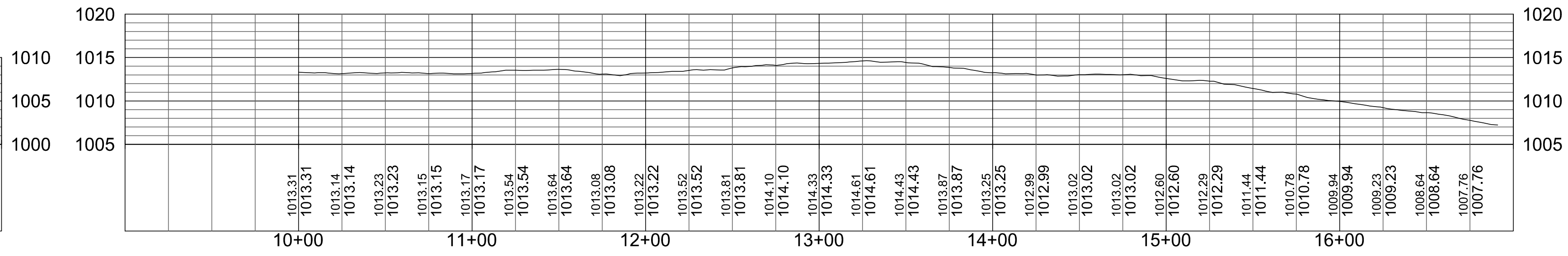
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 Sheet No:  
**C-117**



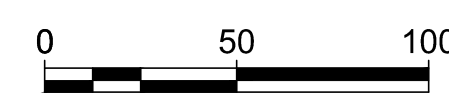
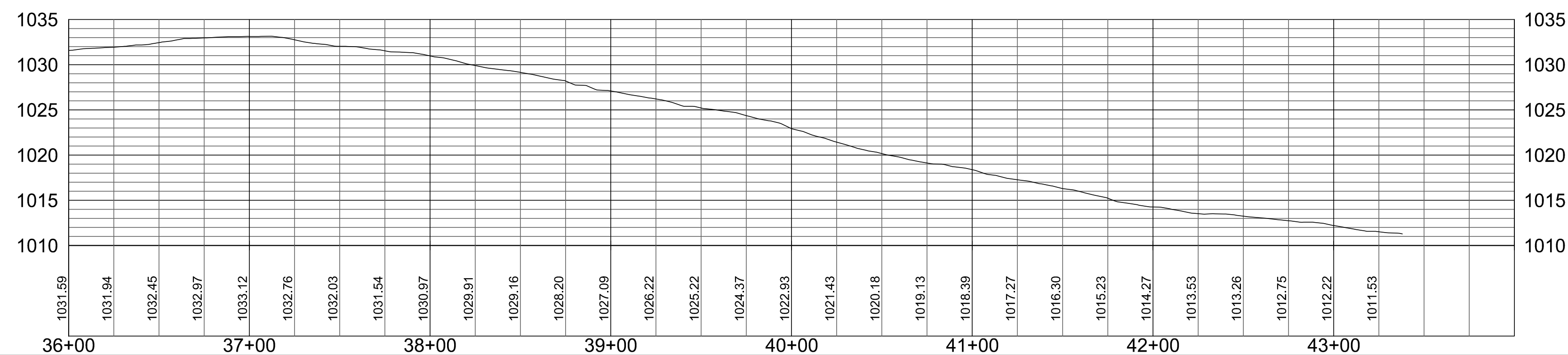
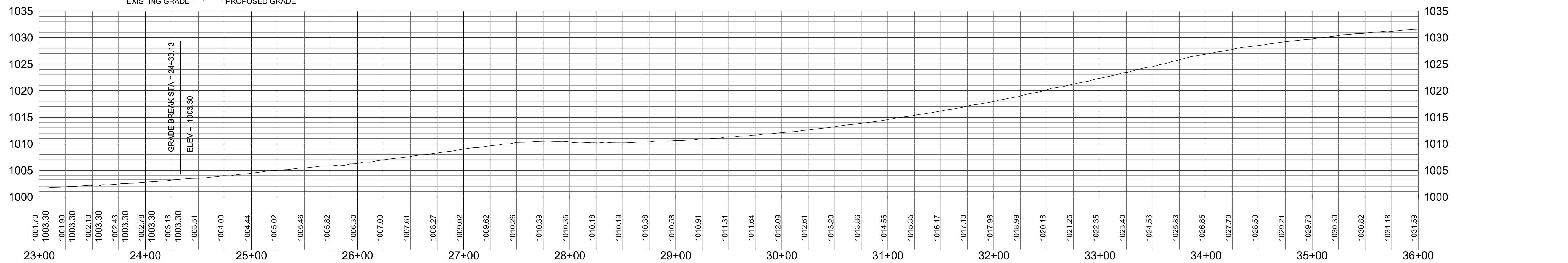
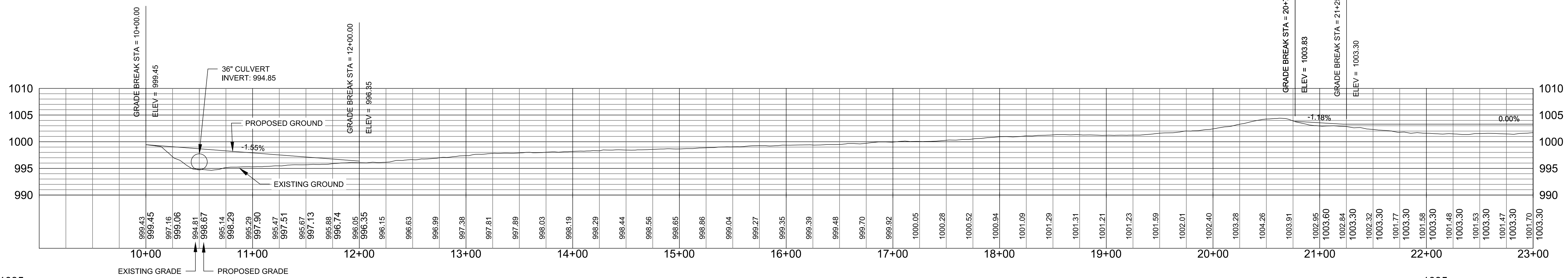
SIDE ROAD 1



SIDE ROAD 2



ACCESS ROAD



M+W GROUP

Gehrlicher Solar America Corp.  
 21 FADEM ROAD  
 SPRINGFIELD, NJ 07081  
 Phone Main: +1 908 219 4379  
 Toll Free: +1 877 844 9174  
 Fax: +1 908 219 4375  
 Homepage: www.gehrlicher.us

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Professional Engineer:  
**Mead & Hunt**  
 7900 West 78th Street,  
 Suite 370  
 Minneapolis, MN 55439  
 phone: 952-941-5619  
 meadhunt.com

PE Seal:  
**PROFESSIONAL ENGINEER**  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
 Signature: *Karen A. Wiemen*  
 Typed or Printed Name: Karen Wiemen  
 Date: 07/07/2016 License Number: 21122

DRAWING ISSUE

<input type="checkbox"/> Preliminary	<input checked="" type="checkbox"/> Construction
<input type="checkbox"/> Customer Approval	<input type="checkbox"/> As-built
<input type="checkbox"/> Permitting	<input type="checkbox"/> Other

REVISIONS

Rev	By	App	Description	Date
0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

Project Name:  
 NORTHFIELD COMMUNITY  
 SOLAR GARDENS

Site Address:  
 2300 NORTH AVE.  
 NORTHFIELD, MN  
 55057

Sheet Name:  
 ROAD PROFILES

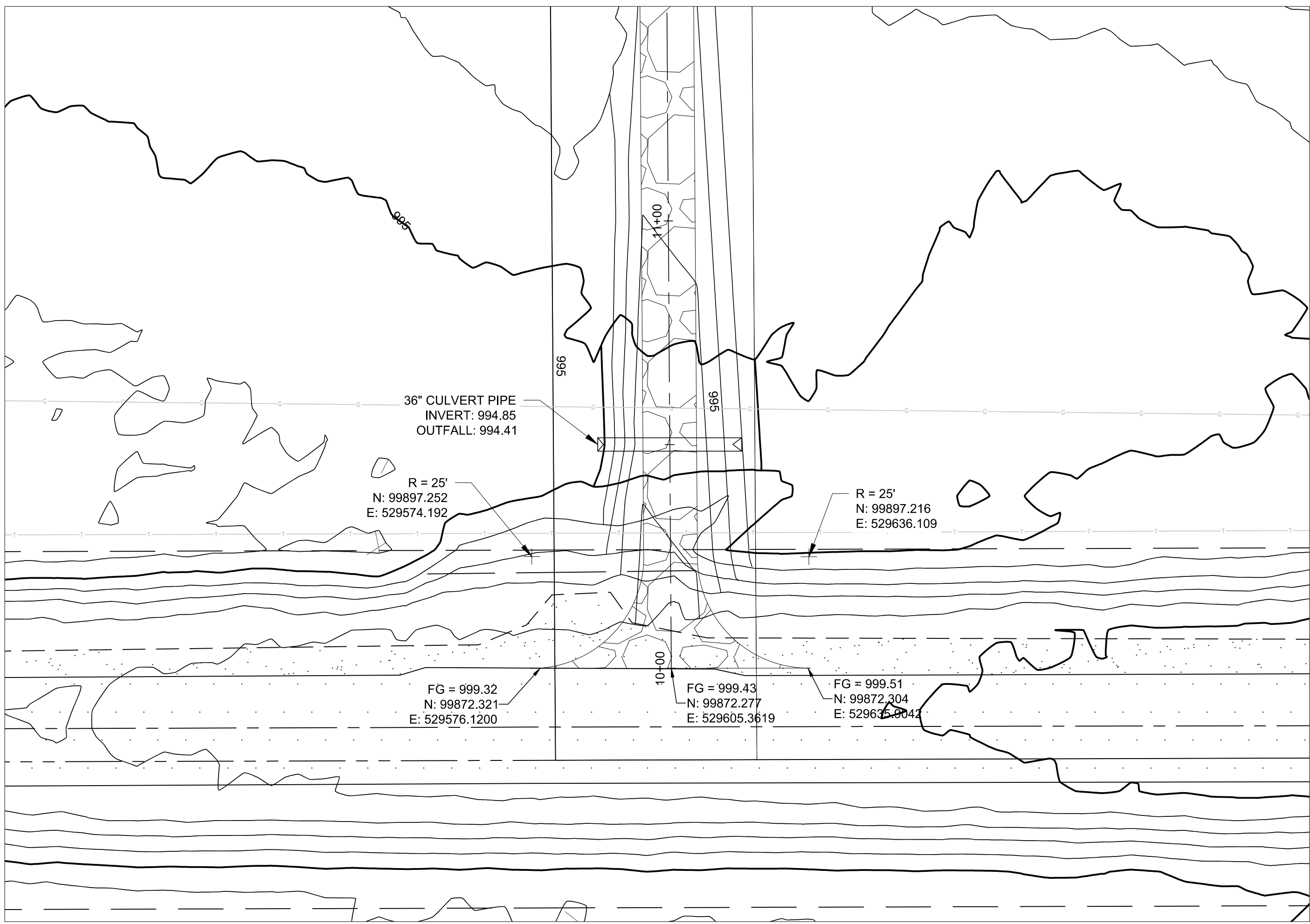
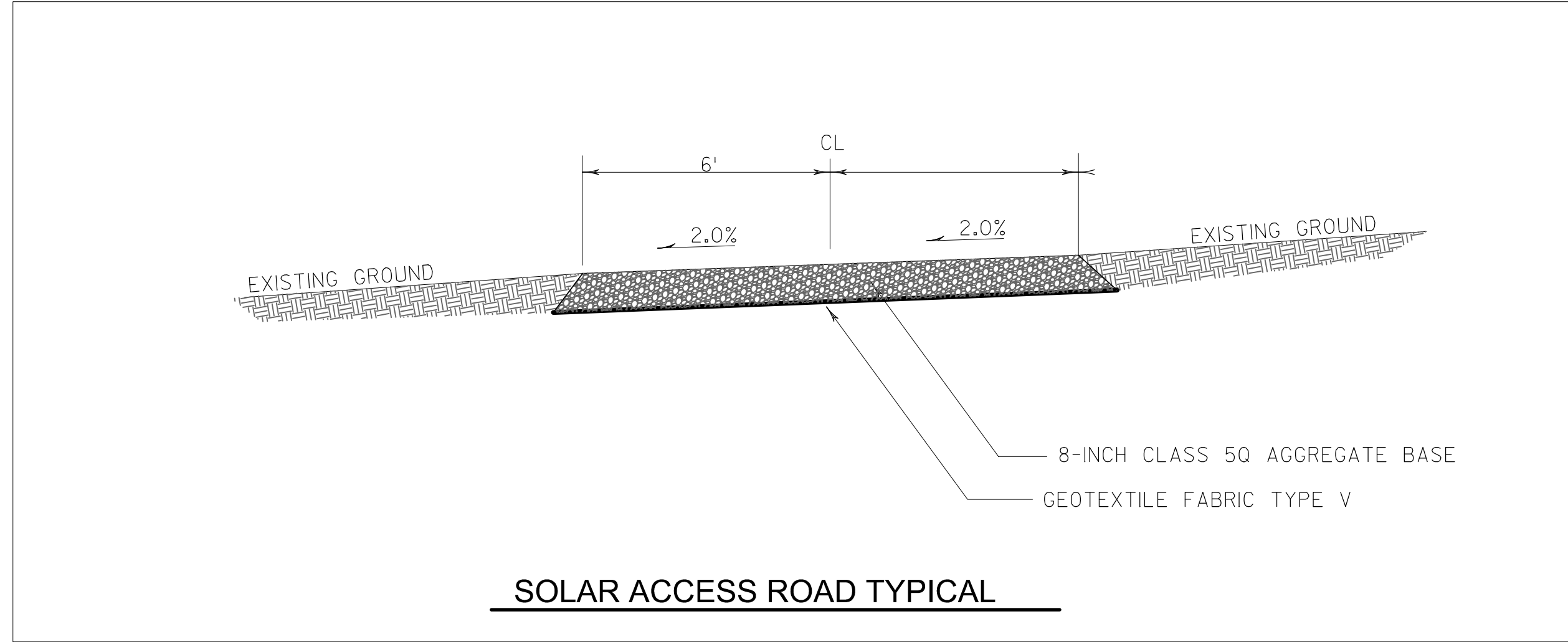
Scale: 1"=50' Project ID: 19774

Sheet No:  
**C-118**



A | B | C | D | E | F | G | H | I | J | K | L | M | N | O

P | Q



**SITE ACCESS ROAD**  
SCALE: 1" = 20'

**M+W GROUP**  
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SPRINGFIELD, NJ 07081  
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Professional Engineer:

7900 West 78th Street,  
Suite 370  
Minneapolis, MN 55439  
phone: 952-941-5619  
meadhunt.com

PE Seal:  
PROFESSIONAL ENGINEER  
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
Signature: *Karen Wiemen*  
Typed or Printed Name: Karen Wiemen  
Date: 07/07/2016 License Number: 211122

DRAWING ISSUE

Preliminary  Construction  
 Customer Approval  As-built  
 Permitting  Other

REVISIONS

Rev	By	App	Description	Date
0	JAK	***	ISSUE FOR CONSTRUCTION	07/07/2016

Project Name:  
NORTHFIELD COMMUNITY  
SOLAR GARDENS

Site Address:  
2300 NORTH AVE.  
NORTHFIELD, MN  
55057

Sheet Name:  
CONSTRUCTION  
DETAILS

Scale: Project ID: 19774

Sheet No:  
C-119

A | B | C | D | E | F | G | H | I | J | K | L | M | N | O

P | Q

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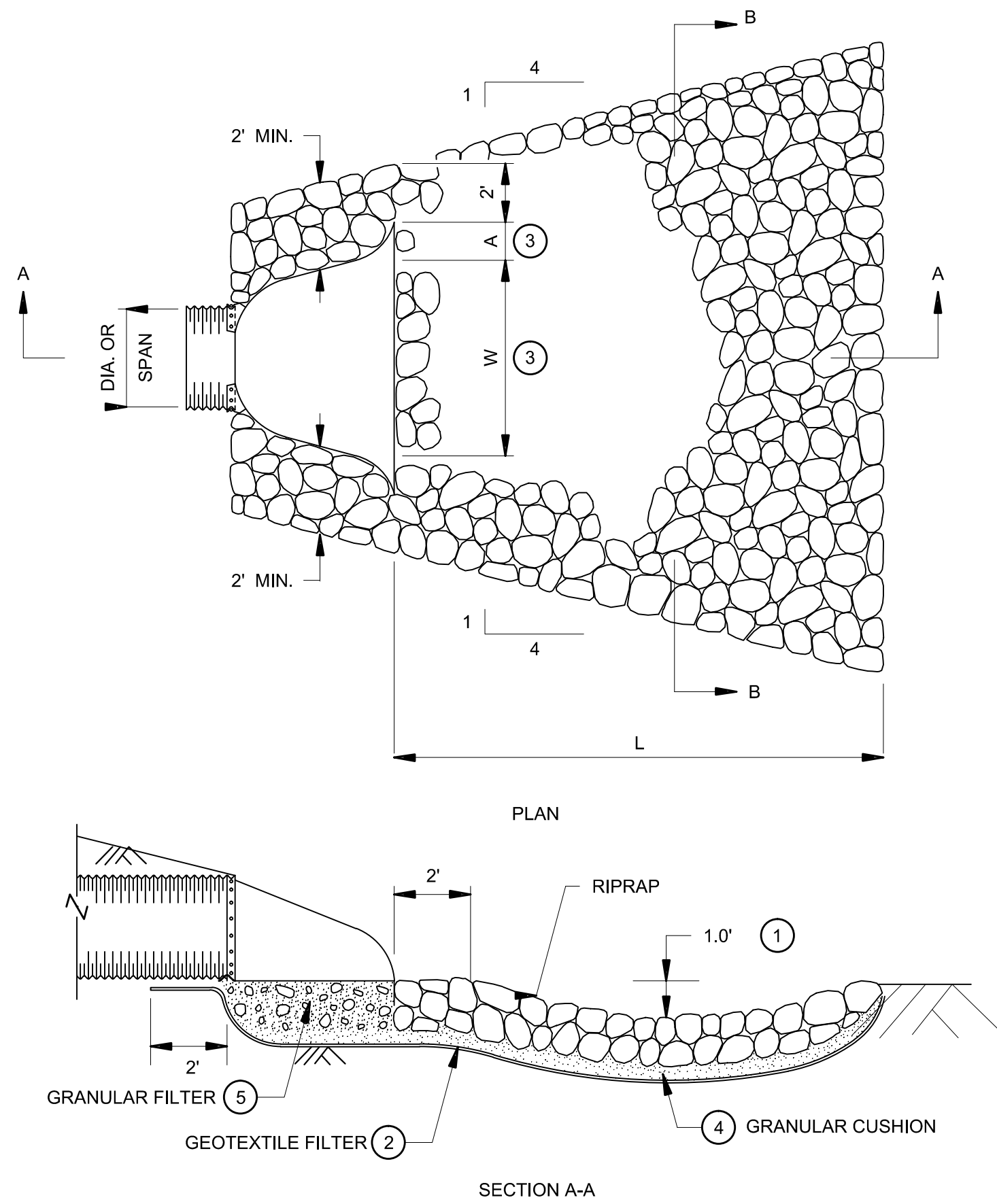


**TABLE OF QUANTITIES  
RIPRAP AT CSP OUTLETS**

DIA. OF ROUND PIPE (IN.)	L (FT.)	CLASS II $d_{50} = 6"$			CLASS III $d_{50} = 9"$			CLASS IV $d_{50} = 12"$		
		GEO-TEXTILE FILTER UNDER APRON (SQ.YD.)	GRANUL. FILTER UNDER APRON (CU.YD.)	12" DEPTH RIPRAP (CU.YD.)	GEO-TEXTILE FILTER UNDER APRON (SQ.YD.)	GRANUL. FILTER UNDER APRON (CU.YD.)	18" DEPTH RIPRAP (CU.YD.)	GEO-TEXTILE FILTER UNDER APRON (SQ.YD.)	GRANUL. FILTER UNDER APRON (CU.YD.)	24" DEPTH RIPRAP (CU.YD.)
12	8	16.4	0.2	3.0	19.2	0.2	4.5	22.3	0.3	6.0
15	8	17.8	0.2	3.3	20.7	0.3	4.9	23.9	0.4	6.6
18	10	22.9	0.3	4.6	26.2	0.5	6.8	29.7	0.6	9.1
21	10	24.5	0.4	4.9	27.9	0.6	7.3	31.5	0.8	9.7
24	12	30.4	0.5	6.4	34.2	0.8	9.5	38.2	1.0	12.7
30	14	38.9	0.8	8.5	43.2	1.2	12.7	47.7	1.5	16.9
36	16	48.3	1.1	10.8	53.1	1.6	16.2	58.1	2.1	21.6
42	18	58.7	1.5	13.5	64.0	2.2	20.2	69.5	2.9	27.0
48	20	68.5	1.8	16.0	74.2	2.7	24.0	80.1	3.5	32.0

**TABLE OF QUANTITIES  
RIPRAP AT CSP-A OUTLETS**

SPAN OF PIPE ARCH (IN.)	L (FT.)	CLASS II $d_{50} = 6"$			CLASS III $d_{50} = 9"$			CLASS IV $d_{50} = 12"$		
		GEO-TEXTILE FILTER UNDER APRON (SQ.YD.)	GRANUL. FILTER UNDER APRON (CU.YD.)	12" DEPTH RIPRAP (CU.YD.)	GEO-TEXTILE FILTER UNDER APRON (SQ.YD.)	GRANUL. FILTER UNDER APRON (CU.YD.)	18" DEPTH RIPRAP (CU.YD.)	GEO-TEXTILE FILTER UNDER APRON (SQ.YD.)	GRANUL. FILTER UNDER APRON (CU.YD.)	24" DEPTH RIPRAP (CU.YD.)
17	8	18.7	0.2	3.1	20.1	0.3	4.7	23.2	0.3	6.3
21	10	21.9	0.3	4.5	25.1	0.4	6.7	28.6	0.5	9.0
24	10	23.5	0.3	4.9	26.8	0.5	7.4	30.4	0.6	9.8
28	12	29.2	0.4	6.4	32.9	0.6	9.6	36.8	0.8	12.9
35	14	36.8	0.6	8.5	41.0	0.9	12.8	45.4	1.2	17.1
42	16	46.5	0.9	11.2	51.1	1.3	16.8	56.0	1.7	22.5
49	18	55.5	1.1	13.8	60.6	1.7	20.7	66.0	2.2	27.6
57	20	66.6	1.5	17.0	72.2	2.3	25.5	78.0	3.0	34.0



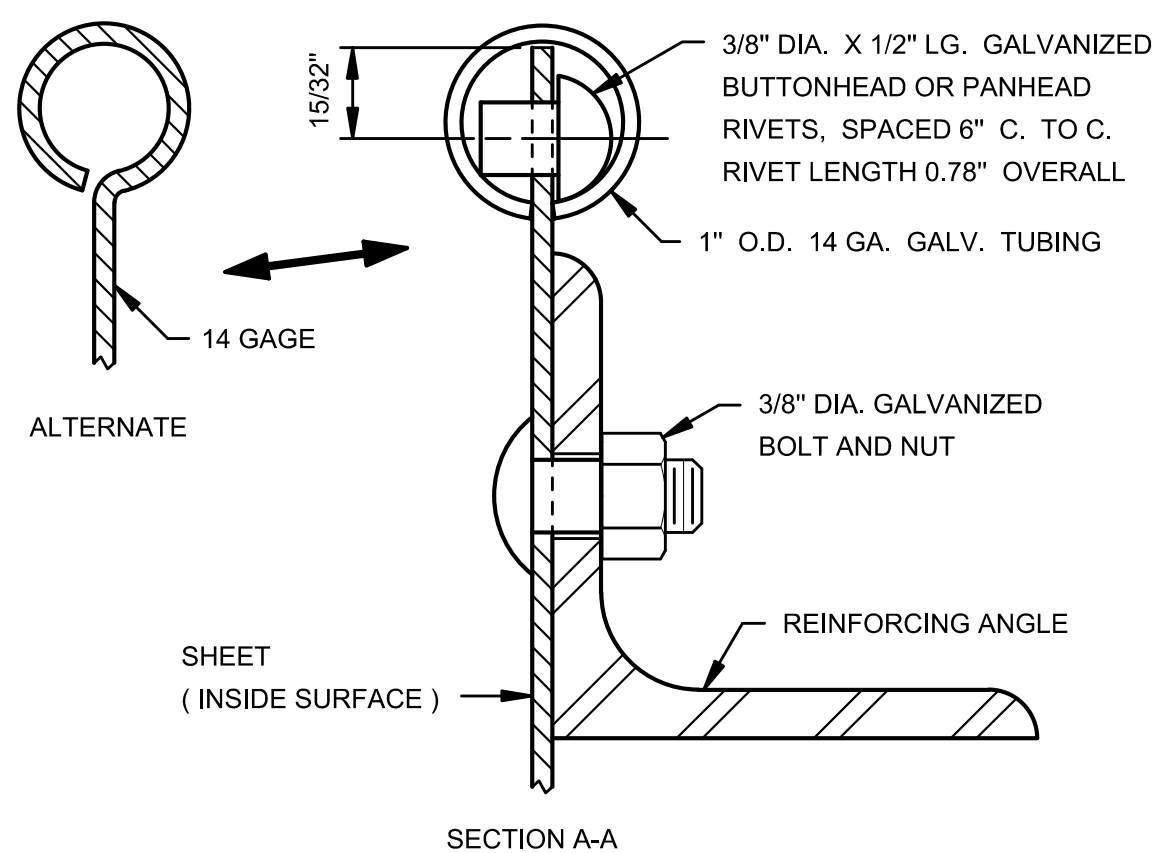
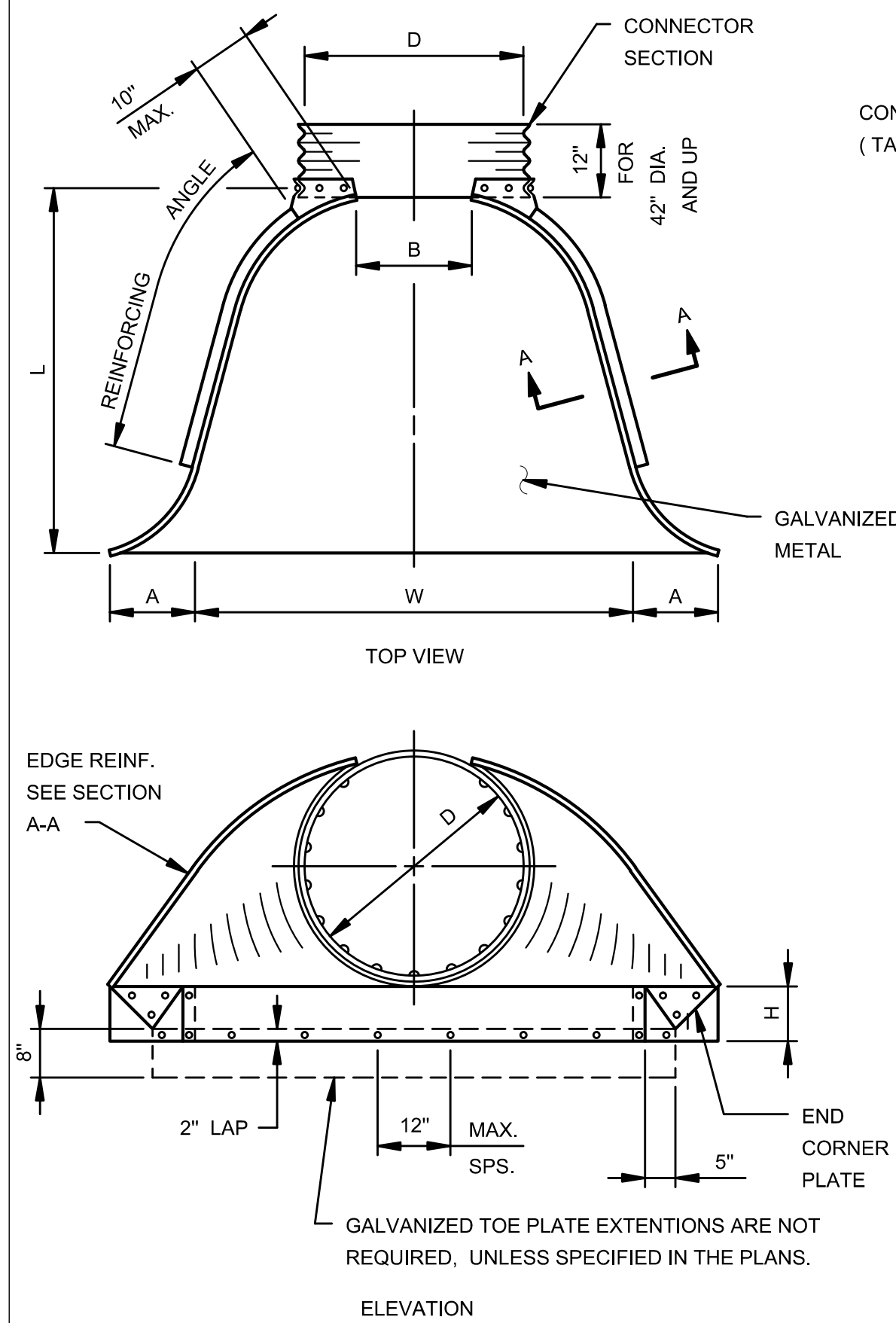
**RIPRAP AT CSP OUTLETS**

**NOTES:**

REQUIREMENTS FOR GEOTEXTILE TYPE, RIPRAP SIZE AND THICKNESS SHALL BE DESIGNATED IN THE PLANS.

PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A SPECIAL DESIGN.

- ① FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5".
- ② GEOTEXTILE FILTER, SPEC. 3733, SHALL COVER THE BOTTOM AND SIDES OF THE AREA EXCAVATED FOR THE RIPRAP, GRANULAR FILTER MATERIALS.
- ③ DIMENSIONS W AND A ARE GIVEN ON STANDARD PLATES 3122 AND 3123.
- ④ GRANULAR FILTER, SPEC. 3601, MAY BE USED AS A CUSHION LAYER. PLACE FILTER PER SPEC. 2511. THE CUSHION LAYER IS INCIDENTAL.
- ⑤ GRANULAR FILTER OR RIPRAP, SPEC. 3601, TO EXTEND UNDER ENTIRE OPEN PORTION OF PIPE APRON. DEPTH OF MATERIAL UNDER APRON SHALL MATCH RIPRAP DEPTH. WHEN USING RIPRAP INCREASE RIPRAP QUANTITY ACCORDINGLY AND PLACE A 3" LAYER OF 1.5" CRUSHED ROCK UNDER THE APRON TO AID IN GRADING FOR APRON PLACEMENT. CRUSHED ROCK IS INCIDENTAL.



**NOTES:**

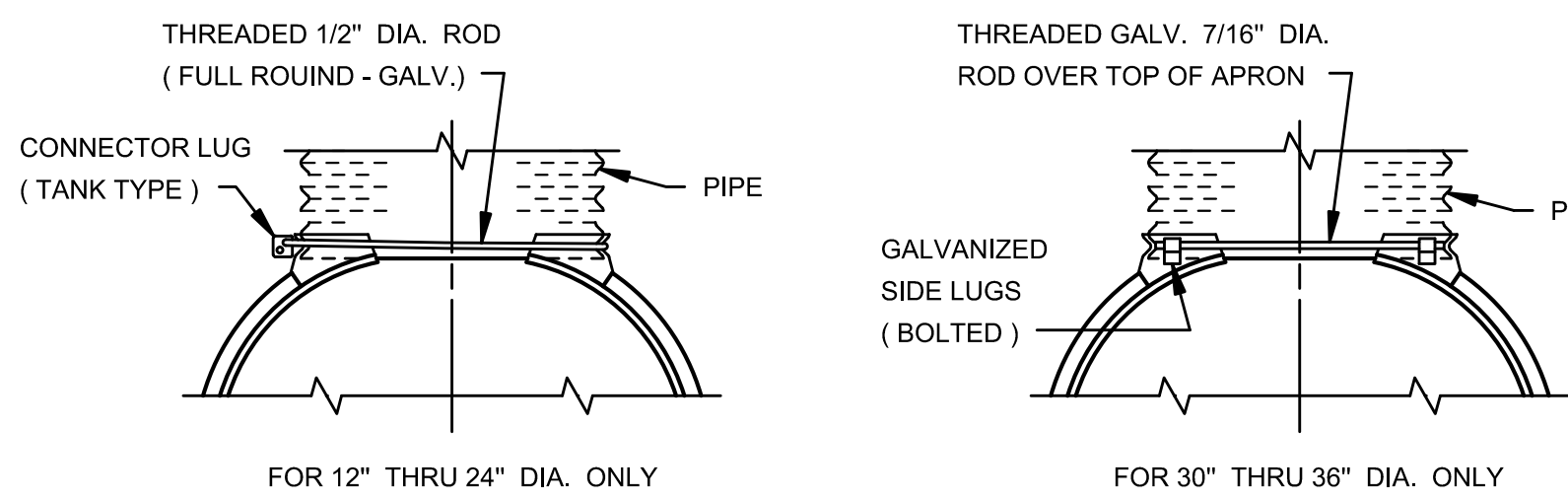
FOR OTHER APPROVED CONNECTIONS, SEE STANDARD PLATE 3124.

MULTIPLE PANEL BODIES SHALL HAVE 2" MIN. LAP SEAMS WHICH ARE TO BE JOINED BY 3/8" DIA. RIVETS OR BOLTS (GALVANIZED) SPACED AT 6" MAX. C. TO C. NUTS SHALL BE TIGHTENED TO 25 LB. TORQUE.

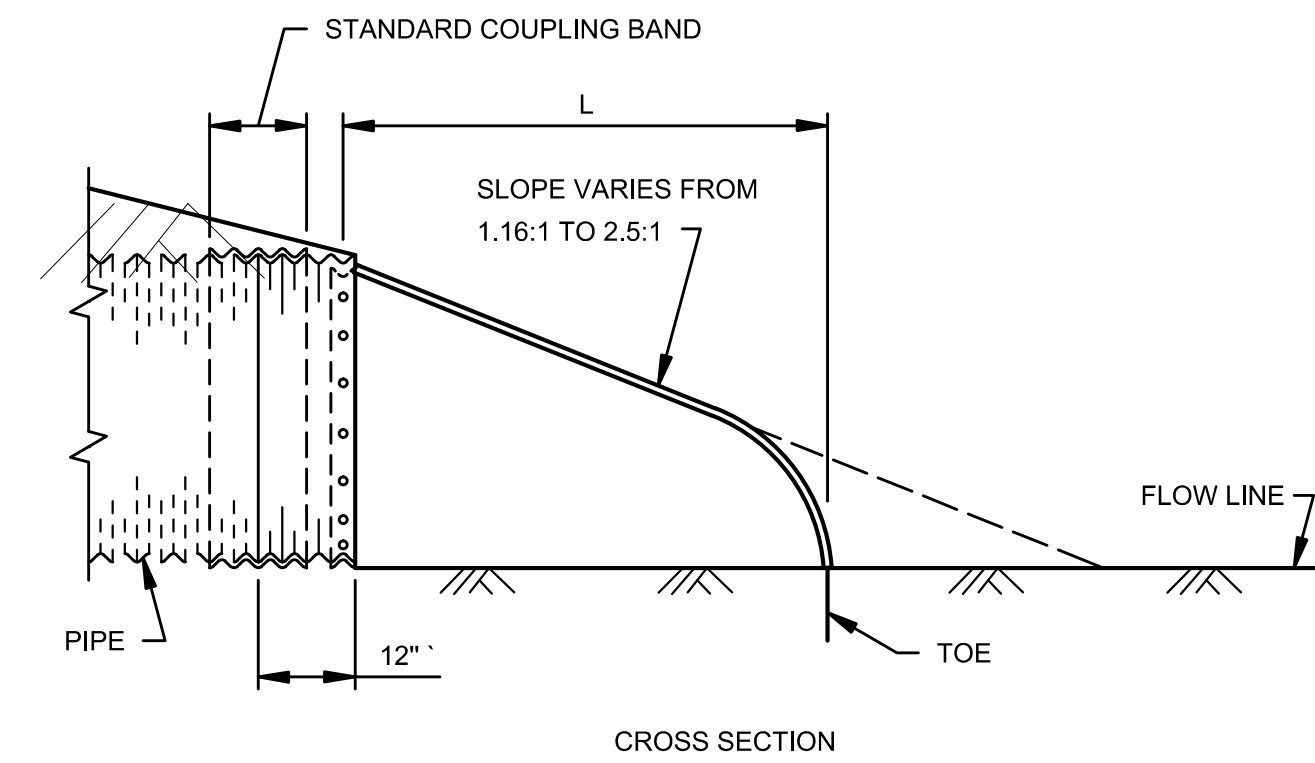
WHERE METAL APRONS ARE TO BE FASTENED TO HELICALLY CORRUGATED PIPE, AN APPROVED CONNECTION SHALL BE USED.

THE TOP EDGE OF ALL APRONS SHALL HAVE TUBING REINFORCING (SEE SECTION A-A). THE TUBING SHALL BE SUPPLEMENTED WITH 2" X 2" X 1/4" GALV. ANGLE FOR 60" THRU 72" DIA. AND 2-1/2" X 2-1/2" X 1/4" GALV. ANGLE FOR 78" AND 84" DIA. ALTERNATE ROLLED TOP EDGE DESIGNS APPROVED BY THE MN/DOT MATERIALS SECTION MAY BE USED.

**METAL APRON FOR C.S. PIPE**



**ALTERNATE ROD CONNECTIONS**



**CROSS SECTION**

PIPE DIA. (IN.)	GAUGE	DIMENSIONS					REMARKS
		A (IN.)	B MAX. (IN.)	H (IN.)	L 1-1/2" (IN.)	W 2" (IN.)	
12	16	6	6	6	21	24	1 PIECE
15	16	7	8	6	26	30	"
18	16	8	10	6	31	36	"
21	16	9	12	6	36	42	"
24	16	10	13	6	41	48	"
30	14	12	16	8	51	60	"
36	14	14	19	9	60	72	2 PIECES, < SPLICE
42	12	16	22	11	69	84	"
48	12	18	27	12	78	90	"
54	12	18	30	12	84	102	"
60	12	18	33	12	87	114	3 PIECES, 2 SPLICES
66	12	18	36	12	87	120	"
72	12	18	39	12	87	126	"
78	12	18	42	12	87	132	"
84	12	18	45	12	87	138	"

- ① A 2 PIECE APRON WITH < SPLICE MAY BE USED IN LIEU OF A 1 PIECE APRON.
- ② A 3 PIECE APRON WITH 2 SPLICES MAY BE USED IN LIEU OF A 2 PIECE APRON. THE 3 PIECE BODIES SHALL BE MADE OF 3 EQUAL SECTIONS OF 12 GA. MATERIAL.
- ③ 3 PIECE BODIES SHALL HAVE 12 GA. SIDES AND 10 GA. CENTER PANELS. WIDTH OF CENTER PANEL SHALL EXCEED 20% OF PIPES PERIPHERY.
- ④ FOR 12" THRU 24" DIA. PIPE, A FLAT STRAP CONNECTOR MAY BE USED IN PLACE OF THE ROD CONNECTION. STRAP CONNECTOR SHALL BE 1" WIDE, 12 GA. STRAP WITH STANDARD 6" LONG X 1/2" DIA. BAND BOLT AND NUT.
- ⑤ THE PIPE DIAMETER IS EQUAL TO DIMENSION D OF APRON.



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PE Seal:  
PROFESSIONAL ENGINEER  
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
Signature: *Karen Wiemen*  
Typed or Printed Name: Karen Wiemen  
Date: 07/07/2016 License Number: 21122

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Project Name:  
**NORTHFIELD COMMUNITY  
SOLAR GARDENS**

Site Address:  
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NORTHFIELD, MN  
55057**

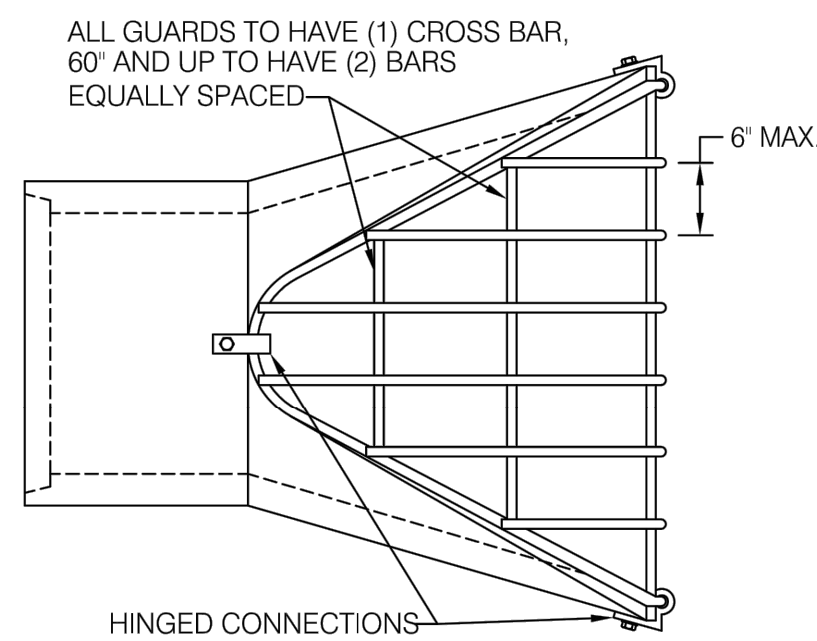
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DETAILS - 2**

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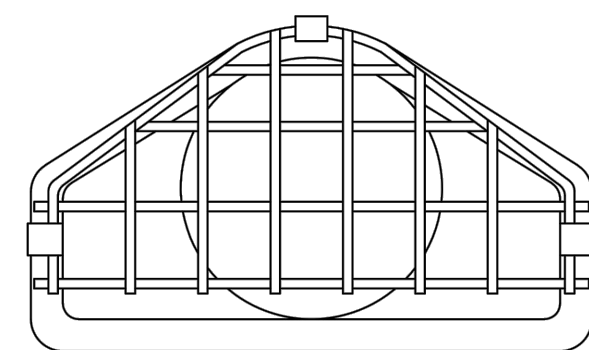
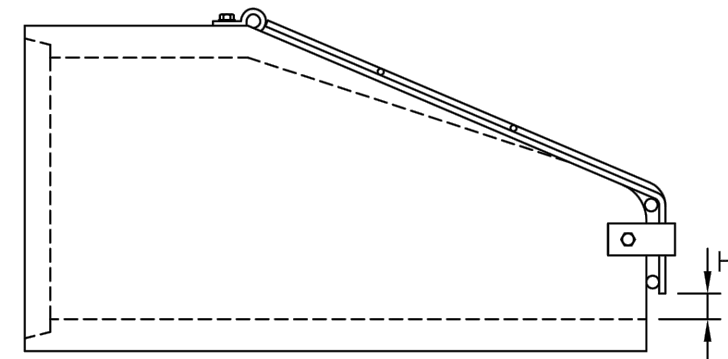
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### TRASH GUARDS FOR FLARED END SECTIONS



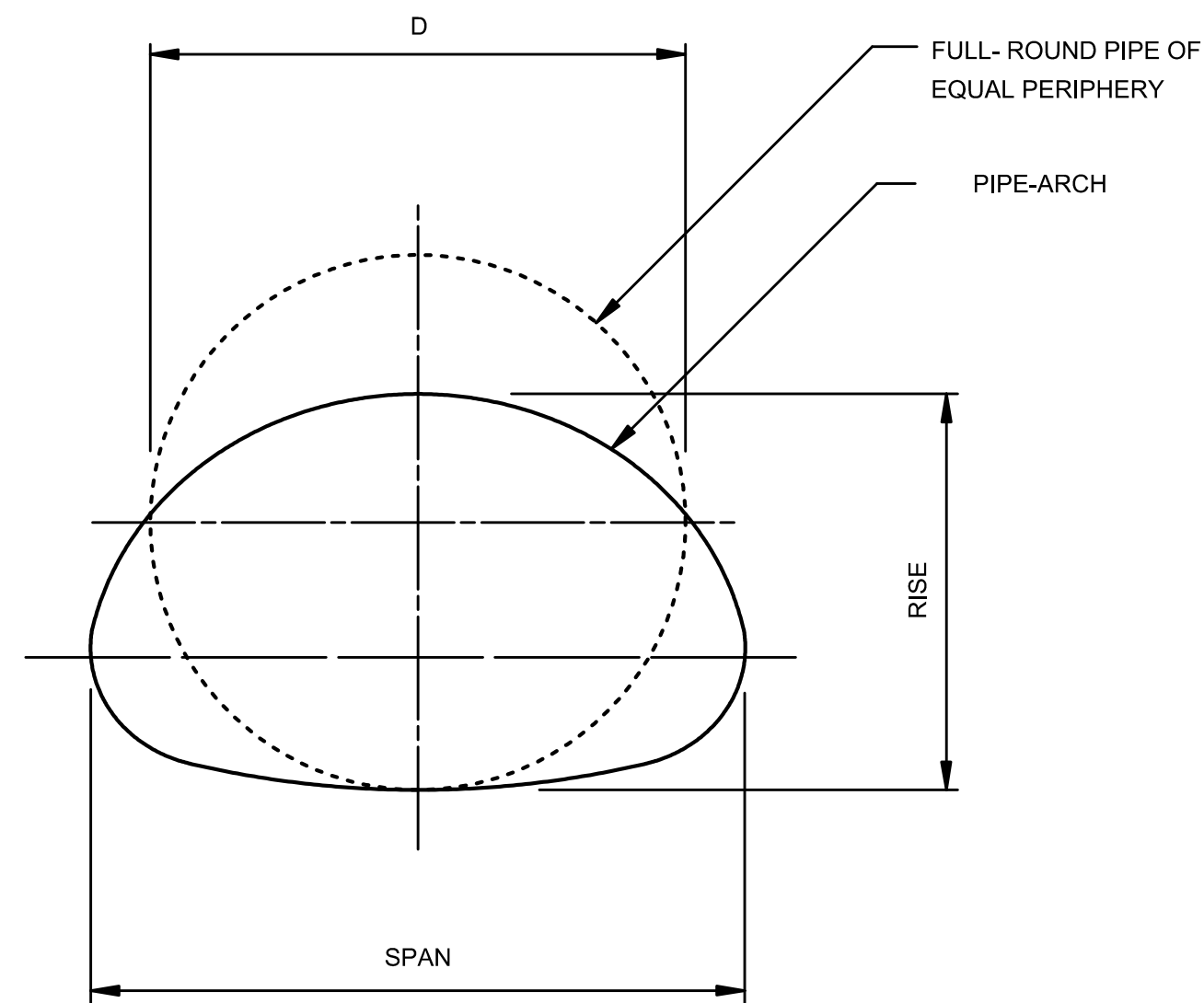
ROUND		
PIPE SIZE	H	
12"	2 1/2"	
15"	3"	
18"-24"	4"	
27"-36"	5"	
42"-54"	6"	
60"-72"	7"	
78"-90"	8"	



BAR SIZES							
STANDARD DESIGN				HEAVY DESIGN			
PIPE SIZE	HOLE DIA REQD	BOLT DIA	BAR SIZE	PIPE SIZE	HOLE DIA REQD	BOLT DIA	BAR SIZE
12"-24"	3/4"	5/8"	5/8"	12"-18"	3/4"	5/8"	3/4"
27"-48"	7/8"	3/4"	3/4"	21"-42"	7/8"	3/4"	1"
54"-90"	1 1/8"	1"	1"	48"-90"	1 1/8"	1"	1 1/4"

BOLT LENGTH = PIPE WALL THICKNESS + 2 1/2"

Note:  
Hot dip galvanized per ASTM A153.



SHEET THICKNESS - GAGE RELATIONSHIP		
GAGE	THICKNESS - EQUIVALENT	
	GALV. STEEL (IN.)	ALUM. ALLOY (IN.)
18	.0516	.048
16	.0635	.060
14	.0785	.075
12	.1084	.105
10	.1382	.135
8	.1681	.164

ROUND PIPE			PIPE-ARCH			
PIPE DIA. (IN.)	END AREA SQ. FT.	GAGE (MIN.)	SPAN (IN.) ①	RISE (IN.) ①	END AREA SQ. FT.	GAGE (MIN.)
6	0.2	18				
8	0.4	16				
10	0.6	16				
12	0.8	16				
15	1.2	16	17	13	1.1	16
18	1.8	16	21	15	1.5	16
21	2.4	16	24	18	2.2	16
24	3.1	16	28	20	2.8	16
30	4.9	14	35	24	4.4	14
36	7.1	14	42	29	6.4	14
42	9.6	12	49	33	8.7	12
48	12.6	12	57	38	11.4	12
54	15.9	12	64	43	14.3	12
60	19.6	10	71	47	17.6	10
66	23.8	10	77	52	21.3	8
72	28.3	10	83	57	25.3	8
78	33.2	8				
84	38.5	8				

ROUND PIPE SHALL HAVE THE VERTICAL AXIS ELONGATED 5% MORE THAN THE NORMAL DIAMETER WHEN CALLED FOR IN THE PLANS.

THE AVERAGE INSIDE DIAMETER OF CIRCULAR PIPE AND PIPE TO BE REFORMED INTO PIPE ARCHES SHALL NOT VARY MORE THAN ONE PERCENT OR ONE-HALF INCH, WHICHEVER IS GREATER, FROM THE NOMINAL DIAMETER WHEN MEASURED ON THE INSIDE CREST OF THE CORRUGATIONS.

FOR PIPE-ARCH A TOLERANCE OF PLUS OR MINUS ONE INCH OR TWO PERCENT OF THE EQUIVALENT CIRCULAR DIAMETER, WHICHEVER IS GREATER, WILL BE PERMISSIBLE IN SPAN AND RISE. ALL DIMENSIONS ARE MEASURED FROM THE INSIDE CRESTS OF THE CORRUGATIONS.

① SEE AASHTO M196M FOR ALUMINUM PIPE-ARCH VALUES.

### CORRUGATED METAL PIPE CULVERT

STANDARD 2-2/3" x 1/2" CORRUGATION

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PROFESSIONAL ENGINEER  
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.  
Signature: *Karen Wiemen*  
Typed or Printed Name: Karen Wiemen  
Date: 07/07/2016 License Number: 21122

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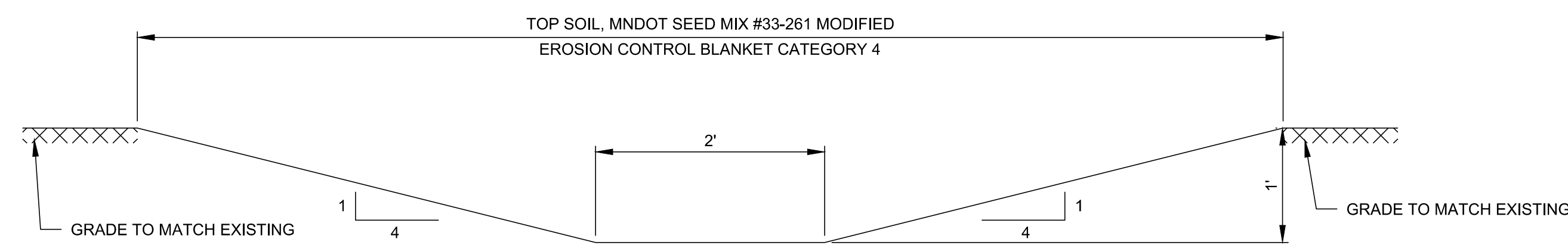
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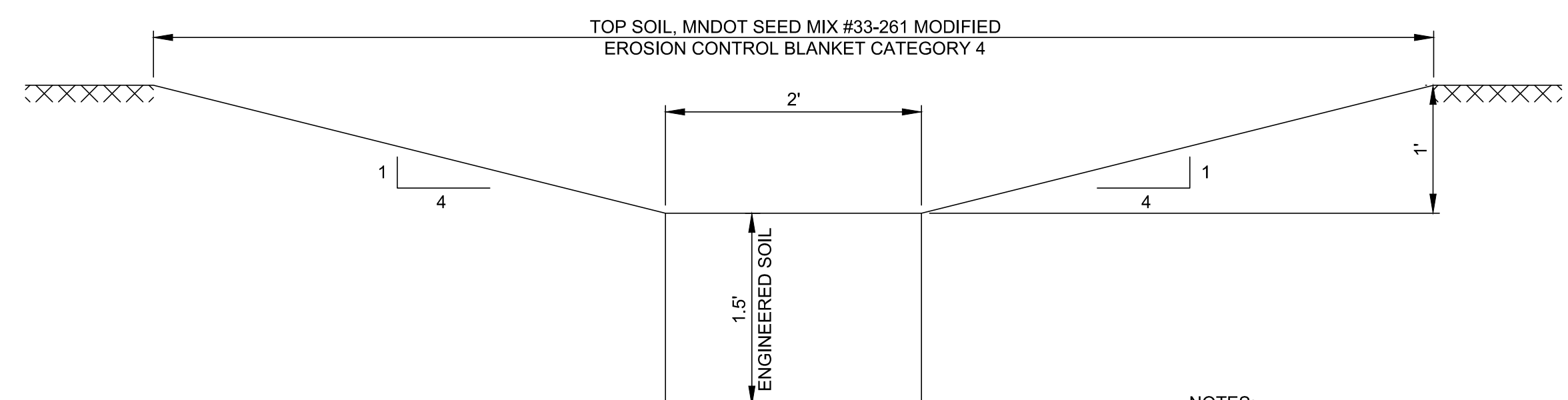
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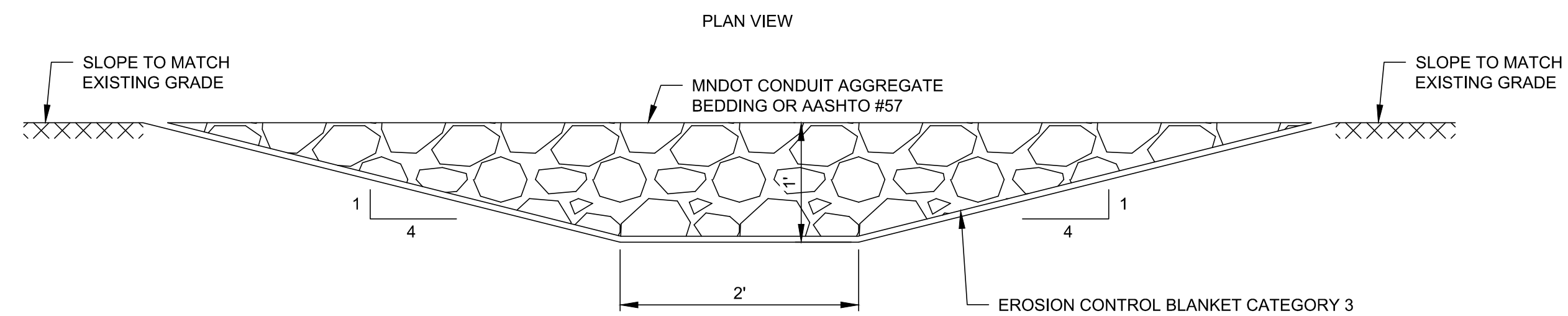


**GRASS SWALE SECTION**

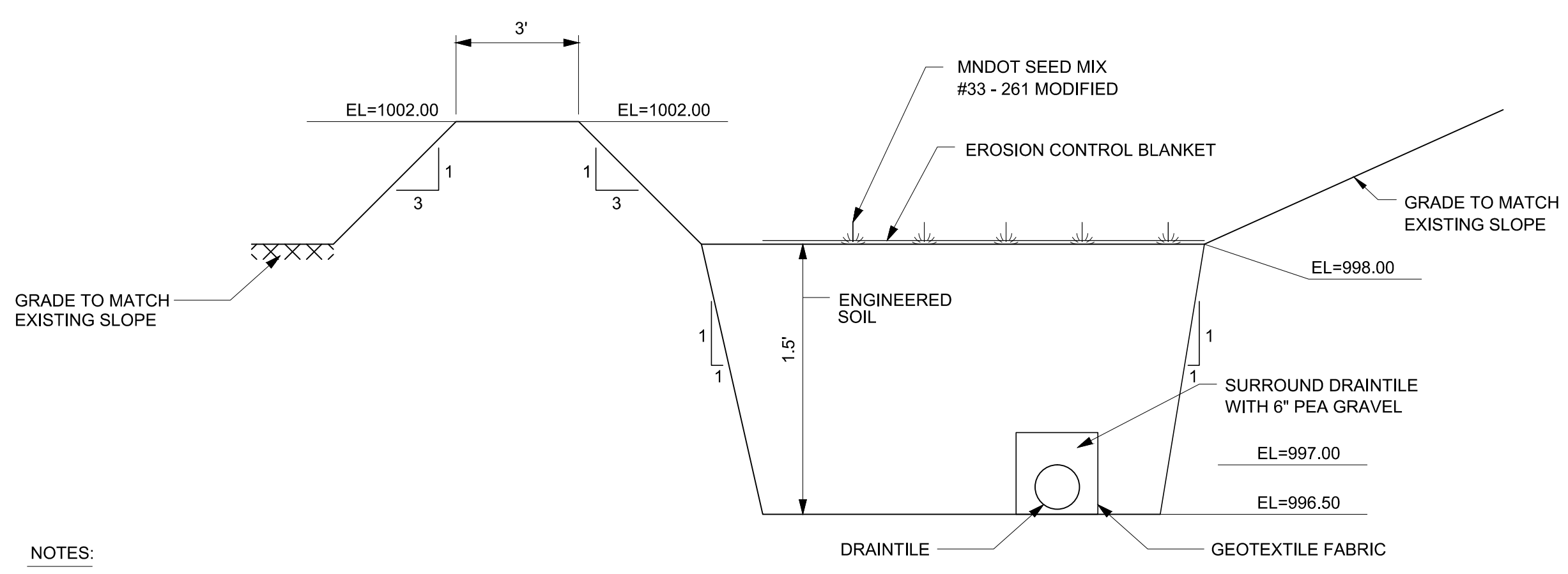
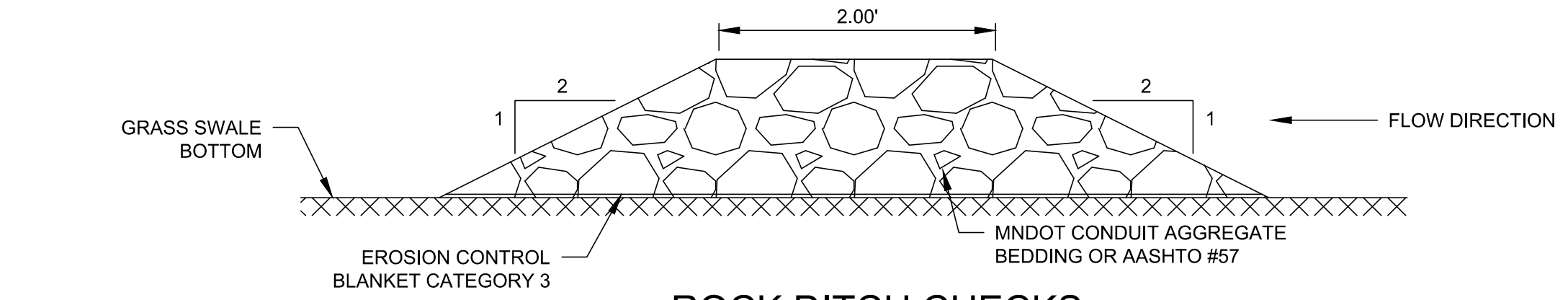


**INFILTRATION GRASS SWALE**

- NOTES:
- ENGINEERED SOIL:  
70-85% = MINERAL SAND (97% SiO<sub>2</sub>)  
15-30% = COMPOST

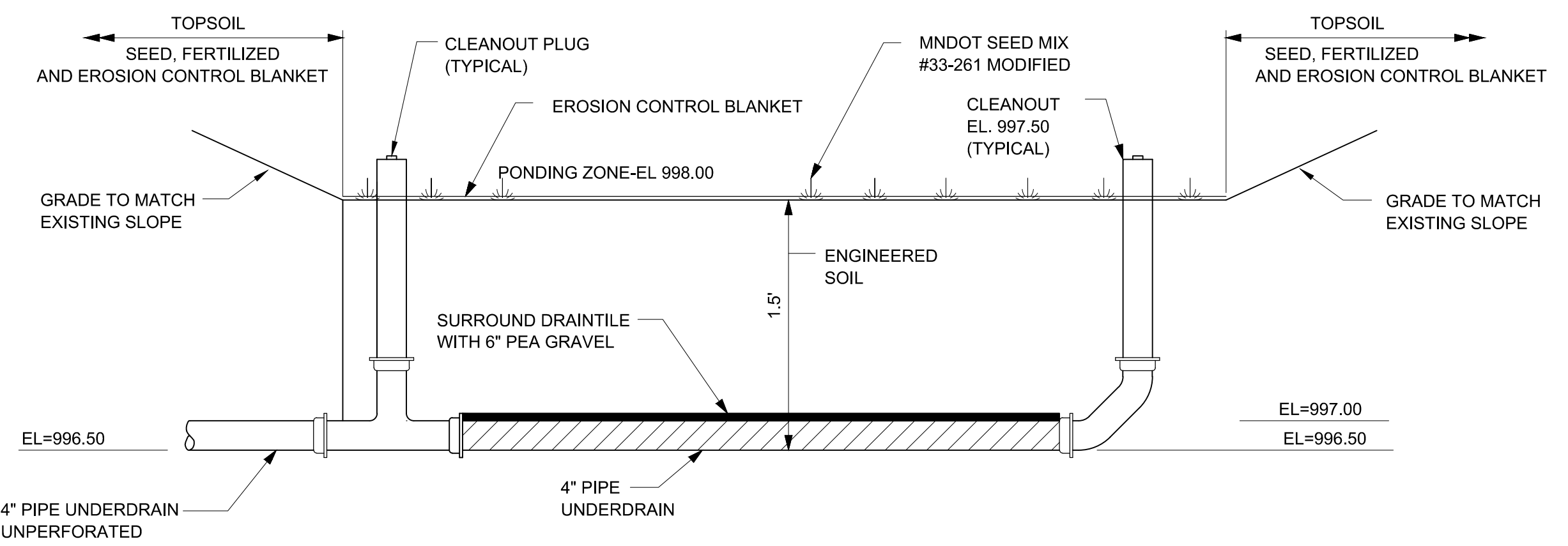


**ROCK DITCH CHECKS**



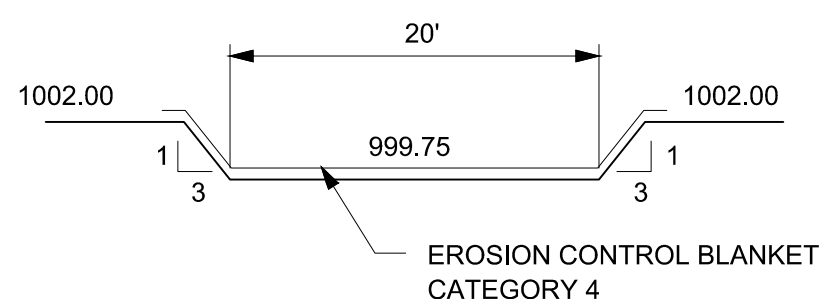
**SECTION A-A**  
NOT TO SCALE

- NOTES:
- ENGINEERED SOIL:  
70-85% = MINERAL SAND (97% SiO<sub>2</sub>)  
15-30% = COMPOST
  - USE:  
USDA COURSE SAND (0.02-0.04 IN),  
ASTM C33 FINE AGGREGATE SAND OR  
FINE AGGREGATE CONCRETE SAND



**SECTION B-B**  
NOT TO SCALE

**DRY POND INFILTRATION BASIN**  
NOT TO SCALE



**SECTION C-C**  
NOT TO SCALE

**OVERFLOW WEIR**  
NOT TO SCALE

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of the state of Minnesota.  
Signature: *Karen Wiemen*  
Typed or Printed Name: Karen Wiemen  
Date: 07/07/2016 License Number: 21122

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DETAILS - 4**

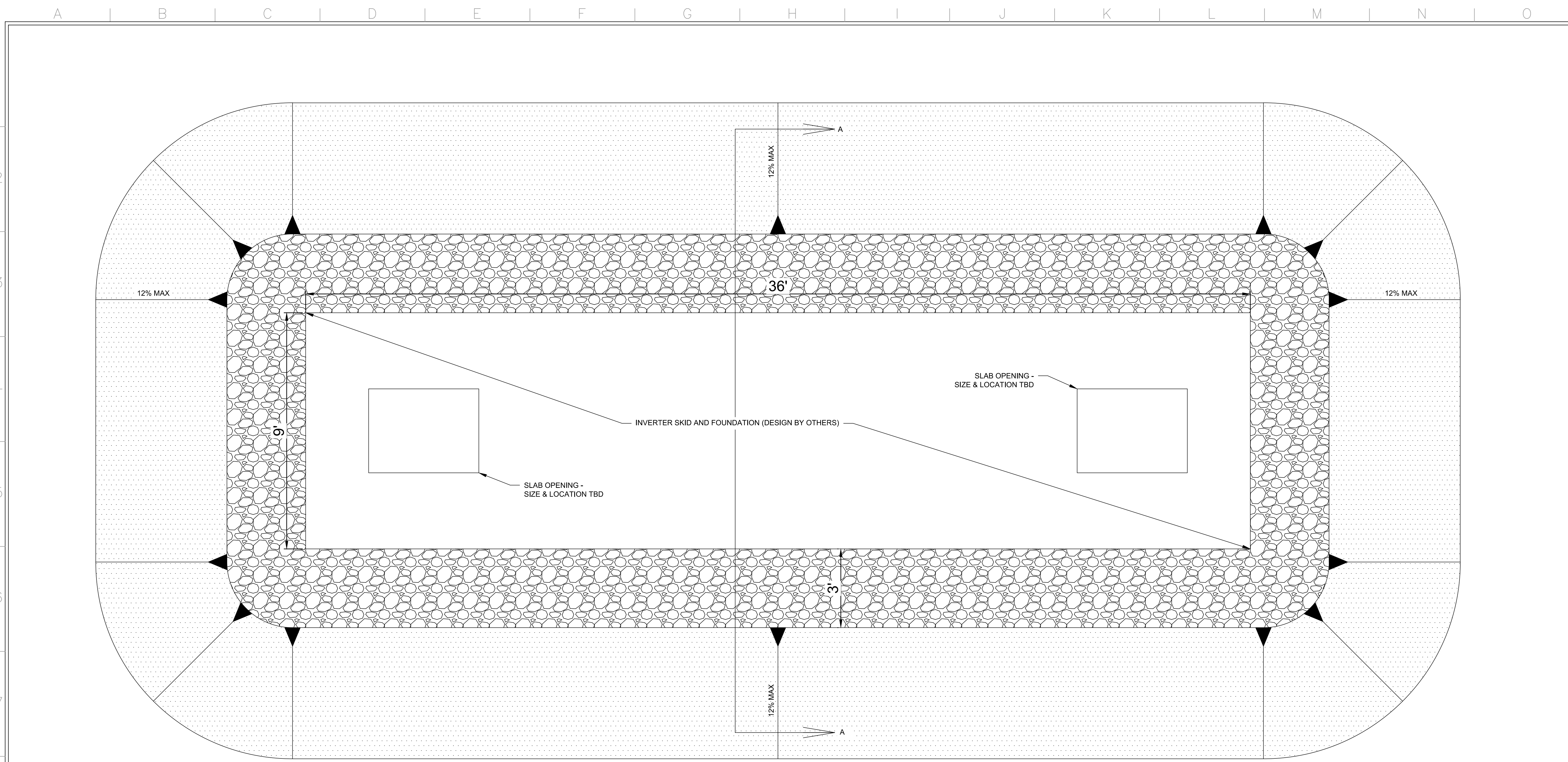
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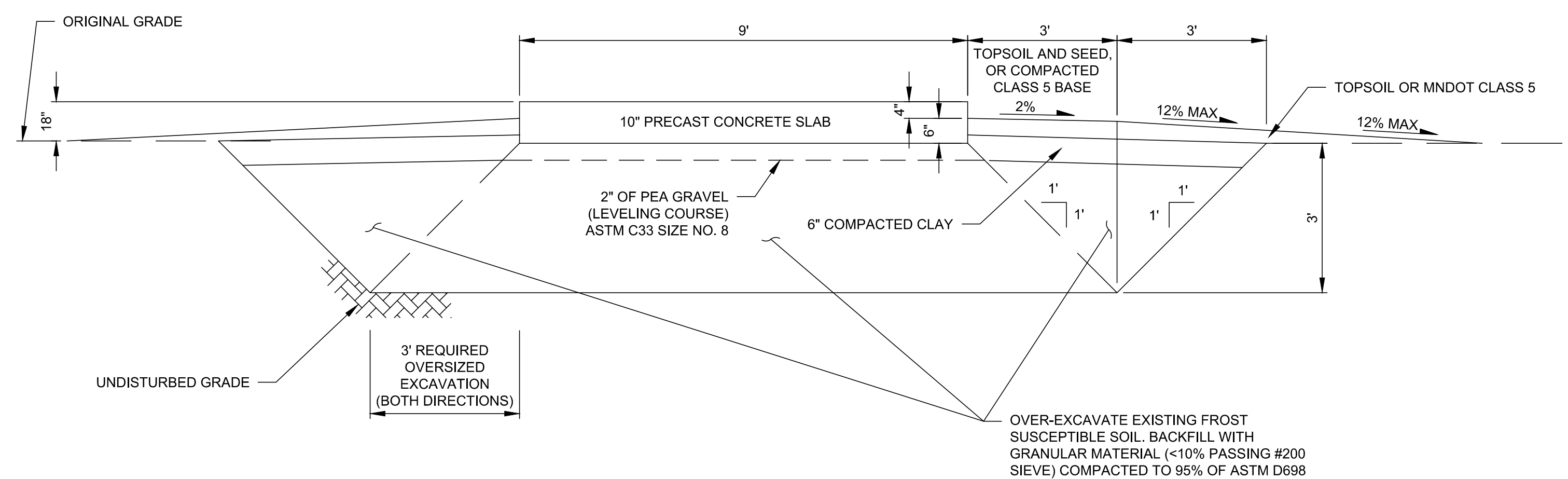
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INVERTER SUPPORT PAD - PLAN VIEW



SECTION A-A  
INVERTER SUPPORT PAD

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 Signature: *Karen L. Wiemer*  
 Typed or Printed Name: Karen Wiemer  
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 DETAILS

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