MICHAUD LAW GROUP
RENEWABLE ENERGY LAW IS OUR BUSINESS

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515 Centerpoint Dr., Suite 502
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www.mlgcleanenergy.com

May 28, 2021

VIA CERTIFIED MAIL AND ELECTRONIC FILING

Melanie A. Bachman, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **PETITION NO. 1427** – SunJet Energy, LLC notice of election to waive exclusion from Connecticut Siting Council jurisdiction, pursuant to Connecticut General Statutes § 16-50k (e), and petition for a declaratory ruling, pursuant to Connecticut General Statutes § 4-176 and § 16-50k, for the proposed construction, maintenance and operation of a 1.0-megawatt or less AC solar photovoltaic electric generating facility and associated electrical interconnection located at 0 Matthews Street and 125 Hill Street, Bristol, Connecticut: **Compliance Filings (Conditions)**

Dear Executive Director Bachman:

On January 15, 2021, the Connecticut Siting Council ("Council") issued a declaratory ruling in favor of Petition No. 1427 ("Declaratory Ruling"). Subsequently, SunJet Energy, LLC ("SunJet"), transferred its interests in the above-referenced solar project to TRITEC Americas, LLC ("TRITEC").

TRITEC hereby submits the attached documents in compliance with Condition Items 2 through 7. Please contact me if you have any questions.

Respectfully submitted,

SUNJET ENERGY, LLC

By: Paul R. Michaud
Paul R. Michaud

Its Attorney

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Bureau of Materials Management and Compliance Assurance

Notice of Permit Authorization

May, 27 2021

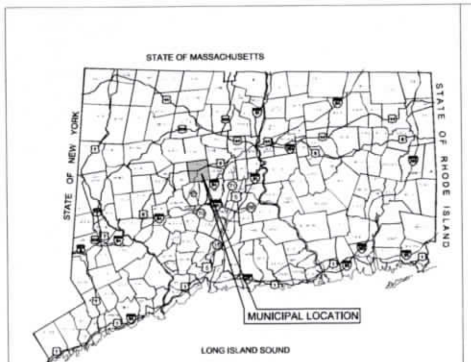
PAUL MICHAUD
SUNJET ENERGY LLC
28 Pocotopaug Dr
East Hampton, CT 06424-1377

Subject: General Permit Registration for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities
Application NO.: 202011679

PAUL MICHAUD:

The Department of Energy and Environmental Protection, Water Permitting and Enforcement Division of the Bureau of Materials Management and Compliance Assurance, has completed the review of the BRISTOL SOLAR (located at Matthews Street & Hill Street, Bristol) registration for the **General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective 10/1/13 (general permit)** . The project is compliant with the requirements of the general permit and the discharge(s) associated with this project is (are) authorized to commence as of the date of this letter. Permit No. GSN003634 has been assigned to authorize the stormwater discharge(s) from this project.

Questions can be emailed to deep.stormwater@ct.gov.



STATE OF CONNECTICUT

SUNJET, LLC

"BRISTOL SOLAR"

MATTHEWS ST. & HILL ST.
BRISTOL, CT 06010

LIST OF DRAWINGS

T-1 TITLE SHEET & INDEX

IMPROVEMENT LOCATION SURVEY PROVIDED BY DUFOUR SURVEYING, LLC

AB-1 ABUTTERS MAP

GN-1 SITE NOTES

EN-1 ENVIRONMENTAL NOTES

EC-1 SEDIMENTATION & EROSION CONTROL NOTES

EC-2 SEDIMENTATION & EROSION CONTROL DETAILS

EC-3 SEDIMENTATION & EROSION CONTROL PLAN

SP-1 SITE & UTILITY PLAN

GP-1 GRADING & DRAINAGE PLAN

DN-1 SITE DETAILS

DN-2 SITE DETAILS

SITE INFORMATION

SITE NAME: "BRISTOL SOLAR"

LOCATION: MATTHEWS ST. & HILL ST.
BRISTOL, CT 06010

SITE TYPE/DESCRIPTION: ADD (1) GROUND MOUNTED SOLAR PANEL ARRAY W/ ASSOCIATED EQUIPMENT.

PROPERTY OWNER: LINDA ARBESMAN, KATHLEEN FERRIER, H.C. TR ALLAIRE & LAUREN VALENTINO
481 MATTHEWS STREET
BRISTOL, CT 06010

APPLICANT: SUNJET ENERGY LLC
28 POCOTOPAUG DRIVE
EAST HAMPTON, CT 06424

ENGINEER CONTACT: BRADLEY J. PARSONS, P.E.
(860) 663-1697 x208

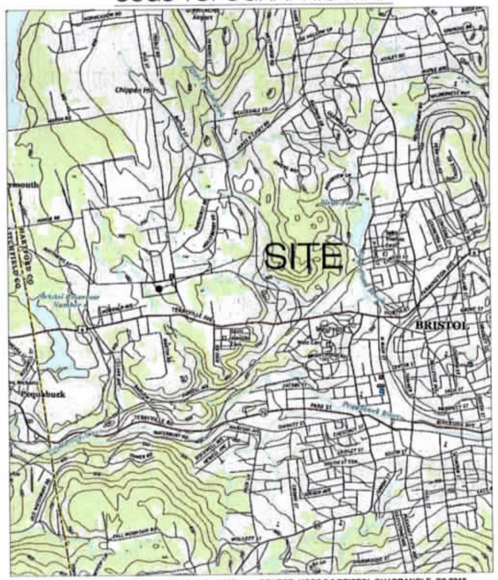
LATITUDE: 41°41'03.75" N
LONGITUDE: 72°58'29.78" W
ELEVATION: 662'± AMSL

MBLU: 66-255A
ZONE: R-15
EXISTING LAND USE: AGRICULTURAL
PROPOSED LAND USE: COMMUNICATIONS, TRANSPORTATION AND PUBLIC UTILITY USES
- LARGE SCALE GROUND MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS

TOTAL SITE ACREAGE: 11.94± AC.
TOTAL DISTURBED AREA: 6.50± AC.

APPROX. VOLUME OF CUT: 3,995± CY
APPROX. VOLUME OF FILL: 0± CY
APPROX. NET VOLUME: 3,995± CY OF CUT

USGS TOPOGRAPHIC MAP



SCALE : 1" = 2000'± SOURCE: USGS 7.5 BRISTOL QUADRANGLE, CT 2018

SUNJET

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PH: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

APPROVED FOR CONSTRUCTION

NO	DATE	REVISION
0	01/28/21	FOR CONSTRUCTION: BJP
1	05/20/21	FOR CONSTRUCTION: BJP
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHALL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: LINDA ARBESMAN, KATHLEEN FERRIER, H.C. TR ALLAIRE & LAUREN VALENTINO
ADDRESS: 481 MATTHEWS STREET BRISTOL, CT 06010

BRISTOL SOLAR

SITE ADDRESS: MATTHEWS ST. & HILL ST. BRISTOL, CT 06010

APT FILING NUMBER: CT562100

DRAWN BY: CSH

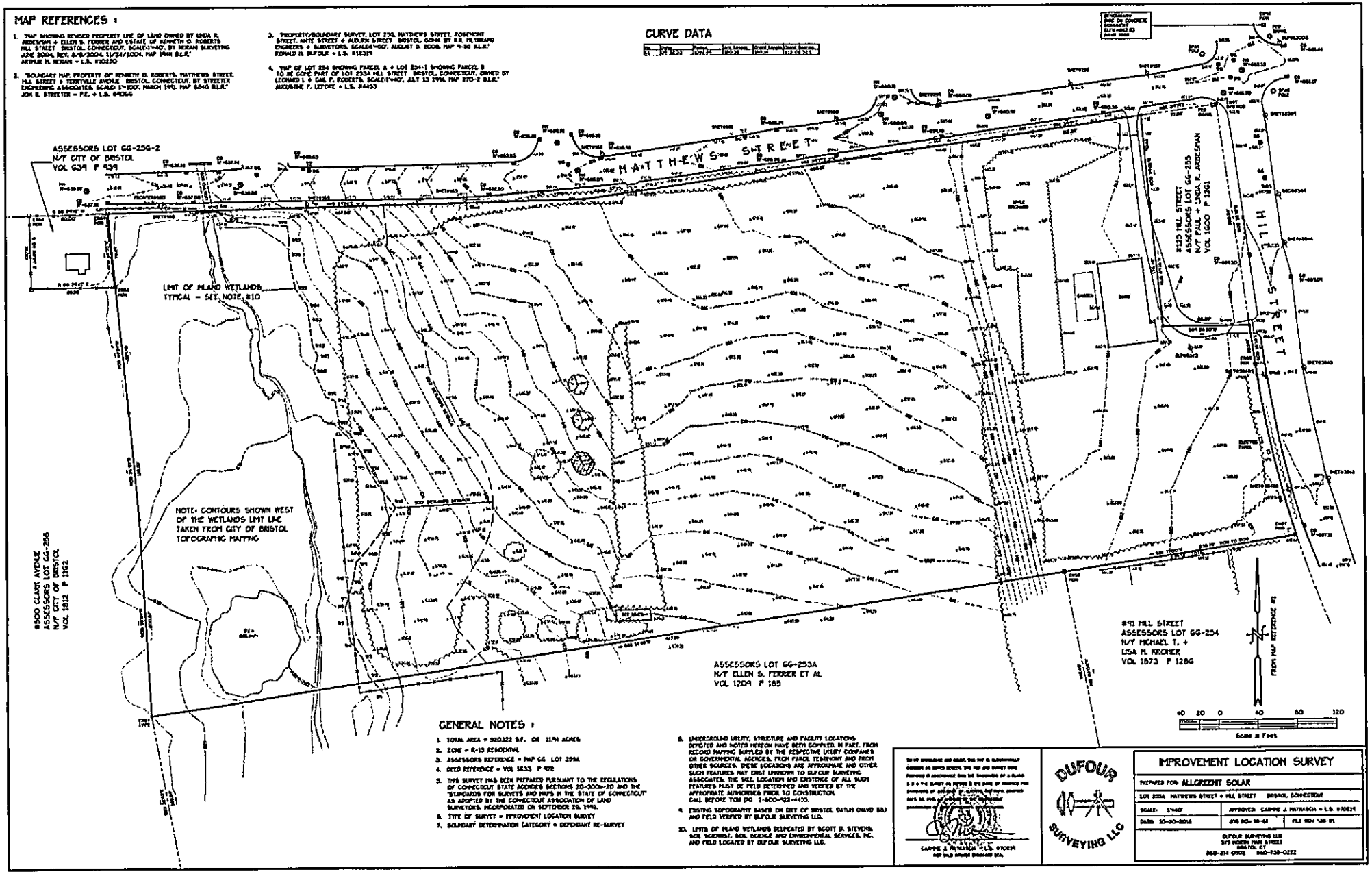
DATE: 01/28/21 CHECKED BY: BJP

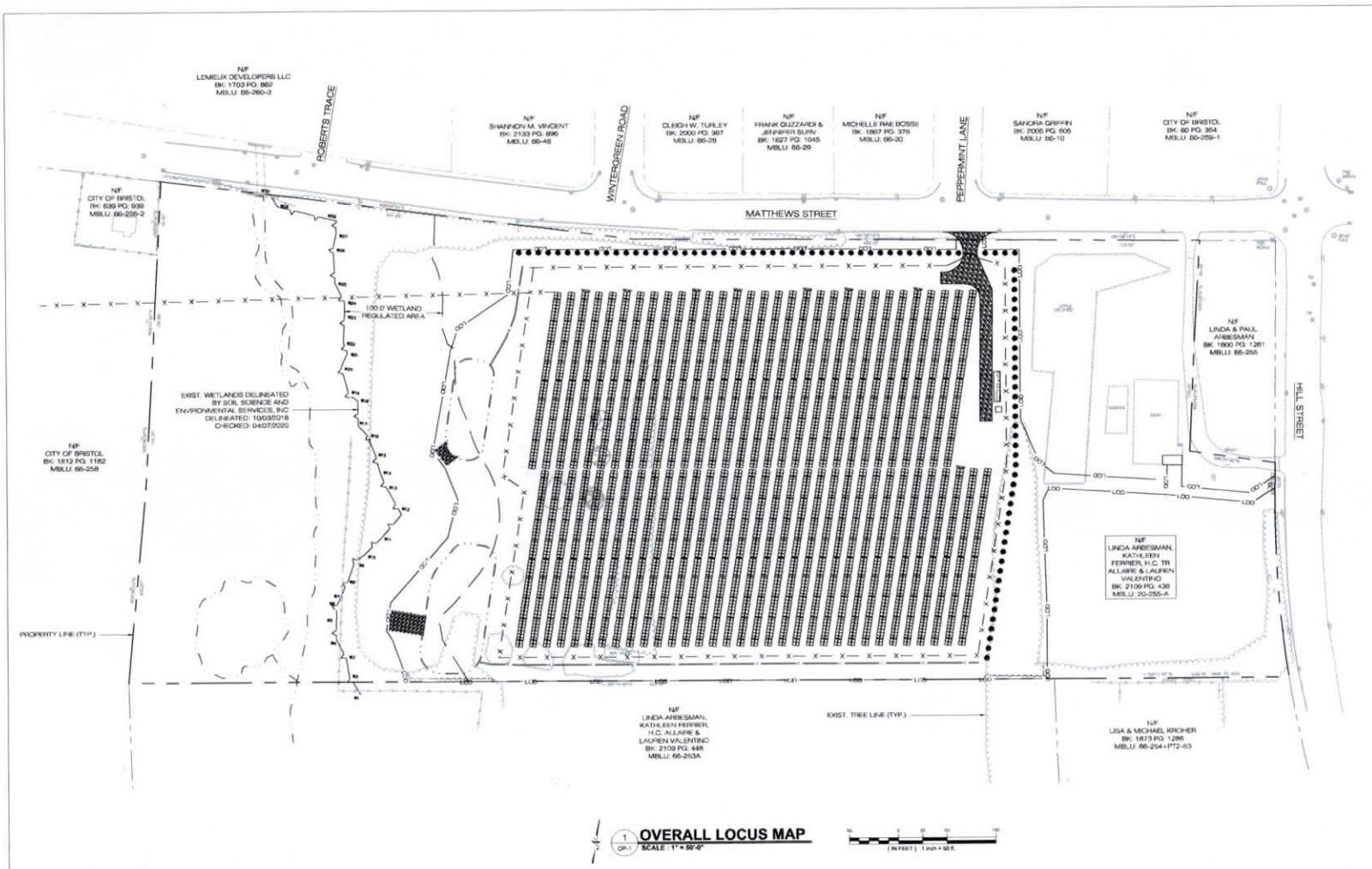
SHEET TITLE:

TITLE SHEET & INDEX

SHEET NUMBER:

T-1


MAP REFERENCES :
1. "MAP SHOWING REVISED PROPERTY LINE OF LAND OWNED BY LINDA R. ANDERSMAN & ELLEN S. FERRER AND ESTATE OF KENNETH O. ROBERTS HILL STREET BRISTOL, CONNECTICUT, SCALE:1"=40', BY MORAN SURVEYING JUNE 2004, REV. 8/5/2004, 11/24/2004, 12/28/2004, MAP 1948 B.L.R." ARTHUR H. MORAN - L.S. #12830
2. "BOUNDARY MAP, PROPERTY OF KENNETH O. ROBERTS, MATTHEWS STREET, HILL STREET & TERRYVILLE AVENUE, BRISTOL, CONNECTICUT, BY STREETER ENGINEERING ASSOCIATES, SCALE 1"=100', MARCH 1998, MAP 6646 B.L.R." JON E. STREETER - P.E. & L.S. #14066
3. "PROPERTY/BOUNDARY SURVEY, LOT 253, MATTHEWS STREET, EDMONDS STREET, WHITE STREET & AUBURN STREET, BRISTOL, CONN. BY R.R. HILLIARD ENGINEERS & SURVEYORS, SCALE:1"=60', AUGUST 3, 2006, MAP 9-30 B.L.R." RONALD R. DUFOUR - L.S. #18319
4. "MAP OF LOT 254 SHOWING PARCEL A & LOT 254-1 SHOWING PARCEL B TO BE CORE PART OF LOT 253A HILL STREET BRISTOL, CONNECTICUT, OWNED BY LEONARD I. & CAL P. ROBERTS, SCALE:1"=40', JULY 13 1998, MAP 370-2 B.L.R." AUGUSTINE F. LEPORE - L.S. #14453
CURVE DATA
ASSESSORS LOT GG-25G-2
N/F CITY OF BRISTOL
VOL 634 P 939
MATTHEWS STREET
LIMIT OF INLAND WETLANDS
TYPICAL - SEE NOTE #10
#500 CLARK AVENUE
ASSESSORS LOT GG-256
N/F CITY OF BRISTOL
VOL 1812 P 1162
NOTE: CONTOURS SHOWN WEST OF THE WETLANDS LIMIT LINE TAKEN FROM CITY OF BRISTOL TOPOGRAPHIC MAPPING
#523 HILL STREET
ASSESSORS LOT GG-255
N/F PAUL & LINDA R. ANDERSMAN
VOL 1600 P 1261
HILL STREET
#491 HILL STREET
ASSESSORS LOT GG-254
N/F MICHAEL T. & LISA M. KROHER
VOL 1873 P 1286
ASSESSORS LOT GG-253A
N/F ELLEN S. FERRER ET AL
VOL 1209 P 185
FROM MAP REFERENCE #1
40 20 0 40 80 120
Scale in Feet
GENERAL NOTES :
1. TOTAL AREA = 902122 S.F. OR 11.94 ACRES
2. ZONE = R-13 RESIDENTIAL
3. ASSESSORS REFERENCE = MAP GG LOT 253A
4. DEED REFERENCE = VOL 1833 P 972
5. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INCORPORATED ON SEPTEMBER 26, 1996.
6. TYPE OF SURVEY = IMPROVEMENT LOCATION SURVEY
7. BOUNDARY DETERMINATION CATEGORY = DEPENDENT RE-SURVEY
8. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING SUPPLIED BY THE RESPECTIVE UTILITY COMPANIES OR GOVERNMENTAL AGENCIES. FROM PARCEL TESTIMONY AND FROM OTHER SOURCES. THESE LOCATIONS ARE APPROXIMATE AND OTHER SUCH FEATURES MAY EXIST UNKNOWN TO DUFOUR SURVEYING ASSOCIATES. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.
9. EXISTING TOPOGRAPHY BASED ON CITY OF BRISTOL DATUM (NAVD 88) AND FIELD VERIFIED BY DUFOUR SURVEYING LLC.
10. LIMITS OF INLAND WETLANDS DELINEATED BY SCOTT D. STEVENS, SOIL SCIENTIST, SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC. AND FIELD LOCATED BY DUFOUR SURVEYING LLC.
CARRIE J. PATRASCIA - L.S. #70831
DUFOUR SURVEYING LLC
IMPROVEMENT LOCATION SURVEY
PREPARED FOR ALLGREENT SOLAR
LOT 253A MATTHEWS STREET & HILL STREET BRISTOL, CONNECTICUT
SCALE: 1"=40'
APPROVED CARRIE J. PATRASCIA - L.S. #70831
DATE: 10-20-2014
JOB NO.: 14-61
FILE NO.: 14-61
DUFOUR SURVEYING LLC
395 NORTH MAIN STREET
BRISTOL, CT
860-314-0906 860-738-0222



1 OP-1 **OVERALL LOCUS MAP**
SCALE : 1" = 50'-0"

(IN FEET) 1 inch = 50 ft.

SUNJET
NEW ENERGY FUTURE

ALL-POINTS
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BRISTOL SOLAR

SITE ADDRESS: MATTHEWS ST. & HILL ST. BRISTOL, CT 06010

APT FILING NUMBER: CT562100

DRAWN BY: CSH

DATE: 01/28/21 CHECKED BY: BJP

SHEET TITLE:
ABUTTERS MAP

SHEET NUMBER:
AB-1

GENERAL NOTES

1. ALL CONSTRUCTION SHALL COMPLY WITH PROJECT DEVELOPER STANDARDS, CITY OF BRISTOL STANDARDS, CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS IN THE ABOVE REFERENCED INCREASING HIERARCHY. IF SPECIFICATIONS ARE IN CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY.
2. IF NO PROJECT CONSTRUCTION SPECIFICATION PACKAGE IS PROVIDED BY THE PROJECT DEVELOPER OR THEIR REPRESENTATIVE, THE CONTRACTOR SHALL COMPLY WITH THE MANUFACTURE, CITY OF BRISTOL, OR CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, AND BE IN ACCORDANCE WITH ALL APPLICABLE OSHA, FEDERAL, STATE AND LOCAL REGULATIONS.
3. THE PROJECT DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY ZONING AND STORMWATER PERMITS REQUIRED BY GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL CITY OF BRISTOL CONSTRUCTION PERMITS. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
4. REFER TO PLANS, DETAILS AND REPORTS PREPARED BY ALL-POINTS TECHNOLOGY CORPORATION FOR ADDITIONAL INFORMATION. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS IN THE FIELD AND CONTACT THE PROJECT DEVELOPER IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS SO THAT APPROPRIATE REVISIONS CAN BE MADE PRIOR TO BIDDING/CONSTRUCTION. ANY CONFLICT BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE CONFIRMED WITH THE PROJECT DEVELOPERS CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ALL PRODUCTS, MATERIALS PER PLANS AND SPECIFICATIONS TO THE PROJECT DEVELOPER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OR DELIVERY TO THE SITE. ALLOW A MINIMUM OF 14 WORKING DAYS FOR REVIEW.
6. SHOULD ANY UNKNOWN OR INCORRECTLY LOCATED EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONSULT THE PROJECT DEVELOPER IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THIS AREA.
7. DO NOT INTERRUPT EXISTING UTILITIES SERVICING FACILITIES OCCUPIED AND USED BY THE PROJECT DEVELOPER OR OTHERS DURING OCCUPIED HOURS, EXCEPT WHEN SUCH INTERRUPTIONS HAVE BEEN AUTHORIZED IN WRITING BY THE PROJECT DEVELOPER AND THE LOCAL MUNICIPALITY. INTERRUPTIONS SHALL ONLY OCCUR AFTER ACCEPTABLE TEMPORARY SERVICE HAS BEEN PROVIDED.
8. THE CONTRACT LIMIT IS THE PROPERTY LINE UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE CONTRACT DRAWINGS.
9. THE CONTRACTOR SHALL ABIDE BY ALL OSHA, FEDERAL, STATE AND LOCAL REGULATIONS WHEN OPERATING CRANES, BOOMS, HOISTS, ETC. IN CLOSE PROXIMITY TO OVERHEAD ELECTRIC LINES. IF CONTRACTOR MUST OPERATE EQUIPMENT CLOSE TO ELECTRIC LINES, CONTACT POWER COMPANY TO MAKE ARRANGEMENTS FOR PROPER SAFEGUARDS. ANY UTILITY COMPANY FEES SHALL BE PAID FOR BY THE CONTRACTOR.
10. THE CONTRACTOR SHALL COMPLY WITH OSHA CFR 29 PART 1926 FOR EXCAVATION TRENCHING AND TRENCH PROTECTION REQUIREMENTS.
11. THE ENGINEER IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ENGINEER HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OF PERSONNEL OR TO SUPERVISE SAFETY AND DO NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
12. THE CONTRACTOR SHALL RESTORE ANY DRAINAGE STRUCTURE, PIPE, CONDUIT, PAVEMENT, CURBING, SIDEWALKS, LANDSCAPED AREAS OR SIGNAGE DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER, AS APPROVED BY THE PROJECT DEVELOPER OR CITY OF BRISTOL.
13. THE CONTRACTOR SHALL PROVIDE AS-BUILT RECORDS OF ALL CONSTRUCTION (INCLUDING UNDERGROUND UTILITIES) TO THE PROJECT DEVELOPER AT THE END OF CONSTRUCTION.
14. ALTERNATIVE METHODS AND PRODUCTS, OTHER THAN THOSE SPECIFIED, MAY BE USED IF REVIEWED AND APPROVED BY THE PROJECT DEVELOPER, ENGINEER, AND APPROPRIATE REGULATORY AGENCY PRIOR TO INSTALLATION DURING THE BIDDING/CONSTRUCTION PROCESS.
15. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "DIG SAFE" 72 HOURS BEFORE COMMENCEMENT OF WORK AT "811" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS.
16. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES.

SITE PLAN NOTES

1. THE SURVEY WAS PROVIDED BY DUFOUR SURVEYING, LLC DATED OCTOBER 30, 2018.
2. THERE ARE WETLANDS LOCATED ON THE SITE AS INDICATED ON THE PLANS. WETLAND BOUNDARIES WERE FLAGGED BY SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC AND LOCATED BY DUFOUR SURVEYING L.L.C IN OCTOBER 2018.
3. THERE WILL BE MINIMAL GRADING ON SITE IN THE AREAS OF THE MINOR CLEARING, TO ENSURE THAT PROPER DRAINAGE IS MAINTAINED.
4. THE CONTRACTOR SHALL FOLLOW THE RECOMMENDED SEQUENCE OF CONSTRUCTION NOTES PROVIDED ON THE EROSION CONTROL PLAN OR SUBMIT AN ALTERNATE PLAN FOR APPROVAL BY THE ENGINEER AND/OR PERMITTING AGENCIES PRIOR TO THE START CONSTRUCTION. ALLOW A MINIMUM OF 14 WORKING DAYS FOR REVIEW.
5. PROPER CONSTRUCTION PROCEDURES SHALL BE FOLLOWED ON ALL IMPROVEMENTS WITHIN THIS PARCEL SO AS TO PREVENT THE SILTING OF ANY WATERCOURSE OR BVWS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. IN ADDITION, THE CONTRACTOR SHALL ADHERE TO "EROSION CONTROL PLAN" CONTAINED HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE TO POST ALL BONDS AS REQUIRED BY GOVERNMENT AGENCIES WHICH WOULD GUARANTEE THE PROPER IMPLEMENTATION OF THE PLAN.
6. ALL SITE WORK, MATERIALS OF CONSTRUCTION, AND CONSTRUCTION METHODS FOR EARTHWORK AND STORM DRAINAGE WORK, SHALL CONFORM TO THE SPECIFICATIONS AND DETAILS AND APPLICABLE SECTIONS OF THE PROJECT SPECIFICATIONS MANUAL. OTHERWISE THIS WORK SHALL CONFORM TO THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION AND PROJECT GEOTECHNICAL REPORT IF THERE IS NO PROJECT SPECIFICATIONS MANUAL. ALL FILL MATERIAL UNDER STRUCTURES AND PAVED AREAS SHALL BE PER THE ABOVE STATED APPLICABLE SPECIFICATIONS, AND/OR PROJECT GEOTECHNICAL REPORT, AND SHALL BE PLACED IN ACCORDANCE WITH THE APPLICABLE SPECIFICATIONS UNDER THE SUPERVISION OF A QUALIFIED PROFESSIONAL ENGINEER. MATERIAL SHALL BE COMPACTED IN 8" LIFTS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557 AT 95% PERCENT OF OPTIMUM MOISTURE CONTENT.
7. ALL DISTURBANCE INCURRED TO PUBLIC, MUNICIPAL, COUNTY, STATE PROPERTY DUE TO CONSTRUCTION SHALL BE RESTORED TO ITS PREVIOUS CONDITION OR BETTER, TO THE SATISFACTION OF THE CITY OF BRISTOL AND STATE OF CONNECTICUT.
8. IF IMPACTED OR CONTAMINATED SOIL IS ENCOUNTERED BY THE CONTRACTOR, THE CONTRACTOR SHALL SUSPEND EXCAVATION WORK OF IMPACTED SOIL AND NOTIFY THE PROJECT DEVELOPER AND/OR PROJECT DEVELOPERS ENVIRONMENTAL CONSULTANT PRIOR TO PROCEEDING WITH FURTHER WORK IN THE IMPACTED SOIL LOCATION UNTIL FURTHER INSTRUCTED BY THE PROJECT DEVELOPER AND/OR PROJECT DEVELOPERS ENVIRONMENTAL CONSULTANT.

UTILITY NOTES

1. CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE CITY OF BRISTOL TO SECURE CONSTRUCTION PERMITS AND FOR PAYMENT OF FEES FOR STREET CUTS AND CONNECTIONS TO EXISTING UTILITIES.
2. REFER TO DRAWINGS BY PROJECT DEVELOPER FOR THE ONSITE ELECTRICAL DRAWINGS AND INTERCONNECTION TO EXISTING ELECTRICAL GRID. SITE CONTRACTOR SHALL SUPPLY AND INSTALL PIPE ADAPTERS AS NECESSARY AT BUILDING CONNECTION POINT OR AT EXISTING UTILITY OR PIPE CONNECTION POINT. THESE DETAILS ARE NOT INCLUDED IN THESE PLANS.
3. UTILITY LOCATIONS AND PENETRATIONS ARE SHOWN FOR THE CONTRACTORS INFORMATION AND SHALL BE VERIFIED WITH THE ELECTRICAL ENGINEER AND THE PROJECT DEVELOPERS CONSTRUCTION MANAGER PRIOR TO THE START OF CONSTRUCTION.
4. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY THE ELEVATION AND LOCATION OF ALL UTILITIES BY VARIOUS MEANS PRIOR TO BEGINNING ANY EXCAVATION. TEST PITS SHALL BE DUG AT ALL LOCATIONS WHERE PROP. SANITARY SEWERS AND WHERE PROP. STORM PIPING WILL CROSS EXISTING UTILITIES, AND THE HORIZONTAL AND VERTICAL LOCATIONS OF THE UTILITIES SHALL BE DETERMINED. THE CONTRACTOR SHALL CONTACT THE PROJECT DEVELOPER IN THE EVENT OF ANY DISCOVERED OR UNFORESEEN CONFLICTS BETWEEN EXISTING AND PROPOSED SANITARY SEWERS, STORM PIPING AND UTILITIES SO THAT AN APPROPRIATE MODIFICATION MAY BE MADE.
5. UTILITY CONNECTION DESIGN AS REFLECTED ON THE PLAN MAY CHANGE SUBJECT TO UTILITY PROVIDER AND GOVERNING AUTHORITY STAFF REVIEW.
6. THE CONTRACTOR SHALL ENSURE THAT ALL UTILITY PROVIDERS AND GOVERNING AUTHORITY STANDARDS FOR MATERIALS AND CONSTRUCTION METHODS ARE MET. THE CONTRACTOR SHALL PERFORM PROPER COORDINATION WITH THE RESPECTIVE UTILITY PROVIDER.
7. THE CONTRACTOR SHALL ARRANGE FOR AND COORDINATE WITH THE RESPECTIVE UTILITY PROVIDERS FOR SERVICE INSTALLATIONS AND CONNECTIONS. THE CONTRACTOR SHALL COORDINATE WORK TO BE PERFORMED BY THE VARIOUS UTILITY PROVIDERS AND SHALL PAY ALL FEES FOR CONNECTIONS, DISCONNECTIONS, RELOCATIONS, INSPECTIONS, AND DEMOLITION UNLESS OTHERWISE STATED IN THE PROJECT SPECIFICATIONS MANUAL AND/OR GENERAL CONDITIONS OF THE CONTRACT.
8. ALL EXISTING PAVEMENT WHERE UTILITY PIPING IS TO BE INSTALLED SHALL BE SAW CUT. AFTER UTILITY INSTALLATION IS COMPLETED, THE CONTRACTOR SHALL INSTALL TEMPORARY AND/OR PERMANENT PAVEMENT REPAIR AS DETAILED ON THE DRAWINGS OR AS REQUIRED BY THE CITY OF BRISTOL.
9. ALL PIPES SHALL BE LAID ON STRAIGHT ALIGNMENTS AND EVEN GRADES USING A PIPE LASER OR OTHER ACCURATE METHOD.
10. RELOCATION OF UTILITY PROVIDER FACILITIES, SUCH AS POLES, SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY PROVIDER.
11. THE CONTRACTOR SHALL COMPACT PIPE BACKFILL IN 8" LIFTS ACCORDING TO THE PIPE BEDDING DETAILS. TRENCH BOTTOM SHALL BE STABLE IN HIGH GROUNDWATER AREAS. A PIPE FOUNDATION SHALL BE USED PER THE TRENCH DETAILS AND IN AREAS OF ROCK EXCAVATION.
12. CONTRACTOR TO PROVIDE STEEL SLEEVES AND ANNULAR SPACE SAND FILL FOR UTILITY PIPE AND CONDUIT CONNECTIONS UNDER FOOTINGS.
13. ALL UTILITY CONSTRUCTION IS SUBJECT TO INSPECTION FOR APPROVAL PRIOR TO BACKFILLING, IN ACCORDANCE WITH THE APPROPRIATE UTILITY PROVIDER REQUIREMENTS.
14. A ONE-FOOT MINIMUM VERTICAL CLEARANCE BETWEEN WATER, GAS, ELECTRICAL, AND TELEPHONE LINES AND STORM PIPING SHALL BE PROVIDED. A SIX-INCH MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN STORM PIPING AND SANITARY SEWER. A 6-INCH TO 18-INCH VERTICAL CLEARANCE BETWEEN SANITARY SEWER PIPING AND STORM PIPING SHALL REQUIRE CONCRETE ENCASEMENT OF THE PROP. SANITARY PIPING.
15. THE CONTRACTOR SHALL RESTORE ANY UTILITY STRUCTURE, PIPE, CONDUIT, PAVEMENT, CURBING, SIDEWALKS, DRAINAGE STRUCTURE, SWALE OR LANDSCAPED AREAS DISTURBED DURING CONSTRUCTION, TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE PROJECT DEVELOPER AND CITY OF BRISTOL.
16. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY, AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE INCLUDING SERVICES. CONTACT "DIG SAFE" AT 811 72 HOURS PRIOR TO CONSTRUCTION AND VERIFY ALL UNDERGROUND AND OVERHEAD UTILITY AND STORM DRAINAGE LOCATIONS. THE CONTRACTOR SHALL EMPLOY THE USE OF A UTILITY LOCATING COMPANY TO PROVIDE SUBSURFACE UTILITY ENGINEERING CONSISTING OF DESIGNATING UTILITIES AND STORM PIPING ON PRIVATE PROPERTY WITHIN THE CONTRACT LIMIT AND CONSISTING OF DESIGNATING AND LOCATING WHERE PROP. UTILITIES AND STORM PIPING CROSS EXISTING UTILITIES AND STORM PIPING WITHIN THE CONTRACT LIMITS.
17. THE CONTRACTOR SHALL ARRANGE AND COORDINATE WITH UTILITY PROVIDERS FOR WORK TO BE PERFORMED BY UTILITY PROVIDERS. THE CONTRACTOR SHALL PAY ALL UTILITY FEES UNLESS OTHERWISE STATED IN THE PROJECT SPECIFICATION MANUAL AND GENERAL CONDITIONS, AND REPAIR PAVEMENTS AS NECESSARY.
18. ELECTRIC DRAWINGS AND REQUIREMENTS ARE NOT INCLUDED AS PART OF THIS DRAWING SET AND SHOULD BE OBTAINED FROM THE PROJECT DEVELOPER.
19. ALTERNATIVE METHODS AND PRODUCTS OTHER THAN THOSE SPECIFIED MAY BE USED IF REVIEWED AND APPROVED BY THE PROJECT DEVELOPER, ENGINEER, AND APPROPRIATE REGULATORY AGENCIES PRIOR TO INSTALLATION.
20. THE CONTRACTOR SHALL MAINTAIN ALL FLOWS AND UTILITY CONNECTIONS TO EXISTING BUILDINGS WITHOUT INTERRUPTION UNLESS/UNTIL AUTHORIZED TO DISCONNECT BY THE PROJECT DEVELOPER, CITY OF BRISTOL, UTILITY PROVIDERS AND GOVERNING AUTHORITIES.

SUNJET

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DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
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BRISTOL SOLAR

SITE ADDRESS: MATTHEWS ST. & HILL ST. BRISTOL, CT 06010

APT FILING NUMBER: CT562100

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SHEET TITLE:

SITE NOTES

SHEET NUMBER:

GN-1

ENVIRONMENTAL NOTES - RESOURCE PROTECTION MEASURES

WETLAND PROTECTION PLAN

AS A RESULT OF THE PROPOSED FACILITY'S LOCATION IN THE VICINITY OF WETLANDS, THE FOLLOWING BEST MANAGEMENT PRACTICES ("BMPS") ARE RECOMMENDED TO AVOID UNINTENTIONAL IMPACT TO WETLAND HABITATS DURING CONSTRUCTION ACTIVITIES. COMPLETE DETAILS OF THE RECOMMENDED BMPS ARE PROVIDED BELOW, WHICH WILL BE INCORPORATED INTO THE CONSTRUCTION DRAWINGS TO ENSURE THE CONTRACTOR IS FULLY AWARE OF THE PROJECT'S ENVIRONMENTALLY SENSITIVE SETTING.

A WETLAND SCIENTIST FROM ALL-POINTS TECHNOLOGY CORP. ("APT") EXPERIENCED IN COMPLIANCE MONITORING OF CONSTRUCTION ACTIVITIES WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT THE FOLLOWING BMPS ARE IMPLEMENTED PROPERLY. THIS PROTECTION PROGRAM SHALL BE IMPLEMENTED REGARDLESS OF TIME OF YEAR THE CONSTRUCTION ACTIVITIES OCCUR. ALL-POINTS TECHNOLOGY CORPORATION, P.C. ("APT") WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT WETLAND PROTECTION MEASURES ARE IMPLEMENTED PROPERLY. THE CONTRACTOR SHALL CONTACT DEAN GUSTAFSON, SENIOR WETLAND SCIENTIST AT APT, AT LEAST 5 BUSINESS DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING. MR. GUSTAFSON CAN BE REACHED BY PHONE AT (860) 552-2033 OR VIA EMAIL AT DGUSTAFSON@ALLPOINTSTECH.COM.

THE PROPOSED WETLAND PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS INCLUDING: USE OF APPROPRIATE EROSION CONTROL MEASURES TO CONTROL AND CONTAIN EROSION WHILE AVOIDING/MINIMIZING WILDLIFE ENTANGLEMENT; PERIODIC INSPECTION AND MAINTENANCE OF EROSION CONTROLS FOR THE PURPOSES OF ENSURING PROTECTION OF WETLAND RESOURCES; EDUCATION OF ALL CONTRACTORS AND SUB-CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE; PROTECTIVE MEASURES; AND, REPORTING.

1. CONTRACTOR EDUCATION:

a. PRIOR TO WORK ON SITE AND INITIAL DEPLOYMENT/MOBILIZATION OF EQUIPMENT AND MATERIALS, THE CONTRACTOR SHALL ATTEND AN EDUCATIONAL SESSION AT THE PRE-CONSTRUCTION MEETING WITH THE ENVIRONMENTAL MONITOR. THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF INFORMATION STRESSING THE ENVIRONMENTALLY SENSITIVE NATURE OF THE PROJECT AND PROXIMITY TO WETLAND RESOURCES AND THE NEED TO ENSURE THEIR PROTECTION THROUGHOUT THE DURATION OF THE CONSTRUCTION.

b. THE ENVIRONMENTAL MONITOR WILL ALSO POST CAUTION SIGNS THROUGHOUT THE PROJECT SITE AND MAINTAIN THEM FOR THE DURATION OF CONSTRUCTION TO PROVIDE NOTICE OF THE ENVIRONMENTALLY SENSITIVE NATURE OF THE WORK AREA.

c. THE CONTRACTOR WILL BE PROVIDED WITH THE ENVIRONMENTAL MONITOR'S CELL PHONE AND EMAIL CONTACT INFORMATION TO IMMEDIATELY REPORT ANY FAILURES OF EROSION CONTROLS OR RELEASES OF SEDIMENT INTO NEARBY WETLANDS.

2. EROSION AND SEDIMENTATION CONTROLS

a. PLASTIC NETTING WITH LARGE MESH OPENINGS (> ¼") USED IN A VARIETY OF EROSION CONTROL PRODUCTS (I.E., EROSION CONTROL BLANKETS, FIBER ROLLS [WATTLES], REINFORCED SILT FENCE) HAS BEEN FOUND TO ENTANGLE WILDLIFE, INCLUDING REPTILES, AMPHIBIANS, BIRDS AND SMALL MAMMALS. NO PERMANENT EROSION CONTROL PRODUCTS OR REINFORCED SILT FENCE WILL BE USED ON THE PROJECT. TEMPORARY EROSION CONTROL PRODUCTS THAT WILL BE EXPOSED AT THE GROUND SURFACE REPRESENT A POTENTIAL FOR WILDLIFE ENTANGLEMENT WILL USE EITHER EROSION CONTROL BLANKETS AND FIBER ROLLS COMPOSED OF PROCESSED FIBERS MECHANICALLY BOUND TOGETHER TO FORM A CONTINUOUS MATRIX (NETLESS) OR NETTING WITH A MESH SIZE <¼" SUCH AS THAT TYPICALLY USED IN COMPOST FILTER SOCKS TO AVOID/MINIMIZE WILDLIFE ENTANGLEMENT.

b. INSTALLATION OF EROSION AND SEDIMENTATION CONTROLS, REQUIRED FOR EROSION CONTROL COMPLIANCE, SHALL BE PERFORMED BY THE CONTRACTOR FOLLOWING CLEARING ACTIVITIES AND PRIOR TO ANY EARTHWORK IN ACCORDANCE WITH THE PROJECT SITE PLANS. THE ENVIRONMENTAL MONITOR WILL INSPECT THE WORK ZONE AREA PRIOR TO AND FOLLOWING EROSION CONTROL BARRIER INSTALLATION TO ENSURE IT HAS BEEN SATISFACTORILY INSTALLED PRIOR TO THE INITIATION OF EARTHWORK.

c. THE CONTRACTOR SHALL HAVE ADDITIONAL BARRIER FENCING SHOULD FIELD CONDITIONS WARRANT EXTENDING THE FENCING AS DIRECTED BY THE ENVIRONMENTAL MONITOR.

d. IN ADDITION TO REQUIRED DAILY INSPECTION BY THE CONTRACTOR, THE FENCING WILL BE INSPECTED BY THE CONTRACTOR FOR TEARS OR BREECHES IN THE FABRIC FOLLOWING INSTALLATION AND FOLLOWING STORM EVENTS THAT PRODUCE A DISCHARGE. INSPECTIONS WILL BE CONDUCTED PERIODICALLY BY THE ENVIRONMENTAL MONITOR THROUGHOUT THE COURSE OF THE CONSTRUCTION PROJECT.

e. ALL EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS OF COMPLETION OF WORK AND PERMANENT STABILIZATION OF SITE SOILS. IF FIBER ROLLS/WATTLES, STRAW BALES, OR OTHER NATURAL MATERIAL EROSION CONTROL PRODUCTS ARE USED, SUCH DEVICES WILL NOT BE LEFT IN PLACE TO BIODEGRADE AND SHALL BE PROMPTLY REMOVED AFTER SOILS ARE STABLE SO AS NOT TO CREATE A BARRIER TO MIGRATING WILDLIFE. SEED FROM SEEDING OF SOILS SHALL NOT BE SPREAD OVER FIBER ROLLS/WATTLES AS IT MAKES THEM HARDER TO REMOVE ONCE SOILS ARE STABILIZED BY VEGETATION.

3. PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION

a. CERTAIN PRECAUTIONS ARE NECESSARY TO STORE PETROLEUM MATERIALS, REFUEL AND CONTAIN AND PROPERLY CLEAN UP ANY INADVERTENT FUEL OR PETROLEUM (I.E., OIL, HYDRAULIC FLUID, ETC.) SPILL DUE TO THE PROJECT'S LOCATION IN PROXIMITY TO SENSITIVE WETLAND RESOURCES.

b. A SPILL CONTAINMENT KIT CONSISTING OF A SUFFICIENT SUPPLY OF ABSORBENT PADS AND ABSORBENT MATERIAL WILL BE MAINTAINED BY THE CONTRACTOR AT THE CONSTRUCTION SITE THROUGHOUT THE DURATION OF THE PROJECT. IN ADDITION, A WASTE DRUM WILL BE KEPT ON SITE TO CONTAIN ANY USED ABSORBENT PADS/MATERIAL FOR PROPER AND TIMELY DISPOSAL OFF SITE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL LAWS.

c. THE FOLLOWING PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING RESTRICTIONS AND SPILL RESPONSE PROCEDURES WILL BE ADHERED TO BY THE CONTRACTOR.

i. PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING

1. REFUELING OF VEHICLES OR MACHINERY SHALL TAKE PLACE ON AN IMPERVIOUS PAD WITH SECONDARY CONTAINMENT DESIGNED TO CONTAIN FUELS.
2. ANY REFUELING DRUMS/TANKS OR HAZARDOUS MATERIALS THAT MUST BE KEPT ON SITE SHALL BE STORED ON AN IMPERVIOUS SURFACE UTILIZING SECONDARY CONTAINMENT A MINIMUM OF 100 FEET FROM WETLANDS OR WATERCOURSES.

ii. INITIAL SPILL RESPONSE PROCEDURES

1. STOP OPERATIONS AND SHUT OFF EQUIPMENT.
2. REMOVE ANY SOURCES OF SPARK OR FLAME.
3. CONTAIN THE SOURCE OF THE SPILL.
4. DETERMINE THE APPROXIMATE VOLUME OF THE SPILL.
5. IDENTIFY THE LOCATION OF NATURAL FLOW PATHS TO PREVENT THE RELEASE OF THE SPILL TO SENSITIVE NEARBY WATERWAYS OR WETLANDS.
6. ENSURE THAT FELLOW WORKERS ARE NOTIFIED OF THE SPILL.

iii. SPILL CLEAN UP & CONTAINMENT

1. OBTAIN SPILL RESPONSE MATERIALS FROM THE ON-SITE SPILL RESPONSE KIT. PLACE ABSORBENT MATERIALS DIRECTLY ON THE RELEASE AREA.
2. LIMIT THE SPREAD OF THE SPILL BY PLACING ABSORBENT MATERIALS AROUND THE PERIMETER OF THE SPILL.
3. ISOLATE AND ELIMINATE THE SPILL SOURCE.
4. CONTACT THE APPROPRIATE LOCAL, STATE AND/OR FEDERAL AGENCIES, AS NECESSARY.
5. CONTACT A DISPOSAL COMPANY TO PROPERLY DISPOSE OF CONTAMINATED MATERIALS.

iv. REPORTING

1. COMPLETE AN INCIDENT REPORT.
2. SUBMIT A COMPLETED INCIDENT REPORT TO LOCAL, STATE AND FEDERAL AGENCIES, AS REQUIRED.

4. REPORTING

a. INSPECTION REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) WILL BE PREPARED BY THE ENVIRONMENTAL MONITOR DOCUMENTING EACH INSPECTION AND SUBMITTED TO THE PERMITTEE FOR COMPLIANCE VERIFICATION. ANY NON-COMPLIANCE OBSERVATIONS OF EROSION CONTROL MEASURES OR EVIDENCE OF EROSION OR SEDIMENT RELEASE WILL BE IMMEDIATELY REPORTED TO THE PERMITTEE AND ITS CONTRACTOR AND INCLUDED IN THE REPORTS.

b. ANY INCIDENTS OF RELEASE OF SEDIMENT OR OTHER MATERIALS INTO WETLAND RESOURCE AREAS SHALL BE REPORTED BY THE PERMITTEE WITHIN 24 HOURS TO THE CONNECTICUT SITING COUNCIL.

c. ANY OBSERVATIONS OF RARE SPECIES WILL BE REPORTED TO THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION'S NATURAL DIVERSITY DATA BASE PROGRAM.

d. FOLLOWING COMPLETION OF THE PROJECT, A SUMMARY REPORT WILL BE PREPARED BY THE ENVIRONMENTAL MONITOR DOCUMENTING COMPLIANCE WITH THE WETLAND PROTECTION PLAN AND SUBMITTED TO THE PERMITTEE, WHO SHALL SUBMIT A COPY TO THE CONNECTICUT SITING COUNCIL.

RARE GRASSLAND BIRD SPECIES PROTECTION PROGRAM

THE PROJECT IS LOCATED WITHIN AND PROXIMATE TO RARE GRASSLAND BIRD SPECIES HABITAT. AS A RESULT, THE FOLLOWING PROTECTIVE MEASURES SHALL BE FOLLOWED TO HELP AVOID IMPACT TO LISTED SPECIES.

THE FOLLOWING TWO STATE-LISTED BIRDS OCCUR AND POTENTIALLY BREED ON THE PROJECT SITE: BOBOLINK (DOLICHONYX ORYZIVORUS) AND SAVANNAH SPARROW (PASSERCULUS SANDWICHENSIS). THESE SPECIES ARE SMALL (APPROXIMATELY 6" IN HEIGHT) MIGRATORY SONGBIRDS THAT INHABIT GRASSLANDS, HAYFIELDS OR OTHER OPEN TREELESS HABITATS WITH LITTLE TO NO WOODY SHRUB COVER. THEY ARRIVE ON THE BREEDING GROUNDS IN EARLY TO MID-MAY AND ESTABLISH WELL-CONCEALED NESTS ON OR CLOSE TO THE GROUND AMONGST TALL GRASSY COVER.

THE GRASSLAND BIRD SPECIES PROTECTION MEASURES INCLUDED HEREIN SATISFY REQUIREMENTS FROM THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION ("DEEP") WILDLIFE DIVISION IN ACCORDANCE WITH THEIR NATURAL DIVERSITY DATA BASE ("NDDB") DETERMINATION LETTER (NO. 202006358) DATED JUNE 15, 2020; THIS DETERMINATION IS VALID UNTIL JUNE 15, 2022 PROVIDED THE SCOPE OF THE PROJECT HAS NOT CHANGED AND WORK HAS BEGUN ON THE PROJECT PRIOR TO THE EXPIRATION DATE. THIS PROTECTION PLAN ALSO SATISFIES CONDITION #3 IN THE CONNECTICUT SITING COUNCIL'S DECLARATORY RULING OF THIS PROJECT, IDENTIFIED AS PETITION NO. 1431, ISSUED APRIL 9, 2021.

IT IS OF THE UTMOST IMPORTANCE THAT CONTRACTOR COMPLY WITH THE REQUIREMENT FOR IMPLEMENTATION OF THESE PROTECTIVE MEASURES AND THE EDUCATION OF ITS EMPLOYEES AND SUBCONTRACTORS PERFORMING CONSTRUCTION AND MAINTENANCE WORK AT THE PROJECT SITE. THE WETLAND PROTECTION MEASURES SHALL BE IMPLEMENTED AND MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES UNTIL PERMANENT STABILIZATION OF SITE SOILS HAS OCCURRED.

TO AVOID IMPACT TO THESE RARE GRASSLAND BIRD SPECIES, IT IS RECOMMENDED THAT CONSTRUCTION IN SUITABLE GRASSLAND HABITAT BE PERFORMED OUTSIDE OF THE SENSITIVE BREEDING SEASON (APRIL 1 THROUGH AUGUST 30). HOWEVER, IF THIS IS NOT POSSIBLE, THE RARE GRASSLAND BIRDS PROTECTIVE MEASURES DURING CONSTRUCTION SHOULD BE FOLLOWED TO HAVE THE LEAST IMPACT ON STATE-LISTED GRASSLAND BIRD SPECIES.

ALL-POINTS TECHNOLOGY CORPORATION, P.C. ("APT") WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT PROTECTION MEASURES DURING CONSTRUCTION WORK ARE IMPLEMENTED PROPERLY. APT WILL PROVIDE AN EDUCATION SESSION FOR THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION ACTIVITIES ON RARE GRASSLAND BIRD SPECIES THAT MAY BE ENCOUNTERED DUE TO THE PROJECT'S LOCATION WITHIN AND ADJACENT TO POTENTIALLY SENSITIVE HABITAT. THE CONTRACTOR SHALL CONTACT DEAN GUSTAFSON, SENIOR BIOLOGIST AT APT, AT LEAST 5 BUSINESS DAYS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES. MR. GUSTAFSON CAN BE REACHED BY PHONE AT (860) 552-2033 OR VIA EMAIL AT DGUSTAFSON@ALLPOINTSTECH.COM.

THIS PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS: EDUCATION OF ALL CONTRACTORS AND SUB-CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE; PROTECTIVE MEASURES; PERIODIC INSPECTION OF THE CONSTRUCTION PROJECT; AND, REPORTING.

1. RARE GRASSLAND BIRDS PROTECTIVE MEASURES DURING CONSTRUCTION

a. IF CONSTRUCTION ACTIVITIES ARE TO OCCUR DURING THE ACTIVE PEAK BREEDING SEASON FOR RARE GRASSLAND BIRD SPECIES (MAY 20 TO AUGUST 20), SURVEYS (MAXIMUM OF FOUR [4] SURVEYS WILL BE PERFORMED) WILL BE REQUIRED TO AVOID IMPACT TO BREEDING STATE-LISTED GRASSLAND BIRD SPECIES AS FOLLOWS.

b. IF CONSTRUCTION STARTS BEFORE, BUT IS ANTICIPATED TO EXTEND BEYOND, MAY 20TH INTO THE BOBOLINK BREEDING SEASON, APT WILL PERFORM A BREEDING BIRD SURVEY STARTING IN LATE MAY WITH PERIODIC SURVEYS (MAXIMUM OF FOUR [4] SURVEYS WILL BE PERFORMED) THROUGHOUT THE DURATION OF CONSTRUCTION TO DOCUMENT NO GRASSLAND BIRD SPECIES NESTS ARE BEING ESTABLISHED. IF AN ACTIVE NEST IS IDENTIFIED, A 400-FOOT BUFFER RESTRICTING ANY DISTURBANCE WOULD BE ESTABLISHED AROUND THE NEST UNTIL THE JUVENILE BIRDS HAVE FLEDGED.

c. IF CONSTRUCTION IS PROPOSED TO START AFTER MAY 20TH BUT BEFORE AUGUST 20TH, A GRASSLAND BIRD BREEDING SURVEY WOULD BE PERFORMED BY APT PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES. IF AN ACTIVE NEST IS IDENTIFIED, A 400-FOOT BUFFER RESTRICTING ANY DISTURBANCE WOULD BE ESTABLISHED AROUND THE NEST UNTIL THE JUVENILE BIRDS HAVE FLEDGED. IF NO NEST IS FOUND, THE RULES NOTED IN B. ABOVE WOULD APPLY.

d. FOR MAINTENANCE OF THE FACILITY ONCE CONSTRUCTION HAS BEEN COMPLETED, MOWING ACTIVITIES SHOULD BE RESTRICTED AS OUTLINED IN SECTION 3: SITE MANAGEMENT PROTECTION MEASURES (MOWING).

2. REPORTING

a. DAILY COMPLIANCE MONITORING REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) DOCUMENTING EACH APT INSPECTION DURING CONSTRUCTION WILL BE SUBMITTED BY APT TO TRITEC AMERICAS FOR COMPLIANCE VERIFICATION. ANY OBSERVATIONS OF TURTLES, BOBOLINK, WETLAND IMPACTS, OR CORRECTIVE ACTIONS WILL BE INCLUDED IN THE REPORTS. THE REPORTS WILL DOCUMENT IMPLEMENTATION OF THIS RARE GRASSLAND BIRDS PROTECTION PROGRAM, MONITORING OBSERVATIONS AND ANY SPECIES OBSERVATIONS. TRITEC AMERICAS WILL PROVIDE COPIES OF THE COMPLIANCE MONITORING REPORTS TO THE CONNECTICUT SITING COUNCIL FOR COMPLIANCE VERIFICATION.

b. ANY OBSERVATIONS OF RARE GRASSLAND BIRD SPECIES OR ANY OTHER RARE SPECIES WILL BE REPORTED TO CTDEEP BY APT ON THE APPROPRIATE SPECIAL ANIMAL REPORTING FORM, WITH PHOTO-DOCUMENTATION (IF POSSIBLE) AND SPECIFIC INFORMATION ON THE LOCATION AND DISPOSITION OF THE ANIMAL.

3. SITE MANAGEMENT PROTECTION MEASURES (MOWING)

a. THE FOLLOWING MEASURES ARE INTENDED FOR IMPLEMENTATION WITHIN THE FENCED SOLAR-POWERED GENERATION FACILITY. THE LIKELIHOOD OF NESTING OCCURRING WITHIN THE FENCED COMPOUND, AND AMONGST THE ARRAYS THEMSELVES, IS LOW. HOWEVER, THESE BIRDS MAY BREED IN THE CONTIGUOUS GRASSLAND HABITAT ADJACENT TO THE FACILITY AND THEREFORE WOULD BE SUBJECT TO SECONDARY IMPACTS SUCH AS NOISE OR VISUAL DISTURBANCE THAT MAY AFFECT NESTING. ADDITIONALLY, THERE IS THE POTENTIAL FOR ADULTS AND FLEDGLINGS TO FEED WITHIN THE FENCED COMPOUND.

b. BREEDING PERIOD: PROVIDED BELOW ARE THE TYPICAL BREEDING PERIODS IN THE STATE.

CT BIRD ATLAS SAFE DATES:

COMMON NAME	APPROXIMATE BREEDING PERIOD*
BOBOLINK	6/1 TO 8/1
SAVANNAH SPARROW	6/10 TO 8/1

*DATES BASED ON "SAFE DATES" PROVIDED IN THE CT BIRD ATLAS. DUE TO SEASONAL VARIATIONS BASED ON WEATHER AND BIOGEOGRAPHICAL REGION, A TWO-WEEK BUFFER PERIOD SHOULD BE CONSIDERED AT BOTH THE START AND END OF THE BREEDING SEASON TO BE CONSERVATIVE.

c. BREEDING BEGINS IN EARLY MAY, EGGS INCUBATE IN JUNE AND JULY, AND FLEDGLINGS DEVELOP FROM JULY THROUGH AUGUST. ANY MOWING CONDUCTED DURING THOSE PERIODS HAS THE POTENTIAL TO IMPACT NESTS OR DEVELOPING NESTLINGS OR DISTURB NESTING BIRDS ADJACENT TO THE FACILITY.

d. TIMING OF MOWING/VEGETATION MAINTENANCE: IF POSSIBLE, MOWING SHOULD BE AVOIDED FROM MAY 15TH THROUGH AUGUST 15TH TO MINIMIZE IMPACTS TO NESTING BIRDS. FOR THE BENEFIT OF BIRDS AS WELL AS TERRESTRIAL WILDLIFE, MOWING CONDUCTED ONCE PER SEASON IS OPTIMAL, AFTER OCTOBER 15TH WHEN MOST SPECIES HAVE ENTERED FALL/WINTER DORMANCY.

e. MOWING TYPE/METHOD:

1. MOWER SPEED: MOWING AT SLOW SPEEDS WILL ALLOW ANIMALS TO REACT AND MOVE OUT OF THE FIELD.
2. MOWING STYLE: AVOID FLAIL MOWER HEADS WITH GUIDE BARS THAT RIDE ALONG THE GROUND. SICKLE BAR MOWERS WILL HAVE THE LEAST IMPACT IF MOWING EVERY 1-5 YEARS.
3. MOWING HEIGHT: IF MOWING DURING THE BREEDING SEASON, RETENTION OF MOWING STUBBLE AT A MINIMUM HEIGHT OF 7 INCHES WILL REDUCE MORTALITY AND WILL LEAVE IMPORTANT COVER FOR WILDLIFE.
4. DIRECTIONALITY: IF MOWING DURING THE BREEDING SEASON IS NECESSARY, START MOWING CLOSEST TO THE ARRAYS AND MOVE OUTWARD TOWARD THE EDGE OF THE ARRAY FIELD.

d. PRE-MOWING NEST SURVEYS: IF MOWING OUTSIDE OF THE NESTING SEASON IS NOT POSSIBLE, A PRE-MOWING INSPECTION BY AN ORNITHOLOGIST IS RECOMMENDED TO CONFIRM THAT NO NESTS ARE PRESENT WITHIN THE MOWING LIMITS. THAT SURVEY SHOULD OCCUR NO MORE THAN ONE WEEK PRIOR TO THE START OF MOWING. ANY ACTIVITY BY TARGET SPECIES SHOULD BE FIELD FLAGGED AND/OR CONVEYED TO THE CONTRACTOR. IF A NEST SITE IS OBSERVED WITHIN THE MOWING LIMITS, NO MOWING SHOULD OCCUR WITHIN 100 FEET OF THE NEST SITE UNTIL IT IS INACTIVE AND THE FLEDGLINGS ARE FULLY MOBILE.

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EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROL PLAN NOTES

1. THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, LATEST EDITION, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND AS DIRECTED BY THE TOWN OF BRISTOL PERMITTEE AND/OR SWPCP MONITOR. ALL PERIMETER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CLEARING AND GRUBBING AND DEMOLITION OPERATIONS.

2. THESE DRAWINGS ARE ONLY INTENDED TO DESCRIBE THE SEDIMENT AND EROSION CONTROL MEASURES FOR THIS SITE. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THE EROSION & SEDIMENT CONTROL PLAN ARE SHOWN IN A GENERAL SIZE AND LOCATION ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL EROSION CONTROL MEASURES ARE CONFIGURED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO STORM DRAINAGE SYSTEMS AND/OR WATERCOURSES. ACTUAL SITE CONDITIONS OR SEASONAL AND CLIMATIC CONDITIONS MAY WARRANT ADDITIONAL CONTROLS OR CONFIGURATIONS, AS REQUIRED, AND AS DIRECTED BY THE PERMITTEE AND/OR SWPCP MONITOR. SEE SEDIMENT AND EROSION CONTROL DETAILS AND SUGGESTED CONSTRUCTION SEQUENCE FOR MORE INFORMATION. REFER TO SITE PLAN FOR GENERAL INFORMATION AND OTHER CONTRACT PLANS FOR APPROPRIATE INFORMATION.

3. A BOND OR LETTER OF CREDIT MAY BE REQUIRED TO BE POSTED WITH THE GOVERNING AUTHORITY FOR THE EROSION CONTROL INSTALLATION AND MAINTENANCE.

4. THE CONTRACTOR SHALL APPLY THE MINIMUM EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THE PLAN IN CONJUNCTION WITH CONSTRUCTION SEQUENCING, SUCH THAT ALL ACTIVE WORK ZONES ARE PROTECTED. ADDITIONAL AND/OR ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES MAY BE INSTALLED DURING THE CONSTRUCTION PERIOD IF FOUND NECESSARY BY THE CONTRACTOR, OWNER, SITE ENGINEER, MUNICIPAL OFFICIALS, OR ANY GOVERNING AGENCY. THE CONTRACTOR SHALL CONTACT THE OWNER AND APPROPRIATE GOVERNING AGENCIES FOR APPROVAL IF ALTERNATIVE CONTROLS OTHER THAN THOSE SHOWN ON THE PLANS ARE PROPOSED BY THE CONTRACTOR.

5. THE CONTRACTOR SHALL TAKE EXTREME CARE DURING CONSTRUCTION SO AS NOT TO DISTURB UNPROTECTED WETLAND AREAS OR INSTALLED SEDIMENTATION AND EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSPECT ALL SEDIMENT AND EROSION CONTROLS WEEKLY AND WITHIN 24 HOURS OF A STORM WITH A RAINFALL AMOUNT OF 0.25 INCHES OR GREATER TO VERIFY THAT THE CONTROLS ARE OPERATING PROPERLY AND MAKE REPAIRS AS NECESSARY IN A TIMELY MANOR.

6. THE CONTRACTOR SHALL KEEP A SUPPLY OF EROSION CONTROL MATERIAL (SILT FENCE, COMPOST FILTER SOCK, EROSION CONTROL BLANKET, ETC.) ON-SITE FOR PERIODIC MAINTENANCE AND EMERGENCY REPAIRS.

7. ALL FILL MATERIAL PLACED ADJACENT TO ANY WETLAND AREA SHALL BE GOOD QUALITY, WITH LESS THAN 5% FINES PASSING THROUGH A #200 SIEVE (SANK RUS), SHALL BE PLACED IN MAXIMUM ONE FOOT LIFTS, AND SHALL BE COMPACTED TO 95% MAX. DRY DENSITY MODIFIED PROCTOR OR AS SPECIFIED IN THE CONTRACT SPECIFICATIONS.

8. PROTECT EXISTING TREES THAT ARE TO BE SAVED BY FENCING, ORANGE SAFETY FENCE, CONSTRUCTION TAPE, OR EQUIVALENT FENCING/TAPE. ANY LIMB TRIMMING SHOULD BE DONE AFTER CONSULTATION WITH AN ARBORIST AND BEFORE CONSTRUCTION BEGINS IN THAT AREA. FENCING SHALL BE MAINTAINED AND REPAIRED DURING CONSTRUCTION.

9. CONSTRUCTION ENTRANCES (ANTI-TRACKING PADS) SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR CONSTRUCTION ACTIVITY AND SHALL BE MAINTAINED THROUGHOUT THE DURATION OF ALL CONSTRUCTION IF REQUIRED. THE LOCATION OF THE TRACKING PADS MAY CHANGE AS VARIOUS PHASES OF CONSTRUCTION ARE COMPLETED. CONTRACTOR SHALL ENSURE THAT ALL VEHICLES EXITING THE SITE ARE PASSING OVER THE ANTI-TRACKING PADS PRIOR TO EXISTING.

10. ALL CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE, WHICH SHALL BE MARKED WITH SILT FENCE, SAFETY FENCE, HAY BALES, RIBBONS, OR OTHER MEANS PRIOR TO CLEARING. CONSTRUCTION ACTIVITY SHALL REMAIN ON THE UPHILL SIDE OF THE SEDIMENT BARRIER UNLESS WORK IS SPECIFICALLY CALLED FOR ON THE DOWNHILL SIDE OF THE BARRIER.

11. NO CUT OR FILL SLOPES SHALL EXCEED 2:1 EXCEPT WHERE STABILIZED BY ROCK FACED EMBANKMENTS OR EROSION CONTROL BLANKETS. ALL SLOPES SHALL BE SEEDED AND BANKS WILL BE STABILIZED IMMEDIATELY UPON COMPLETION OF FINAL GRADING UNTIL TURF IS ESTABLISHED.

12. DIRECT ALL DEWATERING PUMP DISCHARGE TO A SEDIMENT CONTROL DEVICE THE GUIDE LINES WITHIN THE APPROVED LIMIT OF DISTURBANCE IF REQUIRED. DISCHARGE TO STORM DRAINS OR SURFACE WATERS FROM SEDIMENT CONTROLS SHALL BE CLEAR AND APPROVED BY THE PERMITTEE OR MUNICIPALITY.

13. THE CONTRACTOR SHALL MAINTAIN A CLEAN CONSTRUCTION SITE AND SHALL NOT ALLOW THE ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS ON THE SITE. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES AND SECURED APPROPRIATELY. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE AND SHALL ADHERE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE/CONTAINMENT.

14. MINIMIZE LAND DISTURBANCES. SEED AND MULCH DISTURBED AREAS WITH TEMPORARY MIX AS SOON AS PRACTICABLE (2 WEEK MAXIMUM UNSTABILIZED PERIOD) USING PERENNIAL RYEGRASS AT 40 LBS PER ACRE. MULCH ALL CUT AND FILL SLOPES AND SWALES WITH LOOSE HAY AT A RATE OF 2 TONS PER ACRE. IF NECESSARY, REPLACE LOOSE HAY ON SLOPES WITH EROSION CONTROL BLANKETS OR JUTE CLOTH. MODERATELY GRADED AREAS, ISLANDS, AND TEMPORARY CONSTRUCTION STAGING AREAS MAY BE HYDROSEEDED WITH TACKIFIER.

15. SWEEP AFFECTED PORTIONS OF OFF SITE ROADS ONE OR MORE TIMES A DAY OR LESS FREQUENTLY IF TRACKING IS NOT A PROBLEM) DURING CONSTRUCTION. FOR DUST CONTROL, PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER ON UNPAVED TRAVELWAYS TO KEEP THE TRAVELWAYS DAMP. CALCIUM CHLORIDE MAY ALSO BE APPLIED TO ACCESS ROADS. DUMP TRUCK LOADS EXITING THE SITE SHALL BE COVERED.

16. TURF ESTABLISHMENT SHALL BE PERFORMED OVER ALL DISTURBED SOIL, UNLESS THE AREA IS UNDER ACTIVE CONSTRUCTION. IT IS COVERED IN STONE OR SCHEDULED FOR PAVING WITHIN 30 DAYS. TEMPORARY SEEDING OR NON-LIVING SOIL PROTECTION OF ALL EXPOSED SOILS AND SLOPES SHALL BE INITIATED WITHIN THE FIRST 7 DAYS OF SUSPENDING WORK IN AREAS TO BE LEFT LONGER THAN 30 DAYS.

17. MAINTAIN ALL PERMANENT AND TEMPORARY SEDIMENT CONTROL DEVICES IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. UPON COMPLETION OF WORK SWEEP CONCRETE PADS, CLEAN THE STORMWATER MANAGEMENT SYSTEMS AND REMOVE ALL TEMPORARY SEDIMENT CONTROLS ONCE THE SITE IS FULLY STABILIZED AND APPROVAL HAS BEEN RECEIVED FROM PERMITTEE OR THE MUNICIPALITY.

18. SEEDING MIXTURES SHALL BE NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX (SEE SITE DETAILS SHEET DN-2), OR APPROVED EQUAL BY OWNER.

SEDIMENT & EROSION CONTROL NARRATIVE

1. THE PROJECT INVOLVES THE CONSTRUCTION OF A GROUND MOUNTED SOLAR PANEL FACILITY WITH ASSOCIATED EQUIPMENT, INCLUDING THE CLEARING, GRUBBING AND GRADING OF APPROXIMATELY 6.50 ACRES OF EXISTING LOT.

THE PROPOSED PROJECT INVOLVES THE FOLLOWING CONSTRUCTION:

A. CLEARING, GRUBBING, AND GRADING OF EXISTING LOT;
B. CONSTRUCTION OF 3,456 GROUND MOUNTED SOLAR PANELS AND ASSOCIATED EQUIPMENT.
B. THE STABILIZATION OF DISTURBED AREAS WITH PERMANENT GRASS TREATMENTS.

2. FOR THIS PROJECT, THERE ARE APPROXIMATELY 6.50± ACRES OF THE SITE BEING DISTURBED WITH NEGLIGIBLE INCREASE IN THE IMPERVIOUS AREA OF THE SITE, AS ALL ACCESS THOUGH THE SITE WILL BE GRAVEL. IMPERVIOUS AREAS ARE LIMITED TO THE CONCRETE PADS FOR ELECTRICAL EQUIPMENT.

3. THE PROJECT SITE, AS MAPPED IN THE SOIL SURVEY OF STATE OF CONNECTICUT (NRCS, VERSION 18, DEC 6, 2018), CONTAINS TYPE 38C (HYDROLOGIC SOIL GROUP A) AND 12 (HYDROLOGIC SOIL GROUP C/D) SOILS. A GEOTECHNICAL ENGINEERING REPORT HAS NOT BEEN COMPLETED.

4. IT IS ANTICIPATED THAT CONSTRUCTION WILL BE COMPLETED IN APPROXIMATELY 3-4 MONTHS.

5. REFER TO THE CONSTRUCTION SEQUENCING AND EROSION AND SEDIMENTATION NOTES FOR INFORMATION REGARDING SEQUENCING OF MAJOR OPERATIONS IN THE ON-SITE CONSTRUCTION PHASES.

6. STORMWATER MANAGEMENT DESIGN CRITERIA UTILIZES THE APPLICABLE SECTIONS OF THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL, AND THE CITY OF BRISTOL STANDARDS, TO THE EXTENT POSSIBLE AND PRACTICABLE FOR THIS PROJECT ON THIS SITE. EROSION AND SEDIMENTATION MEASURES ARE BASED UPON ENGINEERING PRACTICE, JUDGEMENT AND THE APPLICABLE SECTIONS OF THE CONNECTICUT EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, LATEST EDITION.

7. DETAILS FOR THE TYPICAL STORMWATER MANAGEMENT AND EROSION AND SEDIMENTATION MEASURES ARE SHOWN ON THE PLAN SHEETS OR PROVIDED AS SEPARATE SUPPORT DOCUMENTATION FOR REVIEW IN THIS PLAN.

8. CONSERVATION PRACTICES TO BE USED DURING CONSTRUCTION AREA:

A. STAGED CONSTRUCTION;
B. MINIMIZE THE DISTURBED AREAS TO THE EXTENT PRACTICABLE DURING CONSTRUCTION;
C. STABILIZE DISTURBED AREAS AS SOON AS POSSIBLE WITH TEMPORARY OR PERMANENT MEASURES;
D. MINIMIZE IMPERVIOUS AREAS;
E. UTILIZE APPROPRIATE CONSTRUCTION EROSION AND SEDIMENTATION MEASURES.

9. THE FOLLOWING SEPARATE DOCUMENTS ARE TO BE CONSIDERED A PART OF THE EROSION AND SEDIMENTATION PLAN:

A. STORMWATER MANAGEMENT MEMO FOR EXISTING AND PROPOSED PEAK FLOWS.

SUGGESTED CONSTRUCTION SEQUENCE

THE FOLLOWING SUGGESTED SEQUENCE OF CONSTRUCTION ACTIVITIES IS PROJECTED BASED UPON ENGINEERING JUDGEMENT AND BEST MANAGEMENT PRACTICES. THE CONTRACTOR MAY ELECT TO ALTER THE SEQUENCING TO BEST MEET THE CONSTRUCTION SCHEDULE, THE EXISTING SITE ACTIVITIES AND WEATHER CONDITIONS. SHOULD THE CONTRACTOR ALTER THE CONSTRUCTION SEQUENCE OR ANY EROSION AND SEDIMENTATION CONTROL MEASURES THEY SHALL MODIFY THE STORMWATER POLLUTION CONTROL PLAN ("SWPCP") AS REQUIRED BY THE GENERAL PERMIT.

1. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING, PHYSICALLY FLAG THE LIMITS OF DISTURBANCE IN THE FIELD AS NECESSARY TO FACILITATE THE PRE-CONSTRUCTION MEETING.

2. CONDUCT A PRE-CONSTRUCTION MEETING TO DISCUSS THE PROPOSED WORK AND EROSION AND SEDIMENTATION CONTROL MEASURES. THE MEETING SHOULD BE ATTENDED BY THE OWNER, THE OWNER REPRESENTATIVE(S), THE MUNICIPALITY, THE GENERAL CONTRACTOR, DESIGNATED SUB-CONTRACTORS AND THE PERSON, OR PERSONS, RESPONSIBLE FOR THE IMPLEMENTATION, OPERATION, MONITORING AND MAINTENANCE OF THE EROSION AND SEDIMENTATION MEASURES. THE CONSTRUCTION PROCEDURES FOR THE ENTIRE PROJECT SHALL BE REVIEWED AT THIS MEETING.

3. NOTIFY CITY OF BRISTOL AGENT AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO COMMENCEMENT OF ANY DEMOLITION, CONSTRUCTION OR REGULATED ACTIVITY ON THIS PROJECT.

4. NOTIFY CALL BEFORE YOU DIG AT 811, AS REQUIRED, PRIOR TO THE START OF CONSTRUCTION.

5. REMOVE EXISTING IMPEDIMENTS AS NECESSARY AND PROVIDE MINIMAL CLEARING AND GRUBBING TO INSTALL THE REQUIRED CONSTRUCTION ENTRANCES.

6. CLEAR ONLY AS NEEDED TO INSTALL THE PERIMETER EROSION AND SEDIMENTATION CONTROL MEASURES AND, IF APPLICABLE, TREE PROTECTION. ALL WETLAND AREAS SHALL BE PROTECTED BEFORE MAJOR CONSTRUCTION BEGINS.

7. CONSTRUCT SEDIMENTATION TRAPS.

8. INSTALL REMAINING PERIMETER EROSION AND SEDIMENTATION CONTROL MEASURES.

9. PERFORM THE REMAINING CLEARING AND GRUBBING AS NECESSARY. REMOVE CUT WOOD AND STOCKPILE FOR FUTURE USE OR REMOVE OFF-SITE. REMOVE AND DISPOSE OF DEMOLITION DEBRIS OFF-SITE IN ACCORDANCE WITH APPLICABLE LAWS.

10. TEMPORARILY SEED DISTURBED AREAS NOT UNDER CONSTRUCTION FOR THIRTY (30) DAYS OR MORE.

11. INSTALL ELECTRICAL CONDUIT AND CONCRETE PADS.

12. INSTALL RACKING POSTS FOR GROUND MOUNTED SOLAR PANELS.

13. INSTALL GROUND MOUNTED SOLAR PANELS AND COMPLETE ELECTRICAL INSTALLATION.

14. AFTER SUBSTANTIAL COMPLETION OF THE INSTALLATION OF THE SOLAR PANELS, COMPLETE REMAINING SITE WORK, INCLUDING THE LANDSCAPE SCREENING, AND STABILIZE ALL DISTURBED AREAS.

15. FINE GRADE, RAKE, SEED AND MULCH ALL REMAINING DISTURBED AREAS.

16. AFTER THE SITE IS STABILIZED AND WITH THE APPROVAL OF THE PERMITTEE AND CITY OF BRISTOL AGENT, REMOVE PERIMETER EROSION AND SEDIMENTATION CONTROLS.

CONSTRUCTION OPERATION AND MAINTENANCE PLAN - BY CONTRACTOR		
E&S MEASURE	INSPECTION SCHEDULE	MAINTENANCE REQUIRED
CONSTRUCTION ENTRANCE	DAILY	PLACE ADDITIONAL STONE, EXTEND THE LENGTH OR REMOVE AND REPLACE THE STONE. CLEAN PAVED SURFACES OF TRACKED SEDIMENT.
COMPOST FILTER SOCK	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED.
SILT FENCE	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE FENCE.
TOPSOIL/SOIL/HOW STOCKPILES	DAILY	REPAIR/REPLACE SEDIMENT BARRIERS AS NECESSARY.
TEMPORARY SEDIMENT BASIN (W/ BAFFLES)	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.5"	REMOVE SEDIMENT ONCE IT HAS ACCUMULATED TO ONE HALF OF MINIMUM REQUIRED VOLUME OF THE WET STORAGE. DEWATERING AS NEEDED. RESTORE TRAP TO ORIGINAL DIMENSIONS. REPAIR/REPLACE BAFFLES WHEN FAILURE OR DETERIORATION IS OBSERVED.
TEMPORARY SEDIMENT TRAP (W/ BAFFLES)	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.5"	REMOVE SEDIMENT ONCE IT HAS ACCUMULATED TO ONE HALF OF MINIMUM REQUIRED VOLUME OF THE WET STORAGE. DEWATERING AS NEEDED. RESTORE TRAP TO ORIGINAL DIMENSIONS. REPAIR/REPLACE BAFFLES WHEN FAILURE OR DETERIORATION IS OBSERVED.
TEMPORARY SOIL PROTECTION	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR ERODED OR BARE AREAS IMMEDIATELY. RESEED AND MULCH.

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APPROVED FOR CONSTRUCTION

NO	DATE	REVISION
0	01/28/21	FOR CONSTRUCTION: BJP
1	05/20/21	FOR CONSTRUCTION: BJP
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DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHALL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: LINDA ARBESMAN, KATHLEEN FERRIER, H.C. TR ALLAIRE & LAUREN VALENTINO
ADDRESS: 481 MATTHEWS STREET BRISTOL, CT 06010

BRISTOL SOLAR

SITE ADDRESS: MATTHEWS ST. & HILL ST. BRISTOL, CT 06010

APT FILING NUMBER: CT562100

DRAWN BY: CSH

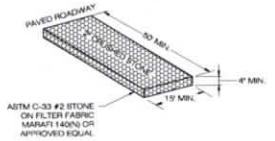
DATE: 01/28/21 CHECKED BY: BJP

SHEET TITLE:

SEDIMENTATION & EROSION CONTROL NOTES

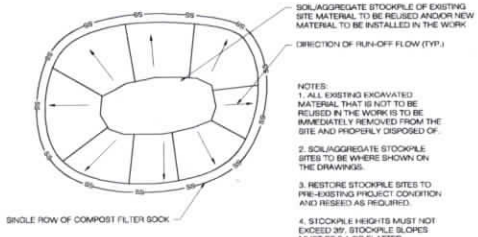
SHEET NUMBER:

EC-1



CONSTRUCTION ENTRANCE DETAIL

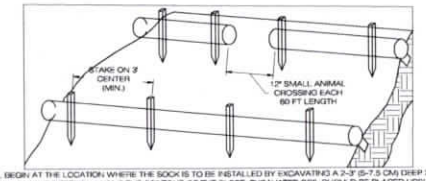
1 / EC-2 SCALE : N.T.S.



NOTES:
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS.
3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.
4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

MATERIALS STOCKPILE DETAIL

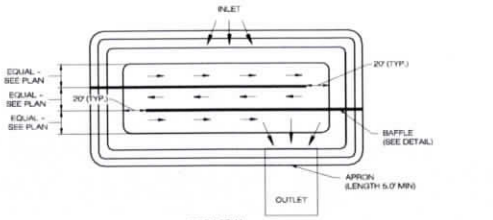
2 / EC-2 SCALE : N.T.S.



1. BEGIN AT THE LOCATION WHERE THE SOCK IS TO BE INSTALLED BY EXCAVATING A 2-3" (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UPSLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE SOCK IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE SOCK ON THE UPHILL SIDE. SOCKS SHALL BE INSTALLED IN 60 FT CONTINUOUS LENGTHS WITH ADJACENT SOCKS TIGHTLY ABUT. EVERY 60 FT THE SOCK ROW SHALL BE SPACED 12 INCHES CLEAR, END TO END, FOR AMPHIBIAN AND REPTILE TRAVEL. THE OPEN SPACES SHALL BE STAGGERED MID LENGTH OF THE NEXT DOWN GRADIENT SOCK.
3. SECURE THE SOCK WITH 18-24" (45.7-61 CM) STAKES EVERY 3-4' (0.9 -1.2 M) AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE SOCK LEAVING AT LEAST 2-3" (5-7.5 CM) OF STAKE EXTENDING ABOVE THE SOCK. STAKES SHOULD BE DRIVEN PERPENDICULAR TO THE SLOPE FACE.

COMPOST FILTER SOCK SEDIMENTATION CONTROL BARRIER

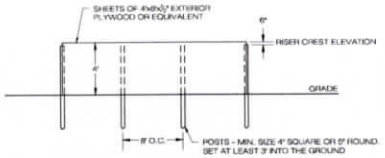
3 / EC-2 SCALE : N.T.S.



NOTES:
1. CONSTRUCT TEMPORARY SEDIMENT TRAP BERMS AND SIDEWALLS PER THE INFILTRATION BASIN DETAIL.
2. PERVIOUS STONE DIKE SHALL BE CONSTRUCTED OF CT DOT MODIFIED RIP-RAP WITH #3 STONE ON FACE.
3. SEDIMENT TRAP BAFFLES SHALL BE INSTALLED AS SHOWN ON EC-1 AND EC-2.
4. SEE TST SIZING TABLE FOR WET AND DRY STORAGE VOLUMES.

TEMPORARY SEDIMENT TRAP

4 / EC-2 SCALE : N.T.S.



SEDIMENT TRAP BAFFLE

5 / EC-2 SCALE : N.T.S.

TEMPORARY SEDIMENT BASIN SIZING TABLE

NAME	DRAINAGE AREA (AC)	SEDIMENT VOLUME/ACRE AREA (CY)	REQ. VOLUME (CY)	REQ. WET VOLUME (CY)	PROP. BTM. ELEV. (FT)	PROP. STONE DIKE BTM. ELEV. (FT)	PROP. WEIR CREST ELEV. (FT)	PROP. TOP ELEV. (FT)	WET VOL. PROVIDED (CY)	TOTAL VOL. PROVIDED. (CY)
TST-1	4.98 AC	134 CYD	659.28 CY	329.64 CYD	628.0'	630.5'	631.5'	632.0'	472.63 CY	722.68 CY
TST-2	1.53 AC	134 CYD	206.32 CY	103.16 CYD	635.0'	636.5'	637.5'	638.0'	129.90 CY	248.43 CY

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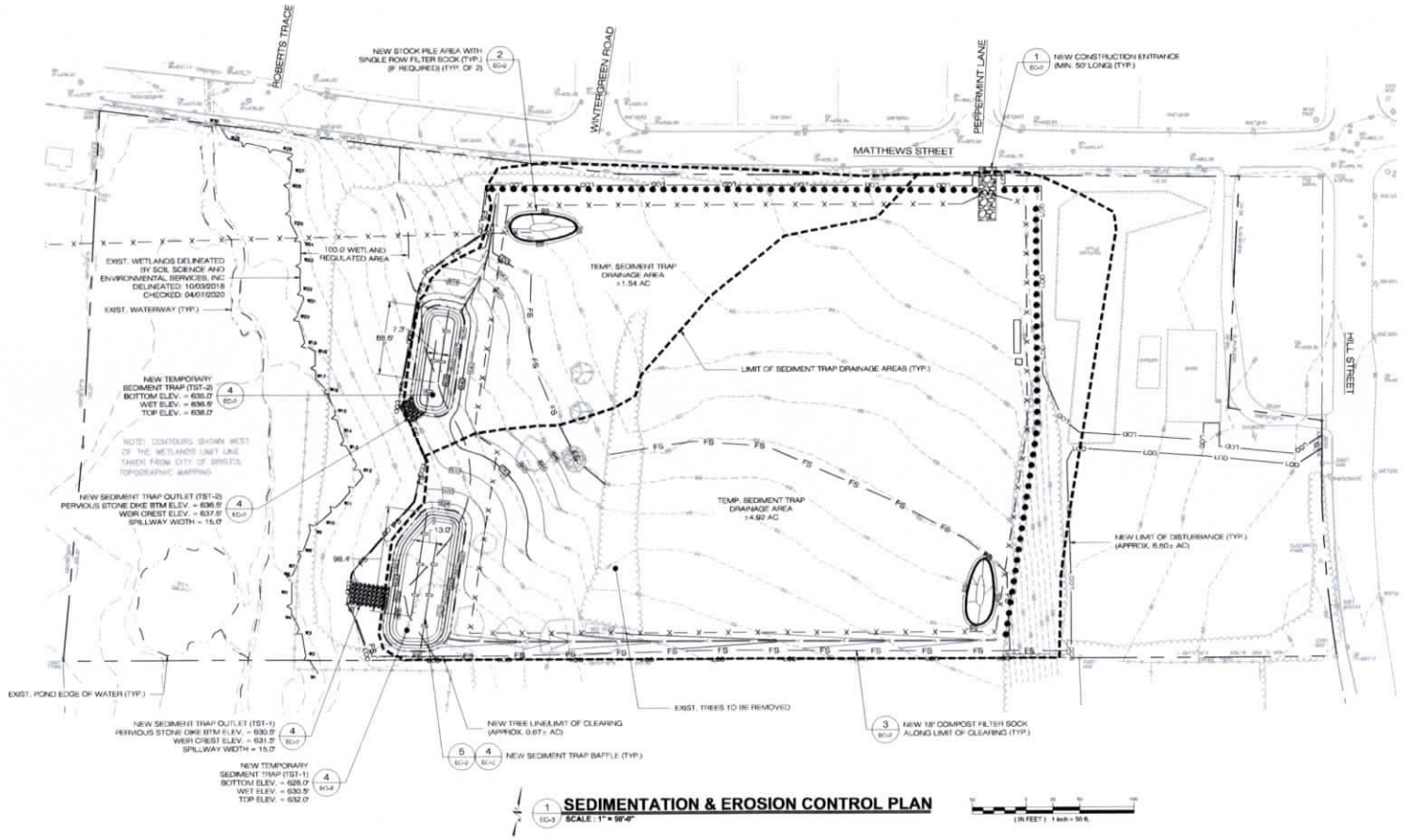
SHEET TITLE:
SEDIMENTATION & EROSION CONTROL DETAILS

SHEET NUMBER:
EC-2



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APT FILING NUMBER: CT562100

DRAWN BY: CBH

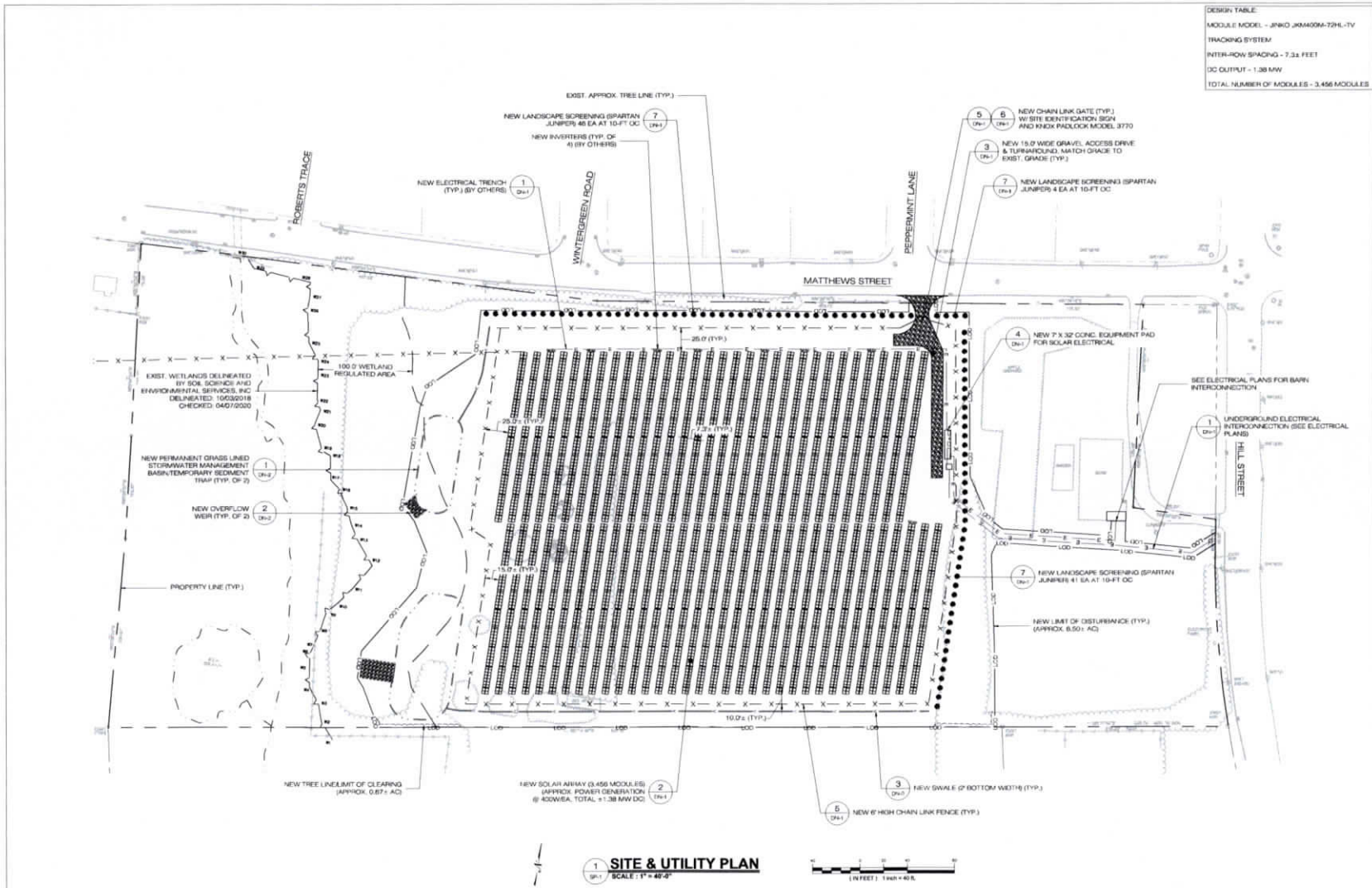
DATE: 01/28/21 CHECKED BY: BJP

SHEET TITLE:

SEDIMENTATION & EROSION CONTROL PLAN

SHEET NUMBER:

EC-3



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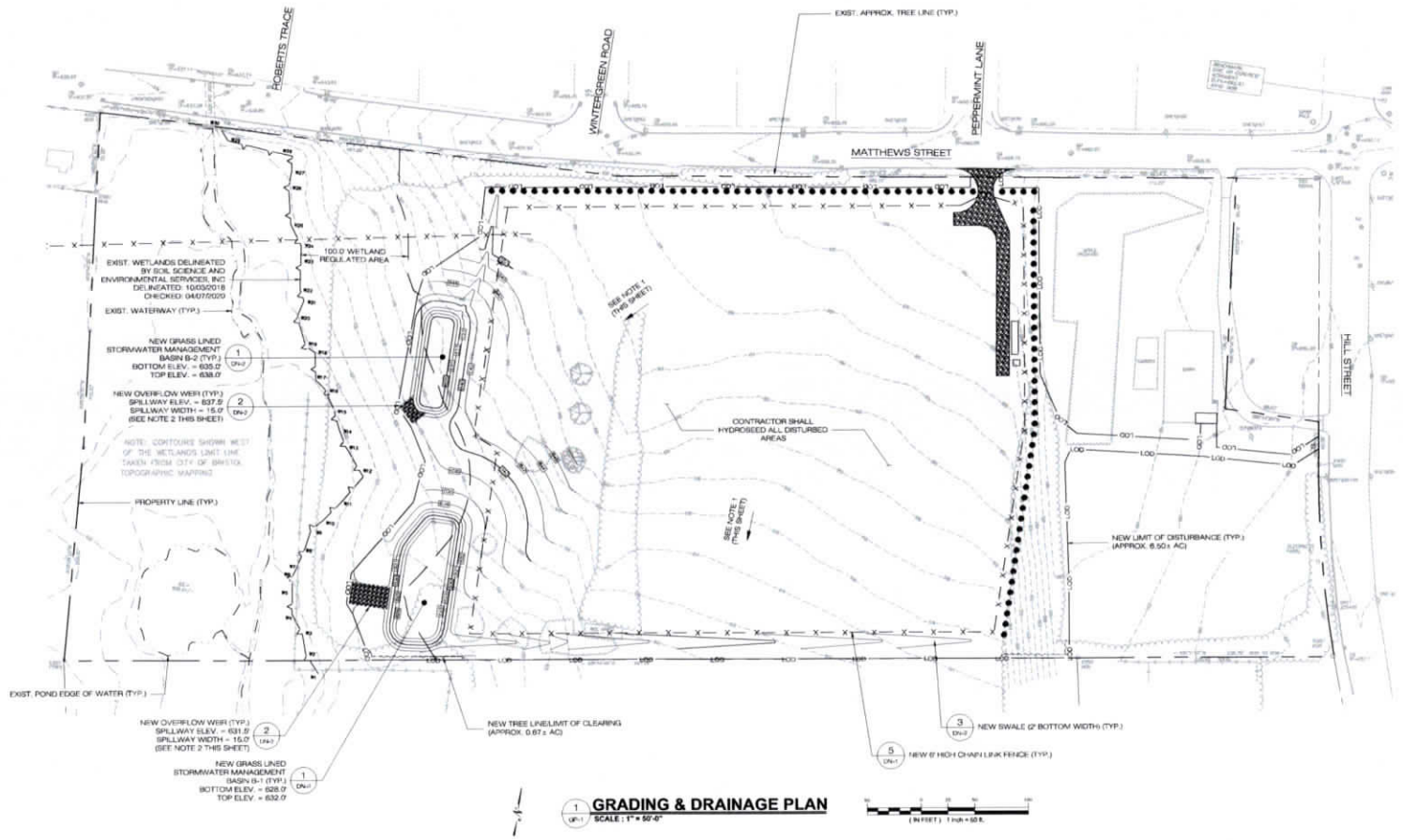
SHEET TITLE:

SITE & UTILITY PLAN

SHEET NUMBER:

SP-1



GRADING & DRAINAGE PLAN

SCALE: 1" = 50'-0"

(IN FEET) 1 inch = 50 ft.

NOTES:
1. GRADE/SHAPE DISTURBED AREA TO MATCH EXISTING GRADE AND FLOW TOWARDS NEW GRASS LINED STORMWATER MANAGEMENT BASINS & SWALES.
2. CONTRACTOR SHALL REPLACE TEMPORARY SEDIMENT TRAP OUTLET WITH RIP-RAP OVERFLOW WEIR UPON THE SITE OR DRAINAGE AREA BEING DEEMED STABILIZED PER THE SWPCP.

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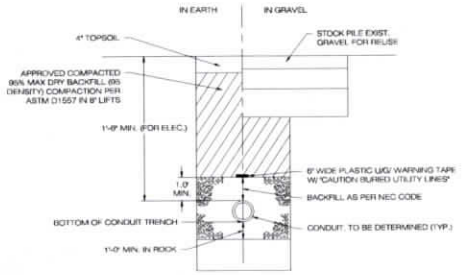
APT FILING NUMBER: CT502100

DRAWN BY: CSH

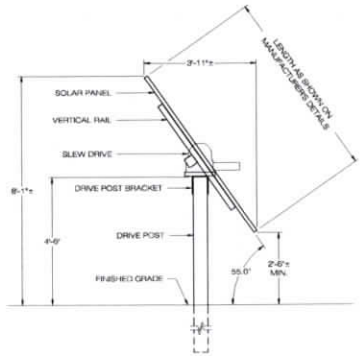
DATE: 01/28/21 CHECKED BY: BJP

SHEET TITLE: GRADING & DRAINAGE PLAN

SHEET NUMBER: GP-1

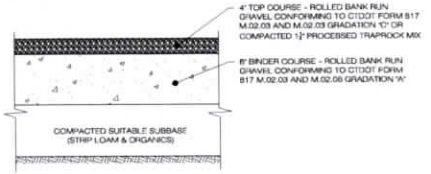


1 DN-1 **ELECTRICAL TRENCH DETAIL**
SCALE : N.T.S.



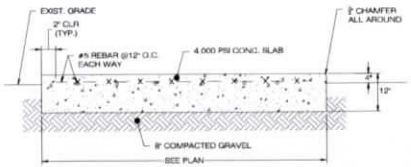
NOTES:
SEE MANUFACTURERS DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.

2 DN-1 **TYPICAL TRACKER POST MOUNTED RACKING SYSTEM**
SCALE : N.T.S.

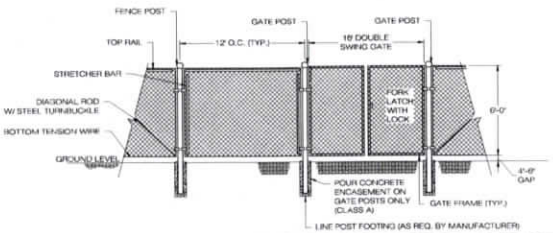


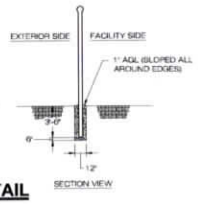
NOTES:
1. SUBBASE MAY CONSIST OF NATIVE MATERIALS IF FOUND ACCEPTABLE BY THE ENGINEER. SUBBASE TO BE COMPACTED TO 95% MAX DRY DENSITY.
2. SUBBASE IS TO BE FREE FROM DEBRIS AND UNSUITABLE MATERIALS.

3 DN-1 **GRAVEL ACCESS DRIVE SECTION**
SCALE : N.T.S.



4 DN-1 **CONCRETE EQUIPMENT PAD**
SCALE : N.T.S.





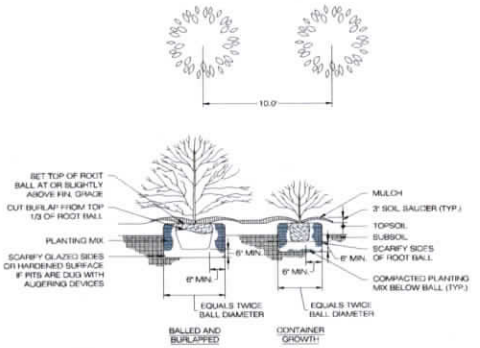
5 DN-1 **CHAIN-LINK FENCE & GATE DETAIL**
SCALE : N.T.S.

BRISTOL SOLAR FARM

IN CASE OF EMERGENCY CALL T.B.D.

NOTES:
EMERGENCY CALL NUMBER TO BE PROVIDED ONCE DETERMINED.

6 DN-1 **NOTIFICATION SIGN DETAIL**
SCALE : N.T.S.



NOTES:
IN AREAS OF MASS PLANTINGS, CONTINUOUSLY EXCAVATE AND MULCH ENTIRE BED.

7 DN-1 **TYPICAL PLANTING DETAIL**
SCALE : N.T.S.

SUNJET
POWER CHANGES EVERYTHING

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PH: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

APPROVED FOR CONSTRUCTION

NO	DATE	REVISION
0	01/28/21	FOR CONSTRUCTION: BJP
1	05/20/21	FOR CONSTRUCTION: BJP
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHALL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: LINDA ARSESMAN, KATHLEEN FERRIER, H.C. TR ALLAIRE & LAUREN VALENTINO
ADDRESS: 481 MATTHEWS STREET BRISTOL, CT 06010

BRISTOL SOLAR

SITE ADDRESS: MATTHEWS ST. & HILL ST. BRISTOL, CT 06010

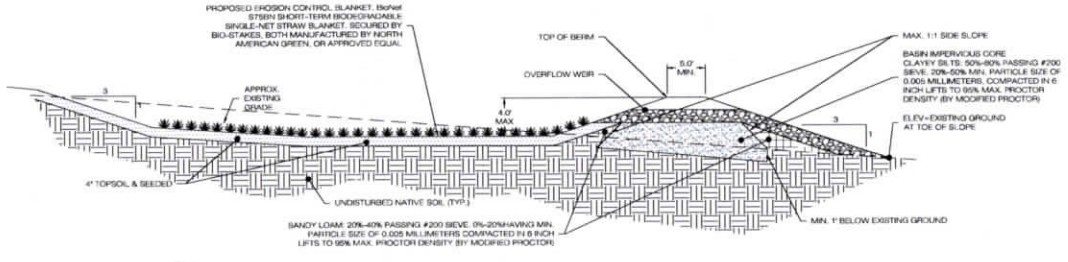
APT FILING NUMBER: CT582100

DRAWN BY: CBH

DATE: 01/28/21 CHECKED BY: BJP

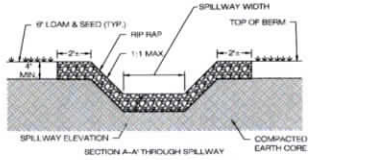
SHEET TITLE:
SITE DETAILS

SHEET NUMBER:
DN-1

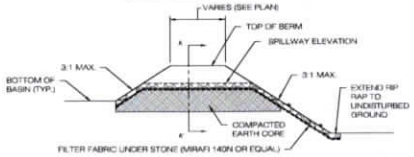


NOTES:
- SEED MIX TO BE NEW ENGLAND EROSION CONTROL/ RESTORATION MIX FOR MOIST SITES ON THE BOTTOM OF THE BASIN AND NEW ENGLAND EROSION/RESTORATION MIX FOR DRY SITES ON THE SIDE SLOPES.
- FOR CONVERTING TST TO INFILTRATION BASIN, REMOVE BAFFLES, CLEAN OUT SEDIMENT, RESHAPE AS REQUIRED, RECONSTRUCT OUTLET WEIR INCLUDING ADDITIONAL IMPERVIOUS CORE, AND RESEEDING.
- INSPECT AND CLEAN PIPES PRIOR TO INSTALLING PERMANENT OUTLET.

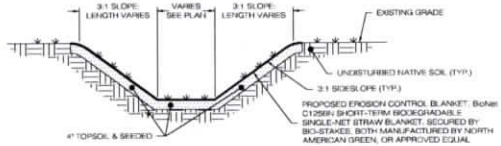
1 GRASS LINED INFILTRATION BASIN
DN-3 SCALE : N.T.S.



SECTION A-A' THROUGH SPILLWAY



2 OVERFLOW WEIR DETAIL
DN-2 SCALE : N.T.S.



NOTES:
1. SEED MIX TO BE NEW ENGLAND EROSION CONTROL/ RESTORATION MIX FOR MOIST SITES ON THE BOTTOM OF THE BASIN AND NEW ENGLAND EROSION/RESTORATION MIX FOR DRY SITES ON THE SIDE SLOPES.

3 GRASS LINED SWALE
DN-3 SCALE : N.T.S.

Ernst Conservation Seeds
8884 Mercer Pike
Meadville, PA 16335
(800) 873-3321 Fax (814) 336-5191
www.ernstseed.com

Date: March 01, 2021

Ernst Solar Farm Seed Mix - ERNMX-186

	Botanical Name	Common Name	Price/lb
45.50 %	*Festuca rubra*	Creeping Red Fescue	2.20
15.00 %	*Festuca ovina* var. *durinscula*, 'Jetty'	Hard Fescue, 'Jetty'	3.52
15.00 %	*Festuca ovina* var. *durinscula*, 'Gladiator'	Hard Fescue, Gladiator	3.52
10.00 %	*Festuca rubra* spp. *commutata*	Chewings Fescue	2.70
5.00 %	*Poa pratensis*, 'Selway'	Kentucky Bluegrass, 'Selway'	3.08
5.00 %	*Poa pratensis*, Appalachian	Kentucky Bluegrass, Appalachian	3.08
4.50 %	*Trifolium repens*, Dutch	White Clover, Dutch	4.84
100.00 %		**Mix Price/lb Bulk:**	**$2.85**

Seeding Rate: 6 lb per 1,000 sq ft
Lawn & Turfgrass Sites; Solar Sites

Provide a 2' clearance between the ground and the solar panels. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

4 SEED MIX
DN-3 SCALE : N.T.S.

SUNJET
ALL-POINTS TECHNOLOGY CORPORATION
587 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PH: (860)-663-1697
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BRISTOL SOLAR

SITE ADDRESS: MATTHEWS ST. & HILL ST. BRISTOL, CT 06010

APT FILING NUMBER: CT562100

DRAWN BY: CSH

DATE: 01/28/21 CHECKED BY: BJP

SHEET TITLE:
SITE DETAILS

SHEET NUMBER:
DN-2

Bristol Solar
Bristol, CT

STRUCTURAL ANALYSIS
For Pile Foundations

Prepared for

Swinerton Renewable Energy
16798 West Bernardo Dr.
San Diego, California

Blymyer Engineers, Inc.
1101 Marina Village Parkway, Suite 100
Alameda, CA 94501
510.521.3773
Project No. 220027
September 24, 2020

Bristol

TABLE OF CONTENTS

BLYMYER ENGINEERS
Blymyer Engineers, Inc.
1101 Marina Village Parkway, Suite 100, Alameda, CA 94501
Computations
P 510.521.3773

Date: 09/23/2020 | Client: Swinerton | Job No:
By: CMM | Chk: | Project: Putnam

Soil Properties

Refer to Appendix A for geotechnical report recommendations.

Uplift & Downward Soil Capacity

750	= Ultimate skin friction [psf]

Per the geotechnical report the contribution to pier capacity from soil above a depth of 3.5 feet should be ignored.

Lateral Pile Capacity

130	Effective Weight (pcf)
35	Friction Angle (°)
90	K (pci)

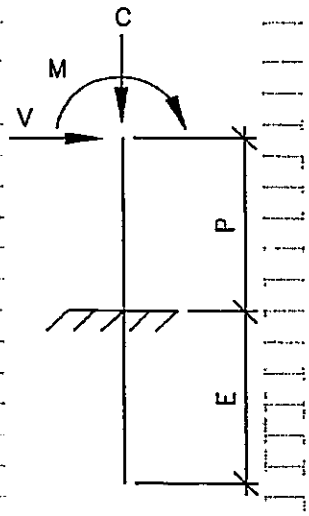
Blymyer Engineers, Inc.
1101 Marina Village Parkway, Suite 100, Alameda, CA 94501
Computations
P 510.521.3773

BLYMYER ENGINEERS

Date: 09/29/2020 | Client: Swinerton | Job No:
By: CMM | Chk: | Project: Bristol

Idler Pier Design - W6x7

P =	6.50	ft	Max Projection
E =	10.50	ft	Min Embedment
d =	5.79	in	Beam Depth
b_f =	3.91	in	Beam Width



SECTION AT COLUMN

Array Loads per Solar FlexRack TDP 2.0 Loads at Torque Tube Column Load Report, Appendix B

0.529	kip	D = Dead Load
3.031	kip	S = Snow Load
2.415	kip	Wdns = Wind Down for Snow Combination
-0.541	kip	Wdnl = Wind Down for Lateral Combination
2.723	kip	Wup = Wind Up
0.541	kip	Wh = Horizontal Wind
15.276	kip*in	Mh = Wind moment at top of pile

Vertical:

Maximum Factored Compression Demand:

F.S.= 1.5	(1(D) + 0.6(Wdns)) * F.S. =	2.97	kip
F.S.= 1.5	(1(D) + 0.6(Wdnl)) * F.S. =	0.31	kip
F.S.= 2.0	(1(D) + 1(S)) * F.S. =	7.12	kip
F.S.= 1.5	(1(D) + 0.75(0.6)(Wdns) + 0.75(S)) * F.S. =	5.83	kip
	Maximum Factored Compression Demand =	7.12	kip

Ultimate Compression Capacity:

2016 psf SF_c Ultimate Compression Skin Friction, See Pile Design Capacities, Page 1

22.80 kip = C_u = $SF_c * 2 * (d + b_f) * (E - 3.5) / 12$ = Ultimate Compression

22.80 kip > 7.12 kip .....(OK)

Maximum Factored Tension Demand:

F.S.= 1.5 (-0.6(D) + 0.6(Wup)) * F.S. = 1.97 kip

Ultimate Tension Capacity:

750 psf SF_t Ultimate Tension Skin Friction, See Pile Design Capacities, Page 1

8.48 kip = T_u = $SF_t * 2 * (d + b_f) * (E - 3.5) / 12$ = Ultimate Tension Capacity

8.48 kip > 1.97 kip .....(OK)

Lateral:

L-Pile Strong Axis Demands:

V =	0.6	Wh =	325	lb	Shear
M =	0.6	Mh =	9,166	lb*in	Moment at Pile Top
C = 1(D) + 0.6(Wdnl) =			204	lb	Compression

Maximum Moment and Deflection

Mx =	[illegible]	lb*in	Maximum Moment (Refer following L-Pile Analysis)				
Δx =	[illegible]	in	Maximum Deflection (Refer following L-Pile Analysis)				
Mc = Mn-x' / Ω =	89,067	lb*in	Allowable Moment (Refer Following)	>	37,839	lb*in	.....(OK)
Pc = Pn' / Ω =	19,982	lb	Allowable Axial (Refer Following)	>	204	lb	.....(OK)
C / Pc =	0.0102						
Combined =	0.430	= C / (2 * Pc) + Mx / Mc		<	1		.....(OK)
Δal-x' =	2.34	in	Allowable Deflection (Refer Following)	>	0.72	in	.....(OK)

BLYMYER ENGINEERS

Blymyer Engineers, Inc.
1101 Marina Village Parkway, Suite 100, Alameda, CA 94501
P 510.521.3773

Computations

Date: 09/29/2020 | Client: Swinerton | Job No:
By: CMM | Chk: | Project: Bristol

Soil Corrosion of Steel Pile

This analysis determines the allowable moment, deflection & compression values for the specified member after the member is corroded by the site soils over its design life.

Per Appendix C, Geotechnical Report Corrosion Parameters, the closest soil type is #32 Ontario Loam.

Parameters:

35	= Design Life [years]
Plain	= Galvanized or Plain Pile
W6x7	= Pile Size
6.5	= L = Pile Projection [ft]
4.527	= Zx = Strong Axis Plastic Section Modulus [in3]
1.245	= Zy = Weak Axis Plastic Section Modulus [in3]
0.878	= ry = Weak Axis Radius of Gyration [in]
1.2	= K = Weak Axis Effective Length Factor
2.07	= A = Area [in2]
50	= Fy = [ksi]

Galvanizing Life:

10.71	Galvanizing Corrosion Test Duration [years] - (See Appendix C, NBS Circular)
0.65	Average Loss in Galvanizing Weight [oz/sq ft] - (See Appendix C, NBS Circular)
0.061	= 0.65 / 10.71 = Galvanizing Loss Rate [oz/ (sq ft / yr)]
75	Coating Grade - (See Appendix C, Galvanizing Datasheet)
1.7	Coating Thickness [oz/sq ft] - (See Appendix C, Galvanizing Datasheet)
28.0	= 1.7 / 0.06 = Life of Galvanizing [Years]

Steel Life:

11.7	Steel Corrosion Test Duration [Year] - (See Appendix C, NBS Circular)
3.7	Average Loss in Steel Weight [oz / sq ft] - (See Appendix C, NBS Circular)
0.316	= 3.7 / 11.7 = Steel Loss Rate [oz/ (sq ft / yr)]
35.0	= 35 - 28 if Galvanized Plile or 35 if Plain Pile = Number of Years Steel Will Experience Corrosion
11.07	= 35 * 0.316 = Steel Lost due to Corrosion on Each Side of Flange [oz/sq ft]
0.0170	= 11.1 / (0.283 * 16 * 144) = Steel Lost due to Corrosion on Each Side of Flange [in]
5.79	= d = Initial Depth [in]
5.756	= d' = 5.79 - 2 * 0.017 = Depth After Corrosion
3.905	= bf = Initial Flange Width [in]
3.871	= bf' = 3.905 - 2 * 0.017 = Flange Width After Corrosion
0.16	= tf = Initial Flange Thickness [in]
0.126	= tf' = 0.16 - 2 * 0.017 = Flange Thickness After Corrosion
0.135	= tw = Initial Web Thickness [in]
0.101	= tw' = 0.135 - 2 * 0.017 = Web Thickness After Corrosion

Strong Axis - Available Strength and Deflection After Corrosion:

89,067	= Mn-x' / Ω = Allowable Flexural Strength After Corrosion [lb * in] - (See Appendix D)
3.00	= Δal-x = Allowable Deflection [in]
2.34	= Δal-x' = (bf' * tf') / (bf * tf) * Δal-x = Allowable Deflection After Corrosion [lb * in]

Weak Axis - Available Strength and Deflection After Corrosion:

22,243	= Mn-y' / Ω = Allowable Flexural Strength After Corrosion [lb * in] - (See Appendix D)
4.00	= Δal-y = Allowable Deflection [in]
3.12	= Δal-y' = (bf' * tf') / (bf * tf) * Δal-y = Allowable Deflection After Corrosion [lb * in]

Compression - Available Strength After Corrosion:

106.6	= K * L / ry
25,185	= Fe = π^2 * E / (K * L / ry)^2 = Elastic Critical Buckling Stress [psi]
26,999	= Pn / Ω = A * [0.658^(Fy/Fe)] * Fy / Ω = Allowable Compressive Strength [lb]
1.53	= A' = 2 * bf' * tf' + (d - tf - tf') * tw' = Area After Corrosion [in2]
19,982	= Pn' / Ω = (A' / A) * Pn / Ω = Allowable Compressive Strength After Corrosion [lb]

LPile Plus for Windows, Version 2013-07.003

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This copy of LPile is used by:

.
.

Serial Number of Security Device: 139691925
This copy of LPile is licensed for exclusive use by: Blymyer Engineers, Alameda, CA

Use of this program by any entity other than Blymyer Engineers, Alameda, CA
is forbidden by the software license agreement.

Files Used for Analysis

Path to file locations: \\AJMDISKSTATION\Main\2020 Year Job\20546\
Name of input data file: W6x7 Idler.lp7d
Name of output report file: W6x7 Idler.lp7o
Name of plot output file: W6x7 Idler.lp7p
Name of runtime messeage file: W6x7 Idler.lp7r

Date and Time of Analysis

Date: September 29, 2020 Time: 10:54:41

Problem Title

Project Name:

Job Number:

Client:

Engineer:

Description:

Program Options and Settings

Engineering Units of Input Data and Computations:
- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:
- Static loading specified

Computational Options:
- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Use of p-y modification factors for p-y curves not selected
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

Pile Structural Properties and Geometry

Total number of pile sections = 1

Total length of pile = 17.00 ft

Depth of ground surface below top of pile = 6.50 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	3.9050000
2	17.000000	3.9050000

Input Structural Properties:

Pile Section No. 1:

Section Type	= Elastic Pile
Cross-sectional Shape	= Strong H-Pile
Section Length	= 17.00000 ft
Flange Width	= 3.90500 in
Section Depth	= 5.79000 in
Flange Thickness	= 0.16000 in
Web Thickness	= 0.13500 in
Section Area	= 2.07000 Sq. in
Moment of Inertia	= 12.30000 in^4
Elastic Modulus	= 29000000. lbs/in^2

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	6.50000 ft
Distance from top of pile to bottom of layer	=	20.00000 ft
Effective unit weight at top of layer	=	130.00000 pcf
Effective unit weight at bottom of layer	=	130.00000 pcf
Friction angle at top of layer	=	35.00000 deg.
Friction angle at bottom of layer	=	35.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

(Depth of lowest soil layer extends 3.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	kpy pci
1	Sand (Reese, et al.)	6.500	130.000	35.000	90.000
		20.000	130.000	35.000	90.000

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 325.00000 lbs	M = 9166.00000 in-lbs	204.00000000	Yes

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head

Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 325.0 lbs
Applied moment at pile head = 9166.0 in-lbs
Axial thrust load on pile head = 204.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7175	9166.0000	325.0000	-0.009642	1553.5601	3.567E+08	0.000	0.000	0.000
0.170	0.6978	9833.0018	325.0000	-0.009588	1659.4398	3.567E+08	0.000	0.000	0.000
0.340	0.6783	10500.	325.0000	-0.009530	1765.3159	3.567E+08	0.000	0.000	0.000
0.510	0.6590	11167.	325.0000	-0.009468	1871.1880	3.567E+08	0.000	0.000	0.000
0.680	0.6397	11834.	325.0000	-0.009402	1977.0558	3.567E+08	0.000	0.000	0.000
0.850	0.6206	12501.	325.0000	-0.009332	2082.9192	3.567E+08	0.000	0.000	0.000
1.020	0.6016	13168.	325.0000	-0.009259	2188.7779	3.567E+08	0.000	0.000	0.000
1.190	0.5828	13834.	325.0000	-0.009182	2294.6316	3.567E+08	0.000	0.000	0.000
1.360	0.5642	14501.	325.0000	-0.009101	2400.4800	3.567E+08	0.000	0.000	0.000
1.530	0.5457	15168.	325.0000	-0.009016	2506.3230	3.567E+08	0.000	0.000	0.000
1.700	0.5274	15835.	325.0000	-0.008927	2612.1603	3.567E+08	0.000	0.000	0.000
1.870	0.5093	16501.	325.0000	-0.008835	2717.9915	3.567E+08	0.000	0.000	0.000
2.040	0.4913	17168.	325.0000	-0.008739	2823.8166	3.567E+08	0.000	0.000	0.000
2.210	0.4736	17835.	325.0000	-0.008639	2929.6351	3.567E+08	0.000	0.000	0.000
2.380	0.4561	18501.	325.0000	-0.008535	3035.4469	3.567E+08	0.000	0.000	0.000
2.550	0.4388	19168.	325.0000	-0.008427	3141.2518	3.567E+08	0.000	0.000	0.000
2.720	0.4217	19834.	325.0000	-0.008315	3247.0493	3.567E+08	0.000	0.000	0.000
2.890	0.4049	20501.	325.0000	-0.008200	3352.8394	3.567E+08	0.000	0.000	0.000
3.060	0.3883	21167.	325.0000	-0.008081	3458.6218	3.567E+08	0.000	0.000	0.000
3.230	0.3719	21833.	325.0000	-0.007958	3564.3961	3.567E+08	0.000	0.000	0.000
3.400	0.3558	22500.	325.0000	-0.007831	3670.1622	3.567E+08	0.000	0.000	0.000
3.570	0.3400	23166.	325.0000	-0.007701	3775.9198	3.567E+08	0.000	0.000	0.000
3.740	0.3244	23832.	325.0000	-0.007566	3881.6687	3.567E+08	0.000	0.000	0.000
3.910	0.3091	24498.	325.0000	-0.007428	3987.4085	3.567E+08	0.000	0.000	0.000
4.080	0.2941	25164.	325.0000	-0.007286	4093.1391	3.567E+08	0.000	0.000	0.000
4.250	0.2794	25830.	325.0000	-0.007140	4198.8602	3.567E+08	0.000	0.000	0.000
4.420	0.2649	26496.	325.0000	-0.006990	4304.5715	3.567E+08	0.000	0.000	0.000
4.590	0.2508	27162.	325.0000	-0.006837	4410.2728	3.567E+08	0.000	0.000	0.000
4.760	0.2370	27828.	325.0000	-0.006680	4515.9638	3.567E+08	0.000	0.000	0.000
4.930	0.2236	28494.	325.0000	-0.006519	4621.6444	3.567E+08	0.000	0.000	0.000
5.100	0.2104	29159.	325.0000	-0.006354	4727.3141	3.567E+08	0.000	0.000	0.000
5.270	0.1977	29825.	325.0000	-0.006185	4832.9729	3.567E+08	0.000	0.000	0.000
5.440	0.1852	30491.	325.0000	-0.006013	4938.6204	3.567E+08	0.000	0.000	0.000
5.610	0.1731	31156.	325.0000	-0.005836	5044.2563	3.567E+08	0.000	0.000	0.000
5.780	0.1614	31821.	325.0000	-0.005656	5149.8805	3.567E+08	0.000	0.000	0.000
5.950	0.1500	32487.	325.0000	-0.005472	5255.4927	3.567E+08	0.000	0.000	0.000

6.120	0.1391	33152.	325.0000	-0.005285	5361.0926	3.567E+08	0.000	0.000	0.000
6.290	0.1285	33817.	325.0000	-0.005093	5466.6799	3.567E+08	0.000	0.000	0.000
6.460	0.1183	34482.	325.0000	-0.004898	5572.2545	3.567E+08	0.000	0.000	0.000
6.630	0.1085	35147.	320.1696	-0.004699	5677.8161	3.567E+08	-4.7357	89.0393	0.000
6.800	0.0991	35792.	303.1898	-0.004496	5780.2359	3.567E+08	-11.9111	245.1449	0.000
6.970	0.0902	36388.	272.0978	-0.004290	5874.7736	3.567E+08	-18.5712	420.2160	0.000
7.140	0.0816	36906.	228.5839	-0.004080	5957.0291	3.567E+08	-24.0895	602.1013	0.000
7.310	0.0735	37324.	175.5857	-0.003868	6023.3569	3.567E+08	-27.8695	773.4126	0.000
7.480	0.0658	37626.	116.1709	-0.003653	6071.2597	3.567E+08	-30.3803	941.3420	0.000
7.650	0.0586	37801.	51.5533	-0.003438	6099.0787	3.567E+08	-32.9702	1147.6836	0.000
7.820	0.0518	37839.	-16.2063	-0.003221	6105.1029	3.567E+08	-33.4607	1317.4588	0.000
7.990	0.0455	37738.	-88.2134	-0.003005	6089.0082	3.567E+08	-37.1345	1666.3674	0.000
8.160	0.0396	37482.	-167.0369	-0.002790	6048.3678	3.567E+08	-40.1434	2070.6082	0.000
8.330	0.0341	37058.	-252.6595	-0.002577	5981.1940	3.567E+08	-43.8003	2622.1113	0.000
8.500	0.0290	36453.	-345.0496	-0.002367	5885.0712	3.567E+08	-46.7783	3286.5923	0.000
8.670	0.0244	35653.	-442.6967	-0.002161	5758.0324	3.567E+08	-48.9541	4089.5860	0.000
8.840	0.0202	34648.	-543.8450	-0.001960	5598.6404	3.567E+08	-50.2110	5065.8423	0.000
9.010	0.0164	33435.	-640.4735	-0.001765	5406.0654	3.567E+08	-44.5228	5530.0320	0.000
9.180	0.0130	32037.	-724.3216	-0.001578	5184.0655	3.567E+08	-37.6813	5904.5760	0.000
9.350	0.009987	30481.	-794.1112	-0.001399	4937.1608	3.567E+08	-30.7398	6279.1200	0.000
9.520	0.007311	28798.	-849.7877	-0.001229	4669.9374	3.567E+08	-23.8450	6653.6640	0.000
9.690	0.004971	27015.	-891.5771	-0.001070	4386.9510	3.567E+08	-17.1250	7028.2080	0.000
9.860	0.002946	25161.	-919.9479	-0.000921	4092.6413	3.567E+08	-10.6895	7402.7520	0.000
10.030	0.001214	23263.	-935.5734	-0.000782	3791.2605	3.567E+08	-4.6296	7777.2960	0.000
10.200	-0.000246	21345.	-939.2942	-0.000655	3486.8125	3.567E+08	0.9816	8151.8400	0.000
10.370	-0.001457	19431.	-932.0832	-0.000538	3183.0050	3.567E+08	6.0881	8526.3840	0.000
10.540	-0.002441	17542.	-915.0103	-0.000432	2883.2120	3.567E+08	10.6501	8900.9280	0.000
10.710	-0.003220	15698.	-889.2115	-0.000337	2590.4479	3.567E+08	14.6429	9275.4720	0.000
10.880	-0.003817	13915.	-855.8590	-0.000253	2307.3512	3.567E+08	18.0556	9650.0160	0.000
11.050	-0.004251	12206.	-816.1348	-0.000178	2036.1769	3.567E+08	20.8896	10025.	0.000
11.220	-0.004543	10585.	-771.2071	-0.000113	1778.7980	3.567E+08	23.1571	10399.	0.000
11.390	-0.004711	9059.8695	-722.2098	-5.655E-05	1536.7129	3.567E+08	24.8795	10774.	0.000
11.560	-0.004773	7638.3436	-670.2249	-8.799E-06	1311.0601	3.567E+08	26.0860	11148.	0.000
11.730	-0.004747	6325.3590	-616.2688	3.113E-05	1102.6372	3.567E+08	26.8121	11523.	0.000
11.900	-0.004646	5123.9408	-561.2804	6.387E-05	911.9243	3.567E+08	27.0981	11897.	0.000
12.070	-0.004486	4035.2818	-506.1131	9.006E-05	739.1107	3.567E+08	26.9875	12272.	0.000
12.240	-0.004279	3058.9245	-451.5289	0.000110	584.1239	3.567E+08	26.5263	12646.	0.000
12.410	-0.004036	2192.9519	-398.1956	0.000125	446.6596	3.567E+08	25.7612	13021.	0.000
12.580	-0.003767	1434.1821	-346.6855	0.000136	326.2126	3.567E+08	24.7389	13395.	0.000
12.750	-0.003482	778.3622	-297.4767	0.000142	222.1078	3.567E+08	23.5050	13770.	0.000
12.920	-0.003188	220.3589	-250.9561	0.000145	133.5305	3.567E+08	22.1034	14145.	0.000
13.090	-0.002891	-245.6593	-207.4236	0.000145	137.5466	3.567E+08	20.5754	14519.	0.000
13.260	-0.002597	-626.0501	-167.0981	0.000142	197.9298	3.567E+08	18.9594	14894.	0.000
13.430	-0.002310	-927.5382	-130.1238	0.000138	245.7880	3.567E+08	17.2900	15268.	0.000
13.600	-0.002034	-1157.0701	-96.5779	0.000132	282.2238	3.567E+08	15.5982	15643.	0.000
13.770	-0.001772	-1321.6857	-66.4782	0.000125	308.3549	3.567E+08	13.9112	16017.	0.000
13.940	-0.001525	-1428.4052	-39.7921	0.000117	325.2955	3.567E+08	12.2517	16392.	0.000
14.110	-0.001294	-1484.1347	-16.4441	0.000109	334.1420	3.567E+08	10.6385	16766.	0.000
14.280	-0.001081	-1495.5877	3.6749	0.000100	335.9601	3.567E+08	9.0861	17141.	0.000
14.450	-0.000886	-1469.2244	20.7002	9.167E-05	331.7752	3.567E+08	7.6054	17515.	0.000
14.620	-0.000707	-1411.2070	34.7849	8.344E-05	322.5655	3.567E+08	6.2031	17890.	0.000
14.790	-0.000545	-1327.3713	46.0925	7.561E-05	309.2574	3.567E+08	4.8828	18265.	0.000
14.960	-0.000399	-1223.2124	54.7903	6.831E-05	292.7233	3.567E+08	3.6444	18639.	0.000
15.130	-0.000267	-1103.8838	61.0426	6.166E-05	273.7811	3.567E+08	2.4853	19014.	0.000
15.300	-0.000147	-974.2098	65.0057	5.572E-05	253.1966	3.567E+08	1.4000	19388.	0.000
15.470	-3.934E-05	-838.7069	66.8224	5.053E-05	231.6869	3.567E+08	0.3811	19763.	0.000
15.640	5.885E-05	-701.6162	66.6186	4.613E-05	209.9252	3.567E+08	-0.5810	20137.	0.000
15.810	0.000149	-566.9416	64.4993	4.250E-05	188.5469	3.567E+08	-1.4968	20512.	0.000
15.980	0.000232	-438.4946	60.5472	3.962E-05	168.1573	3.567E+08	-2.3779	20886.	0.000
16.150	0.000311	-319.9422	54.8207	3.745E-05	149.3383	3.567E+08	-3.2363	21261.	0.000
16.320	0.000385	-214.8572	47.3542	3.593E-05	132.6571	3.567E+08	-4.0839	21635.	0.000
16.490	0.000457	-126.7671	38.1582	3.495E-05	118.6737	3.567E+08	-4.9318	22010.	0.000
16.660	0.000528	-59.2007	27.2222	3.442E-05	107.9482	3.567E+08	-5.7899	22385.	0.000
16.830	0.000598	-15.7293	14.5170	3.420E-05	101.0476	3.567E+08	-6.6662	22759.	0.000
17.000	0.000667	0.000	0.000	3.416E-05	98.5507	3.567E+08	-7.5661	11567.	0.000

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.7174647 inches
Computed slope at pile head	=	-0.0096423 radians
Maximum bending moment	=	37839. inch-lbs
Maximum shear force	=	-939.2942431 lbs
Depth of maximum bending moment	=	7.8200000 feet below pile head
Depth of maximum shear force	=	10.2000000 feet below pile head
Number of iterations	=	9
Number of zero deflection points	=	2

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

Shear	=	325. lb
Moment	=	9166. in- lb
Axial Load	=	204. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
17.0000	0.7174647	37839.	-939.2942431
16.1500	0.7173452	37835.	-938.8430791
15.3000	0.7178129	37831.	-935.2708633
14.4500	0.7181853	37843.	-931.2238906
13.6000	0.7185055	37833.	-942.6040085
12.7500	0.7270899	37815.	-1022.4205652
11.9000	0.7719272	37708.	-1224.7026292
11.0500	0.9566853	37499.	-1553.5167633
10.2000	2.6153638	37746.	-2310.2929003

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 325.0000	M = 9166.0000	204.00000000	0.71746472	37839.	-939.2942	-0.00964227

The analysis ended normally.

Blymyer Engineers, Inc.
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Computations
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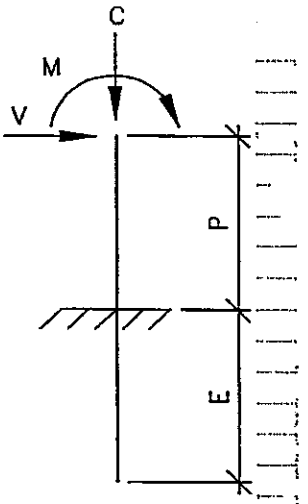
BLYMYER ENGINEERS

Date: 09/29/2020 | Client: Swinerton | Job No:

By: CMM | Chk: | Project: Bristol

Drive Pier Design - W6x15

P =	6.50	ft	Max Projection
E =	10.50	ft	Min Embedment
d =	5.99	in	Beam Depth
b_f =	5.99	in	Beam Width



SECTION AT COLUMN

Array Loads per Solar FlexRack TDP 2.0 Loads at Torque Tube Column Load Report, Appendix B

0.476	kip	D = Dead Load
2.633	kip	S = Snow Load
2.097	kip	Wdns = Wind Down for Snow Combination
-0.470	kip	Wdnl = Wind Down for Lateral Combination
2.365	kip	Wup = Wind Up
0.470	kip	Wh = Horizontal Wind
-13.284	kip*in	Mh = Wind moment at top of pile

Vertical:

Maximum Factored Compression Demand:

F.S.= 1.5	(1(D) + 0.6(Wdns)) * F.S. =	2.60	kip
F.S.= 1.5	(1(D) + 0.6(Wdnl)) * F.S. =	0.29	kip
F.S.= 2.0	(1(D) + 1(S)) * F.S. =	6.22	kip
F.S.= 1.5	(1(D) + 0.75(0.6)(Wdns) + 0.75(S)) * F.S. =	5.09	kip
	Maximum Factored Compression Demand =	6.22	kip

Ultimate Compression Capacity:

2016 psf SF_c Ultimate Compression Skin Friction, See Pile Design Capacities, Page 1

42.27 kip = C_u = $SF_c * 2 * (d + b_f) * E / 12$ = Ultimate Compression

42.27 kip > 6.22 kip .....(OK)

Maximum Factored Tension Demand:

F.S.= 1.5 (-0.6(D) + 0.6(Wup)) * F.S. = 1.70 kip

Ultimate Tension Capacity:

750 psf SF_t Ultimate Tension Skin Friction, See Pile Design Capacities, Page 1

15.72 kip = T_u = $SF_t * 2 * (d + b_f) * E / 12$ = Ultimate Tension Capacity

15.72 kip > 1.70 kip .....(OK)

Lateral:

L-Pile Strong Axis Demands:

V =	0.6	Wh =	282 lb	Shear
M =	0.6	Mh =	-7,970 lb*in	Moment at Pile Top
C = 1(D) + 0.6(Wdnl) =			194 lb	Compression

Maximum Moment and Deflection

Mx =	-17,968	lb*in	Maximum Moment (Refer following L-Pile Analysis)			
Δx =	0.14	in	Maximum Deflection (Refer following L-Pile Analysis)			
Mc = Mn-x' / Ω =	248,239	lb*in	Allowable Moment (Refer Following)	>	17,968 lb*In	.....(OK)
Pc = Pn' / Ω =	83,268	lb	Allowable Axial (Refer Following)	>	194 lb	.....(OK)
C / Pc =	0.0023					
Combined =	0.074	= C / (2 * Pc) + Mx / Mc		<	1	.....(OK)
Δal-x' =	2.59	in	Allowable Deflection (Refer Following)	>	0.14 in	.....(OK)

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Computations

BLYMYER ENGINEERS

Date: 09/29/2020 | Client: Swinerton | Job No:

By: CMM | Chk: | Project: Bristol

Soil Corrosion of Steel Pile

This analysis determines the allowable moment, deflection & compression values for the specified member after the member is corroded by the site soils over its design life.

Per Appendix C, Geotechnical Report Corrosion Parameters, the closest soil type is #32 Ontario Loam.

Parameters:

35	= Design Life [years]
Plain	= Galvanized or Plain Pile
W6x15	= Pile Size
6.5	= L = Pile Projection [ft]
10.8	= Zx = Strong Axis Plastic Section Modulus [in3]
4.75	= Zy = Weak Axis Plastic Section Modulus [in3]
1.45	= ry = Weak Axis Radius of Gyration [in]
1.2	= K = Weak Axis Effective Length Factor
4.43	= A = Area [in2]
50	= Fy = [ksi]

Galvanizing Life:

10.71	Galvanizing Corrosion Test Duration [years] - (See Appendix C, NBS Circular)
0.65	Average Loss in Galvanizing Weight [oz/sq ft] - (See Appendix C, NBS Circular)
0.061	= 0.65 / 10.71 = Galvanizing Loss Rate [oz/ (sq ft / yr)]
100	Coating Grade - (See Appendix C, Galvanizing Datasheet)
2.3	Coating Thickness [oz/sq ft] - (See Appendix C, Galvanizing Datasheet)
37.9	= 2.3 / 0.06 = Life of Galvanizing [Years]

Steel Life:

11.7	Steel Corrosion Test Duration [Year] - (See Appendix C, NBS Circular)
3.7	Average Loss in Steel Weight [oz / sq ft] - (See Appendix C, NBS Circular)
0.316	= 3.7 / 11.7 = Steel Loss Rate [oz/ (sq ft / yr)]
35.0	= 35 - 37.9 if Galvanized Plile or 35 if Plain Pile = Number of Years Steel Will Experience Corrosion
11.07	= 35 * 0.316 = Steel Lost due to Corrosion on Each Side of Flange [oz/sq ft]
0.0170	= 11.1 / (0.283 * 16 * 144) = Steel Lost due to Corrosion on Each Side of Flange [in]
5.99	= d = Initial Depth [in]
5.956	= d' = 5.99 - 2 * 0.017 = Depth After Corrosion
5.99	= bf = Initial Flange Width [in]
5.956	= bf' = 5.99 - 2 * 0.017 = Flange Width After Corrosion
0.26	= tf = Initial Flange Thickness [in]
0.226	= tf' = 0.26 - 2 * 0.017 = Flange Thickness After Corrosion
0.230	= tw = Initial Web Thickness [in]
0.196	= tw' = 0.23 - 2 * 0.017 = Web Thickness After Corrosion

Strong Axis - Available Strength and Deflection After Corrosion:

248,239	= Mn-x' / Ω = Allowable Flexural Strength After Corrosion [lb * in] - (See Appendix D)
3.00	= Δal-x = Allowable Deflection [in]
2.59	= Δal-x' = (bf' * tf') / (bf * tf) * Δal-x = Allowable Deflection After Corrosion [lb * in]

Weak Axis - Available Strength and Deflection After Corrosion:

103,914	= Mn-y' / Ω = Allowable Flexural Strength After Corrosion [lb * in] - (See Appendix D)
4.00	= Δal-y = Allowable Deflection [in]
3.46	= Δal-y' = (bf' * tf') / (bf * tf) * Δal-y = Allowable Deflection After Corrosion [lb * in]

Compression - Available Strength After Corrosion:

64.6	= K * L / ry
68,688	= Fe = π^2 * E / (K * L / ry)^2 = Elastic Critical Buckling Stress [psi]
97,800	= Pn / Ω = A * [0.658^(Fy/Fe)] * Fy / Ω = Allowable Compressive Strength [lb]
3.77	= A' = 2 * bf' * tf' + (d - tf - tf') * tw' = Area After Corrosion [in2]
83,268	= Pn' / Ω = (A' / A) * Pn / Ω = Allowable Compressive Strength After Corrosion [lb]

LPile Plus for Windows, Version 2013-07.003

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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Files Used for Analysis

Path to file locations: \\AJMDISKSTATION\Main\2020 Year Job\20546\
Name of input data file: W6x15 Drive.lp7d
Name of output report file: W6x15 Drive.lp7o
Name of plot output file: W6x15 Drive.lp7p
Name of runtime messeage file: W6x15 Drive.lp7r

Date and Time of Analysis

Date: September 29, 2020 Time: 10:55:43

Problem Title

Project Name:

Job Number:

Client:

Engineer:

Description:

Program Options and Settings

Engineering Units of Input Data and Computations:
- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	100
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

Loading Type and Number of Cycles of Loading:
- Static loading specified

Computational Options:
- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Use of p-y modification factors for p-y curves not selected
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

Pile Structural Properties and Geometry

Total number of pile sections	=	1
Total length of pile	=	17.00 ft
Depth of ground surface below top of pile	=	6.70 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	5.9900000
2	17.000000	5.9900000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Strong H-Pile
Section Length	=	17.00000 ft
Flange Width	=	5.99000 in
Section Depth	=	5.99000 in
Flange Thickness	=	0.26000 in
Web Thickness	=	0.23000 in
Section Area	=	4.43000 Sq. in
Moment of Inertia	=	29.10000 in^4
Elastic Modulus	=	29000000. lbs/in^2

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
= 0.000 radians

Pile Batter Angle = 0.000 degrees
= 0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	6.70000 ft
Distance from top of pile to bottom of layer	=	20.00000 ft
Effective unit weight at top of layer	=	130.00000 pcf
Effective unit weight at bottom of layer	=	130.00000 pcf
Friction angle at top of layer	=	35.00000 deg.
Friction angle at bottom of layer	=	35.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

(Depth of lowest soil layer extends 3.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	kpy pci
1	Sand (Reese, et al.)	6.700	130.000	35.000	90.000
		20.000	130.000	35.000	90.000

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 282.00000 lbs	M = -7979.00000 in-lbs	194.00000000	Yes

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head

Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 282.0 lbs
Applied moment at pile head = -7979.0 in-lbs
Axial thrust load on pile head = 194.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1448	-7979.0000	282.0000	-0.001410	864.9987	8.439E+08	0.000	0.000	0.000
0.170	0.1419	-7403.1580	282.0000	-0.001429	805.7325	8.439E+08	0.000	0.000	0.000
0.340	0.1389	-6827.3090	282.0000	-0.001446	746.4655	8.439E+08	0.000	0.000	0.000
0.510	0.1360	-6251.4534	282.0000	-0.001462	687.1979	8.439E+08	0.000	0.000	0.000
0.680	0.1330	-5675.5919	282.0000	-0.001476	627.9297	8.439E+08	0.000	0.000	0.000
0.850	0.1299	-5099.7249	282.0000	-0.001489	568.6609	8.439E+08	0.000	0.000	0.000
1.020	0.1269	-4523.8530	282.0000	-0.001501	509.3916	8.439E+08	0.000	0.000	0.000
1.190	0.1238	-3947.9768	282.0000	-0.001511	450.1219	8.439E+08	0.000	0.000	0.000
1.360	0.1207	-3372.0969	282.0000	-0.001520	390.8518	8.439E+08	0.000	0.000	0.000
1.530	0.1176	-2796.2137	282.0000	-0.001528	331.5813	8.439E+08	0.000	0.000	0.000
1.700	0.1145	-2220.3278	282.0000	-0.001534	272.3106	8.439E+08	0.000	0.000	0.000
1.870	0.1114	-1644.4398	282.0000	-0.001538	213.0397	8.439E+08	0.000	0.000	0.000
2.040	0.1082	-1068.5502	282.0000	-0.001542	153.7685	8.439E+08	0.000	0.000	0.000
2.210	0.1051	-492.6596	282.0000	-0.001543	94.4973	8.439E+08	0.000	0.000	0.000
2.380	0.1019	83.2314	282.0000	-0.001544	52.3586	8.439E+08	0.000	0.000	0.000
2.550	0.0988	659.1224	282.0000	-0.001543	111.6298	8.439E+08	0.000	0.000	0.000
2.720	0.0956	1235.0128	282.0000	-0.001541	170.9010	8.439E+08	0.000	0.000	0.000
2.890	0.0925	1810.9019	282.0000	-0.001537	230.1721	8.439E+08	0.000	0.000	0.000
3.060	0.0894	2386.7894	282.0000	-0.001532	289.4430	8.439E+08	0.000	0.000	0.000
3.230	0.0862	2962.6745	282.0000	-0.001526	348.7136	8.439E+08	0.000	0.000	0.000
3.400	0.0831	3538.5568	282.0000	-0.001518	407.9840	8.439E+08	0.000	0.000	0.000
3.570	0.0800	4114.4358	282.0000	-0.001508	467.2540	8.439E+08	0.000	0.000	0.000
3.740	0.0770	4690.3108	282.0000	-0.001498	526.5236	8.439E+08	0.000	0.000	0.000
3.910	0.0739	5266.1813	282.0000	-0.001486	585.7928	8.439E+08	0.000	0.000	0.000
4.080	0.0709	5842.0467	282.0000	-0.001472	645.0614	8.439E+08	0.000	0.000	0.000
4.250	0.0679	6417.9066	282.0000	-0.001457	704.3295	8.439E+08	0.000	0.000	0.000
4.420	0.0650	6993.7604	282.0000	-0.001441	763.5969	8.439E+08	0.000	0.000	0.000
4.590	0.0620	7569.6074	282.0000	-0.001424	822.8636	8.439E+08	0.000	0.000	0.000
4.760	0.0592	8145.4472	282.0000	-0.001405	882.1296	8.439E+08	0.000	0.000	0.000
4.930	0.0563	8721.2792	282.0000	-0.001384	941.3948	8.439E+08	0.000	0.000	0.000
5.100	0.0535	9297.1029	282.0000	-0.001363	1000.6591	8.439E+08	0.000	0.000	0.000
5.270	0.0508	9872.9177	282.0000	-0.001339	1059.9225	8.439E+08	0.000	0.000	0.000
5.440	0.0480	10449.	282.0000	-0.001315	1119.1850	8.439E+08	0.000	0.000	0.000
5.610	0.0454	11025.	282.0000	-0.001289	1178.4464	8.439E+08	0.000	0.000	0.000
5.780	0.0428	11600.	282.0000	-0.001261	1237.7067	8.439E+08	0.000	0.000	0.000
5.950	0.0402	12176.	282.0000	-0.001233	1296.9659	8.439E+08	0.000	0.000	0.000

6.120	0.0378	12752.	282.0000	-0.001203	1356.2239	8.439E+08	0.000	0.000	0.000
6.290	0.0353	13328.	282.0000	-0.001171	1415.4806	8.439E+08	0.000	0.000	0.000
6.460	0.0330	13903.	282.0000	-0.001138	1474.7360	8.439E+08	0.000	0.000	0.000
6.630	0.0307	14479.	282.0000	-0.001104	1533.9900	8.439E+08	0.000	0.000	0.000
6.800	0.0285	15055.	278.8631	-0.001068	1593.2427	8.439E+08	-3.0754	220.3200	0.000
6.970	0.0263	15618.	267.8938	-0.001031	1651.1766	8.439E+08	-7.6789	594.8640	0.000
7.140	0.0243	16149.	248.2983	-0.000993	1705.8200	8.439E+08	-11.5325	969.4080	0.000
7.310	0.0223	16631.	221.5613	-0.000953	1755.5222	8.439E+08	-14.6803	1343.9520	0.000
7.480	0.0204	17053.	189.0759	-0.000912	1798.9351	8.439E+08	-17.1682	1718.4960	0.000
7.650	0.0186	17404.	152.1400	-0.000871	1834.9928	8.439E+08	-19.0435	2093.0400	0.000
7.820	0.0168	17675.	111.9540	-0.000828	1862.8923	8.439E+08	-20.3546	2467.5840	0.000
7.990	0.0152	17861.	69.6187	-0.000785	1882.0718	8.439E+08	-21.1506	2842.1280	0.000
8.160	0.0136	17959.	26.1345	-0.000742	1892.1904	8.439E+08	-21.4810	3216.6720	0.000
8.330	0.0122	17968.	-17.5994	-0.000699	1893.1065	8.439E+08	-21.3952	3591.2160	0.000
8.500	0.0108	17888.	-60.7834	-0.000655	1884.8570	8.439E+08	-20.9421	3965.7600	0.000
8.670	0.009480	17721.	-102.7173	-0.000612	1867.6359	8.439E+08	-20.1695	4340.3040	0.000
8.840	0.008275	17470.	-142.7969	-0.000570	1841.7741	8.439E+08	-19.1242	4714.8480	0.000
9.010	0.007155	17139.	-180.5120	-0.000528	1807.7194	8.439E+08	-17.8513	5089.3920	0.000
9.180	0.006121	16733.	-215.4419	-0.000487	1766.0169	8.439E+08	-16.3937	5463.9360	0.000
9.350	0.005169	16260.	-247.2517	-0.000447	1717.2912	8.439E+08	-14.7924	5838.4800	0.000
9.520	0.004297	15725.	-275.6873	-0.000408	1662.2280	8.439E+08	-13.0856	6213.0240	0.000
9.690	0.003502	15136.	-300.5700	-0.000371	1601.5585	8.439E+08	-11.3091	6587.5680	0.000
9.860	0.002782	14499.	-321.7908	-0.000335	1536.0437	8.439E+08	-9.4956	6962.1120	0.000
10.030	0.002134	13823.	-339.3047	-0.000301	1466.4603	8.439E+08	-7.6749	7336.6560	0.000
10.200	0.001554	13115.	-353.1245	-0.000269	1393.5882	8.439E+08	-5.8739	7711.2000	0.000
10.370	0.001038	12382.	-363.3143	-0.000238	1318.1990	8.439E+08	-4.1161	8085.7440	0.000
10.540	0.000584	11633.	-369.9836	-0.000209	1241.0455	8.439E+08	-2.4223	8460.2880	0.000
10.710	0.000187	10873.	-373.2807	-0.000181	1162.8534	8.439E+08	-0.8102	8834.8320	0.000
10.880	-0.000156	10110.	-373.3872	-0.000156	1084.3132	8.439E+08	0.7058	9209.3760	0.000
11.050	-0.000450	9349.7177	-370.5115	-0.000133	1006.0743	8.439E+08	2.1135	9583.9200	0.000
11.220	-0.000697	8598.3201	-364.8836	-0.000111	928.7397	8.439E+08	3.4041	9958.4640	0.000
11.390	-0.000902	7861.0806	-356.7494	-9.101E-05	852.8623	8.439E+08	4.5707	10333.	0.000
11.560	-0.001069	7142.8548	-346.3660	-7.287E-05	778.9418	8.439E+08	5.6091	10708.	0.000
11.730	-0.001200	6447.9648	-333.9973	-5.645E-05	707.4231	8.439E+08	6.5172	11082.	0.000
11.900	-0.001299	5780.1905	-319.9090	-4.167E-05	638.6951	8.439E+08	7.2948	11457.	0.000
12.070	-0.001370	5142.7689	-304.3658	-2.846E-05	573.0910	8.439E+08	7.9436	11831.	0.000
12.240	-0.001415	4538.4005	-287.6273	-1.676E-05	510.8889	8.439E+08	8.4667	12206.	0.000
12.410	-0.001438	3969.2627	-269.9456	-6.480E-06	452.3127	8.439E+08	8.8683	12580.	0.000
12.580	-0.001442	3437.0275	-251.5627	2.472E-06	397.5345	8.439E+08	9.1542	12955.	0.000
12.750	-0.001428	2942.8850	-232.7083	1.018E-05	346.6769	8.439E+08	9.3305	13329.	0.000
12.920	-0.001400	2487.5695	-213.5987	1.675E-05	299.8154	8.439E+08	9.4044	13704.	0.000
13.090	-0.001360	2071.3889	-194.4353	2.226E-05	256.9817	8.439E+08	9.3833	14078.	0.000
13.260	-0.001309	1694.2560	-175.4037	2.681E-05	218.1668	8.439E+08	9.2751	14453.	0.000
13.430	-0.001250	1355.7206	-156.6738	3.050E-05	183.3244	8.439E+08	9.0876	14828.	0.000
13.600	-0.001185	1055.0028	-138.3993	3.341E-05	152.3742	8.439E+08	8.8286	15202.	0.000
13.770	-0.001114	791.0251	-120.7181	3.564E-05	125.2054	8.439E+08	8.5059	15577.	0.000
13.940	-0.001039	562.4449	-103.7528	3.728E-05	101.6797	8.439E+08	8.1267	15951.	0.000
14.110	-0.000962	367.6840	-87.6119	3.840E-05	81.6347	8.439E+08	7.6978	16326.	0.000
14.280	-0.000883	204.9581	-72.3898	3.909E-05	64.8868	8.439E+08	7.2257	16700.	0.000
14.450	-0.000802	72.3025	-58.1692	3.943E-05	51.2338	8.439E+08	6.7160	17075.	0.000
14.620	-0.000722	-32.4036	-45.0215	3.948E-05	47.1273	8.439E+08	6.1739	17449.	0.000
14.790	-0.000641	-111.4166	-33.0087	3.930E-05	55.2594	8.439E+08	5.6035	17824.	0.000
14.960	-0.000561	-167.1100	-22.1845	3.897E-05	60.9915	8.439E+08	5.0084	18198.	0.000
15.130	-0.000482	-201.9602	-12.5965	3.852E-05	64.5783	8.439E+08	4.3916	18573.	0.000
15.300	-0.000404	-218.5342	-4.2871	3.801E-05	66.2841	8.439E+08	3.7549	18948.	0.000
15.470	-0.000327	-219.4816	2.7047	3.748E-05	66.3816	8.439E+08	3.0998	19322.	0.000
15.640	-0.000251	-207.5287	8.3419	3.697E-05	65.1514	8.439E+08	2.4269	19697.	0.000
15.810	-0.000176	-185.4759	12.5881	3.649E-05	62.8817	8.439E+08	1.7361	20071.	0.000
15.980	-0.000102	-156.1981	15.4065	3.608E-05	59.8684	8.439E+08	1.0270	20446.	0.000
16.150	-2.926E-05	-122.6461	16.7586	3.574E-05	56.4152	8.439E+08	0.2986	20820.	0.000
16.320	4.335E-05	-87.8513	16.6038	3.549E-05	52.8341	8.439E+08	-0.4504	21195.	0.000
16.490	0.000116	-54.9307	14.8985	3.531E-05	49.4458	8.439E+08	-1.2215	21569.	0.000
16.660	0.000187	-27.0932	11.5962	3.521E-05	46.5808	8.439E+08	-2.0161	21944.	0.000
16.830	0.000259	-7.6461	6.6473	3.517E-05	44.5793	8.439E+08	-2.8357	22318.	0.000
17.000	0.000331	0.000	0.000	3.516E-05	43.7923	8.439E+08	-3.6813	11346.	0.000

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =      0.1447620 inches
Computed slope at pile head      =     -0.0014103 radians
Maximum bending moment           =          17968. inch-lbs
Maximum shear force              =   -373.3872072 lbs
Depth of maximum bending moment  =      8.3300000 feet below pile head
Depth of maximum shear force     =     10.8800000 feet below pile head
Number of iterations             =              6
Number of zero deflection points =              2
```

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

```
Shear      =            282.  lb
Moment     =          -7979. in- lb
Axial Load =            194.  lb
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
17.0000	0.1447620	17968.	-373.3872072
16.1500	0.1448024	17974.	-371.9294464
15.3000	0.1448791	17981.	-372.8114487
14.4500	0.1451226	17959.	-385.6460029
13.6000	0.1470993	17891.	-422.4418245
12.7500	0.1543826	17725.	-486.0406617
11.9000	0.1758283	17443.	-569.1811936
11.0500	0.2382358	17149.	-679.9706408
10.2000	0.5961125	16887.	-901.1625492

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

```
Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians
```

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 282.0000	M = -7979.0000	194.00000000	0.14476203	17968.	-373.3872	-0.00141031

The analysis ended normally.

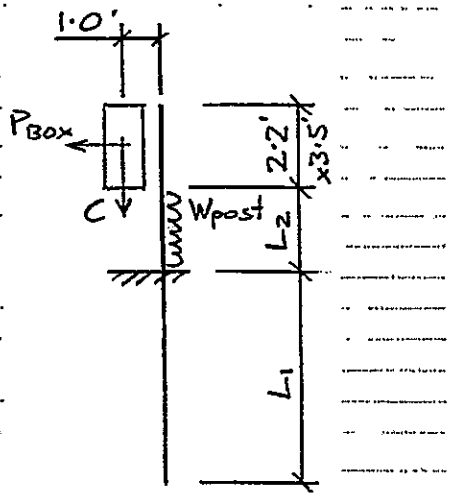
Blymyer Engineers, Inc.
1101 Marina Village Parkway, Suite 100, Alameda, CA 94501
Computations
P 510.521.3773

BLYMYER ENGINEERS

Date: 09/24/2020 | Client: Swinerton | Job No:

By: CMM | Chk: | Project: Bristol

Inverter Column Design - W6x7



L_2 =	3.50	ft	= height to underside of box
C =	218	lb	= Dead Weight
L_1 =	10.50	ft	Min Embedment
d =	6.38	in	Beam Depth
b_f =	6.08	in	Beam Width

Wind Load Per ASCE 7 -16

h_z =	15	ft = elevation of wind pressure
V =	107	mph = wind speed
	C	= exposure
K_z =	0.85	= velocity pressure exposure coefficient
K_d =	0.85	= wind directionality factor
K_{zt} =	1	= topographic factor
q_z =	21.2	psf = 0.00256 * K_z * K_d * K_{zt} * V^2 = velocity pressure
G =	0.85	= gust effect factor
$C_{f,box}$ =	1.4	= wind force coefficient for box
$C_{f,post}$ =	2.0	= wind force coefficient for post
P_{box} =	116.4	lb = 0.6 * q_z * G * $C_{f,box}$ * 3.5' * 2.2' = wind point load on box
W_{post} =	10.8	plf = 0.6 * q_z * G * $C_{f,post}$ * 6" / 12 = wind line load on post
L_3 =	4.60	ft = L_2 + 2.2 / 2 = height to midpoint of box
M =	820	lb*ft = W_{post} * L_2^2 / 2 + P_{box} * L_3 + C * 1.0' = base moment
V =	154	lb = W_{post} * L_2 + P_{box} = base shear
h_{eff} =	5.32	ft = M / V = equivalent height for application of base shear

Maximum Moment

My =	10,929	lb*in	Maximum Moment (Refer following L-Pile Analysis)			
Mc = Mn-y' / Ω =	22,243	lb*in	Allowable Moment (Refer Following)	>	10,929 lb*in	.....(OK)
Pc = Pn' / Ω =	160,648	lb	Allowable Axial (Refer Following)	>	218 lb	.....(OK)
C / Pc =	0.0014					
Combined =	0.491	= C / (2 * Pc) + My / Mc		<	1	.....(OK)

Blymyer Engineers, Inc.
1101 Marina Village Parkway, Suite 100, Alameda, CA 94501
P 510.521.3773

Computations

BLYMYER ENGINEERS

Date: 09/24/2020 Client: Swinerton Job No:

By: CMM Chk: Project: Bristol

Soil Corrosion of Steel Pile

This analysis determines the allowable moment, deflection & compression values for the specified member after the member is corroded by the site soils over its design life.

Per Appendix C, Geotechnical Report Corrosion Parameters, the closest soil type is #32 Ontario Loam.

Parameters:

35	= Design Life [years]
Plain	= Galvanized or Plain Pile
W6x7	= Pile Size
6	= L = Pile Projection [ft]
4.527	= Zx = Strong Axis Plastic Section Modulus [in3]
1.245	= Zy = Weak Axis Plastic Section Modulus [in3]
0.878	= ry = Weak Axis Radius of Gyration [in]
1.2	= K = Weak Axis Effective Length Factor
2.07	= A = Area [in2]
50	= Fy = [ksi]

Galvanizing Life:

10.71	Galvanizing Corrosion Test Duration [years] - (See Appendix C, NBS Circular)
0.65	Average Loss in Galvanizing Weight [oz/sq ft] - (See Appendix C, NBS Circular)
0.061	= 0.65 / 10.71 = Galvanizing Loss Rate [oz/ (sq ft / yr)]
75	Coating Grade - (See Appendix C, Galvanizing Datasheet)
1.7	Coating Thickness [oz/sq ft] - (See Appendix C, Galvanizing Datasheet)
28.0	= 1.7 / 0.06 = Life of Galvanizing [Years]

Steel Life:

11.7	Steel Corrosion Test Duration [Year] - (See Appendix C, NBS Circular)
3.7	Average Loss in Steel Weight [oz / sq ft] - (See Appendix C, NBS Circular)
0.316	= 3.7 / 11.7 = Steel Loss Rate [oz/ (sq ft / yr)]
35.0	= 35 - 28 if Galvanized Plile or 35 if Plain Pile = Number of Years Steel Will Experience Corrosion
11.07	= 35 * 0.316 = Steel Lost due to Corrosion on Each Side of Flange [oz/sq ft]
0.0170	= 11.1 / (0.283 * 16 * 144) = Steel Lost due to Corrosion on Each Side of Flange [in]
5.79	= d = Initial Depth [in]
5.756	= d' = 5.79 - 2 * 0.017 = Depth After Corrosion
3.905	= bf = Initial Flange Width [in]
3.871	= bf' = 3.905 - 2 * 0.017 = Flange Width After Corrosion
0.16	= tf = Initial Flange Thickness [in]
0.126	= tf' = 0.16 - 2 * 0.017 = Flange Thickness After Corrosion
0.135	= tw = Initial Web Thickness [in]
0.101	= tw' = 0.135 - 2 * 0.017 = Web Thickness After Corrosion

Strong Axis - Available Strength and Deflection After Corrosion:

89,067	= Mn-x' / Ω = Allowable Flexural Strength After Corrosion [lb * in] - (See Appendix D)
3.00	= Δal-x = Allowable Deflection [in]
2.34	= Δal-x' = (bf' * tf') / (bf * tf) * Δal-x = Allowable Deflection After Corrosion [lb * in]

Weak Axis - Available Strength and Deflection After Corrosion:

22,243	= Mn-y' / Ω = Allowable Flexural Strength After Corrosion [lb * in] - (See Appendix D)
4.00	= Δal-y = Allowable Deflection [in]
3.12	= Δal-y' = (bf' * tf') / (bf * tf) * Δal-y = Allowable Deflection After Corrosion [lb * in]

Compression - Available Strength After Corrosion:

98.4	= K * L / ry
29,557	= Fe = π^2 * E / (K * L / ry)^2 = Elastic Critical Buckling Stress [psi]
30,530	= Pn / Ω = A * [0.658^(Fy/Fe)] * Fy / Ω = Allowable Compressive Strength [lb]
1.53	= A' = 2 * bf' * tf' + (d - tf - tf') * tw' = Area After Corrosion [in2]
22,596	= Pn' / Ω = (A' / A) * Pn / Ω = Allowable Compressive Strength After Corrosion [lb]

LPile Plus for Windows, Version 2013-07.003

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This copy of LPile is used by:

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is forbidden by the software license agreement.

Files Used for Analysis

Path to file locations: \\AJMDISKSTATION\Main\2020 Year Job\20546\
Name of input data file: W6x7 Inverter.lp7d
Name of output report file: W6x7 Inverter.lp7o
Name of plot output file: W6x7 Inverter.lp7p
Name of runtime messeage file: W6x7 Inverter.lp7r

Date and Time of Analysis

Date: September 24, 2020 Time: 7:44:44

Problem Title

Project Name:

Job Number:

Client:

Engineer:

Description:

Program Options and Settings

Engineering Units of Input Data and Computations:
- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:
- Static loading specified

Computational Options:
- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Use of p-y modification factors for p-y curves not selected
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

Pile Structural Properties and Geometry

Total number of pile sections = 1

Total length of pile = 15.82 ft

Depth of ground surface below top of pile = 5.32 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	5.7900000
2	15.820000	5.7900000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Weak H-Pile
Section Length	=	15.82000 ft
Flange Width	=	3.90500 in
Section Depth	=	5.79000 in
Flange Thickness	=	0.16000 in
Web Thickness	=	0.13500 in
Section Area	=	2.07000 Sq. in
Moment of Inertia	=	1.59000 in^4
Elastic Modulus	=	29000000. lbs/in^2

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	5.32000 ft
Distance from top of pile to bottom of layer	=	20.00000 ft
Effective unit weight at top of layer	=	130.00000 pcf
Effective unit weight at bottom of layer	=	130.00000 pcf
Friction angle at top of layer	=	35.00000 deg.
Friction angle at bottom of layer	=	35.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

(Depth of lowest soil layer extends 4.18 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	kpy pci
1	Sand (Reese, et al.)	5.320	130.000	35.000	90.000
		20.000	130.000	35.000	90.000

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 154.00000 lbs	M = 0.0000 in-lbs	218.00000000	Yes

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head

Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 154.0 lbs
Applied moment at pile head = 0.0 in-lbs
Axial thrust load on pile head = 218.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.8206	3.409E-08	154.0000	-0.0136	105.3140	46110000.	0.000	0.000	0.000
0.158	0.7948	297.9879	154.0000	-0.0136	647.8769	46110000.	0.000	0.000	0.000
0.316	0.7690	595.9707	154.0000	-0.0136	1190.4305	46110000.	0.000	0.000	0.000
0.475	0.7432	893.9434	154.0000	-0.0136	1732.9657	46110000.	0.000	0.000	0.000
0.633	0.7175	1191.9008	154.0000	-0.0135	2275.4731	46110000.	0.000	0.000	0.000
0.791	0.6919	1489.8380	154.0000	-0.0135	2817.9435	46110000.	0.000	0.000	0.000
0.949	0.6664	1787.7497	154.0000	-0.0134	3360.3677	46110000.	0.000	0.000	0.000
1.107	0.6410	2085.6310	154.0000	-0.0133	3902.7365	46110000.	0.000	0.000	0.000
1.266	0.6158	2383.4768	154.0000	-0.0132	4445.0405	46110000.	0.000	0.000	0.000
1.424	0.5908	2681.2819	154.0000	-0.0131	4987.2707	46110000.	0.000	0.000	0.000
1.582	0.5660	2979.0413	154.0000	-0.0130	5529.4176	46110000.	0.000	0.000	0.000
1.740	0.5415	3276.7500	154.0000	-0.0129	6071.4721	46110000.	0.000	0.000	0.000
1.898	0.5172	3574.4029	154.0000	-0.0127	6613.4249	46110000.	0.000	0.000	0.000
2.057	0.4931	3871.9949	154.0000	-0.0126	7155.2669	46110000.	0.000	0.000	0.000
2.215	0.4694	4169.5208	154.0000	-0.0124	7696.9887	46110000.	0.000	0.000	0.000
2.373	0.4460	4466.9758	154.0000	-0.0122	8238.5812	46110000.	0.000	0.000	0.000
2.531	0.4229	4764.3546	154.0000	-0.0120	8780.0351	46110000.	0.000	0.000	0.000
2.689	0.4003	5061.6523	154.0000	-0.0118	9321.3412	46110000.	0.000	0.000	0.000
2.848	0.3780	5358.8637	154.0000	-0.0116	9862.4903	46110000.	0.000	0.000	0.000
3.006	0.3561	5655.9838	154.0000	-0.0114	10403.	46110000.	0.000	0.000	0.000
3.164	0.3347	5953.0075	154.0000	-0.0112	10944.	46110000.	0.000	0.000	0.000
3.322	0.3137	6249.9298	154.0000	-0.0109	11485.	46110000.	0.000	0.000	0.000
3.480	0.2933	6546.7456	154.0000	-0.0106	12025.	46110000.	0.000	0.000	0.000
3.639	0.2733	6843.4499	154.0000	-0.0104	12566.	46110000.	0.000	0.000	0.000
3.797	0.2539	7140.0375	154.0000	-0.0101	13106.	46110000.	0.000	0.000	0.000
3.955	0.2350	7436.5035	154.0000	-0.009784	13645.	46110000.	0.000	0.000	0.000
4.113	0.2167	7732.8428	154.0000	-0.009472	14185.	46110000.	0.000	0.000	0.000
4.271	0.1991	8029.0503	154.0000	-0.009147	14724.	46110000.	0.000	0.000	0.000
4.430	0.1820	8325.1210	154.0000	-0.008810	15263.	46110000.	0.000	0.000	0.000
4.588	0.1656	8621.0499	154.0000	-0.008462	15802.	46110000.	0.000	0.000	0.000
4.746	0.1499	8916.8319	154.0000	-0.008101	16341.	46110000.	0.000	0.000	0.000
4.904	0.1349	9212.4620	154.0000	-0.007727	16879.	46110000.	0.000	0.000	0.000
5.062	0.1205	9507.9350	154.0000	-0.007342	17417.	46110000.	0.000	0.000	0.000
5.221	0.1070	9803.2461	154.0000	-0.006944	17955.	46110000.	0.000	0.000	0.000
5.379	0.0942	10098.	151.7372	-0.006535	18492.	46110000.	-2.3839	48.0532	0.000
5.537	0.0822	10385.	140.3669	-0.006113	19013.	46110000.	-9.5949	221.6815	0.000

5.695	0.0710	10636.	114.9784	-0.005680	19472.	46110000.	-17.1524	458.8256	0.000
5.853	0.0606	10826.	75.7986	-0.005239	19817.	46110000.	-24.1243	755.7303	0.000
6.012	0.0511	10929.	24.5942	-0.004791	20003.	46110000.	-29.8204	1108.3144	0.000
6.170	0.0424	10923.	-36.1590	-0.004341	19994.	46110000.	-34.1842	1530.1539	0.000
6.328	0.0346	10795.	-103.4699	-0.003894	19760.	46110000.	-36.7291	2015.3870	0.000
6.486	0.0276	10534.	-171.3616	-0.003455	19285.	46110000.	-34.7961	2391.0272	0.000
6.644	0.0215	10147.	-233.5534	-0.003029	18581.	46110000.	-30.7242	2715.3802	0.000
6.803	0.0161	9649.4868	-287.2267	-0.002621	17675.	46110000.	-25.8217	3039.7333	0.000
6.961	0.0115	9058.6885	-331.1253	-0.002236	16599.	46110000.	-20.4263	3364.0863	0.000
7.119	0.007635	8394.1211	-364.5952	-0.001877	15389.	46110000.	-14.8348	3688.4393	0.000
7.277	0.004400	7675.9473	-387.5042	-0.001546	14081.	46110000.	-9.3003	4012.7924	0.000
7.435	0.001764	6924.1249	-400.1582	-0.001246	12712.	46110000.	-4.0309	4337.1454	0.000
7.594	-0.000330	6157.6575	-403.2153	-0.000976	11317.	46110000.	0.8102	4661.4984	0.000
7.752	-0.001943	5394.0052	-397.6025	-0.000739	9926.4744	46110000.	5.1030	4985.8514	0.000
7.910	-0.003134	4648.6517	-384.4364	-0.000532	8569.3686	46110000.	8.7677	5310.2045	0.000
8.068	-0.003963	3934.8172	-364.9505	-0.000355	7269.6509	46110000.	11.7611	5634.5575	0.000
8.226	-0.004483	3263.3018	-340.4295	-0.000207	6046.9861	46110000.	14.0722	5958.9105	0.000
8.385	-0.004749	2642.4458	-312.1536	-8.547E-05	4916.5597	46110000.	15.7170	6283.2636	0.000
8.543	-0.004808	2078.1875	-281.3516	1.171E-05	3889.1838	46110000.	16.7336	6607.6166	0.000
8.701	-0.004704	1574.2005	-249.1634	8.690E-05	2971.5469	46110000.	17.1773	6931.9696	0.000
8.859	-0.004478	1132.0922	-216.6128	0.000143	2166.5761	46110000.	17.1153	7256.3227	0.000
9.017	-0.004163	751.6469	-184.5887	0.000181	1473.8786	46110000.	16.6226	7580.6757	0.000
9.176	-0.003789	431.0955	-153.8343	0.000206	890.2332	46110000.	15.7777	7905.0287	0.000
9.334	-0.003382	167.3985	-124.9438	0.000218	410.1056	46110000.	14.6590	8229.3818	0.000
9.492	-0.002961	-43.4714	-98.3651	0.000221	184.4648	46110000.	13.3421	8553.7348	0.000
9.650	-0.002544	-206.2566	-74.4076	0.000215	480.8567	46110000.	11.8975	8878.0878	0.000
9.808	-0.002143	-326.1607	-53.2538	0.000205	699.1726	46110000.	10.3884	9202.4408	0.000
9.967	-0.001768	-408.6201	-34.9735	0.000189	849.3109	46110000.	8.8703	9526.7939	0.000
10.125	-0.001424	-459.1047	-19.5396	0.000172	941.2310	46110000.	7.3896	9851.1469	0.000
10.283	-0.001116	-482.9500	-6.8456	0.000152	984.6475	46110000.	5.9838	10175.	0.000
10.441	-0.000846	-485.2219	3.2781	0.000132	988.7841	46110000.	4.6817	10500.	0.000
10.599	-0.000614	-470.6132	11.0475	0.000113	962.1852	46110000.	3.5036	10824.	0.000
10.758	-0.000419	-443.3699	16.7102	9.370E-05	912.5818	46110000.	2.4622	11149.	0.000
10.916	-0.000259	-407.2456	20.5313	7.619E-05	846.8883	46110000.	1.5635	11473.	0.000
11.074	-0.000130	-365.4796	22.7821	6.028E-05	770.7627	46110000.	0.8078	11797.	0.000
11.232	-2.983E-05	-320.7963	23.7297	4.616E-05	689.4053	46110000.	0.1905	12122.	0.000
11.390	4.526E-05	-275.4210	23.6288	3.388E-05	606.7881	46110000.	-0.2967	12446.	0.000
11.549	9.881E-05	-231.1104	22.7162	2.345E-05	526.1094	46110000.	-0.6647	12770.	0.000
11.707	0.000134	-189.1914	21.2059	1.480E-05	449.7852	46110000.	-0.9264	13095.	0.000
11.865	0.000155	-150.6080	19.2865	7.807E-06	379.5342	46110000.	-1.0957	13419.	0.000
12.023	0.000164	-115.9709	17.1198	2.320E-06	316.4686	46110000.	-1.1869	13743.	0.000
12.181	0.000164	-85.6095	14.8408	-1.830E-06	261.1879	46110000.	-1.2140	14068.	0.000
12.340	0.000157	-59.6217	12.5587	-4.820E-06	213.8706	46110000.	-1.1903	14392.	0.000
12.498	0.000146	-37.9226	10.3581	-6.828E-06	174.3618	46110000.	-1.1281	14716.	0.000
12.656	0.000131	-20.2885	8.3015	-8.026E-06	142.2544	46110000.	-1.0385	15041.	0.000
12.814	0.000115	-6.3969	6.4318	-8.575E-06	116.9611	46110000.	-0.9312	15365.	0.000
12.972	9.852E-05	4.1389	4.7750	-8.622E-06	112.8499	46110000.	-0.8143	15690.	0.000
13.131	8.232E-05	11.7401	3.3430	-8.295E-06	126.6898	46110000.	-0.6944	16014.	0.000
13.289	6.703E-05	16.8385	2.1363	-7.706E-06	135.9728	46110000.	-0.5769	16338.	0.000
13.447	5.306E-05	19.8577	1.1467	-6.951E-06	141.4699	46110000.	-0.4657	16663.	0.000
13.605	4.064E-05	21.1981	0.3595	-6.106E-06	143.9106	46110000.	-0.3636	16987.	0.000
13.763	2.988E-05	21.2277	-0.2442	-5.233E-06	143.9645	46110000.	-0.2724	17311.	0.000
13.922	2.077E-05	20.2752	-0.6860	-4.378E-06	142.2301	46110000.	-0.1930	17636.	0.000
14.080	1.325E-05	18.6268	-0.9881	-3.577E-06	139.2289	46110000.	-0.1254	17960.	0.000
14.238	7.189E-06	16.5264	-1.1729	-2.854E-06	135.4045	46110000.	-0.0692	18284.	0.000
14.396	2.417E-06	14.1761	-1.2611	-2.222E-06	131.1252	46110000.	-0.0237	18609.	0.000
14.554	-1.247E-06	11.7402	-1.2718	-1.688E-06	126.6900	46110000.	0.0124	18933.	0.000
14.713	-3.993E-06	9.3489	-1.2215	-1.254E-06	122.3360	46110000.	0.0405	19257.	0.000
14.871	-6.008E-06	7.1034	-1.1242	-9.154E-07	118.2475	46110000.	0.0620	19582.	0.000
15.029	-7.468E-06	5.0811	-0.9911	-6.646E-07	114.5654	46110000.	0.0783	19906.	0.000
15.187	-8.531E-06	3.3410	-0.8305	-4.912E-07	111.3971	46110000.	0.0909	20230.	0.000
15.345	-9.333E-06	1.9284	-0.6482	-3.827E-07	108.8252	46110000.	0.1011	20555.	0.000
15.504	-9.984E-06	0.8800	-0.4481	-3.249E-07	106.9163	46110000.	0.1098	20879.	0.000
15.662	-1.057E-05	0.2273	-0.2318	-3.021E-07	105.7279	46110000.	0.1180	21204.	0.000
15.820	-1.113E-05	0.000	0.000	-2.974E-07	105.3140	46110000.	0.1262	10764.	0.000

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.8206362 inches
Computed slope at pile head	=	-0.0136143 radians
Maximum bending moment	=	10929. inch-lbs
Maximum shear force	=	-403.2153234 lbs
Depth of maximum bending moment	=	6.0116000 feet below pile head
Depth of maximum shear force	=	7.5936000 feet below pile head
Number of iterations	=	8
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

Shear	=	154. lb
Moment	=	0. in- lb
Axial Load	=	218. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
15.8200	0.8206362	10929.	-403.2153234
15.0290	0.8206658	10928.	-402.9335129
14.2380	0.8206640	10936.	-403.4911547
13.4470	0.8206287	10936.	-403.3972464
12.6560	0.8212452	10945.	-404.0552534
11.8650	0.8211791	10938.	-404.0828776
11.0740	0.8218188	10942.	-402.9343413
10.2830	0.8215674	10937.	-400.2943278
9.4920	0.8268250	10938.	-423.7292387
8.7010	0.8973391	10916.	-539.3774635
7.9100	2.0602394	11000.	-804.7386355

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 154.0000	M = 0.000	218.00000000	0.82063619	10929.	-403.2153	-0.01361432

Appendix A

Geotechnical Report Recommendations

1/16-inch all around the piles should be used. DTE recommends the following preliminary static design parameters for a driven pile foundation alternative:

DESCRIPTION	VALUE
Maximum Net Allowable Bearing Capacity[1]	
Soil/Weathered Rock	5 kips per square foot (ksf)
Bedrock	10 ksf
Ultimate Skin Friction Value[2]	
Soil (>3.5 fbg)	750 pounds per square foot (psf)
Weathered Rock	1,000 psf
Modulus of Lateral Subgrade Reaction[3]	
Soil (>2.5 fbg) – dry	90 pounds per cubic inch (pci)
Soil (>7 fbg) – wet	90 pci
Weathered Rock	150 pci
Angle of Internal Friction	
Soil	35
Weathered Rock	38
Total Soil Unit Weight	
Soil	130 pounds per cubic foot (pcf)
Weathered Rock	140 pcf

1. End-bearing should be neglected for uplift calculations. Provided value assumes a factor of safety of 3.
2. Contribution to pile capacity within the frost depth (i.e., above depths of 3.5 feet) should be ignored. The uplift capacity should be based on the dead weight of the pile and side resistance provided by the subsurface soils (i.e., end bearing should be neglected).
3. To analyze foundation under lateral loading (e.g., Ensoft LPILE).
4. All values provided in this table are preliminary and must be verified in the field by load testing.

Center-to-center pile spacing should not be less than 30 inches or 3 pile diameters. Final pile order lengths should be established based on the results of pile testing and the contractor should be prepared to increase anticipated pile lengths as conditions are exposed in the field.

Piles should be installed to a minimum ultimate geotechnical axial capacity of the structural load multiplied by 2 (assuming load testing is performed). Based on the recommended pile type, bearing material, and anticipated loads, we estimate negligible pile settlements.

The lateral capacity of the upper 30 inches of soil should be neglected due to loss of strength from frost action and the presence of loose surficial soils. Appropriate lateral capacity reductions associated with group effects should be used for piles having a center-to-center spacing of less than 5 times their largest cross-sectional dimension.

7.2.1 Load Testing and Drivability

Tension and lateral load tests should be performed on test piles to finalize foundation design for uplift and lateral load capacity. Compression load tests should also be completed if end bearing capacity of piles is used. Load tests should be completed near the boring explorations in order to corroborate the load test and subsurface exploration data and develop final design

Appendix B

Solar FlexRack TDP 2.0 Loads at Torque Tube Column Load Report

Stow Position

Unfactored Load	Joint Label	X[lb]	Y[lb]	Z[lb]	Mx[lb-ft]	My[lb-ft]	Mz[lb-ft]
DL	Worst Idler	0	529	0	1	0	-1
SL	Worst Idler	0	3031	0	10	0	-10
WL+X	Worst Idler	0	-2723	0	-8	0	870
WL-X	Worst Idler	0	2415	0	8	0	-778
ELX	Worst Idler	-52	21	0	0	0	12
ELZ	Worst Idler	0	21	-53	0	0	0

Joint Label	X[lb]	Y[lb]	Z[lb]	Mx[lb-ft]	My[lb-ft]	Mz[lb-ft]
Drive Post	0	476	0	0	0	0
Drive Post	0	2633	0	0	0	3
Drive Post	0	-2365	0	0	0	748
Drive Post	0	2097	0	0	0	-669
Drive Post	-47	19	0	0	0	11
Drive Post	0	19	-47	0	0	0

45°

Unfactored Load	Joint Label	X[lb]	Y[lb]	Z[lb]	Mx[lb-ft]	My[lb-ft]	Mz[lb-ft]
DL	Worst Idler	0	529	0	1	0	87
SL	Worst Idler	0	986	0	3	0	227
WL+X	Worst Idler	-541	-541	0	-2	2	1273
WL-X	Worst Idler	526	526	0	2	-2	-1242
ELX	Worst Idler	-52	21	0	0	0	12
ELZ	Worst Idler	0	21	-53	0	0	3

Joint Label	X[lb]	Y[lb]	Z[lb]	Mx[lb-ft]	My[lb-ft]	Mz[lb-ft]
Drive Post	0	476	0	0	0	79
Drive Post	0	856	0	0	0	200
Drive Post	-470	-470	0	0	0	1107
Drive Post	457	457	0	0	0	-1079
Drive Post	-47	19	0	0	0	11
Drive Post	0	19	-47	0	0	3

Appendix C

Geotechnical Report - Soil Corrosion Data
NBS Circular - Soil Corrosion Test Data
Galvanizing Datasheet

THIELSCH ENGINEERING	195 Frances Avenue Cranston RI, 02910 Phone: (401)-467-6454 Fax: (401)-467-2398 thielsch.com *Let's Build a Solid Foundation*	Client Information: Down to Earth Consulting, LLC Naugatuck, CT PM: Ray Janeiro Assigned By: Ran Janeiro Collected By: Client	Project Information: **Sunjet Bristol** **Bristol, CT** DTE Project Number: 0032-036.00 Summary Page: 1 of 1 Report Date: 06.03.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-E-171

Boring ID	Sample No.	Depth (ft)	Laboratory No.	Identification Tests						Corrosivity Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Resitivity (Mohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)	Sulfide (mg/kg)	Redox Potential (mv)	pH	Electrical Resist. As Received Ohm-cm @ 60°F	Electrial Resist. Saturated Ohm-cm @ 60°F	
				D2216	D4318		D6913			EPA	D4327	D4327	EPA		D4972	G57		
B-2	Grab	0-4	20-S-1405	4.6							ND	ND			6.48	110000	107000	Corrosivity Only
B-4	Grab	0-4	20-S-1406	2.5							ND	ND			7.21	109000	85200	Corrosivity Only
B-3	S-3	5-5.8	20-S-1407				23.6	61.9	14.5									Brown silty sand with gravel
B-5	S-3	5-7	20-S-1408				28.3	63.6	8.1									Brown well-graded sand with silt and gravel

Date Received: *05.26.2020* Reviewed By: Date Reviewed: *06.03.2020*

TABLE 6. *Chemical and physical properties of the soils at the NBS test sites* [a]

No. [b]	Soil Type	Location	Internal drainage of test site [c]	Resistivity at 60°F	pH	Composition of water extract, mg-eq per 100 g of soil								Mean temperature [a]	Annual precipitation [a]	Moisture equivalent	Air-pore space	Apparent specific gravity	Volume shrinkage
						Total acidity [d]	Na+K as Na	Ca	Mg	CO_3	HCO_3	Cl	SO_4						
				Ohm-cm										°F	*Inches*	*Percent*	*Percent*		*Percent*
1	Allis silt loam	Cleveland, Ohio	P	1,215	7.0	11.4	0.72	0.25	0.43	0.00	0.09	0.09	0.83	49.2	33.8	28.0	1.1	----	6.0
2	Bell clay	Dallas, Tex	PG	684	7.3	3.5	.28	1.09	.13	.00	1.18	.04	.18	65.5	30.2	37.0	2.0	1.95	23.0
3	Cecil clay loam	Atlanta, Ga	FP	30,000	5.2	11.5	----	----	----	----	----	----	----	61.2	48.3	29.1	18.2	1.60	7.0
4	Chester loam	Jenkintown, Pa	P	6,670	5.6	7.0	----	----	----	----	----	----	----	54	40	22.2	7.0	1.78	2.2
5	Dublin clay adobe	Oakland, Calif	P	1,345	7.0	6.5	.93	.48	.10	.00	0.69	.03	.25	60.4	23.4	28.8	4.9	2.00	22.6
6	Everett gravelly sandy loam	Seattle, Wash	GF	45,100	5.9	12.8	----	----	----	----	----	----	----	51.0	34.0	12.2	40.6	1.50	0.1
7	Maddox silt loam	Cincinnati, Ohio	PF	2,120	4.4	29.8	----	----	----	----	----	----	----	53.2	38.0	34.3	3.7	2.02	34.5
8	Fargo clay loam	Fargo, N. Dak	P	350	7.6	A	1.42	1.72	2.55	.00	.71	.01	4.43	39	21	37.0	8.7	1.56	21.0
9	Genesee silt loam	Sidney, Ohio	FP	2,820	6.8	7.2	----	----	----	----	----	----	----	51.2	39.0	24.8	15.8	1.74	8.6
10	Gloucester sandy loam	Middleboro, Mass	F	7,460	6.6	3.6	----	----	----	----	----	----	----	50	41	13.0	27.8	1.58	0.2
11	Hagerstown loam	Loch Raven, Md	GP	11,000	5.3	10.8	----	----	----	----	----	----	----	55.4	42.0	32.0	15.5	1.49	8.0
12	Hanford fine sandy loam	Los Angeles, Calif	FP	3,190	7.1	2.5	0.39	0.50	0.10	.00	.40	.00	0.14	62.4	15.2	12.4	33.5	----	0
13	Hanford very fine sandy loam	Bakersfield, Calif	FP	290	9.5	A	6.23	.09	.13	.00	1.12	1.04	3.70	64.6	5.0	21.7	34.5	----	0
14	Hempstead silt loam	St. Paul, Minn	P	3,520	6.2	5.6	----	----	----	----	----	----	----	41.2	27.2	17.2	14.4	1.70	1.0
15	Houston black clay	San Antonio, Tex	P	489	7.5	5.0	2.18	.88	.20	.00	2.00	0.13	0.73	68.9	27.2	51.4	5.7	2.08	39.8
16	Kalmia fine sandy loam	Mobile, Ala	FP	8,290	4.4	11.8	----	----	----	----	----	----	----	67.3	61.6	22.2	12.0	1.65	0.6
17	Keyport loam	Alexandria, Va	FP	5,980	4.5	19.1	----	----	----	----	----	----	----	55.	42	30.8	4.4	1.72	5.4
18	Knox silt loam	Omaha, Nebr	GP	1,410	7.3	1.4	0.27	.63	.20	.00	0.94	.00	.25	50.6	27.8	28.4	16.0	1.28	1.3
19	Lindley silt loam	Des Moines, Iowa	GP	1,970	4.6	10.9	.38	.32	.41	.00	.16	.03	.40	49.5	32.0	28.4	3.9	1.70	11.8
20	Mahoning silt loam	Cleveland, Ohio	P	2,870	7.5	1.3	.25	.48	.20	.00	.51	.00	.15	49.2	33.8	22.4	3.8	1.90	3.9
21	Marshall silt loam	Kansas City, Mo	FG	2,370	6.2	9.5	----	----	----	----	----	----	----	54.4	37.1	31.2	10.8	1.60	6.5
22	Memphis silt loam	Memphis, Tenn	FG	5,150	4.9	9.7	----	----	----	----	----	----	----	61.0	47.7	28.4	9.0	1.67	3.0
23	Merced silt loam	Buttonwillow, Calif	FG	275	9.4	A	8.38	.38	.22	.02	1.87	1.12	5.57	65	6	21.7	0.1	1.69	0.2
24	Merrimac gravelly sandy loam	Norwood, Mass	F	11,400	4.5	12.0	----	----	----	----	----	----	----	50	41	13.0	34.7	1.4	0
25	Miami clay loam	Milwaukee, Wis	P	1,780	7.2	1.7	0.23	.70	.41	.00	1.01	0.03	0.10	46.1	30.1	25.8	9.5	1.95	7.6
26	Miami silt loam	Springfield, Ohio	GP	2,980	7.3	2.0	.27	.50	.31	.00	0.70	.03	.12	53	37	16.4	20.9	1.95	1.0
27	Miller clay	Bunkie, La	P	570	6.6	3.7	.53	1.80	1.12	.00	2.00	.08	1.54	67	56	42.6	1.9	2.01	32.5
28	Montezuma clay adobe	San Diego, Calif	VP	408	6.8	----	1.50	0.00	0.18	.00	0.12	.00	0.89	61.0	10.3	24.6	2.5	----	5.9
29	Muck	New Orleans, La	VP	1,270	4.2	28.1	2.15	1.92	1.55	.00	.00	1.09	2.30	69.3	57.4	34.5	20.6	----	5.8
30	Muscatine silt loam	Davenport, Iowa	P	1,300	7.0	2.6	0.32	0.65	0.40	.00	.71	0.09	0.24	49.0	32.1	29.4	7.2	1.81	7.5
31	Norfolk fine sand	Jacksonville, Fla	G	20,500	4.7	1.8	----	----	----	----	----	----	----	69.3	47.4	2.8	38.1	1.55	0
32	Ontario loam	Rochester, N. Y	GP	5,700	7.3	0.5	.23	.70	.12	.00	.73	.01	.42	47.6	32.8	17.8	11.7	1.85	0.1
33	Peat	Milwaukee, Wis	VP	800	6.8	36.0	1.52	7.30	4.00	.00	----	2.27	2.13	46.1	30.1	72.8	34.0	----	16.9
34	Penn silt loam	Norristown, Pa	FG	4,900	6.7	7.0	----	----	----	----	----	----	----	54	40	23.4	11.7	1.82	8.4
35	Ramona loam	Los Angeles, Calif	G	2,000	7.3	5.7	0.58	0.68	0.49	.00	1.10	0.06	0.36	62.4	15.2	18.0	10.9	1.89	3.1
36	Ruston sandy loam	Meridian, Miss	GP	11,200	4.5	4.0	----	----	----	----	----	----	----	64.0	53.0	13.8	10.0	1.62	0
37	St. John's fine sand	Jacksonville, Fla	G	11,200	3.8	15.3	----	----	----	----	----	----	----	69.3	47.4	7.0	----	----	0
38	Sassafras gravelly sandy loam	Camden, N. J	FP	38,600	4.5	1.7	----	----	----	----	----	----	----	54	40	3.0	32.1	1.59	0
39	Sassafras silt loam	Wilmington, Del	P	7,440	5.6	0.6	----	----	----	----	----	----	----	54	40	24.2	7.5	1.72	3.8
40	Sharkey clay	New Orleans, La	P	970	6.0	9.4	.56	.58	.14	.00	0.93	.07	.28	69.3	57.4	33.0	2.3	1.78	16.4
41	Summit silt loam	Kansas City, Mo	F	1,320	5.5	11.0	.30	.54	.36	.00	.78	.04	.40	54.4	37.1	33.1	6.9	1.61	14.0
42	Susquehanna clay	Meridian, Miss	VP	13,700	4.7	28.2	----	----	----	----	----	----	----	64.0	53.0	34.8	14.9	1.79	4.7
43	Tidal marsh	Elizabeth, N. J	VP	60	3.1	36.8	45.10	5.17	9.45	.00	.00	43.30	37.00	52	43	55.4	----	----	----
44	Wabash silt loam	Omaha, Nebr	GP	1,000	5.8	8.8	1.05	1.08	0.00	.00	1.97	0.82	0.41	50.6	27.8	31.2	7.2	1.55	0.0
45	Unidentified alkali soil	Casper, Wyo	GP	263	7.4	A	8.15	3.70	.70	.00	0.24	.18	11.98	47.2	15.3	14.8	18.7	----	0
46	Unidentified sandy loam	Denver, Colo	GP	1,500	7.0	----	----	----	----	----	----	----	----	50.0	14.1	7.6	23.2	----	----
47	Unidentified silt loam	Salt Lake City, Utah	PP	1,770	7.6	3.0	0.67	0.72	.39	.00	.88	.00	0.48	61.6	16.1	25.7	2.0	1.72	3.7
51	Acadia clay	Spindletop, Tex	PP	190	6.2	13.2	10.27	15.55	5.03	.00	.56	6.75	22.00	69	49	47.1	1.4	2.07	37.9
52	Lake Charles clay loam	League City, Tex	PG	234	8.8	A	4.20	0.33	0.18	.52	1.36	1.33	1.20	69	47	54.8	3.7	1.97	33.9
53	Cecil clay loam	Atlanta, Ga	G	17,790	4.8	5.1	----	----	----	----	----	----	----	61.2	48.3	33.7	18.2	1.60	7.0

See footnotes at end of table.

b. Results of Field Tests on Galvanized Coatings

In 1924, an underground exposure test was initiated on a series of five different base metals (Bessemer steel, wrought iron, plain and copper-bearing steel, and open-hearth iron) to which a series of zinc coatings were applied by the hot-dip process. This test was terminated after 10-years exposure (table 65). An analysis of these data showed that in most of the soils, zinc coatings of 2 oz or less were destroyed during the 10-year exposure period, and pitting of the underlying steel occurred. However, the test showed that the 3-oz coatings were intact on at least half of the specimens, and in only one (soil 23) of the 47 soils was there any measurable development of pits in the steel. Although the galvanized specimens differed somewhat in coating weight and uniformity of thickness, the results of the tests [115] show in the case of the five alloys tested, that the base metal is not a factor in the corrosion rate.

These results indicated a desirability of a further development of data for the 3-oz coatings, not only, in some of the 1924 soils but in additional soils that had been shown by subsequent tests to be corrosive to both zinc and iron. In view of this, specimens of 1½-in. steel pipe with a 3.08-oz zinc coating were buried in 1937, together with representative control specimens (table 66, fig. 52).

TABLE 65. *Corrosion of galvanized pipe and 16-gage steel sheet buried in 1924*

(The numbers in parentheses are the weights (oz/ft²) of the coatings.)

Z = Zinc continuous over specimen.
A = Blue or black alloy layer exposed over at least a portion of specimen.
R = Rusted or bare steel exposed.
M = Shallow metal attack; no pits as great as 10 mils—total depth.

Soil		Duration of test	Loss in weight (oz/ft²)						Condition or maximum pit depth (in mils)				
			Pipe	Sheet					Pipe[a]	Pipe	Sheet		
No.	Type		A (2.82)[a]	A3 (0.99)	B (0.81)	Y3 (1.07)	Average	Bare[b]	B (1.81)	A	A3	B	Y3
		Years											
1	Allis silt loam	10.66	2.92	4.62	4.79	4.46	4.62	10.20	27	R	28	28	30
2	Bell clay	9.92	.35	.44	.58	.29	.44	-------	M	Z	A	R	Z
3	Cecil clay loam	10.09	.41	.48	.72	.62	.61	3.96	M	Z	R	10	R
4	Chester loam	10.02	1.94	1.85	1.76	2.05	1.89	-------	R	R	23	17	14
5	Dublin clay adobe	10.17	1.82	2.50	3.03	2.45	2.66	-------	-------	R	12	22	12
6	Everett gravelly sandy loam	10.16	.12	.27	.25	.09	.20	-------	-------	Z	A	A	Z
7	Haddox silt loam	10.48	2.82	2.69	2.36	3.04	2.70	-------	R	R	17	17	22
8	Fargo clay loam	10.03	.78	.65	.56	.39	.53	5.55	R	Z	A	R	A
9	Genesee silt loam	9.48	1.10	.87	.78	1.08	.91	-------	R	A	29	19	23
10	Gloucester sandy loam[c]	10.62	1.29	1.74	1.71	1.75	1.73	-------	A	R	16	24	12
11	Hagerstown loam	10.55	.90	.42	.91	1.15	.83	1.79	-------	A	16	21	13
12	Hanford fine sandy loam	10.17	-------	.33	.96	.26	.52	-------	A	-------	A	M	A
13	Hanford very fine sandy loam	10.16	*.87	2.23	.37	1.37	1.32	-------	-------	R	15	R	8
14	Hempstead silt loam	10.04	.26	.33	.34	.58	.45	5.00	A	Z	A	A	R
15	Houston black clay	10.06	.35	.29	.60	.21	.37	-------	-------	Z	Z	A	Z
16	Kalmia fine sandy loam	10.04	.99	1.46	2.04	1.78	1.76	6.44	Z	M	20	15	18
17	Keyport loam	10.57	3.64	5.90	3.92	3.89	4.57	-------	R	R	22	27	19
19	Lindley silt loam	10.51	.68	.82	1.16	1.04	.67	3.30	A	Z	27	20	22
20	Mahoning silt loam	10.67	1.22	2.10	2.40	1.56	2.02	5.01	R	R	17	21	13
22	Memphis silt loam	9.93	1.19	2.04	2.28	2.37	2.23	7.16	-------	R	56	32	29
23	Merced silt loam	10.16	9.60	3.64	2.64	6.38	4.22	25.66	-------	68	37	21	41
24	Merrimac gravelly sandy loam	10.63	*.26	.13	.17	.04	.11	-------	Z	Z	A	A	Z
25	Miami clay loam	10.65	.36	1.09	1.03	.92	1.01	-------	-------	Z	10	R	R
26	Miami silt loam	10.48	.71	.78	1.09	.80	.89	-------	A	A	10	6	8
27	Miller clay	10.08	.92	1.49	1.37	.84	.93	-------	-------	A	12	10	9
28	Montezuma clay adobe	9.60	*1.96	4.73	6.41	2.22	4.45	16.32	-------	R	33	63	22
29	Muck	10.08	*5.98	5.19	4.48	4.24	4.64	14.79	30	R	32	26	28
30	Muscatine silt loam	10.51	.47	1.58	1.42	1.48	1.49	-------	12	A	20	13	11
31	Norfolk fine sand	10.04	*.16	.05	.17	.05	.09	-------	-------	Z	Z	A	Z
→ 32	Ontario loam	10.71	*.60	.61	.62	.72	.65	3.04	R	R	A	R	A
33	Peat	10.65	1.83	2.00	4.27	1.58	2.62	11.96	-------	R	17	29	14
35	Ramona loam	10.16	.30	.70	1.07	.43	.73	-------	A	A	A	R	A
36	Ruston sandy loam	10.05	.23	.14	.43	.34	.30	-------	-------	Z	A	4	A
37	St. John's fine sand	10.04	2.03	3.15	3.06	3.02	3.08	8.54	-------	R	20	17	14
38	Sassafras gravelly sandy loam	10.62	*.21	.16	.22	.12	.17	-------	-------	Z	A	A	A
40	Sharkey clay	10.08	.93	2.20	2.22	2.14	2.19	7.48	R	R	47	48	38
41	Summit silt loam	10.52	.54	.27	.38	.27	.31	-------	M	A	A	A	A
42	Susquehanna clay	10.05	.71	.86	-------	.74	.80	10.64	-------	R	21	-------	23
43	Tidal marsh	10.73	*1.38	1.09	6.27	.69	2.68	12.72	25	A	R	63	R
44	Wabash silt loam	10.52	-------	.22	.75	.43	.47	-------	-------	-------	A	A	A
45	Unidentified alkali soil	10.55	*1.84	1.01	1.69	1.79	1.50	13.53	38	R	19	5	16
46	Unidentified sandy loam	10.54	.17	.11	.17	.28	.19	4.38	A	Z	Z	Z	Z
47	Unidentified silt loam	10.60	1.06	.70	.83	.69	.74	-------	A	A	R	R	R

[a] The weight of coating given here is in ounces per square foot of exposed area. It is the average obtained from at least 10 measurements of thickness by the stripping method.

[b] In the column headed "Bare" are presented the average weight losses of rolled iron and steel specimens buried a similar length of time, i.e., approximately 10 years. These were not available for all soils.

[c] The B pipes were buried 12 years. They were not weighed before burial so weight losses are not known.

[d] In this soil there were 2 specimens. The condition or penetration is for the worse-corroded specimen.

[e] There were 2 specimens of this material. The condition is for the worse of these specimens.

TABLE 13. *Loss in weight and maximum penetration of wrought black ferrous pipe buried in 1922* [a, b]—Continued

(Average of two specimens)

Soil No.	Type	Duration of exposure	Loss in weight (oz/ft²)								Maximum penetration (mils)							
			1½-in. pipe				3-in. pipe				1½-in. pipe				3-in. pipe			
			Open-hearth iron	Wrought iron	Bessemer steel	Bessemer steel (scale-free)	Wrought iron	Open-hearth steel	Bessemer steel	Open-hearth steel with 0.22 percent Cu	Open-hearth iron	Wrought iron	Bessemer steel	Bessemer steel (scale-free)	Wrought iron	Open-hearth steel	Bessemer steel	Open-hearth steel with 0.22 percent Cu
Material			a	b	c	y	B	K	M	Y	a	b	c	y	B	K	M	Y
28	Montezuma clay adobe	Years 1.0	3.4	2.7	3.6	3.0	2.1	3.2	2.9	3.5	20	26	34	20	29	40	35	36
		5.5	10.3	9.3	9.5	10.6	8.9	10.7	10.5	10.7	50	69	60	56	56	70	58	75
		7.7	11.6	12.8	14.5	15.1	15.3	16.4	13.2	18.3	137	124	117	106	132	161	117	153
		9.6	15.7	15.4	16.4	16.8	16.8	16.2	16.5	17.7	145+	132+	137+	145+	167	183+	152	216+
29 (56)	Muck	2.0	4.0	3.3	3.8	4.4	3.5	4.2	4.1	4.2	48	37	54	56	42	68	43	37
		4.1	7.2	7.7	7.3	6.8	7.2	7.3	6.9	7.9	65	47	60	68	72	78	60	90
		6.0	10.0	8.9	9.4	9.9	9.2	9.6	8.9	9.3	104	78	92	83	56	80	90	81
		8.0	14.3	13.0	13.7	14.0	10.9	10.4	11.0	15.7	104+	68	90	90	98	90	128	178
		10.0	10.2	13.4	13.8	14.0	14.9	15.3	14.8	15.0	145+	97	74	92	84	120	100	178
		12.0	21.5	16.2	19.2	19.4	15.6	17.9	14.8	20.1	145+	90	136+	145+	134	216+	119	216+
30	Muscatine silt loam	1.1	0.9	0.9	1.1	0.9	0.9	1.1	1.1	1.0	24	<10	12	10	12	16	16	18
		3.6	1.1	1.2	1.2	1.2	1.4	1.8	1.4	1.2	<20	<20	<20	<20	<20	<20	<20	<20
		5.7	1.8	2.8	2.0	2.0	2.5	2.7	2.5	2.4	<20	<20	24	10	28	28	27	28
		8.2	4.1	4.7	4.1	4.2	4.7	4.0	4.4	3.8	46	36	33	34	62	35	48	31
		11.6	5.2	5.6	4.8	5.3	6.3	5.8	5.6	5.2	84	51	58	51	53	54	63	66
		17.0	6.1	5.9	5.7	5.4	6.0	6.0	6.9	6.4	50	44	52	42	53	64	76	65
31	Norfolk fine sand	2.0	0.7	1.3	1.2	1.5	0.8	1.2	1.3	1.1	30	32	67	39	37	48	52	54
		4.1	2.0	1.7	2.1	2.2	2.1	2.5	2.1	2.3	24	26	25	25	30	47	28	34
		6.0	1.0	1.8	1.9	1.9	1.6	1.9	2.3	2.3	28	30	26	53	29	58	32	46
		8.0	1.8	2.2	2.4	2.8	2.1	2.2	2.3	2.6	36	44	37	38	42	45	64	36
		12.0	2.9	3.0	2.8	2.7	2.8	2.8	2.8	3.4	34	29	34	30	41	41	40	36
		17.7	4.9	4.2	3.7	4.4	6.3	4.5	4.1	4.6	50	42	43	52	41	90	66	49
32	Ontario loam	1.0	0.2	0.5	0.4	0.4	0.3	0.4	0.4	0.3	40	20	21	12	30	23	27	26
		3.7	1.2	1.8	1.6	1.4	1.4	1.3	1.3	1.4	44	40	30	27	40	34	36	41
		5.8	1.6	2.1	2.3	1.8	2.3	2.2	2.0	2.8	37	32	30	30	38	39	37	42
		7.8	2.0	2.8	2.7	2.3	2.5	2.6	2.3	2.7	32	42	42	39	38	48	44	46
		9.8	2.1	3.2	3.1	2.5	3.0	2.4	2.8	2.6	48	55	46	44	52	49	54	94
		11.7	3.1	3.5	3.3	3.7	3.6	3.6	4.2	3.2	58	42	46	50	60	86	62	93
33	Peat	1.0	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	<10	<10	<10	<10	<10	<10	<10	<10
		3.7	3.5	3.3	3.4	3.5	3.7	3.5	3.6	3.8	38	<20	<20	25	32	30	40	38
		5.8	4.7	4.6	4.6	5.0	4.3	5.0	4.8	5.0	48	56	<20	51	36	54	33	28
		7.6	8.4	9.2	9.2	8.8	8.5	8.8	8.9	7.8	120+	60	66	57	100	117	96	94
		9.7	11.1	12.4	11.4	9.8	10.1	9.9	11.4	10.6	114	82	92	74	112	102	115	111
		11.7	14.1	14.0	14.3	14.2	14.3	11.6	12.8	14.0	112	98	90	104	104	108	96	84
34	Penn silt loam	1.4	1.3	1.3	1.2	1.1	1.4	1.4	1.4	1.2	20	21	20	18	22	27	22	29
		4.0	1.0	1.8	1.8	1.9	1.8	1.9	1.8	1.8	22	21	<20	18	10	18	16	17
		6.1	2.1	2.8	2.8	2.7	2.8	3.1	2.8	2.9	48	28	16	32	36	38	20	48
		8.0	3.0	3.3	3.4	3.6	3.5	3.2	3.3	3.2	42	46	45	52	43	67	40	68
		9.9	4.2	4.8	4.0	4.1	4.5	3.9	4.3	4.4	82	48	84	94	71	73	77	104
		12.0	3.8	4.8	4.0	3.2	5.9	4.3	5.3	4.8	58	36	41	32	55	36	50	74
35	Ramona loam	1.9	0.8	0.9	0.7	0.7	0.8	0.9	1.1	0.8	<10	17	<10	<10	<10	<10	17	18
		4.1	1.7	2.0	1.8	1.4	2.1	2.0	1.9	1.8	16	<20	<20	<20	20	17	22	24
		6.2	1.2	1.2	1.5	1.0	0.9	0.7	1.0	1.4	<20	<20	40	<20	22	<20	18	21
		8.0	2.4	2.1	1.7	1.7	2.1	2.1	2.1	2.3	32	24	23	<20	18	38	28	27
		12.1	1.6	2.7	2.2	1.1	1.8	1.7	2.5	1.9	10	24	18	<20	30	22	29	27
		17.5	1.5	4.1	1.5	0.9	1.2	0.9	3.2	3.3	12	54	9	17	32	34	36	64
36	Ruston sandy loam	2.0	1.2	1.2	1.4	1.1	0.8	0.8	1.0	0.9	28	37	34	38	37	48	43	37
		4.1	1.4	2.0	2.2	2.1	1.7	1.7	1.6	1.5	37	38	30	31	39	50	40	42
		6.0	1.3	1.7	1.7	1.8	1.4	1.8	1.4	1.6	47	48	37	41	41	52	48	42
		8.0	2.0	3.0	2.5	2.4	1.8	2.0	2.1	2.1	48	64	35	38	48	58	50	50
		12.0	2.5	3.3	3.2	2.9	2.3	2.8	2.4	2.5	58	46	48	48	47	60	45	44
		17.7	3.3	4.1	4.1	3.7	2.5	3.0	2.6	3.1	51	50	55	45	50	60	46	57
37	St. John's fine sand	2.0	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.4	38	35	48	48	42	43	53	90
		4.1	4.2	4.4	4.4	4.2	4.5	4.4	4.5	5.0	46	42	62	66	50	58	55	92
		6.0	4.2	4.8	3.8	4.6	3.8	4.2	4.1	3.8	46	51	38	73	38	48	50	59
		8.0	5.8	6.1	5.2	5.2	6.3	6.1	5.8	6.5	58	49	62	54	64	68	67	90
		10.1	9.1	8.0	8.0	7.7	8.2	8.7	8.5	10.0	68	71	69	74	75	72	84	114
		12.0	8.3	9.0	7.7	6.8	8.2	8.4	9.0	10.4	76	64	78	68	80	63	95	127
38	Escambia gravelly sandy loam	1.4	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	<10	<10	<10	<10	<10	<10	<10	<10
		4.0	.5	.7	.7	.6	.5	.4	.6	.5	<20	28	<20	<20	<20	<20	<20	<20
		6.1	.8	.8	1.2	.8	1.1	1.3	1.2	1.2	40	26	20	20	37	17	34	35
		8.0	2.0	2.0	2.1	1.8	2.0	2.0	2.2	2.1	52	28	20	24	34	25	29	24
		12.0	2.1	2.4	2.8	2.6	2.4	2.5	2.2	2.7	35	34	26	20	28	22	42	26
		17.2	2.7	3.4	2.3	2.6	2.3	2.8	2.8	2.5	40	33	28	36	34	38	34	33
			1.4	1.0	1.2	1.2	1.3	1.2	1.3	1.2	2.1	<10	<10	<10	<10	<10	<10	<10	<10

COATING MEASUREMENT

The specifications give requirements concerning the amount of coating applied to the steel part during the hot-dip galvanizing process. The amount of coating can be specified by thickness or weight per surface area. The specifications include tables providing specific requirements for thickness or weight per surface area based upon the steel part type and the measured steel thickness.

The minimum coating requirements specified by ASTM for different classes of work are summarized in *Table 1* for ASTM A123/A123M, *Table 2* for ASTM A153/A153M, and *Table 3* for ASTM A767/A767M (next page).

COATING THICKNESS GRADE

COATING GRADE	MILS	OZ/FT²	µM	G/M²
45	1.8	1.0	45	320
65	2.6	1.5	65	460
85	3.3	2.0	85	600

TABLE 1A: COATING THICKNESS GRADES FROM ASTM A123/A123M

MINIMUM AVERAGE COATING THICKNESS GRADE BY MATERIAL CATEGORY - ASTM A123/A123M (ROLLED, PRESSED AND FORGED SHAPES, CASTINGS, PLATES, BARS AND STRIPS)

MATERIAL CATEGORY	ALL SPECIMENS TESTED (STEEL THICKNESS RANGE (MEASURED), IN (MM))				
	<1/16 (<1.6)	1/16 TO <1/8 (1.6 TO < 3.2)	1/8 TO 3/16 (3.2 TO 4.8)	>3/16 TO <1/4 (>4.8 TO <6.4)	>1/4 (>6.4)
STRIP AND BAR	45	65	75	85	100
WIRE	35	50	60	65	80

TABLE 1: MINIMUM COATING THICKNESS FROM ASTM A123/A123M (SEE TABLE 1A FOR INFORMATION ON COATING THICKNESS GRADE)

MINIMUM AVERAGE COATING THICKNESS BY MATERIAL CLASS - ASTM A153/A153M (IRON AND STEEL HARDWARE)

CLASS OF MATERIAL		MINIMUM WEIGHT OF ZINC COATING, OZ/FT² (G/M²) OF SURFACE[A]		MINIMUM THICKNESS, MILS (MICRONS)	
		AVERAGE OF SPECIMENS TESTED	ANY INDIVIDUAL SPECIMEN	AVERAGE OF SPECIMENS TESTED	ANY INDIVIDUAL SPECIMEN
CLASS A -	CASTINGS, MALLEABLE IRON, STEEL	2.00 (610)	1.80 (550)	3.4 (86)	3.1 (79)
B-1 -	3/16 IN (476 MM) AND OVER IN THICKNESS AND OVER 15 IN (381 MM) IN LENGTH	2.00 (610)	1.80 (550)	3.4 (86)	3.1 (79)
B-2 -	UNDER 3/16 IN (4.76 MM) IN THICKNESS AND OVER 15 IN (381 MM) IN LENGTH	1.50 (458)	1.25 (381)	2.6 (66)	2.1 (53)
B-3 -	ANY THICKNESS AND 15 IN (4.76MM) AND UNDER IN LENGTH	1.30 (397)	1.10 (336)	2.2 (56)	1.9 (48)
CLASS D -	FASTENERS 3/8 IN (9.52 MM) AND UNDER IN DIAMETER, RIVETS, NAILS AND SIMILAR ARTICLES. WASHERS UNDER 3/16 IN (4.76 MM) IN THICKNESS	1.00 (305)	0.85 (259)	1.7 (43)	1.4 (36)

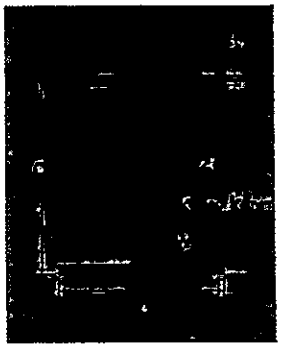
[A] IN THE CASE OF LONG PIECES, SUCH AS ANCHOR RODS AND SIMILAR ARTICLES OVER 5 FT (1.52 MM) IN LENGTH, THE WEIGHT OF COATING SHALL BE DETERMINED AT EACH END AND THE MIDDLE OF THE ARTICLE. IN NO CASE SHALL INDIVIDUAL MEASUREMENTS BE BELOW THE MINIMUM SHOWN IN THE "ANY INDIVIDUAL SPECIMEN" COLUMN.

TABLE 2: MINIMUM COATING THICKNESS FROM ASTM A153/A153M

Appendix D

Corroded Pile RISA Analysis

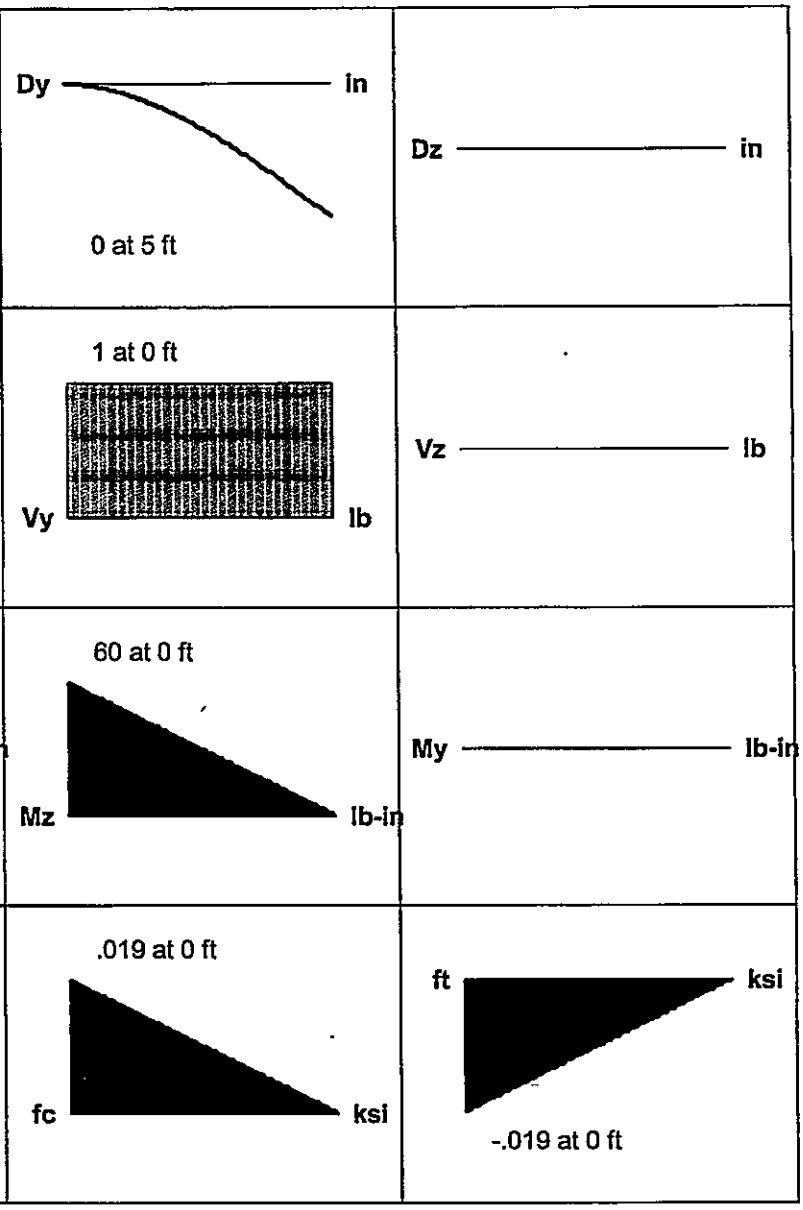
Shape Name : **W6x7 35P32**
Database : **AISC**
Shape Type : **Wide Flange**
Material : **Hot Rolled**



Depth	: **5.756**	**in**	Zyy	: **.958**	**in^3**
Flange Width	: **3.871**	**in**	Zzz	: **3.511**	**in^3**
Flange Thick	: **.126**	**in**	Cw	: **9.656**	**in^6**
Web Thick	: **.101**	**in**	Wno	: **5.448**	**in^2**
Area	: **1.531**	**in^2**	Sw	: **.664**	**in^4**
Iyy	: **1.219**	**in^4**	rT	: **1.024**	**in**
Izz	: **9.135**	**in^4**	kdes	: **.3**	**in**
J	: **.007**	**in^4**	kdet	: **.3**	**in**

Beam: ***M1***

Shape: **W6x7 35P32**
Material: **A992**
Length: **5 ft**
I Joint: **N1**
J Joint: **N2**
LC 1: v
Code Check: **0.001 (bending)**
Report Based On 97 Sections



AISC 14th(360-10): ASD Code Check

Direct Analysis Method

Max Bending Check	**0.001**	Max Shear Check	**0.000 (y)**	Max Defl Ratio	**L/10000**
Location	**0 ft**	Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**			Span	**NA**

Bending Flange	**Non-Compact**	Compression Flange	**Slender**	**Qs=.943**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=.953**

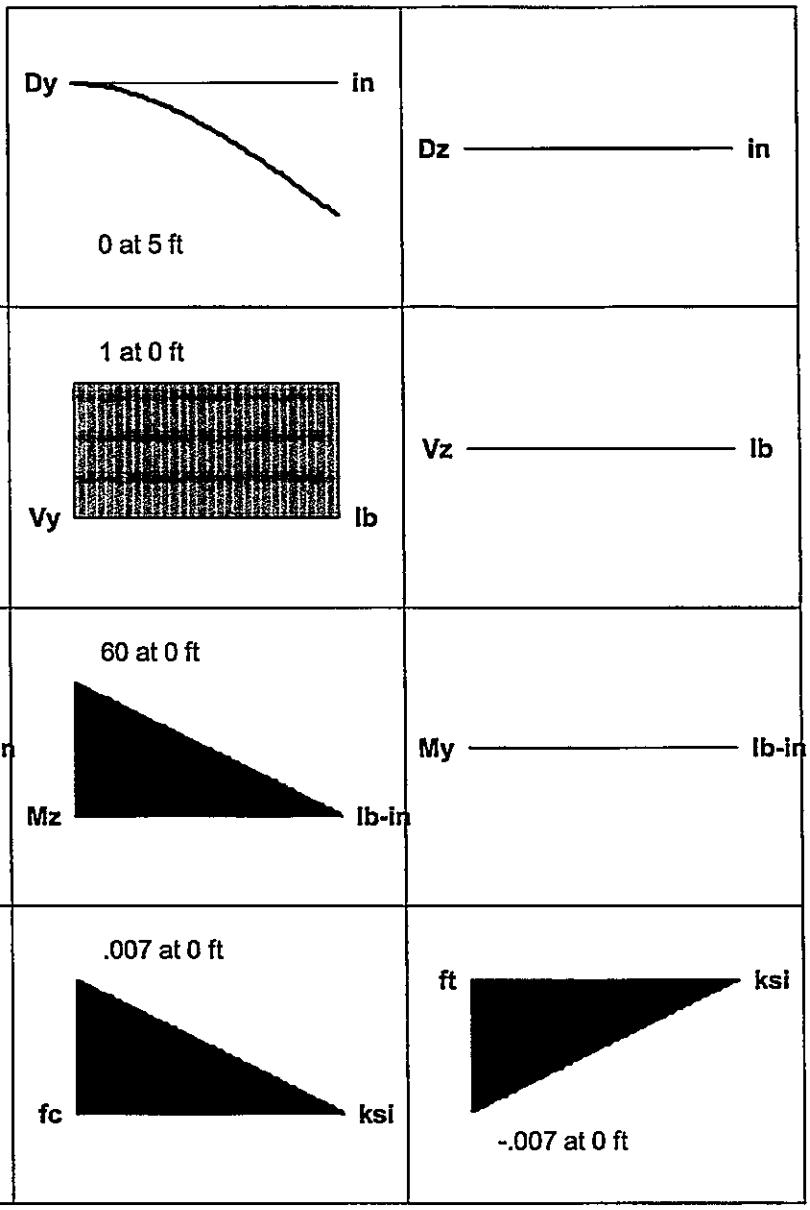
			y-y	z-z
Fy	**50 ksi**	Lb	**5 ft**	**5 ft**
Pnc/om	**26859.966 lb**	KL/r	**80.69**	**24.563**
Pnt/om	**45838.323 lb**			
Mny/om	**22243.821 lb-in**	L Comp Flange	**5 ft**	
Mnz/om	**89068.615 lb-in**	L-torque	**5 ft**	
Vny/om	**11627.12 lb**	Tau_b	**1**	
Vnz/om	**17523.808 lb**			
Cb	**1.667**			

Shape Name : **W6x15 35P32**
Database : **AISC**
Shape Type : **Wide Flange**
Material : **Hot Rolled**

Depth	: **5.956**	**in**	Zyy	: **4.061**	**in^3**
Flange Width	: **5.956**	**in**	Zzz	: **9.197**	**in^3**
Flange Thick	: **.226**	**in**	Cw	: **65.352**	**in^6**
Web Thick	: **.196**	**in**	Wno	: **8.532**	**in^2**
Area	: **3.771**	**in^2**	Sw	: **2.871**	**in^4**
Iyy	: **7.962**	**in^4**	rT	: **1.615**	**in**
Izz	: **24.832**	**in^4**	kdes	: **.51**	**in**
J	: **.06**	**in^4**	kdet	: **.75**	**in**

Beam: ***M1***

Shape: **W6x15 35P32**
Material: **A992**
Length: **5 ft**
I Joint: **N1**
J Joint: **N2**
LC 1: v
Code Check: **0.000 (bending)**
Report Based On 97 Sections



AISC 14th(360-10): ASD Code Check

Direct Analysis Method

Max Bending Check	**0.000**	Max Shear Check	**0.000 (y)**	Max Defl Ratio	**L/10000**
Location	**0 ft**	Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**			Span	**NA**

Bending Flange	**Non-Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**5 ft**	**5 ft**
Pnc/om	**94350.533 lb**	KL/r	**49.551**	**23.382**
Pnt/om	**112904.192 lb**			
Mny/om	**103914.459 lb-in**	L Comp Flange	**5 ft**	
Mnz/om	**248238.512 lb-in**	L-torque	**5 ft**	
Vny/om	**23347.52 lb**	Tau_b	**1**	
Vnz/om	**48361.293 lb**			
Cb	**1.667**			