

RESTAURANT UTILITIES PROJECT

TULALIP, WASHINGTON

SECTION 31 20 00 – EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY

- A. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision as required in these specifications, on the drawings and as otherwise deemed necessary to complete the work. Included are the following topics:
 - 1. Preparing subgrades for slab-on-grade, walks, and pavements.
 - 2. Subbase course for concrete walks and pavements.
 - 3. Subbase and base course for asphalt paving.
 - 4. Excavating and backfilling for utility trenches.

1.02 RELATED SECTIONS

- A. Division 1 Specification Sections.
- B. Specification Section 31 12 00 – SITE CLEARING
- C. Specification Section 31 23 19 – DEWATERING
- D. Specification Section 31 25 00 – EROSION AND SEDIMENT CONTROL
- E. Specification Section 32 12 00 – FLEXIBLE PAVING
- F. Specification Section 32 16 13 – CURBS AND SIDEWALKS
- G. Specification Section 32 92 23 – SODDING
- H. Specification Section 33 11 00 – WATER UTILITY DISTRIBUTION PIPING
- I. Specification Section 33 30 00 – SANITARY SEWERAGE UTILITIES

1.03 REFERENCE STANDARDS

- A. Technical specifications, design detail, construction detail and materials for all newly constructed roadway, storm drainage and utility improvements, and modifications to existing roadway, storm drainage and utility improvements, shall conform to the following reference documents:
 - 1. Water Distribution Design and construction Standards and Specifications, City of Marysville, November 1998, Revised May 2007.
 - 2. Standard Specifications for Road, Bridge and Municipal Construction, WSDOT/APWA, latest edition.

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- 3. Standard Plans for Road and Bridge Construction, WSDOT/APWA, latest edition.
- B. Where conflicts between standards and specifications occur, the more stringent shall apply.

1.03 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Subgrade: The surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- C. Subbase Course: The course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- D. Base Course: Course placed between subbase course and hot-mix asphalt paving.
- E. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- F. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- G. Fill: Soil materials used to raise existing grade.

1.04 QUALITY ASSURANCE

- A. Provide at least one (1) person who shall be present at all times during execution of this portion of the work, be thoroughly familiar with the type of work being performed and the best methods for its execution and who shall direct all work performed under this section.
- B. The Contractor shall comply with the applicable provisions of all pertinent codes and regulations.

1.05 SUBMITTALS

- A. Within ten (10) work days after award of contract, Contractor shall submit to Owner a schedule, detailing sequence and time of completion of phases of work under this section.

1.06 PROJECT SITE INFORMATION

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- A. Limit of work for project is depicted on sheet C1.1 and C1.2 of the drawings.
- B. A geotechnical report has been prepared for the Tulalip Casino Project:
 - 1. "Geotechnical Engineering Report Tulalip Casino", AMEC Earth and Environmental, Inc., June 15, 2001.
 - 2. The report is for information only and is not part of the Contract Documents. The opinions expressed in the reports are those of the geotechnical engineer and represent interpretations of the subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data by Contractor.
- C. Contractor may make additional test borings and conduct other exploratory operations as necessary.

1.07 INSPECTION BY GEOTECHNICAL ENGINEER

- A. The Owner will employ a Geotechnical Engineer to perform all required tests of fill and of soil compaction, and for observation of the earthwork.
- B. Contractor shall notify the Geotechnical Engineer prior to completion of each lift and phase of the work in order to permit him to make tests as required. Samples of all fill materials proposed for use shall be delivered to him at least five (5) days prior to the time that such materials are expected to be placed in the work.
- C. No materials shall be placed until receipt of written approval by Geotechnical Engineer of samples. All materials used shall be the same as those in the samples submitted.
- D. The Geotechnical Engineer shall be considered the Owner/Architect/Engineer's representative on the job during earthwork operations. Fill material, which, in his opinion, does not meet the specification requirements, shall be removed or otherwise corrected as he directs.

1.08 APPROVAL BY GEOTECHNICAL ENGINEER

- A. The Geotechnical Engineer will inspect the work and submit a written report to the Owner stating whether or not the site work has been performed in accordance with the Contract Documents and is approved by the Geotechnical Engineer.

1.09 STORMWATER MANAGEMENT

- A. Integrate work into the erosion control best management practices (BMP). BMPs shall be in place, inspected and functioning prior to starting earthwork.

PART 2 – PRODUCTS

2.01 GENERAL

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- A. All fill material shall be subject to approval of the Geotechnical Engineer. All approvals given by Geotechnical Soils Engineer shall not relieve the Contractor of his responsibility to meet the requirements of these specifications and the recommendations of the Geotechnical Report.
- B. For approval of imported fill material, notify the Geotechnical Engineer at least five (5) working days in advance of intention to import material, designate the proposed borrow areas, and permit the Geotechnical Engineer to sample as necessary from the borrow area for the purpose of performing tests.

2.02 SOILS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: As shown on notes and details on approved civil drawings, free of Rock or gravel larger than 3 inches (75 mm), debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Course: Natural or artificially graded mixture of crushed gravel, crushed stone, and (natural or crushed) sand. It is defined by ASTM D 2940: at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Natural or artificially graded mixture of crushed gravel, crushed stone, and (natural or crushed) sand per WSDOT Std. Spec. 9-03.9(3).
- F. Fill: Natural or artificially graded mixture of crushed gravel, crushed stone, and natural or crushed sand per ASTM D 2940 with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, per the drawings. Pipe bedding shall conform to WSDOT gravel backfill for pipe-zone bedding specification 9-03.12(3). All pipes shall be laid on a properly prepared foundation according to WSDOT Specification 7-08.

2.03 CEMENT SLURRY GROUT

- A. Cement slurry grout shall be used where indicated on the drawings to backfill trenches that are cut to cross existing roads.
- B. Portland cement based grout having a slump of 10"-12" and the following mix proportion (per CY):

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1. Type 1 Portland Cement 100#
 2. Class C Fly Ash 300#
 3. Fine Aggregate 2700#
 4. Water 400#
 5. Air Entraining Admixture 35 oz
- C. Similar mix designs that are suitable for the intended use will be considered by Owner.
1. Contractor shall submit proposed alternate mix design to Owner subject to the approval by the Geotechnical Engineer.

2.04 OTHER MATERIALS

- A. All other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by the Contractor subject to the approval of the Geotechnical Engineer.

PART 3 – EXECUTION

3.01 GENERAL

- A. Prior to all work of this Section, Contractor shall become thoroughly familiar with the site, site conditions, and all portions of the work falling within this Section.
- B. Site inspection and review:
1. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to all inspections, tests, and approvals.
 2. Should any of the work be so enclosed or covered up before it has been approved, Contractor shall uncover all such work at no additional cost to the Owner, if so directed by the Owner.
- C. Protection of Existing Facilities:
1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 2. Protect and maintain erosion and sediment controls, which are specified in Specification Section 31 25 00 EROSION AND SEDIMENT CONTROL.
 3. Keep active utilities intact and in continuous operation, street drains and sewers open for free drainage at all times.

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4. Carefully maintain benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed by the Owner at no additional cost to the Owner.
 5. Contact the following 48 hours before digging:
 - a. Dial-A-Dig;
 - i. Dial-A-Dig does not perform a complete utility locate. Tulalip Tribes do not subscribe to Dial-A-Dig.
 - b. Quil Ceda Village Utilities; and
 - c. Tulalip Data Services.
- D. Disposal of Waste Material:
1. Protect streets and adjacent property throughout the operations. Allow no debris to accumulate in structures or on the site.
 2. Haul unsuitable material and debris away from site and dispose of legally and as required by applicable Federal, State and Tribal regulations and by authorities having jurisdiction at no additional cost to the Owner.
- E. Dewatering:
1. Dewatering shall be completed in accordance with Specification Section 31 23 19 DEWATERING.

3.02 FINISHED ELEVATIONS AND LINES

- A. For setting and establishing finish elevations and lines, secure the services of a licensed land surveyor acceptable to the Owner. Carefully preserve all data and all monuments set by the surveyor and, if displaced or lost, immediately replace to the approval of the Owner and at no additional cost to the Owner.
- B. Finished elevation grade stakes and any other surveying necessary for the layout of the work is the responsibility of the Contractor. The Contractor shall conduct his operations in such a manner that survey stakes will be protected as long as their need exists. Finished grade stakes, if damaged or stolen, shall be replaced by the surveyor at the General Contractors expense.

3.03 EXCAVATION

- A. Excavate to lines and grades and within the tolerances specified and indicated on drawings.
- B. Remove rocks, boulders, and other obstructions, and dispose of legally, at no additional cost to the Owner.

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- C. Excavate for work indicated on drawings or specified in whatever material encountered. No changes in the Contract Sum or Contract Time will be authorized for excavation of rock, hardpan, or any other materials or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials, replace with satisfactory soil materials.
- D. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations and subgrades indicated on Drawings.
- E. Segregate the various materials excavated. Reserve material may meet the requirements of backfill for the location. Haul unsuitable material and debris away from site and dispose of legally and as required by applicable Federal, State and Tribal regulations and by authorities having jurisdiction at no additional cost to the Owner.

3.04 TRENCH EXCAVATION

- A. Excavate trenches to gradients, lines, depths and elevations indicated on Drawings. Excavations shall be sufficiently deep to provide for bedding beneath pipes and structures as required.
- B. Locate bedding, backfill and spoil piles in accordance with OSHA requirements, and so that it does not interfere with public travel, adjacent landowners or other construction activities.
- C. Trench excavation shall be limited to that which can be excavated and backfilled within the same workday.
- D. The same trench may obstruct no more than one street crossing at one time.
- E. Trench excavation shall be free of water to a level one (1) foot below the trench bottom.
 - 1. Ground water level shall be maintained to be a minimum of one (1) foot below proposed trench depth prior to beginning trench excavation.
 - 2. Ground water level shall be maintained to be a minimum of one (1) foot below trench depth until trench excavation and backfill work is complete.
- F. Trench Width:
 - 1. The trench width at the ground surface shall be minimized to the extent possible through the use of trench boxes, shields, or shoring.
 - 2. Excavate trench to uniform width to provide twelve (12) inches of clearance on each side of pipe or conduit.
- G. Trench Bottoms:

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1. Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
2. Remove projecting stones and sharp objects along trench subgrade.
3. Notify the Owner's Representative if trench subgrade consists of unstable soil, organic material, debris or other undesirable material.

3.05 TRENCH BACKFILL

- A. Affix an indicating wire directly to all pipes and install a plastic non-biodegradable warning tape 24 inches above all pipes.
- B. Bed pipes and place initial cover material in accordance with detail drawings and the requirements of specifications for the utility and pipe type being installed.
- C. Shape bedding material to conform to bell of pipe, fittings and structures.
- D. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the utility pipe or conduit.
 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.
 2. Compaction of initial cover material for pipe and fittings shall be accomplished using hand tools and vibratory plate or tamping type walk behind compactors.
 3. Coordinate backfilling with utilities testing.
- E. Backfill trenches to elevations shown on the plans; allow for placement of base course, pavements, and topsoil as required by the plans and other Contract Documents.
- F. Backfilling of trench shall be made with the same materials excavated from the trench providing it meets requirements for fill.
- G. Flooding or jetting of backfill material for compaction purposes is not allowed.

3.06 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 1. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

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2. Place backfill materials on subgrades free of mud, frost, snow, and ice. Do not use frozen material as fill.

3.07 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Unless otherwise indicated on the drawings, compact backfill and fill soil materials to the following percentages of maximum dry unit weight according to ASTM D 1557 (Modified Proctor):
 1. Under walkways and pavements:
 - a. Scarify and compact top 12 inches of existing subgrade to 95 percent
 - b. Compact each layer of backfill or fill soil material to 95 percent for full depth of fill.
 2. Utility trenches:
 - a. Compact each layer of initial and final backfill soil material to 95 percent for full depth of trench.
 3. Landscaped areas:
 - a. Compact each layer of backfill material to approximately 90 percent for depth of backfill to subgrade elevation.
 - b. Compact landscape planting soil to approximately 80 percent for full depth.
- D. It is the responsibility of the Contractor to provide all necessary compaction equipment and other grading equipment that may be required to obtain the specified density. Vibratory plate or tamping type walk behind compactors will be required whenever backfill is placed adjacent to structures, pipes, utility lines and other features.
- E. Owner reserves right to order soil compaction tests made to verify that fill compaction is adequate and meets specified levels. The decision of a Geotechnical Engineer hired by the Owner in disputed cases shall be final and the Contractor shall be responsible for remedial measures required, at no additional cost to the Owner.

3.08 GRADING

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- A. Uniformly grade areas to a smooth surface, free from irregular surface and grade/slope changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Provide constant gradients between given elevations unless otherwise noted or for a specific reason.
 - 3. All areas shall drain with flow lines and shall be free of depressions which permit water to stand. Slope to drains where provided.
 - 4. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Finish sub-grades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1/4 inch.
 - 3. Pavements: Plus or minus 1/4 inch.
- C. Where grades are not specifically indicated on Drawings, establish grades as follows:
 - 1. Paving, walks and other surfaced areas - Grade to underside of surfacing and base material.
 - 2. Landscaped areas - Grade to contours as indicated on the grading drawing, allowing for landscape planting soil depth of 8"

3.09 PREPARATION OF SUBGRADE

- A. During unfavorable weather, the soil could approach or exceed the optimum moisture content, making it difficult or impossible to obtain proper compaction, therefore, do not place, spread or roll fill materials during unfavorable weather conditions.
- B. Do not resume operations until moisture content and fill density are satisfactory to the Geotechnical Engineer.
- C. Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collecting in depressions.
- D. Where soil has been softened or eroded during the course of the work, remove all damaged areas and recompact as specified for fill and compaction.

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- E. Provide, and maintain at all times during construction, ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the work.
- F. All debris, vegetation, and other perishable materials shall be removed from the job site. The area to be paved shall be rough graded to within ± 0.10 feet and all excess material removed from the location of the work.
- G. Install drainage swale along entire length and width of property to keep surface water from running onto construction site. Drain by gravity or mechanical means.
- H. Areas inaccessible to power rollers or areas that cannot be compacted properly with power rollers shall be compacted with vibratory compactors, or other suitable mechanical means which produce a firm foundation for the pavement structure.
- I. Cut or fill side slopes shall not exceed 2H:1V, unless otherwise indicated on the drawings and approved by the local building authority.
- J. Keep earth under footings and slabs dry and free from frost. Should bearing surfaces be softened by water or frost, re-excavate to solid bearing and fill with concrete or compacted gravel at no additional cost to the Owner.

3.10 SUBBASE AND BASE COURSES

- A. Place base course on subgrades free of mud, frost, snow, and ice.
- B. On prepared subgrade, place base course under pavements and walks as follows:
 - 1. Shape base course to required crown elevations and cross slope grades.
 - 2. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to meet not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.11 INADEQUATE SOIL CONDITIONS

- A. The adequacy of all soil bearing values shall be determined by the Geotechnical Engineer. Should soil of inadequate density and bearing capacity be encountered at the elevations shown on the Drawings, and where new fill is to be placed upon loose existing fill material exposed by excavation, carry the excavation to the depth required to attain soil of bearing quality as determined by the Geotechnical Engineer.
- B. Owner reserves right to order soil compaction tests made to verify that fill compaction is adequate and meets specified levels. The decision of the Geotechnical Engineer in disputed cases shall be final and the Contractor shall be responsible for remedial measures required, at no additional cost to the Owner.

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END OF SECTION 31 20 00