



# STORMWATER MANAGEMENT PLAN

**MERIDIAN ROAD & BENT GRASS MEADOWS DRIVE**  
**FILE #: CDR [-19-004](#)**

**STORMWATER PERMIT # COR\_\_\_\_\_**  
**CERTIFICATION # \_\_\_\_\_**

**Owner/Developer:**

Challenger Communities, LLC  
8605 Explorer Drive, Suite 250  
Colorado Springs, CO 80920

**SWMP Preparer:**

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Colorado Springs, CO 80918

**Contractor:**

To be Determined

**Qualified Stormwater Manager:**

To be Determined

**Date:**

November 15, 2019

**SWMP Location:**

On-Site (Copy) and Challenger Communities, LLC (Original)

**ACCEPTED for FILE**  
**Engineering Review**

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dsdnijkamp

EPC Planning & Community Development Department



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- A. Vicinity Map
- B. Soils Map
- C. GES Plan
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## SWMP REPORT REVISION LOG

REVISION #	DATE	BY	COMMENTS
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## **I. PROJECT DESCRIPTION**

### **LOCATION**

The site is located in the Northwest  $\frac{1}{4}$  and Southwest  $\frac{1}{4}$  of Section 1, Township 13S, Range 65W, of the Sixth Principal Meridian, County of El Paso, State of Colorado. The proposed improvements are located at the intersection of Bent Grass Meadows Drive and Meridian Road, as well as the west side of Meridian Road from Bent Grass Meadows Drive to Owl Place.

### **DESCRIPTION OF PROPERTY**

The project site contains approximately 0.69 acres and includes a portion of Bent Grass Meadows Drive, an 80' R.O.W. Collector, consisting of (1) left turn lane and (1) right turn lane East bound onto Meridian Road. Southbound Meridian Road consists of (2) lanes and (1) deceleration lane approaching Bent Grass Meadows Drive. Northbound Meridian Road consists of (2) lanes, and (1) left turn lane onto Bent Grass Meadows Drive. An existing roadside ditch runs parallel to Southbound Meridian road along the west side with (3) existing 45" X 29" Elliptical RCP storm pipes run under Bent Grass Meadows Drive at Meridian Road.

### **CONSTRUCTION ACTIVITY**

East bound Bent Grass Meadows Drive is to add a turn lane onto Meridian Road. East bound Bent Grass Meadows Drive will now include (2) left turn lanes and (1) right turn lane. In addition, a 960' acceleration lane with a 255' taper will be constructed along South bound Meridian Road. The (3) existing 45" X 29" Elliptical RCP storm pipes and associated FES' will be relocated to accommodate the additional turn and acceleration lane. Another (2) 45" X 29" Elliptical RCP storm pipes and associated FES' are proposed to be installed to convey additional off-site flows described in the Final Drainage Report. Additionally, the intersection of Bent Grass Meadows Drive and Meridian Road is proposed to be signalized.

Temporary stabilization measures (silt fence) will be installed prior to beginning construction. During construction temporary stabilization measures including inlet protection will be utilized to control stormwater runoff. Once final stabilization is achieved, temporary erosion control measures will be removed.

## **II. PHASING AND PROPOSE CONSTRUCTION SEQUENCE**

### **PHASING**

No phasing plan is proposed for the Meridian Road & Bent Grass Meadows Drive project. All construction improvements will be completed at once.

### **CONSTRUCTION DOCUMENTATION**

Construction drawings are provided with this document showing each of these phases and are intended to be a “living” document used by the SWMP Manager to document construction activities. See section IX “Inspection and Record Keeping” for additional information.

### **PROPOSED SEQUENCE FOR MAJOR CONSTRUCTION ACTIVITIES**

Construction for the development of this project is currently projected to begin in August of 2020. It is estimated that construction activities will be completed by August 2021. Final stabilization is expected in the July of 2021. The anticipated sequence of construction is as follows:

Meridian Road & Bent Grass Meadows Drive:

1. Installation of perimeter erosion control measures as shown on the construction drawings.
2. Site Clearing/Grubbing
3. Construct temporary sediment basins as necessary.
4. Rough grading of the site.
5. Installation of new storm pipe.
6. Backfill storm drain pipe trenches.
7. Construct curb/gutter and pavement.
8. Final stabilize ROW.
9. Final erosion control measures as areas are completed
10. Remove construction BMP's

See Section VI “Areas and Volumes” for information on anticipated disturbed area and grading volumes.

## **III. FINAL STABILIZATION**

Final site stabilization will be achieved when all final landscaping and paving is complete and when vegetation density is greater than 70 percent of pre-disturbance density over its entire area. All final stabilization on the site will be of a permanent nature. All temporary BMPs will be

removed upon completion of construction. It is the responsibility of the contractor to remove all dirt and garbage from the site. This project does not rely on control measures owned or operated by any other entity.

## **IV. PRE-DEVELOPMENT CONDITIONS & SOILS**

### **FLOODPLAIN**

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map number 08041C0553G, effective December 7, 2018, the project site is located within Zone X. Zone X is described as areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance-flood (See Appendix for the FEMA FIRM Exhibit).

### **EXISTING VEGETATION**

The site is currently undeveloped and has been used as a pasture for many years. Vegetation consists of native grasses/weeds that have been heavily grazed for years. There is no brush or trees within the area to be graded. Ground cover is estimated at 70% density. Ground cover was determined through visual inspections (site visits) and aerial imagery.

### **EXISTING DRAINAGE PATTERNS**

In the existing conditions, runoff from the west half of Meridian Road near Bent Grass Meadows Drive drains directly into the roadside channel, which flows south at an average slope of 1.75%. The majority of the channel in this area is triangular in shape with a depth of approximately 3 feet.

There are also three existing 45" x 29" elliptical RCP's that run beneath Bent Grass Meadows Drive. The Federal Highway Administration's HY-8 program was used to analyze the culvert and design the proposed culverts in the future conditions. The calculations included in Appendix C show that the existing culverts can convey approximately 166 cfs before flow begins to overtop Bent Grass Meadows Drive. All of the included calculations show that the culverts and channel are clearly vastly undersized and will need to be improved by El Paso County in the future to properly convey the flows outlined in the DBPS.

### **EXISTING SLOPES**

Existing slopes are around 1.75% flowing south.

### EXISTING SOIL TYPES

Soil data for Bent Grass Residential was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey.

The following table summarizes the characteristics of the soil type:

Soil	Hydro Group	Shrink/Swell Potential	Permeability	Surface Runoff Potential	Erosion Hazard
19—Columbine gravelly sandy loam, 0 to 3 percent slopes	A	Low	High	Very Low	Slight

The existing soil types have a slight potential for erosion which can be mitigated by employing appropriate downstream construction BMP's before/during/after construction to limit potential impacts to stormwater discharges. The potential impacts are sediment discharge into the existing wet weather conveyance and proposed drainage system. Sediment should not be allowed to enter these existing and proposed facilities and can be mitigated by constructing small temporary sediment basins at low points prior to discharge into the systems. Based upon the location of the different soil types and type of construction, the contractor shall employ the most appropriate method of erosion control measures based on the El Paso County/City of Colorado Springs Drainage Criteria Manual, Vol. 2 or as directed by a Qualified Stormwater Manager or his representative.

More detailed soils information can be found in the SCS soils survey for El Paso County.

## V. DESCRIPTION OF POTENTIAL POLLUTANTS

Potential sources of sediment to stormwater runoff include earth moving and concrete activities associated with grading and landscaping.

Potential pollutants and sources, other than sediment, to stormwater runoff include Trash, debris, line transfer, Dewatering, fueling and equipment failure.

A dewatering permit is not required

Construction activities produce many different kinds of pollutants which may cause storm water contamination problems. Grading activities remove rocks, vegetation and other erosion controlling surfaces, resulting in the exposure of underlying soil to the elements. Because the soil surface is unprotected, soil and sand particles are easily picked up by wind and/or washed away by rain or other water sources.

The following sections highlight the potential sources of pollution at the Project Site and list the “Best Management” strategies that will be used to prevent migration of pollution offsite. Chemical materials stored indoors or that have no reasonable chance of impacting storm water quality will not be discussed in this plan.

Materials of significance stored on the project site include:

- Sediment
- Concrete Washout
- Cement
- Trash & Debris
- Sanitary Wastes
- Fuels & Oils

#### **WIND EROSION & DUST CONTROL**

Pollutant: Sediment Best Management Strategies:

- Daily inspections will occur for areas experiencing excessive winds, vehicle traffic, or precipitation events.
- Water trucks will spray down dust on the project Site as needed to not impact adjacent properties.
- Attention will be given to prevent the over use of water in dust control operations to minimize any muddying of the surface and possible sediment transportation.

#### **VEHICULAR TRANSPORT**

Pollutant: Sediment Tracking Best Management Strategies:

- Construct a stabilized construction entrance to provide ingress and egress of the site.
- Restrict access to the stabilized construction entrance.
- Fencing will be erected if problems with access control are evident.

- Maintain track out pads by fluffing up the rock material or by adding additional rock as needed.
- Inspect, sweep and clean adjacent streets where track out is evident.

## **STOCKPILES**

Pollutant: Sediment Best Management Strategies:

- Locate stockpiles clear of any water flow paths.
- Locate stockpiles within the property boundary.
- Stockpiles will have erosion control devices as needed installed around the base to prevent the migration of soil.
- Topsoil stock piles and disturbed portions of the site where construction activity temporarily ceases for at least 14 days will be stabilized with temporary seed and mulch no later than 14 days from the last construction activity in the area.

## **GRADING, TRENCHING, EXPORT/IMPORT**

Pollutant: Sediment Best management Strategies:

- Earth moving will be minimized by the engineering balancing of the site.
- Disturbed portions of the site where construction activity temporarily ceases for at least 14 days will be stabilized with temporary seed and mulch no later than 14 days from the last construction activity in the area.
- Seed bed preparation is not required if soil is in loose condition.
- Prior to seeding, fertilizer shall be applied to each acre to be stabilized in accordance with the manufacturer's specifications.
- If required seeding areas shall be mulched with straw to a uniformed cover. The straw mulch is to be tacked into place by a disk with blades set nearly straight.
- A site specific erosion control drawing has been developed showing the location of Best Management practices to be used during site construction.
- Where indicated on the erosion control plan, Best Management Practices will be installed.
- Material shall be in accordance with the plans and specifications and all construction shall be provided in accordance with the manufacturer's specifications.
- All BMP's will be inspected bi-weekly and cleaned/maintained as required.

### **WASTE, RESIDUAL CONCRETE**

Pollutant: Concrete, paint, and Phosphoric Acid Best Management Strategies:

- A cleanup and washout area will be designated and posted.
- Subcontractors will be instructed on the locations and importance of the washout and cleanup areas. No on-site disposal is allowed.
- Instruct subcontractors to remove waste for which proper onsite disposal facilities are not provided back to their own facilities for ultimate transport, storage & disposal.
- Subcontractors and subcontractor employees are held responsible for improper washout.

### **SANITARY FACILITIES, TRASH CONTAINERS & LITTERING**

Pollutant: Bacteria, Ammonia, Trash Best Management Strategies:

- Portable facilities will be regularly serviced to prevent excessive waste containment and overflow.
- All waste materials will be collected and stored in a container which will meet all local and any state solid waste management regulations.
- Trash dumpsters will be emptied prior to becoming 90% full or when debris control becomes an issue.
- Employees will be instructed on the importance of recycling and waste management, and will be held responsible for improper waste management.

### **FUELING, HAZARDOUS MATERIALS, EQUIPMENT LEAKAGE, FERTILIZER**

Pollutant: Petroleum Hydrocarbons, Ethylene Glycol, Sediment Best Management Strategies:

- MSDS sheets will be maintained in the project trailer for all onsite materials
- All dry materials such as cement will be covered and protected from rain.
- Secondary containment will be provided for stored fuel, oil, paint and any material classified as hazardous.
- Subcontractors are responsible for hazardous waste removal back to their own facilities for ultimate transportation, storage and disposal.
- Supplies will be kept onsite as necessary to control any potential spill.
- Employees will be held responsible for any illegal dumping.

- Seals will be checked by a qualified professional on all equipment and containers containing significant materials that could contribute potential pollutants and will be replaced as necessary.
- Equipment will be inspected by a qualified professional.
- Drip pans will be available for minor leaks and during fueling operations.
- Fueling nozzles, gauges, hoses, seals, and emergency shutoff valves will be inspected for leaks prior to use.
- Under no circumstances during fueling will the fueling hose/nozzle be left unattended.
- Fertilizers used will be applied only in the minimum amounts recommended by soil tests.
- Once applied, fertilizers will be worked into the soil to limit exposure to storm water.
- Stored fertilizer will be protected from exposure to precipitation and storm water runoff.

**DEWATERING** – not needed.

This shown for information only Pollutant: Sediment, Oil and/or Grease and Phosphoric Acid Best Management Strategies:

All dewatering will be filtered through rock and/or woven geo mesh fabric.

All dewatering will be tested for Pollutants per state guidelines weekly.

**CONCRETE AND ASPHALT BATCH PLANT** – not needed.

This shown for information only There are no existing batch plants located on this project site and there are no proposed batch plants in the future.

**DRILLING SLURRY FOR DRILLING PIERS.** – not needed.

This is shown for information only. No drilling slurry is allowed to be deposited onto the job site. All drilling slurry shall be collected and pumped into an on-site frac tank and shall be disposed of off-site.

There are no major potential pollutants anticipated to be used on the site.

**ADDITIONAL (NON-STRUCTURAL) BEST MANAGEMENT PRACTICES FOR SEDIMENT:**

1. Earth moving will be minimized by the engineering balancing of the site.

2. Disturbed portions of the site where construction activity temporarily ceases for at least 14 days will be stabilized with temporary seed and mulch no later than 14 days from the last construction activity in the area.
3. Seed bed preparation is not
4. required if soil is in loose condition.
5. Prior to seeding, fertilizer shall be applied to each acre to be stabilized in accordance with the manufacturer's specifications.
6. If required seeding areas shall be mulched with straw to a uniformed cover. The straw mulch is to be tacked into place by a disk with blades set nearly straight.
7. A site-specific erosion control drawing has been developed showing the location of Best Management practices to be used during site construction.
8. Where indicated on the erosion control plan, Best Management Practices will be installed.
9. Material shall be in accordance with the plans and specifications and all construction shall be provided in accordance with the manufacturer's specifications.
10. All BMP's will be inspected bi-weekly and cleaned/maintained as required.

## **VI. AREAS AND VOLUMES**

The site consists of 0.69 acres. 0.69 acres are expected to be disturbed.

The unadjusted cut and fill quantities as of the writing of this report are listed below:

Cut Volume = 98.22 Cubic Yards

Fill Volume = 61.25 Cubic Yards

Net Volume = 36.96 Cubic Yards (Cut)

Note: The Total disturbed area shall be updated on the SWMP as changes occur.

## **VII. APPROPRIATE CONTROLS AND MEASURES**

Also refer to attached Erosion and Sediment Control notes and plans included in the site plans

### **MINIMIZE DISTURBED AREA AND PROTECT NATURAL FEATURES AND SOIL**

All work will occur inside the limits of construction per the erosion Control Site Plan.

**PHASE CONSTRUCTION ACTIVITY** The sequence for the installation and removal of erosion and sediment control measures is as follows: Perimeter control measures (silt barriers and fencing) installed at designated areas as noted on the site plans (Exhibit 1), cleaning of street surfaces

during construction if applicable, site grading, installation of utilities, paving final and grading, installation of sod or other vegetation, removal of temporary practices and perimeter controls, and site cleanup.

#### **CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT**

Offsite stormwater flows adjacent to this project site from the East Tributary of Jimmy Camp Creek. Reconstruction of the East Tributary north of this site was performed under a separate permit. On-site stormwater will be directed to detention ponds that will function as sedimentation basins so that no sediment enters the downstream receiving waters into the East Tributary.

#### **STABILIZE SOILS**

No disturbed area which is not actively being worked shall remain denuded for more than 14 calendar days unless otherwise authorized by the director. Temporary cover by seeding or mulching should be provided on areas which will be exposed for a period greater than 14 days before permanent stabilization can be achieved. Permanent cover should be provided on all areas as soon as possible, by means of seeding and mulching, straw or hay mulch is required. All soil stock piles and borrow areas must be protected with silt fence within 14 days after grading. All slopes within the project limits that are found to be eroding excessively within two years of permanent stabilization shall be provided additional slope stabilization methods such as seeding and mulching. Water is to be used for dust control. The Contractor will prevent the escape of this water and any sediment it may carry from the construction site.

#### **PROTECT SLOPES**

Temporary stabilization will include the installation of silt fences on level contours spaced at 10-20 foot intervals. Slopes will be seeded and covered with hay, straw or erosion control blankets on slopes greater than 3:1 as needed to provide for temporary stabilization until vegetation is permanently established. All slopes within the project limits that are found to be eroding excessively within two years of permanent stabilization shall be provided additional slope stabilization methods such as seeding and mulching. Where slopes are steeper than 3:1 erosion control blankets (per specification requirements) will be utilized for final stabilization.

#### **PROTECT STORM DRAIN INLETS**

Inlet protection will be installed as soon as storm drain inlets are installed and before land disturbance activities begin in areas with existing storm drain systems. At the Contractor's

discretion, additional temporary erosion control practices to include rock bags and sand bag barriers may be installed to prevent sediment movement. Inlet protection will include rock bags erosion logs curb inlet sediment filters where an overflow capacity is necessary to prevent excessive ponding in front of the curb inlet. Concrete block and wire screen inlet protection if used detail will be included Appendix prior to installation, will be used where heavy flows are expected and where an overflow capacity is necessary to prevent excessive ponding around the inlet. Inlet protection devices will be inspected and accumulated sediment will be removed as needed.

#### **ESTABLISH PERIMETER CONTROLS AND SEDIMENT BARRIERS**

Temporary stabilization will include the installation of silt fences on the downslope perimeter of project area. The silt fence will be trenched in on the uphill side 6 inches deep and 6 inches wide as detailed in the silt fence exhibit. Sediment will be removed when it reaches 1/3 the height of the fence. Silt fence will be inspected and replaced or repaired as needed.

#### **RETAIN SEDIMENT ON-SITE**

Temporary sediment traps shall be installed to detain sediment laden runoff from small watersheds for a period long enough to allow sediment to settle before discharge into receiving waters. For small drainage locations smaller sediment traps should be used. At a minimum, silt fences, vegetative buffer strips or equivalent sediment controls are required for all down-slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction. The use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal will be utilized. Sediment traps will be checked regularly for sediment cleanout. Sediments shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design volume of the wet storage. Sediment shall be disposed in suitable areas and in such a manner that will not erode or cause sedimentation problems. The gravel outlets will be checked regularly for sediment buildup which will prevent damage. If the gravel is clogged by sediment, it shall be removed and cleaned or replaced.

An alternate to sediment traps are temporary sediment basins.

#### **ESTABLISH STABILIZED CONSTRUCTION EXITS**

The construction entrance will be established in the entry points of roads. The construction entrance will be at least 75 feet in length and approximately 12 feet wide and graded so runoff does not leave the site. The aggregate will be established at 8 inches thick on top of 4 inch minimum thick free draining material on top of geotextile and will consist of Type G dense graded material. A stabilized stone pad with a filter fabric under liner will be placed at points of vehicular ingress and egress.

**ADDITIONAL BMP'S BMP SCHEDULE:**

All Sediment and Erosion control BMP's (detailed below and only on BMP site map and details if utilized onsite) will be installed prior to any excavation or demolition and will be coordinated with the construction schedule. As construction changes and new temporary BMP's are needed to control sediment and erosion temporary BMP's will be installed within 24 hours of inspection report.

**RECOMMENDED BMP'S: ALL RECOMMENDED BMP'S WILL BE INSTALLED PRIOR TO EXCAVATION NEAR ANY SENSITIVE AREAS.**

**CULVERT INLET PROTECTION** will be used to protect existing and new culvert inlets. Inlet Protection Detail will be included in Appendix before using onsite. Removal of this BMP will occur only after vegetation is established to a minimum of 70% pre construction coverage and after removal of BMP all sediment builds up will be removed and the area exposed shall be seeded.

**SILT FENCE** is to be installed in sensitive areas to protect stream channels, pond, and overland runoff. On this site it will be used to protect runoff from the slip pits. See Silt Fence Detail. Removal of this BMP will occur only after vegetation is established to a minimum of 70% pre construction coverage and after removal of BMP all sediment builds up will be removed and the area exposed shall be seeded.

**VEHICLE TRACKING CONTROL** is needed at the main construction entrance location. Vehicle tracking control shall be installed at the edge of the construction staging area where construction vehicles regularly exit onto existing asphalt road. If sediment tracking occurs it will be cleaned within 24 hours.

See Vehicle Tracking Control Detail in Grading & Erosion Control Drawings. Removal of this BMP will occur only after project is substantially complete and is ready for seeding operations; the area will then be seeded per specification with the rest of the project.

**CHECK DAMS** (rip rap) will be used to reduce storm water velocities in drainage channels during construction as a temporary measure until permanent stabilization can be created and vegetation has been established. Check Dam Detail will be included in the the Appendix before using onsite. Removal of this BMP will occur only after vegetation is established to a minimum of 70% pre construction coverage and after removal of BMP all sediment build-up will be removed and the area exposed shall be seeded.

**PORTABLE TOILETS:** Portable toilets are brought in from a service contractor and will be maintained in accordance with standard waste disposal practices using vacuum trucks and place on stable ground to minimize risk of spillage. All portable toilets will be kept a minimum of 500' from any waterway.

**WASTE DISPOSAL:** If needed Roll offs will be utilized for standard construction waste. A qualified contractor will remove waste weekly and take to an appropriate dump site off this project.

**PERMANENT BMP'S:**

**REVEGETATION:** During construction any disturbed area not being currently worked left dormant longer than 14 days will be re-vegetated per specification with native seed and mulched and crimped with weed free straw.

All BMPs shall be installed and maintained in accordance with the most recent Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual.

## **VIII. MATERIALS HANDLING AND SPILL PREVENTION**

### **MATERIAL HANDLING AND WASTE MANAGEMENT**

The site will use a private refuse collector that will remove litter twice weekly. No less than one litter receptacle will be present at the construction site. In the event that unusual items such as tanks, cylinders, unidentified containers, etc. which could contain potentially hazardous materials are discovered or disturbed, the Fire and Rescue services will be notified. Litter and debris will be picked up and disposed of properly daily. Temporary toilet facilities will be located 500 feet away from any storm drain inlets and all waters of the state.

### **ESTABLISH PROPER BUILDING MATERIAL STAGING AREAS**

A designated staging area will be used, location to be determined based on available space in the field and plans will be redline. The staging area will be contained per SWMP guidelines. All Equipment and Materials will be brought into the site as needed.

**DESIGNATE WASHOUT AREAS**

A concrete washout will be installed to detail as shown on the Construction Drawings and will be placed more than 500 feet away from any waters of the state.

**ESTABLISH PROPER EQUIPMENT/VEHICLE FUELING AND MAINTENANCE PRACTICES**

During construction the site will be exposed to operation and maintenance of construction equipment. The contractor shall be responsible for all activities such as fueling, oil changing, lubrication and repair which require use of petroleum products. Such products shall be transported to and from the site in special trucks equipped for that purpose. No waste petroleum products, rags, residue, or equipment parts shall be left on site. In the event of a spill or leak, causing soil to be contaminated, that soil shall be excavated placed in sealed barrels and removed from the site for transport to an approved location for disposal.

**CONTROL EQUIPMENT/VEHICLE WASHING**

This activity will not be allowed onsite.

**ANY ADDITIONAL BMPs**

Additional BMP's will be added to this SWMP as needed.

**ALLOWABLE NON-STORMWATER DISCHARGE MANAGEMENT**

There are no visible natural springs or irrigation, or other non-stormwater discharges anticipated to be encountered.

**SELECTING POST CONSTRUCTION BMP'S**

Post Construction BMPs. Re-vegetation including seeding, mulching and erosion control blanket will be final BMP's. Permanent stabilization will be achieved with 70% pre construction vegetative establishment.

### **SPILL PROVENTION AND CONTROL PLAN**

The SITE SUPERINTENDENT will act as the point of contact for any spill that occurs at this jobsite. The project manager will be responsible for implementation of prevention practices, spill containment / cleanup, worker training, reporting and complete documentation in the event of a spill. The ECO shall immediately notify the Owner, /Construction Manager, STATE and the Local Fire Department in addition to the legally required Federal, State, and Local reporting channels (including the National Response Center, 800.424.8802) if a reportable quantity is released to the environment.

### **SPILL PREVENTION AND BEST MANAGEMENT PRACTICES**

This section describes spill prevention methods Best Management Practices (BMP) that will be practiced to eliminate spills before they happen.

- **Equipment Staging and Maintenance:** Store and maintain equipment in a designated area Reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. Use secondary containment (drain pan) to catch spills when removing or changing fluids. Use proper equipment (pumps, funnels) to transfer fluids Keep spill kits readily accessible Check incoming vehicles for leaking oil and fluids. Transfer used fluids and oil filters to waste or recycling drums immediately following generation. Inspect equipment routinely for leaks and spills Repair equipment immediately, if necessary, implement a preventative maintenance schedule for equipment and vehicles.
- **Fueling Area:** Perform fueling in designated fueling area minimum 50' away from federal waters Use secondary containment (drain pan) to catch spills Use proper equipment (pumps, funnels) to transfer fluids Keep spill kits readily accessible Inspect fueling areas routinely for leaks and spills Hazardous Material Storage Areas Reduce the amount of hazardous materials by substituting non-hazardous or Less hazardous materials.
- **Hazardous Material Storage Areas:** Minimize the quantity of hazardous materials brought onsite Store hazardous materials in a designated area away from drainage points.

- Unexpected Contaminated Soil and Water: Perform all excavation activities carefully and only after the Owner/Construction Manager directed any activities.

### **SPILL CONTAINMENT METHODS**

The following discussion identifies the types of secondary containment that will be used in the event of a spill. The Table below summarizes the containment methods for each potential source.

- Equipment Staging and Maintenance Area: An equipment leak from a fuel tank, equipment seal, or hydraulic line will be contained within a spill containment cell placed beneath all stationary potential leak sources. An undetected leak from parked equipment will be cleaned up using hand shovels and containerized in a 55-gallon steel drum for offsite disposal.
- Fueling Area: A small spill during fueling operations will be contained using fuel absorbent pads at the nozzle. The transfer of fuel into portable equipment will be performed using a funnel and/or hand pump and a spill pad used to absorb any incidental spills/drips. Any leaking tanks or drums will have fluids removed and transferred to another tank, drum, or container for the fluids. A spill response kit will be located near the fueling area or on the fuel truck for easy access. The spill response kit will include plastic sheeting, tarps, over pack drums, absorbent litter, and shovels.
- Hazardous Material Storage Area: A spill from containers or cans in a hazardous material storage area will be contained within the storage cabinet these materials are kept in.
- Unexpected Contaminated Soil: If contaminated soil is encountered during the project, the Owner/Construction Manager will be notified immediately. Small quantities of suspected contaminated soil will be placed on a 6-mil plastic liner and covered with 6-mil plastic. A soil berm or silt fence will be used to contain the stockpile and prevent migration of contaminated liquids in the soil.

### **SPILL PREVENTION AND CONTAINMENT METHODS**

<b>Potential Spill Source</b>	<b>Response Method</b>
Equipment Staging and Maintenance Area	Spill containment pad, spill kit, pumps, funnels

Fueling Area (site equipment only)	Spill containment pad, spill kit, pumps, funnels
Hazardous Material Staging Area	Spill containment pad, spill kit, pumps, funnels
Unexpected Contaminated Soil	Plastic liner, plastic cover, soil berm, hay bales, lined super sacks

### **SPILL COUNTERMEASURES**

Every preventative measure shall be taken to keep contaminated or hazardous materials contained. If a release occurs, the following actions shall be taken:

1. Stop the Spill: The severity of a spill at the site is anticipated to be minimal as large containers/quantities of Hazardous Materials (HM) are not anticipated. The type of spill would occur while dispensing material at the HM storage facility and would likely be contained in secondary containment. Thus, the use spill kits or other available absorbent materials should stop the spill.
2. Warn Others: Notify co-workers and supervisory personnel of the release. Notify emergency responders if appropriate. For site personnel, an alarm system will consist of three one second blasts on an air horn sounded by the person discovering a spill or fire. In the event of any spill, the Superintendent and Project Manager shall be notified if the spill is 5 gallons or more the STATE will be contacted along with the Fire Department.
3. Isolate the Area: Prevent public access to the area and continue to minimize the spread of the material. Minimize personal exposure throughout emergency response actions.
4. Containment: A spill shall only be contained by trained personnel and if it is safe to do so. DO NOT PLACE YOURSELF IN DANGER. Attempt to extinguish a fire only if it is in the incipient stage; trash can size or smaller. For larger spills, wait for the arrival of emergency response personnel and provide directions to the location of the emergency.
5. Complete a Spill and Incident Report: For each spill of a Hazardous Material a spill and incident report shall be completed and submitted to the Owner/Construction Manager and if applicable to the Engineer and the State of Colorado Department of Public Health and Environment

## **X. RECEIVING WATERS**

The project site is located within the West Falcon Tributary. Stormwater from this site drains to an existing unnamed tributary to Black Squirrel Creek No. 2 that routes to a regional detention pond

designated as Detention Pond WU South. The detention pond outfalls back into the unnamed tributary to Black Squirrel Creek No. 2 that then continues to flow into Black Squirrel Creek.

Stream Crossing – No stream crossing is required for this development. A wet weather conveyance crossing is required. See “Floodway” in “Pre-Development Conditions & Soils” for additional information on stream crossing.

## **IX. INSPECTION AND RECORD KEEPING**

The project is subject to inspections by the Colorado Division of Public Health and Environment (CDPHE), the Environmental Protection Agency (EPA), and El Paso County at any time.

Inspection of the stormwater management system shall be performed, by a Qualified Stormwater Manager, at least every 14 calendar days and after the occurrence of precipitation or snow melt event that may cause noticeable erosion or run-off. Time span greater than 14 calendar days is a violation of the CDPS permit.

### **QUALIFIED STORMWATER MANAGER**

The individual(s), position, or title responsible for developing, implementing, maintaining, and revising the SWMP is to be determined upon award of the project. The individual listed as the Erosion Control Supervisor shall fill out the information below and place in the on-site copy before beginning installation of the BMPs for this site and notify the County of the appropriate contact information.

Qualified Stormwater Manager Name:

Cell Phone:

Office Phone:

Email:

### **INSPECTION SCHEDULES**

Inspections of the stormwater management system are required at least every 14 calendar days and within 24 hours after any precipitation or snowmelt event that causes surface runoff. A more frequent inspection schedule may be necessary to ensure that BMPs continue to operate as designed.

Differences or modifications in the field from the approved SWMP are required to be made within 72 hours site changes are observed. The SWMP shall be onsite at all times when onsite construction activity is occurring.

### **INSPECTION SCOPE**

The construction site perimeter, all disturbed areas, material and/or waste storage areas that are exposed to precipitation, discharge locations, and locations where vehicles access the site shall be inspected for evidence of, or the potential for pollutants leaving the construction site boundaries or discharging to State Waters. All erosion and sediment control practices identified in the SWMP shall be evaluated to ensure that they are maintained and operating correctly.

### **INSPECTION REPORT**

A thorough record of inspection shall be maintained and identify any incidents of non-compliance with the SWMP. Inspection records shall be retained for three years from expiration or inactivation of permit coverage. Federal, State, local authority reserves the right to request that a copy of the inspection reports be submitted. At a minimum, the inspection report shall include the following:

1. Inspection date
2. Name(s) and title(s) and signature(s) of personnel making the inspection
3. Location(s) of discharges of sediment or other pollutants from the site
4. Location(s) of BMPs that need to be maintained
5. Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location
6. Location(s) where additional BMPs are needed or were not in place at the time of inspection
7. Deviations from the minimum inspection schedule
8. Description of corrective action for items c, d, e and f above, dates corrective action(s) taken, and measures taken to prevent future violations, including requisite changes to the SWMP, as necessary
9. After adequate corrective action(s) have been taken, or where a report does not identify any incidents requiring corrective action, the report shall contain a signed statement indicating the site is in compliance with the permit to the best of the signer's knowledge and belief

10. The date and amount of storm or snowmelt events that cause erosion.

#### **BMP MAINTENANCE/REPLACEMENT AND FAILED BMPs**

Adequate site assessment shall be performed as part of comprehensive Inspection and Maintenance procedures to assess the adequacy of BMPs at the site and to evaluate the necessity of changes to those BMPs to ensure continued effective performance. Where site assessment results in the determination that new or replacement BMPs are necessary, the BMPs shall be installed to ensure ongoing implementation. Failed BMPs must be addressed as soon as possible, in most cases immediately, to ensure continued performance and minimize the likelihood of pollutant discharge. The SWMP shall be updated once new BMPs are installed or failed BMPs replaced. A specific timeline for implementing maintenance procedures is not included in the State Permit because BMP maintenance is expected to be proactive, not responsive. Observations resulting in BMP maintenance activities can be made during a site inspection, or during general observations of site conditions. BMPs shall be maintained per DCM2 criteria and ECM criteria. Please refer to the Appendix for specific maintenance required for each BMP.

#### **PLAN REVIEW AND REVISIONS**

1. The plan must be signed in accordance with the general permit.
2. The plan must be made available, upon request, to CDPHE, United States Environmental Protection Agency, or operator of the local municipal storm sewer system, if applicable.
3. The plan must be amended whenever there is a change in design, construction, operation or maintenance that could have a significant effect on the potential for the discharge of pollutants to State Waters. It also must be amended if it is found to be ineffective in controlling pollutants present in stormwater.

#### **RECORD KEEPING AND DOCUMENTING OF INSPECTIONS**

The permittee shall retain a copy of the SWMP required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to the Director; a State or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final

stabilization. Permittees with day-to-day operational control over SWMP implementation shall have a copy of the SWMP available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWMP whenever they are on the construction site. If minor modifications to the SWMP are required, they shall be recorded on the owner's copy of the SWMP and be available during inspections. Whenever a significant change is made to the SWMP (including changes to design, construction, operation or maintenance), an amended SWMP shall be submitted for review and approval. The following documents must be kept in a field office, trailer, shed or vehicle that is onsite during normal working hours:

1. A completed and signed copy of the Notice of Intent
2. The permit coverage letter from the Colorado Department of Public Health and Environment (CDPHE)
3. The Stormwater Management Plan
4. Site Inspection Records
5. A copy of the Colorado General Permit for Stormwater Discharges from Construction Activities

If a reasonable onsite location is not available, then the documents may be retained at a readily available alternative location, preferably with the SWMP plan contact. If the site is inactive, then the documents may be stored at a local office.

All records and information must be kept for at least three years or longer if requested by the Colorado Department of Public Health and Environment or United States Environmental Protection Agency.

#### **RECORD KEEPING**

The SWMP is a "living document" that is continuously reviewed and modified. The ECS shall make changes to the SWMP, including but not limited to: additions, deletions, changing locations of BMP's shall be marked in the plans, dated and initialed at time of occurrence.

All inspection and maintenance activities or other repairs will be documented by the ECS and the records kept on the project site.

Records of spill, leaks or overflows that result in the discharge of pollutants will be documented and maintained. The following Information will be recorded for all occurrences:

1. Time and date
2. Weather conditions
3. Reasons for spill

4. A release of any chemical, oil, petroleum product, sewage, etc., which may enter state waters must be reported.

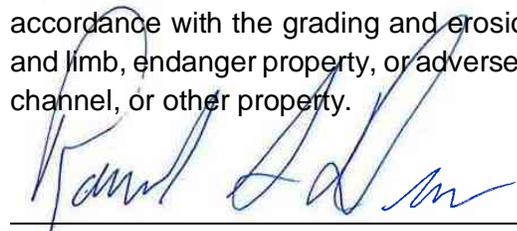
At 14-day inspections incidents of noncompliance, such as uncontrolled releases of pollutants including mud, muddy water or measurable quantities of sediment found off-site shall be noted, along with a brief explanation as to measures taken to prevent future violations and measures taken to clean up sediment that has left the site.

After measures have been taken to correct any problems and recorded, or where a report does not identify incidents of noncompliance, the report shall contain a signed certification indicating the site is in compliance.

**Signature Page:**

**Engineer's Statement:**

The Erosion and Stormwater Quality Control/Grading Plan was prepared under my direction and supervision and is correct to the best of my knowledge and belief. If such work is performed in accordance with the grading and erosion control plan, the work will not become a hazard to life and limb, endanger property, or adversely affect the safety, use, or stability of public way, drainage channel, or other property.



9/22/2020

Grant Dennis

Date

Registered Professional Engineer  
State of Colorado No. 51622

**Developer's Statement:**

The owner will comply with the requirements of the Erosion and Stormwater Quality Control Plan including temporary BMP inspection requirements and final stabilization requirements. I acknowledge the responsibility to determine whether the construction activities on these plans require Colorado Discharge Permit System (CDPS) permitting for Stormwater discharges associated with Construction Activity.

Developer/ Owner Signature: James Byers

Name of Developer/ Owner: Challenger Communities LLC

DBA: \_\_\_\_\_ Phone: 719-598-5192

Title: VP of Community Development Email: jim@challengerhomes.com

Address: \_\_\_\_\_ Fax: \_\_\_\_\_

8605 Explorer Dr Suite 250 80920

## APPENDIX A



**MERIDIAN ROAD IMPROVEMENTS**

MERIDIAN RD & BENT GRASS MEADOWS DR

SCALE: 1" = 1,000'

VICINITY MAP

Project No: CLH000016.20

Drawn By: BHB

Checked By: SMB

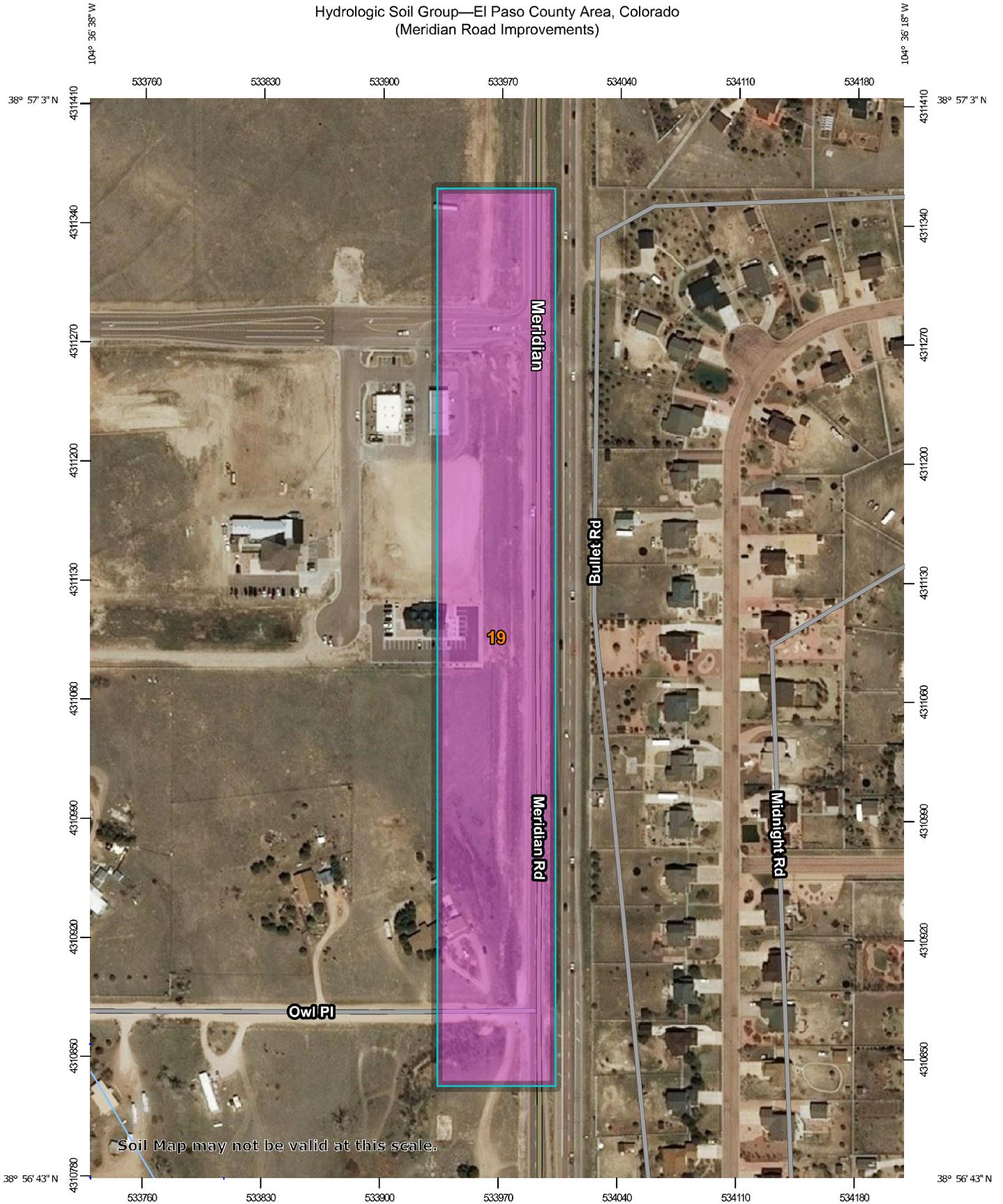
Date: NOVEMBER 2019



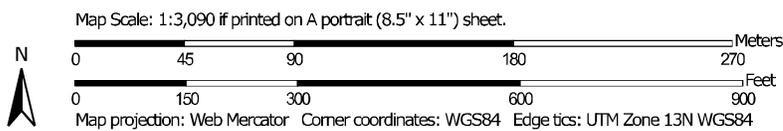
1155 Kelly Johnson Blvd., Suite 305  
 Colorado Springs, CO 80920  
 719.900.7220 • GallowayUS.com

## APPENDIX B

Hydrologic Soil Group—El Paso County Area, Colorado  
(Meridian Road Improvements)



Soil Map may not be valid at this scale.



Hydrologic Soil Group—El Paso County Area, Colorado  
(Meridian Road Improvements)

**MAP LEGEND**

<b>Area of Interest (AOI)</b>		 C
 Area of Interest (AOI)		 C/D
<b>Soils</b>		 D
<b>Soil Rating Polygons</b>		 Not rated or not available
 A		<b>Water Features</b>
 A/D		 Streams and Canals
 B		<b>Transportation</b>
 B/D		 Rails
 C		 Interstate Highways
 C/D		 US Routes
 D		 Major Roads
 Not rated or not available		 Local Roads
<b>Soil Rating Lines</b>		<b>Background</b>
 A		 Aerial Photography
 A/D		
 B		
 B/D		
 C		
 C/D		
 D		
 Not rated or not available		
<b>Soil Rating Points</b>		
 A		
 A/D		
 B		
 B/D		

**MAP INFORMATION**

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.  
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado  
Survey Area Data: Version 17, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	9.1	100.0%
<b>Totals for Area of Interest</b>			<b>9.1</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

### Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*

## APPENDIX C



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**MERIDIAN ROAD & BENT GRASS MEADOWS DRIVE GRADING & EROSION CONTROL PLANS FOR CHALLENGER COMMUNITIES, LLC**

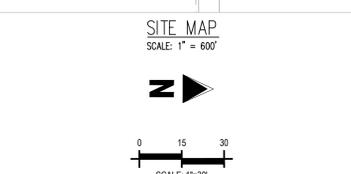
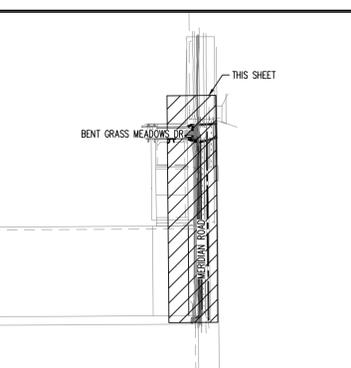
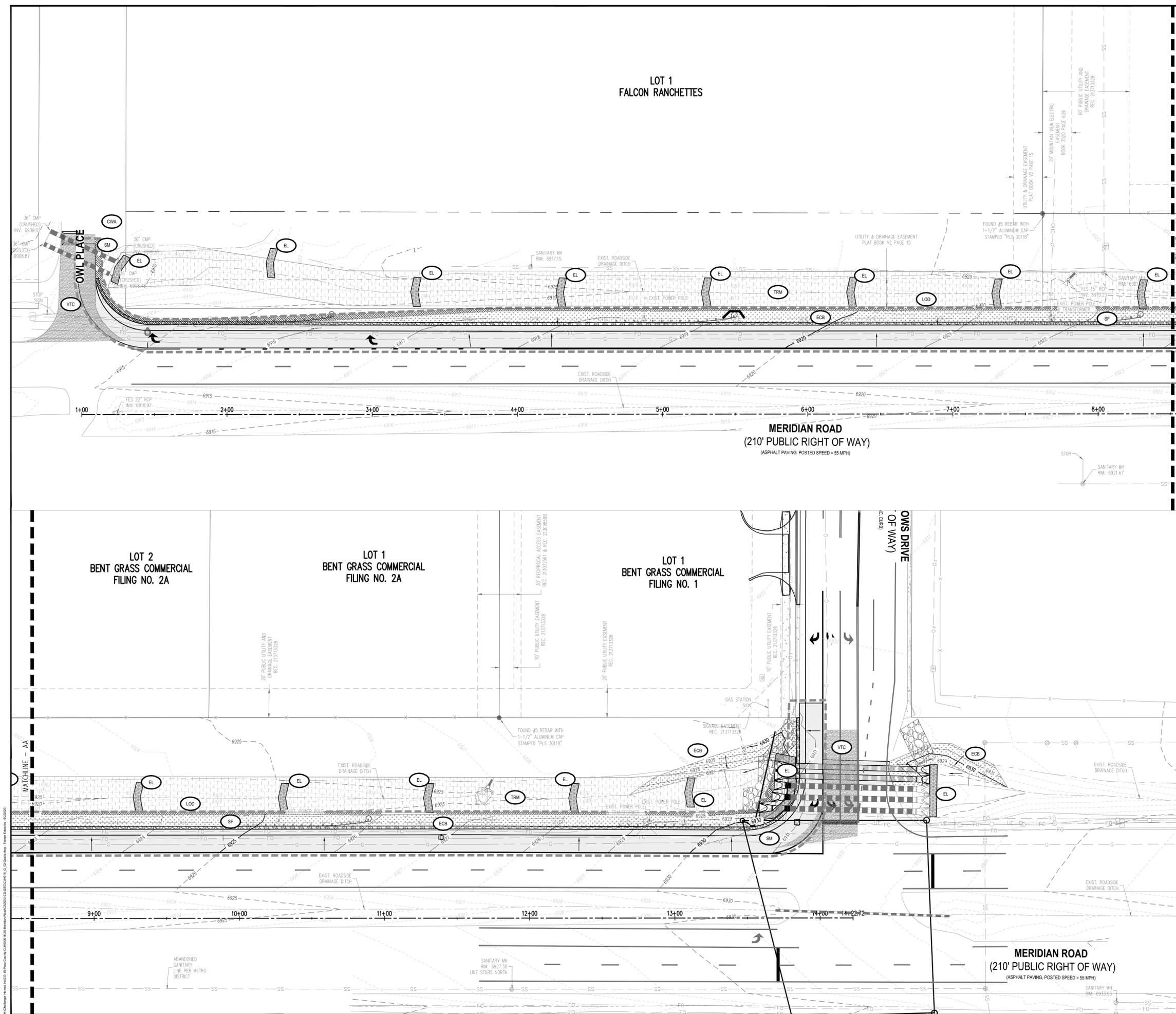
**SWC BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD FALCON, CO 80831 EL PASO COUNTY**

#	Date	Issue / Description	Init.
1	04/07/20	REV. PER COUNTY COMMENTS	TJE
2	7/27/20	REV. PER COUNTY COMMENTS	CMD
3	09/04/20	REV. PER COUNTY COMMENTS	TJE

Project No: CLH0015.20  
 Drawn By: JDP  
 Checked By: RGD  
 Date: 11/15/2019

**GRADING AND EROSION CONTROL PLAN**

**C1.0**  
 Sheet 2 of 4



- LEGEND**
- G — EXISTING PROPERTY LINE
  - G — EXISTING GAS LINE
  - W — EXISTING WATER LINE
  - UE — EXISTING UNDERGROUND ELECTRIC
  - FO — EXISTING FIBER OPTIC LINE
  - SS — EXISTING SANITARY SEWER
  - OHE — EXISTING OVERHEAD ELECTRIC LINE
  - X — EXISTING FENCE LINE
  - — — EXISTING STORM LINE
  - — — PROPOSED STORM PIPE
  - FOUND PROPERTY MONUMENT
  - EXISTING SANITARY MANHOLE
  - EXISTING WATER VALVE
  - EXISTING SIGN
  - EXISTING UTILITY MARKER POST
  - EXISTING TELECOM PEDESTAL
  - EXISTING ELECTRICAL TRANSFORMER
  - FIBER OPTIC PULL BOX
  - EXISTING FLARED END SECTION
  - EXISTING UTILITY POLE
  - 6921 --- EXISTING MINOR CONTOUR
  - 6922 --- EXISTING MAJOR CONTOUR
  - 6921 --- PROPOSED MINOR CONTOUR
  - 6922 --- PROPOSED MAJOR CONTOUR
  - 6922.50 PROPOSED SPOT ELEVATION
  - 0.45% PROPOSED SLOPE
  - — — EXISTING TOP OF BANK
  - — — PROPOSED 8" THICK STRIPING
  - — — PROPOSED 4" THICK STRIPING
  - — — PROPOSED ASPHALT
  - — — PROPOSED SIGN
  - — — SF — SILT FENCE
  - LOD — LIMITS OF DISTURBANCE/CONSTRUCTION BOUNDARY
  - ECR — EROSION CONTROL BLANKET
  - EL — EROSION LOG CHECK DAM
  - VTC — VEHICLE TRACKING CONTROL
  - CWA — CONCRETE WASHOUT AREA
  - SM — SEEDING & MULCHING
  - TRM — TRM LINING FOR STABILIZATION
  - — — PROPOSED FLOW

**NOTE:**  
 THERE ARE NO PROPOSED CONCRETE OR ASPHALT BATCH PLANS FOR THIS PROJECT.

**CONTRACTOR'S NOTE:**  
 ALL EXISTING UNDERGROUND UTILITIES LOCATIONS APPROXIMATELY SHOWN. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES CAUSED BY ANY CONSTRUCTION ACTIVITIES CAUSED IF THE UTILITY LOCATE HAS NOT BEEN PERFORMED.

**VEGETATION NOTE:**  
 NO NOTABLE VEGETATION IS OBSERVED WITHIN THE LIMITS OF CONSTRUCTION ON THIS SITE. THE EXISTING VEGETATION WITHIN THE LIMITS OF DISTURBANCE CONSISTS OF NATIVE GRASSES AND WEEDS.

**CAUTION - NOTICE TO CONTRACTOR**

1. ALL UTILITY LOCATIONS SHOWN ARE BASED ON MAPS PROVIDED BY THE APPROPRIATE UTILITY COMPANY AND FIELD SURFACE EVIDENCE AT THE TIME OF SURVEY AND IS TO BE CONSIDERED AN APPROXIMATE LOCATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE FIELD LOCATION OF ALL UTILITIES, PUBLIC OR PRIVATE, WHETHER SHOWN ON THE PLANS OR NOT, PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.

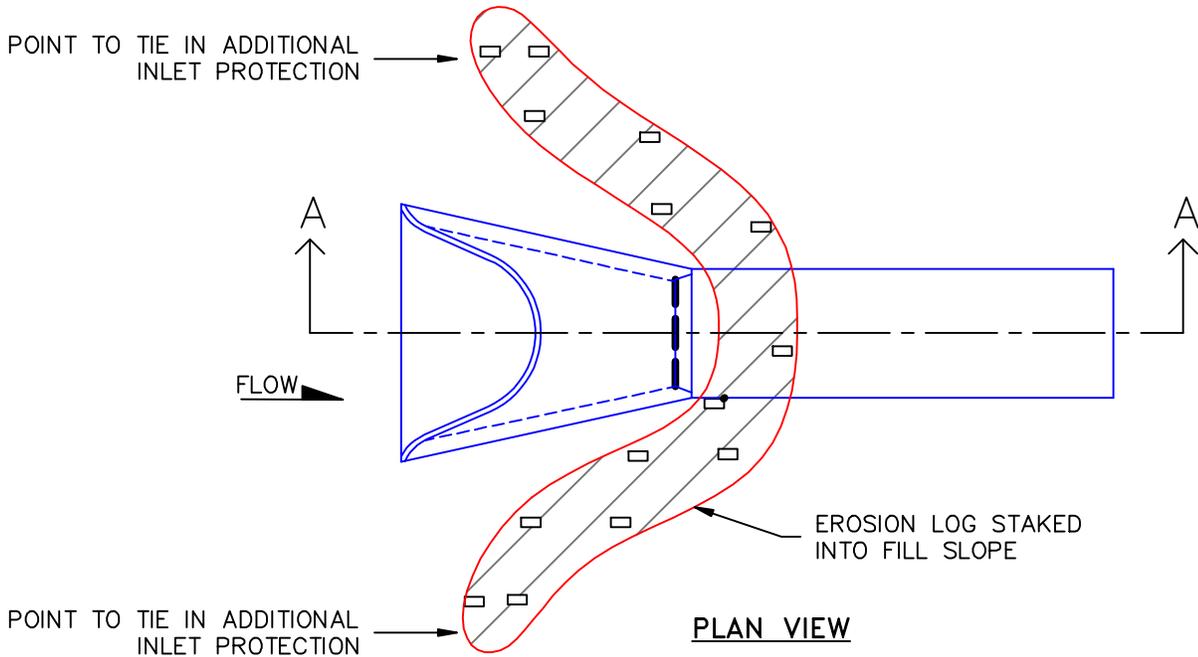
2. WHERE A PROPOSED UTILITY CROSSES AN EXISTING UTILITY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF SUCH EXISTING UTILITY, EITHER THROUGH POULING OR ALTERNATIVE METHOD. REPORT INFORMATION TO THE ENGINEER PRIOR TO CONSTRUCTION.

**811**  
 Know what's below.  
 Call before you dig.



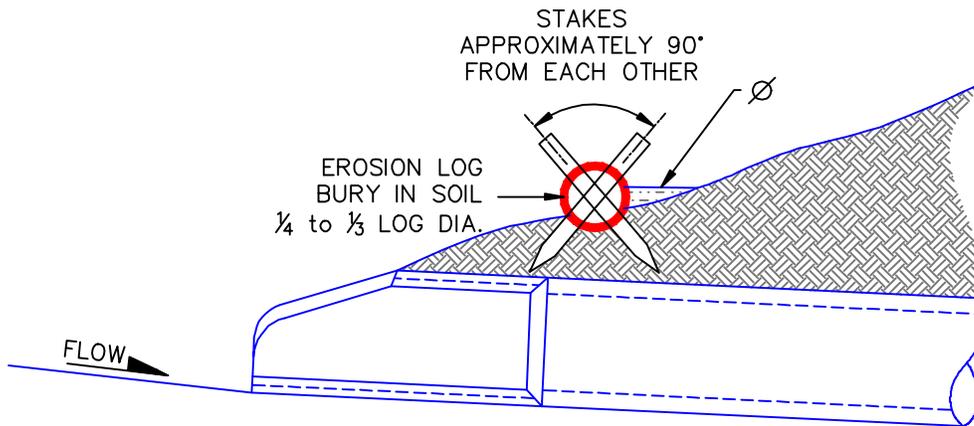


## APPENDIX D



**NOTE:**

Ø REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ONE HALF OF EXPOSED LOG HEIGHT. INSPECTIONS SHALL BE PERFORMED FREQUENTLY FOR PROPER FUNCTION.

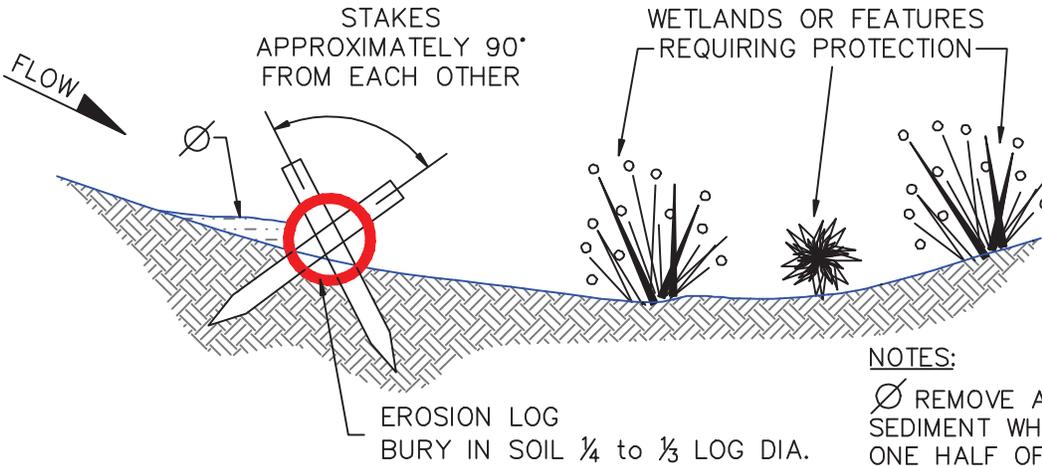


**SECTION A-A**

EROSION PROTECTION ABOVE CULVERT OUTLETS IS SIMILAR

EROSION LOGS SHOULD BE KEYED IN TO PREVENT UNDER-CUTTING

<p>1/1/08</p> <p>DATE APPROVED:</p> <p>John A. McCarty</p> <p>DEPARTMENT OF TRANSPORTATION</p>	<p>Culvert Inlet and Outlet Protection Erosion Logs Above Inlets and Outlets For Slopes 3:1 or Steeper</p> <p>Standard Drawing</p> <p>REVISION DATE: 7/17/07</p> <p>FILE NAME: SD_3-86</p>	
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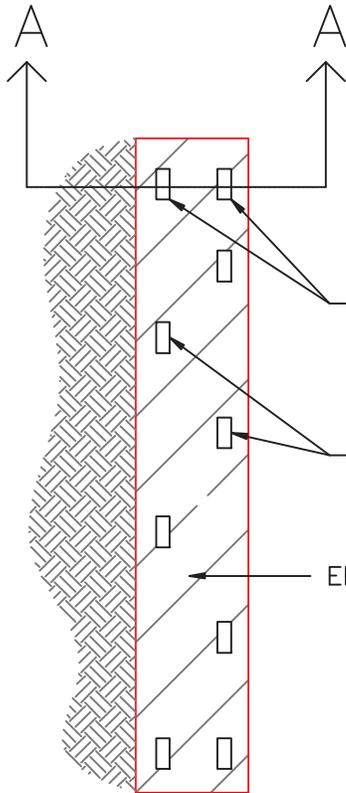
**NOTES:**

Ø REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ONE HALF OF EXPOSED LOG HEIGHT. INSPECTIONS SHALL BE PERFORMED FREQUENTLY FOR PROPER FUNCTION.

EROSION LOGS SHOULD BE KEYPED IN TO PREVENT UNDER-CUTTING

WHEN MORE THAN ONE EROSION LOG IS NEEDED, ENDS MUST BE TIGHTLY ABUTTED.

**SECTION A-A  
EROSION LOG APPLICATION**



USE TWO WOOD STAKES 1½" x 1½" (NOMINAL) x SUFFICIENT LENGTH TO BE EMBEDDED AT LEAST 4" INTO THE SOIL AT ALL EROSION LOG ENDS OR JOINTS

USE A STAKE EVERY 24" AND CONTINUE ALTERNATE ORIENTATION THROUGHOUT THE LENGTH OF THE EROSION LOG

EROSION LOG

**TYPICAL STAKE INSTALLATION**

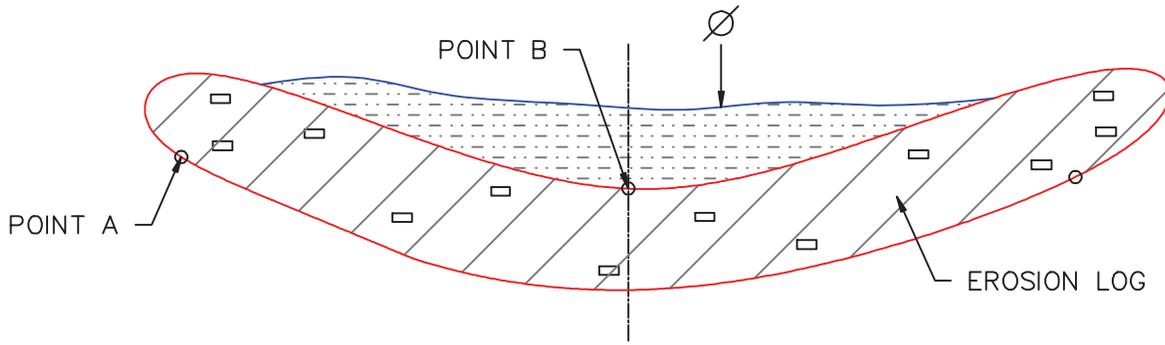
EROSION LOGS CAN ALSO BE USED ACROSS LONG SLOPES TO REDUCE EROSION AND SEDIMENT MOVEMENT

<p>1/1/08</p> <p>DATE APPROVED:</p> <p>John A. McCarty</p> <p>DEPARTMENT OF TRANSPORTATION</p>	<p>Erosion Log Barrier</p> <p>Standard Drawing</p> <p>REVISION DATE: 7/17/07</p> <p>FILE NAME: SD_3-87</p>	
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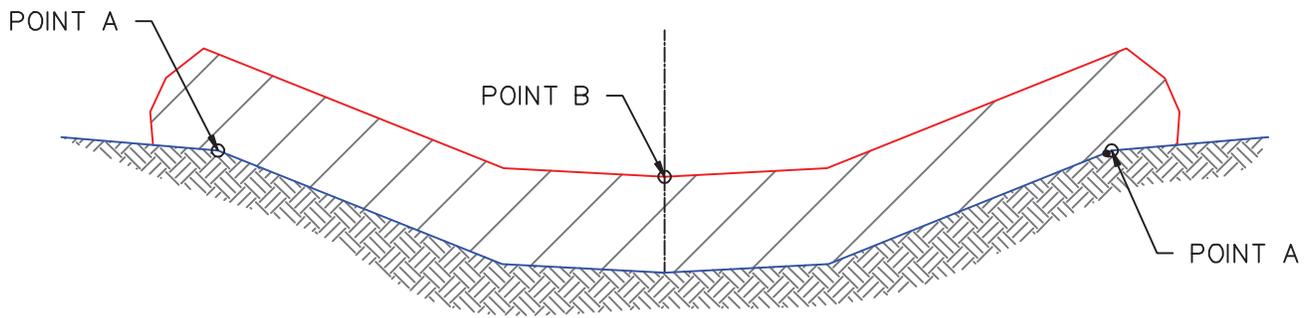


Ø REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ONE HALF OF EXPOSED LOG HEIGHT. INSPECTIONS SHALL BE PERFORMED FREQUENTLY FOR PROPER FUNCTION.

EROSION LOGS SHOULD BE KEYED IN TO PREVENT UNDER-CUTTING



PLAN VIEW

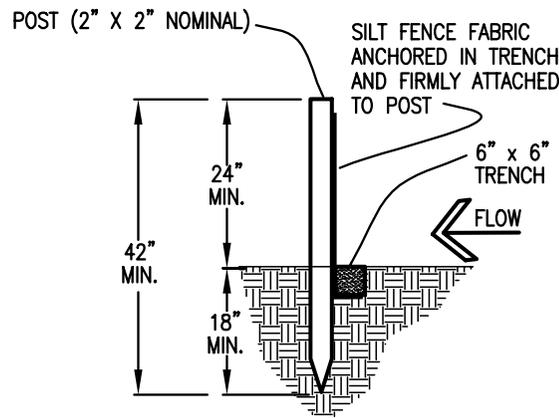
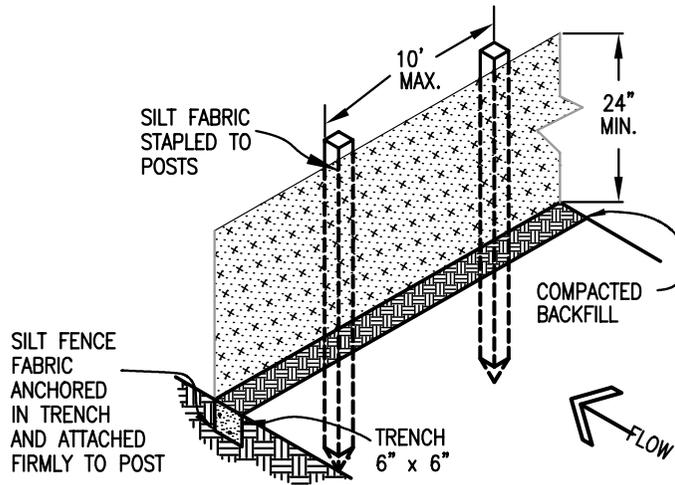


POINTS A SHALL BE HIGHER THAN POINT B

ELEVATION  
EROSION LOG DETAIL DITCH INSTALLATION

NOTE: EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.

<p>1/1/08</p> <p>DATE APPROVED:</p> <p>John A. McCarty</p> <p>DEPARTMENT OF TRANSPORTATION</p>	<p>Erosion Log Check Dams</p> <p>Standard Drawing</p> <p>REVISION DATE: 7/17/07</p> <p>FILE NAME: SD_3-85</p>	
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SILT FENCE

## SILT FENCE NOTES

### INSTALLATION REQUIREMENTS

1. SILT FENCES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
2. WHEN JOINTS ARE NECESSARY, SILT FENCE GEOTEXTILE SHALL BE SPLICED TOGETHER ONLY AT SUPPORT POST AND SECURELY SEALED.
3. METAL POSTS SHALL BE "STUDDED TEE" OR "U" TYPE WITH MINIMUM WEIGHT OF 1.33 POUNDS PER LINEAR FOOT. WOOD POSTS SHALL HAVE A MINIMUM DIAMETER OR CROSS SECTION DIMENSION OF 2 INCHES.
4. THE FILTER MATERIAL SHALL BE FASTENED SECURELY TO METAL OR WOOD POSTS USING WIRE TIES, OR TO WOOD POSTS WITH 3/4" LONG #9 HEAVY-DUTY STAPLES. THE SILT FENCE GEOTEXTILE SHALL NOT BE STAPLED TO EXISTING TREES.
5. WHILE NOT REQUIRED, WIRE MESH FENCE MAY BE USED TO SUPPORT THE GEOTEXTILE. WIRE FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST 3/4" LONG, TIE WIRES OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 6" AND SHALL NOT EXTEND MORE THAN 3' ABOVE THE ORIGINAL GROUND SURFACE.

6. ALONG THE TOE OF FILLS, INSTALL THE SILT FENCE ALONG A LEVEL CONTOUR AND PROVIDE AN AREA BEHIND THE FENCE FOR RUNOFF TO POND AND SEDIMENT TO SETTLE. A MINIMUM DISTANCE OF 5 FEET FROM THE TOE OF THE FILL IS RECOMMENDED.
7. THE HEIGHT OF THE SILT FENCE FROM THE GROUND SURFACE SHALL BE MINIMUM OF 24 INCHES AND SHALL NOT EXCEED 36 INCHES; HIGHER FENCES MAY INPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE.

### MAINTENANCE REQUIREMENTS

1. CONTRACTOR SHALL INSPECT SILT FENCES IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND WEEKLY DURING PERIODS OF NO RAINFALL. DAMAGED, COLLAPSED, UNENTRENCHED OR INEFFECTIVE SILT FENCES SHALL BE PROMPTLY REPAIRED OR REPLACED.
2. SEDIMENT SHALL BE REMOVED FROM BEHIND SILT FENCE WHEN IT ACCUMULATES TO HALF THE EXPOSED GEOTEXTILE HEIGHT.
3. SILT FENCES SHALL BE REMOVED WHEN ADEQUATE VEGETATIVE COVER IS ATTAINED AS APPROVED BY THE CITY.