SECTION 02010--SUBSURFACE INVESTIGATION

PART 1--GENERAL

SUMMARY:

The Subcontractor shall furnish all labor, materials, and equipment to perform the subsurface investigations specified herein and on the drawings. The location of the subsurface investigations is shown on the drawings.

Section Includes: Work includes, but is not limited to:

Operation and maintenance of the drilling/sampling equipment.

Supervision and safety of the drilling personnel.

Drilling of the bore holes.

Collection of samples as specified hereinafter.

Backfilling of all bore holes.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein:

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T203 Soil Investigation and Sampling by Auger Borings (ASTM D 1452)
AASHTO T206 Penetration Test and Split-Barrel Sampling of Soils
AASHTO T207 Thin-Walled Tube Sampling of Soils (ASTM D 1587)
AASHTO T223 Field Vane Shear Test in Cohesive Soil
AASHTO T251 Soil Investigation and Sampling by Hollow Stem Auger Borings

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA A100 Standard for Water Wells

SUBMITTALS:

Submittals include, but are not limited too the following:

Qualifications: Submit driller/sampler qualifications.
Logs: Submit bore hole logs.

Test Report: Submit thin walled sample and split barrel sample test reports in accordance with Division 2 Section, Geotechnical Testing and Reports.

See Section 01300, Submittals and Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Qualifications: The driller/sampler shall have a minimum of 3 years experience with a hollow-stem auger and the driller's helper shall have a minimum of 1 year experience.

PROJECT/SITE CONDITIONS:

Site Information: The existing soil is composed mainly of _____ The depth from the surface to bedrock (basalt rock) contact is generally ____ft.

Bench Marks: The Contractor shall provide bench marks with elevations and locations of each proposed test hole. The Subcontractor shall be responsible for maintaining the bench marks.

PAYMENT:

Bids shall be submitted based on unit prices as specified in the following payment schedule. All unit prices shall be based on a minimum of _____ bore holes to an average depth of _ ft. Unit pricing shall allow for equipment moving and setup time between bore holes, backfilling, nightly equipment storage within _ miles of the sampling site and all personnel equipment and overhead costs.

1. Price per lineal foot for hollow stem auguring.
2. Price per lineal foot for split barrel sampling (based on 18 in. sampling intervals as specified under AASHTO T206) for both the 1.5 and 4.0 samplers.
3. Price per lineal foot for thin-wall tube sampler (AASHTO T207). Price shall include cost of sample tube and be based on approximately _ lineal feet total.
4. Price per lineal foot for sampling by hollow stem auger (AASHTO T251 and T203) for depths to _ ft.
5. Stand by time, price per hour.
6. Fixed price for mobilization both ways for equipment and personnel.

PART 2—PRODUCTS

MATERIALS AND EQUIPMENT:

Drilling Equipment: Drilling equipment shall meet the following requirements:

Thin-wall (Shelby) tube sampler: 3.0 in. diameter by 24 in.

Split barrel (Split spoon) sampler: 1.5 in. and 4.0 in.

Field Vane Shear Apparatus.

Hollow stem auger: The hollow stem auger shall be capable of operating to a minimum depth of 30 ft and of using the above samplers.

Drive hammer: A drive hammer for operation of the split spoon sampler shall be provided by the Subcontractor.

All equipment shall be truck and/or trailer mounted and in good repair. Operation of drilling equipment shall be designed such as to not damage the asphalt paving surface or base.

PART 3--EXECUTION

DRILLING:

Bore holes shall be drilled at locations shown on the drawings or as indicated by the Contractor. A minimum of _ holes shall be drilled. Bore holes shall be a minimum of 4Êin. in diameter. Logging of the holes shall conform to AASHTO T206. Hollow stem auger procedures shall comply with AASHTO T203 and T251.

The Subcontractor shall be responsible for backfilling the bore holes (see AWWA Standards). Cleanup and removal of all debris or foreign materials is also a part of his responsibilities.

SAMPLING:

Thin walled samples shall be taken in accordance with AASHTO T207. Split barrel samples shall be made in accordance with AASHTO T206.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 02010

SECTION 02200--EARTHWORK

PART 1--GENERAL

SUMMARY:

Section Includes: Work includes, but is not limited to:

Clearing and grubbing as required.

Excavating all materials encountered, of every description, for completion of the Subcontract as shown on the drawings and as specified herein.

Backfilling of all excavation for footings, foundations, pipe and utility trenches, etc.

Installing a locator ribbon above utilities installed under this Subcontract.

Compacting all backfill including structures and access roads as specified herein.

Finish grading and grading for surface drainage.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein.

AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (AASHTO)

AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
AASHTO M145	Recommended Practice for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
AASHTO T11	Standard Method of Test for Materials Finer Than 75 Micrometer (No. 200) Sieve in Mineral Aggregates by Washing
AASHTO T27	Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
AASHTO T99	Standard Method of Test for the Moisture-Density Relations of Soils Using a 5.5 lb (2.6 kg) Rammer and a 12 in. (305 mm) Drop
AASHTO T238	Standard Method of Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

CODE OF FEDERAL REGULATIONS

29 CFR 1926 OSHA General Industry Safety Standards, Subpart P

IDAHO TRANSPORTATION DEPARTMENT (ITD)

SSHC Standard Specification for Highway Construction

SUBMITTALS:

No Vendor Data required for this section.

DELIVERY, STORAGE, AND HANDLING:

Explosives, if used, shall be handled, stored, transported, and used within safety limitations established by DOE-ID.

PART 2--PRODUCTS

MATERIALS:

Satisfactory Soil Materials: Satisfactory soil materials are defined as those complying with AASHTO M145, soil classification Groups A-1, A-2-4, A-2-5, and A-3.

Unsatisfactory Soil Materials: Unsatisfactory soil materials are those defined in AASHTO M145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also peat and other highly organic soils.

Backfill and Fill Material: "Satisfactory" soil materials free of clay, rock, gravel larger than 3 in. in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter. Select pit run gravel is available at the Borax, T12 (SW of RWMC), CFA, TRA, NRF (restricted for NRF projects), Lincoln Boulevard or TAN gravel pits. Gravel pit material and use of the gravel pits shall be at no cost to the Subcontractor. Upon completion of operations involving fill material removal, the Subcontractor shall grade and reshape the disturbed areas. Sloped surfaces shall meet the requirements of OSHA 29 CFR 1926.

Base or Leveling Course Material: Naturally or artificially graded mixture of 3/4 in. maximum size crushed gravel, crushed stone, natural and crushed sand. Material shall meet the requirements of ITD subsection 703.04.

Buried Pipe Identification Ribbon: See the appropriate Piping or Electrical specifications for Buried Pipe Identification Ribbon requirements.

Locator Ribbon: Ribbon shall be 3 in. wide and shall be red for all electrical conduits, electrical cables, and telephone cables. Yellow ribbon shall be used for all buried pipelines. Orange ribbon shall be used on cathodic protection. Ribbon shall be tape manufactured by

Reef Industries or Allen Markline or equal and shall have metal foil which is completely encased in plastic so as to be unaffected by cathodic protection systems and can be easily detected by metal detectors. The ribbon shall be printed with the manufacturer's standard wording, "CAUTION ELECTRIC LINE BURIED BELOW," for all electrical conduits, phone lines, etc., "CAUTION BURIED PIPELINE BELOW," for all buried pipelines, and "CAUTION CATHODIC PROTECTION," for all buried cathodic protection systems.

PART 3--EXECUTION

EXCAVATION:

Clearing and Grubbing: All areas to be occupied by new buildings, roadways, storage tanks, berms and other similar structures plus 10 ft outside these areas and 1 ft outside sidewalk areas and pipe trenches, shall be stripped and cleared of all brush, weeds, rubbish and organic matter. All vegetable matter, roots, brush and debris encountered during the stripping operations shall be removed from the cleared areas to a depth of at least 4-in. below the subgrade. Resulting depressions shall be completely backfilled and compacted in accordance with the applicable part of these specifications except in those cleared areas where further excavation is required. Stripped material shall be stockpiled or disposed of as specified hereinafter.

Earth Excavation: Earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, soil material of any classification, and other materials encountered that are not classified as rock excavation or unauthorized excavation.

Rock Excavation: Rock excavation consists of removal and disposal of materials encountered that cannot be excavated without drilling and blasting, or requiring use of special equipment.

Rock excavation shall be measured by the in-place cubic yard. Measurements shall be made according to the following criteria.

Rock Payment Line: Rock payment line limits include:

Two feet outside of concrete work for which forms are required, except footings.

One foot outside perimeter of footings.

In pipe trenches, 6 in. below invert elevation of pipe and 2 ft wider than outside diameter of pipe, but not less than 3 ft minimum trench width.
Neat outside dimensions of concrete work where no forms are required.

Under slabs or footings 6 in. below bottom of concrete.

Unauthorized Excavation: Unauthorized excavation consists of removal of materials beyond indicated elevations or dimensions without specific direction by the Contractor. Unauthorized excavation, as well as remedial work directed by the Contractor, shall be at the Subcontractor's expense.

Structural: Excavations for such structures as footings, foundations, and slabs shall be made to the depths shown on the drawings and of sufficient width to allow adequate room for setting and removing forms, installing accessories and inspection. Where concrete foundations or slabs are to be constructed on material other than rock, care shall be taken to prevent disturbing the bottom of the excavation. Excavation to final grade shall not be made until just before concrete forms are to be placed therein. Concrete foundations shall be placed only on undisturbed soil or rock.

Trenches: Trenches shall be of sufficient width to provide adequate room for workmen to perform any necessary service to the materials or items being installed therein and to permit proper compaction of the backfill.

Sod: Where new trenches run through established lawns, lawn sod shall be carefully removed with an approved mechanical sod cutter, rolled and stored for later use or disposed of as directed in the Special Conditions.

Grade: The bottom of pipe trenches shall be graded to allow for a minimum of 4 in. of compacted sand bedding beneath the pipe. Bell holes shall be shaped so that pipe will be uniformly supported for its entire length on the compacted sand backfill. Hubs or flanges shall be unsupported until the pipeline has been tested, coated, and wrapped, as required.

Stockpiling and Disposal: Excavated material that is suitable and required for backfilling, grading or topsoil, shall be piled in an orderly manner a sufficient distance from the edge of the excavation, but in no case closer than 2 ft, and so located that it will not interfere with normal vehicular or pedestrian traffic. Excavated materials to be used for backfill shall be kept free from vegetation and other objectionable materials. Topsoil to be used for finish grading shall be kept free from subsoil, vegetation and other objectionable materials and stones larger than 1-in. Excavated materials not required or not approved for backfilling, grading or topsoil, shall be disposed of. Unused excavated earth and rock waste and combustible materials shall be hauled to areas designated by the Contractor and disposed of in a manner specified in the Special Conditions.

Unstable Soils: If wet or otherwise unsatisfactory soil is encountered in an excavation, at or below the excavation line, it shall be brought to the attention of the Contractor and removed as directed in accordance with Article 38 , "Differing Site Conditions", of the General Provisions. The bottom of the excavation shall then be brought to the required grade with concrete or compacted backfill as specified hereinafter. Excavation of unstable soil resulting from the Subcontractor's neglect to keep the excavated opening dry, and other over depth excavation not required to satisfactorily complete the work, shall be brought up to the

required grade with concrete or compacted backfill as specified hereinafter at the Subcontractor's expense.

Shoring and Bracing: The sides of all excavations shall be sloped or securely shored and braced in accordance with OSHA 29 CFR 1926, Subpart P.

Control of Water: All excavations shall be kept free of standing water. The Subcontractor shall furnish, install and operate the equipment required to keep excavations free from water at all times. Water shall be disposed of in a manner that will not cause injury to property.

Roads and Sidewalks: Where excavations are required across roads or streets, one lane shall be kept open to traffic at all times unless otherwise directed. This shall be accomplished by excavating and backfilling only one-half of the road or street at one time. Temporary footbridges, with a handrail on both sides, shall be provided over excavation through sidewalks.

BACKFILL OR FILL:

General: The excavations shall be cleared of all trash and debris prior to backfilling or filling. All backfill or fill material shall be free from trash, organic matter and frozen particles. Backfilling or filling shall be done only when approved by the Contractor. In excavations that are shored, shoring and formwork shall be removed or raised as backfill or fill is placed.

Under Footings and Foundations: Footings and foundations for columns and for heavy equipment shall not be placed on earth backfill. Over depths in excavations for such footings and foundations shall be backfilled with concrete. The concrete shall be in accordance with the "Concrete" section of these specifications.

Under Slabs or Pavement: Backfill or fill materials under concrete slabs, floors, sidewalks, and concrete or asphalt pavement including fill for manholes shall be compacted fill material as specified in the "Materials" section, except that the last 2 in. of such fill shall be compacted leveling course material.

Pipelines and Buried Tanks: Bedding for piping and buried tanks shall be compacted sand or other approved granular material unless otherwise shown on the drawings. Bedding material shall extend from a minimum of 4 in. beneath the pipe or tank to a minimum cover of 4 in. The remainder of the trench or excavation shall be backfilled as specified hereinafter.

Overdepth Pipeline Excavation: Where pipe trenches are excavated to an overdepth due to the presence of rock, unstable soil or other unsuitable material, the overdepth shall be backfilled to required grade with compacted sand or other approved granular material.

Placement: Concentrated dumping of backfill or fill material into excavations will not be permitted. No water shall be used for placing, settling or compacting backfill or fill except to

obtain optimum moisture content. All material must be placed in uniform layers not to exceed 8 in. loose measurement and brought up simultaneously and evenly on both sides of foundation walls and around underground or covered structures and equipment such as culverts, manholes, storage tanks and pipe. Backfill or fill around piping, and at least 4 in. over, shall be hand placed and compacted prior to pressure testing. Pipe joints shall be left exposed until leak testing has been completed. Care shall be taken when backfilling, filling, or compacting around any buried items or dampproofed walls to prevent injury to the item being covered and to prevent piercing or rupturing the insulation, coating or dampproofing membrane. Loose backfill or fill may be placed as specified hereinafter.

Compaction: Unless otherwise indicated on the drawings or specifications, compact all backfill and fill material under slabs, roads, sidewalks, and other surfaced areas, around foundation walls, culverts, underground tanks and other similar structures and to at least 4 in. compacted depth above all piping in trenches. Unless otherwise indicated, all "compacted" backfill or fill shall be compacted to at least 95% of maximum density at optimum moisture content as determined by AASHTO T99. Each 8-in., maximum, loose measurement lift shall be compacted before the next lift is placed thereon. Compacted backfill or fill density and moisture content may be measured by the Contractor at any location and depth. Sections of backfill or fill failing to meet the minimum compaction requirements shall be corrected prior to placement of subsequent lifts. No heavy equipment shall be allowed within 5 ft of a structure or the foundation of any structure. No heavy equipment shall be allowed over piping until a minimum of 24 in. of backfill has been compacted over the piping.

Locator Ribbon: The locator ribbon shall be placed in a zone 6 to 12 in. from the ground surface directly over the utility during the backfill and compaction operation.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 02200

SECTION 02513--ASPHALT CONCRETE PAVING

PART 1--GENERAL

SUMMARY:

Provide all work, operations and material required to construct asphalt paving in accordance with the project drawings and these specifications.

Section Includes: Work includes, but is not limited to:

Patch all paved areas where excavation occurred

Furnish and apply asphalt tack coat.

Haul, place and compact asphalt concrete mix.

REFERENCES:

The following documents, including others referenced herein, form part of this Section to the extent designated herein:

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS (AASHTO)

AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 946	Standard Specification for Penetration Graded Asphalt Cement for use in Pavement Construction.
ASTM D 2922	Standard Test Methods for Density of Soil and soil-Aggregate In Place By Nuclear Methods (Shallow Depth)
ASTM D 4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

IDAHO TRANSPORTATION DEPARTMENT (ITD)

Standard Specifications for Highway Construction (SSHC)
1995 Edition, Field Test Manual, Part I, Sampling and Test Methods

SUBMITTALS:

Submittals include, but are not limited to the following:

Sample: Submit a 200-lb sample of aggregate to an independent test laboratory for testing.

Sieve Test report: Submit sieve test report for approval.

Mix Design Test Report: Submit results of the asphalt concrete mix design test .

See Section 01300, Submittals and Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Codes and Standards: Comply with provisions of the following codes, specifications and standards unless otherwise specified herein. Idaho State Specifications are available for inspection at offices of the Division of Highways, State of Idaho, and the Department of Energy (DOE), Idaho Operations Office Headquarters.

AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
ASTM D 946	
SSHC	Standard Specifications for Highway Construction (SSHC) 1995 Edition, Field Test Manual, Part I, Sampling and Test Methods

PART 2--PRODUCTS

Asphalt: The asphalt cement shall be Viscosity Grade AC-5. The grade may be changed one step by the Contractor at no change in unit price. Asphalt shall meet applicable requirements of Section 702 of the SSHC, AASHTO M226/Table 1, and ASTM D 946.

Crushed Gravel Aggregate: The master gradation for aggregate for the plant mix pavement shall be as follows:

Sieve	Percent Passing
3/4	100
1/2	90 - 100
No. 4	51 - 61
No. 8	37 - 47
No. 50	18 - 26
No. 200	5 - 10

Tack Coat: The tack coat shall be an emulsified asphalt, SS-1 or SS-1h, diluted with one part water to one part emulsified asphalt, meeting the applicable requirements of Section 702 (SSHC).

PART 3--EXECUTION

QUALITY CONTROL TESTING:

Contractor Supplied Testing: The following tests may be performed by others at no cost to the Subcontractor.

AASHTO T99 (Standard Proctor) for density of the base course.

AASHTO T238 (ASTM D 2922) for moisture-density relationship of base course in place and asphalt concrete in place.

Idaho T125 (Nuclear Densimeter) for asphalt concrete in-place density.

Idaho T87 for surface smoothness of finished pavement.

Subcontractor Supplied Testing: The Subcontractor shall supply a 200-lb sample of aggregate to an independent test laboratory to determine the gradation and mix design. A sieve report shall be submitted for approval.

The test methods shall be in accordance with the following:

Mechanical Analysis	AASHTO T27
Passing a No. 200 Sieve	AASHTO T11

A tolerance of 2% in the amount passing the maximum size screen will be permitted to allow for reasonable screen wear, providing all oversize material passes a screen having 1/8 in. larger opening.

Composition of Mixture: The asphalt concrete shall be composed of a mixture of aggregate, filler if required, and asphalt. The mix design shall be tested by an independent test laboratory based on the aggregate gradation before mentioned, and shall meet the following criteria:

Marshall Method:

Stability:	500-lb minimum
Flow:	8 to 20
Air Voids:	3% to 5%

HVEEM Method:

Stability:	37 minimum (See 405.02 of SSHC)
Swell:	Less than 0.030 in.
Air Voids:	3% to 5%

The mix design test results shall be submitted for approval, and the approved design mix shall be in effect unless modified in writing by the Contractor.

After the mix design is established, all mixtures furnished for the project shall conform thereto within the following ranges of tolerances:

Passing No. 4 and Larger Sieves	± 7%
Passing No. 8 to No. 100 Sieves, inclusive	± 4%
Passing No. 200 Sieve	± 2%
Asphalt	± 0.4%
Temperature of Mixture	± 20° F

Should a change in sources of material be made, a new mix design shall be established before the new material is used; when unsatisfactory results or other conditions make it necessary, the Contractor may establish a new mix design.

The aggregate and asphalt shall be mixed in accordance with SSHC Section 405.11.

EARTH EXCAVATION:

Excavate existing earth to subgrade elevations where required to permit placement of base material to the depth shown on the drawings. Construction of ditches shall be considered as earth excavation. Dispose of excavated material in accordance with Division 2 Section, "Earthwork".

PLACING PIT RUN GRAVEL FILL:

General: Construct pit run gravel bases, including the preparation of the subbase upon which the gravel is to rest, in accordance with this specification, and to the lines, grades, and typical cross sections shown on the drawings.

Construction Requirements: Prior to placement of the pit run gravel base, the existing subbase shall be stripped of all vegetation, brought to optimum moisture content, and compacted to at least 90% maximum density as determined by the AASHTO T99.

At locations where the required compacted depth of the pit run course exceeds 0.5 ft, the base shall be constructed in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 0.5 ft. When vibrating types of special compacting equipment are used, the compacted depth of a single layer of the base course may be increased to 0.8 ft upon approval.

Material containing excessive moisture shall be permitted to dry to a moisture content that will permit the required compaction. No extra payment will be made for rehandling such material to permit drying. Material that does not contain sufficient moisture to compact to the required density shall be uniformly moistened as required. Use watering equipment specified in this specification section.

Materials not compacted to the specified density shall be excavated and recompacted to the requirements for the class of compaction specified at no cost to the Government.

Compaction: Each layer shall be uniformly compacted to 95% of maximum density as determined in accordance with AASHTO T99.

PLACING CRUSHED GRAVEL LEVELING COURSE:

General: Furnish and place crushed gravel as a leveling course and as shoulder protection in accordance with the plans and specifications.

Construction Requirements: Crushed gravel shall be mixed by motor graders or other approved equipment until the mixture is uniform throughout. During the mixing, water shall be added in an amount necessary to facilitate compaction. Use watering equipment specified in this specification.

Compaction: After each layer has been spread it shall be compacted for its full width. The choice of compaction equipment will be left to the Subcontractor. Compaction shall continue until not less than 95% of the maximum density is attained, determined in accordance with AASHTO T99.

SURFACE PREPARATION:

Existing asphalt shall be cleaned to permit adhesion of bituminous materials. The prepared base shall be kept in repair at all times in advance of placing the plant mix pavement. Holes or depressions shall be filled level with bituminous surfacing, brought to the required grade and compacted. Do not commence placing asphalt until all conditions are satisfactory.

Tack Coat: Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.10 gal per sq. yd of surface.
Allow to dry until the tack coat has reached the proper condition to receive paving.

PLACING AND FINISHING ASPHALT CONCRETE:

General: Prior to placing the mixture on the roadbed, the prepared base shall be satisfactorily cleaned of all loose and foreign material. Uniformity of temperatures of the mixture delivered to the paver shall be such that the temperature of any one load shall not vary more than 20° F from the average of the preceding five loads. The material shall be placed to the specified thickness. Placing of the paving mixture shall be as continuous as possible.

Joints: Longitudinal joints shall be smooth, straight, and show no segregation of material. Should irregularities in the edge of the surface appear, the previous lane shall be cut back to a vertical face before placing adjacent material. Any material removed in cutting back the course to a vertical face shall be removed and wasted.

Transverse joints shall be formed by cutting back on the previous run or existing asphalt to expose the full depth of the course. A brush coat of SS-1 emulsified asphalt shall be used on contact surfaces of transverse joints, cold longitudinal joints, and existing asphalt edges just before additional mixture is placed.

Cuts shall be straight and clean.

Rolling: The asphalt concrete shall be compacted as quickly as possible after placing. Breakdown rolling shall follow the paver as closely as possible. Intermediate rolling shall follow immediately behind the breakdown rolling. Compaction of the pavement shall continue until the pavement density is 96% of that specified in the approved laboratory report. Testing of the plant mix density will be performed according to Idaho Department of Highways Method of Test T125 (Nuclear Densimeter). All breakdown and intermediate compaction shall be performed while the mixture temperature is above 180° F. Finish rolling shall be performed at as high a temperature as practicable and shall eliminate marks from previous rolling. Finish rolling shall be done the same day as the paving. Rollers shall not pass over the unprotected end of a freshly laid mixture.

Surface Smoothness: The completed surface will be inspected in accordance with Idaho Transportation Department Division of Highways Method of Test T87. The surface shall not vary more than 1/4 in. from a 10-ft straight edge.

Weather Limitations: Plant mix material shall not be placed on a wet or frozen surface, when the air temperature is below 40° F, or when weather or surface conditions otherwise prevent the proper handling or finishing of the plant mix material.

EQUIPMENT REQUIREMENTS:

Mixing Plant: The mixing plant shall conform to the applicable portions of Section 405.06 SSHC and be capable of producing up to 250 tons per hour.

Hauling Equipment: Trucks used for hauling plant mix materials shall have tight, clean, smooth metal beds. When necessary each truck shall have a cover of canvas or other suitable material of such size as to protect the mixture from the weather. When necessary, so that the

mixture will be delivered on the road at the specified temperature, truck beds shall be insulated and covers shall be securely fastened.

Paver: Pavers shall be self-propelled units, provided with an activated heated screed. Only screed extensions that produce results equal to the rest of the screed will be allowed.

The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.

The paver shall be operated at a speed consistent with the delivery of plant mix which provides for a smooth, uniform forward travel with the least stops.

The screed shall be equipped with automatic controls which will make adjustments in both transverse and longitudinal directions. The sensing device shall pick up grade information from a ski that is a minimum of 30 ft in length. The ski may be removed when paver is required to operate in areas of limited space (parking areas, turnarounds, fillets, etc.,). In the event of failure of the automatic controls, the Subcontractor will be permitted to finish the day's run using manual controls, but he will not be permitted to resume operations until the controls are repaired.

Rollers: Nonvibrating steel-wheel rollers shall be multiple axle, self-propelled, equipped with cleaning devices and weighing from 8 to 12 tons. Pneumatic-tire rollers shall be self-propelled and constructed within the limits of 50 to 100% of the values set in groups No. 2, 3, and 4 as set forth in Section 306 (SSHC). Rollers shall be equipped with a means of distributing the load uniformly between all wheels on at least one of the axles. The use of wobble-wheel rollers whose tires revolve in a plane that is not at right angles to the axle shaft will not be permitted. Rollers shall be multiple axle, multiple wheel type with wheels staggered on the axles and spaced so that the overlap of wheels will provide for uniform compaction for the full compacting width of roller. The air pressure in any tire shall not vary more than 5 lb from the pressure established. The rollers shall be operated at speeds of not less than 3 nor more than 8 miles per hour.

Scales: DOE-owned scales located in the Central Facilities Area may be used at no cost to the Subcontractor, or the Subcontractor may furnish his own scales. Scales shall meet the applicable portions of Section 109.01 (SSHC).

Watering Equipment: Provide water tank trucks capable of applying a uniform unbroken spread of water over the surface. A suitable device for positive shut-off and regulation of flow shall be located to permit operation by driver in cab.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 02513

SECTION 02514--ASPHALT CONCRETE PATCHING

PART 1--GENERAL

SUMMARY:

Provide all work, operations and material required to construct asphalt concrete patching in accordance with the project drawings and these specifications.

Section Includes: Work includes, but is not limited to:

Patching areas disturbed by excavation/trenching through paved areas.

REFERENCES:

The following documents, including others referenced therein, form a part of this Section to the extent designated herein.

AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (AASHTO)

AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
AASHTO M226	Viscosity Graded Asphalt Cement

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 946	Standard Specification for Penetration Graded Asphalt Cement for use in Pavement Construction

IDAHO TRANSPORTATION DEPARTMENT (ITD)

ITD SSHC	Standard Specifications for Highway Construction
ITD	Field Test Manual, Part I, Sampling and Test Methods

SUBMITTALS:

Submittals include, but are not limited to the following:

Sample: Submit a 200-lb sample of aggregate to an independent test laboratory for testing.

Sieve Test Report: Submit sieve test report for approval.

Mix Design Test Report: Submit results of the asphalt concrete mix design test.

See Section 01300, Submittals and Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Regulatory Requirements: (Codes and Standards): Comply with provisions of the following codes and standards, unless otherwise specified herein. Idaho State Specifications are available for inspection at offices of the Division of Highways, State of Idaho, and the Department of Energy (DOE), Idaho Operations Office Headquarters.

AASHTO M226
ASTM D 946
ITD SSSHC

PART 2--PRODUCTS

Asphalt: The asphalt cement shall be Viscosity Grade AC-5. Products shall meet applicable requirements of Section 702 of the SSHC, AASHTO M226/Table 1, and ASTM D 946.

Tack Coat: The tack coat shall be an emulsified asphalt, SS-1 or SS-1h, meeting the applicable requirements of Section 702 (SSHC).

Crushed Gravel for Aggregate: The master gradation for aggregate for the asphalt concrete shall be as follows unless modified in writing:

Sieve	Percent Passing
3/4	100
1/2	95-100
3	75-90
No. 4	50-75
No. 8	35-60
No. 30	15-35
No. 50	10-25
No. 200	4-8

PART 3--EXECUTION

QUALITY CONTROL TESTING:

Contractor Supplied Testing: The following tests may be performed by the Contractor's Representative.

Idaho T-125 (Nuclear Densimeter) for asphalt concrete in-place density.
Idaho T-87 for surface smoothness of finished pavement.

Subcontractor Supplied Testing: The Subcontractor shall submit an asphalt concrete mix design for approval a minimum of 5 days before anticipated use. If the mix design has not been used on the INEL within the past two years, a new mix design shall be obtained and tested by an independent laboratory at the expense of the Subcontractor.

New Mix Design Testing:

Aggregate: The Subcontractor shall supply a 200-lb sample of aggregate to an independent test laboratory to determine the gradation and mix design. A sieve report shall be submitted for approval.

The test methods shall be in accordance with the following:

Mechanical Analysis	AASHTO T27
Passing a No. 200 Sieve	AASHTO T11

A tolerance of 2% in the amount passing the maximum size screen will be permitted to allow for reasonable screen wear, providing all oversize material passes a screen having 1/8 in. larger opening.

Composition of Mixture: The asphalt concrete shall be composed of a mixture of aggregate, filler if required, and asphalt. The mix design shall be tested by an independent test laboratory based on the aggregate gradation before mentioned, and shall meet one of the following criteria:

Marshall Method:

Stability:	500-lb minimum
Flow:	8 to 20
Air Voids:	3% to 5%

HVEEM Method:

Stability:	37 minimum (See 405.04 of SSHC)
Swell:	Less than 0.030 in.
Air Voids:	3% to 5%

The mix design test results shall be submitted for approval, and the approved design mix shall be in effect unless modified in writing by the Contractor.

The aggregate and asphalt shall be mixed in accordance with SSHC Section 405.11.

BASE CONSTRUCTION:

The placement and compaction of the base leveling course material shall be in accordance with Division 2 Section, "Earthwork".

SURFACE PREPARATION:

The Subcontractor shall saw cut the existing asphalt pavement back 6 to 10 inches from the edge of excavation in a neat, vertical straight line. Any fractured, heaved, undermined or otherwise damaged asphalt beyond the 6 to 10 inch offset cut shall be "squared out" as directed by the Contractor's Representative and repaved.

TACK COAT:

Immediately prior to replacing any asphalt surfacing, the Subcontractor shall paint all edges of the old mat with an asphalt tack coat. Distribute at rate of 0.10 gal per sq. yd of surface.

PLACING AND FINISHING ASPHALT CONCRETE:

General: The asphalt plant mix shall then be spread uniformly and without segregation across the entire width of the area where the surfacing has been removed and where the patch is required. It shall be spread to such a depth that when compacted to its maximum density, the patched surface will match the existing surface. The asphalt concrete shall be compacted to 95% standard density.

Surface Smoothness: When tested with a 10-ft straight edge laid on the finished surface, perpendicular to the trench line, the repaired surface shall vary in no place more than 1/2 in. from the lower edge of the straight edge. The Subcontractor shall "rake" all edges to ensure the availability of a sufficient number of fines to seal the joints.

FIELD QUALITY CONTROL:

Surveillance will be performed by Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 02514

SECTION 02713--UNDERGROUND POTABLE AND RAW WATER SYSTEM

PART 1--GENERAL

SUMMARY:

The Subcontractor shall furnish and install all equipment, materials and supplies and perform all work and operations necessary to furnish and install the underground potable water (CW) and raw water piping system and appurtenances to complete the work as shown on the subcontract drawings and specified herein. Underground piping includes all piping, fixtures, and fittings starting 6" above the finished floor and below, including all piping inside underground trenches and utility tunnels. **Pipe selection will be made after considering the cost estimate and necessary cathodic protection.**

Section Includes: Work includes, but is not limited to:

Furnish and install all valves, tubing, pipe, strainers, hangers, supports, insulation, and appurtenances as required to complete the work as shown on the subcontract drawings for the potable water system.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B62	Standard Specifications for Composition Bronze or Ounce Metal Castings
ASTM B88	Standard Specifications for Seamless Copper Water Tube
ASTM F437	Standard Specifications for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings
ASTM F439	Standard Specifications for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings
ASTM F441	Standard Specifications for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C 651	Standard Specifications for Disinfecting Water Mains

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

NACE MR0274	Standard Material Requirements for Polyolefin Cold-Applied Tapes for Underground or Submerged Pipeline Coatings
NACE RP0188	Discontinuity (Holiday) Testing of Protective Coatings

INTERNATIONAL ASSOCIATION OF PLUMBING & MECHANICAL OFFICIALS (IAPMO)

UPC	Uniform Plumbing Code

SUBMITTALS:

Submittals include, but are not limited to the following:

TBD

Maintenance Manuals: Submit maintenance and operation manuals with complete parts lists for all valves and assemblies.

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Regulatory Requirements (Codes and Standards): Comply with the provisions of the following codes and standards, unless otherwise specified herein:

AWWA
UPC

PART 2—PRODUCTS

GENERAL:

All materials, products and equipment shall be as manufactured by the manufacturer specified in this section, or approved equal.

PIPE AND FITTINGS:

Chlorinated Polyvinyl Chloride (CPVC), (ND), Ployethylene (NH) Piping and Fittings:

Service: Raw water potable water, underground less than 6" diameter.

Piping: Potable water piping shall be HDPE SDR 17.0, in accordance with AWWA C906, or approved equal. Raw water piping shall be PVC C900 or approved equal.

Fittings: Raw water fittings shall be CPVC, SW, Schedule 80, in accordance with ASTM F437 or ASTM F439 for less than 3" diameter. Potable water fittings shall be HPPE SDR 17.0, in accordance with AWWA C906 or approved equal.

Fittings: Raw water fittings shall be CPVC, Schedule 80, SW, in accordance with ASTM F437 or ASTM F439 for less than 6" diameter.

Ball Valves: Raw water valves shall be CPVC, SW, True Union Type, for less than 4". Bronze or iron body valves may be used.

FIXTURES, FITTINGS AND TRIM:

Products shall be as listed below, or approved equal.

Identification Ribbon (GFE): Identification ribbon shall be 3-in. minimum wide, with a message printed on the ribbon that identifies the actual pipeline contents.

The plastic ribbon shall be color coded in conformance with the following:

Pipeline Contents	Tape Color	Lettering Color
Raw Water	Blue	White
Potable Water	Green	White

Locator Ribbon: See Section 02200, Earthwork.

PART 3--EXECUTION

ACCESSIBILITY:

Items such as valves, controls, access doors, specialties, and accessories shall be installed so as to be readily accessible for operation, servicing, maintaining and repairing.

PIPELINES:

Pipe shall be bedded in sand, insulation or other approved material, 4-in. minimum in all directions. Pipe shall be buried a minimum of 6 ft. to top of pipe.

Install pipe to uniform pitches between points for which elevations are established. Provide bends or elbows for changes in directions. One-quarter bends shall be long sweep type.

Between bends or elbows, lines shall be straight, free from irregularities, and have smooth interior surfaces. Reducers shall be required for changes in the size of pipes and fittings. Bushings shall not be used.

Anchorage against slippage shall be provided by means of concrete or masonry piers, tie rods and pipe clamps, or other approved means. Joints shall be made accessible for inspection and repair prior to testing and backfilling.

PIPE SLEEVES:

Install standard weight pipe sleeves for pipes passing through job cast concrete and masonry walls. Diameters of sleeves shall not be larger than required for unrestricted expansion and contraction. Length of sleeves shall be such that when installed, they will project 2 in. above floors, and be flush with finished surfaces of walls and ceilings.

PIPE JOINTS:

Steel Pipe Joints: Welded joints shall be made in accordance with the welding section of these specifications. Mechanical joints shall be made in accordance with the manufacturer's requirements.

Pipe Tie-Ins: When performing final tie-ins to existing or new piping which requires cutting, grinding, drilling or other operations and may introduce dirt, chips, or debris into the pipe interior, expanding pipe plugs shall be installed in the pipe where possible to prevent contamination spread. These plugs shall be equipped with lanyards, which extend outside the pipe end to prevent the plug from being inadvertently left in the pipe. No other objects such as rags, cardboard, paper, etc., shall be used in lieu of these plugs. Where it is not possible to install pipe plugs, the Subcontractor shall prepare a work plan that describes how cleanliness shall be maintained. This plan shall be approved by the Contractor.

PROTECTIVE COATINGS:

All underground piping shall be coated with a corrosion resistant coating.

Pipeline coatings shall be inspected by the Contractor's Representative with the use of a holiday detector. Performance of this holiday test shall be in accordance with NACE Standard RP 0188. After coating has been applied but prior to installation into trench, the piping shall be presented for inspection by notifying the Contractor's Representative.

All underground piping shall be protected with Cathodic protection. See Section 16640 for Cathodic Protection System.

PIPE IDENTIFICATION:

Identification Ribbon: All underground piping shall be wrapped with Identification Ribbon. All existing underground piping uncovered during construction shall be identified and

wrapped with Identification Ribbon to the extents of the excavation. The ribbon shall be wrapped around the pipeline at no less than 1 wrap per 3 ft of run, with the pipe identification label showing.

Locator Ribbon: See Section 02200, Earthwork.

EQUIPMENT, FIXTURES, ETC.:

Equipment shall be set in place, aligned, connected, and made ready for operation. Required safety devices shall be installed. Initial lubrication shall be provided. Controls shall be set for efficient, stable operation.

Fixtures shall be installed and supported in a safe, rigid, neat, and orderly manner. They shall be free from undue stresses and made suitable for normal use.

All of the above shall be protected from damage during and after installation. At completion, work shall be free from tool marks, discolorations, cracks, scratches, chips and other defects.

POTABLE WATER SEPARATION:

Potable water lines includes only potable water (CW). Utility lines include fire water (FW) and raw water (RW). Process lines shall include all other process, waste, sanitary, and service lines.

Potable water lines shall be separated from other lines horizontally and vertically as specified below:

Potable water shall be separated from utility lines by a minimum of 12 in. horizontally (outside wall to wall), and a minimum of 12 in. above vertically (top of utility pipe to bottom of potable water pipe).

Potable water lines shall be separated from process lines by a minimum of 10 ft. horizontally, or; separated by 6 ft. horizontally and 18 in. vertically and the process line shall be constructed, as a minimum, to the requirements of the water line, or encased in 4" minimum of concrete all around, or double encased in welded Sch. 40 CS or polyethylene pipe sealed at both ends.

FIELD QUALITY CONTROL:

Surveillance will be performed by Contractor's Representative to verify compliance of the work to the drawings and specifications.

CLEANING AND TESTING:

Per AWWA

END OF SECTION 02713