



ACHD SPs and SSPs for Green Stormwater Infrastructure (GSI)

Use Excavation ISPWC 202.4.1.A.1 and Clearing & Grubbing 201.4.1.A.1 per AC

SP 02030 - GEOGRID

Consultant to provide a specification when this type of product is being used. Consultant should use the name and number provided above and payment "Per SF"

Payment for this item will be made under:

SP 02030 – Geogrid.....Per SF

SSP 20201 – BIORETENTION SOIL MIX (BSM)

Description: The BSM shall be a mixture of Fine Aggregate (Sand), Sandy Loam and Compost conforming to the following requirements. Refer to ACHD Stormwater Design Tools and Approved BMP’s – Bioretention Swale BMP 30 (ACHD Policy 8200). BSM should achieve a long-term, in-place infiltration rate with a minimum five (5) inches per hour.

Materials: This item covers the production of BSM, material testing of BSM, and construction requirements.

1. FINE AGGREGATE (SAND) – 60% of BSM

- a. Fine Aggregate shall be weed seed free, washed, and free of wood, waste, or any other foreign material.
- b. Fine Aggregate shall be analyzed using AASHTO T-11/T-27 and meet the following gradations requirements:

ISPWC – Section 801.2.2 Filter Sand	
SIEVE SIZE	PERCENT PASSING
3/8 inch	100
No. 4	95-100
No. 8	<i>Report Only</i>
No. 16	45-80
No. 30	<i>Report Only</i>
No. 50	10-30
No. 100	2-10
No. 200	0-4

- c. Fine Aggregate Sand shall be analyzed to meet the following requirements:

Test Method	SPECIFICATIONS
Soluble salt	< 3.0 dS/m
Boron	< 0.8 ppm
SAR	< 2.0

2. SANDY LOAM – 20% of BSM

- a. Sandy loam shall be free of weeds, roots, stems, seeds, heavy metals, and all other foreign material.
- b. Sandy loam shall be classified using ASTM D-422 and meet the following requirements:

COMPONENT	PERCENT IN SAMPLE
Sand	70-90
Silt	0-30
Clay	2-15

Note: These ranges were selected from the USDA soil textural classification for a sandy loam, such that clay content does not exceed 15 percent of sandy loam.

- c. Sandy loam shall be analyzed and meet the following requirements:

TEST METHOD	SPECIFICATIONS
Phosphorus – Olsen P	<60 mg/kg
Comprehensive Soil Analysis including: TEC, pH, soluble salt, major and minor nutrients, half saturation, SAR, & percent organic matter	Typical Range

3. COMPOST – 20% of BSM

- a. The Compost shall be mature, well decomposed, weed free, herbicide free, pesticide free, manure free, absent of garbage, and certified by supplier. Organic matter sources shall be derived from waste (feedstock) including yard debris, wood waste, or crop by-products. This product shall not include manure or bio-solids. Any manufactured materials (plastic, concrete, ceramics, or metal) shall be less than 1.0% by dry weight of the product.
- b. Compost shall be analyzed and meet the following requirements:

TEST METHOD	SPECIFICATIONS
Sieve Analysis – AASHTO T-11/T27	½” Screen – 100% passing No. 200 Screen – 0-20% passing
Percent Moisture	35%-50%
Organic Matter – ASTM F-1647 or TMECC 05.07A	35%-65%
pH – TMECC 4.11	6-8
Carbon: Nitrogen Ratio	15:1 – 35:1**
Soluble Salt	≤ 6 dS/m
Maturity – TMECC 05.05A or Solvita	>80% >5%
Pathogens: Fecal Coliform – TMECC 07.01AB Salmonella – TMECC 07.02A	<1000 MPN/g <3 MPN/4g

***Failing test results may require an action plan be submitted to ACHD detailing what will be adjusted to specification during placement. Or be required to resubmit a soil sample prior to placement at cost to the contractor.*

4. BSM MIXTURE

- a. BSM Mixture shall be analyzed and meet the following requirements:

TEST METHOD	SPECIFICATIONS
Organic Matter – ASTM F-1647 or TMECC 05.07A	7%-13%
pH – TMECC 4.11	6-8
Cation Exchange Capacity (CEC) – ASTM D-7503	≥5 meq/100g
Constant Head Permeability – ASTM D-2434	> 5 inches/hour

- b. Gradation Limit: The definition of the BSM should be the following USDA classification scheme by weight:
- i. Sand: 85-90 %
 - ii. Silt: 10 % maximum
 - iii. Clay: 5 % maximum
- c. A description of the equipment and methods used to completely mix the three components of the BSM and the delivery to the project site.
- d. Tests should be conducted no more than 180 days prior to the delivery date of the BSM to the project site. Batch-specific test results and certification will be required for projects installing more than 100 cubic yards of BSM.
- e. The Contractor shall submit the following for approval:
- i. All required test data for each individual component and on the BSM mixture.
 - ii. A one-gallon sample of the BSM mixture shall be submitted to ACHD for review within 10 business days prior to installation.
 - iii. ACHD may request additional samples of any individual component and/or the BSM mixture to be submitted.

Workmanship: After excavation to subgrade, should be ripped or scarified to promote greater infiltration before placing the BSM on the surface.

1. Erosion and sediment control practices during construction should be employed to protect the long-term functionality of the bioretention. The following practices shall be followed for this reason.
 - a. Provide erosion control in the contributing drainage areas to the facility and stabilize upslope areas.
 - b. Facilities should not be used as sediment control facilities, unless installation of all bioretention related materials are withheld towards the end of construction, allowing the temporary use of the location as a sediment control facility, and appropriate excavation of sediment is provided prior to installation of bioretention materials.
2. Do not excavate, place soils, or amend soils during wet or saturated conditions.
3. Operate equipment adjacent to the facility. Equipment operation within the facility should be avoided to prevent soil compaction. If machinery must operate in the facility, use lightweight, low ground contact pressure equipment to prevent compaction.
4. The following practices shall be followed to protect the long-term functionality of the facility:

- a. The BSM shall be mixed prior to being delivered to the site unless another method of onsite mixing is approved by ACHD.
- b. Place soil in six (6) inches to twelve (12) inch lifts with machinery adjacent to the facility (to ensure equipment is not driven across soil). If working within the facility, to avoid over-compacting, place first lifts at far end from entrance and place backwards towards entrance.
- c. Allow BSM lifts to settle naturally, saturate three (3) inches of surface to provide settlement and natural compaction between lifts. After lightly watering, allow soil to dry between lifts. Soil cannot be worked when saturated, so this method should be used with caution to ensure dry conditions. After all lifts are placed, wait two days to check for settlement, and add additional media as needed. No mechanical compaction is allowed.
- d. The long-term hydraulic conductivity rate should not be less than five (5) inches per hour when tested with a double ring infiltrometer (in accordance with ASTM D-3385, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer), a single ring infiltrometer, a Modified Philip-Dunne Infiltrometer, or other approved methods.
- e. Vehicular traffic shall not drive on, move onto, or disturb the BSM once placed, and water compacted.
- f. Rake bioretention soil as needed to level out. Verify BSM elevations before applying mulch or installing plants.

Measurement and Payment: Measurement for this item shall consist of placement of BSM material on a per cubic yard basis.

Payment of this item will be made under:
 SSP 20201 - Bioretention Soil Mix (BSM).....Per Cubic Yard

SP 20209.1 – GSI SEEDING

Description: This item shall include all costs associated with applying seed including: seed bed preparation, seeding, and soil amendments.

Materials: Provide materials as specified herein:

USE TAX TABLE

Item No.	Quantity	Supplied By	Description
SP 20209.1	SY	ACHD	GSI Seeding

Workmanship:

1. General

Perform seeding operations as specified. Perform seeding between November and January, except for seeding used as a temporary erosion and sediment control measure, or if the site has a functioning irrigation system.

2. GSI Seeding

Site should be free of trash and debris prior to seedbed preparation. Remove trash and debris manually and dispose of properly. Cultivate areas to be broadcast seeded immediately before seeding by furrowing the ground surface at least three (3) inches in depth and leave in a rough condition. Where slopes are benched or serrated, ACHD will not require additional preparation. Prepare the surface for seeding. On areas subject to severe erosion, ensure the extent of seedbed preparation does not exceed the area on which the entire seeding can be applied within a one-day operation. If conditions occur that prevent seeding at specified furrow depths, or if the roughened condition is destroyed, prepare the seedbed again at no cost to ACHD.

Unless otherwise specified, ACHD will provide seed to the contractor and contractor shall pay use tax for all material supplied. Use the mix and rate of seeding specified. Rake the soil or mechanically roughen the soil before applying seed, mulch mixture, or both. Apply seed uniformly over the seeded area by dry surface broadcast seeder. After seed application apply hydro-mulch mix. Do not mix the seed into the hydro-mulch mix. No fertilizer shall be included within the mulch mix. If the area is improperly seeded contractor shall cover the cost of new seed, re-prepare the site, and reseed at no cost to the District.

Broadcast the seed using a hydro-seeder or dry broadcast equipment as specified. **Do not apply fertilizer.** Do not apply seeding mixture if rainy conditions are anticipated outside manufacturer's application recommendations of 48 hrs of dry weather before and after application. In the event of unanticipated rainy conditions, re-apply the hydroseeding mixture to uncured areas at no additional cost to the District.

Do not allow trucks or equipment to drive on the area after seed is in place. Inspection of seeded areas will be made upon completion of seeding. The work in any area will not be measured for payment until a uniform distribution of the materials is accomplished at the specified rate. Areas that have not received a uniform application of seed at the specified rate, as determined by the Engineer, shall be re-seeded at the Contractor's expense prior to payment.

3. Hydraulically Applied Erosion Control Product

Provide a mixture that is nontoxic to animals, soil microorganisms, aquatic and plant life. Ensure the hydraulically applied erosion control product does not interfere with or impede seed germination or vegetative growth and establishment.

- a. Hydraulic Mulch. Mix and apply the mixture, in accordance with the manufacturer's written instructions and at a rate for the soil type, roughness of surface, conditions and degree of slope.
- b. Stabilized Mulch Matrix. Mix and apply the mixture, in accordance with the manufacturer's written instructions and at a rate for the soil type, roughness of surface, conditions and degree of slope.
- c. Bonded Fiber Matrix. Mix and apply in accordance with the manufacturer's written instructions and at a rate for the soil type, roughness of surface, conditions and degree of slope.
- d. Fiber Reinforced Matrix. Mix and apply the mixture, in accordance with the manufacturer's written instructions and at a rate for the soil type, roughness of surface, conditions and degree of slope.
- e. 100% Biodegradable Erosion Blankets. Install 100% biodegradable erosion blankets on slopes in a vertical direction and in accordance with the manufacturer's recommendations or as Engineer directed.

Measurement and Payment: Measurement for this item shall consist of paying Use Tax for supplied material. Applying seed including: seed bed preparation, and seeding per square yard basis.

Payment of this item will be made under:

SP 20209.1 – GSI Seeding..... Square Yard

SP 20210.1 – SHREDDED BARK MULCH WITH PRE-EMERGENT

Description: This item shall consist of furnishing all labor, material, and equipment necessary for installation of Shredded Bark Mulch.

Materials: The organic material has a shredded texture from naturally harvested woods. The texture ranges from medium fibers to shredded four (4) inch to six (6) inch size chunks. The organic material will be free of weed seed, fungus, and mold.

The following material will not be accepted by ACHD including dyed wood, bark nuggets, or shredded rubber products. Weed barrier fabric and staking is not allowed.

Workmanship: Soil is to be treated with a bare ground pre-emergent before installing the Shredded Bark Mulch. The Contractor shall ensure that the shredded mulch area fully covers the designated area at a five (5) inch depth applied to bare soil either by hand or machine. Once installed it shall be monitored to ensure no noxious weeds are growing in the medium during the duration of the Plant Establishment Plan.

Inspection of Shredded Bark Mulch areas with pre-emergent will be made upon completion of installation. The work in any area will not be measured for payment until a uniform distribution of the materials is accomplished at the specified depth/width per plan. Areas that have not received a uniform application of Shredded Bark Mulch at the specified depth/width per plan, as determined by the Engineer, shall be re-installed at the Contractor’s expense prior to payment.

Measurement and Payment: Shredded bark mulch with pre-emergent will be measured per square yard and shall include all labor, equipment, and material necessary for the completion of the bid item.

Payment of this item will be made under:

SP 20210.1 Shredded Bark Mulch With Pre-Emergent.....Per Square Yard

SP 20210.2 – SHREDDED BARK MULCH

Description: This item shall consist of furnishing all labor, material, and equipment necessary for installation of Shredded Bark Mulch.

Materials: The organic material has a shredded texture from naturally harvested woods. The texture ranges from medium fibers to shredded four (4) inch to six (6) inch size chunks. The organic material will be free of weed seed, fungus, and mold.

The following material will not be accepted by ACHD including dyed wood, bark nuggets, or shredded rubber products. Weed barrier fabric and staking is not allowed.

Workmanship: All debris including trash, sticks, and leaves to be removed prior to soil preparation. The Contractor shall ensure that the shredded mulch area fully covers the designated area at a five (5) inch depth applied to bare soil either by hand or machine. Once installed it shall be monitored to ensure no noxious weeds are growing in the medium during the Plant Establishment Plan.

Inspection of Shredded Bark Mulch areas will be made upon completion of installation. The work in any area will not be measured for payment until a uniform distribution of the materials is accomplished at the specified depth/width per plan. Areas that have not received a uniform application of Shredded Bark Mulch at the specified depth/width per plan, as determined by the Engineer, shall be re-installed at the Contractor's expense prior to payment.

Measurement and Payment: Shredded bark mulch will be measured per square yard and shall include all labor, equipment, and material necessary for the completion of the bid item.

Payment of this item will be made under:

SP 20210.2 Shredded Bark Mulch..... Per Square Yard

SP 20221 – PLANT ESTABLISHMENT PLAN

Description: This item includes all costs to implement the Plant Establishment Plan.

Workmanship: During construction, installation, and throughout the plant establishment period the Contractor shall achieve the following objectives: the growth and establishment of desirable vegetation, weed removal, erosion control, clean up, and maintenance of irrigation facilities. The Contractor shall not use fertilizer, pesticides, and/or herbicides of any kind in the stormwater facilities. Contractors shall ensure all plant material, seeded areas, and pre-existing desirable vegetation are kept healthy and in a vigorous growing condition. Contractor shall maintain all vegetated and unvegetated areas as stated in the Plant Establishment Plan.

The plant establishment period is defined as at least one complete growing season (April – September). Further, if vegetation is installed during the growing season, the Plant Establishment Plan duration will be extended until September 30th of the following year. During the plant establishment period, the Contractor shall perform all work outlined in the Plant Establishment Plan. Maintenance shall include though is not limited to; labor and materials necessary for removal of foreign, dead, or rejected plant material; maintaining a weed-free condition; and the replacement of all unsatisfactory plant material planted under the Contract. If plants are stolen or damaged by the acts of others, ACHD will pay bid cost only for the replacement plants with no mark-up and the Contractor will be responsible for the labor to install the replacement plants.

Workmanship: During the plant establishment period, the Contractor shall meet with the Engineer at the times specified in the Plant Establishment Plan. It is the Contractor's responsibility to contact the ACHD Engineer to schedule the required inspections prior to the start of the plant establishment period. The Contractor shall correct all unsatisfactory conditions within a 10-day period immediately following the inspection(s) unless otherwise agreed upon with ACHD.

1. Live Plants

The Contractor shall water, cultivate, and prune the plants as required or directed by the Engineer. The Contractor shall reshape plant saucers, repair washouts and gullies, replace lost wood chip mulch, keep all planting sites free from weeds and do other work necessary to maintain the site and keep the plants in a healthy and vigorous growing condition.

The Contractor shall be responsible for replacing any dead plants up to the specified acceptable survival rate stated in the Plant Establishment Plan by September 30th unless otherwise agreed upon with ACHD.

ACHD shall perform a plant evaluation by September 15th to determine the overall plant success and die off that occurred during the plant establishment period. If plant replacement is required, the Contractor shall submit a plan and schedule for the plant replacement to the Engineer within 10-days of the Contractor's receipt of the plant evaluation results, unless otherwise agreed upon with ACHD.

2. Seeded Areas

The Contractor shall be responsible for reseeding any poorly established areas as stated in the Plant Establishment Plan by September 30th unless otherwise agreed upon. ACHD shall supply the seed unless otherwise stated in the contract.

ACHD shall perform a plant evaluation by September 15th to determine the overall seeding success during the plant establishment period. If reseeding is required, the Contractor shall submit a plan and schedule to the Engineer within 10-days of the Contractor's receipt of plant evaluation results unless otherwise agreed upon with ACHD.

3. Pre-Existing Desirable Vegetation

The contractor shall be responsible for the replacement of any pre-existing desired vegetation within the project vicinity deemed dead due to construction activities such as being driven over, lack of irrigation, etc.

ACHD shall perform a plant evaluation by September 15th the year following construction to determine the overall die off that occurred during construction and the plant establishment period. If plant replacement is required, the Contractor shall submit a plan and schedule for the plant replacement, including any substitutions for dead pre-existing plants, to the Engineer within 10-days of the Contractor's receipt of the plant evaluation results, unless otherwise agreed upon with ACHD.

Measurement and Payment: This item includes all material, labor, and equipment necessary for the Plant Establishment Plan.

Payment of this item will be made under:

SP 20221 Plant Establishment Plan Lump Sum

SP 20222 – WETLAND SOD

Description: Wetland sod is to be grown in a hydroponic coir (coconut fiber) mat. This item shall include all work and costs associated with installing Wetland Sod Mats in the areas as shown on the construction plans or as directed by the Engineer.

Materials: Wetland Sod mat delivery should be scheduled to coincide with immediate job site installation. If mats cannot be immediately installed, the product is required be stored in a shady location for no more than **three (3)** days and must be kept thoroughly saturated and

covered (tarped) during that time. In hot, dry weather mats should be stored in the same conditions but for no more than **two (2)** days. Each Wetland Sod mat is approximately 16.2 feet in length and 3.2 feet wide. Mat weights vary seasonally from 120-170 pounds. Stakes are 1"x2"x12" Survey Stakes, 8-10 per mat.

USE TAX TABLE

Item No.	Quantity	Supplied By	Description
SP 20222	SY	ACHD	Wetland Sod

Product is from North Fork Native Plants or approved equal by Engineer.

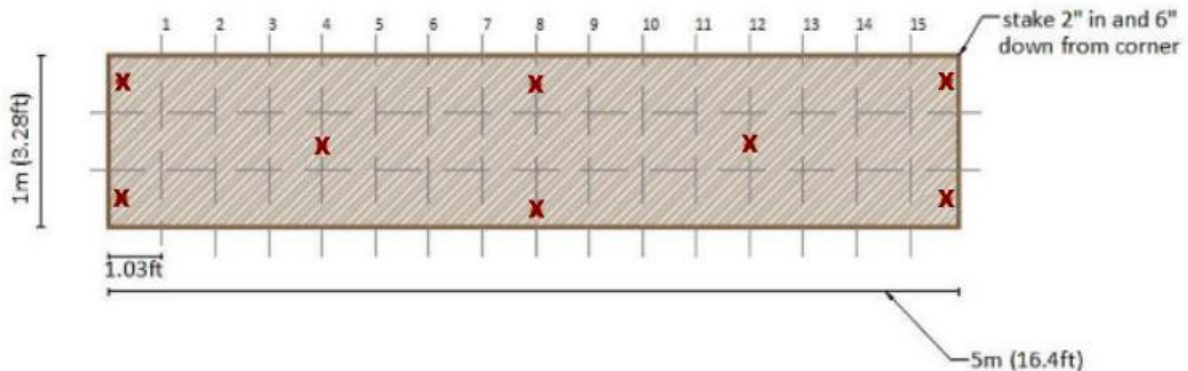
Address: 1499 S 6000 W, Rexburg, ID 83440

Phone: +1 (208) 354-3691

Workmanship: Wetland Sod is to be planted on naturally saturated soils. Temporary irrigation will follow standard ACHD watering requirements. Mats are moved to installation site, unrolled and staked down. All debris including trash, rocks, sticks shall be removed prior to installation.

Ensure that the mats are meeting direct contact with the soil. Space between the mat bottom and ground caused by folds, wrinkles or upturned mat edges will create a void that will allow the root system to dry and vegetation to die.

Mats should not be installed on slopes steeper than a 2.5:1, and if this occurs contact engineer for guidance. Some die-back can be expected when slopes exceed 3:1 steepness.



Staking requires overlapping ends and/or sides of two mats (2inches -4inches). Use 8 stakes; 2 on each end near the corners, 2 in the middle near the top and bottom, and 2 spaced evenly between the middle and the ends. If overlapped ends and/or sides, then move stakes closer to the edges (~2 inches from edge) to catch overlap of adjacent mats. Stakes should be inserted at an angle to pin coir fabric tightly to the ground until plants and leave about 4" of the stake protruding above the mat.

Measurement and Payment: Measurement for this item shall consist of Wetland Sod mats, stakes, and installation of product on a per square yard basis.

Measurement & Payment for this item will be made under:

SP 20222- Wetland Sod.....Per Square Yard

SP 25007 – 3/4" CRUSHED ORNAMENTAL ROCK

Description: This item consists of furnishing all labor, equipment and material necessary to install 3/4" crushed ornamental rock at the locations shown on the plans or as directed.

Materials: 3/4" Crushed Ornamental Rock material shall consist of washed 3/4" crushed aggregate, color light tan. (Black/Tan Typ. and Perma-Bark Not Acceptable) Sample must be submitted to ACHD prior to installation for approval. Weed barrier fabric and staking is not allowed.

Workmanship: All debris including trash, sticks, and leaves to be removed prior to soil preparation. Soil is to be treated with a bare ground pre-emergent before installing the 3/4" Crushed Aggregate. 3/4" Crushed ornamental rock to be placed at a depth of four (4) inches over treated uncompacted soil. Placement of shall be two (2) inches below back of curb and one (1) inch below sidewalk.

Measurement and Payment: 3/4" Crushed Ornamental Rock will be measured per cubic yard and shall include all labor, equipment, and material necessary for the completion of the bid item.

Payment for this item will be made under:

SP 25007 – 3/4" Crushed Ornamental RockPer Cubic Yard

SP 25050.1 – GSI TOPSOIL

Description: This item shall include all work and costs associated with installing six (6) inch minimum of topsoil in the areas as shown on the construction plans or as directed by the Engineer.

Materials: Topsoil shall be friable, fertile, agricultural soil, containing normal amounts of macro and micronutrients capable of sustaining vigorous plant growth. It shall be of uniform composition throughout, without admixture of subsoil. It shall be free of stones 1" (one inch) or larger, lumps, sticks, live plants and their root, and other extraneous matter. It shall not be infested with nematodes or other pest or disease organisms. It shall be free of seed of noxious weeds and other material detrimental to vegetative growth. ACHD reserves the right to request soil samples be tested at the Contractor's expense to verify the topsoil can sustain vigorous plant growth.

Workmanship: Topsoil shall not be placed in its final position until the areas to be covered have been properly prepared and grading operations in the area have been substantially complete.

Place six (6) inch soil lifts with machinery adjacent to the facility (to ensure equipment is not driven across soil). If working within the facility, to avoid over-compacting, place first lifts at far end from entrance and place backwards towards entrance. Topsoil shall be placed and spread at locations shown and dictated in the plans and thickness of topsoil placement shall be six (6) inch.

Measurement and Payment: Measurement for this item shall consist of placement of topsoil to a six (6) inch minimum depth on a per square yard basis.

ITEM 29, "VARIATIONS IN QUANTITIES," ON PAGE GC16 OF THE ACHD GENERAL CONDITIONS, SECOND PARAGRAPH, shall not apply to this bid item.

Payment of this item will be made under:

SP 25050A - GSI Topsoil.....Per Square Yard

SP 29107.1 – GSI TEMPORARY IRRIGATION SYSTEM

Description: This item shall consist of furnishing all labor, material, and equipment necessary for installing irrigation and watering the vegetated GSI Facility as shown on plans or as directed by the Engineer.

Materials: Contractor shall supply shop drawings to include supply parts list, and calculations to submit to ACHD for approval prior to installation. Materials used for irrigation shall be installed prior to revegetation. Drip Lines and micro-sprinklers are prohibited to be used within ACHD owned and maintained GSI facilities. If plans reference drip emitters contact Engineer.

Controller

- Required to be battery operated and fixed power capable.
- Adaptable power by a solar powered controller.
- Manual controls for onsite adjustment
- Wifi enabled is prohibited (these facilities don't have the capability)

PVC Pipe

- Main supply underground: Schedule 40 PVC
- Circuit supply line: Class 200 PVC
- Sleeving (under all paved and concrete): Class 200 PVC
- Risers: Flexible Poly-pipe in tree wells.
- Fittings: Schedule 40 solvent welded. Threaded fittings as required.
- Locating strips to be installed above PVC pipes

Backflow Prevention Devices

- Approved reduce pressure backflow assemble. $\frac{3}{4}$ " inch. Install per prevailing codes and ordinances.
- Above-ground reduce pressure backflow to be enclosed with Strong Box Aluminum
- Backflow Enclosure sized smallest to cover and lock securely.

Workmanship: Water used for the irrigation of vegetated GSI facility areas shall be potable; no surface irrigation water is permitted for use. The Contractor shall ensure that the planted area receives enough water to support vegetative establishment, however no more than necessary as overwatering contributes to weed growth and death of desirable. Materials used for irrigation should keep the upper three inches of soil wetted during germination then provide deep soaking into the subsurface of the vegetated area to promote deep root growth to ensure that plants will not perish upon ceasing irrigation. The irrigation season is defined in the 1 yr Plant Establishment Plan.

Install underground sprinkler irrigation for supply GSI facility. The systems will be connected to the new water meter and backflow valve where located on plans with verified coordination with local utility company. Winterize system at completion of season. Startup and make all adjustments at the beginning and through-out the following season. The work primarily consists of providing service supply connection, backflow device, automatic control, automatic valve, piping, and watering to the vegetation within the GSI facility.

Conduct of Work: It will be the Contractor's responsibility to verify these locations on the ground. Should the ditching intercept and damage any existing utilities, all further work within said area shall stop until the Landscape Architect is advised and can supervise repair.

1. Trenching

Trenching shall be executed in conformance with ISPWC Section 300-TRENCH EXCAVATION AND BACKFILL for Type I Trench Excavation. Trenches under paved surfaces shall be at least 24 inches deep for PVC lateral sprinkler lines downstream from automatic control valves (zone). All trenches must be straight and not have abrupt changes in grade. Unavoidable depth variations shall be approved by Landscape Architect.

2. Main Supply

Connect to building supply line, downstream of meter at location as shown on the drawings, with approved tapping device. Extend main supply line to valve box location. Install manual gate valve, manual drain valve, and backflow device. Install proposed automatic valve, filters, and other specified components.

3. Drain Valves

Install drain valves, one per circuit, outside foundation wall penetrations. Provide 1/2 cubic yard gravel sump. Install PVC risers and traffic rated valve box(es) at finish grade within GSI facility.

4. PVC Pipe and Fittings

Due to the nature of PVC pipe and fittings, the Contractor shall exercise care in handling, loading, unloading, and storing to avoid damage. The pipe and fittings shall be stored under cover and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat, to prevent undue bending or concentrated external load at any point. Any pipe that has been dented or damaged shall be discarded until such damage has been cut out and the pipe is rejoined with a coupling.

PVC pipe ends shall be cut 90 degrees to the pipe length and cleaned of all cutting burrs prior to cementing. Use approved reaming tool. Pipe ends shall be wiped clean with a rag lightly wetted with PVC thinner. Apply cement with a light coat inside of the fitting and a heavier coat on outside of the pipe. Insert pipe into the fitting and give a quarter-turn to seat the cement. Wipe excess cement from outside of the pipe. Test pipe as indicated elsewhere in these Specifications. No backfilling will be permitted other than at the centers of pipe lengths until the pressure test is completed.

PVC pipe shall extend between tree wells uninterrupted by fittings. Locate pipe, tee, and other fittings within tree wells where practical. Protect pipe from damage where it penetrates the tree well. Provide PVC sleeving for all piping under paved surfaces.

Solvent welded joints shall be given at least 15 minutes set-up time before moving or handling. Pipe shall be partially center loaded to prevent arching and slipping. No water shall be permitted in pipe until a period of at least 10 hours has elapsed for solvent weld setting and curing.

Sand bedding shall occur a minimum of 4 (four) inches in all directions around pipe.

Do backfilling when pipe is not in an expanded condition due to heat or pressure. Accomplish cooling of the pipe by operating the system for a short time before backfilling, or by backfilling in the early part of the morning before the heat of the day.

Before pressure testing, soluble weld joints shall be given at least 24 hours curing time. Great care must be taken to ensure that the inside of the pipe is absolutely clean. Any pipe ends not being worked on must be protected and not left open.

5. Pressure Testing

Before backfilling, all components of the system shall be pressure tested. Cap all risers and water fill for testing of all supply lines. Tests are to be witnessed by the ACHD Inspector or District Engineer. The Contractor shall give 48 hours of advance notice.

All system joints, connections, couplings, valves, hose bibs, and all other junction points, shall be left exposed until completion and acceptance of the pressure tests. The system shall be water filled, capped, and pressure-tested at 90 psi. To be acceptable, the system loses 0 psi in a 30-minute time span. Leaks shall be repaired and corrected.

The location, inspection, and testing provisions of these Specifications will be strictly adhered to. If, for any reason, any part of the sprinkler system is backfilled before ACHD authorizes approved location, testing, or inspection, it must be completely uncovered and exposed until approved for backfilling.

6. Watering schedule is provided in the 1 yr Plant Establishment Plan.

7. Final Acceptance

Upon completion and approval of all tests, final acceptance of the system will be contingent upon the Contractor instructing ACHD personnel in system operation, providing signed and approved sprinkler/plumbing/health/electrical permits as may be applicable in the area, as well as reproducible "records drawings" and two binders of all catalog cuts/manufacturer's instructions/maintenance and operation information.

Guarantee in writing all materials, equipment and workmanship furnished to be free of all defects of workmanship and materials. Within one year after date of Substantial Completion repair or replace all defective parts or workmanship that may be found at no additional cost to Owner.

Measurement and Payment: GSI Temporary Irrigation system shall be measured on a per year basis and shall include all labor, equipment, and material necessary for completion of the bid items. This system shall be under a 1 year warranty period by the contractor.

Payment for this item will be made under:

SP 29107.1 GSI Temporary Irrigation System.....Lump Sum

SP 29097 - LANDSCAPE BOULDERS

Description: This item includes all material, labor and equipment necessary to provide and install boulders at locations illustrated on the landscape plans.

Materials: Boulders will be light in color and shall have an approximate dimension of 3'x5'x3', sourced locally.

Workmanship: Boulders shall be kept a minimum 5' from traffic signs also located within the center island. Boulder is to be situated on a firm base, with approximately 1/3 boulder depth buried, with the largest rock face placed down to prevent tipping or rolling. The rock will not be placed until all work in the affected areas has been substantially complete.

Measurement and Payment: Payment shall be on a per each basis for each individual landscape boulder placed.

Payment for this item will be made under:

SP 29097 - Landscape Boulders.....Per Each

SP 29098 – TREE AND SHRUB PLANTING

Description: This item includes all labor, supervision, equipment, materials, and supplies necessary for, and incidental to, the installation of trees and shrubs, as indicated on the landscape plans and further specified herein.

Applicable Industry Standards:

1. American Standard for Nursery Stock, ANSI Z60.1. current edition.
American Association of Nurseryman, Inc.,
1250 Inc. ST. NW, Suite 500, Washington, DC 20005.
2. American National Standard for Tree Care Operations, ANSI A300 – most current edition.
International Society of Arboriculture,
PO Box 3129, Champaign, IL 61826-3129.

Materials:

1. A complete list of plants, including a schedule of quantities, and other requirements is included within the Landscape Plans. If discrepancies occur between quantities of plants indicated in the Plant Schedule, and as indicated on the Drawings, the plant quantities indicated on the Drawings shall govern.
2. All plant material shall conform to American Standard for Nursery Stock. Plant material shall be true to species and variety specified and nursery grown in accordance with good horticultural practices under climate conditions similar to those in the locality of the project. Plant material shall have been freshly excavated (during the most recent favorable harvest season). Plants shall be so trained in development and appearance as to be unquestionably superior in form and symmetry. They shall be sound, healthy, vigorous, well branched, and densely foliated when in leaf, and free of disease and insect adult eggs, pupae, or larvae. They shall have healthy, well-developed root systems and shall be free from physical damage or other conditions that would prevent thriving growth.
3. Trees with multiple leaders, unless specified will be rejected.
4. Trees with a damaged, cut, or crooked leader, including bark, abrasion of bark, sunscald, disfiguring knots, insect damage, mold, prematurely opened buds, or cuts of limbs over 3/4-inch diameter that are not completely callused are cause for rejection.
5. Substitutions of plant materials will not be permitted unless authorized in writing by ACHD. If proof is submitted, substantiated in writing, that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety, at no additional cost to ACHD.
6. All plants shall be labeled by size and scientific plant names as listed in the current edition of Index of Garden Plants. Labels shall be attached securely to all plants, bundles, and containers of plant materials when delivered.

Workmanship:

1. Plants and trees shall not be installed with the wire and/or burlap. All wire and burlap to be fully removed for installation. Firmly dig to the recommended depth by the current edition of American Standard for Nursery Stock, and to sufficient depth to include fibrous and feeding roots. The root collar shall be within the top 2" of the soil ball. Balled-and-burlapped plants with manufactured balls or balls that are dry, cracked, or broken before or during planting operation will not be accepted. Plant root balls shall be fully buried. Earthen berms shall be 2 to 3 inches in height and shall be placed within 4-inches from the base of the plant and must fully encompass the plant to help hold moisture.
2. Branches shall be tied with rope or twine only, and in such a manner that no damage will occur to the bark or branches.
3. During transportation of plant material, the Contractor shall exercise care to prevent injury and drying out of the trees. Should the roots be dried out, large branches broken, balls of earth broken or loosened, or areas of bark torn, ACHD may reject the injured tree(s) and order them replaced at no additional cost to the ACHD.
4. The root systems of each load of bare root stock sent from the storage facility shall be adequately covered with wet soil, sawdust, wood chips, moss, peat, straw, hay, or other acceptable moisture holding medium, and shall be covered with an open-mesh tarpaulin or canvas. Loads that are not protected in the above manner may be rejected.
5. Plants must be protected at all times from sun or drying winds. Those that cannot be planted immediately on delivery shall be kept in the shade, well protected with soil, wood chips, or other acceptable material, and kept well-watered.
6. Freshly excavated plant material is given preference over plant material held in storage. Plant material held in storage will be rejected if excessive growth or dieback of branches has occurred in storage.
7. Plants shall not remain unplanted longer than 3 days after delivery without permission from the Owner.
8. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Trees shall be staked to support tree stability and prevent leaning.
9. Plants shall be lifted and handled with suitable support of the soil ball to avoid damaging it.
10. Soil, branches, binding and wrapping material, rejected plants, or other debris resulting from any tree planting shall be promptly cleaned up and removed. The work area shall be kept safe and neat at all times until the cleanup operation is completed. Under no condition shall the accumulation of soil, branches, or other debris be allowed upon a public property in such a manner as to result in a public hazard.
11. The Contractor shall guarantee all plants to be healthy and in flourishing condition for one year from the date of acceptance. The guarantee does not include vandalism, storm damage, animal damage or mechanical damage unrelated to contractor activities.
12. The Contractor shall remove and replace, without cost, and as soon as weather conditions permit, and within a specified planting period, all plants not in a healthy and flourishing condition as determined by ACHD any time during the guarantee period. Replacements shall be subject to all requirements stated in this specification.
13. The guarantee of all replacement plants shall extend for an additional period of one year from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended guarantee period, ACHD may elect subsequent replacement or credit for that item.

14. At the end of the guarantee period and upon written request of the Contractor, the Owner shall inspect all guaranteed work for final acceptance. The request shall be received at least 5 working days before the anticipated date for final inspection. Upon completion and re-inspection of all repairs or renewals necessary in the judgment of ACHD at that time, ACHD shall certify, in writing, that the project has received final acceptance.

Measurement and Payment: Payment shall be on a per each basis for each individual tree and shrub planted, as indicated in the project plans.

Payment for this item will be made under:

SP 29098 - Tree and Shrub PlantingPer Each