

PRECAST CONCRETE ELEMENT NOTES:

DESCRIPTION:

A. FURNISH AND INSTALL PRECAST CONCRETE SUBSTRUCTURE AND SUPERSTRUCTURE ELEMENTS, INCLUDING BRIDGE ABUTMENT FOOTINGS, BRIDGE ABUTMENT BACKWALLS AND BOX BEAMS, HEREIN REFERRED TO AS PRECAST ELEMENTS. THIS WORK INCLUDES ALL NECESSARY MATERIALS AND EQUIPMENT TO COMPLETE THE WORK AS SHOWN IN THE CONTRACT DOCUMENTS. USE OF ALTERNATE CAST-IN-PLACE CONCRETE WILL BE ALLOWED, WITH APPROVAL OF THE ENGINEER, FOR ABUTMENTS AND BACKWALLS AS SHOWN IN THE PLANS.

B. MATERIALS AND REQUIREMENTS FOR PRECAST/PRESTRESSED CONCRETE BRIDGE ELEMENTS SHALL CONFORM TO SECTION 2407 OF THE STANDARD SPECIFICATIONS AND MATERIALS I.M. 570 LRFD. MATERIALS AND REQUIREMENTS FOR NON-PRESTRESSED PRECAST CONCRETE BRIDGE ELEMENTS SHALL CONFORM TO SECTION 2407 OF THE STANDARD SPECIFICATIONS AND MATERIALS I.M. 445, EXCEPT AS PERMITTED IN THE ALTERNATE SITE CASTING NOTES IN THESE DESIGN PLANS. THE FOLLOWING PRECAST CONCRETE ELEMENT NOTES APPLY TO ALL PLANT CAST PRECAST CONCRETE ELEMENTS AND ALTERNATE SITE CAST PRECAST CONCRETE ELEMENTS:

SUBMITTALS:

A. PROVIDE SUBMITTALS TO THE ENGINEER AS REQUIRED ON SHEET B24-02-16 IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.

MATERIALS:

A. CONCRETE:

1. CONCRETE MATERIALS FOR PRECAST ELEMENTS CONSTRUCTED EITHER AT A PREAPPROVED FABRICATION PLANT OR IN ACCORDANCE WITH THE ALTERNATE SITE CASTING NOTES SHALL BE IN ACCORDANCE WITH SECTION 2407 OF THE STANDARD SPECIFICATIONS, WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH AS NOTED IN THE PLANS. CONCRETE MIX DESIGN MUST BE APPROVED BY THE ENGINEER PRIOR TO CONCRETE PLACEMENT.

2. SELF-CONSOLIDATING CONCRETE FOR SUBSTRUCTURE PILE POCKETS:

a. HIGH EARLY STRENGTH SELF-CONSOLIDATING CONCRETE MIX DESIGNS SHALL BE APPROVED BY THE ENGINEER. SELF-CONSOLIDATING CONCRETE SHALL COMPLY WITH MATERIALS I.M. 445, APPENDIX D.

b. HIGH EARLY STRENGTH SELF-CONSOLIDATING CONCRETE SHALL INCLUDE THE FOLLOWING PROPERTIES:

- MAXIMUM TOP SIZE AGGREGATE SHALL BE LIMITED TO 1/2 INCH.
- MINIMUM 6-HOUR COMPRESSIVE STRENGTH SHALL BE 2500 PSI.
- MINIMUM 7-DAY COMPRESSIVE STRENGTH SHALL BE 4000 PSI.
- MINIMUM 28-DAY COMPRESSIVE STRENGTH SHALL BE 5000 PSI.
- MIX SHALL CONTAIN SHRINKAGE COMPENSATING ADDITIVES SUCH THAT THERE WILL BE NO SEPARATION OF PILE POCKET FILL CONCRETE FROM THE ADJACENT PRECAST ELEMENTS.
- SHRINKAGE-COMPENSATING ADDITIVE SHALL PRODUCE EXPANSION IN THE HIGH EARLY STRENGTH CONCRETE OF NO MORE THAN 3%.

B. REINFORCING STEEL:
CONFORM TO SECTION 2404 OF THE STANDARD SPECIFICATIONS.

C. CORRUGATED METAL PIPE:
USE CORRUGATED METAL PIPE TO FORM PILE POCKETS IN PRECAST SUBSTRUCTURE ELEMENTS OF THE DIAMETER AND LENGTH INDICATED IN THE PLANS. CORRUGATED METAL PIPE SHALL BE GALVANIZED, TYPE 1, 16 GAGE, IN ACCORDANCE WITH SECTION 4141 OF THE STANDARD SPECIFICATIONS AND MATERIALS I.M. 441.

CONSTRUCTION:

A. QUALITY ASSURANCE:

1. PRECAST/PRESTRESSED ELEMENTS SHALL BE CONSTRUCTED BY A PREAPPROVED FABRICATOR AT A PREAPPROVED FACILITY, IN ACCORDANCE WITH MATERIALS I.M. 570. FABRICATOR SHALL HAVE EXPERIENCE IN THE MANUFACTURE OF SIMILAR PRODUCTS, SATISFACTORY TO THE CONTRACTING AUTHORITY, AND UPON REQUEST BY THE ENGINEER, SHALL PROVIDE DOCUMENTATION DEMONSTRATING ADEQUATE STAFF, EXPERIENCE, EQUIPMENT AND QUALITY CONTROL.

2. NON-PRESTRESSED PRECAST ELEMENTS SHALL BE CONSTRUCTED BY A PREAPPROVED FABRICATOR AT A PREAPPROVED FACILITY, IN ACCORDANCE WITH MATERIALS I.M. 445, EXCEPT AS PERMITTED IN THE ALTERNATE SITE CASTING NOTES IN THESE PLANS.

B. FABRICATION:

TO ALLOW COORDINATION OF INSPECTION AND TESTING, THE ENGINEER SHALL BE PROVIDED WITH A MINIMUM 14 DAY NOTICE PRIOR TO THE ANTICIPATED DATE OF SHIPPING OF PRECAST ELEMENTS TO THE PROJECT SITE (FOR PLANT-CAST ELEMENTS) OR 14 DAY NOTICE PRIOR TO PLACEMENT OF CONCRETE FOR PRECAST ELEMENTS (FOR ALTERNATE SITE-CAST ELEMENTS). CONCRETE PLACEMENT FOR ALTERNATE SITE-CAST ELEMENTS SHALL NOT PROCEED UNTIL ENGINEER HAS INSPECTED AND APPROVED THE FORMING AND REINFORCING STEEL PLACEMENT.

C. HANDLING AND TRANSPORTATION:

IN ADDITION TO THE REQUIREMENTS OF ARTICLE 2407.03, K OF THE STANDARD SPECIFICATIONS, THE FOLLOWING PROVISIONS APPLY:

1. WHEN NO LONGER NEEDED, LIFTING LOOPS SHALL BE REMOVED AND PATCHED AFTER USE BY MEANS APPROVED BY THE ENGINEER.
2. IF MORE THAN ONE PRECAST ELEMENT IS TRANSPORTED PER VEHICLE, PROPER SUPPORT AND SEPARATION MUST BE PROVIDED BETWEEN INDIVIDUAL PRECAST ELEMENTS. PRECAST ELEMENTS SHALL BE STORED AND TRANSPORTED IN THEIR UPRIGHT POSITION, UNLESS OTHERWISE APPROVED.
3. HANDLING AND ERECTION BRACING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

D. SURFACE DEFECTS AND DAMAGE REPAIR:

REPAIR OF SURFACE DEFECTS AND DAMAGE CAUSED TO THE PRECAST ELEMENTS DURING FABRICATION, LIFTING AND HANDLING, OR TRANSPORTATION SHALL BE IN ACCORDANCE WITH MATERIALS I.M. 570. REOCCURRING DAMAGE TO PRECAST ELEMENTS SHALL BE CAUSE FOR STOPPAGE OF FABRICATION OPERATIONS UNTIL THE CAUSE OF THE DAMAGE CAN BE REMEDIED. ALL PROPOSED REPAIR PROCEDURES SHALL BE SUBMITTED IN WRITING AND APPROVED BY THE ENGINEER IN ADVANCE. CONCRETE REPAIR WORK MUST REESTABLISH THE ELEMENT'S STRUCTURAL INTEGRITY, DURABILITY AND AESTHETICS TO THE SATISFACTION OF THE ENGINEER.

E. GENERAL PROCEDURES FOR INSTALLATION OF PRECAST SUBSTRUCTURE ELEMENTS:

1. ESTABLISH WORKING POINTS, WORKING LINES, AND BENCHMARK ELEVATIONS PRIOR TO PLACEMENT OF ALL PRECAST ELEMENTS.
2. CHECK THE CONDITION OF THE RECEIVING BONDING/BEARING SURFACE PRIOR TO PLACEMENT AND/OR CONNECTION OF PRECAST ELEMENTS. TAKE NECESSARY MEASURES TO REMOVE DUST, RUST, DEBRIS, ETC. AS NECESSARY TO PROVIDE PROPER SUPPORT OF PRECAST ELEMENT AND SATISFACTORY CONNECTION TO STRUCTURE.
3. LIFT PRECAST SUBSTRUCTURE ELEMENTS USING THE LIFTING ATTACHMENT POINTS DETAILED IN THE PLANS. ALIGN THE PILE POCKET VOIDS IN THE PRECAST ELEMENTS OVER THE SUPPORTING STEEL BEARING PILING. THE CONTRACTOR SHALL BE PERMITTED TO MAKE MINOR ADJUSTMENTS TO THE POSITIONS OF THE TOPS OF THE STEEL BEARING PILING.
4. CONTRACTOR IS ADVISED TO KEEP THE PRECAST SUBSTRUCTURE ELEMENT RIGGED AND SUPPORTED BY THE CRANE(S) UNTIL FINAL PLACEMENT AND ADJUSTMENT IS COMPLETED.
 - a. BRIDGE ABUTMENT FOOTING WITH SHEET PILE WINGS:
PRECAST BRIDGE ABUTMENT FOOTING SHALL BE SUPPORTED BY THE STEEL BEARING PILING THAT WILL BECOME PERMANENTLY CONNECTED TO THE ABUTMENT FOOTING AS A PART OF THE DESIGN. SUPPORT SYSTEM FOR BRIDGE ABUTMENT FOOTING SHALL ACCOMMODATE AN APPROVED METHOD OF ADJUSTING VERTICAL AND HORIZONTAL POSITION OF THE PRECAST ELEMENT TO WITHIN ACCEPTABLE TOLERANCES OF INTENDED DESIGN POSITION.
 - b. BRIDGE ABUTMENT FOOTING WITH CONCRETE WINGS:
PRECAST BRIDGE ABUTMENT FOOTING SHALL BE SUPPORTED ON A LEVEL AND SUFFICIENTLY FIRM PREPARED BEARING PAD, UNLESS OTHER MEANS OF SUPPORT ARE APPROVED. SUPPORT SYSTEM FOR BRIDGE ABUTMENT FOOTING SHALL ACCOMMODATE AN APPROVED METHOD OF ADJUSTING VERTICAL AND HORIZONTAL POSITION OF THE PRECAST ELEMENT TO WITHIN ACCEPTABLE TOLERANCES OF INTENDED DESIGN POSITION.
5. SURVEY THE POSITION AND ELEVATION OF THE PRECAST SUBSTRUCTURE ELEMENT AS PLACED AND SUPPORTED, UTILIZE ADJUSTMENT DEVICES (WIGS, TEMPLATES, SHIMS, LEVELING DEVICES, ETC.) AS REQUIRED TO ESTABLISH THE DESIGN HORIZONTAL AND VERTICAL POSITION OF THE PRECAST SUBSTRUCTURE ELEMENT.

6. INSTALL TEMPORARY BRACING AS REQUIRED. STABILITY OF THE PRECAST SUBSTRUCTURE ELEMENT AND THE COMPREHENSIVE SUBSTRUCTURE SYSTEM SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.

7. ENSURE THAT PILES EXTEND INTO THE PILE POCKETS AT LEAST THE MINIMUM EMBEDMENT LENGTH SPECIFIED IN THE PLANS. ENSURE PILE POCKET VOIDS ARE PROPERLY AND SUFFICIENTLY FORMED FOR PLACEMENT OF SELF-CONSOLIDATING CONCRETE MATERIALS.

8. PLACE APPROVED SELF-CONSOLIDATING HIGH EARLY STRENGTH CONCRETE WITHIN THE PILE POCKET VOIDS. FINISH THE TOP OF THE PILE POCKET FILL WITH A SMOOTH TROWELED FINISH. CORRUGATED METAL PIPE FOR PILE POCKET FORMED BLOCKOUTS SHALL BE PREVENTED FROM EXTENDING ABOVE THE FINISHED SURFACE OF THE PRECAST CONCRETE PORTION OF THE SUBSTRUCTURE ELEMENT. PILE POCKET FILL FOR BRIDGE ABUTMENT FOOTINGS SHALL BE ALLOWED TO FLOW PARTIALLY UNDER THE PRECAST ELEMENT (THE ENTIRE UNDERSIDE OF THE PRECAST FOOTING NEED NOT BE FILLED) IF THE BOTTOM OF THE ABUTMENT IS NOT EXPOSED IN ITS FINAL CONDITION. OTHERWISE, IT SHALL BE FORMED FLUSH WITH THE BOTTOM.

9. TEMPORARY SUPPORTS AND/OR BRACING, AS REQUIRED, SHALL REMAIN IN PLACE UNTIL SELF-CONSOLIDATING CONCRETE USED FOR PERMANENT ATTACHMENT OF THE COMPONENT HAS ACHIEVED A MINIMUM DESIGN STRENGTH OF 4000 PSI.

F. GENERAL PROCEDURES FOR INSTALLATION OF PRECAST AND PRECAST / PRESTRESSED BOX BEAM ELEMENTS:

1. BOXES SHALL NOT BE PLACED ON SUBSTRUCTURE COMPONENTS UNTIL THE SUBSTRUCTURE COMPONENTS AND/OR PILE POCKET CONCRETE HAVE ACHIEVED DESIGN STRENGTH AND SUFFICIENT BRACING HAS BEEN PROVIDED AT THE SUBSTRUCTURE COMPONENTS TO FACILITATE THE CONTRACTOR'S INTENDED BOX BEAM PLACEMENT PROCEDURES. SUBSTRUCTURE STABILITY DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REQUIRED BRACING SHALL BE DESIGNED BY THE CONTRACTOR.

2. SURVEY THE TOP ELEVATION OF THE PRECAST SUBSTRUCTURES. ESTABLISH WORKING POINTS, WORKING LINES, AND BENCHMARK ELEVATIONS PRIOR TO PLACEMENT OF BOX BEAM ELEMENTS.

3. CLEAN BEARING SURFACES BEFORE BOX BEAMS ARE ERECTED. ENSURE SUBSTRUCTURE BEARING AREA IS WITHIN ACCEPTABLE CONSTRUCTION TOLERANCES, ALLOWING FOR PROPER PERFORMANCE OF NEOPRENE BEARINGS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. LOCALIZED SMOOTHING OF BEARING SURFACES MAY BE PERFORMED BY GRINDING OR OTHER METHODS APPROVED BY THE ENGINEER.

4. LIFT AND ERECT BOX BEAMS USING LIFTING ATTACHMENT POINTS SHOWN ON THE PLANS.

5. SET BOX BEAMS IN THE DESIGNATED BEARING LOCATIONS FOLLOWING MATCH-MARKS. DO NOT ALLOW BOX BEAMS TO BEAR AT ANY LOCATION ON THE SUBSTRUCTURE NOT DESIGNATED AS A DESIGN BEARING LOCATION. SURVEY THE TOP ELEVATIONS OF THE BOX BEAMS. CHECK FOR PROPER ALIGNMENT AND GRADE WITHIN SPECIFIED TOLERANCES. APPROVED NEOPRENE SHIM PADS SHALL BE USED BETWEEN THE BEARING AND THE SUBSTRUCTURE TO COMPENSATE FOR MINOR DIFFERENCES IN ELEVATIONS. NO MORE THAN TWO SHIM PADS SHALL BE ALLOWED AT ANY ONE BEARING LOCATION, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

6. TEMPORARILY SUPPORT, ANCHOR, AND BRACE ALL ERECTED BOX BEAMS AS NECESSARY FOR STABILITY AND TO RESIST GRAVITY LOADS, WIND LOADS OR OTHER LOADS UNTIL THEY ARE PERMANENTLY SECURED BY THE CAST-IN-PLACE UHPC JOINTS.

LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	
		STANDARD DESIGN - 24'-0 ROADWAY, SINGLE SPAN CONCRETE BOX BEAM BRIDGES
		DECEMBER, 2016
		GENERAL NOTES (SHEET 2 OF 3)
		B24-03-16