

## GENERAL NOTES

### A. SUMMARY OF WORK:

THE FOLLOWING PROJECT SUMMARY NOTES PERTAIN TO WORK INCLUDED ON STRUCTURAL DRAWINGS S202-R, S203-R, S300-R, S301-R AND S302-R ONLY. REFER TO OTHER DISCIPLINES FOR ADDITIONAL REQUIREMENTS. STRUCTURAL WORK INCLUDES, BUT IS NOT LIMITED TO, PROVIDING THE FOLLOWING:

1. REPLACEMENT OF EXISTING REMOVABLE CONCRETE COVER TO UTILITY TUNNEL WITH PERMANENT UNDERGROUND COVER SLAB (SEE SHEET S301-R).
2. CAPPING OF EXISTING CONCRETE UTILITY TUNNEL IN THE LOCATION OF THE EXISTING BOILER BUILDING AND CONSTRUCTION OF NEW TUNNEL ACCESS HATCH (SEE SHEET S301-R).
3. CONSTRUCTION OF NEW UTILITY TUNNEL (BELOW NEW RECEIVING STATION BUILDING) TO HOUSE EXISTING 33" DIA. SEWER FORCEMAIN ALONG WITH TWO MANHOLE ACCESS WAYS AND ONE REMOVABLE PRECAST PANEL FOR MAINTENANCE ACCESS. THE EXISTING FORCEMAIN SHALL BE PROTECTED, TEMPORARILY SUPPORTED, AND KEPT IN CONTINUOUS (ACTIVE) SERVICE THROUGH THE DURATION OF THE PROJECT, WHILE THE NEW CAST-IN-PLACE UTILITY TUNNEL IS BUILT AROUND IT (SEE SHEET S203-R).
4. RECONSTRUCTION OF END WALL TO EXISTING UTILITY TUNNEL, WHERE PORTION OF TUNNEL IS DEMOLISHED (SEE SHEET S203-R).

### B. GENERAL:

1. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS AND UTILITY LOCATIONS PRIOR TO THE START OF WORK. ALL EXISTING DIMENSIONS AND ELEVATIONS PROVIDED WERE BASED ON LIMITED DRAWINGS AND INFORMATION.
2. THE CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS FOR ALL PARTS OF THE WORK AS SPECIFIED.
3. TYPICAL DETAILS AND NOTES SHOWN ON STRUCTURAL DRAWING S302-R SHALL BE APPLICABLE TO ALL PARTS OF THE STRUCTURAL WORK EXCEPT WHERE SPECIFICALLY REQUIRED OTHERWISE BY CONTRACT DOCUMENTS.
4. DETAILS NOT SPECIFICALLY SHOWN SHALL BE SIMILAR TO THOSE SHOWN FOR THE MOST NEARLY SIMILAR CONDITION.

### C. SUBGRADE PREPARATION:

1. SUBGRADE REQUIREMENTS SHALL BE AS FOLLOWS:  
 EXISTING SOILS SHALL BE EXCAVATED TO A MINIMUM DEPTH OF 2 FEET BELOW FOUNDATION BEARING LEVEL AND REPLACED WITH EITHER 1-1/2 TO 2 INCH SIZE CRUSHED STONE OR COMPACTED STRUCTURAL FILL. IF CRUSHED STONE IS USED IT SHOULD BE SEPARATED FROM THE FILL MATERIAL USING A GEOTEXTILE SEPARATOR LAYER THAT MEETS THE REQUIREMENTS OF SECTION 722.01 STABILIZATION/REINFORCEMENT GEOTEXTILE OF THE M.D.O.T. STANDARD SPECIFICATIONS, MOST RECENT EDITION. THE CRUSHED STONE STRUCTURAL FILL SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE PLAN LIMITS OF THE FOUNDATION.
2. REMOVE ALL UNSUITABLE MATERIAL IF IT IS FOUND AT FOOTING BEARING ELEVATION, AND REPLACE WITH COMPACTED STRUCTURAL FILL.
3. KEEP EXCAVATION DRY AND STABLE BY PUMPING AND PUMPING OF SEEPAGE WATER.
4. DO NOT BACKFILL AGAINST WALLS UNTIL CONCRETE HAS OBTAINED COMPRESSIVE STRENGTH EQUAL TO 28-DAY COMPRESSIVE STRENGTH.
5. PLACE BACKFILL SIMULTANEOUSLY ON BOTH SIDES OF WALLS TO PREVENT DIFFERENTIAL PRESSURE, WHERE APPLICABLE.
6. DESIGN CRITERIA:  
 MINIMUM FROST DEPTH = 4 FEET BELOW GRADE  
 ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF  
 AT REST EARTH PRESSURE  $K_0 = 0.50$   
 MOIST DENSITY = 125 PCF  
 MEAN LOW TIDE LEVEL = EL. 0.00  
 MEAN TIDE LEVEL = EL. 4.90  
 MEAN HIGH TIDE LEVEL = EL. 9.91'

### D. DESIGN LOADS:

1. COVER SLABS (Ø ROADWAYS AND PAVED AREAS) = H20 LOADING.
2. SIDE WALL SURCHARGE = 2 FEET OF SOIL.
3. FOOTING LOADS FROM PROPOSED BUILDING = 2000 P.S.F. (AS REQUIRED TO ACHIEVE MAXIMUM SOIL BEARING PRESSURE)

### E. REINFORCED CONCRETE:

1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS - 4000 psi; MAXIMUM WATER TO CEMENTITIOUS RATIO = 0.45.
2. CONCRETE DESIGN AS PER ACI 318-95 BUILDING CODE AND ACI 350R-89 ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES.
3. REINFORCEMENT: ASTM A615 GRADE 60 - ALL SPLICES CLASS B (U.N.O.).
4. REINFORCEMENT SHALL BE DETAILED, FABRICATED, AND PLACED AS PER ACI 315 DETAILING MANUAL.
5. PROVIDE 3/4" CHAMFER ON EXPOSED EDGES OF CONCRETE, U.N.O.
6. CONCRETE HARDENER FOR FORCEMAIN TUNNEL BASE SLAB: WATER-WHITE, SILICATE-BASED, CHEMICALLY HARDENING COMPOUND MEETING FEDERAL SPECIFICATION CE-204 EQUAL TO "HARRIS SUPER KURHARD 309" BY A.H. HARRIS.
7. PROVIDE EPOXY BONDING AGENT AS SPECIFIED TO BOND FRESH CONCRETE TO HARDENED CONCRETE. APPLICATION PER MANUFACTURER'S INSTRUCTIONS.
8. ALL CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL HAVE MINIMUM 6" X 3/8" RIBBED, CENTER BULB PVC WATERSTOPS AS SPECIFIED AND AS SHOWN ON THE DRAWINGS, (TYP. EXCEPT AT EXISTING STRUCTURES WHERE HYDROPHILIC WATERSTOP IS SPECIFIED.)
9. SUBMIT PLAN TO ENGINEER FOR APPROVAL SHOWING ALL PROPOSED CONSTRUCTION JOINT LOCATIONS AND PLACEMENT SEQUENCE FOR ALL CONCRETE WORK.
10. ALL FORM TIES SHALL HAVE NEOPRENE WATERSEAL WASHERS AS SPECIFIED.
11. WALLS SHALL NOT BE BACKFILLED AND STRUCTURAL SLAB FORM WORK SHALL NOT BE REMOVED UNTIL CONCRETE HAS ACHIEVED 28-DAY DESIGN STRENGTH AS APPROVED BY ENGINEER, BUT IN NO CASE LESS THAN 14 DAYS.

### F. PRECAST CONCRETE:

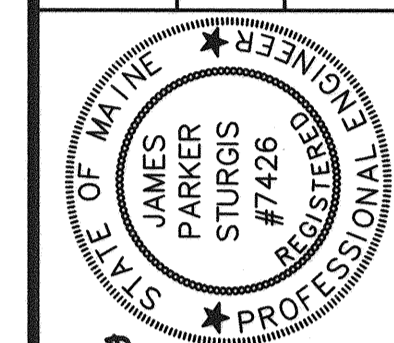
1. FABRICATION, TRANSPORTATION AND ERECTION OF PRESTRESSED MEMBERS SHALL CONFORM TO THE LATEST "PRESTRESSED CONCRETE INSTITUTE" STANDARDS FOR PRESTRESSED CONCRETE PLANKS, IN ADDITION TO THE PROVISIONS GIVEN HEREIN.
2. PRESTRESSED PRECAST PLANK MANUFACTURER SHALL PROVIDE COMPLETE DESIGN FOR ALL PLANKS FOR THE LOADS INDICATED ON PLANS. DESIGN CALCULATIONS STAMPED BY A MAINE PROFESSIONAL ENGINEER, SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
3. PRECAST PRESTRESS PLANKS SHALL BE DESIGNED TO SUPPORT A LOAD IN ACCORDANCE WITH H20-44 LOADING AS DESCRIBED ON THE LATEST EDITION OF THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" (AASHTO). PLANKS SHALL ALSO BE DESIGNED TO SUPPORT 33 INCHES OF GRAVEL OVERBURDEN, AS SHOWN ON THE DRAWINGS.
4. CONNECTION DETAILS ARE NOT EXCLUSIVE AND MAY BE ALTERED BY MANUFACTURER TO SUIT OTHER STANDARDS OF SUGGESTED DETAIL, PROVIDED THAT BOTH THE STRENGTH AND THE ABILITY TO REMOVE/RE-INSTALL THE PLANKS ARE MAINTAINED.
5. LIFTING AND HANDLING INSERTS SHALL BE DESIGNED FOR AN ADDITIONAL 25% IMPACT, AND SHALL BE ACCESSIBLE FROM THE OUTSIDE FOR FUTURE REMOVAL.

### G. WATERTIGHTNESS TESTING:

1. THE FORCEMAIN TUNNEL STRUCTURE SHALL HAVE A PASSING WATERTIGHTNESS TEST PERFORMED PRIOR TO BACKFILLING WALLS AND PRIOR TO THE INSTALLATION OF ANY INTERIOR OR EXTERIOR COATINGS AND WATERPROOFING. TUNNEL COVER SLAB SHALL BE IN PLACE AND CURED 28-DAYS PRIOR TO WATER TESTING, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. GENERAL TEST PROCEDURE:
  - A. REFER TO ACI 350.1R/AWWA 400 FOR FURTHER REQUIREMENTS.
  - B. PLUG ALL OPENINGS SECURELY AND FILL STRUCTURE WITH WATER TO THE TOP.
  - C. ALLOW PERIOD OF TIME FOR ABSORPTION (DETERMINED BY CONTRACTOR). A 3-DAY INTERVAL IS RECOMMENDED.
  - D. REFILL STRUCTURE TO THE TOP.
  - E. TAKE MEASUREMENT AT A MINIMUM OF TWO POINTS ON OPPOSITE SIDES OF THE TANK. ALL MEASUREMENTS SHALL BE TAKEN AT 24-HOUR INTERVALS.
  - F. MAXIMUM ALLOWABLE LEAKAGE = 1/2" DROP IN LEVEL OVER 24 HOUR PERIOD.
  - G. A WATERTIGHT CONTAINER (SUCH AS A 5-GALLON BUCKET) FILLED TO THE TOP WITH WATER SHALL BE PLACED ADJACENT TO THE TESTED STRUCTURE DURING THE TEST PERIOD TO CALIBRATE THE TEST AND QUANTIFY EVAPORATION.
  - H. FAILED TEST(S): IF THE MEASURED LEAKAGE EXCEEDS THE ABOVE ALLOWABLE LIMIT, IF WATER IS OBSERVED FLOWING FROM THE STRUCTURE, OR IF MOISTURE (OTHER THAN PRECIPITATION) CAN BE TRANSFERRED TO A DRY HAND FROM THE EXTERIOR SURFACE, THE STRUCTURE SHALL BE CONSIDERED TO HAVE FAILED THE TEST.
  - I. ANY STRUCTURE FAILING THE TEST SHALL BE REPAIRED AND RETESTED AT THE CONTRACTOR'S EXPENSE. THE REPAIR WORK MAY INCLUDE DEWATERING THE STRUCTURE AND INSPECTING THE INTERIOR FOR DEFECTS THAT CAUSE LEAKAGE. REPAIR PRODUCTS AND PROCEDURES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

### H. WATERSTOPS, WATERPROOFING & VAPOR BARRIERS:

1. **VAPOR BARRIER:** PUNCTURE-PROOF 15-MIL VAPOR BARRIER (ALL SEAMS TAPED) EQUAL TO "STEGO WRAP" BY STEGO INDUSTRIES, MEETING ASTM E 1745 CLASS A AND WITH WVTR LESS THAN 0.008 AS TESTED BY ASTM E 96. INSTALL USING ALL ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATIONS. PLACE CONTINUOUS GEOTEXTILE EQUAL TO MIRAFI 140N BELOW VAPOR BARRIER UNDER SLAB; EXTEND VAPOR BARRIER CONTINUOUS FROM UNDER SLAB UP WALLS AND AROUND COVER SLAB FOR ALL BURIED CONCRETE SURFACES (TYP. ALL NEW WALLS, BASE SLABS, AND COVER SLABS).
2. **UNDER SLAB WATERPROOFING:** PROVIDE BENTONITE GEOTEXTILE WATERPROOFING EQUAL TO "VOLCLAY VOLTEX DSCR" AS SPECIFIED IN SECTIONS 07170 DIRECTLY BELOW AND UP SIDES OF FORCEMAIN TUNNEL BASE SLAB. SEE DRAWINGS FOR FURTHER DETAILS. INSTALL USING ALL ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATIONS.
3. **LIQUID-APPLIED MEMBRANE WATERPROOFING:** CONTINUOUS WATERPROOFING SHALL BE APPLIED TO ALL NEW EXTERIOR CONCRETE WALLS AND COVER SLAB SURFACES. APPLY WATERPROOFING WITH CONTINUOUS VAPOR BARRIER EXTENDING FROM UNDER BASE SLAB AND OVER COVER SLABS TO SERVE AS PROTECTION BARRIER FOR MEMBRANE. WATERPROOFING SHALL BE EQUAL TO "STEGO MASTIC", BY STEGO INDUSTRIES; A MEDIUM-VISCOSITY, WATER-BASED, POLYMER-MODIFIED, ANIONIC BITUMINOUS/ASPHALT EMULSION, 55 TO 65 WET MILS, 0.17 PERMS PER ASTM E 96, AND TENSILE STRENGTH 32 PSI/3860% PER ASTM D 412. INSTALLATION AS PER MANUFACTURER'S RECOMMENDATIONS.
4. ALL PVC WATERSTOP SHALL BE 6" X 3/16" OR 4" X 1/8", RIBBED AND CENTER BULBED (SIZE SHALL BE AS SHOWN ON DRAWINGS.)
5. A HYDROPHILIC WATERSTOP PASTE EQUAL TO ULTRA SEAL P-201 AS MANUFACTURED BY ADEKA SHALL BE USED TO SEAL ALONG ALL FOUR SIDES OF THE PROPOSED REMOVABLE PRECAST CONCRETE COVER.
6. A HYDROPHILIC WATERSTOP EQUAL TO HYDRO-FLEX WATERSTOP, AS MANUFACTURED BY HENRY, SHALL BE USED ALONG ALL NEW AND EXISTING CONCRETE INTERFACES, UNLESS NOTED OTHERWISE.
7. ALL SURFACE PREPARATION AND INSTALLATION OF WATERPROOFING/WATERSTOP PRODUCTS SHALL BE IN STRICT ACCORDANCE'S WITH MANUFACTURER'S RECOMMENDATION.



*James S. Sturges*  
 SIGNATURE  
 7426  
 P.E. NUMBER  
 10-8-04  
 DATE

PROJ. MGR.	DATE	BY
PAUL POTTLE		JRB
DESIGN-DETAILED		JRB
CHECKED-REVIEWED		JRB
DESIGN-DETAILED2		JRB
DESIGN-DETAILED3		JRB
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

CITY OF PORTLAND  
 OCEAN GATEWAY PHASE 1  
 GENERAL NOTES