

**STANDARDS AND REFERENCES**

Materials and construction methods specified in the plans reference the Minnesota Department of Transportation (MNDOT) Standard Specifications for Construction. The Contractor shall obtain a current copy of MNDOT's Standard Specifications for Construction and review the specification sections applicable to the plans.

It is mandatory that the Contractor be knowledgeable of the applicable MNDOT specification sections during construction. No additional compensation will be paid to the Contractor for additional work due to unfamiliarity with the applicable specification sections.

**EARTHWORK NOTES**

**PROTECTION**

- 1) The Contractor shall maintain all benchmarks, monuments and other reference points. If any are disturbed or destroyed, they shall be replaced at the Contractor's expense.
2) The Contractor shall contact the Engineer immediately if any unknown functioning underground utilities are discovered during the course of the project, which may interfere with construction. The Contractor shall wait for instructions before proceeding.
3) The Contractor shall be responsible for any damage to functioning underground or overhead utility lines. Damaged utilities shall be repaired immediately and service restored at no additional cost to the Owner.
4) The Contractor shall provide barricades, shoring and other safety measures required by OSHA.
5) The Contractor shall protect all adjacent existing facilities from damage, including, but not limited to settlement due to excavations, erosion, etc. The Contractor shall be responsible for repair of such damages.

**PROJECT CONDITIONS**

- 1) The Contractor shall become familiar with the project site, and compare actual conditions in the field with those shown on the project drawings. The Contractor shall contact the Engineer immediately if any inconsistencies are found between the existing conditions and the project drawings.
2) No extra compensation will be allowed due to unusual conditions which could have reasonably been determined or anticipated by examination of the project site and project drawings.

**PLAN GRADES**

- 1) Elevations shown on the project drawings are finished grade elevations, unless otherwise noted. Elevations not specifically indicated shall be determined by interpolation of uniform spot elevations or contours, or between such points and existing elevations. Adequate slope shall be constructed to provide positive drainage away from structures.
2) If inconsistencies exist on the plans between contours and spot elevations, the spot elevations shall govern.

**CLEARING**

- 1) Vegetation shall be stripped within the limits of the building and areas designated for impervious surfacing. Trees, which may hinder new construction work, shall be removed as well. The removal of trees outside building or paved areas, shall be approved by the Architect or Engineer. Remove all trees including stumps and root systems as shown on the plans.

**TOPSOIL**

- 1) Adequate imported and/or stockpiled salvageable topsoil shall be utilized for this project.
2) Topsoil shall be free of clay lumps, roots, brush, large stones, and debris, and shall have a minimum organic content of 5 percent.
3) Remove topsoil to its entire depth from areas, which are to be disturbed by new construction work. Existing lawn areas, which are not in the proposed construction areas, shall remain in place. The Contractor shall field verify topsoil depths between any soil borings, and remove to greater depths than indicated in the soils report if such conditions are encountered. Salvaged topsoil shall be maintained in stockpiles.
4) Stockpiled topsoil shall only be used for finish grading of new lawn areas. Excess topsoil shall be removed from the site by the Contractor.
5) Protect all existing lawn areas, plantings, and other landscaping to remain in place. Any damaged areas shall be replaced at the Contractor's expense.

**UNFORESEEN OBSTACLES**

- 1) The Engineer shall be contacted immediately if any unforeseen major obstacles are encountered during excavation, such as abandoned wells, abandoned or functioning utilities, subsurface streams or rock, etc., which would add significant expense to the Contractor.
2) The Contractor shall still be responsible for completing all work required for this project where encountered conditions may be reasonably determined from a soils/geotechnical report and review of the project site and contract documents.

**DEWATERING**

- 1) Surface drainage shall be provided during construction in a manner so as not to create a nuisance to adjacent areas.
2) All excavations shall be free of water during construction within the excavations. Dewatering shall be accomplished by pumping or trenching, and shall be conducted regardless of the cause, source, or nature of the water.
3) Berms, cofferdams, or piling shall be provided as necessary to protect excavations.
4) Excavations shall be sloped to drain, and necessary pumps, hoses and other equipment shall be provided to keep excavation free of water.
5) All temporary equipment used for dewatering shall be removed from the site when no longer necessary.

**FILLING AND GRADING**

- 1) Rough grading of all areas within the construction limits, including adjacent transition areas shall be reasonably smooth and compacted. The rough graded subgrade surface generally shall not be more than 6 inches above or below the established subgrade elevations. All ditches, swales, and gutters shall be graded to drain readily. The subgrade shall be evenly sloped to provide drainage away from building walls in all directions at a minimum slope of 2%. The Contractor shall provide rounded transitions at top and bottom of banks and other breaks in grade.
2) Fill and backfill materials shall be inorganic soils free of roots, rocks, boulders, and debris.
3) Bedding material or granular backfill larger than 2" in its largest dimension shall not be allowed within 2 feet of new underground pipes. Material larger than 3" in its largest dimension shall not be allowed within 1 foot of subgrade elevation.
4) Imported compacted fill material shall have a maximum of 12 percent passing the #200 sieve, by weight. The proposed fill material shall be tested by an independent testing lab for suitability as compacted fill for this project. The Contractor shall pay for the testing services and provide a copy of the test results to the Engineer.
5) The Contractor shall fill and grade as necessary to bring surface to required elevations, and provide all materials necessary, whether obtained on or off the project site.
6) The Contractor shall place compacted material in uniform horizontal lifts not exceeding 8" in depth for clay soils, and 12" in depth for sandy soils, and compact as required to achieve specified density.
7) Compaction shall be obtained with the use of vibratory rollers or rammers. During compaction, fill material shall contain moisture content, as necessary, for the required compaction as indicated by an independent testing laboratory. The moisture shall be uniform throughout each lift. If the material is too dry, water shall be added with approved equipment and methods, which will not wash out fine material. If the material is too wet, it shall be dried by harrowing, disk, blading, or other approved methods recommended by the independent testing laboratory.
8) Areas designated for pavement in excavated (cut) areas shall be scarified to a depth of 1 foot. The Contractor shall bring the optimum moisture content as indicated by the independent testing laboratory, and compact the subgrade to the specified density listed below for soils underneath pavements.
9) The Contractor shall not place fill material when either the fill material, or the material on which it is to be placed, is frozen. Any soft or yielding areas appearing in the fill resulting from frost, rain, or any other reason whatsoever shall be scarified, removed, recompacted and/or otherwise rectified to the satisfaction of the Engineer before any new fill is placed.

**COMPACTION TESTS**

- 1) Utility Trench Backfill: The Contractor's independent soils technician and approved testing laboratory shall perform in-place density and moisture tests at random depths in trench backfill at 100 foot intervals, or fraction thereof. Compaction of trenches shall be a minimum of 95% of the maximum dry density (as determined by the independent testing laboratory) in lawn areas, and at depths greater than 3 feet below areas designated for pavement. Compaction of trenches at depths within 3 feet of paved surfaces shall be a minimum of 100% of the maximum dry density.
2) Compacted Fill Under Pavements: Compaction tests shall not be required beneath new pavements. Adequate compaction of materials under pavements shall be determined by test rolling the subgrade, and checking for excessive rutting. Test rolling shall be performed as per MNDOT Spec. 211.1.
3) Areas exhibiting a failed compaction test shall be re-compacted and re-tested to the satisfaction of the Engineer prior to acceptance of the project.
4) Copies of all compaction testing and test roll observation reports shall be provided to the Engineer.

- 5) Optimum moisture-density relationship will be determined by testing laboratory in accordance with ASTM D698 and maximum density determination made by Method D of ASTM D698 unless otherwise noted in these specifications.

**SUBGRADE PREPARATION**

- 1) Finished subgrade elevations shall be as follows:
a) Bituminous parking areas: 9" below finish grade.
b) Concrete Aprons: 14" below finish grade.
c) Lawn areas: 4" below finish grade.
d) Planting areas: See Landscaping Plans/Details
2) The tolerance for areas to be paved shall not exceed 0.15 feet above or below plan subgrade.
3) The Contractor shall protect newly graded areas from erosion, settlement or washing that occurs prior to acceptance of the Work shall be repaired and grades re-established.

**DISPOSAL OF EXCESS WASTE MATERIALS**

- 1) The Contractor shall remove excess excavated material, debris, and waste materials, from the Owner's property and legally dispose of it in accordance with all governing codes.

**SPREADING TOPSOIL AND FINISH GRADING**

- 1) Scarify subgrade to depth of 3" after it has attained permanent set. Spread topsoil evenly over complete subgrade as follows:
a) Lawn Areas on Private Property: Spread 4" lightly compacted layer of topsoil.
b) Lawn Areas in Public Right-of-way: Per City requirements
c) Planting Areas: See Landscape Plan/Details
2) Finish grade accurately and carefully, true to grade and cross section within 0.15 feet of finish grade shown on the project drawings, less the thickness of any sod where it is to be installed. Slope all grades away from the building to provide positive drainage.
3) Prepare topsoil suitable to receive seed and/or sod. Grading of areas designated for topsoil shall be reasonably smooth and even, and in accordance with MNDOT Spec. 2105.3G. All debris and stones exceeding 3" in diameter shall be removed from the soil surface of these areas prior to seeding. Areas compacted by vehicles or storage of materials shall be plowed, disked and harrowed to match texture of other finish graded areas.
4) Grass seed shall be in accordance with MNDOT Spec. 3876, seed mix No. 260, applied at the rate of 100 pounds per acre or as indicated on the landscape plans. Mulch shall be applied and dischored to oil seeded areas and shall meet the requirements of MNDOT Spec. 3882, Type 3 or as otherwise indicated by the Engineer.

**UTILITY NOTES**

**STANDARD SPECIFICATIONS**

- 1) The following standard specifications shall apply to this project:
a) Minnesota Plumbing Code (MN Dept. of Labor and Industry-MNDOL)
b) City Engineers Association of Minnesota (CEAM) Standard Specifications
c) American Society for Testing Materials (ASTM)
d) American National Standards Institute (ANSI)
e) American Water Works Association (AWWA)
f) Federal Standards (IWW)
g) Minnesota Department of Transportation "Standard Specifications for Construction" (MN/DOT)
2) The Contractor shall comply with all local ordinances and codes
3) Certifications of all utility materials, as well as shop drawings, shall be submitted to the Engineer for review

**POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS - SANITARY**

- 1) Smooth walled polyvinyl chloride pipe and fittings shall consist of SDR 26 or SDR 35 pipe, unless noted otherwise, and meet the requirements of Section 4715.0420 of the MN Plumbing Code, and Section 2621.2A5 of the CEAM Standard Specifications
2) All pipe and fittings shall be SDR 35 for depths of up to 20 feet, and SDR 26 for depths exceeding 20'.
3) Pipe joints shall meet the requirements of Section 4715.0810 of the MN Plumbing Code, and Section 2621.3A3 of the CEAM Standard Specifications.

**DUCTILE IRON (DI) PIPE AND FITTINGS - WATER**

- 1) Ductile iron pipe shall meet the requirements of Section 4715.0420 of the MN Plumbing Code, and Section 2611.2A1 of the CEAM Standard Specifications
2) Pipe joints shall meet the requirements of Section 4715.0800 of the MN Plumbing Code, and Section 2611.3B of the CEAM Standard Specifications. Stainless steel fasteners shall be prohibited.
3) 6" pipe shall be Class S2. 8" and larger pipe shall be Class 50.

**POLYVINYL CHLORIDE (CPVC) PIPE AND FITTINGS - WATER**

- 1) Polyvinyl chloride pressure pipe and fittings shall meet the requirements of Section 4715.0420 of the MN Plumbing Code, and Section 2611.2A3 of the CEAM Standard Specifications
2) Pipe joints shall meet the requirements of Section 4715.0810 of the MN Plumbing Code, and Section 2611.3B of the CEAM Standard Specifications.

**GATE VALVES - WATER**

- 1) Gate valves shall meet the requirements of Section 4715.1800 of the MN Plumbing Code, and Sections 2611.2C and 2611.3D of the CEAM Standard Specifications

**HYDRANTS - WATER**

- 1) Hydrants shall meet the requirements of Sections 2611.2B and 2611.3D of the CEAM Standard Specifications
2) Hydrants shall be Waterous WB67, or approved equal

**BLOCKING AND ANCHORING - WATER**

- 1) Water main blocking and anchoring shall meet the requirements of Section 2611.3A4 of the CEAM Standard Specifications
2) Provide thrust reaction blocking consisting of concrete with a minimum 28 day compressive strength of 2000 psi.
3) Place between undisturbed ground and the fitting to be anchored. Place thrust blocking so that the pipe and fitting joints are accessible for repair.
4) Mega-Lugs may be used in lieu of thrust block if allowed by local utility.

**COPPER TUBING AND CURB STOPS - WATER SERVICE**

- 1) Copper tubing for water services shall meet the requirements of Section 4715.0420 of the MN Plumbing Code, and Section 2611.2D of the CEAM Standard Specifications
2) Curb stops for water services Section 2611.2D of the CEAM Standard Specifications

**REINFORCED CONCRETE SEWER PIPE (RCP) AND FITTINGS - STORM**

- 1) RCP pipe and fittings shall meet the requirements of Section 4715.0420 of the MN Plumbing Code, and Section 2621.2A3 of the CEAM Standard Specifications
2) Pipe joints shall meet the requirements of Section 4715.0780 of the MN Plumbing Code, and Section 2621.3A3 of the CEAM Standard Specifications
3) The ASTM strength class of pipe shall be Class II unless otherwise shown on the Plans.
4) The pipe shall be drawn together by some approved method of jacking or winching. This pressure must be maintained until sufficient backfill is placed to keep the joint from opening.

**CORRUGATED STEEL PIPE (CSP) AND FITTINGS - STORM**

- 1) CSP pipe and fittings shall meet the requirements of Section 4715.0420 of the MN Plumbing Code, Section 2621.2A4 of the CEAM Standard Specifications, and MNDOT Spec. 3226.
2) Pipe joints shall meet the requirements of Section 2621.3A3 of the CEAM Standard Specifications, and MNDOT Spec. 2503.
3) The pipe shall be fourteen (14) gauge unless otherwise indicated, except that the gauge of metal in arch-pipe shall conform to the Standard Plate 3040 of the Minnesota Department of Transportation Standards for the sizes shown on the Plans.
4) If bituminous coating is required, the provisions of MNDOT Spec 3227 (Type A) shall apply.
5) End sections shall be provided at all pipe inlets and outlets. The last 3 joints shall be tied, and shall be provided with an approved trash guard.

**END SECTIONS - STORM**

- 1) End sections shall be provided at all pipe inlets and outlets.
2) The end sections shall consist of material matching the material of the pipe, which it is being connected to. Materials and joints shall be as per the specifications described above for the applicable pipe material.
3) The last 3 joints shall be tied, and the end section shall be provided with an approved trash guard.

**MANHOLES AND CATCH BASINS - SANITARY AND STORM**

- 1) Unless otherwise noted, manhole and catch basin structures shall consist of precast concrete, and meet the requirements of Sections 2621.2C and 2621.3D of the CEAM Standard Specifications
2) Catch basins shall be provided with the following castings:
a) Along curbline: Neenah R-3250A w/ type "C" grate
b) Isolated (in paved area): Neenah R-2535 w/ type "C" grate
c) Isolated (in vegetated area): Neenah R-2560 w/ type "C" grate
3) Manholes shall be provided with the following castings:
a) Sanitary: Neenah R-1733 w/ concealed pick hole
b) Storm: Neenah R-1733 lettered "STORM", center pick hole

**INSTALLATION**

- 1) Unless otherwise noted, installation of all water and sewer pipe, fittings, and appurtenances shall be as per the CEAM Standard Specifications.

**TESTING REQUIREMENTS**

- 1) Water and sewer pipe, fittings, and appurtenances shall be inspected and tested as per Sections 4715.2800-4715.2890 of the MN Plumbing Code, and Sections 2611.3E-2611.3H and 2621.3F-2621.3H of the CEAM Standard Specifications.
2) In the event of discrepancies between the testing requirements of the MN Plumbing Code and the CEAM Standard Specifications, the most stringent will govern.

**GRANULAR SURFACING (BASE COURSE FOR FUTURE PAVEMENT)**

- 1) Compacted thickness of aggregate base: 6"
2) Aggregate base material shall meet the requirements of MNDOT Spec. 3138, Class 5.
3) The subgrade shall be tested and observed to the satisfaction of the Engineer prior to placement of aggregate base material.

**CONCRETE PAVEMENT, CURB & GUTTER, AND SIDEWALK**

**STANDARDS**

- 1) ACI 318, ACI 315, CRSI, ACI 301, latest editions.
2) Minnesota Standard Specifications for Construction, most recent edition

**GRANULAR BASE COURSE MATERIAL (CONCRETE APRON)**

- 1) Compacted thickness of finished base: 6"
2) Base material shall be granular with less than 12% passing the #200 sieve by weight.

**AGGREGATES**

- 1) Coarse: MNDOT Spec. 3137.
2) Fine: MNDOT Spec. 3126.

**WATER**

- 1) Clean, fresh and potable, MndOT Spec. 3906.

**AIR ENTRAINING ADMIXTURES**

- 1) ASTM C260.
2) Provide entrainment of 4 - 7 percent by volume.

**PORTLAND CEMENT**

- 1) ASTM C150, Type I plus an approved air entraining agent, or Type IA air-entraining Portland cement.

**OTHER ADMIXTURES**

- 1) MndOT Spec. 3113.
2) Calcium Chloride or materials containing chlorides or nitrates shall not be allowed.

**DEFORMED REINFORCING BARS**

- 1) MndOT Spec. 3301

**ACCESSORIES**

- 1) Properly sized chairs, spacers, bolsters, etc.
2) Provide plastic coated accessories at slabs and beams that are exposed below.

**PROPORTIONING AND DESIGN OF MIXES**

- 1) MndOT Spec. 2461.3
2) Concrete Classifications
a) Curb and gutter, slip-formed concrete: 3A22
b) Sidewalk, aprons, incidental concrete, manual curb & gutter: 3A32
c) Concrete pavements or aprons: 3Y43
d) Repair concrete, fast strength concrete: 3Y43
3) Concrete Specifications:
a) 3A22: 1-2" slump, 3900 psi, 4-7% air
b) 3A32: 2-3" slump, 3900 psi, 4-7% air
c) 3Y43: 3-4" slump, 4300 psi, 4-7% air
d) Temperatures of all concrete during placement shall be 50°F to 90°F

**REINFORCEMENT PLACEMENT**

- 1) Place, support and tie reinforcing to prevent displacement. Reinforcing shall be clean of oil, grease, scale, rust or other coatings which will impair the bond.
2) Reinforcing shall not be welded nor shall accessories of any kind be welded to reinforcing bars, unless approved by the Engineer.
3) Welded wire fabric shall be lapped a minimum of 2 squares plus 2". Welded wire fabric shall be suspended completely in the concrete and shall not be allowed to rest on subgrade at any point.
4) Concrete cover over reinforcement, bend radii, etc. shall be in accordance with the guidelines of ACI 318. Specifically, minimum clear cover shall be as follows unless otherwise noted on the Project Drawings:
a) Concrete cast against and permanently exposed to earth: 3"
b) Concrete exposed to earth or weather: 1 1/2" (#5 and smaller), 2" (#6 and larger)
c) Concrete not exposed to weather or in contact with ground: 3/4"
5) Lap splices shall be a length of 40 bar diameters unless noted otherwise on the Project Drawings. When two bars of different diameter are spliced, use 40 diameters of the smaller bar.
6) Reinforcing shall be continuous at all footing steps and stepped bond beams. Lap splices may be used.

**CONCRETE PLACEMENT**

- 1) Place concrete as soon as possible after mixing. Place before initial set has occurred, and in no event after it has contained its water content for more than one hour.
2) Avoid overworking concrete or allowing concrete to fall unrestricted for excessive vertical distances, and other situations which can cause segregation of the aggregates.
3) Concrete pavements shall be placed in accordance with applicable portions of MnDOT 2301.
4) Sidewalks shall be placed in accordance with MnDOT 2521.
5) Curb and gutter shall be placed in accordance with MnDOT 2531.

**PROTECTION**

- 1) Provide adequate protection against rain, sleet and snow before and during placement and finishing of concrete.
2) Protect concrete from premature drying. Provide temporary covering as required. Keep concrete continuously moist for 7 days.
3) Treat concrete with membrane curing compound in accordance with MnDOT 2531.3G.

**COLD WEATHER CONCRETE**

- 1) Do not place concrete when the atmospheric temperature is below 40 degrees F, or when the concrete is likely to be subjected to freezing temperatures within 24 hours after it has been deposited unless adequate temporary heating is provided.
2) Maintain concrete temperature of 40 to 90 degrees F for 3 days. Protect from freezing for the following 5 days.
3) No frozen materials may be used in the concrete. Chemicals may not be used to prevent freezing unless approved by the Engineer.
4) Perform all cold weather concreting in accord with ACI 306.

**HOT WEATHER CONCRETE**

- 1) Do not place concrete when the atmospheric temperature is above 100 degrees F.
2) Maintain concrete temperature of 40 to 90 degrees F for 3 days. Protect from temperatures over 90 degrees for the following 5 days.
3) Thoroughly wet dry porous surfaces before concreting.
4) Water reducing admixtures with retarding properties are required for all concrete placed when the temperature exceeds 80 degrees F.
5) Perform all hot weather concreting in accord with ACI 305.

**FINISHING**

- 1) Provide a smooth, steel trowel finish unless noted otherwise.
2) Provide a broomed finish on exterior sidewalks and ramps unless noted otherwise.

**QUALITY CONTROL**

- 1) The Contractor shall hire an independent testing firm to provide the following tests:
a) The independent testing technician shall perform random field testing of the fresh concrete including slump, air content, and temperature, (ASTM C143, C173, C231 and C138). One series of the aforementioned tests shall be performed on the first load of concrete.
b) The independent testing technician shall cast a set of four compression test cylinders for the first load of concrete as well as 1 set for every 100 cubic yards, or fraction thereof, of concrete thereafter. Compression tests shall be performed on one test cylinder at 7 days and two test cylinders at 28 days. The fourth test cylinder shall be retained in the event of failing compression tests on the 28-day test cylinders.

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Engineer under the laws of the state of Minnesota.

Blaine, MN 55425, PE
Date: 02/03/2010 License No.: 481729

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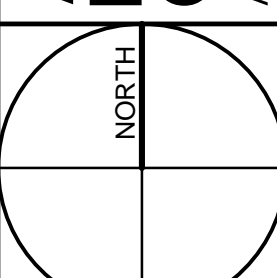
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GENERAL NOTES AND SPECIFICATIONS