New York
State Thruway Authority

ORANGE PAGES

May 2022

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NEW YORK STATE OF OPPORTUNITY. Thruway Authority

NEW YORK STATE THRUWAY AUTHORITY

BRIDGE MANUAL ORANGE PAGES

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1.1 Purpose

Add this sentence to the end of the first paragraph:

The NYSTA Orange Pages has been prepared to provide policies and procedures required for bridge project development for the New York State Thruway Authority (NYSTA). These modifications alter the NYSDOT Bridge Manual for the purpose of implementing NYSTA policies.

1.2 Applicability

Add this sentence to the end of the first paragraph:

The Orange Pages apply to all bridge related transportation projects under contract with the New York State Thruway Authority in New York State.

1.4 Referenced Standards, Manuals and Documents

Add this manual to the end of the list:

AASHTO Guide Specification for Wind Loads on Bridges During Construction, First Edition 2017

1.6 ABBREVIATIONS

Add a new Article 1.6:

The following abbreviations shall be substituted with the appropriate NYSTA title or definition as prescribed below:

Construction & Foundation Unit – NYSTA Division Construction Engineer
Departmental Geotechnical Engineer – NYSTA Geotechnical Engineer
DCEC – Director of Construction Management
DCED – Director of the Office of Design
DCES – Director of Structures Design Bureau
DCETS – Director of Structures Design Bureau
Department - Authority
Engineer – Engineer in Charge (construction)
Geotechnical Engineering Bureau – NYSTA Geotechnical Engineer
Landscape/Environmental Unit – NYSTA Environmental Bureau
Materials Bureau
New York State Department of Transportation – New York State Thruway Authority
NYSDOT Concrete Engineering Unit – Director, Structures Design Bureau
NYSDOT Office of Structures – NYSTA Structures Design Bureau
NYSDOT – NYSTA
Office of Structures Standards Unit - Director of Structures Design Bureau
Regional Bridge Maintenance Engineer – Division Bridge Engineer
Regional Design Engineer – Chief Engineer
Regional Environmental Coordinator – Division Environmental Specialist
Regional Hydraulics Engineer – NYSTA Hydraulics Engineer
Regional Materials Engineer – NYSTA Materials Engineer
Regional Structures Engineer – Director of Structures Design Bureau
Regional Geotechnical Engineer – NYSTA Geotechnical Engineer
Regional Landscape/Environmental Unit – NYSTA Environmental Bureau
Regional Utility Engineer – NYSTA Utility Engineer
Standards Unit – NYSTA Final Plan Unit

2.2 GEOMETRIC DESIGN POLICY FOR BRIDGES

2.2.2 Miscellaneous Bridge Width Considerations

Add a paragraph under the "Stage Construction" subheading to read as follows:

For NYSTA projects the minimum traffic lane width on the mainline shall be 11 feet with 1-foot offset to barrier.

Any pavement, temporary or final, that will be used to maintain traffic on the approaches the bridge shall have a constant cross slope to match the bridge deck pavement. The cross slope shall be maintained to a point where the travel lane is at least 2 feet from the barrier system. The criteria may be waived if there is a 2-foot shoulder between the edge of travel lane and the railing system.

Add a paragraph under the "Twin Structures" subheading to read as follows:

For NYSTA projects, the minimum bridge width on twin structures shall be 54 feet minimum between face of barrier to face of barrier for the purposes of maintaining four lanes of traffic on a single structure for emergency use and temporary work zone traffic control.

2.3 VERTICAL CLEARANCES

2.3.1 Over Highways for Highway, Pedestrian, and Overhead Sign Structures

Add the following paragraphs at the end of Section 2.3.1:

The minimum vertical under-clearance for new and replacement vehicle structures over the Thruway mainline and ramps shall be 16'-6" minimum. When a major rehabilitation project is undertaken on an overhead bridge, every effort shall be made to achieve the 16'-6" vertical clearance. For minor rehabilitation projects, the designer shall consider and investigate options to improve the vertical clearance as much as possible. Under no circumstance shall the vertical clearance of an existing structure with substandard vertical clearance be reduced.

For Highway projects:

The Authority is required to notify NYSDOT Regional Structures Engineer of any bridge projects on the Strategic Defense Highway Network (STRAHNET) where the proposed vertical clearance will be less than 16'-0". NYSDOT will in turn request approval to retain the substandard vertical clearance by submitting a justification to the Federal Highway Administration (FHWA).

The minimum vertical under-clearance for new and replacement pedestrian and overhead sign structures over the Thruway mainline and ramps shall be 17'-6" minimum. When a major rehabilitation project is undertaken on an overhead sign structure or pedestrian bridge, every effort shall be made to achieve the 17'-6" minimum vertical clearance. For minor rehabilitation projects, the designer shall consider and investigate options to improve the vertical clearance as closely as possible to the minimum vertical clearance of 17'-6".

3.1 INITIAL BRIDGE PROJECT SCOPING

3.1.2 Bridge Scoping Activities

Delete the five bullets under the primary DAD bullets and replace it with the following:

- IPP/FDR – this format uses an expanded IPP format to obtain project initiation, scope and design approval. The project must be NEPA Class II Categorical Exclusion and/or SEQR Type II (6 NYCRR Part 617).
- "Bridge Rehabilitation Report" – this format uses an expanded IPP format to obtain project initiation, scope and design approval for Bridge Rehabilitation projects. The project must be NEPA Class II Categorical Exclusion and/or SEQR Type II (6 NYCRR Part 617).
- PSR/FDR – this format uses a simplified Design Approval Document to obtain scope and design approval. The project must be a NEPA Class II Categorical Exclusion and SEQR Unlisted or Type 1.
- DDR/FDR – this format uses the traditional design approval report format to obtain design approval. The project must be a NEPA Class III (EA) project and SEQR Unlisted or Type 1.
- DDR/DEIS & FDR/FEIS – this format uses the traditional design report format to obtain design approval. All projects for which a NEPA Class I (EIS) and/or SEQR Type I (EIS) is thought to be needed. Any project with significant social, economic or environmental impacts and/or public controversy.

3.2 HYDRAULICS

3.2.1 Bridge Scour Evaluation Report

On all Thruway Authority projects, the preparation of new Bridge Scour Evaluation Report will be required for all major bridge rehabilitation and bridge replacement projects

5.1 CONCRETE DECK SLABS

5.1.3 Monolithic Decks for Adjacent Concrete Beams and Slab Units

Add the following sentence to the end of the first paragraph:

For all Thruway Authority projects, only galvanized reinforcement shall be used.

5.1.5 DECK REINFORCEMENT DESIGN

5.1.5.1 Isotropic Decks

Replace the eleventh bullet of the section to read as follows:

- The top and bottom mats of reinforcement shall have the same type of corrosion protection. For all Thruway Authority projects, only galvanized reinforcement shall be used.

5.1.5 DECK REINFORCEMENT DESIGN

5.1.5.2 Traditional Deck Slab Reinforcement

Replace the second sentence of the fifth paragraph of the section to read as follows:

For all Thruway Authority projects, only galvanized reinforcement shall be used.

5.1.5 DECK REINFORCEMENT DESIGN

5.1.5.3 Reinforcement of Decks for Adjacent Concrete Beams or Slab Units

Replace the second sentence of the first paragraph of the section to read as follows:

For all Thruway Authority projects, a single mat of #4 galvanized reinforcement bars spaced at 8" in each direction shall be used in the top of the deck.

8.2 STEEL TYPES

8.2.6 Steel Item Numbers

Add the following sentence to the end of the first paragraph of the section.

Thruway Authority bridge replacement projects will utilize the Item 564.51nnnn – LB as the structural steel item.

8.4 DESIGN REQUIREMENTS AND ECONOMIC CONSIDERATIONS

8.4.2.4 Webs

Delete the first paragraph and replace with:

Due to weld distortions that are possible with very thin plates, the minimum web thickness shall be 5/8” for web depths of 33” or greater. Shallower plate girders shall have a minimum web thickness of 1/2".

8.10 SPLICES

8.10.1 Girder Splices

Delete the third sentence of the second paragraph and add the following to the section to read as follows:

The Authority will allow the use of fill plates in girder splices with the approval of the DCES. The minimum fill plate thickness is 3/8".

If fill plates are used in the girder splice, the fabricator shall check and confirm 100% of the holes drilled on each ply of the splice for acceptance.

9.7 ALLOWABLE STRESSES

Delete the first paragraph and replace it with the following:

Allowable stresses used during design shall comply with current *NYSTA LRFD Bridge Design Specifications*, which consists of the *AASHTO LRFD Bridge Design Specifications* together with the "NYSDOT LRFD Blue Pages".

9.8 REINFORCEMENT

Delete the first paragraph and replace it with the following:

Reinforcement in prestressed units shall not be epoxy coated. Composite stirrups extending into the deck, or top longitudinal bars extending into the approach slab shall be galvanized.

15.1.1 REINFORCEMENT

The Thruway Authority shall require the use of galvanized reinforcement unless otherwise approved by the DCES.

17.3 GENERAL NOTES

FOUNDATION NOTES (Notes 25-30)

Add the following notes, as appropriate, from the Foundation Design Report:

FOUNDATION NOTES

1. PERFORM (A) SURVEY(S) TO ESTABLISH (A) BASELINE PROFILE(S) OF THE RAILROAD TRACK(S) AS DESCRIBED BELOW. INCLUDE THE COST OF THIS SURVEY WORK IN THE BID PRICE FOR SURVEY OPERATIONS, ITEM _____.

   A. PROVIDE TOP OF RAIL ELEVATIONS ON EACH RAIL AT 15 FOOT STATIONS FROM STATION ___ TO STATION ___. ESTABLISH HORIZONTAL CONTROL FOR THESE SAME POINTS.

   B. PROVIDE TRACK MONITORING AS DIRECTED BY THE ENGINEER, IN CONSULTATION WITH THE RAILROAD'S FIELD REPRESENTATIVE, WHEN IT IS SUSPECTED THAT ___ OPERATIONS NEAR THE TRACK(S) IS CAUSING A SUBSIDENCE IN THE RAIL OR TRACK PROFILE.

   C. IF DIRECTED BY THE ENGINEER, TAKE COMPARISON ELEVATIONS HOURLY DURING ___ OPERATIONS THROUGHOUT THE AFFECTED AREA.

   D. IMMEDIATELY REPORT ALL DEVIATIONS IN EXCESS OF ¼ INCH TO THE ENGINEER AND THE RAILROAD'S FIELD REPRESENTATIVE. HALT ALL ___ OPERATIONS UNTIL THE ENGINEER GIVES FURTHER DIRECTION.

2. GOVERN METHODS OF OPERATIONS TO MINIMIZE VIBRATIONS SO THAT PEAK PARTICLE VELOCITIES MEASURED AT THE ___ RESULTING FROM THE ___ DO NOT EXCEED ___ INCH PER SECOND. INCLUDE THE COST OF MONITORING IN ____.

3. PERFORM ITEM _____- BUILDING CONDITION SURVEY AT_____.

4. *For spread footings on soil: Place the following table on each substructure plan and elevation sheet in the Contract Plans. The designer shall fill in the bearing pressures to the nearest kip per square foot.*

Substructure	Strength Limit State Bearing Pressure (kips/ft^2)	Service Limit State Bearing Pressure (kips/ft^2)

5. *For spread footings on rock: Place the following table on each substructure plan and elevation sheet in the Contract Plans. Show the footing's actual maximum Service Limit State and Strength Limit State bearing pressures on the Contract Plans to the nearest kip per square foot. An Engineering Geologist uses this information during construction to determine whether the rock can support the designed bearing pressures.*

Substructure	Strength Limit State Bearing Pressure (kips/ft^2)	Service Limit State Bearing Pressure (kips/ft^2)

6. KEY THE _____ FOOTING _____ FEET INTO COMPETENT ROCK FOR (SCOUR)/ (SLIDING RESISTANCE)/(SCOUR AND SLIDING RESISTANCE).

7. AT EACH OF THE SUBSTRUCTURES SUPPORTED ON ROCK, THE AUTHORITY'S ENGINEERING GEOLOGIST WILL BE REQUIRED TO INSPECT THE ROCK TO DETERMINE IF IT IS COMPETENT TO SUPPORT THE SERVICE LIMIT STATE BEARING PRESSURES SHOWN ON THE CONTRACT PLANS.

8. ADHERE TO THE FOLLOWING PROCEDURES IF THE ROCK SURFACE AT A SUBSTRUCTURE IS NOT FOUND AT THE ELEVATION SHOWN ON THE CONTRACT PLANS:

A. <u>ROCK SURFACE WITHIN 2.0 FEET OF THE PROPOSED BOTTOM-OF-FOOTING ELEVATION</u>

- IF THE ROCK SURFACE IS HIGHER, REMOVE THE ROCK SO THAT THE MINIMUM FOOTING THICKNESS CAN BE PLACED.

- IF THE ROCK SURFACE IS LOWER, PLACE ADDITIONAL FOOTING CONCRETE SO THAT THE TOP-OF-FOOTING ELEVATION CAN BE ACHIEVED.

B. ROCK SURFACE MORE THAN 2.0 FEET FROM THE PROPOSED BOTTOM-OF-FOOTING ELEVATION

- THE ENGINEER WILL NOTIFY THE NYSTA STRUCTURES DESIGN BUREAU OF THIS CONDITION. THE NYSTA STRUCTURES DESIGN BUREAU WILL DETERMINE IF: THE FOUNDATION FOR THE SUBSTRUCTURE HAS TO BE REDESIGNED, ADDITIONAL FOOTING CONCRETE HAS TO BE PLACED, OR ADDITIONAL ROCK HAS TO BE EXCAVATED.

8. ADHERE TO THE FOLLOWING PROCEDURES IF THE ROCK SURFACE AT A SUBSTRUCTURE IS NOT FOUND TO BE AT THE ELEVATION AS SHOWN ON THE CONTRACT PLANS:

A. ROCK SURFACE WITHIN 2.0 FEET OF THE PROPOSED BOTTOM-OF-TREMIE SEAL ELEVATION

- IF THE ROCK SURFACE IS HIGHER, RAISE THE TOP-OF-TREMIE SEAL AND FOOTING AND SHORTEN THE STEM SO THAT THE MINIMUM TREMIE SEAL AND FOOTING THICKNESS CAN BE PLACED.

- IF THE ROCK SURFACE IS LOWER, PLACE ADDITIONAL CONCRETE FOR STRUCTURES, CLASS G (DEPOSITED UNDER WATER), ITEM _____, IN THE TREMIE SO THAT THE TOP-OF-TREMIE ELEVATION CAN BE ACHIEVED.

B. ROCK SURFACE MORE THAN 2.0 FEET FROM THE PROPOSED BOTTOM-OF-TREMIE SEAL ELEVATION

- THE ENGINEER WILL NOTIFY THE NYSTA STRUCTURES DESIGN BUREAU OF THIS CONDITION. THE NYSTA STRUCTURES DESIGN BUREAU WILL DETERMINE IF: THE FOUNDATION FOR THE SUBSTRUCTURE HAS TO BE REDESIGNED, ADDITIONAL CONCRETE FOR STRUCTURES, CLASS G, HAS TO BE PLACED, OR ADDITIONAL ROCK HAS TO BE EXCAVATED.

9. CONSTRUCT THE APPROACH EMBANKMENT AT THE ___ ABUTMENT TO SUBGRADE ELEVATION (INCLUDING)/(EXCLUDING) THE AREA TO BE OCCUPIED BY THE ABUTMENT. AFTER CONSTRUCTING THE APPROACH EMBANKMENTS TO THIS ELEVATION, OBSERVE A ___ WAITING PERIOD PRIOR TO (EXCAVATING FOR)/(CONSTRUCTING) THE ABUTMENT.

10. THIS WAITING PERIOD MAY BE REDUCED BY THE ENGINEER, BASED UPON THE INTERPRETATION BY THE AUTHORITY'S

GEOTECHNICAL ENGINEER OF READINGS FROM ___ INSTALLED AT THE FOLLOWING LOCATIONS:_____.

INSTALL AND MONITOR THE INSTRUMENTATION IN ACCORDANCE WITH THE APPROPRIATE NYSDOT GEOTECHNICAL ENGINEERING BUREAU SOIL CONTROL PROCEDURE.

11. POUR THE PEDESTALS FOR THE ABUTMENTS _____ (WEEKS/MONTHS) AFTER THE ABUTMENTS HAVE BEEN BACKFILLED TO SUBGRADE SURFACE.

12. ___ MAY BE ENCOUNTERED AT THE PROPOSED FOOTING ELEVATION OF THE ___. IF THIS MATERIAL IS ENCOUNTERED, REMOVE IT AND REPLACE WITH ___, ITEM ___, TO THE DEPTH AND EXTENT DIRECTED BY THE ENGINEER.

DRILLED SHAFT FOUNDATION NOTES FOR USE WITH SECTION 644- OVERHEAD SIGN STRUCTURES

Designers should consult with the NYSTA Geotechnical Engineer to determine which of these notes are appropriate for their project. In general, note #1 should always be included and notes #2 and #3 will be included based on individual project soil conditions.

1. THE DRILLED SHAFT FOUNDATIONS FOR THESE STRUCTURES DERIVE SOME OR ALL OF THEIR CAPACITY FROM SIDE FRICTION ALONG THE LENGTH OF THE SHAFT. THE DEVELOPMENT OF SIDE FRICTION IS DEPENDANT UPON FLUID CONCRETE BEING PLACED DIRECTLY AGAINST SOIL ALONG THE LENGTH OF THE SHAFT. UNDER NO CIRCUMSTANCES SHALL TEMPORARY CASINGS BE LEFT IN PLACE. ALL TEMORARY CASINGS SHALL BE REMOVED AS THE CONCRETE IS PLACED.

2. DUE TO THE PRESENCE OF GROUNDWATER AND LOOSE COHESIONLESS SOIL AT THE BASE OF THE DRILLED SHAFT, IT MAY NOT BE POSSIBLE TO DEWATER THE SHAFT AND PLACE CLASS A CONCRETE IN THE DRY, AS SPECIFIED IN SUBSECTION 644-3.05 A. FOR THESE SITUATIONS, THE SHAFT EXCAVATION SHALL NOT BE DEWATERED AND SHALL BE CONCRETED WITH CLASS G TREMIE CONCRETE IN ACCORDANCE WITH SUBSECTION 555-3.05 –DEPOSITING STRUCTURAL CONCRETE UNDER WATER. THE BOTTOM OF THE SHAFT EXCAVATION SHALL BE CLEANED OF LOOSE MATERIAL TO THE SATISFACTION OF THE ENGINEER IMMEDIATELY PRIOR

TO CONCRETEING. THE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR DRILLED SHAFT FOR OVERHEAD SIGN STRUCTURES.

3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE LAYER OF _____ INDICATED IN BORING ____. THE SHAFTS FOR _____ ARE DESIGNED TO GAIN ALL OF THEIR GEOTECHNICAL CAPACITY BELOW THE BOTTOM OF THIS LAYER, WHICH IS ESTIMATED TO EXTEND TO A (DEPTH)/(ELEVATION) OF _____. THE SHAFT SHOULD EXTEND A MINIMUM OF _____ FEET BELOW THE BOTTOM OF THIS LAYER.

COFFERDAM AND DEWATERING NOTES

1. SHOULD THE CONTRACTOR ELECT TO LAY BACK A PORTION OF EXISTING EARTH ADJACENT TO AN EXCAVATION REQUIRING A COFFERDAM, ANY REQUIRED EXTENSIONS OF THE COFFERDAM NECESSARY TO KEEP WATER FROM ENTERING THE EXCAVATION SHALL BE FURNISHED AND PLACED AT NO COST TO THE AUTHORITY.

2. WHERE A COFFERDAM IS USED COMPLETELY OR PARTIALLY AROUND AN EXCAVATION, THE COST OF DEWATERING THE ENTIRE EXCAVATION, REGARDLESS OF SOURCE OF WATER, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE COFFERDAM ITEM.

3. THE WATER LEVELS NOTED ON THE BORING LOGS FOR THIS STRUCTURE MAY NOT BE INDICATIVE OF ACTUAL WATER CONDITIONS AT THE TIME OF CONSTRUCTION.

4. PLACE THE COFFERDAMS FOR THE ___ SO THAT THEY WILL NOT INTERFERE WITH THE DRIVING OF BATTER PILES.

5. THE COFFERDAM AND TREMIE SYSTEM SHALL BE FLOODED AS DIRECTED BY THE ENGINEER WHEN THE WATER ELEVATION EXCEEDS _____.

6. SHOULD FIELD CONDITIONS REQUIRE A CHANGE FROM THE TYPE OF COFFERDAM SYSTEM CALLED FOR ON THE PLANS, THE ENGINEER SHALL CONTACT THE N.Y.S.T.A. STRUCTURES DESIGN BUREAU FOR COORDINATION WITH APPROPRIATE AGENCIES TO APPROVE THE CHANGE.

   {Include the following note on the contract plans when cofferdams are used with a tremie system:}

7. THE COFFERDAM AND TREMIE SYSTEM SHALL BE DESIGNED TO AUTOMATICALLY FLOOD BY NON-MECHANICAL MEANS WHEN THE WATER ELEVATION EXCEEDS _____.

   {Include the following notes on the contract plans as applicable:}

8. IF MULTIPLE COFFERDAMS ARE REPLACED BY A SINGLE SYSTEM, AS PERMITTED BY THE AUTHORITY'S HYDRAULICS ENGINEER, PAYMENT SHALL BE BASED ON ALL OF THE APPLICABLE COFFERDAM ITEMS INDICATED ON THE PLANS.

9. DEWATERING OF THE COFFERDAM SHALL BE ACCOMPLISHED BY PUMPING THE WATER TO AN APPROVED UPLAND VEGETATED AREA OUTSIDE OF THE STREAMBED AS SHOWN ON THE PLANS AND/OR APPROVED BY THE ENGINEER. TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL, SUCH AS HAY BALES OR APPROVED EQUAL, MAY BE REQUIRED AS DETERMINED BY THE ENGINEER. NO SETTLEMENT BASIN SHALL BE CONSTRUCTED.

10. THE CONTRACTOR SHALL HAVE THE OPTION OF INSTALLING A SEPARATE COFFERDAM OR INCORPORATING THE PERMANENT SHEETING INTO THE COFFERDAM ITEM.

11. IF THE CONTRACTOR ELECTS TO INCORPORATE THE PERMANENT SHEETING IN THE COFFERDAM ITEM, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ANY ADDITIONAL BRACING REQUIRED TO STRENGTHEN THE PERMANENT SHEETING SYSTEM AND PROVIDE ANY WORK NECESSARY TO RETURN THE PERMANENT SHEETING TO ITS INTENDED FUNCTION AFTER THE COFFERDAM FUNCTION IS COMPLETE.

    {The following note shall be provided to specify water elevations developed for use at this location.}

12. ORDINARY HIGH WATER IS ESTIMATED TO BE _____. THIS IS DEFINED AS THE WATER SURFACE ELEVATION FOR THE MEAN ANNUAL FLOOD, WHICH IS THE FLOOD THAT HAS A RECURRENCE INTERVAL OF 2.33 YEARS.

    ORDINARY WATER IS ESTIMATED TO BE_____. THIS IS DEFINED AS THE HIGHEST SURFACE WATER ELEVATION LIKELY TO BE ENCOUNTERED DURING ONE CONSTRUCTION SEASON (OTHER THAN MAJOR FLOODS). IT IS ALWAYS LESS THAN THE ORDINARY HIGH WATER ELEVATION AND IT IS USUALLY AN OBSERVED ELEVATION RATHER THAN A COMPUTED ONE.

    LOW WATER IS ESTIMATED TO BE _____. THIS WATER ELEVATION IS THE NORMAL LOW WATER ELEVATION PREVALENT DURING ONE CONSTRUCTION SEASON FOR MORE THAN 25% OF THE TIME. IT IS AN OBSERVED ELEVATION RATHER THAN A COMPUTED ONE.

SHEET PILING NOTES

1. THE MINIMUM SECTION MODULUS OF THE STEEL SHEETING SHALL BE _____ ____IN^3/FT.

2. THE MINIMUM THICKNESS OF THE STEEL SHEETING SHALL BE 3/8 INCH.

3. THE MAXIMUM DEPTH OF EXCAVATION FOR THE STEEL SHEETING IS _____ ____FEET.

4. THE MINIMUM EMBEDMENT LENGTH FOR THE STEEL SHEETING IS _____ FEET.

   Use the following note if higher strength steel (50 KSI) is required for temporary, interim or permanent steel sheeting. If ASTM A328 steel is acceptable (38 KSI), no special note is needed.

5. THE STEEL SHEETING SHALL CONFORM TO ASTM A572, GRADE 50.

   Cold-formed steel sheeting is an economical alternative to hot rolled sheeting and can be used for temporary sheeting where hard driving conditions are not present. Choose one of the following notes for each use of interim and/or temporary steel sheeting.

6A. COLD-FORMED STEEL SHEETING SHALL NOT BE USED FOR ____.

6B. COLD-FORMED STEEL SHEETING MAY BE USED FOR _____.

7. CUT OFF THE INTERIM STEEL SHEETING, ITEM_____, (AT SUBGRADE SURFACE) / (1 FOOT BELOW FINISHED GRADE).

8. CUT OFF THE INTERIM STEEL SHEETING, ITEM_____, AT THE TOP OF THE RAILROAD TIE DURING CONSTRUCTION. AFTER BACKFILLING THE ___, CUT OFF THE SHEETING 1.5 FEET BELOW EXISTING GROUNDLINE.

9. THE FOLLOWING INFORMATION WAS USED IN THE DESIGN OF THE (STEEL SHEETING)/(SOLDIER PILE AND LAGGING WALL)/(EARTH SUPPORT SYSTEM):

LOCATION	ELEV. (FEET)	UNIT WEIGHT (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)

A. THE PASSIVE EARTH PRESSURE COEFFICIENT (K_P) WAS DIVIDED BY (1.25)/(1.50).

B. GROUNDWATER WAS ASSUMED AT ELEVATION ___ FEET.

C. A SURCHARGE LOAD OF ___ PSF WAS APPLIED AT THE TOP OF THE WALL.

D. SHEETING CANNOT BE DRIVEN BELOW ELEVATION ___, DUE TO (ROCK, BOULDERS, COMPACT MATERIAL, OBSTRUCTIONS, ARTESIAN WATER PRESSURE, ETC.).

PILE NOTES

1. THE ___ PILES ARE DESIGNED TO SUPPORT A MAXIMUM STRENGTH LIMIT STATE AXIAL LOAD OF ___ KIPS PER PILE. DRIVE THESE PILES TO ACHIEVE A NOMINAL RESISTANCE OF ___ KIPS PER PILE. THESE PILES HAVE AN ESTIMATED LENGTH OF ___ FEET.

   THE MAXIMUM SERVICE LIMIT STATE AXIAL LOAD (FOR/APPLIED TO) THE PILES AT THE ___ IS ___ KIPS PER PILE.

2. THE ___ PILES ARE DESIGNED TO SUPPORT A MAXIMUM STRENGTH LIMIT STATE AXIAL LOAD OF ___ KIPS PER PILE. DRIVE THESE PILES TO PRACTICAL REFUSAL (20 BLOWS PER INCH), AND A NOMINAL RESISTANCE OF ___ KIPS PER PILE. THESE PILES HAVE AN ESTIMATED LENGTH OF ___ FEET.

   THE MAXIMUM SERVICE LIMIT STATE AXIAL LOAD (FOR/APPLIED TO) THE PILES AT THE ___ IS ___ KIPS PER PILE.

3. DRIVE THE PILES AT THE ___ TO A MINIMUM DEPTH OF ___ FEET. THE ENGINEER WILL IMMEDIATELY CONTACT THE NYSTA GEOTECHNICAL ENGINEER IF THE MINIMUM DEPTH IS NOT ACHIEVED.

4. DYNAMIC PILE TESTS SHALL BE CONDUCTED ON THE FIRST PILE DRIVEN AT _____ OR AT OTHER LOCATIONS ORDERED BY THE ENGINEER. THE DRIVING CRITERIA FOR THE REMAINING PILES SHALL BE BASED ON THE RESULTS OF THESE TESTS. THE PILE USED FOR THE DYNAMIC PILE TEST SHALL BE A MINIMUM OF 5 FEET LONGER THAN THE ESTIMATED PILE LENGTH AT THE TEST LOCATION. REFER TO THE SPECIAL NOTE IN THE PROPOSAL TITLED "FURNISHING EQUIPMENT AND PERSONNEL-DYNAMIC LOAD TESTING OF PILES".

5. THE DYNAMIC PILE TEST WILL CONSIST OF ONE TEST AT INITIAL DRIVE AND A RESTRIKE AFTER A ___-HOUR WAITING PERIOD. ADDITIONAL PILES MAY BE DRIVEN DURING THIS TIME, STARTING A MINIMUM DISTANCE OF 10 FEET FROM THE TEST PILE AND PROGRESSING AWAY FROM THE TEST PILE.

6. THE EXISTING ___ (IS)/(ARE) PILE SUPPORTED. THESE EXISTING PILES MAY INTERFERE WITH THE INSTALLATION OF THE PROPOSED PILES. IF THERE ARE PILE INTERFERENCES, THE ENGINEER WILL CONTACT THE NYSTA STRUCTURES DESIGN BUREAU AND DIRECT THE CONTRACTOR HOW TO PROCEED.

7. DIFFICULT DRIVING OF PILES MAY BE ENCOUNTERED AND IT MAY BE NECESSARY TO USE MECHANICAL EQUIPMENT TO REMOVE VERY COMPACT MATERIAL OR BOULDERS FROM THE LOCATION OF THE PILES. WHEN REQUIRED, SPUD OR EXCAVATE HOLES PRIOR TO DRIVING IN ACCORDANCE WITH SECTION 551.

8. THE USE OF MECHANICAL PILE SPLICES FOR CAST-IN-PLACE CONCRETE PILES MAY BE ALLOWED ON THIS STRUCTURE IF THE FOLLOWING REQUIREMENTS ARE MET:

   A. PLACE A SEAL WELD COMPLETELY AROUND THE TOP AND BOTTOM OF THE SPLICER SLEEVE.

   B. DO NOT USE A SPLICER SLEEVE WITHIN 30 FEET OF THE PILE TOE.

   C. AVOID THE USE OF MECHANICAL PILE SPLICES WITHIN 6 FEET OF THE PILE CUT-OFF ELEVATION.

9. DO NOT USE MECHANICAL PILE SPLICES ON THIS STRUCTURE.

10. PROVIDE ___-GAUGE, TAPERED CAST-IN-PLACE CONCRETE PILES.

11. PROVIDE CAST-IN-PLACE CONCRETE PILES WITH A MINIMUM WALL THICKNESS OF ___ INCH.

12. EQUIP ALL CAST-IN-PLACE CONCRETE PILES WITH 60-DEGREE CONICAL SHOES. ATTACH THE SHOE TO THE PILE WITH A ___ INCH FILLET WELD, WELD ALL AROUND.

13. EQUIP ALL CAST-IN-PLACE CONCRETE PILES WITH 3/4-INCH THICK FLAT CLOSURE PLATES. SUPPLY A FLAT PLATE WITH A DIAMETER THAT DOES NOT EXCEED THE PILE DIAMETER BY MORE THAN 1/2 INCH. ATTACH THE PLATE TO THE PILE WITH A ___ INCH FILLET WELD, WELD ALL AROUND.

14. PROVIDE CAST-IN-PLACE CONCRETE PILES MEETING THE REQUIREMENTS OF ASTM A252 GRADE ___ STEEL.

15. PROVIDE STEEL BEARING PILES MEETING THE REQUIREMENTS OF ASTM A572 GRADE 50 STEEL.

16. EQUIP ALL STEEL BEARING PILES WITH REINFORCED SHOES.

17. EQUIP ALL STEEL BEARING PILES WITH APF HP77750 OR EQUIVALENT.

18. AFTER COMPLETION OF THE PILE INSTALLATION, THE ENGINEER SHALL COMPLETE THE "ACTUAL PILE LENGTH" TABLE FOR INCLUSION IN THE AS-BUILT PLANS.

19. *Place the following table on each substructure's (pile)/(micropile)/(drilled shaft) layout plan sheet in the Contract Plans to document the installed lengths*:

ACTUAL (PILE)/(MICROPILE)/(DRILLED SHAFT) LENGTH	
(PILE)/(SHAFT) NO.	**LENGTH BELOW CUT-OFF (feet)**