



GRADING, EROSION AND SEDIMENT CONTROL (GESC)

FOR

Flooring Retailer – Lone Tree
Lot 1A, Block 2, Parkway Subdivision Filing No. 3
Lone Tree, Colorado

Prepared For:
Floor & Decor
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Lone Tree, CO 80124

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OWNER’S CERTIFICATION

Daniel Roppoli hereby certifies that the grading, erosion and sediment control facilities for the Floor & Decor – Lone Tree project shall be constructed according to the design presented in this report. I understand that the City of Lone Tree does not and will not assume liability for the grading, erosion and sediment control facilities designed and/or certified by my engineer and that the City of Lone Tree reviews GESC plans; but cannot, on behalf of the Floor & Decor – Lone Tree project, guarantee that final review will absolve Brian Saltikov and/or their successors and/or assigns of future liability for improper design.

Daniel Roppoli
Floor & Decor

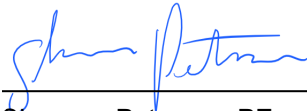
Date _____

Note

The Grading, Erosion and Sediment control Plan included herein has been placed in the City of Lone Tree file for this project and appears to fulfill applicable City of Lone Tree Grading, Erosion and Sediment Control criteria, as amended. Additional grading, erosion and sediment control measures may be required of the permittee(s) due to unforeseen erosion problems or if the submitted GESC Plan does not function as intended. The requirements of this GESC Plan shall run with the land and be the obligation of the permittee(s) until such time as the GESC Plan is properly completed, modified, or voided.

DESIGNER'S CERTIFICATION

The Grading, Erosion and Sediment Control (GESC) report included herein has been prepared under my direct supervision in accordance with the requirements of the Douglas County Grading, Erosion, and Sediment Control Criteria Manual, as amended.



Shannon Petersen, PE
Colorado Registered PE # 59369



Note

The Grading, Erosion and Sediment control Plan included herein has been placed in the City of Lone Tree file for this project and appears to fulfill applicable City of Lone Tree Grading, Erosion and Sediment Control criteria, as amended. Additional grading, erosion and sediment control measures may be required of the permittee(s) due to unforeseen erosion problems or if the submitted GESC Plan does not function as intended. The requirements of this GESC Plan shall run with the land and be the obligation of the permittee(s) until such time as the GESC Plan is properly completed, modified, or voided.

GENERAL REQUIREMENTS

INTRODUCTION AND PURPOSE

This GESC is provided to support the approval of the Grading, Erosion and Sediment Control through the City and the issuance of a Colorado Discharge Permit System General Permit (CDPS Permit) through CDPHE. This Report, in conjunction with the Grading, Erosion and Sediment Control Construction Drawings, provides a site and project understanding along with guidelines for implementation and maintenance of erosion, sediment and stormwater quality control measures prior to and during construction of the Project.

The primary goal of pollution prevention efforts during project construction is to control sediment and pollutants that originate on the site and prevent them from flowing to surface waters. The purpose of this GESC is to provide guidelines for achieving that goal. A successful pollution prevention program also relies upon careful inspection and adjustments during the construction process in order to enhance its effectiveness.

This GESC must be implemented before construction begins on the site. It primarily addresses the impact of storm rainfall and runoff on areas of the ground surface disturbed during the construction process. In addition, there are recommendations for controlling other sources of pollution that could accompany the major construction activities. Applicability of this GESC shall be terminated when disturbed areas are stabilized, permanent erosion controls are removed, construction activities covered herein have ceased.

PERMIT COVERAGE AND APPLICATIONS

Based upon a Site Disturbance Area of one (1) acre or more, this site requires a Colorado Discharge Permit System (CDPS) - Stormwater Discharge Associated with Construction Activities Application (the General Permit) through the Colorado Department of Public Health and Environment (CDPHE).

A copy of the existing CDPS General Permit for Stormwater Discharges Associated with Construction Activity and the CDPS General Permit for Stormwater Discharges Associated with Construction Activity Modification Application is included in **Appendix A** of this report.

DEFINITIONS

CDPHE – Colorado Department of Public Health and Environment

Operator – The group or individual that is responsible for day-to-day operations on the project site. The Operator will be assigned the GESC Administrator role and these terms are used interchangeably in the GESC.

GESC – Construction Activities Grading, Erosion and Sediment Control

Qualified Stormwater Manager –The individual(s) knowledgeable in the principles and practices of erosion and sediment control and pollution prevention, and with the skills to assess conditions at construction sites that could impact stormwater quality and to assess the effectiveness of stormwater controls implemented. The activities and responsibilities of the Manager shall address all aspects of the facility's GESC. The Operator will be assigned the GESC Manager role and these terms are used interchangeably in the GESC.

PROJECT DESCRIPTION

GENERAL PROJECT DESCRIPTION

The Site currently consists of an existing 1 story, 157,323 SF stucco building and associated infrastructure located on 16.45 acres. The Project consists of the existing building located within Lot 1A, Block 2 of the Filing No. 3 site being expanded at the northeast corner. The improvements will consist of adding a customer pick up area, a sidewalk along the east side of the building, and associated pavement improvements and landscaping.

The total anticipated limits of construction are 3.42± acres and the site area of disturbance is 1.52± acres. These areas are as indicated on the Grading, Erosion and Sediment Control Construction Drawings, submitted separately.

PROJECT CONTACTS

GESC Preparer

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Qualified Stormwater Manager

Company: TBD
Contact: _____
Address: _____
Phone: _____
Email: _____

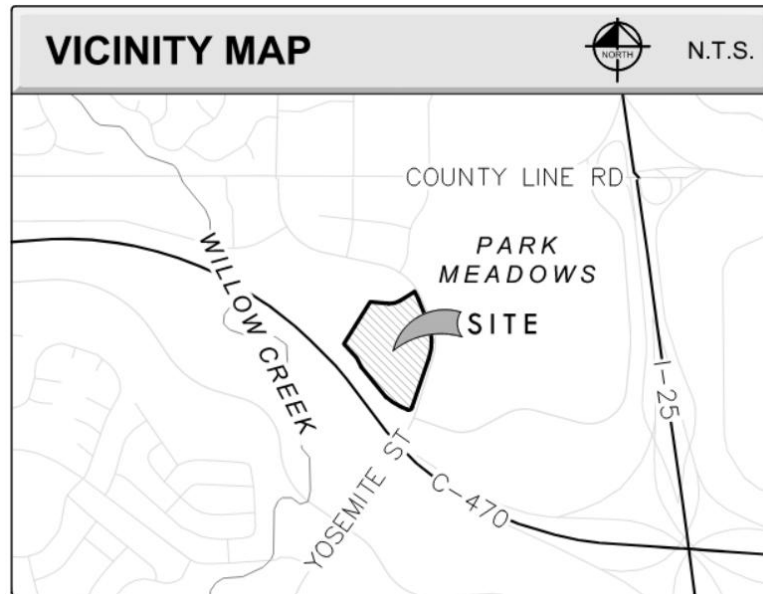
PROJECT LOCATION

The Project is located on Lot 1A, Block 2, Parkway Subdivision Filing Number 3, within the northwest quarter of Section 3 Township 6 South, Range 67 west of the 6th Principal Meridian, in the City of Lone Tree, CO, (the "City"). The Site encompasses ±16.45 acres in total. The Site is bounded by the following:

- North: Lot 2, Block 2, Parkway Subdivision Filing No. 3
- South: Tract A, Exception Parcel Book 1344, Page 1660
- East: Sout Yosemite Street
- West: Lot 4, Block 2, Parkway Subdivision Filing No. 3

VICINITY MAP

A vicinity map is provided below for reference:



SCALE: N.T.S.

EXISTING SITE CONDITIONS

VEGETATION

The existing site is developed containing a 1 story 157,323 SF building with associated parking and landscaping.

DRAINAGE CHARACTERISTICS

The storm design for this site was previously approved under the Phase III Drainage Study, *Project Majestic (December 1994)*, (the Phase III Report). The site is currently served by existing permanent stormwater infrastructure as designed and constructed with the Phase III Report. The site currently conveys stormwater via a network of existing surface inlets routed to an underground storm sewer system. This storm sewer system conveys runoff to existing detention pond located in the western corner of the site. The total area of disturbance for the Project is approximately 1.52 acres. It is not anticipated that the proposed improvements will negatively impact the existing storm infrastructure. Existing drainage patterns will be maintained with the site improvements. As such, the project described herein is subject to meeting the criteria and expected design flows as outlined in the Phase III drainage Report.

ADJACENT AREAS

The site is bounded by a private drive and existing commercial building to the north, South Yosemite Street and Park Meadows Mall to the east, parking associated with the existing building to the south, and Home Depot and C-470 to the west. More globally, the site is part of the Parkway Subdivision Filing No. 3 with aforementioned areas described.

Since our site already has existing infrastructure in place, there should be minimal impacts to these adjacent areas, as long as the necessary BMPs outlined in the GESC plans are implemented.

SOILS

The Site is currently developed with an existing building and associated parking lot. A review of the Natural Resource Conservation Service (NRCS) Web Soil Survey determined that the Site is made up almost entirely of Renohill-Buick complex soils, a hydrologic rating of Type D.

For additional information on soils, refer to the NRCS study, found in **Appendix B** of the report.

AREAS & VOLUMES

The site limits of construction are 3.42± acres and the site area of disturbance is 1.52±. The site earthworks are summarized in the table below:

Raw Earthworks Summary

CUT	36.47 CY
FILL	427.62 CY
NET	391.14 CY Fill

EROSION & SEDIMENT CONTROL MEASURES

Erosion and sediment control measures shall be implemented during construction of the project. The operator is responsible for ensuring all control measures located outside the permitted area, that are being utilized by the operator, are properly maintained and in compliance with the terms of the permit. BMP's are described below:

- **Construction Fence (CF):** Temporary fencing surrounding the site to prevent unsafe access to the site.
- **Silt fence (SF):** Fencing placed around the entire perimeter of the site to capture sediment and ensure it does not make it into the streets.
- **Vehicle tracking control (VTC):** Shall be installed at the location noted on the Grading, Erosion and Sediment Control (GESC) Plans to reduce off-site sediment tracking.
- **Concrete Washout (CWA):** An area directly adjacent to the vehicle tracking control for managing wasted concrete onsite.
- **Inlet protection (IP):** A bounded bag of gravel surrounding existing or newly installed inlets, to prevent dirt from entering the existing or newly installed storm system.
- **Stabilized Stage Area (SSA)** A temporary pad for placement of trucks and equipment.
- **Temporary Soil Stockpile (TSS):** A storage location for bulk materials. All stockpiles shall require erosion and sediment control. All stockpiles shall:
 - Not be located adjacent to a waterway.
 - Be stabilized within 14 days after establishment. Stabilization shall include, but not be limited to, surface roughening, seeding, and mulching.
 - Not exceed 10 feet in height.
 - Utilize silt fence in all down slope sides of the stockpile.
- **Seeding & Mulching (SM):** A practice utilized for final stabilization of a site, or when a site has not been disturbed for more than 14 days.

- **Street Sweeping (SS):** A good housekeeping practice to remove dust and debris that makes it outside the silt fencing surrounding the site by vehicular or other means. Paved and impervious surfaces which are adjacent to construction sites must be swept on a daily basis and as needed during the day when sediment and other materials are tracked or discharged onto them. Either sweeping by hand or use of street sweepers is acceptable. Street sweepers using water while sweeping is preferred in order to minimize dust. Flushing off paved surfaces with water is prohibited.

In addition to those noted above, Perimeter Control and Portable Toilets will also be utilized on site. Best management practices should be used to manage these items.

All persons engaged in earth disturbances shall design, implement, and maintain acceptable soil erosion and sedimentation control measures, in conformance with the erosion and sediment control technical standards adopted by the City. All temporary erosion and sediment control facilities, and all permanent facilities intended to control erosion of any earth disturbance operation shall be installed before any earth disturbance operations take place. Any earth disturbances shall be conducted in such a manner to effectively control runoff volumes, reduce accelerated soil erosion, sediment movement, and deposition off-site. All earth disturbances shall be completed in such a manner so that the total amount of soil exposed at any given time shall be minimized, and the exposed area of any disturbed land shall be limited to the shortest possible period of time. Temporary soil erosion control facilities shall be removed, and earth disturbance areas graded and stabilized with permanent soil erosion control measures pursuant to approved plans and specifications.

Any disturbed land area shall be completed within fourteen (14) calendar days after final grading or the final earth disturbances has been completed. When it is not possible to permanently stabilize a disturbed area after an earth disturbance has been completed or where significant earth disturbance activity ceases, temporary soil erosion control measures shall be implemented within fourteen (14) calendar days. All temporary soil erosion control measures shall be maintained until permanent soil erosion measures are implemented.

Expected Best Practice:

All construction site operators shall control waste such as discarded building materials, hazardous chemicals (to include but not be limited to, heavy equipment maintenance fluids, motor oil, antifreeze and secondary containment of vehicle fuel), litter, and sanitary waste at the construction site that may cause adverse impacts to water quality. Chemicals, paints, solvents, fertilizers, and other toxic materials must be stored in weatherproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated, and disposed at an approved solid waste or chemical disposal facility. On-site fueling is not expected with this project.

Throughout build-out, the developer shall be responsible for implementing and maintaining control measures to control erosion and sediment problems on all idle lots.

TIMING/PHASING SCHEDULE

General construction sequencing and activities associated with this project consist of the following:

Initial Phase

The initial phase shall consist of the temporary construction control measures to minimize potential for erosion and sediment transfer while mobilizing and preparing the site for construction activities

and during the construction of the proposed structures and associated limited site improvements. The operator shall complete the anticipated initial phase sequencing as follows:

1. Prepare and submit the state of Colorado, Colorado department of public health and environment (CDPHE) notice of reassignment. A copy of the permit shall be provided to the owner upon receipt from the CDPHE.
2. Install GESC information sign(s) in accordance with applicable city, state, and owner requirements.
3. Ensure that general construction control measures which are required throughout the project at locations shown on the GESC or as dictated by construction activities are operational.
4. Install perimeter controls including the silt fence (SF) around the limits as shown on the plan. Ensure that the limits of construction (LOC) are defined as necessary or known by all parties which will be responsible for construction on site. Limits of construction may be located outside the construction fence.
5. Install vehicle tracking control (VTC) and concrete washout (CWA) as shown on plan. Contractor to denote the location of the concrete washout area (CWA).
6. Install and denote on the plan any of the following areas: trailer, parking, lay down, porta-potty, wheel wash, mason's area, fuel and material storage containers, solid waste containers, etc.
7. Prepare a stabilized staging area (SSA). Contractor to note the actual size and location of this area and shall minimize this area.
8. Install inlet protection (IP) as shown on plan.
9. Begin clearing and grubbing the designated site areas. Stockpile materials in accordance with the temporary soil stockpile (TSS) control measure.
10. Temporarily seed, throughout construction, denuded areas that will be inactive for 14 days or more.
11. Begin grading the site. Stockpile materials in accordance with the temporary soil stockpile management (TSS) control measure.
12. Start construction of building pad and structures.
13. Install utilities, storm infrastructure, and curb and gutters.
14. Contractor to conduct street sweeping (SS) as required to maintain clean areas surrounding the construction site.

Interim Phase

The interim phase shall consist of maintaining certain perimeter control measures to minimize potential for erosion and sediment transfer during construction. It will also consist of adding new control measures as required for certain construction activities, as well as shifting certain BMPs for proposed construction. The operator shall complete the anticipated final phase sequencing as follows:

1. Contractor to maintain silt fencing (SF) control measures surrounding the site.
2. Contractor to maintain inlet protection (IP) control measures as shown on plan.
3. Contractor to maintain vehicle tracking control (VTC) control as shown on plan.
4. Contractor to maintain temporary soil stockpile (TSS) measure as shown on plans.
5. Contractor to add inlet protection (IP) control measure on newly installed storm inlets.
6. Contractor to remove stabilized staging area (SSA) as site construction necessitates.

Final Phase

The final phase shall consist of the temporary construction control measures to minimize potential for erosion and sediment transfer during the construction of the proposed structure and associated

limited site improvements. The operator shall complete the anticipated final phase sequencing as follows:

1. Confirm existing control measures from the initial and interim phase, which are to be maintained throughout construction, are in working order and compliant with applicable regulations.
2. Provide erosion control blanket (ECB) in zones exceeding 4:1 slopes.
3. Repair and/or replace any existing control measures which are deemed inadequate.
4. Temporarily stabilize (TS), throughout construction, denuded areas that will be inactive for 14 days or more.
5. Install additional curb and gutters.
6. Permanently stabilize (SM) areas to be vegetated as they are brought to final grade.
7. Prepare site for paving.
8. Perform asphalt paving operations as depicted on plans.
9. Install appropriate inlet protection devices for paved areas as work progresses.
10. Complete grading and installation of permanent stabilization (SM) over all areas in accordance with approved landscape plans.
11. Remove remaining control measures once permanent stabilization (SM) has been achieved. Repair and stabilize areas disturbed through control measure removal.
12. Notify the owner of intent to file the notice of inactivation with the CDPHE and receive Owner acceptance to proceed with stormwater management close-out.
13. Proceed with filing the notice of inactivation with the CDPHE.
14. Provide the owner with a copy of stormwater documentation (permits, inspection reports, logs, etc.) upon completion of project stormwater notice of inactivation.

PERMANENT STABILIZATION

Permanent stabilization for the site will be accomplished by proposed hardscape or landscaping for all areas outside of the building. For areas not covered by landscape or hardscape, seeding and mulching (SM) will be installed. Erosion control blankets (ECB) will be installed in zones with slopes exceeding 4:1 slope.

Final site stabilization is achieved when vegetative cover provides permanent stabilization with a uniform density greater than **70 percent of the pre-disturbance levels**, or equivalent permanent, physical erosion reduction methods have been employed over the entire area to be stabilized by vegetative cover. This area is exclusive of areas that are covered with rock (crushed granite, gravel, etc.) or landscape mulch, paved or have a building or other permanent structure on them.

STORMWATER MANAGEMENT CONSIDERATIONS QUALIFIED STORMWATER MANAGER

The Qualified Stormwater Manager is the Operator selected for the project. This is an individual(s) knowledgeable in the principles and practices of erosion and sediment control and pollution prevention, and with the skills to assess conditions at construction sites that could impact stormwater quality and to assess the effectiveness of stormwater controls implemented. The activities and responsibilities of the Administrator shall address all aspects of the facility's GESG.

SITE SPECIFIC POLLUTION SOURCES

Further identification of site-specific pollutants that fall within the categories outlined in the next section may be field noted using the corresponding log included in the appendices of this report. The logs are

intended to record site specific pollutants, the date of arrival on the site, the date removed from the site, and the methods of treatment.

IDENTIFICATION OF POLLUTANT SOURCES

Evaluation of general sediment and non-sediment pollution sources associated with site construction activities, as outlined within the General Permit, consist of the following:

- **Disturbed and Stored Soils** – Earth disturbing activities (grading, excavation, etc.) will be necessary for this project; therefore, the potential exists for disturbed site soils to contribute sediment to stormwater discharges.
- **Vehicle Tracking and Sediment** – Construction traffic will be entering and exiting the Site; therefore, the potential exists for vehicle tracking to contribute sediment to stormwater discharges.
- **Management of Contaminated Soils** – Contaminated soils are not anticipated on this Site. If encountered, the GESC Administrator shall take appropriate containment and treatment measures.
- **Loading and Unloading Operations** – Loading and unloading operations will be taking place at the Site; therefore, the potential exists for these operations to introduce sediment and non-sediment pollutants to stormwater discharges.
- **Outdoor Storage of Materials** – Limited outdoor storage of materials is anticipated with construction of this site; however, outdoor storage of chemicals, fertilizers, etc. is not anticipated.
- **Vehicle and Equipment Maintenance and Fueling** – Routine maintenance and fueling of vehicles and equipment is anticipated with this Site; therefore, the potential exists for pollutants associated with these activities to contribute pollutants to stormwater discharges.
- **Significant Dust or Particulate Generating Processes** – Earth disturbing activities (grading, excavation, etc.) will be necessary for this project; therefore, the potential exists for windblown site soils to contribute sediment to stormwater discharges.
- **Routine Maintenance** – Routine maintenance involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc., other than those identified within Vehicle and Equipment Maintenance and Fueling are not anticipated with this project. If encountered, the GESC Administrator shall take appropriate containment and treatment measures.
- **Onsite Waste Management** – Waste management consisting of solid waste piles, liquid wastes, dumpsters, etc. are anticipated onsite; therefore, the potential exists for these operations to introduce sediment and non-sediment pollutants to stormwater discharges.
- **Concrete Truck / Equipment Washing** – Concrete truck and equipment washing are anticipated with this project. The GESC Administrator shall take appropriate containment and treatment measures.
- **Dedicated Asphalt and Concrete Batch Plants** – Dedicated asphalt and/or concrete batch plants are not anticipated with this project. If encountered, the GESC Administrator shall take appropriate containment and treatment measures and document as necessary.
- **Non-Industrial Waste Sources** – Non-Industrial waste sources limited to portable sanitary facilities are anticipated with this project.
- **Additional Pollutant Sources** – Additional areas or procedures where potential spills could occur are not anticipated with this project.

Logs for the identification of pollutant sources are included in **Appendix C** for reference and use.

Based on the following, the potential to contribute pollutants to stormwater discharges is not significant

for most of the pollutants identified above:

- Relatively Low Frequency of the Activities
- The Ability to Schedule Activities During Dry Weather
- Existing Site Topography
- The Ability to Implement Primary and Secondary Containment for Product Storage
- The Ability to Locate Activities Away from Drainage Ways

Potential pollutant sources noted below shall be mitigated by use of Control Measures as noted in the following sections:

- Disturbed and Stored Soils
- Vehicle Tracking and Sediment
- Loading and Unloading Operations
- Outdoor Storage
- Vehicle Equipment and Maintenance Fueling
- Significant Dust or Particulate Generating Processes
- Non-Industrial Waste Sources

CONTROL MEASURES FOR STORMWATER POLLUTION PREVENTION

Appendix G includes City of Lone Tree control measure details.

Structural Practices for Erosion and Sediment Control

Structural control measures shall be implemented onsite to minimize erosion and sediment transport. Recommended control measures based upon a limited site review may be seen within the GESC Site Map included in the appendices of this report. Additional control measures shall be implemented by the Qualified Stormwater Manager if necessary, to prevent sediment laden runoff from leaving the project site. The GESC shall be updated to reflect any changes or revisions enacted in the field.

Non-Structural Practices for Erosion and Sediment Control

Non-Structural control measures shall be implemented onsite to minimize erosion and sediment transport. Recommended control measures based upon a limited site review may be seen within the GESC Site Map included in the appendices of this report. Additional control measures shall be implemented by the Qualified Stormwater Manager if necessary, to prevent sediment laden runoff from leaving the project site. The GESC shall be updated to reflect any changes or revisions enacted in the field.

Phased Control Measure Implementation

Construction of the identified improvements will take place under two phases of construction anticipated as identified within the construction sequencing included within this report.

A Land Disturbance, Control Measure Installation, and Stabilization Log is provided in **Appendix D** and shall be filled out accordingly during control measure implementation.

Materials Handling and Spill Prevention

Any hazardous or potentially hazardous material that is brought onto the construction site shall be handled properly in order to reduce the potential for stormwater pollution. To minimize the potential for a spill of petroleum product or hazardous materials to come in contact with stormwater, the following steps shall be implemented:

- Material Safety Data Sheets (MSDS) information shall be kept on site for any and all applicable materials.
- All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, additives for soil stabilization, concrete, curing compounds and additives, etc.) shall be stored in a secure location, under cover and in appropriate, tightly sealed containers when not in use.
- The minimum practical quantity of all such materials shall be kept on the job site and scheduled for delivery as close to time of use as practical.
- A spill control and containment kit (containing, for example, absorbent material, acid neutralizing agent, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) shall be provided on the construction site and location(s) shown on Site Maps.
- All of the product in a container shall be used before the container is disposed of. All such containers shall be triple rinsed, with water prior to disposal. The rinse water used in these containers shall be disposed of in a manner in compliance with State and Federal regulations and shall not be allowed to mix with stormwater discharges.
- All products shall be stored in and used from the original container with the original product label and used in strict compliance with the instructions on the product label.
- The disposal of excess or used products shall be in strict compliance with instructions on the product label.
- Portable toilets shall not be placed in a location that is in the path of direct runoff or machine traffic. Portable toilets shall be placed in a location that is easily accessible for maintenance. Portable toilets shall be staked down to prevent overturning.

Temporary onsite fuel tanks for construction vehicles shall meet all state and federal regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations. From NFPA 30: All tanks shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel.

The tanks shall be in sound condition free of rust or other damage which might compromise containment. Fuel storage areas shall meet all Environmental Protection Agency (EPA), OSHA and other regulatory requirements for signage, fire extinguisher, etc. Hoses, valves, fittings, caps, filler nozzles and associated hardware shall be always maintained in proper working condition. The location of fuel tanks shall be shown on the Site Maps and shall be located to minimize exposure to weather and surface water drainage features.

The Operator shall develop and implement a Materials Handling and Spill Prevention Plan (MHSPP) in accordance with the EPA and State of Colorado requirements. In the event of an accidental spill, immediate action shall be undertaken by the Operator to contain and remove the spilled material. All hazardous materials, including contaminated soil, shall be disposed of by the Operator in the manner specified by federal, state and local regulations and by the manufacturer of such products. As soon as possible, the spill shall be reported to the appropriate agencies. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States shall be properly reported. The Operator shall prepare a written record of any spill and associated clean-up activities of petroleum products or hazardous materials in excess of 1 gallon or reportable quantities, whichever is less.

Any spills of petroleum products or hazardous materials in excess of Reportable Quantities as defined by EPA or the state or local agency regulations, shall be immediately reported to the Colorado Department of Public Health and Environment spill reporting lines.

- CDPHE Environmental Release and Incident Reporting Line (877) 518-5608.

For reference, a bulletin on Environmental Spill Reporting published by the CDPHE, has been included in **Appendix E** of this report.

Vehicle Tracking and Dust Control

Vehicle Tracking Control Measures (structural and non-structural) shall be implemented in order to control potential sediment discharges from vehicle tracking. Practices shall be implemented for all areas of potential vehicle tracking which include but are not limited to reduced site access and utilization of designated haul routes.

Areas of soil that are denuded of vegetation and have little protection from particles being picked up and carried by wind should be protected with a temporary cover or kept under control with water or other soil adhering products to limit wind transported particles exiting the site perimeter.

Waste Management and Disposal

An effective first step towards preventing pollution in stormwater from work sites involves using a commonsense approach to improve the facility's basic housekeeping methods. Poor housekeeping practices result in increased waste and potential for stormwater contamination.

No solid materials are allowed to be discharged from the site with stormwater. All solid waste, including disposable materials incidental to the construction activities, must be collected and placed in containers. Secure covers for the containers shall be provided at all times to meet state and local requirements. The location of solid waste receptacles shall be identified on the GESC by the Operator.

Concrete waste is anticipated with this project; and therefore, a dedicated concrete washout is required. The Qualified Stormwater Manager shall take appropriate containment and treatment measures and document as necessary.

Groundwater and Stormwater Dewatering

Except as noted below, all discharges covered by this permit shall be composed entirely of stormwater associated with construction activity.

- Emergency Fire Fighting Activities
- Uncontaminated Spring Water

Groundwater dewatering is not anticipated. If groundwater is encountered during construction, the Qualified Stormwater Manager shall file for appropriate dewatering permits (Permit No. COG070000) with the CDPHE.

The CDPHE dewatering application and guidance documents are provided in **Appendix F**.

MAINTENANCE

Permittee or contractor shall produce written inspection records every seven (7) days and after significant precipitation events. All necessary maintenance and repair shall be completed

immediately. The purpose of site inspections is to assess performance of pollutant controls. The inspections will be conducted by the contractor's staff; however, the inspector must meet the qualifications of a Qualified Stormwater Manager. Based on these inspections, it is the responsibility of the contractor to revise or implement additional control measures, repair erosion control measures, modify, maintain, supplement, or take additional steps as necessary to achieve effective pollutant control measures.

Examples of specific items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection, the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances.

- A. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized VTC shall be constructed where vehicles enter and exit. Exits shall be maintained or supplemented as necessary to prevent the release of sediment from vehicles leaving the site.
- B. Sediment barriers must be inspected, and they must be extended, repaired, or cleaned at such time as their original capacity has been reduced by 33 percent. All material excavated from behind sediment barriers shall be stockpiled on the up-slope side. Additional sediment barriers must be constructed as needed.
- C. Inspections shall evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system or discharging from the site. If necessary, the materials must be covered, or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas, and/or run-on.
- D. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

An inspection log from CDPHE to be used by the operator has been provided in **Appendix H** for reference.

OPINION OF PROBABLE COST

An opinion of probable cost (OPC) has been prepared using the City of Lone Tree Template. Refer to **Appendix K** for this OPC.

CALCULATIONS

Due to the project being located on a site with existing downstream infrastructure, a sediment basin and diversion ditches were not required for this site. As such, no calculations have been provided.

TERM AND CONDITIONS OF THE CDPS GENERAL PERMIT

GENERAL LIMITATIONS

The following limitations shall apply to discharges associated with construction activities:

- Stormwater discharges from construction activities shall not cause, have the reasonable potential to cause, or measurably contribute to an exceedance of any water quality standard, including narrative standards for water quality.
- Concrete washout water shall not be discharged to state surface waters or to storm sewer systems. Onsite permanent disposal of concrete washout waste is not authorized by this permit. Discharge to the ground of concrete washout waste that will subsequently be disposed of offsite is not authorized by this permit. See Part I.A.2.c of the permit.
- Bulk storage structures for petroleum products and any other chemicals shall have secondary containment or equivalent adequate protection to contain all spills and prevent any spilled material from entering State Waters.
- No chemicals are to be added to the discharge unless permission for the use of a specific chemical is granted by CDPHE. In granting the use of such chemicals, special conditions and monitoring may be addressed by separate correspondence.
- CDPHE reserves the right to require sampling and testing, on a case-by-case basis, if there is reason to suspect that compliance with the GESC is a problem, or to measure the effectiveness of the control measures in removing pollutants in the effluent. Such monitoring may include Whole Effluent Toxicity testing.
- All site wastes must be properly managed to prevent potential pollution of State Waters. This permit does not authorize onsite waste disposal.
- All dischargers must comply with the lawful requirements of federal agencies, municipalities, counties, drainage districts and other local agencies regarding any discharges of stormwater to storm drain systems or other water courses under their jurisdiction, including applicable requirements in municipal stormwater management programs developed to comply with CDPS permits. Dischargers must comply with local stormwater management requirements, policies, or guidelines including erosion and sediment control.

The above information is taken directly from the CDPHE General Permit.

PROHIBITION OF NON-STORMWATER DISCHARGES

Except as identified within the Terms and Conditions of the General Permit (Section A.1.B – Allowable Non-Stormwater Discharges), all discharges covered by this permit shall be composed entirely of stormwater associated with construction activity. Discharges of material other than stormwater must be addressed in a separate CDPS permit issued for that discharge.

Discharges to the ground from construction dewatering activities that do not meet the referenced criteria must be covered under a separate CDPS discharge permit. Contaminated groundwater requiring coverage under a separate CDPS discharge permit may include groundwater contaminated with pollutants from a landfill, mining activity, industrial pollutant plume, underground storage tank, or other source.

The above information is taken from the CDPHE General Permit.

GESC RETENTION REQUIREMENTS

The permittee must document inspection results and maintain a record of the results for a period of 3 years following expiration or inactivation of permit coverage. These records must be made available to the City, County, CDPHE or EPA upon request.

In order to fulfill this requirement, the Qualified Stormwater Manager shall retain a copy of the GESC and provide the original to the owner/permittee upon inactivation of the permit.

GESC REVIEW / CHANGES

At nearly every site, the recommended and/or implemented control measures will need to be modified to adapt to changing site conditions, or to ensure that the potential pollutants are consistently and properly managed. The Operator shall amend the GESC:

- When there is a change in design, construction, operation, or maintenance of the site, which would require the implementation of new or revised control measures; or
- If the GESC proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activity; or
- When control measures are no longer necessary and removed; or
- When corrective actions are taken onsite that result in a change to the GESC.

GESC changes shall be made prior to changes in site conditions, except as noted below. Revisions may include, but are not limited to, potential pollutant source identification, selection of appropriate control measures for site conditions, control measure maintenance procedures and interim and final stabilization practices. The GESC changes may include a schedule for further control measure design and implementation, provided that, if any initial control measures are needed to comply with the permit, they are also included in the GESC and implemented during the initial period.

GESC CORRECTIVE ACTIONS

GESC changes addressing control measure installation and/or implementation are often required to be made in response to changing conditions, or when current control measures are determined ineffective. The majority of these GESC revisions can be made immediately with quick in-the-field revisions to the GESC. In the less common situation where more complex development of materials to modify the GESC is necessary, the revisions shall be made in accordance with the following requirements:

- The GESC shall be revised as soon as practicable, but in no case more than 72 hours after the change(s) in control measure installation/implementation occur at the site; and
- A notation must be included in the GESC prior to the site change(s) that includes the time and date of the change(s) in the field, an identification of the control measure(s) removed or added and the location(s) of those control measure(s).
- If a control measure is determined to be inadequate and is not repaired immediately, the operator must describe why it was infeasible to repair immediately as well as provide a schedule to correct the control measure.

Any control measure deficiencies, replacement or additional control measures that may be required shall be documented on the Grading, Erosion and Sediment Controls and in the appropriate logs. Copies of the Corrective Action Log and GESC Amendment Log have been included in **Appendix I** and **Appendix J** for reference and use.

CONCLUSIONS

Temporary erosion control measures will enhance stormwater quality within the project area by retaining sediment-laden runoff prior to discharging off-site.

REFERENCES

Colorado Discharge Permit System (CDPS) – Stormwater Discharge Associated with Construction Activities Application - Prepared by Water Quality Control Division, Colorado Department of Public Health and Environment; Revised April 2011.

Colorado Discharge Permit System (CDPS) General Permit – Stormwater Discharges Associated with Construction Activity - Prepared by Water Quality Control Division, Colorado Department of Public Health and Environment; signed and issued on October 31, 2018 and administratively continued effective April 1, 2019.

Stormwater Discharges Associated with Construction Activity – Grading, Erosion and Sediment Control Preparation Guidance - Prepared by Water Quality Control Division, Colorado Department of Public Health and Environment; Revised April 2011.

Urban Storm Drainage Criteria Manual, Volume 3 - Urban Drainage and Flood Control District, Denver, CO.; November 2010.

Construction Site Grading, Erosion, and Sediment Control (GESC) Program Standard Operating Procedures Manual – Prepared by City of Lone Tree Public Works Department; Revised September 2018

Grading, Erosion, and Sediment Control (GESC) Manual – Prepared by Douglas County, CO.; March 2004, Amended July 2019

APPENDICES

APPENDIX A – Construction Activities Stormwater Discharge Permit



For Agency Use Only
Permit Number Assigned
RWAIVER - _____
Date Received ____/____/____ Month Day Year

COLORADO DISCHARGE PERMIT SYSTEM (CDPS)
RAINFALL EROSIONITY WAIVER FOR EXCLUSION FROM CDPS STORMWATER PERMITTING
FOR SMALL CONSTRUCTION PROJECTS (LESS THAN FIVE ACRES)

PHOTO COPIES, FAXED COPIES, PDF COPIES OR EMAILS WILL NOT BE ACCEPTED.

Please print or type. Original signatures are required. All items must be completed accurately and in their entirety for the application to be deemed complete. Incomplete applications will not be processed until all information is received which will ultimately delay the issuance of a permit. If more space is required to answer any question, please attach additional sheets to the application form. Applications must be submitted by mail or hand delivered to:

Colorado Department of Public Health and Environment
 Water Quality Control Division
 4300 Cherry Creek Drive South
 WQCD-P-B2
 Denver, Colorado 80246-1530

This Rainfall Erosivity Waiver Form is for use by all Small Construction Projects regulated under the Stormwater Program where the project "R" Factor is less than 5, as determined using the State approved method. This includes sites otherwise required to apply for, or maintain, coverage under CDPS general permit COR-030000, but only if they meet the definition of Small Construction Projects given below.

Small construction projects are projects that result in land disturbance of equal to or greater than one acre and less than five acres. Small construction activity also includes the disturbance of any area less than five acres of total land area that is part of a larger common plan of development or sale, if the larger common plan will ultimately disturb equal to or greater than one and less than five acres.

Response by the Water Quality Control Division ("Division") indicating acceptance of a Rainfall Erosivity Waiver request constitutes notice that the facility does not require authorization for its stormwater discharges associated with construction activities. **This waiver does not relieve the operator of the following requirements:**

- 1) The operator or owner must comply with the requirements of local agencies, such as meeting local stormwater quality requirements.
- 2) The operator or owner must obtain authorization to discharge stormwater related with other industrial activities and materials, including but not limited to, asphalt and concrete batch plants and sand and gravel mining operations.
- 3) The operator or owner must obtain authorization to discharge any process water, including but not limited to, groundwater dewatering, washing activities, and discharges related to utility installation (hydrostatic test water, super chlorinated water, etc.)

RWAIVER APPLICANT INFORMATION

Applicant is: Property Owner Contractor/Operator

A. CONTACT INFORMATION - NOT ALL CONTACT TYPES MAY APPLY * indicates required

***PERMITTEE (If more than one please add additional pages)**

***ORGANIZATION FORMAL NAME:** _____

1) ***PERMITTEE** the person authorized to sign and certify the permit application. This person receives all permit correspondences and is **legally responsible** for compliance with the permit.

Responsible Position (Title): _____

Currently Held By (Person): _____

Telephone No: _____ email address _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

This form must be signed by the Permittee to be considered complete. See page 4 (signature requirements)

Rwaiver application

2) *SITE CONTACT local contact for questions relating to the facility & discharge authorized by this permit for the facility. Same As 1) Permittee

Responsible Position (Title): _____

Currently Held By (Person): _____

Telephone No: _____ email address _____

Organization: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

3) OTHER CONTACT TYPES (check below) Add pages if necessary:

Responsible Position (Title): _____

Currently Held By (Person): _____

Telephone No: _____ email address _____

Organization: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

- Pretreatment Coordinator
- Inspection Facility Contact
- Stormwater MS4 Responsible Person
- Environmental Contact
- Consultant
- Stormwater Authorized Representative
- Biosolids Responsible Party
- Compliance Contact
- Other _____
- Property Owner

B. Construction Project/Facility Information

A separate Rainfall Erosivity Waiver must be provided for each construction site qualifying for the Waiver. In addition, the exclusion from NPDES stormwater permitting is available on a development-wide basis only, not for individual filings, phases, or other portions of a larger common plan development or sale.

Project/Facility Name _____

Street Address or cross streets _____

City, _____ Zip Code _____ County _____

Facility Latitude/Longitude— (approximate center of site to nearest 15 seconds using one of following formats

001A Latitude _____ . _____ Longitude _____ . _____ (e.g., 39.703°, 104.933°')

degrees (to 5 decimal places) degrees (to 5 decimal places)

C. DESCRIPTION OF CONSTRUCTION ACTIVITY

D. AREA OF CONSTRUCTION SITE

Total area of project site (acres): _____

Area of project site to undergo disturbance (acres): _____

If the disturbed area of the project (D.2) or the Larger Common Plan of Development or Sale (D.3) exceeds 5 acres, you do NOT qualify for this waiver. Please complete and submit the Permit Application for Stormwater Discharges Associated with Construction Activity.

E. ANTICIPATED CONSTRUCTION SCHEDULE

Construction Start Date: _____ Final Stabilization Date: _____

It is very important to provide an accurate estimate. If in doubt, assume a longer period of time. Underestimating the anticipated construction schedule can result in a lower calculated project R-Factor. If a construction site operator underestimates the project R-Factor and does not apply for permit coverage, and the actual R-Factor for the project is above 5, the operator may be held liable for discharging from a point source without a permit.

F. RECEIVING WATERS (If discharge is to a ditch or storm sewer, include the name of the ultimate receiving waters)

Immediate Receiving Water(s): _____

Ultimate Receiving Water(s): _____

G. Waiver Worksheet (State Approved Method):

The following method must be used to calculate a construction project's Rainfall Erosivity Factor (the R Factor) when submitting a certification to the Division for a small construction site to be covered under the Rainfall Erosivity Waiver.

The Division reserves the right to revoke or refuse to grant the waiver based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to State waters.

The Division will not grant waivers for construction sites located in areas where snow cover can exist at the site for extended periods of time, if the construction site will remain active and unstabilized during the spring runoff. The Division will make the decision on whether or not a project qualifies for the waiver based on information provided by the permittee, and other sources, such as local government agencies. In order to calculate a project's R Factor, the following information is required:

1)	The start date of the construction project. begin disturbing soils, including grubbing, stockpiling, excavating, and grading activities.	
		Month / Day / Year
2)	The end date of the construction project. this is when the site is finally stabilized. This means that all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels. Permit coverage must be maintained until that time. If permit coverage is still required once your part is completed, and the <u>total</u> time of permit coverage does <u>not</u> result in an R-Factor of less than 5, then your part does <u>not</u> qualify for the waiver.	
		Month / Day / Year
3)	The county the project is located in. If the project is in two or more counties, the county that the majority of the project lies within must be used.	
		County

If the project start date and the project end date are 11 months apart or more, the project's R Factor can not fall below 5, and therefore the project can not qualify for the Rainfall Erosivity Waiver.

4)	Pick the 15-day period that your start date (Item 1) falls within from those along the top of Table 1 (e.g., June 1-15).	
		Start Period
5)	Pick the 15-day period that your end date (Item 2) falls within from those along the top of Table 1. If the completion date falls within the same 15-day period as the starting date, the next 15-day period must be used. For example, if the project will begin on June 1st and end on June 10th, the period used for the start of the project would be "June 1-15" and the period used for the end of the project would be the next period, "June 16-30"	
		End Period
6)	Refer to Table 1. Find the project's "County" (item 3) in the left column. Locate the R Factor Index Values for the 15-day periods that correspond to the project "Start Period" and "End Period" you identified in Items 4 and 5.	
		Start R-Factor
		End R-Factor

If the Start Period (Item 4) and End Period (Item 5) are within the same calendar year, complete Item 7.A. If they are within 2 separate calendar years, complete item 7.B.

Rwaiver application

7.A)	Project R-Factor calculation for projects within ONE calendar year. Subtract the "Start R-Factor" (Item 5) from the "End R-Factor" (Item 6) and write the number in the box to the right.	_____	-	_____	=	_____	
		End-R Factor		Start R-Factor		Project R-Factor	
							(must be less than 5)

7.B)	Project R-Factor calculation for projects within TWO calendar years. Refer to Table 1. Find the project's "County" (item 3) in the left column. Locate the "Annual R-Factor" in the second column. Subtract the "Start R-Factor" (Item 5) from the "Annual R-Factor" and then add the "End R-Factor" (Item 6) and write the number in the box to the right.	_____	-	_____	+	_____	=	_____	
		Annual R-Factor		Start R-Factor		End R-Factor		Project R-Factor	
									(must be less than 5)

H. Waiver Certification:

If the Project R-Factor calculated in 7.A or 7.B is **less than 5**, the project qualifies for the waiver.

If the Project R-Factor calculated in 7.A or 7.B is **equal to or greater than 5**, the project **does not** qualify for the waiver, and the site owner or operator must submit an application for coverage under a CDPS General Permit, and comply with its requirements.

Please check the following boxes indicating you understand the requirements presented herein, and sign the certification:

I understand that if the project's or larger common plan of development or sale's anticipated schedule changes so that the start date is in an earlier 15-day period or the end date is in a later period, this form must be filled out with the new information and resubmitted if the site still qualifies for the waiver, or an application for coverage under the CDPS general permit for Stormwater Discharges Associated with Construction Activity must be submitted to the Division.

I understand that if the project or larger common plan of development or sale exceeds, or is expected to exceed 5 acres of disturbance, an application for coverage under the CDPS general permit for Stormwater Discharges Associated with Construction Activity must be submitted to the Division.

SIGNATURE OF PERMIT LEGAL CONTACT

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Signature of Legally Responsible Person (submission must include original signature)

Date Signed

Name (printed)

Title

Signature of Applicant: The applicant must be either the owner and/or operator of the construction site. Refer to Part B of the instructions for additional information. The application must be signed by the applicant to be considered complete. In all cases, it shall be signed as follows: (Regulation 61.4 (1ei)

- a) In the case of corporations, by the responsible corporate officer is responsible for the overall operation of the facility from which the discharge described in the form originates
- b) In the case of a partnership, by a general partner.
- c) In the case of a sole proprietorship, by the proprietor.
- d) In the case of a municipal, state, or other public facility, by either a principal executive officer, ranking elected official, (a principal executive officer has responsibility for the overall operation of the facility from which the discharge originates).

Fee: There is no fee associated with submittal of this form. However, if you are currently covered under a stormwater discharge permit, any invoices already received for permit coverage must still be paid.

STORMWATER MANAGEMENT PLAN

A Stormwater Management Plan (SWMP) is not required by the Division for small construction projects that qualify for the Rainfall Erosivity Waiver. However, a project operating under the waiver may still be held liable if stormwater discharges from construction activities cause or threaten to cause pollution, contamination or degradation of State waters. For this reason, the Division recommends that a SWMP be developed and implemented, or similar controls implemented, for qualifying projects. The Division has a guidance document available on construction SWMP preparation at <http://www.cdph.state.co.us/wq/PermitsUnit/wqcdpmt.html>, or call (303) 692-3517.

Table 1: R Factors by County

County	Annual R Factor	R- Factor Index by 15-day period:																							
		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31
Adams	50	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.9	2.5	5.0	9.8	13.6	19.2	26.4	34.4	42.0	45.8	48.2	49.1	49.6	49.8	49.9	50.0	50.0
Alamosa	15	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.6	1.5	1.9	2.7	4.6	8.1	11.6	13.4	14.2	14.6	14.8	14.9	14.9	15.0	15.0
Arapahoe	50	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.9	2.5	5.0	9.8	13.6	19.2	26.4	34.4	42.0	45.8	48.2	49.1	49.6	49.8	49.9	50.0	50.0
Archuleta	10	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.7	1.4	2.0	3.0	4.5	6.4	8.3	9.2	9.6	9.8	9.9	10.0	10.0	10.0	10.0
Baca	60	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.7	1.9	4.0	8.6	12.1	17.9	26.7	38.5	49.9	55.3	57.8	58.9	59.6	59.8	59.9	60.0	60.0
Bent	50	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.6	1.6	3.4	7.2	10.1	14.9	22.3	32.1	41.6	46.1	48.2	49.1	49.7	49.9	49.9	50.0	50.0
Boulder	35	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.6	1.7	3.5	6.8	9.5	13.4	18.5	24.1	29.4	32.1	33.7	34.4	34.7	34.9	34.9	35.0	35.0
Broomfield	35	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.6	1.7	3.5	6.8	9.5	13.4	18.5	24.1	29.4	32.1	33.7	34.4	34.7	34.9	34.9	35.0	35.0
Chaffee	20	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.3	2.9	4.0	6.0	8.9	12.8	16.6	18.4	19.3	19.6	19.9	19.9	20.0	20.0	20.0
Cheyenne	70	0.0	0.0	0.1	0.1	0.1	0.1	0.4	0.8	2.2	4.7	10.1	14.1	20.9	31.2	44.9	58.2	64.5	67.5	68.7	69.5	69.8	69.9	70.0	70.0
Clear Creek	25	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	1.2	2.5	4.9	6.8	9.6	13.2	17.2	21.0	22.9	24.1	24.6	24.8	24.9	25.0	25.0	25.0
Conejos	10	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	1.3	1.8	3.1	5.4	7.7	8.9	9.5	9.7	9.9	9.9	10.0	10.0	10.0
Costilla	20	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.8	2.0	2.6	3.6	6.1	10.8	15.4	17.8	19.0	19.4	19.7	19.9	19.9	20.0	20.0
Crowley	40	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.2	2.7	5.8	8.0	11.9	17.8	25.7	33.2	36.9	38.6	39.2	39.7	39.9	39.9	40.0	40.0
Custer	20	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.3	2.9	4.0	6.0	8.9	12.8	16.6	18.4	19.3	19.6	19.9	19.9	20.0	20.0	20.0
Delta	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Denver	40	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.7	2.0	4.0	7.8	10.9	15.3	21.1	27.5	33.6	36.6	38.6	39.3	39.7	39.8	39.9	40.0	40.0
Dolores	20	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.4	2.0	3.1	3.9	5.3	7.3	10.3	13.5	15.9	17.8	18.6	19.2	19.5	19.6	19.7	20.0
Douglas	35	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.6	1.7	3.5	6.8	9.5	13.4	18.5	24.1	29.4	32.1	33.7	34.4	34.7	34.9	34.9	35.0	35.0
Eagle	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Elbert	45	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.8	2.2	4.5	8.8	12.2	17.2	23.8	31.0	37.8	41.2	43.4	44.2	44.6	44.8	44.9	44.9	45.0
El Paso	40	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.2	2.7	5.8	8.0	11.9	17.8	25.7	33.2	36.9	38.6	39.2	39.7	39.9	39.9	40.0	40.0
Fremont	20	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.3	2.9	4.0	6.0	8.9	12.8	16.6	18.4	19.3	19.6	19.9	19.9	20.0	20.0	20.0
Garfield	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Gilpin	25	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	1.2	2.5	4.9	6.8	9.6	13.2	17.2	21.0	22.9	24.1	24.6	24.8	24.9	25.0	25.0	25.0
Grand	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Gunnison	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Hinsdale	15	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.7	1.0	1.5	2.3	3.0	4.0	5.5	7.8	10.1	11.9	13.3	14.0	14.4	14.6	14.7	14.8	15.0
Huerfano	40	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.2	2.7	5.8	8.0	11.9	17.8	25.7	33.2	36.9	38.6	39.2	39.7	39.9	39.9	40.0	40.0
Jackson	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Jefferson	30	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.5	3.0	5.9	8.2	11.5	15.8	20.6	25.2	27.5	28.9	29.5	29.8	29.9	29.9	30.0	30.0
Kiowa	60	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.7	1.9	4.0	8.6	12.1	17.9	26.7	38.5	49.9	55.3	57.8	58.9	59.6	59.8	59.9	60.0	60.0
Kit Carson	55	0.0	0.0	0.1	0.1	0.1	0.2	0.5	0.9	1.9	4.6	10.7	16.5	24.2	32.6	39.8	46.5	50.2	53.1	54.2	54.7	54.9	54.9	55.0	55.0

Table 1 (continued): R Factors by County

County	Annual	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
	R Factor	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31
Lake	20	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.6	1.3	2.9	4.0	6.0	8.9	12.8	16.6	18.4	19.3	19.6	19.9	19.9	20.0	20.0	20.0
La Plata	20	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.4	2.0	3.1	3.9	5.3	7.3	10.3	13.5	15.9	17.8	18.6	19.2	19.5	19.6	19.7	20.0
Larimer	20	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	1.0	2.0	3.9	5.4	7.7	10.6	13.8	16.8	18.3	19.3	19.6	19.8	19.9	20.0	20.0	20.0
Las Animas	30	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.9	2.0	4.3	6.0	8.9	13.4	19.3	24.9	27.7	28.9	29.4	29.8	29.9	29.9	30.0	30.0
Lincoln	45	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.4	3.0	6.5	9.0	13.4	20.0	28.9	37.4	41.5	43.4	44.1	44.7	44.9	44.9	45.0	45.0
Logan	60	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	2.9	5.9	11.7	16.3	23.0	31.7	41.3	50.3	55.0	57.8	58.9	59.5	59.8	59.9	60.0	60.0
Mesa	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Mineral	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Moffat	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Montezuma	20	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.4	2.0	3.1	3.9	5.3	7.3	10.3	13.5	15.9	17.8	18.6	19.2	19.5	19.6	19.7	20.0
Montrose	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Morgan	60	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	2.9	5.9	11.7	16.3	23.0	31.7	41.3	50.3	55.0	57.8	58.9	59.5	59.8	59.9	60.0	60.0
Otero	40	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.2	2.7	5.8	8.0	11.9	17.8	25.7	33.2	36.9	38.6	39.2	39.7	39.9	39.9	40.0	40.0
Ouray	15	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.7	1.0	1.5	2.3	3.0	4.0	5.5	7.8	10.1	11.9	13.3	14.0	14.4	14.6	14.7	14.8	15.0
Park	20	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	1.0	2.0	3.9	5.4	7.7	10.6	13.8	16.8	18.3	19.3	19.6	19.8	19.9	20.0	20.0	20.0
Phillips	60	0.0	0.0	0.1	0.1	0.1	0.2	0.5	1.0	2.1	5.0	11.6	18.0	26.4	35.5	43.4	50.8	54.7	57.9	59.2	59.7	59.9	59.9	60.0	60.0
Pitkin	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Prowers	60	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.7	1.9	4.0	8.6	12.1	17.9	26.7	38.5	49.9	55.3	57.8	58.9	59.6	59.8	59.9	60.0	60.0
Pueblo	40	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.2	2.7	5.8	8.0	11.9	17.8	25.7	33.2	36.9	38.6	39.2	39.7	39.9	39.9	40.0	40.0
Rio Blanco	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Rio Grande	10	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	1.3	1.8	3.1	5.4	7.7	8.9	9.5	9.7	9.9	9.9	10.0	10.0	10.0
Routt	10	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.7	1.0	1.6	2.0	2.7	3.6	5.2	6.8	7.9	8.9	9.3	9.6	9.7	9.8	10.0	10.0
Saguache	10	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	1.3	1.8	3.1	5.4	7.7	8.9	9.5	9.7	9.9	9.9	10.0	10.0	10.0
San Juan	20	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.4	2.0	3.1	3.9	5.3	7.3	10.3	13.5	15.9	17.8	18.6	19.2	19.5	19.6	19.7	20.0
San Miguel	20	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.4	2.0	3.1	3.9	5.3	7.3	10.3	13.5	15.9	17.8	18.6	19.2	19.5	19.6	19.7	20.0
Sedgwick	60	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	2.9	5.9	11.7	16.3	23.0	31.7	41.3	50.3	55.0	57.8	58.9	59.5	59.8	59.9	60.0	60.0
Summit	20	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.4	2.0	3.1	3.9	5.3	7.3	10.3	13.5	15.9	17.8	18.6	19.2	19.5	19.6	19.7	20.0
Teller	30	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.9	2.0	4.3	6.0	8.9	13.4	19.3	24.9	27.7	28.9	29.4	29.8	29.9	29.9	30.0	30.0
Washington	60	0.0	0.0	0.1	0.1	0.1	0.2	0.4	1.0	2.9	5.9	11.7	16.3	23.0	31.7	41.3	50.3	55.0	57.8	58.9	59.5	59.8	59.9	60.0	60.0
Weld	50	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.9	2.5	5.0	9.8	13.6	19.2	26.4	34.4	42.0	45.8	48.2	49.1	49.6	49.8	49.9	50.0	50.0
Yuma	60	0.0	0.0	0.1	0.1	0.1	0.2	0.5	1.0	2.1	5.0	11.6	18.0	26.4	35.5	43.4	50.8	54.7	57.9	59.2	59.7	59.9	59.9	60.0	60.0

APPENDIX B – FEMA Firm Map and NRCS Soils Information

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updates or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Straddle Elevations tables shown on this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the Flood Profiles and Floodway Data and/or Summary of Straddle Elevations tables should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Floodway Data table shown on this FIRM.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The horizontal datum was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geospatial Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geospatial Survey website at <http://nads.ngs.noaa.gov> or contact the National Geospatial Survey at the following address:

NGS Information Services
NOAA, NIMS12
National Geospatial Survey
SSM-C-3, #6202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geospatial Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was provided by the Douglas County GIS Department and the Town of Castle Rock GIS Department. Additional input was provided by the City of Lone Tree and Town of Parker. These data are current as of 2010.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the profile baseline, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

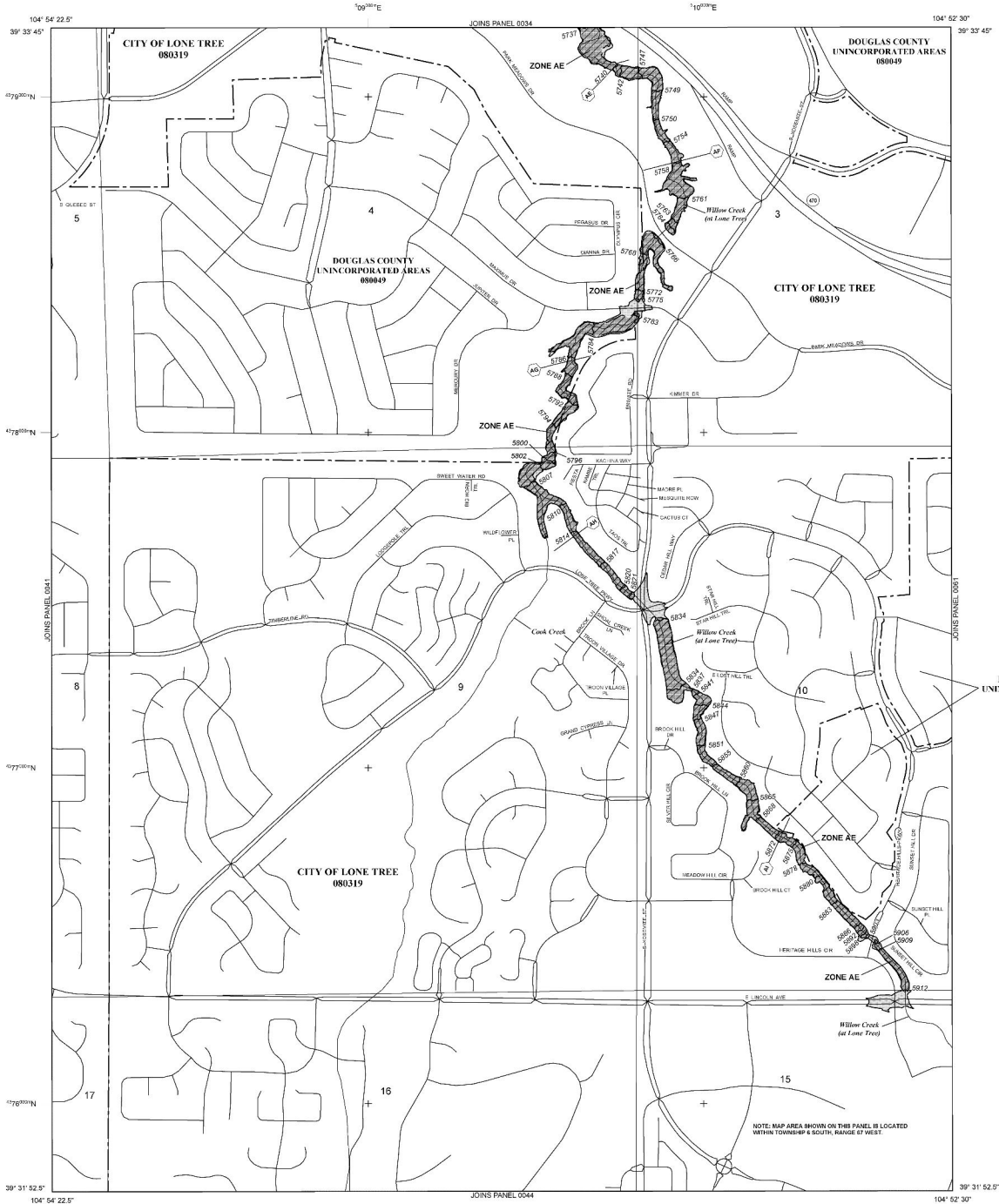
Based on updated topographic information, this map reflects more detailed and up-to-date stream channel configurations and floodplain delineations than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel locations that differ from what is shown on the map. Also, the road to floodplain relationships for unreviewed streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

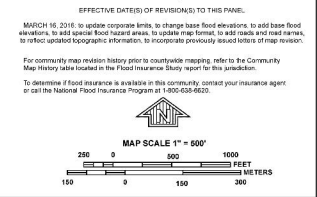
For information on available products associated with this FIRM visit the Map Service Center (MSC) website at <http://map.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have questions about this map, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/fm>.



LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, AV, and V. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A**: No Base Flood Elevations determined.
 - ZONE AE**: Base Flood Elevations determined.
 - ZONE AH**: Flood depths of 1 to 3 feet (usually are ponding); Base Flood Elevations determined.
 - ZONE AO**: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depth determined; areas of wave run flooding, velocities also determined.
 - ZONE AR**: Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently deactivated. Zone AR indicates that the former flood control system is being retained to provide protection from the 1% annual chance or greater flood.
 - ZONE AVS**: Area to be protected from the 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
 - ZONE V**: Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
 - ZONE VE**: Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of obstructions so that the 1% annual chance flood can be carried without substantial increase in flood heights.
- OTHER FLOOD AREAS**
- ZONE X**: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the 1% annual chance flood.
 - OTHER AREAS**: Areas determined to be outside the 0.2% annual chance floodline. Areas in which flood hazards are undetermined, but possible.
 - ZONE D**: Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% Annual Chance Floodplain Boundary
 - 0.2% Annual Chance Floodplain Boundary
 - Floodway boundary
 - Zone D boundary
 - CBRS and OPA boundary
 - Boundary defining Special Flood Hazard Area zones and boundary defining Special Flood Hazard Areas of different Special Flood Hazard, floor depths, or flood velocities
 - Base Flood Elevation line and velocity section in feet
 - Base Flood Elevation value where uniform within zone; elevation in feet
- *Referenced to the North American Vertical Datum of 1988



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0042G

FIRM
FLOOD INSURANCE RATE MAP
DOUGLAS COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 42 OF 495
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	08039	0042	G
LONE TREE CITY OF	08039	0042	D

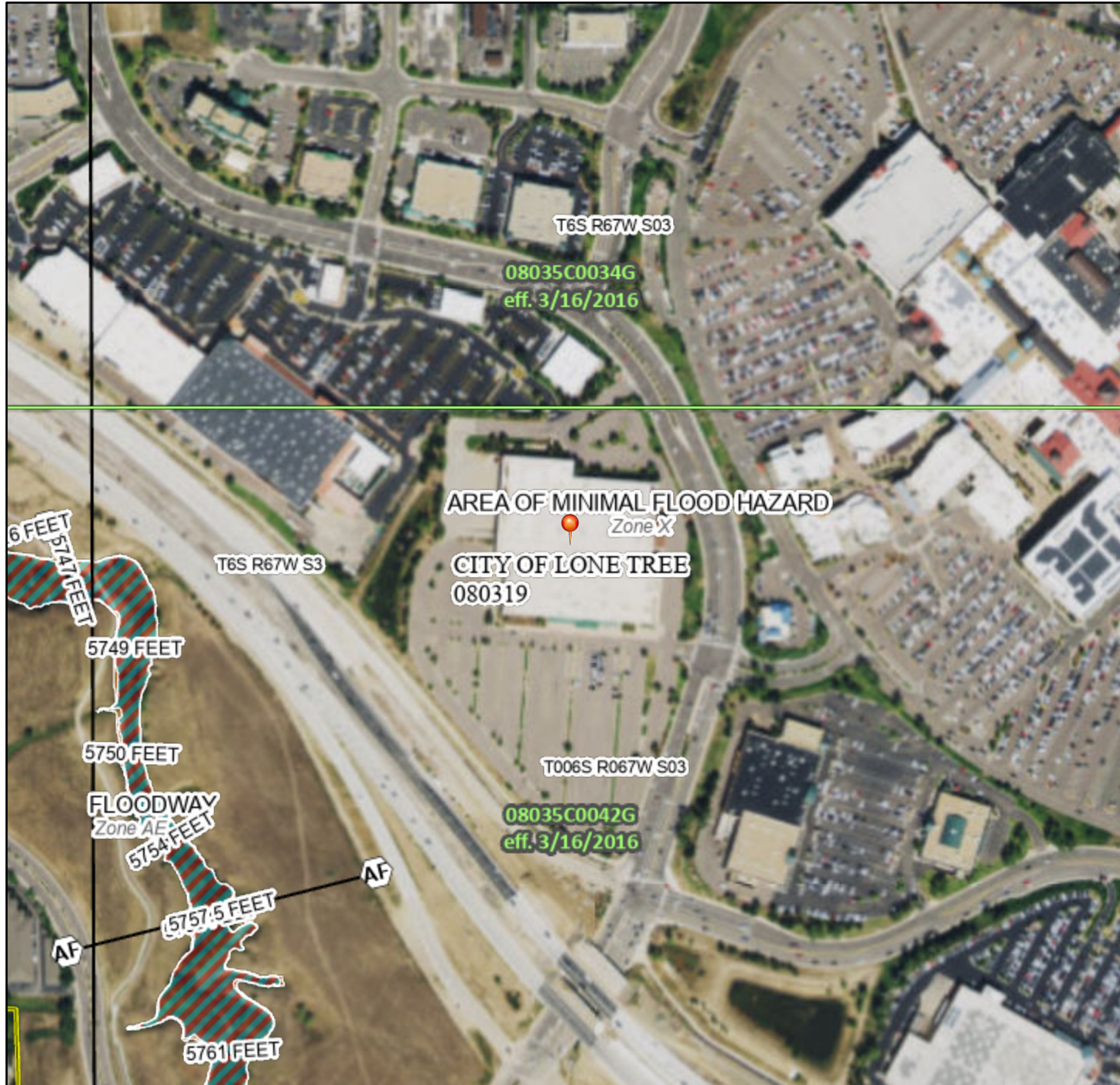
Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
0803C0042G
MAP REVISED
MARCH 16, 2016
Federal Emergency Management Agency

National Flood Hazard Layer FIRMette



104°53'11"W 39°33'55"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | |
|------------------------------------|--|
| SPECIAL FLOOD HAZARD AREAS | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> |
| | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i> |
| | Effective LOMRs |
| | Area of Undetermined Flood Hazard <i>Zone D</i> |
| GENERAL STRUCTURES | Channel, Culvert, or Storm Sewer |
| | Levee, Dike, or Floodwall |
| OTHER FEATURES | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | 17.5 Coastal Transect |
| | Base Flood Elevation Line (BFE) |
| | Limit of Study |
| | Jurisdiction Boundary |
| | Coastal Transect Baseline |
| | Profile Baseline |
| | Hydrographic Feature |
| MAP PANELS | Digital Data Available |
| | No Digital Data Available |
| | Unmapped |



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **2/1/2023 at 2:59 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



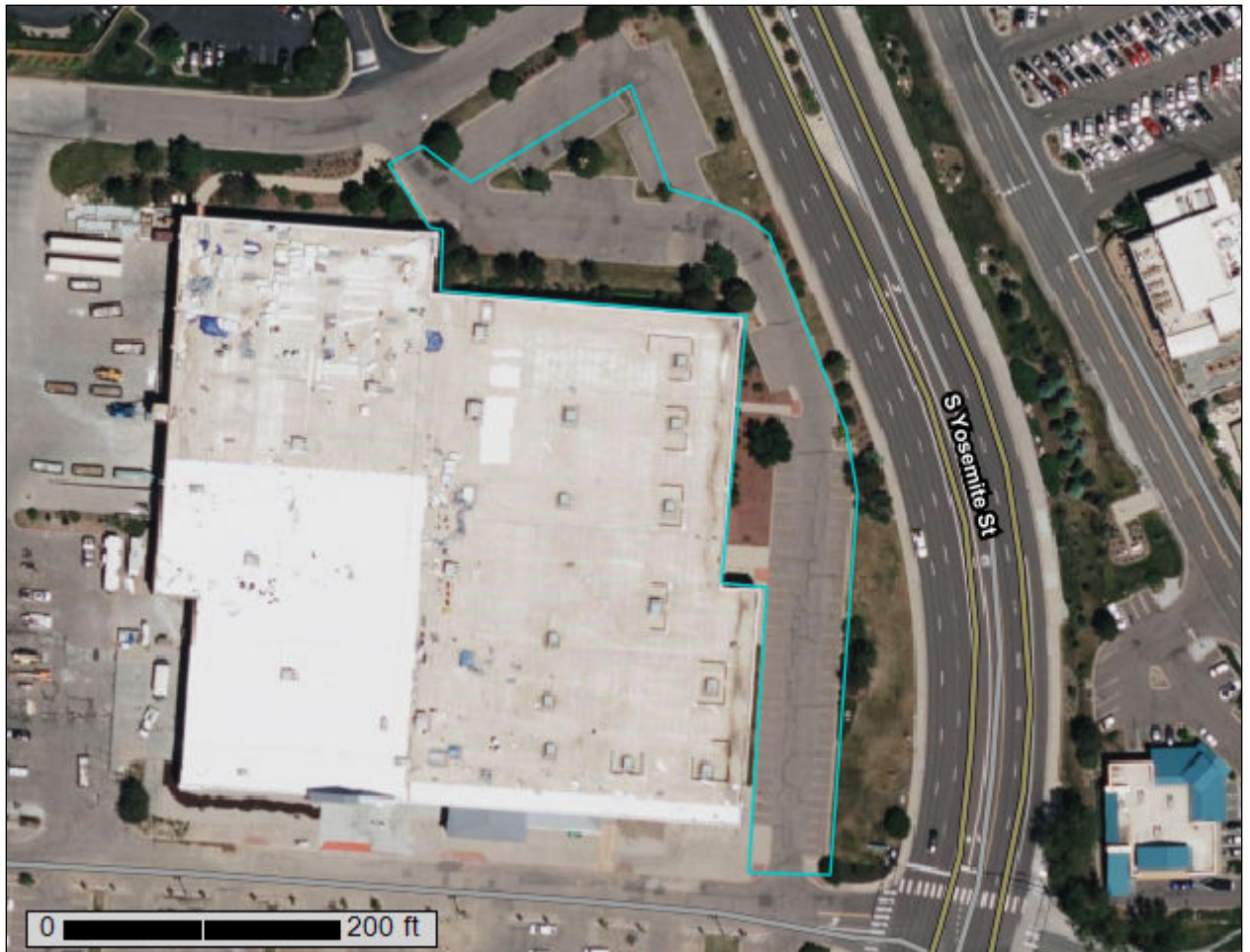
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Castle Rock Area, Colorado



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

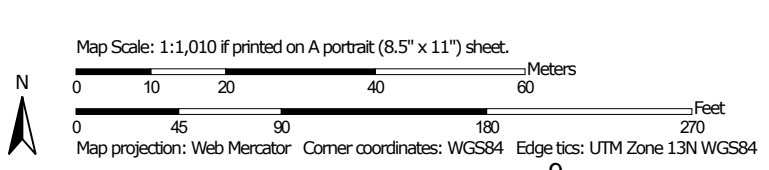
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)


Soils


 Soil Map Unit Polygons


 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Castle Rock Area, Colorado
 Survey Area Data: Version 15, Sep 1, 2022

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

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FoD	Fondis clay loam, 3 to 9 percent slopes	0.0	1.2%
RmE	Renohill-Buick complex, 5 to 25 percent slopes	1.2	98.8%
Totals for Area of Interest		1.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

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onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Castle Rock Area, Colorado

FoD—Fondis clay loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: jqyp
Elevation: 5,500 to 6,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fondis and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fondis

Setting

Landform: Ridges, buttes, mesas
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits over coarse-silty outwash derived from arkose

Typical profile

H1 - 0 to 7 inches: clay loam
H2 - 7 to 24 inches: clay
H3 - 24 to 60 inches: sandy clay loam

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R049XB208CO - Clayey Foothill
Hydric soil rating: No

Minor Components

Kutch

Percent of map unit: 5 percent
Hydric soil rating: No

Englewood

Percent of map unit: 5 percent
Hydric soil rating: No

Denver

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

RmE—Renohill-Buick complex, 5 to 25 percent slopes

Map Unit Setting

National map unit symbol: jqzy
Elevation: 5,500 to 6,200 feet
Mean annual precipitation: 15 to 17 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Renohill and similar soils: 50 percent
Buick and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Renohill

Setting

Landform: Hills
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Weathered, calcareous clayey shale

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 12 inches: clay loam
H3 - 12 to 24 inches: clay loam
H4 - 24 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 25 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

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Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R049XC202CO - Loamy Foothill 14-19 PZ
Hydric soil rating: No

Description of Buick

Setting

Landform: Hills
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits over silty alluvium

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 15 inches: silty clay loam
H3 - 15 to 22 inches: loam
H4 - 22 to 60 inches: sandy clay loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R049XC202CO - Loamy Foothill 14-19 PZ
Hydric soil rating: No

Minor Components

Manzanola

Percent of map unit: 6 percent
Hydric soil rating: No

Satanta

Percent of map unit: 6 percent

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Hydric soil rating: No

Fondis

Percent of map unit: 6 percent

Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 2 percent

Landform: Swales

Hydric soil rating: Yes

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C – Identification of Pollutant Sources

**APPENDIX D – Land Disturbance/ Control Measure/ Stabilization
Log**

APPENDIX E – CDPHE Environmental Spill Reporting



Five day reporting form

Incident / spill / sanitary sewer overflow release

Use this form to report incidents impacting waters of the state

The Water Quality Control Division distinguishes between reporting requirements for incidents that occur at entities operating under a Colorado Discharge Permit System (CDPS) permit and those resulting from non-permitted activities.

Permitted activities - Reporting and management of non-compliance incidents and spills that occur as a result of permitted activities should be performed in accordance with the specific requirements in the notifications section of your permit. You may use this form to submit the information requested in the permit.

Non-permitted activities - In the case of an activity where a permit does not address reporting of, or response to, a given spill please submit a written summary of the event, your response, and clean up efforts to the division within five working days of the date of the event. This form is provided for your convenience. If you have any questions please contact the division's field services staff person assigned to your spill case.

Prior to the five working day deadline you may request an extension to submit the report if needed for sampling analysis or other reasons. To request an extension please send an email to the division's field services staff person assigned to your spill case or to the spill administrator. The field services contact list is available at: www.colorado.gov/cdphe/wq-inspection-services-contact-us.

Please send the completed form or report with signature to the division's field services spill administrator:

Michelle Thiebaud
 222 S. Sixth Street, 232
 Grand Junction, CO 81501

Telephone: 970-248-7150
 Fax: 970-248-7198
 Email: michelle.thiebaud@state.co.us

1. Incident background information					
Incident/spill number (division provided)		Date of event		County	
Type of incident / spill / SSO (check one)					
<input type="checkbox"/> Sanitary sewer overflow	<input type="checkbox"/> Potable water/reuse water/reclaimed water		<input type="checkbox"/> Biosolids		
<input type="checkbox"/> Wastewater treatment plant bypass or upset (authorized outfall point)	<input type="checkbox"/> Petroleum product		<input type="checkbox"/> Oil or gas field production spill		
<input type="checkbox"/> Wastewater treatment plant spill or overflow (other than outfall)	<input type="checkbox"/> Chemical		<input type="checkbox"/> Other		
Estimated volume released					
Size and depth of area affected					
Contact information					
Potentially responsible party contact name					
Potentially responsible party company/agency name					
CDPHE Permit number and facility name (if applicable)					
Email address				Phone	
2. Incident information: Please provide the following information.					
A. Describe incident including source, cause, and location (e.g. address, latitude/longitude).					
B. Material released, e.g. untreated wastewater, specific chemical or product, biosolids. Please attach the OSHA Material Safety Data Sheets for any and all chemicals or products in spill or release.					

C. Actual or estimated duration of the event and time spill was fully controlled/stopped. If release is still occurring, the date and time the release is expected to be stopped.

D. Describe measures taken or planned to contain, reduce, and clean up spill or release.

E. Describe steps taken or planned to prevent reoccurrence.

3. Incident impact to state waters (As defined in § 25-8-103(19), C.R.S.).
Examples of state waters include: stormwater conveyances (when they discharge to surface water), perennial streams, intermittent or ephemeral gulches, ditches, ponds, lakes, reservoirs, irrigation canals, wetlands and groundwater.

A. Did flow or materials reach surface water of the state? If so, identify the water body or bodies and describe the path of flow. What quantity of material reached the surface waters and what was the resulting impact?

B. Did flow or materials reach groundwater of the state? If so, identify the water body or bodies and describe the path of flow. If yes, what quantity of material reached the ground or groundwater and what was the resulting impact?

C. Did the incident include any of the following? If so, please include additional details below.

Chemical release Fish kill Sheen on water

D. Were any water quality samples or other samples taken? If so, please describe sampling process, sampling location(s) in relationship to the incident, i.e. up/down stream and attach results.

4. Incident impact to areas or water users

A. Describe the potential impact of the incident /spill/SSO to public use areas or downstream water users. This includes parks and swim beaches or public water system sources and irrigation diversions.

B. Were the impacted area users and downstream water users notified and describe the method of notification, e.g. signs posted, via phone.

C. List any downstream users who were notified.

I hereby certify that the information presented above is accurate and complete.

Signature	Name and title	Company, organization	Date

APPENDIX F – CDPHE Dewatering Permit



Application Supplement for COLORADO DISCHARGE PERMIT SYSTEM (CDPS) General Permits

- Short-Term Construction Dewatering Discharges (COG080000)
- Short-Term Remediation Activities Discharges (COG317000)
- Long-Term Remediation Activities Discharges (COG318000)
- Subterranean Dewatering Discharges (COG603000)

This combined permit application supplement is designed to streamline the application process for the four types of discharge permits listed above. A [Dewatering Application Guidance](#) document is available on the Water Quality Control Division website to help applicants complete the permit application and this application supplement, and to select the right permit coverage for their discharge.

The online application and this application supplement must be submitted to the division at least 30 days (for Construction Dewatering or Subterranean Dewatering) or 45 days (for Remediation) prior to the anticipated date of discharge, and must be considered complete by the division before the review and approval process begins. The division will notify the applicant if additional information is needed to complete the application. If more space is required to answer any question, please attach additional sheets to this application supplement form. Applications must be submitted via the:

[Colorado Environmental Online Services](#)

IMPORTANT: Please read the *Dewatering Application Guidance* for these permits prior to completing this application supplement. The *Guidance* provides specific and important instructions required for completing the application correctly.

1. PERMIT INFORMATION

Application is for the following discharge permit (select ONE). See Guidance.

- Short-Term Construction Dewatering (COG080000)
- Short-Term Remediation Activities (COG317000)
- Long-Term Remediation Activities (COG318000)
- Subterranean Dewatering (COG603000)

Note: The division may request additional characterization of the proposed discharge to ensure that the appropriate permit coverage is requested and the appropriate permit certification is issued. The division may deny or change the requested type of discharge permit after review of the submitted application and will notify the applicant of the changes. Coverage under the Well Development General Permit COG608000 is not available using this application supplement form.

To complete the application process, you must:

- ✓ Sign in to the [Colorado Environmental Online Services](#) and fill out an application;
- ✓ **Attach a location map(s) for outfalls** to the online application that shows the location of the project/facility, the limits of the construction activity (if applicable), the approximate location of the requested discharge points/outfalls, and the location of potential receiving water(s). If known, the map should also include the approximate location(s) where dewatering is to occur and the location of proposed BMPs to be used. A north arrow must be shown;
- ✓ **Attach this completed application supplement** to the online application; and
- ✓ Attach any additional information (e.g., source water analytical results, SDS sheets for chemical additions) to the online application (as needed).

2. FACILITY / PROJECT INFORMATION

a) Facility Name: _____

3. DEWATERING AND DISCHARGE DESCRIPTION

Note: For discharges of uncontaminated groundwater to land, please review and consider the applicability of the division's [Low Risk Discharge Guidance: Discharges of Uncontaminated Groundwater to Land](#) before submitting a permit application to the division.

a) Please check the box next to the option that describes the discharge activity:

- Construction-related dewatering Long-term foundation dewatering /
subterranean dewatering

b) How will the discharge flow rate be measured?

- Continuous Recorder In-situ * (i.e., single reading, observation or measurement)

Note: CEOS requires that flow estimates are entered in units of Million Gallons per Day (MGD). Applications that provide flow estimates in gpm (gallons per minute) will be returned to the applicant for correction.

Note also - Coverage under COG318000 requires use of a continuous recorder. Coverage under COG603000 or COG317000 requires use of a continuous recorder unless specifically waived by the division. Coverage under COG080000 allows for either a continuous recorder or in-situ method. If "In-situ" is selected, the permit certification will also require reporting of flow duration (i.e., estimated total hours of actual discharge per month).

**If requesting in-situ flow monitoring under COG603000 or COG317000, include your justification for this request in the box below (e.g., no active treatment is required to meet effluent limitations, etc.)*

c) Is the discharge to an impoundment? Yes * No

* If yes:

Is the impoundment lined to prevent seepage? Yes NoIs the impoundment located within 200 feet of a surface water body? Yes No

d) For construction-related dewatering, will the construction activity create or result in a long-term subterranean dewatering discharge at the site (e.g., installation of foundation, footer, toe drains, etc.)?

- Yes * No

If yes, note that construction phase dewatering and long-term subterranean dewatering cannot be covered under the same permit certification. A separate permit application must be submitted for long-term subterranean dewatering. **NOTE: Please plan ahead! The division reserves the authority to deny the termination of a short-term discharge permit associated with the construction of a fixed facility where a long-term discharge remains, unless alternate, appropriate permit coverage is in place for the long-term discharge.*

- e) For construction-related dewatering, is the dewatering and discharge in-stream? (The dewatering operation is considered in-stream where all dewatering activity is conducted within approximately the ordinary high water mark of the stream and/or on the bank of the stream and the discharge is back to the same water body.)

Yes * No

If yes, will coverage under a Clean Water Act Section 404 Permit be obtained for the in-stream work?

Yes No

**For all proposed in-stream work, you must provide a description of how your project meets the definition of "in-stream" in the box below. If no description is provided, the work will not be considered in-stream.*

- f) For construction-related dewatering, will the project involve a temporary stream diversion (e.g., diversion channel, pump-around, piped diversion, coffer dam) to reroute water around the construction area?

Yes * No

**By checking yes, the applicant understands that temporary water diversions are not covered under the permit certification and may require coverage under a Clean Water Act Section 404 Permit. Only dewatering discharge outfalls associated with construction-related activities are covered under the permit certification.*

- g) Will dewatering be conducted in areas that involve work on or near (e.g., replacing, repairing, making connections to, etc.) existing sanitary sewer lines, conveyances, or vessels, or in proximity to septic disposal systems?

Yes * No

If yes, is there the potential that sewage or septage could be in the effluent to be discharged?

Yes No *

**If no, you must provide a description of the control measures that will be implemented to prevent sewage or septage from entering the discharge (use the box below). The division may add effluent limits for E. coli and/or Total Coliform if the applicant does not demonstrate that adequate measures will be in place.*

4. NEARBY SOURCES OF POTENTIAL GROUNDWATER CONTAMINATION

- a) Are you submitting source water data with this permit application? (Requirements for source water data are described in the Dewatering Application Guidance.)

Yes * No

If yes, provide the latitude and longitude where the source water sample(s) were collected:

Degrees (5 decimal places)

Latitude: _____ Longitude: _____ (e.g., 39.70213°, 104.93633°)

Latitude: _____ Longitude: _____ (e.g., 39.70213°, 104.93633°)

Latitude: _____ Longitude: _____ (e.g., 39.70213°, 104.93633°)

- b) Has the proposed dewatering area been reviewed for possible groundwater contamination, such as plumes from leaking underground storage tanks (LUSTs), hazardous waste sites, areas of per- and polyfluoroalkyl substances (PFAS) contamination, or other sources? *Applicants are required to exercise due diligence in evaluating their project/facility sites prior to applying for a discharge permit.*

Yes* No*

**Note: The applicant is required to review the proposed dewatering area for potential sources of groundwater contamination. Failure to check "Yes" may result in delays in processing the application and issuance of a permit certification.*

- c) Is your application for long-term (2 years or more) construction dewatering or subterranean/foundation dewatering?

Yes* No

**If yes, analytical data for all parameters shown in Attachment 1 and Attachment 2 of this application supplement for a source water sample representative of the proposed discharge must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the division. See Guidance.*

- d) Is your site located within the Cherry Creek Reservoir watershed (Regulation 72) or Chatfield Reservoir watershed (Regulation 73)?

Yes* No

**If yes, Total Phosphorus analytical data for a source water sample representative of the proposed discharge must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the division. See Guidance.*

- e) For short-term (less than 2 year) construction dewatering, is the site located within Specified Area 7 (see Regulation 42, *Site Specific Water Quality Classifications and Standards for Ground Water*) or within **one mile** of a known source or other area of PFAS contamination?

Yes* No

**If yes, PFAS analytical data for all parameters shown in Attachment 2 of this application supplement for a source water sample representative of the proposed discharge at the site must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the division. See Guidance.*

- f) For short-term (less than 2 year) construction dewatering, is your project located within a commercial/industrial area of a major metropolitan city (e.g., Denver, Colorado Springs, Pueblo, Boulder, Fort Collins, Grand Junction)?

Yes* No

**If yes, analytical data for all parameters shown in Attachment 1 of this application supplement for a source water sample representative of the proposed discharge must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

- g) For short-term (less than 2 year) construction dewatering, is an open LUST located within **one-quarter mile** of the site?

Yes* No

**If yes, Benzene, Toluene, Ethylbenzene and Xylenes analytical data for a source water sample representative of the proposed discharge at the site must be included with the permit application unless specifically waived by the division. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

- h) For short-term (less than 2 year) construction dewatering, is a Superfund site or National Priorities List (NPL) site located within **one mile** of the site?

Yes* No

**If yes, analytical data for all parameters shown in Attachment 1 of this application supplement (or an alternate list of constituents approved by the division) for a source water sample representative of the proposed discharge must be included with the permit application unless specifically waived by the division. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

- i) For short-term (less than 2 year) construction dewatering, is any other (non-LUST, non-Superfund, non-NPL, non-PFAS) known source of contamination, such as a Voluntary Cleanup (VCUP), Environmental Covenant, open RCRA Corrective Action site, or Brownfields site located within **one-half mile** of the site?

Yes* No

**If yes, analytical data for all parameters shown in Attachment 1 of this application supplement (or an alternate list of constituents approved by the division) for a source water sample representative of the proposed discharge must be included with the permit application unless specifically waived by the division. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

- j) If known sources of contamination are located near the site, please provide an overview of the source and nature of contamination in the box below, including:
- The nature of the contamination of the groundwater, alluvial water, stormwater, and/or surface water (the source water) for which treatment and/or remedial activities will occur;
 - The primary industrial activities which resulted in the source water contamination;
 - The source of the contamination (pipes, leaking underground storage tank, up gradient sources, etc.) or state "unknown."

5. ASSOCIATED PERMITS

a) Does the applicant have a Stormwater Permit for Construction Activities? YES NO PENDING

If Yes, Stormwater Construction Permit Number: COR-_____

b) Does the applicant have a Clean Water Act Section 404 Permit? YES NO PENDING

Water Rights

The State Engineers Office (SEO) has indicated that any discharge that does not return water directly to surface waters (i.e. land application, rapid infiltration basins, etc.) has the potential for material injury to a water right. As a result, the SEO needs to determine that material injury to a water right will not occur from such activities. To make this judgment, the SEO requests that a copy of all documentation demonstrating that the requirements of Colorado water law have been met, be submitted to their office for review. The submittal should be made as soon as possible to the following address:

Colorado Division of Water Resources • 1313 Sherman Street, Room 818 • Denver, Colorado 80203

Should there be any questions on the issue of water rights; the SEO can be contacted at (303) 866-3581. It is important to understand that any CDPS permit issued by the division does not constitute a water right. Issuance of a CDPS permit does not negate the need to also have the necessary water rights in place. It is also important to understand that even if the activity has an existing CDPS permit, there is no guarantee that the proper water rights are in place.

Attachment 1

Please Submit the Laboratory Data Package for any Required Analysis with the Permit Application
(See Important Table Notes)

Required Water Quality Data			
<u>Metals</u>	<u>PQL (µg/l) ¹</u>	<u>Metals</u>	<u>PQL (µg/l) ¹</u>
Aluminum-Trec 7429-90-5 ²	15	Lead-PD 7439-92-1	0.5
Antimony-Trec 7440-36-0	2	Manganese-PD 7439-96-5	2
Arsenic-Trec 7440-38-2	1	Manganese-Diss 7439-96-5	2
Arsenic-PD 7440-38-2	1	Mercury-Total 7439-97-6	0.2
Barium-Trec 7440-39-3	1	Molybdenum-Trec 7439-98-7	0.5
Beryllium-Trec 7440-41-7	2	Nickel-Trec 7440-02-0	1
Cadmium-Trec 7440-43-9	0.5	Nickel-D 7440-02-0	1
Cadmium-PD 7440-43-9	0.5	Selenium-Trec 7782-49-2	1
Chromium III-Trec 16065-83-3	20	Selenium-PD 7782-49-2	1
Chromium III-PD 16065-83-1	20	Silver-Trec 7440-22-4	0.5
Chromium VI-Diss 18540-29-9	20	Silver-PD 7440-22-4	0.5
Chromium-Trec 7440-47-3	20	Thallium-Trec 7440-28-0	0.5
Copper-Trec 7440-50-8	2	Thallium-PD 7440-28-0	0.5
Copper-PD 7440-50-8	2	Uranium-PD 7440-61-1	1
Iron-Trec 7439-89-6	20	Uranium-Trec 7440-61-1	1
Iron-Diss 7439-89-6	20	Zinc-Trec 7440-66-6	10
Lead-Trec 7439-92-1	0.5	Zinc-PD 7440-66-6	10
<u>Volatiles</u>	<u>PQL (µg/l) ¹</u>	<u>Volatiles</u>	<u>PQL (µg/l) ¹</u>
acrolein 107-02-8	15	ethylbenzene 100-41-4	75
benzene 71-43-2	3	methyl bromide 74-83-9	5
bromoform 75-25-2	3	methyl chloride 74-87-3	4.5
carbon tetrachloride 56-23-5	3	1,1,2,2-tetrachloroethane 79-34-5	2
chlorobenzene 108-90-7	60	tetrachloroethylene 127-18-4	2.3
chlorodibromomethane 124-48-1	3	toluene 108-88-3	60
chloroform 67-66-3	3	1,2-trans-dichloroethylene 156-60-5	0.5 *
1,2-dichloroethane 107-06-2	3	1,1,1-trichloroethane 71-55-6	5
1,1-dichloroethylene 75-35-4	5	1,1,2-trichloroethane 79-00-5	2.0
1,2-dichloropropane 78-87-5	2	trichloroethylene 79-01-6	2.3
1,3-dichloropropylene 542-75-6	2 *	vinyl chloride 75-01-4	3
1,4-Dioxane 123-91-1	0.15 *	xylenes 1330-20-7	10 *

Required Water Quality Data			
<u>Semi-Volatile Organic Compounds</u>	<u>PQL (µg/l) ¹</u>	<u>Semi-Volatile Organic Compounds</u>	<u>PQL (µg/l) ¹</u>
acenaphthene 83-32-9	20	1,2-diphenylhydrazine (Reported as 1,2-diphenylhydrazine 122-66-7, but analyzed as azobenzene 103-33-3)	5 *
anthracene 120-12-7	20	fluorene 86-73-7	20
benzidine 92-87-5	170	fluoranthene 206-44-0	25
benzo(a)anthracene 56-55-3	12	hexachlorobenzene 118-74-1	16
benzo(a)pyrene 50-32-8	20	hexachlorobutadiene 87-68-3	9
benzo(b)fluoranthene 205-99-2	35	hexachlorocyclopentadiene 77-47-4	50
benzo(ghi)perylene 191-24-2	20	hexachloroethane 67-72-1	16
benzo(k)fluoranthene 207-08-9	25	indeno(1,2,3-cd)pyrene 193-39-5	20
bis(2-chloroethyl)ether (or Dichloroethyl ether) 111-44-4	15	isophorone 78-59-1	25
bis(2-chloroisopropyl)ether (or 2,2-dichloroisopropyl ether) 108-60-1	60	naphthalene 91-20-3	20
bis(2-ethylhexyl)phthalate 117-81-7	25	nitrobenzene 98-95-3	19
Butyl benzyl phthalate 85-68-7	25	N-nitrosodimethylamine 62-75-9	30
2-chloronaphthalene 91-58-7	20	N-nitrosodi-n-propylamine 621-64-7	30
chrysene 218-01-9	18	N-nitrosodiphenylamine 86-30-6	19
dibenzo(a,h)anthracene 53-70-3	20	pyrene 129-00-0	10
1,2-dichlorobenzene 95-50-1	2.5	1,2,4-trichlorobenzene 120-82-1	20
1,3-dichlorobenzene 541-73-1	2.5	2-chlorophenol 95-57-8	35
1,4-dichlorobenzene 106-46-7	3.5	2,4-dichlorophenol 120-83-2	30
3,3-dichlorobenzidine 91-94-1	18	2,4,-dimethylphenol 105-67-9	30
diethyl phthalate 84-66-2	20	4,6-dinitro-o-cresol 534-52-1	17
dimethyl phthalate 131-11-3	20	2,4-dinitrophenol 51-28-5	100
di-n-butyl phthalate 84-74-2	25	4-nitrophenol 100-02-7	25
2,4-dinitrotoluene 121-14-2	17	pentachlorophenol 87-86-5	36
2,6-dinitrotoluene 606-20-2	20	phenol 108-95-2	15
1,4-Dioxane 123-91-1	0.15 *	2,4,6-trichlorophenol 88-06-2	25

¹ PQLs are as listed in the division's Practical Quantitation Limits Policy (CW 6) unless noted otherwise.

² Chemical CAS Number assigned by the Chemical Abstracts Service (CAS). Where chemical names vary, please refer to the CAS Number to determine the required analysis.

* This is a recommended PQL based on EPA approved methods. The division's Practical Quantitation Limits Policy (CW 6) does not provide a 40 CFR 136 based PQL for this parameter.

Trec = Total Recoverable

PD = Potentially Dissolved

Diss = Dissolved

PQL = Practical Quantitation Limit

Important table notes:

- 1) Please refer to the [Dewatering Application Guidance](#) to determine whether analytical data is required with the permit application, and if so, what specific type of data is required.
- 2) The division may require analytical data for additional parameters where the project site is located in close proximity to potential sources of contamination for parameters not included in this Attachment 1 (or Attachment 2), including but not limited to pesticide, PCB, radionuclide contamination.
- 3) Applicants planning to discharge to groundwater are encouraged to contact the division prior to sample collection to ensure that the correct metal speciation is included in the sample analysis.
- 4) For the permit application, all sampling should be performed according to specified methods in 40 CFR 136, methods approved by EPA pursuant to 40 CFR 136, or methods approved by the division in the absence of a method specified in or approved pursuant to 40 CFR 136. In addition, the PQLs listed in the table should be met unless otherwise approved by the division.

Attachment 2

Please Submit the Laboratory Data Package for any Required Analysis with the Permit Application
(See Important Table Notes)

Required Water Quality Data			
Per- and Polyfluoroalkyl Substances	QL (ng/l)	Per- and Polyfluoroalkyl Substances	QL (ng/l)
Fluorotelomer sulphonic acid 4:2 (4:2 FTS) 757124-72-4	20	Perfluorohexanoic acid (PFHxA) 307-24-4	10
Fluorotelomer sulphonic acid 6:2 (6:2 FTS) 27619-97-2	55	Perfluorohexanesulfonic acid (PFHxS) 355-46-4	2
Fluorotelomer sulphonic acid 8:2 (8:2 FTS) 39108-34-4	20	Perfluorononanoic acid (PFNA) 375-95-1	2
Hexafluoropropylene oxide dimer acid or 2,3,3,3-tetrafluoro-2- (heptafluoropropoxy)propionic acid (Gen-X or HFPO-DA or HFPA-DA) 13252-13-6	6	Perfluorononanesulfonic acid (PFNS) 68259-12-1	2
N-Ethyl perfluorooctanesulfonamidoacetic acid or 2-(N- Ethylperfluorooctanesulfonamido) acetic acid (NEtFOSAA) 2991-50-6	20	Perfluorooctanoic acid (PFOA) 335-67-1	2
N-methylperfluorooctane sulfonamidoacetic acid or 2-(N-methyl-perfluorooctane sulfonamido) acetic acid (NMeFOSAA) 2355-31-9	20	Perfluorooctanesulfonic acid (PFOS) 1763-23-1	2
Perfluorobutanoic acid (PFBA) 375-22-4	7	Perfluorooctanesulfonamide (PFOSA or FOSA) 754-91-6	2
Perfluorobutanesulfonic acid (PFBS) 375-73-5	2	Perfluoropentanoic acid (PFPeA) 2706-90-3	3
Perfluorodecanoic acid (PFDA) 335-76-2	2	Perfluoropentanesulfonic acid (PFPeS) 2706-91-4	2
Perfluorododecanoic acid (PFDoA) 307-55-1	2	Perfluorotetradecanoic acid (PFTeDA or PFTA or PFTeA) 376-06-7	2
Perfluorodecanesulfonic acid (PFDS) 335-77-3	2	Perfluorotridecanoic acid (PFTrDA or RFTrIA) 72629-94-8	2
Perfluoroheptanoic acid (PFHpA) 375-85-9	3	Perfluoroundecanoic acid (PFUDA or PFUNA) 2058-94-8	2
Perfluoroheptane sulfonic acid, perfluoroheptane sulfonate (PFHpS) 375-92-8	2		

QL = PFAS Quantification Limit in nanograms per liter (ng/l) = the lowest concentration of an analyte that can be accurately and precisely quantified using a given method, as determined by the laboratory.

Important table notes:

- 1) Please refer to the [Dewatering Application Guidance](#) to determine whether analytical data is required with the permit application, and if so, what specific type of data is required.
- 2) The division may require analytical data for additional parameters where the project site is located in close proximity to potential sources of contamination for parameters not included in this Attachment 2 (or Attachment 1), including but not limited to pesticide, PCB, radionuclide contamination.
- 3) The laboratory selected should be able to perform analysis on wastewater (non-potable) matrices using a method that is compliant with the requirements set forth in the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories (DoD QSM 5.1 or later). Any 40 CFR Part 136 (Appendix B) approved method for analyzing PFAS in wastewater that becomes available in the future will replace the analytical method recommendations identified above. In addition, the QLs listed in the table should be met unless otherwise approved by the division.

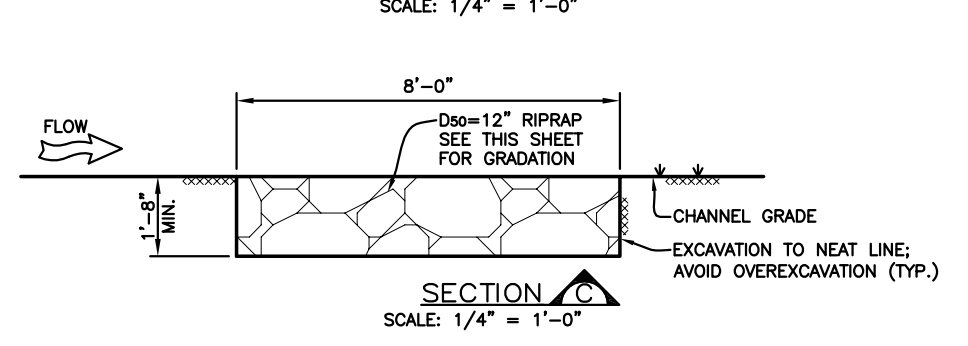
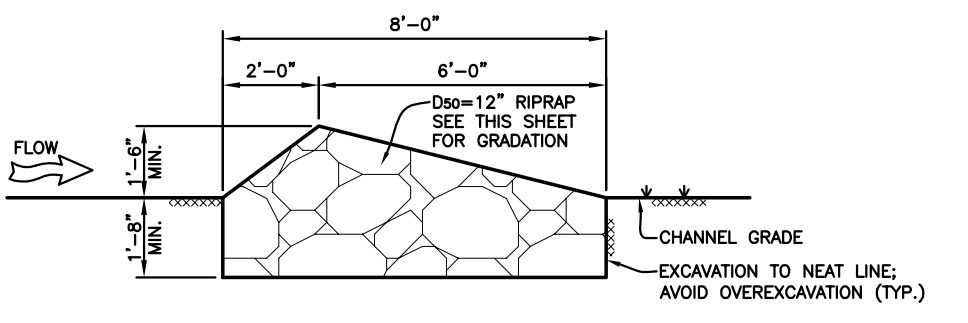
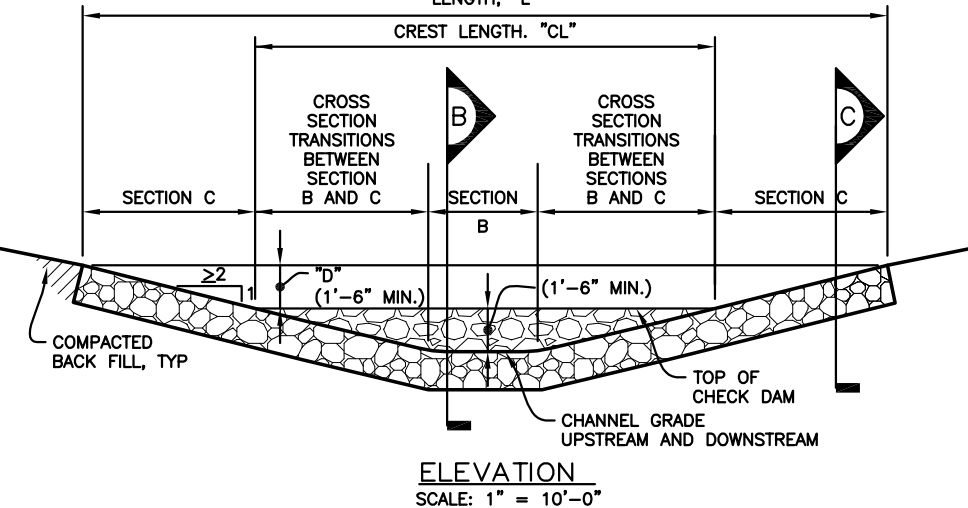
APPENDIX G – City of Lone Tree GESD Details

GRADING, EROSION, AND SEDIMENT CONTROL (GESC) GENERAL NOTES

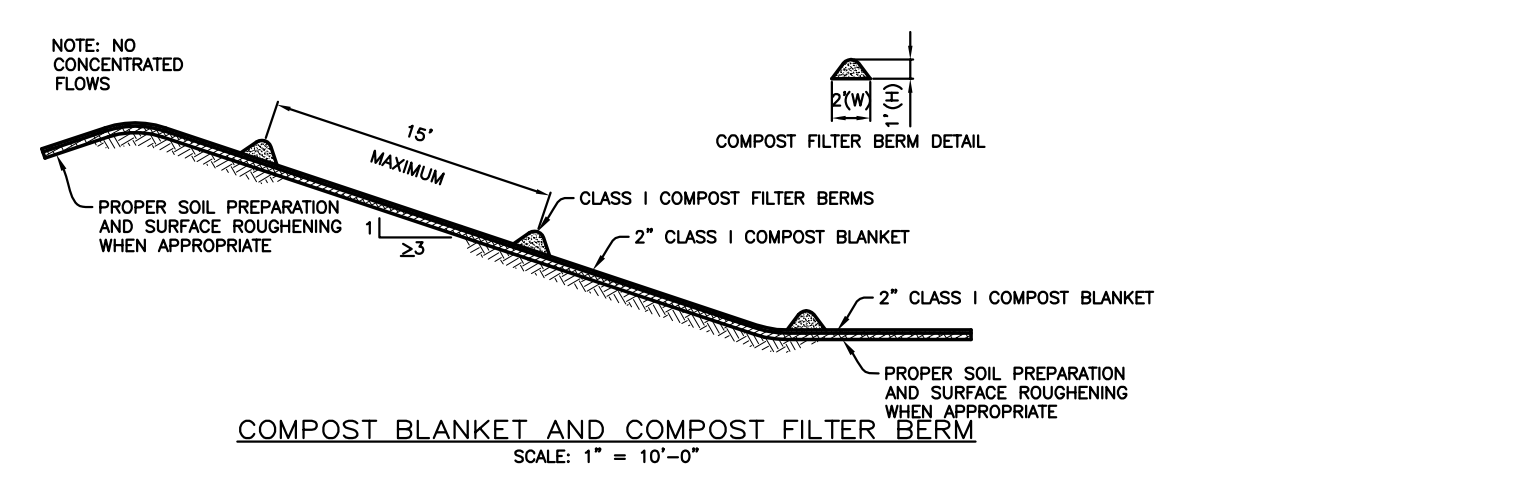
- THE CITY OF LONE TREE ENGINEER'S SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE CITY OF LONE TREE PUBLIC WORKS DEPARTMENT, ENGINEERING DIVISION, HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL COMPLIANCE WITH THE CITY OF LONE TREE SUBDIVISION REGULATIONS AND/OR THE GRADING, EROSION AND SEDIMENT CONTROL (GESC) CRITERIA MANUAL. THE CITY OF LONE TREE ENGINEER, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY (OTHER THAN AS STATED ABOVE) FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS.
- THE ADEQUACY OF THIS GESC PLAN LIES WITH THE ORIGINAL DESIGN ENGINEER.
- THIS GESC PLAN SHALL BE CONSIDERED VALID FOR TWO (2) YEARS FROM THE DATE OF ACCEPTANCE BY THE CITY OF LONE TREE. AFTER WHICH TIME THE PLAN SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY THE CITY OF LONE TREE.
- ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE CITY OF LONE TREE ENGINEERING DIVISION. THE CITY OF LONE TREE RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO THE GESC MANUAL, GESC PLAN OR GESC PERMIT.
- THE PLACEMENT OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) SHALL BE IN ACCORDANCE WITH THE CITY OF LONE TREE - ACCEPTED GESC PLAN AND THE CITY OF LONE TREE GESC MANUAL.
- ANY VARIATION IN MATERIAL, TYPE OR LOCATION OF EROSION AND SEDIMENT CONTROL BMPs FROM THE CITY OF LONE TREE - ACCEPTED GESC PLAN WILL REQUIRE APPROVAL FROM AN ACCOUNTABLE REPRESENTATIVE OF THE CITY OF LONE TREE ENGINEERING DIVISION.
- AFTER THE GESC PLAN HAS BEEN ACCEPTED, THE GESC PERMIT APPLIED FOR, FEES AND FISCAL SECURITY SUBMITTED TO THE CITY, AND THE GESC FIELD MANUAL OBTAINED AND REVIEWED, THE CONTRACTOR MAY INSTALL THE INITIAL-STAGE EROSION AND SEDIMENT CONTROL BMPs INDICATED ON THE ACCEPTED GESC PLAN.
- THE FIRST BMP TO BE INSTALLED ON THE SITE SHALL BE CONSTRUCTION FENCE, MARKERS, OR OTHER APPROVED MEANS OF DEFINING THE LIMITS OF CONSTRUCTION, INCLUDING CONSTRUCTION LIMITS ADJACENT TO STREAM CORRIDORS AND OTHER AREAS TO BE PRESERVED.
- AFTER INSTALLATION OF THE INITIAL-STAGE EROSION AND SEDIMENT CONTROL BMPs, THE PERMITTEE SHALL CALL THE CITY OF LONE TREE CONSTRUCTION INSPECTOR AT (303) 662-8112 TO SCHEDULE A PRECONSTRUCTION MEETING. AT THE PRECONSTRUCTION MEETING, THE PERMITTEE SHALL MAKE A MINIMUM OF THREE BUSINESS DAYS PRIOR TO THE REQUESTED MEETING TIME. NO CONSTRUCTION ACTIVITIES SHALL BE PLANNED WITHIN 24 HOURS AFTER THE PRECONSTRUCTION MEETING.
- THE OWNER OR OWNER'S REPRESENTATIVE, THE GESC MANAGER, THE GENERAL CONTRACTOR, AND THE GRADING SUBCONTRACTOR, IF DIFFERENT FROM THE GENERAL CONTRACTOR, MUST ATTEND THE PRECONSTRUCTION MEETING. IF ANY OF THE REQUIRED PARTICIPANTS FAIL TO ATTEND THE PRECONSTRUCTION MEETING, OR IF THE GESC FIELD MANUAL IS NOT ON SITE, OR IF THE INSTALLATION OF THE INITIAL BMPs ARE NOT APPROVED BY THE CITY OF LONE TREE GESC INSPECTOR, THE APPLICANT WILL HAVE TO PAY A REINSPECTION FEE, ADDRESS ANY PROBLEMS WITH BMP INSTALLATION, AND CALL TO RESCHEDULE THE MEETING, WITH A CORRESPONDING DELAY IN THE START OF CONSTRUCTION. THE CITY OF LONE TREE STRONGLY ENCOURAGES THE APPLICANT TO HAVE THE ENGINEER OF RECORD AT THE PRECONSTRUCTION MEETING. FAILURE OF THE ENGINEER OF RECORD TO ATTEND MAY RESULT IN A DELAY OF THE START OF CONSTRUCTION.
- CONSTRUCTION SHALL NOT BEGIN UNTIL THE CITY OF LONE TREE GESC INSPECTOR APPROVES THE INSTALLATION OF THE INITIAL BMPs AND THE APPROVED GESC PERMIT IS PICKED UP FROM THE CITY AND IS IN-HAND ON THE SITE. THE COMPLETED PERMIT WILL BE AVAILABLE WITHIN 24-HOURS AFTER THE INSTALLATION OF THE INITIAL BMPs ARE APPROVED.
- THE GESC MANAGER SHALL STRICTLY ADHERE TO THE CITY OF LONE TREE -APPROVED LIMITS OF CONSTRUCTION AT ALL TIMES. THE CITY OF LONE TREE ENGINEERING DIVISION MUST APPROVE ANY CHANGES TO THE LIMITS OF CONSTRUCTION AND, AT THE DISCRETION OF THE ENGINEERING DIVISION, ADDITIONAL EROSION/SEDIMENT CONTROLS MAY BE REQUIRED IN ANY ADDITIONAL AREAS OF CONSTRUCTION.
- THE MAXIMUM AREA OF CONSTRUCTION SHALL BE LIMITED TO 40 ACRES (70 ACRES IF APPROVED FOR SOIL MITIGATION OPERATIONS) TO REDUCE THE AMOUNT OF LAND DISTURBED AT ANY ONE TIME. LARGER SITES SHALL BE DIVIDED INTO PHASES THAT ARE EACH 40 (OR 70) ACRES OR LESS IN SIZE. THESE PROJECTS SHALL CONDUCT GRADING ACTIVITIES IN ACCORDANCE WITH THE ACCEPTED GESC PLAN. BMP INSTALLATION AND APPROVAL BY THE CITY OF LONE TREE AT THE START AND COMPLETION OF EACH PHASE SHALL BE CONDUCTED IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN THE GESC MANUAL AND/OR GESC FIELD MANUAL.
- PRIOR TO ACTUAL CONSTRUCTION, THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES. FOR INFORMATION, CONTACT THE DENVER INTER-UTILITY GROUP AT 1-800-922-1987 OR FAX AT (303) 534-6700.
- NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS.
- THE GESC PERMIT SHALL BE VALID FOR A PERIOD OF ONE (1) YEAR, UNLESS EXTENDED.
- A COPY OF THE GESC PERMIT, ACCEPTED GESC PLANS AND THE GESC FIELD MANUAL SHALL BE ON SITE AT ALL TIMES.
- THE GESC MANAGER SHALL BE RESPONSIBLE FOR ENSURING THAT THE SITE REMAINS IN COMPLIANCE WITH THE GESC PERMIT AND SHALL BE THE PERMITTEE'S CONTACT PERSON WITH THE CITY FOR ALL MATTERS PERTAINING TO THE GESC PERMIT. THE GESC MANAGER SHALL BE PRESENT AT THE SITE THE MAJORITY OF THE TIME AND SHALL BE AVAILABLE THROUGH A 24-HOUR CONTACT NUMBER. IN THE EVENT THAT THE CONTRACTOR'S GESC MANAGER IS NOT ON SITE AND CANNOT BE REACHED DURING A VIOLATION, THE ALTERNATE GESC MANAGER SHALL BE CONTACTED. IF NEITHER THE GESC MANAGER NOR ALTERNATE GESC MANAGER CAN BE CONTACTED DURING ANY VIOLATION, A STOP WORK ORDER SHALL BE ISSUED.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE THROUGH THE CITY OF LONE TREE-APPROVED ACCESS POINT. A VEHICLE TRACKING CONTROL PAD IS REQUIRED AT ALL ACCESS POINTS ON THE SITE. ADDITIONAL STABILIZED CONSTRUCTION ENTRANCES MAY BE ADDED WITH AUTHORIZATION FROM THE CITY OF LONE TREE ENGINEERING DIVISION.
- THE GESC MANAGER IS RESPONSIBLE FOR CLEANUP OF SEDIMENT OR CONSTRUCTION DEBRIS TRACKED ONTO ADJACENT PAVED AREAS. PAVED AREAS INCLUDING STREETS ARE TO BE KEPT CLEAN THROUGHOUT BUILD-OUT AND SHALL BE CLEANED WITH A STREET SWEEPER OR SIMILAR DEVICE AT FIRST NOTICE OF ACCIDENTAL TRACKING OR AT THE DISCRETION OF THE CITY OF LONE TREE GESC INSPECTOR. STREET WASHING IS NOT ALLOWED. THE CITY OF LONE TREE RESERVES THE RIGHT TO REQUIRE ADDITIONAL MEASURES TO ENSURE AREA STREETS ARE KEPT FREE OF SEDIMENT AND/OR CONSTRUCTION DEBRIS.
- APPROVED EROSION AND SEDIMENT CONTROL BMPs SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT. AT A MINIMUM, THE GESC MANAGER SHALL INSPECT ALL BMPs IN ACCORDANCE WITH THE ACCEPTED GESC PLAN AND GESC MANUAL. ALL NECESSARY MAINTENANCE AND REPAIR ACTIVITIES SHALL BE COMPLETED WITHIN 48 HOURS FOR LEVEL II VIOLATIONS, AND IMMEDIATELY FOR LEVEL III VIOLATIONS, OR AS DIRECTED BY A CITY OF LONE TREE GESC INSPECTOR. ACCUMULATED SEDIMENT AND CONSTRUCTION DEBRIS SHALL BE REMOVED AND PROPERLY DISPOSED.
- STRAW BALES ARE NOT A GESC-ACCEPTED SEDIMENT CONTROL BMP.
- TOPSOIL SHALL BE STRIPPED AND STOCKPILED IN THE LOCATION SHOWN ON THE ACCEPTED GESC PLAN. THE GESC MANAGER SHALL SCHEDULE AN INSPECTION WITH THE CITY OF LONE TREE GESC INSPECTOR AS SOON AS TOPSOIL STRIPPING IS COMPLETED. FAILURE TO SCHEDULE SUCH INSPECTION OR FAILURE TO STOCKPILE TOPSOIL SHALL RESULT IN ISSUANCE OF A STOP WORK ORDER. THE STOP WORK ORDER WILL BE IN PLACE UNTIL TOPSOIL IS STOCKPILED ON SITE OR APPROPRIATE SOIL AMENDMENTS ARE STOCKPILED ON SITE.
- THE ACCEPTED GESC PLAN MAY REQUIRE CHANGES OR ALTERATIONS AFTER APPROVAL TO MEET CHANGING SITE OR PROJECT CONDITIONS OR TO ADDRESS INEFFICIENCIES IN DESIGN OR INSTALLATION. THE GESC MANAGER SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER AND THE CITY OF LONE TREE ENGINEERING FOR ANY PROPOSED CHANGES.
- LINING OF TEMPORARY SWALES AND DITCHES SHALL BE IN ACCORDANCE WITH THE GESC CRITERIA MANUAL.
- NO PERMANENT EARTH SLOPES GREATER THAN 3:1 SHALL BE ALLOWED.
- ANY SETTLEMENT OR SOIL ACCUMULATIONS BEYOND THE LIMITS OF CONSTRUCTION DUE TO GRADING OR EROSION SHALL BE REPAIRED IMMEDIATELY BY THE GESC MANAGER. THE GESC MANAGER SHALL BE HELD RESPONSIBLE FOR OBTAINING ACCESS RIGHTS TO ADJACENT PROPERTY, IF NEEDED, AND REMEDIATING ANY ADVERSE IMPACTS TO ADJACENT WATERWAYS, WETLANDS, PROPERTIES, ETC. RESULTING FROM WORK DONE AS PART OF THIS PROJECT.
- A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
- SOILS THAT WILL BE STOCKPILED FOR MORE THAN THIRTY (30) DAYS SHALL BE SEEDED AND MULCHED WITHIN FOURTEEN (14) DAYS OF STOCKPILE CONSTRUCTION. NO STOCKPILES SHALL BE PLACED WITHIN ONE HUNDRED (100) FEET OF A DRAINAGE WAY UNLESS APPROVED BY THE CITY OF LONE TREE ENGINEERING DIVISION.
- ALL CHEMICAL OR HAZARDOUS MATERIAL SPILLS WHICH MAY ENTER WATERS OF THE STATE OF COLORADO, WHICH INCLUDE BUT ARE NOT LIMITED TO, SURFACE WATER, GROUND WATER AND DRY GULLIES OR STORM SEWER LEADING TO SURFACE WATER, SHALL BE IMMEDIATELY REPORTED TO THE COPHE PER CRS 25-8-801, AND THE CITY OF LONE TREE. RELEASES OF PETROLEUM PRODUCTS AND CERTAIN HAZARDOUS SUBSTANCES LISTED UNDER THE FEDERAL CLEAN WATER ACT (40 CFR PART 116) MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER AS WELL AS THE COPHE. THE APPLICABLE CONTACT INFORMATION (SEE APPENDIX A, DOUGLAS COUNTY GESC MANUAL SUBJECT TO CHANGE) IS: COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT TOLL-FREE 24-HOUR ENVIRONMENTAL EMERGENCY SPILL REPORTING LINE 1-877-518-5608; NATIONAL RESPONSE CENTER (24-HOUR NATIONAL SPILL RESPONSE) 1-800-424-8802; CITY OF LONE TREE PUBLIC WORKS (303) 662-8112. SPILLS THAT POSE AN IMMEDIATE RISK TO HUMAN LIFE SHALL BE REPORTED TO 911. FAILURE TO REPORT AND CLEAN UP ANY SPILL SHALL RESULT IN ISSUANCE OF A STOP WORK ORDER.
- ALL WORK ON SITE SHALL STAY A MINIMUM OF ONE HUNDRED (100) FEET AWAY FROM ANY DRAINAGE WAY, WETLAND, ETC. UNLESS OTHERWISE NOTED ON AN ACCEPTED CITY OF LONE TREE GESC PLAN.
- ALL PROJECTS SHALL BALANCE EARTHWORK QUANTITIES ON SITE. IN THE EVENT A VARIANCE IS GRANTED BY THE CITY ENGINEER TO ALLOW IMPORT OR EXPORT OF MATERIAL, THE PERMITTEE SHALL HAVE A GESC PERMIT IN HAND FOR THE IMPORT OR EXPORT SITE PRIOR TO ANY TRANSPORTING OF EARTHEN MATERIAL. THE GESC MANAGER SHALL NOTIFY THE CITY OF LONE TREE GESC INSPECTOR OF THE LOCATION AND GESC PERMIT NUMBERS OF BOTH THE EXPORTING AND IMPORTING SITES PRIOR TO ANY IMPORT/EXPORT OPERATIONS.
- THE USE OF REBAR, STEEL STAKES OR STEEL FENCE POSTS FOR STAKING OR SUPPORT OF ANY EROSION OR SEDIMENT CONTROL BMP IS PROHIBITED (EXCEPT STEEL TEE-POSTS FOR USE IN SUPPORTING CONSTRUCTION FENCE).
- THE CLEANING OF CONCRETE DELIVERY TRUCK CHUTES IS RESTRICTED TO APPROVED CONCRETE WASH OUT LOCATIONS ON THE JOB SITE. THE DISCHARGE OF WATER CONTAINING WASTE CONCRETE TO THE STORM SEWER SYSTEM IS PROHIBITED. ALL CONCRETE WASTE SHALL BE PROPERLY CLEANED UP AND DISPOSED AT AN APPROPRIATE LOCATION.
- ALL DEWATERING ON SITE SHALL BE COORDINATED WITH A CITY OF LONE TREE GESC INSPECTOR AND BE FREE OF SEDIMENT IN ACCORDANCE WITH THE GESC CRITERIA MANUAL.
- ALL PERMANENT INSTALLATIONS OF PIPES FOR STORM SEWERS, SLOPE DRAINS, AND CULVERTS, TOGETHER WITH RIPRAP APRONS OR OTHER INLET AND OUTLET PROTECTION, REQUIRE INSPECTION BY THE CITY OF LONE TREE ENGINEERING (SEPARATE FROM GESC INSPECTIONS).
- ALL DISTURBED AREAS SHALL BE DRILL SEEDED AND CRIMP MULCHED IN ACCORDANCE WITH THE DOUGLAS COUNTY GESC MANUAL. CRITERIA AND THE CITY OF LONE TREE SEEDING AND MULCHING DETAIL (#17) INCLUDED HEREIN WITHIN THIRTY DAYS OF INITIAL EXPOSURE, OR WITHIN SEVEN DAYS OF SUBSTANTIAL COMPLETION (AS DEFINED BY THE CITY OF LONE TREE) OF AN AREA, WHICHEVER IS LESS. THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.
- HYDRAULIC SEEDING AND HYDRAULIC MULCHING ARE NOT AN ACCEPTABLE METHOD OF SEEDING OR MULCHING IN THE CITY OF LONE TREE.
- NO CURB AND GUTTER PERMITS SHALL BE ISSUED UNTIL ALL DISTURBED AREAS ARE DRILL SEEDED AND CRIMP MULCHED.
- NO PAVING PERMITS SHALL BE ISSUED UNTIL ALL INTERIM INLET PROTECTION IS INSTALLED AND APPROVED BY THE GESC INSPECTOR.
- A FINAL GESC INSPECTION SHALL BE CONDUCTED A MINIMUM OF TWO WEEKS PRIOR TO THE ANTICIPATED REQUEST FOR CERTIFICATE OR TEMPORARY CERTIFICATE OF OCCUPANCY OR INITIAL ACCEPTANCE.

DETAIL SHEET

NO.	NO.	DESCRIPTION
1	1	CD CHECK DAM
1	1	CB COMPOST BLANKET
3	1	CFB COMPOST FILTER BERM
4	1	CWA CONCRETE WASHOUT AREA
5	1	CF CONSTRUCTION FENCE
6	1	CM CONSTRUCTION MARKERS
7	1	DW DEWATERING
8	1	DD DIVERSION DITCH
9	2	ECB EROSION CONTROL BLANKET
10	2	IP INLET PROTECTION
11	2	RCD REINFORCED CHECK DAM
12	2	RRB REINFORCED ROCK BERM
13	2	RRR RRB FOR CULVERT PROTECTION
14	2	SB SEDIMENT BASIN
15	3	SCL SEDIMENT CONTROL LOG
16	3	ST SEDIMENT TRAP
17	3	SM SEEDING AND MULCHING
18	3	SF SILT FENCE
19	3	SSA STABILIZED STAGING AREA
20	3	SR SURFACE ROUGHENING
21	3	TSD TEMPORARY SLOPE DRAIN
22	3	TSC TEMPORARY STREAM CROSSING
23	3	TER TERRACING
24	3	VTC VEHICLE TRACKING CONTROL
25	3	WW CURB WITH WHEEL WASH
26	3	CS CIRC SOCK
		ROCK AND RIPRAP GRADATIONS
		LIMITS OF CONSTRUCTION



- CHECK DAM INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - LOCATIONS OF CHECK DAMS.
 - CHECK DAM WIDTH (FOR CHECK DAM OR REINFORCED CHECK DAM).
 - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
 - CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, PRIOR TO ANY PERMANENT LAND-DISTURBING ACTIVITIES.
 - RIPRAP UTILIZED FOR CHECK DAMS SHALL HAVE A D_{50} MEDIAN STONE SIZE OF 12".
 - RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-6".
 - THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1'-6" HIGHER THAN THE CENTER OF THE CHECK DAM.
- CHECK DAM MAINTENANCE NOTES**
- THE GESC MANAGER SHALL INSPECT CHECK DAMS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
 - SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
 - CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE CITY.
 - WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACK FILL. PRIOR TO ANY OTHER SEEDING AND MULCHING AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



- COMPOST BLANKET NOTES**
- SEE PLAN VIEW FOR AREA OF COMPOST BLANKET.
 - MAY BE USED IN PLACE OF STRAW MULCH OR EROSION CONTROL BLANKET IN AREAS WHERE ACCESS IS DIFFICULT DUE TO LANDSCAPING OR OTHER OBJECTS OR IN AREAS WHERE A SMOOTH TURF GRASS FINISH IS DESIRED.
 - SHALL ONLY BE UTILIZED IN AREAS WHERE SHEET FLOW CONDITIONS PREVAIL; SHALL BE PROHIBITED IN AREAS OF POSSIBLE CONCENTRATED FLOW.
 - SOIL PREPARATION SHALL BE COMPLETE PER THE SPECIFICATIONS OUTLINED IN THESE CRITERIA PRIOR TO APPLICATION.
 - WHEN TURF GRASS FINISH IS NOT DESIRED, SURFACE ROUGHENING ON SLOPES SHALL TAKE PLACE PRIOR TO APPLICATION.
 - SHALL BE EVENLY APPLIED AT A DEPTH OF 2 INCH.
 - MAY BE APPLIED UTILIZING PNEUMATIC BLOWER, OR BY HAND.
 - SEEDING SHALL BE DRILLED PRIOR TO THE APPLICATION OF COMPOST OR SEED MAY BE COMBINED AND BLOWN WITH THE PNEUMATIC BLOWER.
 - SEEDING SHALL BE DRILLED BEFORE THE APPLICATION OF COMPOST OR SEED MAY BE COMBINED AND BLOWN WITH THE PNEUMATIC BLOWER.
 - COMPOST FILTER BERM SHALL BE UTILIZED ON SLOPES WITH A MAXIMUM SPACING OF 15 FEET FOR THE REQUIREMENTS FOUND IN THE COMPOST FILTER BERM SECTION.
 - THE GESC MANAGER SHALL INSPECT WEEKLY, DURING AND AFTER ANY STORM EVENT.
 - COMPOST USED IN THE APPLICATION OF THE COMPOST BLANKET SHALL BE A CLASS 1 COMPOST AS DEFINED BY THE FOLLOWING PHYSICAL, CHEMICAL, AND BIOLOGICAL PARAMETERS:

PARAMETERS	CLASS 1 COMPOST FOR COMPOST BLANKET
MINIMUM STABILITY INDICATOR	STABLE TO VERY STABLE
SOLUBLE SALTS	MAXIMUM 5mmhos/cm
PH	5.0 - 8.0
AD INDEX	> 10
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	80+/80+
MATURITY INDICATOR EXPRESSED AS CARBON TO NITROGEN RATIO	< 4
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	20:1
TESTED FOR CLOPRAID	YES/NEGATIVE RESULT
MOISTURE CONTENT	30-60 %
ORGANIC MATTER CONTENT	> 10% OF DRY WEIGHT
PARTICLE SIZE DISTRIBUTION	3" (75mm) 100% PASSING 1 1/2" (38mm) 95% TO 100% PASSING 3/4" (19mm) 85% TO 90% PASSING #4 (4.75mm) 50% TO 60% PASSING #10 (2.0mm) 20% TO 35% PASSING
PRIMARY, SECONDARY NUTRIENTS; TRACE ELEMENTS	MUST BE REPORTED
TESTING AND TEST REPORT SUBMITTAL REQUIREMENTS	STA + CLOPRAID
ORGANIC MATTER PER CUBIC YARD	MUST REPORT
CHEMICAL CONTAMINANTS	MEET OR EXCEED US EPA CLASS A STANDARD, 40 CFR 503.1 TABLES 1 & 3 LEVELS
MINIMUM MANUFACTURING/PRODUCTION REQUIREMENT	FULLY PERMITTED UNDER COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
RISK FACTOR RELATING TO PLANT GERMINATION AND HEALTH	LOW

PARAMETERS	CLASS 1 COMPOST FOR COMPOST FILTER BERM
MINIMUM STABILITY INDICATOR	STABLE TO VERY STABLE
SOLUBLE SALTS	MAXIMUM 5mmhos/cm
PH	5.0 - 8.0
AD INDEX	> 10
MATURITY INDICATOR EXPRESSED AS PERCENTAGE OF GERMINATION/VIOR	80+/80+
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	< 4
MATURITY INDICATOR EXPRESSED AS CARBON TO NITROGEN RATIO	20:1
TESTED FOR CLOPRAID	YES/NEGATIVE RESULT
MOISTURE CONTENT	30-60 %
ORGANIC MATTER CONTENT	25-45 % OF DRY WEIGHT
PARTICLE SIZE DISTRIBUTION	> 10% OF DRY WEIGHT 1" (25mm) 95% TO 100% PASSING 3/4" (19mm) 85% TO 90% PASSING 3/8" (9.5mm) 50% TO 60% PASSING #10 (2.0mm) 20% TO 35% PASSING
PRIMARY, SECONDARY NUTRIENTS; TRACE ELEMENTS	MUST BE REPORTED
TESTING AND TEST REPORT SUBMITTAL REQUIREMENTS	STA + CLOPRAID
ORGANIC MATTER PER CUBIC YARD	MUST REPORT
CHEMICAL CONTAMINANTS	MEET OR EXCEED US EPA CLASS A STANDARD, 40 CFR 503.1 TABLES 1 & 3 LEVELS
MINIMUM MANUFACTURING/PRODUCTION REQUIREMENT	FULLY PERMITTED UNDER COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
RISK FACTOR RELATING TO PLANT GERMINATION AND HEALTH	LOW

NOTE: IF A BIOLOGICAL COMPOST IS TO BE UTILIZED IT SHALL BE PRODUCED BY A FACILITY IN POSSESSION OF A VALID NOTICE OF AUTHORIZATION (NOA) FOR THE UNRESTRICTED USE AND DISTRIBUTION BY THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT. THE NOA SHALL BE PROVIDED UPON REQUEST BY THE CITY OF LONE TREE.

NOTE: A LAB TEST DETAILING THE CHEMICAL, PHYSICAL, AND BIOLOGICAL PARAMETERS SHALL BE PROVIDED UPON REQUEST BY THE CITY OF LONE TREE.

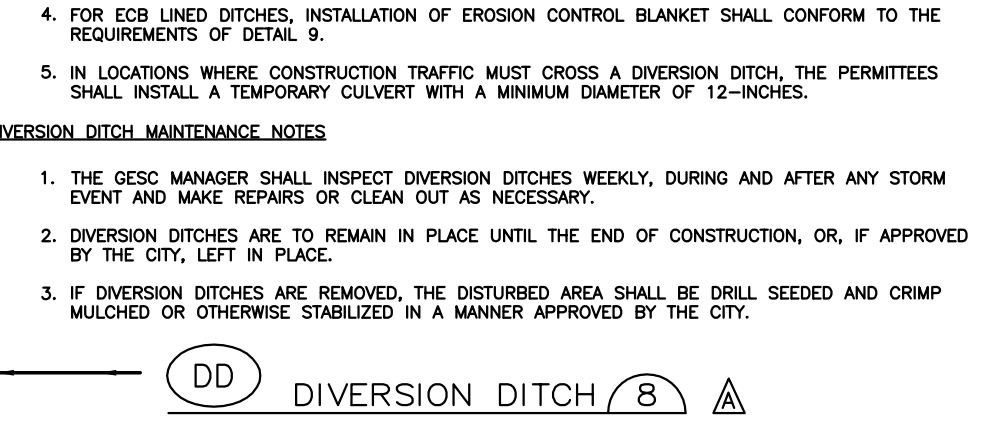
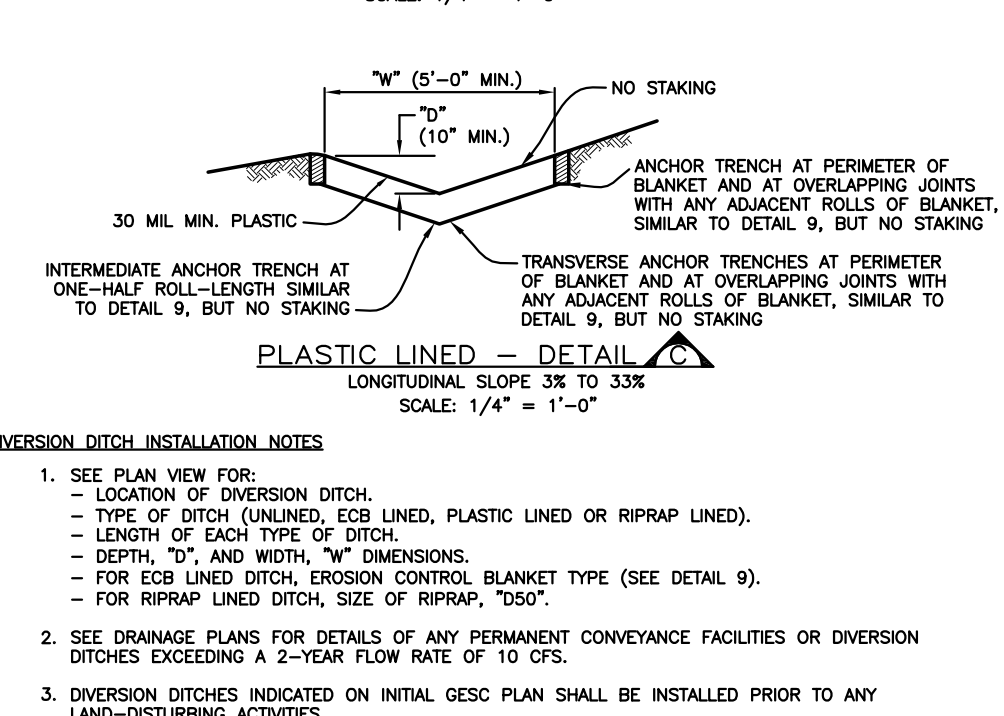
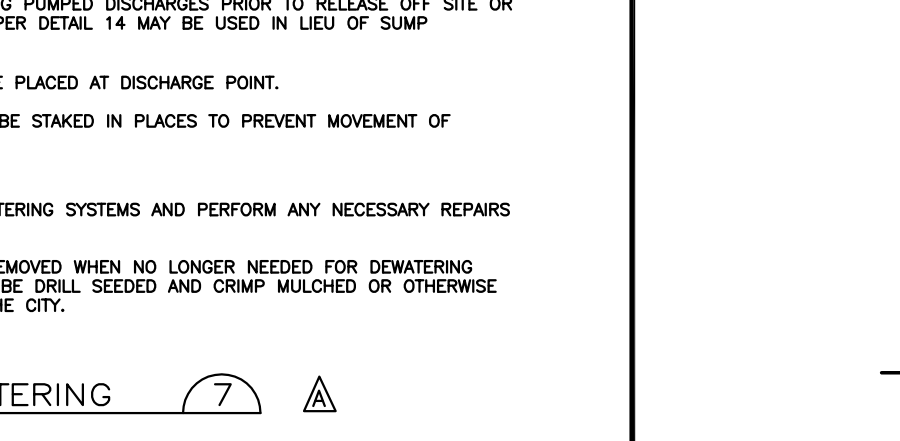
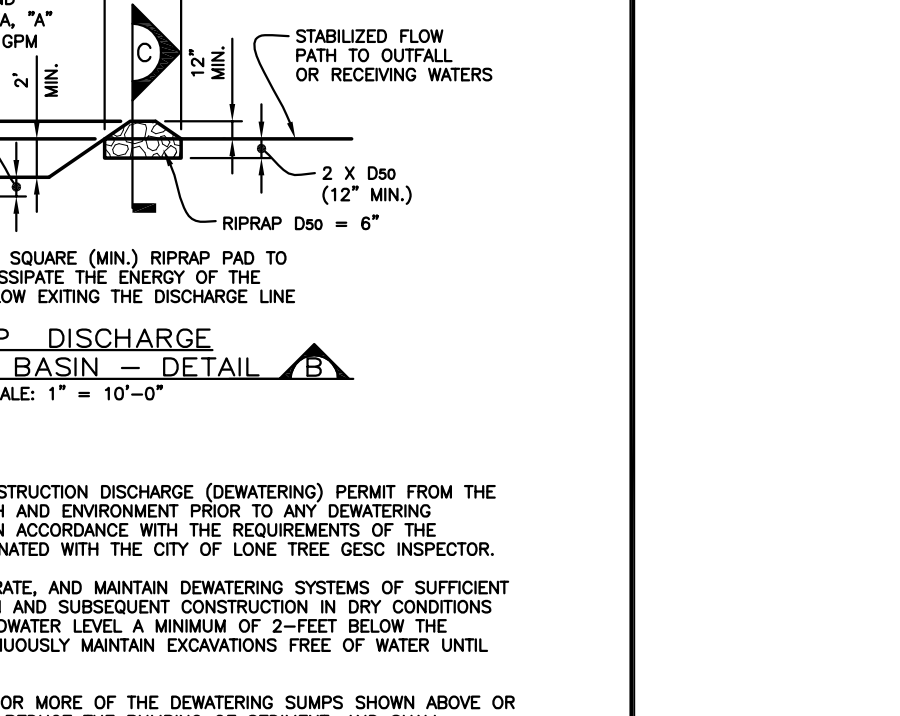
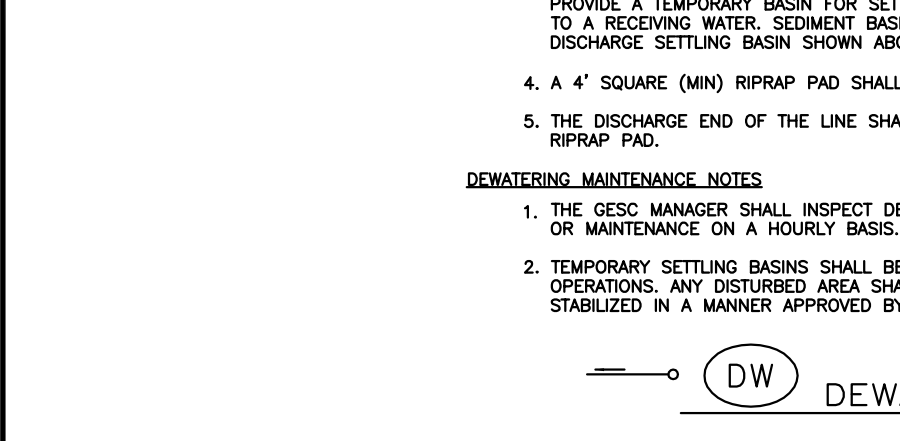
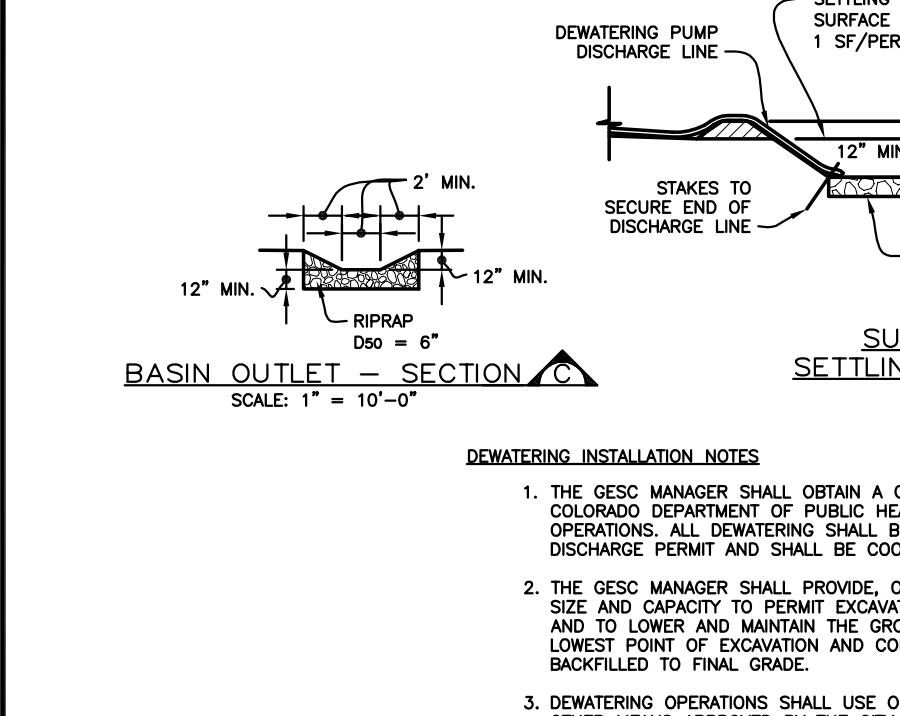
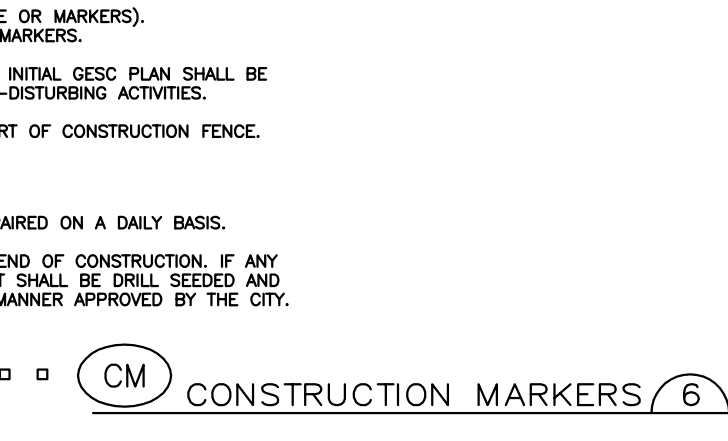
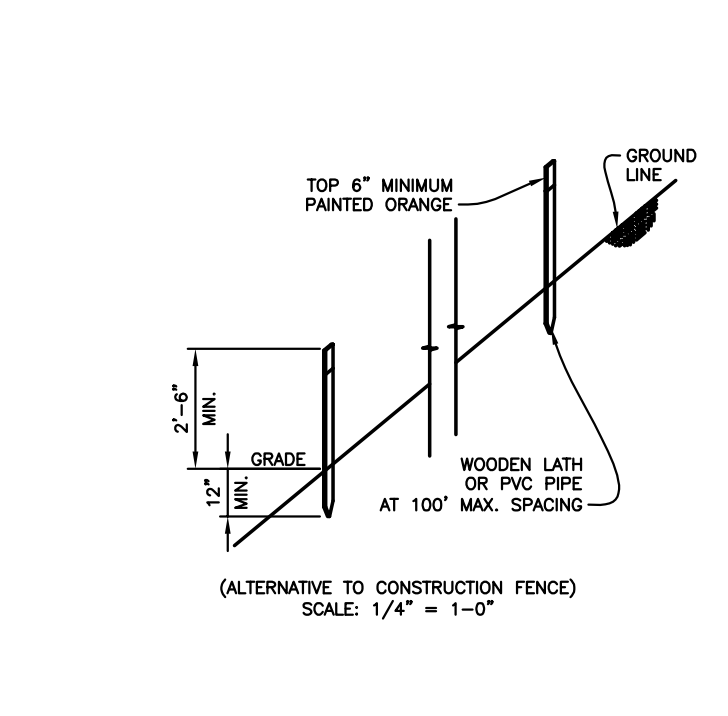
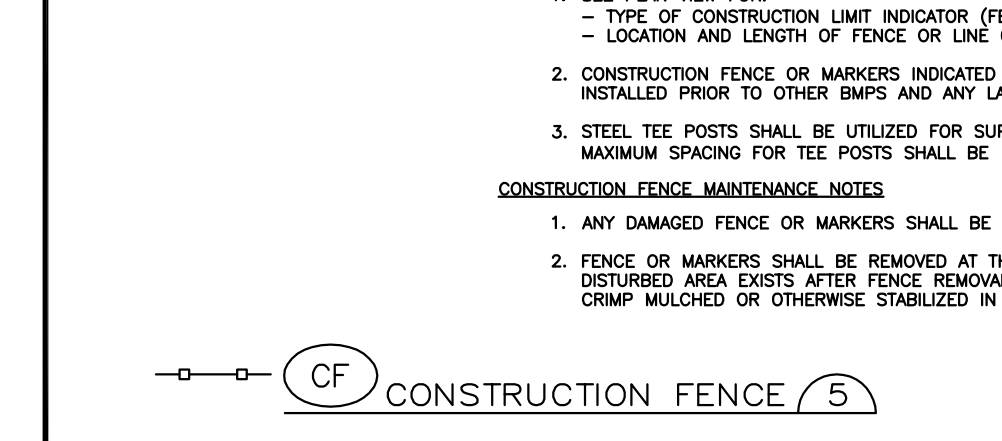
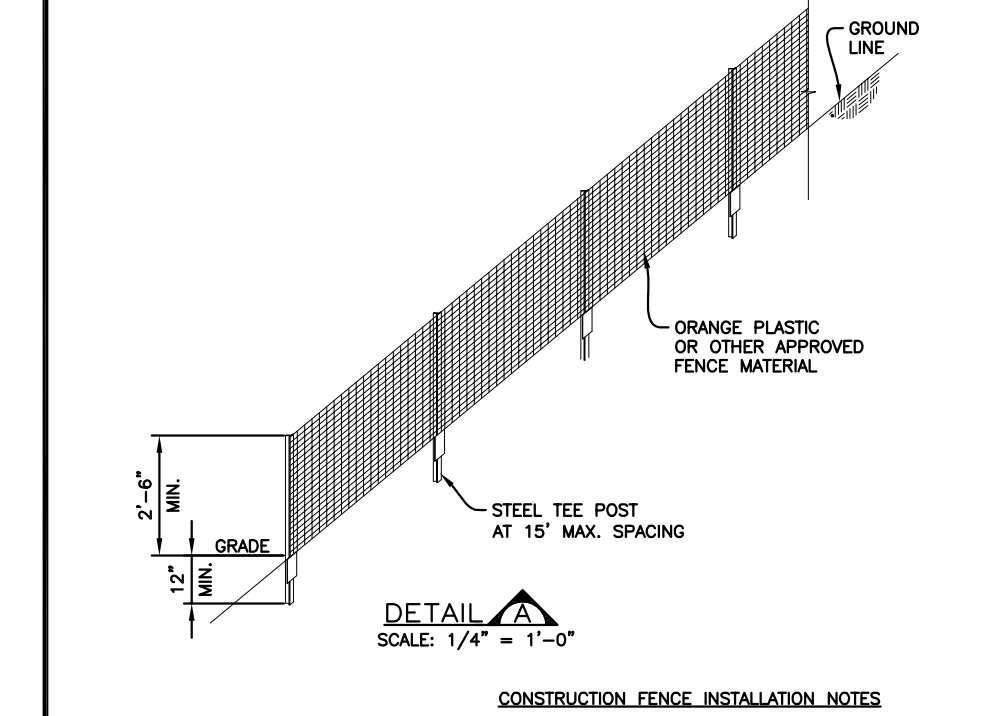
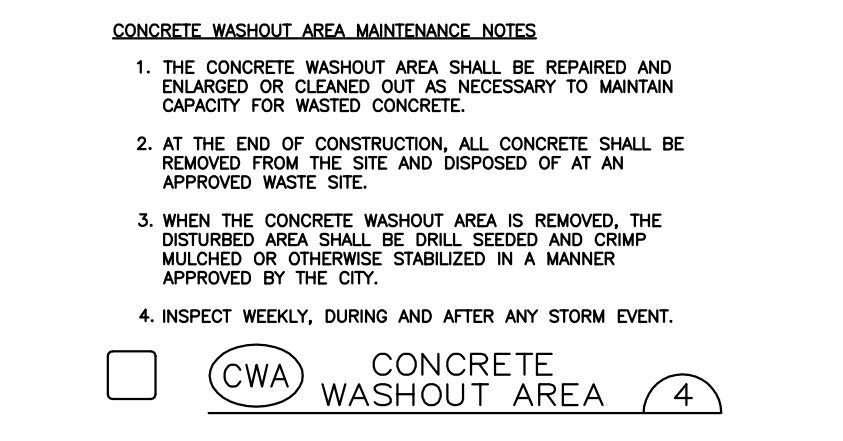
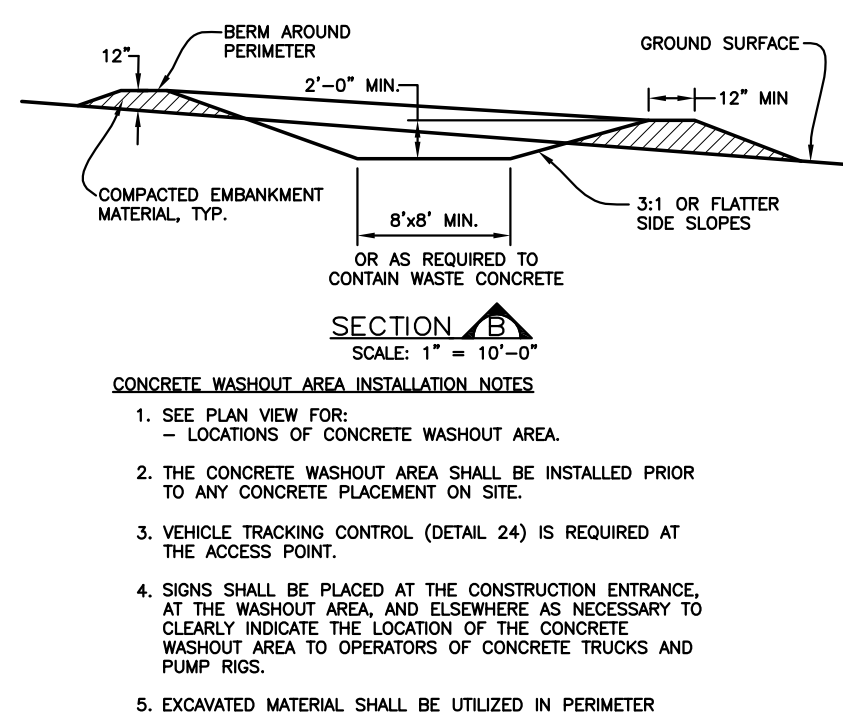
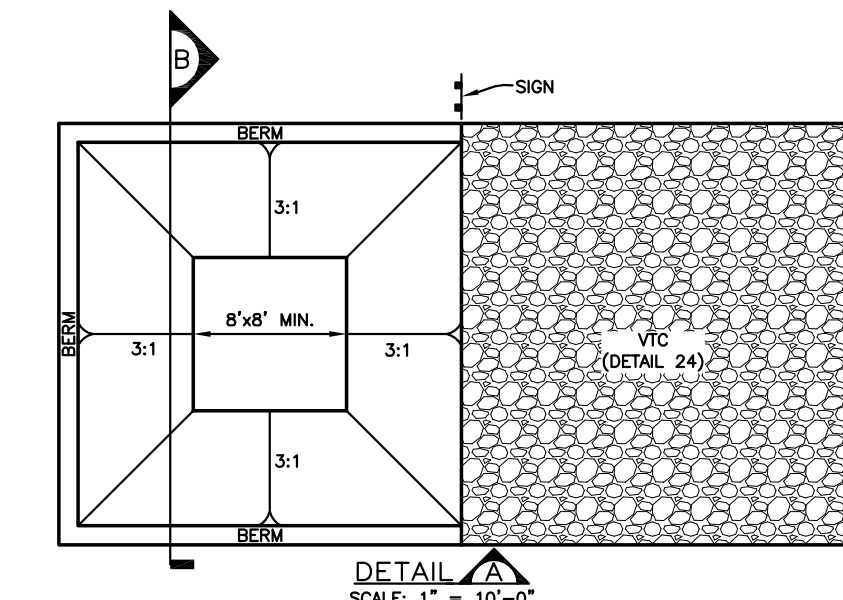


TABLE 1. RIPRAP GRADATIONS

D50 MEDIAN STONE SIZE (INCHES)	% OF MATERIAL SMALLER THAN TYPICAL STONE	TYPICAL STONE DIAMETER (INCHES)	TYPICAL STONE WEIGHT (POUNDS)
6	70 - 100 35 - 50 2 - 10	12 6 2	85 8 0.4
9	70 - 100 50 - 70 35 - 50 2 - 10	15 12 6 2	160 85 9 0.5
12	70 - 100 50 - 70 35 - 50 2 - 10	21 18 12 6	440 220 120 60
18	100 50 - 70 35 - 50 2 - 10	30 24 18 6	1280 650 280 10
24	100 70 - 100 50 - 70 35 - 50 2 - 10	42 33 24 9	3500 1700 670 35

TABLE 2. RIPRAP BEDDING

SEIVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
CLASS A	
3"	100
1 1/2"	20 - 90
NO. 4	0 - 20
NO. 200	0 - 3

TABLE 3. 1 1/2" CRUSHED ROCK

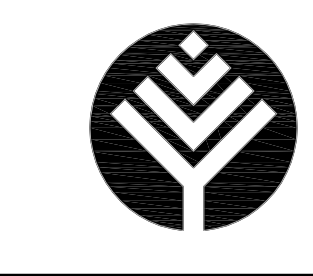
SEIVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
NO. 4	
2"	100
1 1/2"	90 - 100
1"	20 - 55
3/4"	0 - 15
3/8"	0 - 5

ROCK AND RIPRAP GRADATIONS

Sheet Revisions

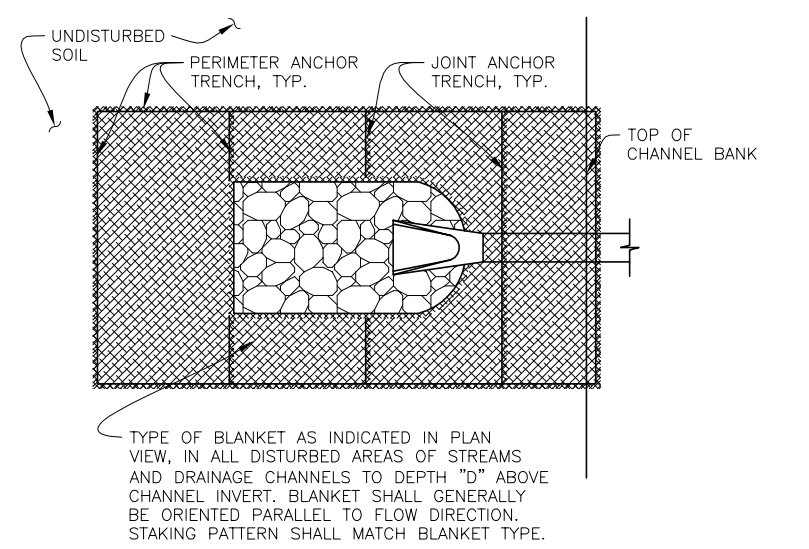
DATE	DESCRIPTION	BY
6/30/05	ADOPTED FROM DOUGLAS COUNTY GESC PLANS	MLP
5/ /08	EDIT UPDATES	GAW
11/ /08	ADD CURB SOCK DETAIL (REF UDFCD, V3 FIGURE C5-23), MISC. NOTE EDITS	GAW

NOTE: SCALES SHOWN ARE FOR 24"x36" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

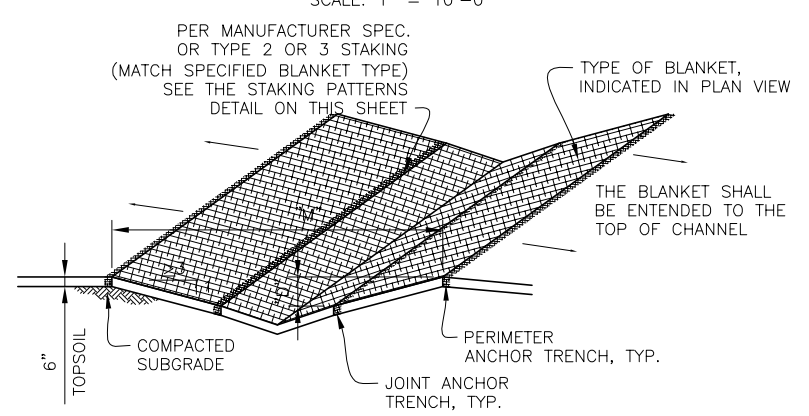


CITY OF LONE TREE
DEPARTMENT OF PUBLIC WORKS
Engineering Division

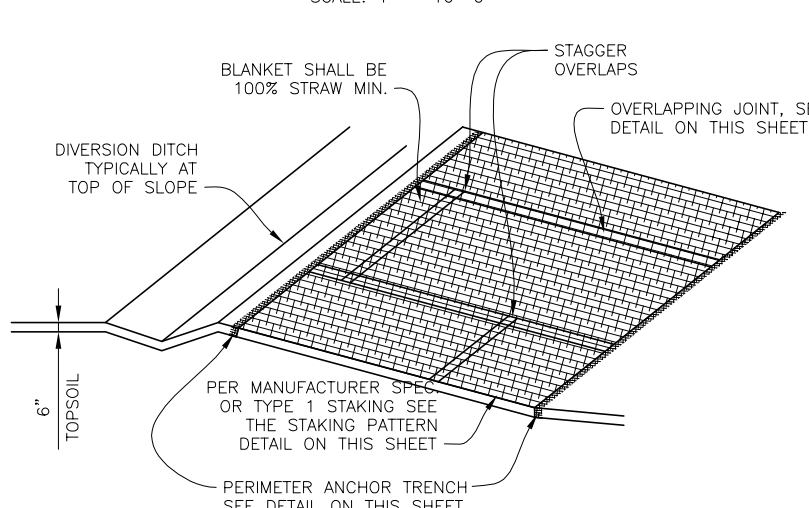
GESC GRADING, EROSION, AND SEDIMENT CONTROL
GESC PLAN STANDARD NOTES AND DETAILS
SHEET 1 OF 3



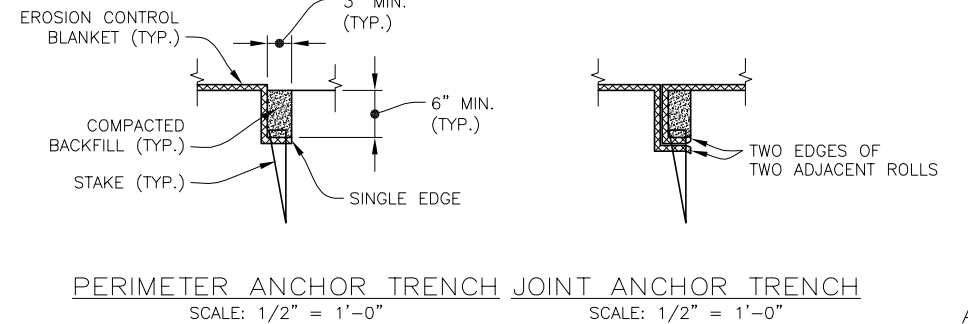
IN DISTURBED AREAS OF STREAMS AND DRAINAGE CHANNELS - DETAIL
SCALE: 1" = 10'-0"



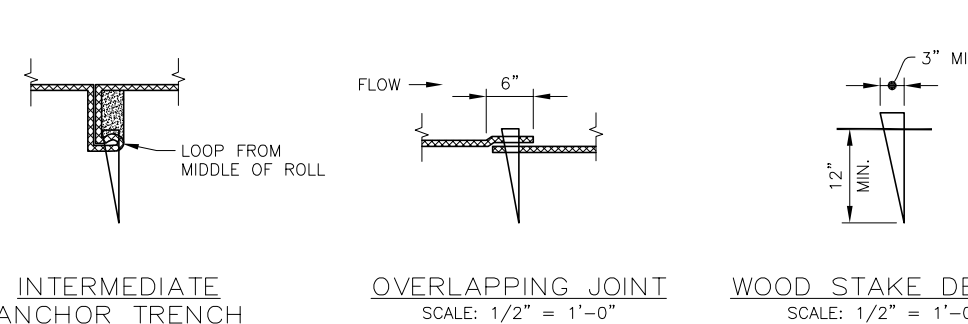
IN DIVERSION DITCH OR SMALL DITCH DRAINAGE - DETAIL
SCALE: 1" = 10'-0"



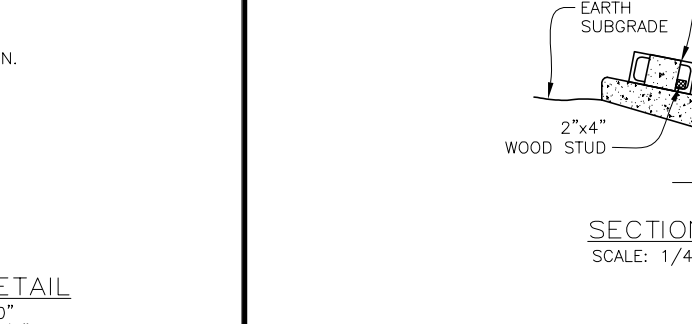
OUTSIDE OF STREAMS AND DRAINAGE CHANNELS - DETAIL
SCALE: 1" = 10'-0"



PERIMETER ANCHOR TRENCH JOINT ANCHOR TRENCH
SCALE: 1/2" = 1'-0"



INTERMEDIATE ANCHOR TRENCH
SCALE: 1/2" = 1'-0"



OVERLAPPING JOINT
SCALE: 1/2" = 1'-0"



WOOD STAKE DETAIL
SCALE: 1/2" = 1'-0"

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
 - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
 - TYPE OF BLANKET (STRAW, STRAW-COCOONUT, COCOONUT OR EXCELSIOR).
 - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL, NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE BLANKET IN ACCORDANCE WITH THE REQUIREMENTS OF DETAIL 17. SEEDING AND MULCHING SUBGRADE SHALL BE SMOOTH AND MOST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE, NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKETS EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCOONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.

EROSION CONTROL BLANKET INSTALLATION NOTES - CONTINUED

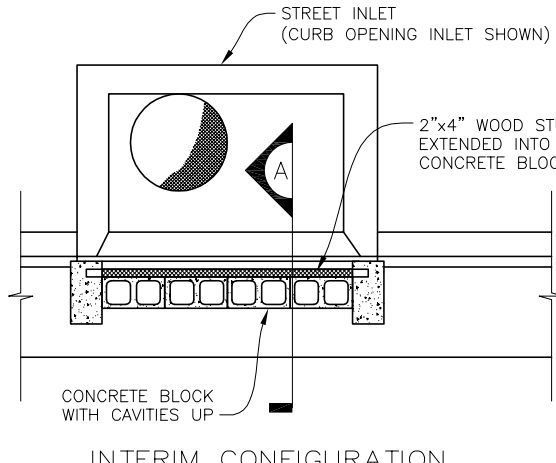
9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEED AND MULCHED IN ACCORDANCE WITH DETAIL 17.
10. SEE DRAINAGE DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION MEASURES THAT MAY EXCEED THE DESIGN CONDITIONS ASSOCIATED WITH THE DETAILS ABOVE.

EROSION CONTROL BLANKET MAINTENANCE NOTES

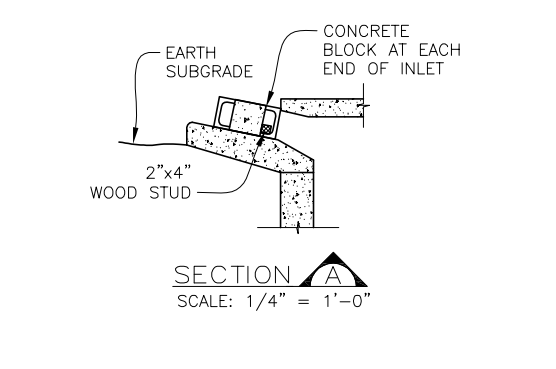
1. THE GESC MANAGER SHALL INSPECT EROSION CONTROL BLANKETS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS REQUESTED TO BE REMOVED BY THE CITY.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.



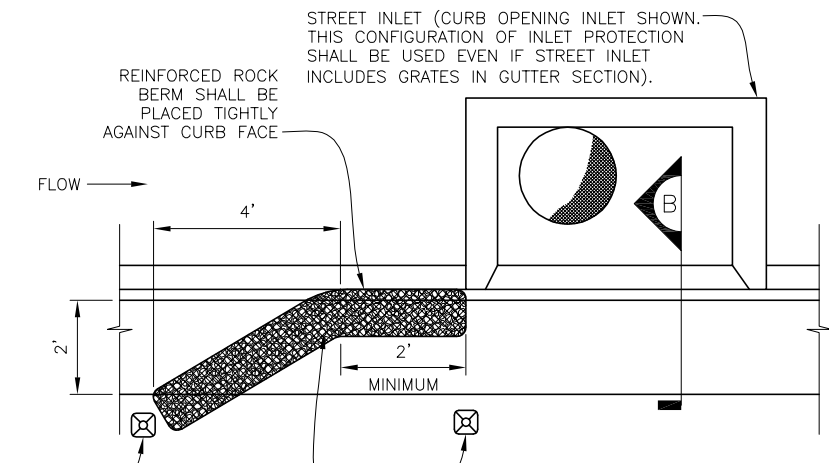
ECB EROSION CONTROL BLANKET (9)



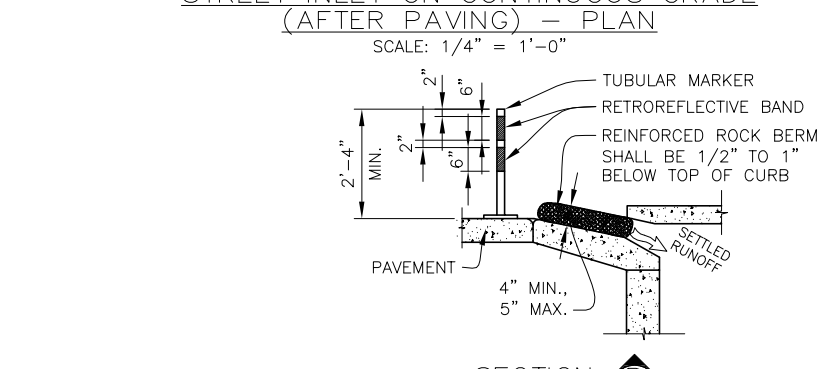
INTERIM CONFIGURATION (BEFORE PAVING) STREET INLET - PLAN
SCALE: 1/4" = 1'-0"



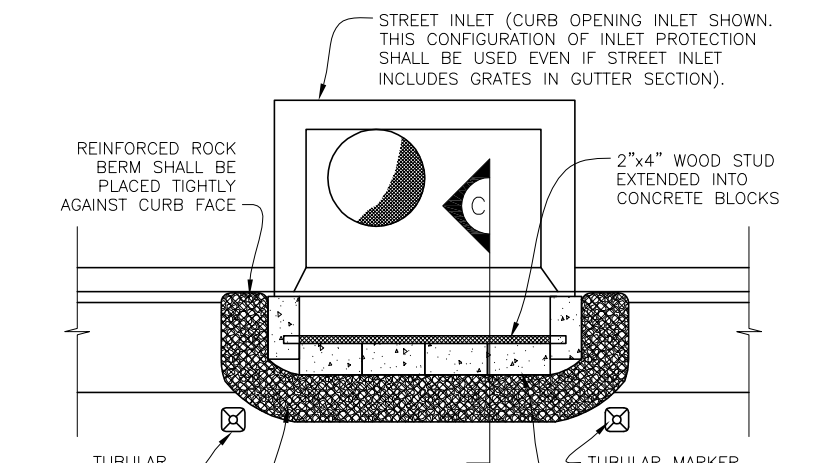
SECTION
SCALE: 1/4" = 1'-0"



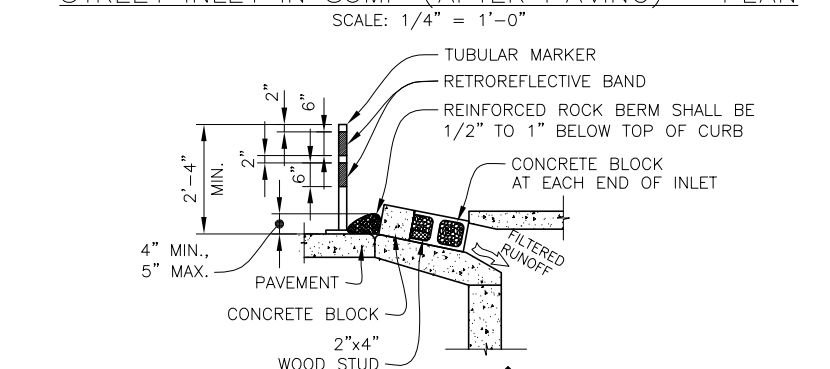
STREET INLET ON CONTINUOUS GRADE (AFTER PAVING) - PLAN
SCALE: 1/4" = 1'-0"



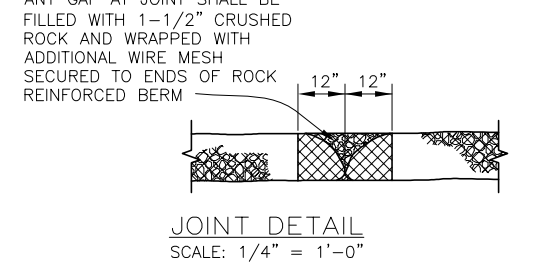
SECTION
SCALE: 1/4" = 1'-0"



STREET INLET IN SLUMP (AFTER PAVING) - PLAN
SCALE: 1/4" = 1'-0"



SECTION
SCALE: 1/4" = 1'-0"



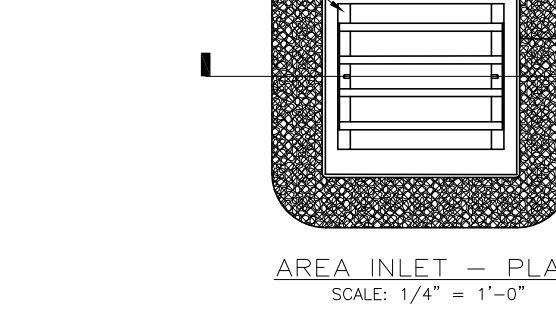
JOINT DETAIL
SCALE: 1/4" = 1'-0"

INLET PROTECTION INSTALLATION NOTES

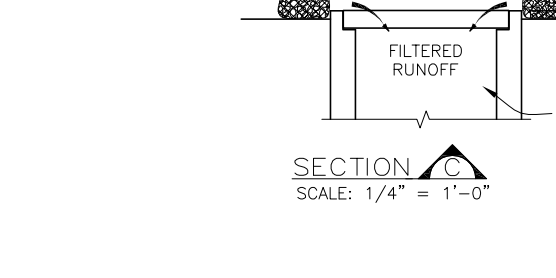
1. INTERIM CONFIGURATION OF INLET PROTECTION IN STREETS SHALL BE INSTALLED WITHIN 48-HOURS OF POURING INLET. INLET PROTECTION (AFTER PAVING) SHALL BE INSTALLED WITHIN 48 HOURS AFTER PAVING IS PLACED.
2. INLET PROTECTION AT AREA INLETS SHALL BE INSTALLED WITHIN 48-HOURS OF POURING INLET.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON SHEET 1 (1-1/2" MINUS). RECYCLED CONCRETE MEETING THIS GRADATION MAY BE USED.
4. WIRE MESH SHALL BE FABRICATED OF 10 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
6. REINFORCED ROCK BERM SHALL BE CONSTRUCTED IN ONE PIECE OR SHALL BE CONSTRUCTED USING JOINT DETAIL.
7. TUBULAR MARKERS SHALL MEET REQUIREMENTS OF MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED.
8. THE TOP OF REINFORCED ROCK BERM SHALL BE 1/2"-1" BELOW TOP OF CURB.

INLET PROTECTION MAINTENANCE NOTES

1. THE GESC MANAGER SHALL INSPECT INLET PROTECTION WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY. MORE FREQUENT INSPECTIONS AND REPAIRS SHALL BE REQUIRED DURING WINTER CONDITIONS DUE TO FREEZE/THAW PROBLEMS.
2. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF ROCK BERM IS WITHIN 2-1/2 INCHES OF THE CREST.
3. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE CITY APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
4. WHEN INLET PROTECTION AT AREA INLETS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



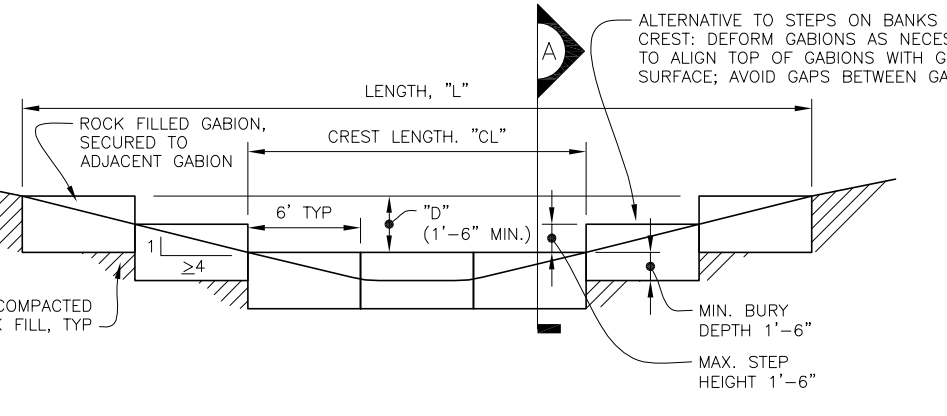
AREA INLET - PLAN
SCALE: 1/4" = 1'-0"



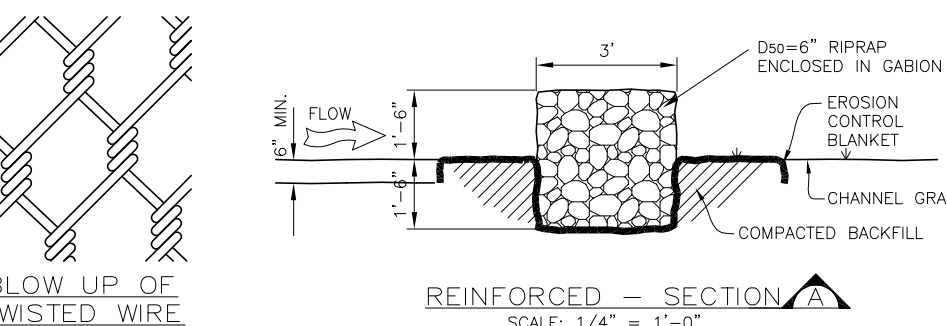
SECTION
SCALE: 1/4" = 1'-0"



IP INLET PROTECTION (10)



REINFORCED - ELEVATION
SCALE: 1" = 10'-0"



REINFORCED - SECTION
SCALE: 1/4" = 1'-0"

REINFORCED CHECK DAM INSTALLATION NOTES

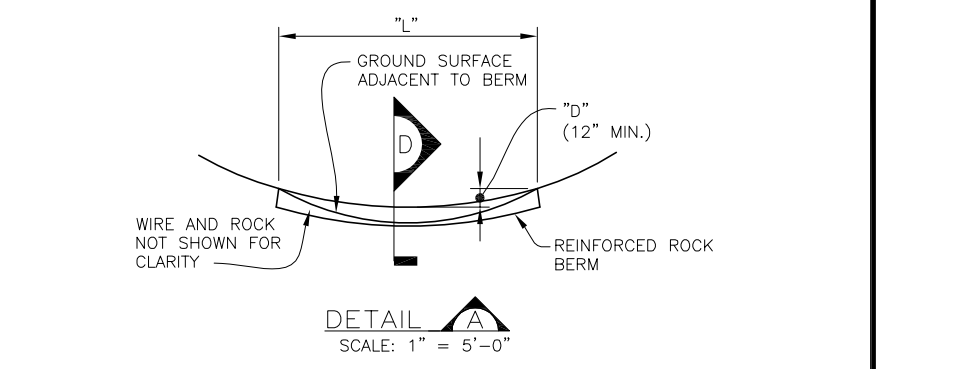
1. SEE PLAN VIEW FOR:
 - LOCATIONS OF CHECK DAMS.
 - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
 - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
2. CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
3. REINFORCED CHECK DAMS: GABIONS SHALL HAVE GALVANIZED TWISTED WIRE NETTING WITH A MAXIMUM OPENING DIMENSION OF 4-1/2" AND A MINIMUM WIRE THICKNESS OF 0.10" WIRE "HOG RINGS" AT 4" SPACING OR OTHER APPROVED MEANS SHALL BE USED AT ALL GABION SEAMS AND TO SECURE THE GABION TO THE ADJACENT GABION.
4. RIPRAP UTILIZED FOR CHECK DAMS SHALL HAVE A D₅₀ MEDIAN STONE SIZE OF 6".
5. THE CHECK DAM SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-6".
6. EROSION BLANKET SHALL BE PLACED IN THE REINFORCED CHECK DAM TRENCH EXTENDING A MINIMUM OF 1'-6" ON BOTH THE UPSTREAM AND DOWNSTREAM SIDES OF THE REINFORCED CHECK DAM.

REINFORCED CHECK DAM MAINTENANCE NOTES

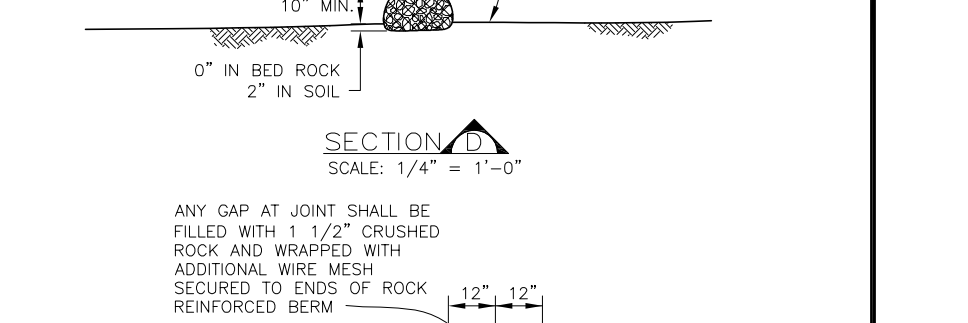
1. THE GESC MANAGER SHALL INSPECT CHECK DAMS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
3. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE CITY.
4. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACK FILL. ANY DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



RCD REINFORCED CHECK DAM (11)



SECTION
SCALE: 1/4" = 1'-0"



JOINT DETAIL
SCALE: 1/4" = 1'-0"

REINFORCED ROCK BERM INSTALLATION NOTES

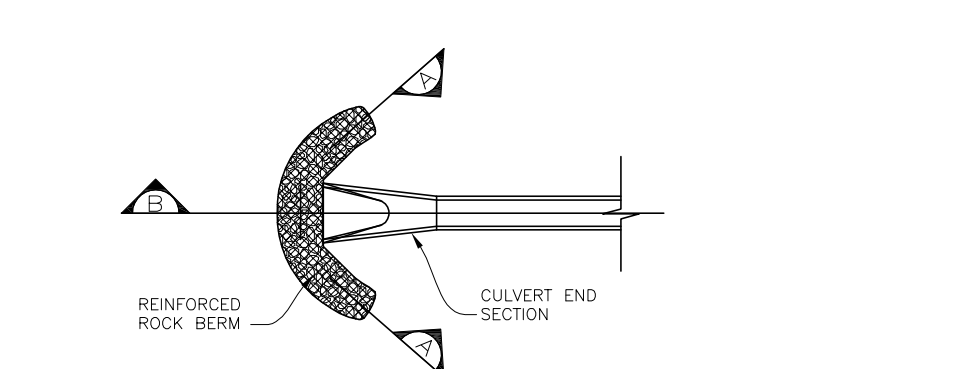
1. SEE PLAN VIEW FOR:
 - LOCATIONS OF REINFORCED ROCK BERMS.
 - LENGTH, "L", AND DEPTH, "D".
2. REINFORCED ROCK BERM SECTION APPLIES TO CULVERT INLET FILTER AND INLET PROTECTION.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON SHEET 1 (1-1/2" MINUS). RECYCLED CONCRETE MEETING THIS GRADATION MAY BE USED.
4. WIRE MESH SHALL BE FABRICATED OF 10 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
6. FOR CONCENTRATED FLOW AREAS THE ENDS OF THE REINFORCED ROCK BERM SHALL BE 12" HIGHER THAN THE CENTER OF THE BERM.

REINFORCED ROCK BERM MAINTENANCE NOTES

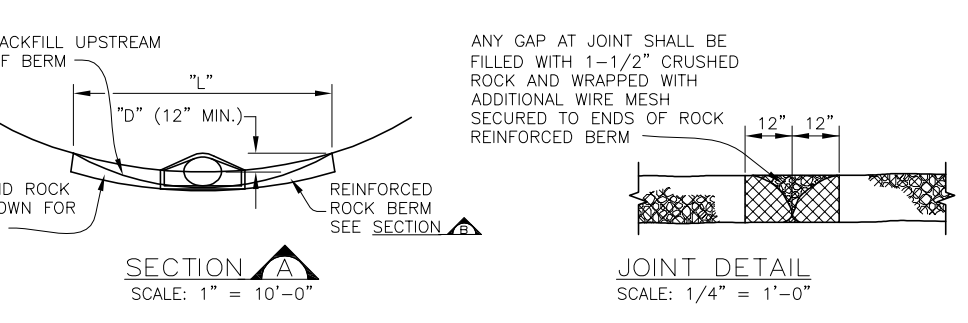
1. THE GESC MANAGER SHALL INSPECT REINFORCED ROCK BERM WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF REINFORCED ROCK BERM SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF FILTER IS WITHIN 5 INCHES OF THE CREST.
3. REINFORCED ROCK BERMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED.
4. WHEN REINFORCED ROCK BERMS ARE REMOVED, ANY DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



RRB REINFORCED ROCK BERM (12)



PLAN
SCALE: 1" = 10'-0"



SECTION
SCALE: 1" = 10'-0"

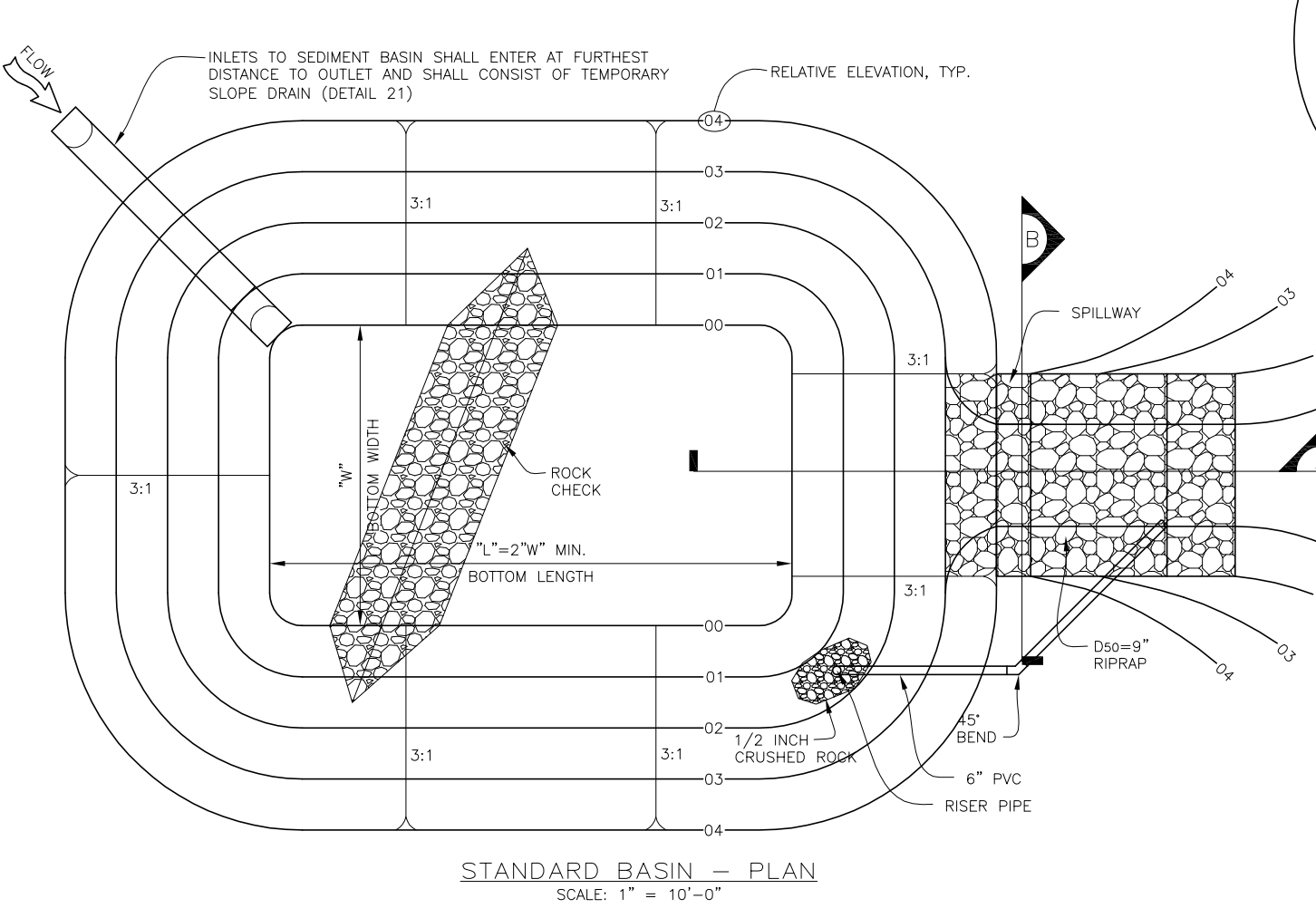
RRB FOR CULVERT PROTECTION (13)

INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
 - LOCATIONS OF CULVERT INLET FILTERS.
 - LENGTH, "L", AND DEPTH, "D".
2. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON SHEET 1 (1-1/2" MINUS). RECYCLED CONCRETE MEETING THIS GRADATION MAY BE USED.
3. WIRE MESH SHALL BE FABRICATED OF 10 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE").
4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
5. THE ENDS OF THE REINFORCED ROCK BERM SHALL BE 12" HIGHER THAN THE CENTER OF THE BERM.

MAINTENANCE NOTES

1. THE GESC MANAGER SHALL INSPECT CULVERT INLET FILTER WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CULVERT INLET FILTER SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF FILTER IS 1/2 THE HEIGHT OF THE REINFORCED ROCK BERM.
3. RIPRAP FOR CULVERT PROTECTION ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE CITY.
4. WHEN CULVERT INLET FILTERS ARE REMOVED, ANY DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



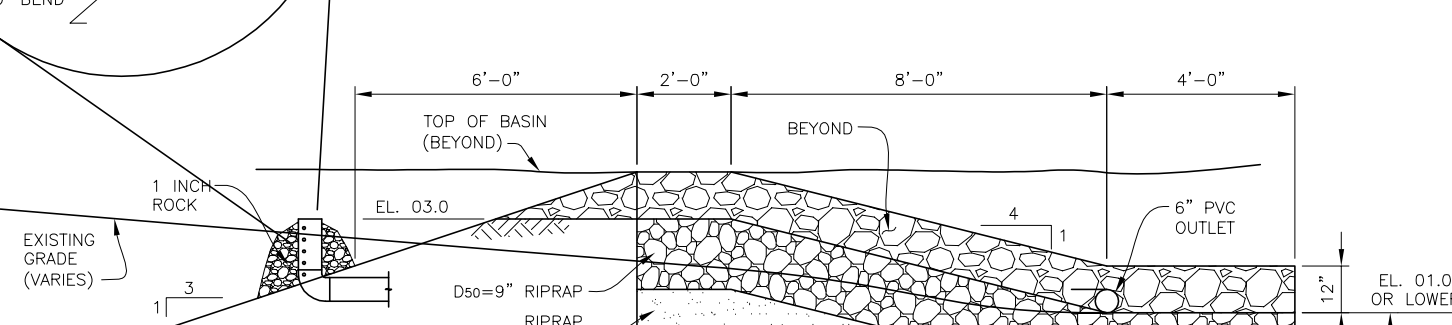
STANDARD BASIN - PLAN
SCALE: 1" = 10'-0"

SEDIMENT BASIN INSTALLATION NOTES

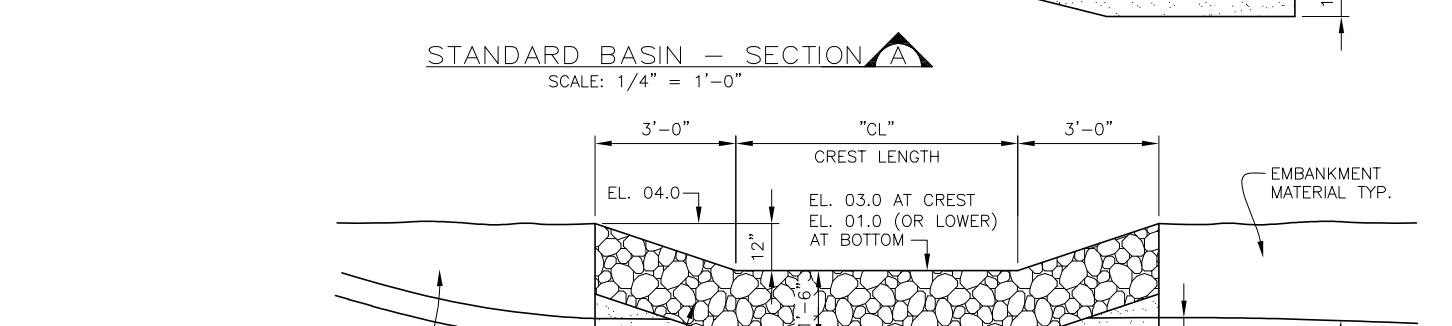
1. SEE PLAN VIEW FOR:
 - LOCATION OF SEDIMENT BASIN.
 - TYPE OF BASIN (STANDARD BASIN OR NON-STANDARD BASIN).
 - FOR STANDARD BASIN: CREST LENGTH, "CL", BOTTOM WIDTH, "W", AND HOLE DIAMETER, "HD".
 - FOR NON-STANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT, "H", NUMBER OF COLUMNS, "N", HOLE DIAMETER, "HD", AND PIPE DIAMETER "D".
2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
3. SEDIMENT BASINS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY OTHER LAND-DISTURBING ACTIVITY.
4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY WITHIN 2 PERCENTAGE POINTS OF OPTIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
6. PIPE SO4 40 OR GREATER SHALL BE USED.
7. THE DETAILS SHOWN ON THIS SHEET PERTAIN TO STANDARD SEDIMENT BASINS IDENTIFIED ON THE GESC PLAN VIEW DRAWINGS USED FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASINS THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. THE GESC MANAGER SHALL INSPECT SEDIMENT BASIN WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED IN SEDIMENT BASIN SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN 2.0 FEET OF THE CREST OF THE SPILLWAY.
3. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE CITY.
4. IF SEDIMENT BASINS ARE REMOVED, THE DISTURBED AREA SHALL BE SEED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



STANDARD BASIN - SECTION
SCALE: 1/4" = 1'-0"



STANDARD BASIN - SECTION
SCALE: 1/4" = 1'-0"

SEDIMENT BASIN (14)

SEDIMENT BASIN MAINTENANCE NOTES

1. THE GESC MANAGER SHALL INSPECT SEDIMENT BASIN WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED IN SEDIMENT BASIN SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN 2.0 FEET OF THE CREST OF THE SPILLWAY.
3. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE CITY.
4. IF SEDIMENT BASINS ARE REMOVED, THE DISTURBED AREA SHALL BE SEED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

Sheet Revisions

6/30/05	ADOPTED FROM DOUGLAS COUNTY GESC PLANS	MLP
5/ /08	EDIT UPDATES	GAW
11/ /08	ADD CURB SOCK DETAIL (REF UDFOC, V3 FIGURE C5-23), MISC. NOTE EDITS	GAW

NOTE: SCALES SHOWN ARE FOR 24"x36" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

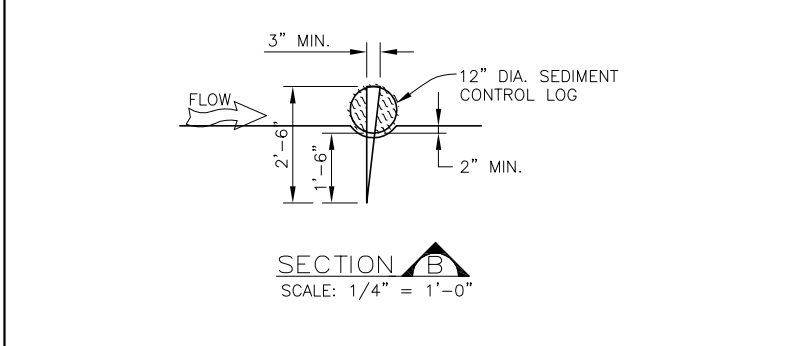
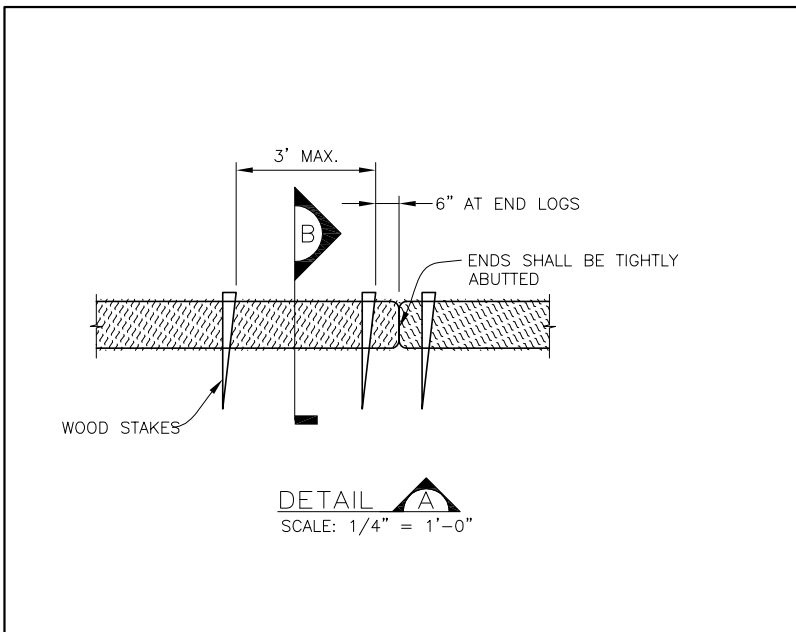


CITY OF LONE TREE
DEPARTMENT OF PUBLIC WORKS
Engineering Division

GESC GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 2 OF 3

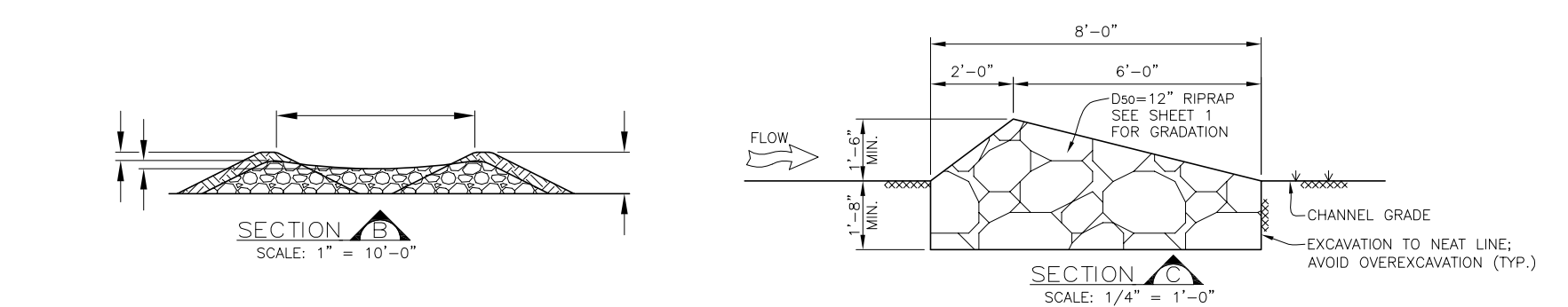
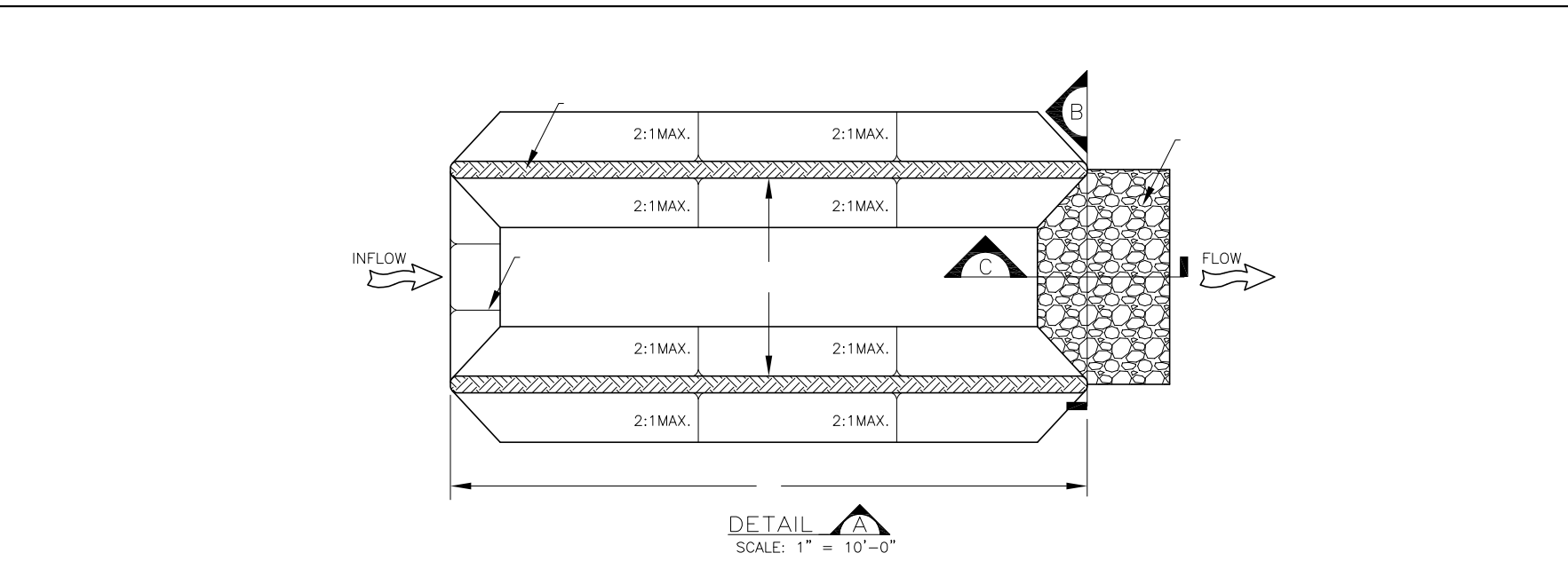


SEDIMENT CONTROL LOG INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATION AND LENGTH OF SEDIMENT CONTROL LOG.
- SEDIMENT CONTROL LOGS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
- SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELISOR, OR COCONUT FIBER.
- NOT FOR USE IN CONCENTRATED FLOW AREAS.
- THE SEDIMENT CONTROL LOG SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 2".

SEDIMENT CONTROL LOG MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT SEDIMENT CONTROL LOGS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOGS SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN 2" OF THE CREST OF LOG.
- SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION, IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.



SEDIMENT TRAP INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATION, LENGTH AND WIDTH OF SEDIMENT TRAP.
- SEDIMENT TRAPS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
- SEDIMENT TRAP BERM SHALL BE CONSTRUCTED FROM MATERIAL FROM EXCAVATION. THE BERM SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
- RIPRAP OUTLET SHALL BE CONSTRUCTED WITH D=12" RIPRAP WITH A MINIMUM OVERFLOW OF 6".
- THE TOP OF THE EARTHEN BERM SHALL BE A MINIMUM OF 6" HIGHER THAN THE TOP OF THE RIPRAP OUTLET STRUCTURE.
- THE ENDS OF THE RIPRAP OUTLET STRUCTURE SHALL BE MINIMUM OF 6" HIGHER THAN THE CENTER OF THE OUTLET STRUCTURE.

SEDIMENT TRAP MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT SEDIMENT TRAPS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- SEDIMENT ACCUMULATED UPSTREAM OF RIPRAP SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN 2" OF THE HEIGHT OF THE RIPRAP OUTLET STRUCTURE.
- SEDIMENT TRAPS SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVERAGE IS APPROVED BY THE CITY.
- WHEN SEDIMENT TRAPS ARE REMOVED THE DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED OR STABILIZED IN A MANNER APPROVED BY THE CITY.

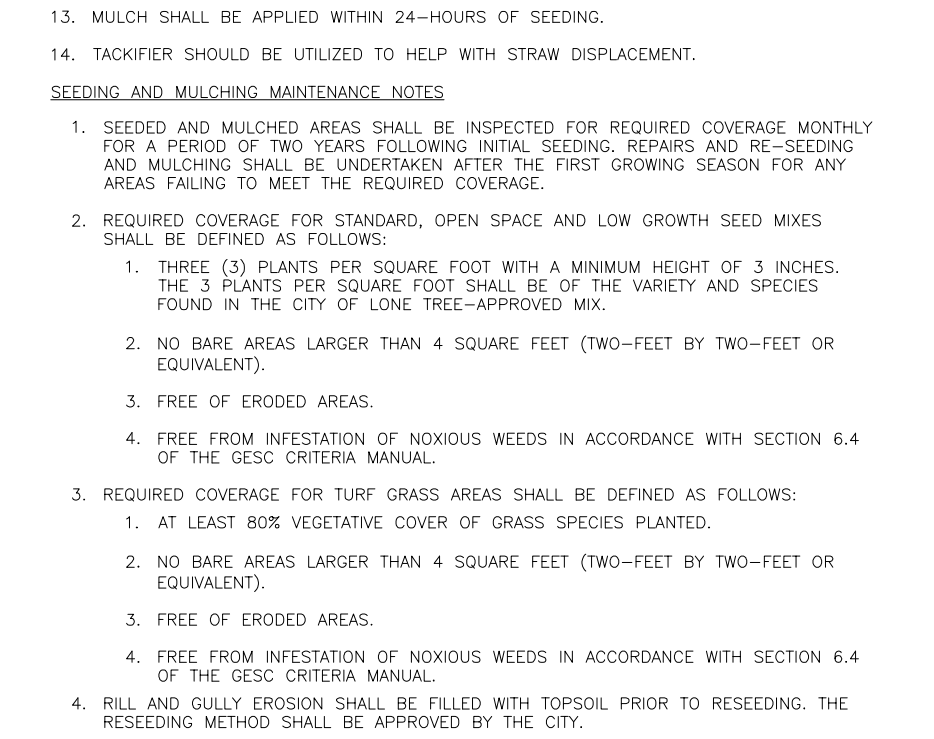


SEEDING AND MULCHING INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - AREA OF SEEDING AND MULCHING.
 - TYPE OF SEED MIX (PERMANENT, TEMPORARY, OR LOW-GROWTH).
- ALL BRANDS FURNISHED SHALL BE FREE FROM SUCH NOXIOUS SEEDS AS RUSSIAN OR CANADIAN THISTLE, COARSE FESCUE, EUROPEAN BROMEGRASS, JOHNSON GRASS, KNAF WEED AND LEAFY SPURGE.
- THE SEEDER SHALL FURNISH TO THE CONTRACTOR A SIGNED STATEMENT CERTIFYING THAT THE SEED FURNISHED IS FROM A LOT THAT HAS BEEN TESTED BY A RECOGNIZED LABORATORY. SEED WHICH HAS BECOME WET, MOLDS, OR OTHERWISE DAMAGED IN TRANSIT OR IN STORAGE WILL NOT BE ACCEPTABLE. SEED TICKETS SHALL BE PROVIDED TO CITY OF LONE TREE UPON REQUEST.
- DRILL SEEDING MIX SHALL CONFORM TO THE TABLE ON THE RIGHT:
- IF THE SEED AVAILABLE ON THE MARKET DOES NOT MEET THE MINIMUM PURITY AND GERMINATION PERCENTAGES SPECIFIED, THE SUBCONTRACTOR MUST COMPENSATE FOR A LESSEY PERCENTAGE OF PURITY OR GERMINATION BY FURNISHING SUFFICIENT ADDITIONAL SEED TO EQUAL THE SPECIFIED PRODUCT. THE PADS FROM THE SEED MIXES MUST BE SUPPLIED TO CONTRACTOR AND FORWARDED TO THE CITY OF LONE TREE GESC INSPECTOR.
- THE FORMULA USED FOR DETERMINING THE QUANTITY OF PURE LIVE SEED (PLS) SHALL BE (POUNDS OF SEED) X (PURITY) X (GERMINATION) = POUNDS OF PURE LIVE SEED (PLS).
- PERMANENT SEED MIX SHALL BE USED UNLESS OTHERWISE APPROVED BY THE CITY.
- ALL AREAS TO BE SEED AND MULCHED SHALL HAVE NATIVE TOPSOIL OR APPROVED SOIL AMENDMENTS SPREAD TO A DEPTH OF AT LEAST 6 INCHES (GROSS DEPTH). HALL ROADS AND OTHER COMPACTED AREAS SHALL BE LOOSENEED TO A DEPTH OF 6 INCHES PRIOR TO SPREADING TOPSOIL.
- SOIL IS TO BE THOROUGHLY LOOSENEED (TILLED) TO A DEPTH OF AT LEAST 6 INCHES PRIOR TO SEEDING. THE TOP 6 INCHES OF THE SEED BED SHALL BE FREE OF ROCKS GREATER THAN 4 INCHES AND SOIL CLOSURE GREATER THAN 2 INCHES. SEEDING OVER ANY COMPACTED AREAS THAT HAVEN'T BEEN THOROUGHLY LOOSENEED SHALL BE REJECTED.
- SEED IS TO BE APPLIED USING A MECHANICAL DRILL TO A DEPTH OF 1/4 INCH. ROW SPACING SHALL BE NO MORE THAN 8 INCHES. MATERIAL USED FOR MULCH SHALL CONSIST OF LONG-STEMMED STRAW, AT LEAST 50 PERCENT OF THE MULCH, BY WEIGHT, SHALL BE 10 INCHES OR MORE IN LENGTH. MULCH SHALL BE APPLIED AND MECHANICALLY ANCHORED TO A DEPTH OF AT LEAST 2 INCHES. MULCH SHALL BE APPLIED AT A RATE OF 4000 LB. OF STRAW PER ACRE.
- IF THE PERMITTEE DEMONSTRATES TO THE CITY THAT IT IS NOT POSSIBLE TO DRILL SEED, SEED IS TO BE UNIFORMLY BROADCAST AT TWO TIMES THE DRILLED RATE, THEN LIGHTLY HARROWED TO PROVIDE A SEED DEPTH OF APPROXIMATELY 1/4 INCH, THEN ROLLED TO COMPACT, THEN MULCHED AS SPECIFIED ABOVE.
- MULCH SHALL BE APPLIED WITHIN 24-HOURS OF SEEDING.
- TACKIFIER SHOULD BE UTILIZED TO HELP WITH STRAW DISPLACEMENT.

SEEDING AND MULCHING MAINTENANCE NOTES

- SEED AND MULCHED AREAS SHALL BE INSPECTED FOR REQUIRED COVERAGE MONTHLY FOR A PERIOD OF TWO YEARS FOLLOWING INITIAL SEEDING. REPAIRS AND RE-SEEDING AND MULCHING SHALL BE UNDERTAKEN AFTER THE FIRST GROWING SEASON FOR ANY AREAS FAILING TO MEET THE REQUIRED COVERAGE.
- REQUIRED COVERAGE FOR STANDARD, OPEN SPACE AND LOW GROWTH SEED MIXES SHALL BE DEFINED AS FOLLOWS:
 - THREE (3) PLANTS PER SQUARE FOOT WITH A MINIMUM HEIGHT OF 3 INCHES. THE 3 PLANTS PER SQUARE FOOT SHALL BE OF THE VARIETY AND SPECIES FOUND IN THE CITY OF LONE TREE-APPROVED MIX.
 - NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO-FOOT BY TWO-FOOT OR EQUIVALENT).
 - FREE OF ERODED AREAS.
 - FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC CRITERIA MANUAL.
- REQUIRED COVERAGE FOR TURF GRASS AREAS SHALL BE DEFINED AS FOLLOWS:
 - AT LEAST 80% VEGETATIVE COVER OF GRASS SPECIES PLANTED.
 - NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO-FOOT BY TWO-FOOT OR EQUIVALENT).
 - FREE OF ERODED AREAS.
 - FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC CRITERIA MANUAL.
- RILL AND GULLY EROSION SHALL BE FILLED WITH TOPSOIL PRIOR TO RESEEDING. THE RESEEDING METHOD SHALL BE APPROVED BY THE CITY.



CITY OF LONE TREE PERMANENT DRILL SEEDING MIX

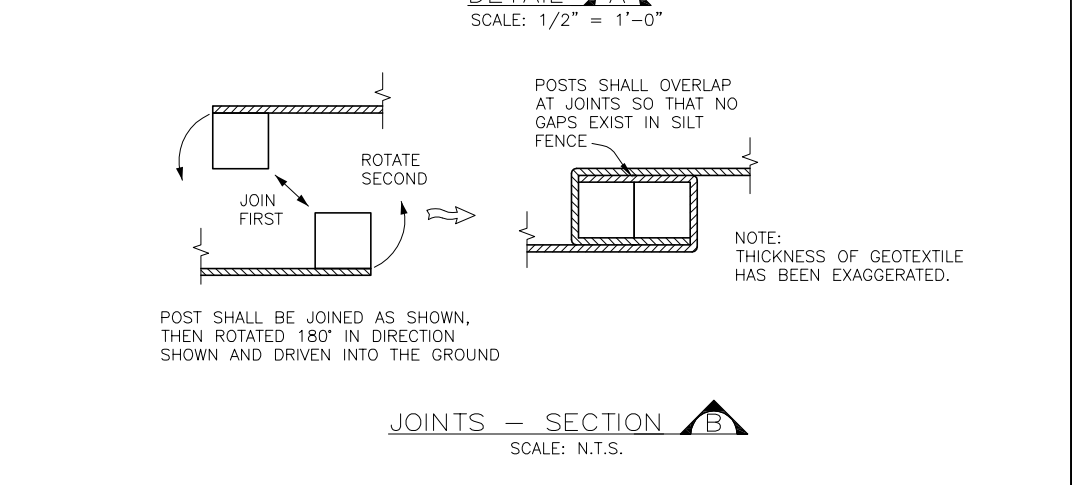
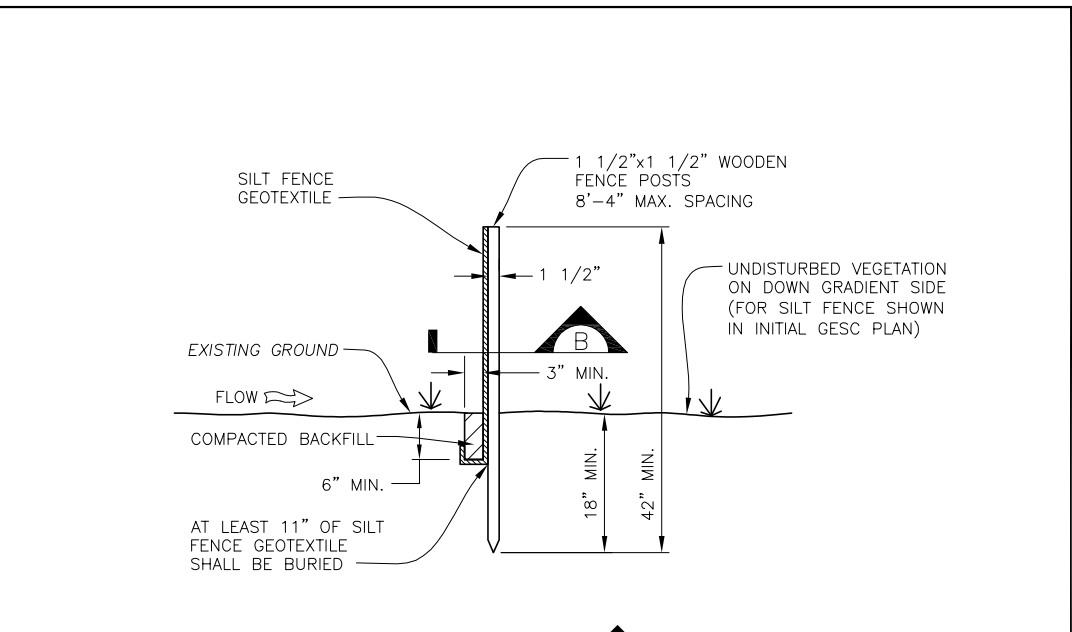
SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BIG BLUESTEM	KAW	PNWS	10	1.1
YELLOW INDANGRASS	CHEYENNE	PNWS	10	1
SWITCHGRASS	BLACKWELL	PNWS	10	0.4
SEDEGAS GRAMA	VAUGHN	PNWB	10	0.9
WESTERN WHEATGRASS	ARRIBA	PNCS	10	1.6
BLUE GRAMA	CHAITA	PNWB	10	0.3
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
PRAIRIE SANDREED	GOSHEN	PNWS	10	0.7
GREEN NEEDLEGRASS	LODOMM	PNCS	10	1
SLENDER WHEATGRASS	PRYOR	PNCS	5	0.6
STREAMBANK WHEATGRASS	SODAR	PNCS	5	0.6
			TOTAL	9.2

CITY OF LONE TREE TEMPORARY DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
SMOOTH BROMEGRASS	LINCOLN	PICS	30	3.9
INTERMEDIATE WHEATGRASS	OMIE	PICS	30	4.5
PURBESCENT WHEATGRASS	LUANA	PICS	30	4.2
ANNUAL RYEGRASS	N/A	AIB	10	0.8
			TOTAL	13.4

CITY OF LONE TREE LOW-GROWTH DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BUFFALOGRASS	TEHOKA	PNWS	20	3.2
BLUE GRAMA	HACHITA	PNWB	20	0.6
WESTERN WHEATGRASS	ARRIBA	PNCS	20	3.2
SEDEGAS GRAMA	VAUGHN	PNWB	20	1.8
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
STREAMBANK WHEATGRASS	SODAR	PNCS	10	1.2
			TOTAL	11.0

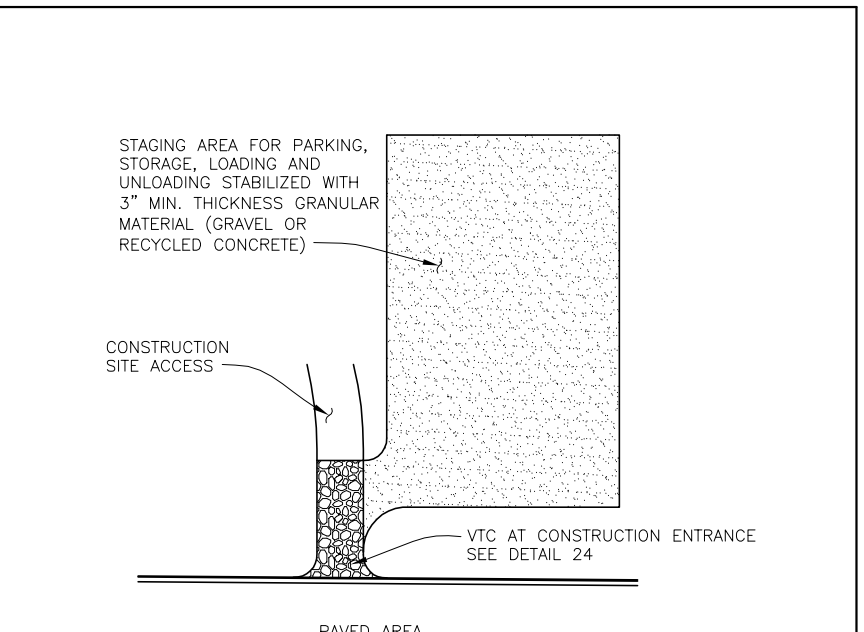


SILT FENCE INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATION AND LENGTH OF FENCE.
- ANCHOR TRENCH SHALL BE EXCAVATED WITH TRENCHER, OR WITH SILT FENCE INSTALLATION MACHINE, NO ROAD GRADERS, BACKHOES, ETC. SHALL BE USED. TRENCH SHALL BE COMPACTED BY HAND, WITH "CAMBER JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
- SILT FENCE GEOTEXTILE SHALL MEET THE FOLLOWING REQUIREMENTS:
 - 6- TO 12-GALLONS PER MINUTE PER SQUARE FOOT FLOW CAPACITY.
 - 90 LB. TENSILE STRENGTH PER ASTM D4622.
 - UV RESISTANT AT 500 HRS MIN. TENSILE STRENGTH RETAINED PER ASTM D 4355.
- SILT FENCE INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT SILT FENCE DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- SEDIMENT ACCUMULATED UPSTREAM OF SILT FENCE SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT REACHES A DEPTH OF 6-INCHES.
- SILT FENCE SHALL BE REMOVED WHEN THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE CITY. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE SEED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

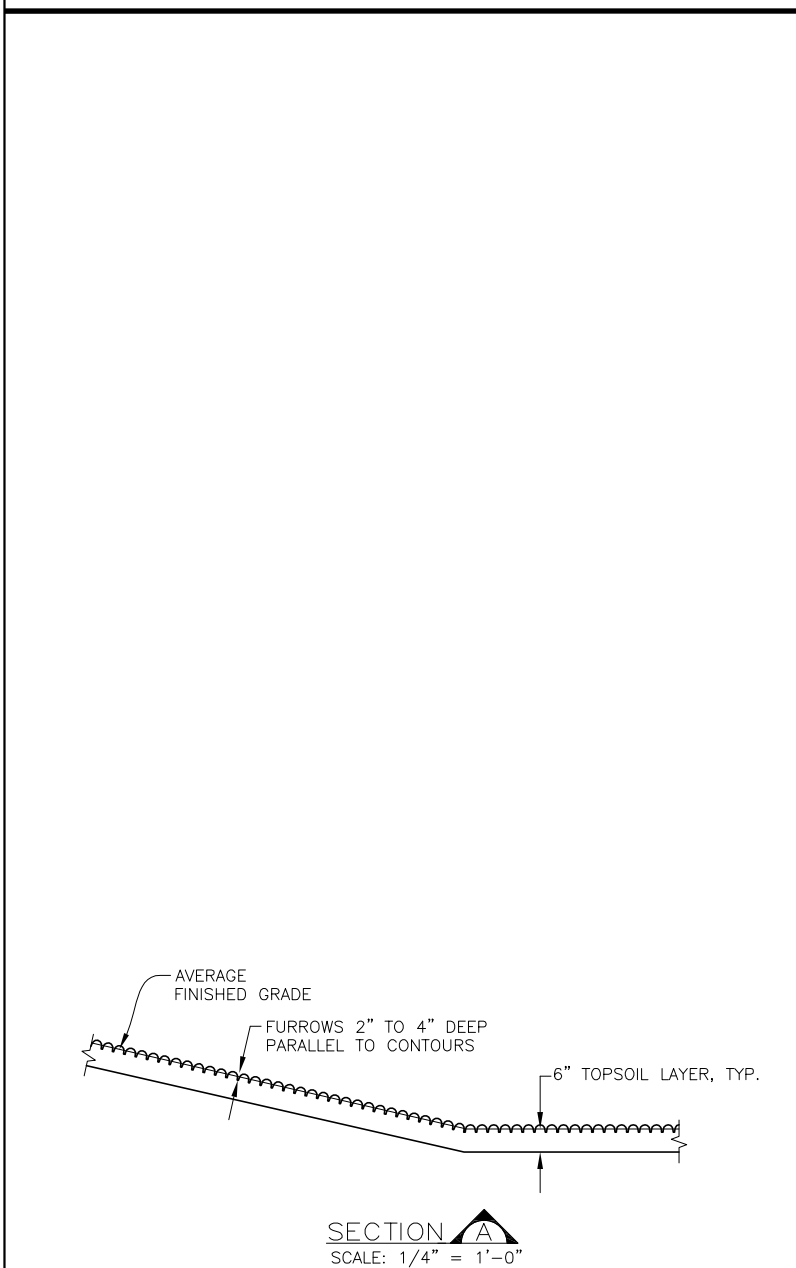
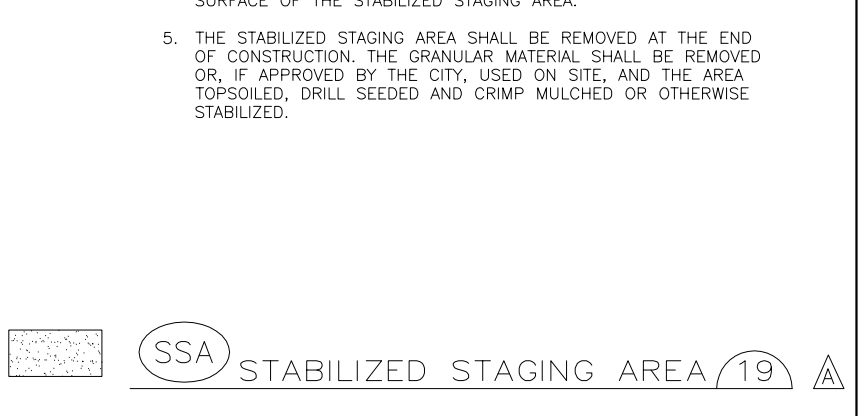


STABILIZED STAGING AREA INSTALLATION NOTES

- SEE PLAN VIEW FOR GENERAL LOCATION OF STAGING AREA. CONTRACTOR MAY MODIFY LOCATION AND SIZE OF STABILIZED STAGING AREA WITH CITY APPROVAL.
- STABILIZED STAGING AREA SHALL BE LARGE ENOUGH TO FULLY CONTAIN UNLOADING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
- IF REQUIRED BY THE CITY, SITE ACCESS ROADS SHALL BE STABILIZED IN THE SAME MANNER AS THE STAGING AREA.
- STAGING AREA SHALL BE STABILIZED PRIOR TO ANY OTHER OPERATIONS ON THE SITE.
- THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM OF 3" OF GRANULAR MATERIAL (GRAVEL OR RECYCLED CONCRETE).

STABILIZED STAGING AREA MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT THE STABILIZED STAGING AREA WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- GESC MANAGER SHALL PROVIDE ADDITIONAL THICKNESS OF GRANULAR MATERIAL IF ANY RUTTING OCCURS OR UNDERLYING SURFACED BECOMES EXPOSED.
- STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
- ANY ACCUMULATED DIRT OR MUD SHALL BE REMOVED FROM THE SURFACE OF THE STABILIZED STAGING AREA.
- THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE CITY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

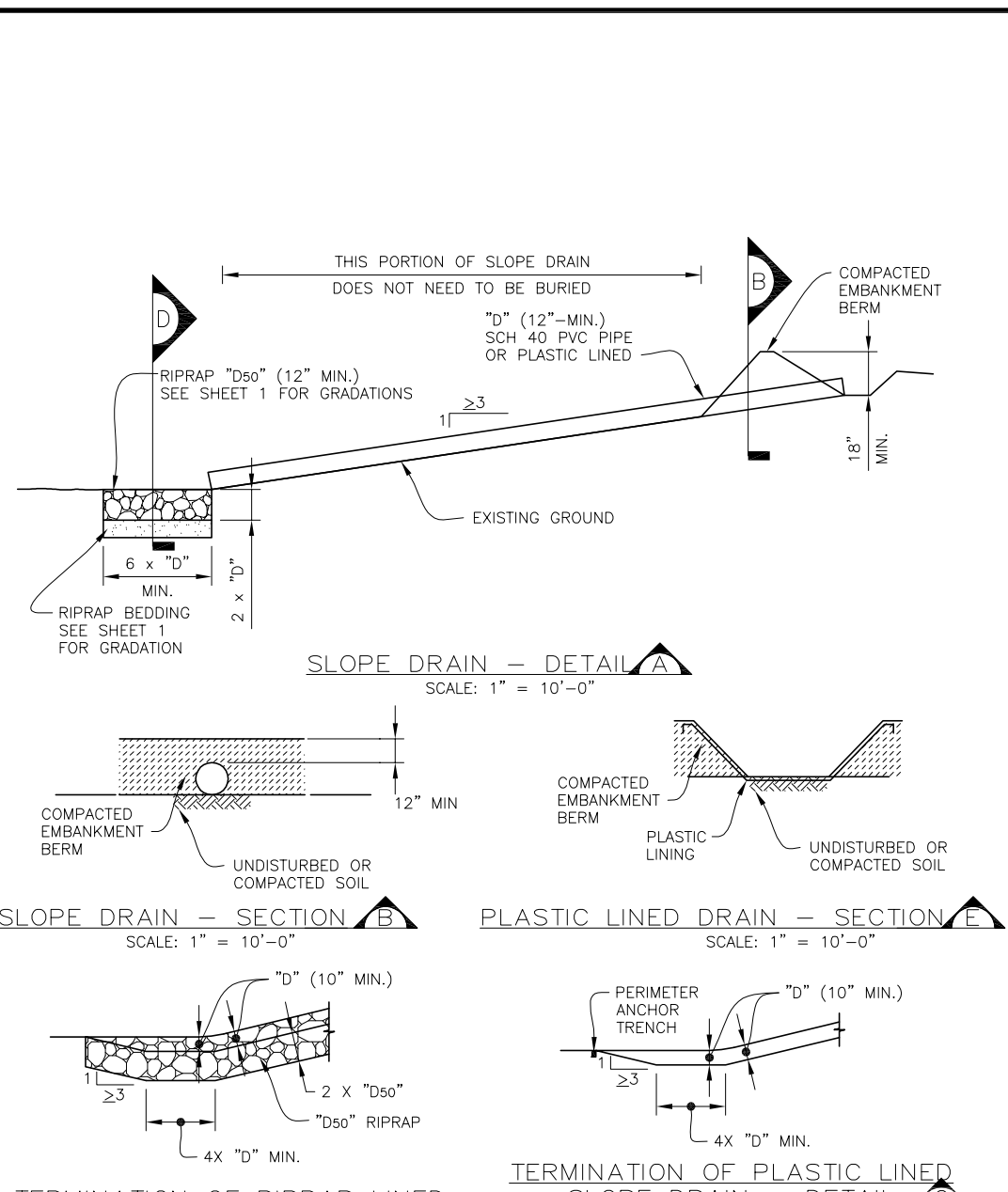


SURFACE ROUGHENING INSTALLATION NOTES

- SURFACE ROUGHENING SHALL BE PROVIDED ON ALL FINISHED CONCRETE CURBS AND "FLAT" AREAS WITHIN 2 DAYS OF COMPLETION OF FINISHED GRADE (FOR AREAS NOT RECEIVING TOPSOIL) OR WITHIN 2 DAYS OF TOPSOIL PLACEMENT.
- AREAS WHERE BUILDING FOUNDATIONS, PAVEMENT, OR SOIL IS TO BE PLACED WITHIN 7-DAYS OF FINISHED GRADING DO NOT NEED TO BE SURFACE ROUGHENED.
- DISTURBED SURFACES SHALL BE ROUGHENED USING HIPPIER OR TILTING EQUIPMENT ON THE CONTIGUOUS TRACKING UP AND DOWN A SLOPE USING EQUIPMENT TREADS.

SURFACE ROUGHENING MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT THE SURFACE ROUGHENING WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- VEHICLES AND EQUIPMENT SHALL GENERALLY BE CONFINED TO ACCESS DRIVES AND SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.
- IN NON-TURF GRASS FINISHED AREAS, SEEDING AND MULCHING SHALL TAKE PLACE DIRECTLY OVER SURFACE ROUGHENED AREAS WITHOUT FIRST SMOOTHING OUT THE SURFACE.
- IN AREAS NOT SEED AND MULCHED AFTER SURFACE ROUGHENING, SURFACES SHALL BE RE-ROUGHENED AS NECESSARY TO MAINTAIN GROOVE DEPTH AND SMOOTH OVER ANY RILL EROSION.

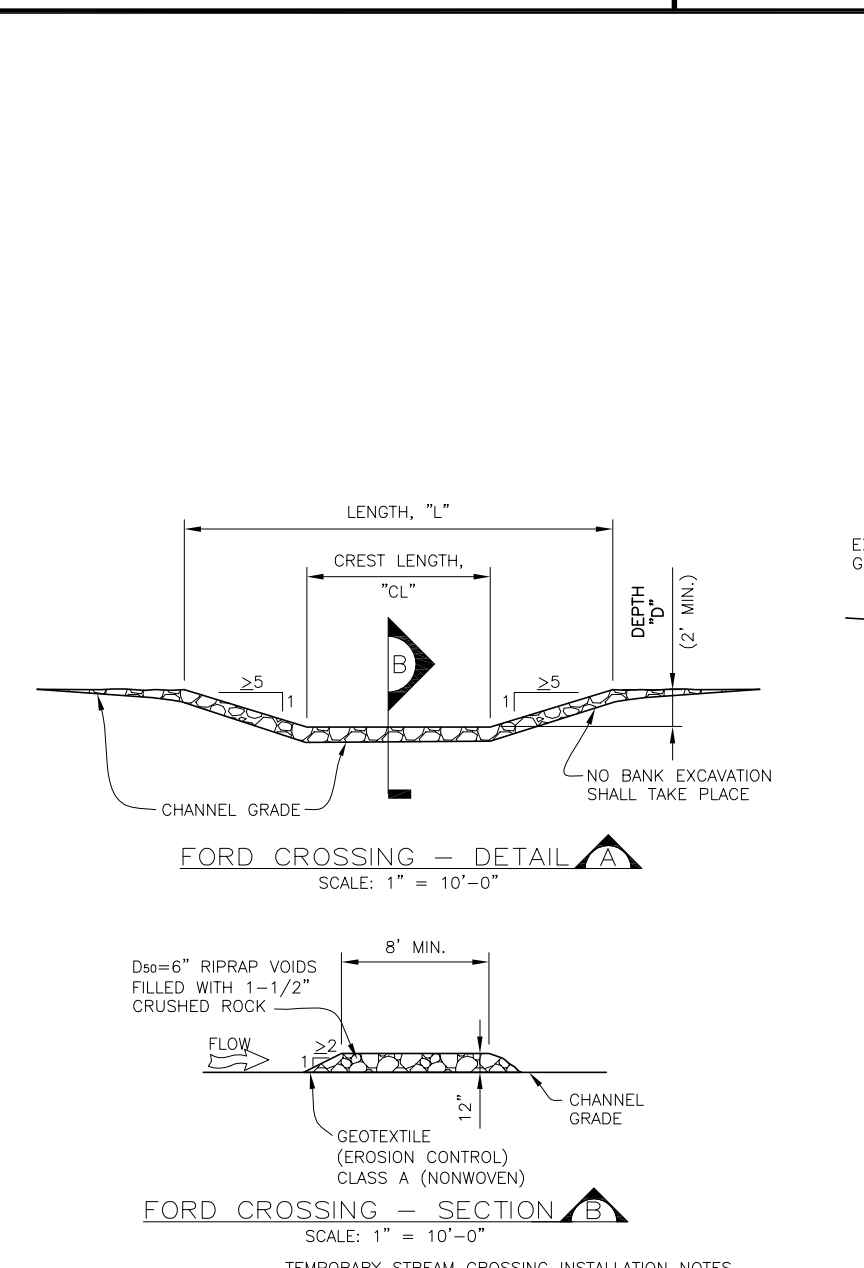


SLOPE DRAIN INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATION AND LENGTH OF SLOPE DRAIN.
 - PIPE DIAMETER, "D", AND RIPRAP SIZE, "Dw".
- SLOPE DRAIN DIMENSIONS SHALL BE CONSIDERED MINIMUM DIMENSIONS. CONTRACTOR MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO SLOPE OR SLOPE DRAIN DURING RUNOFF EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- SLOPE DRAINS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
- FOR TEMPORARY SLOPE DRAINS, PIPE MAY BE INSTALLED ON TOP OF SLOPE; HOWEVER, 12" MIN. COVER AT TOP OF SLOPE SHALL BE PROVIDED.
- A RIPRAP PAD SHALL BE PLACED AT THE OUTFALL OF THE SLOPE DRAIN.

SLOPE DRAIN MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT SLOPE DRAINS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
- TEMPORARY SLOPE DRAINS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION. WHEN SLOPE DRAINS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

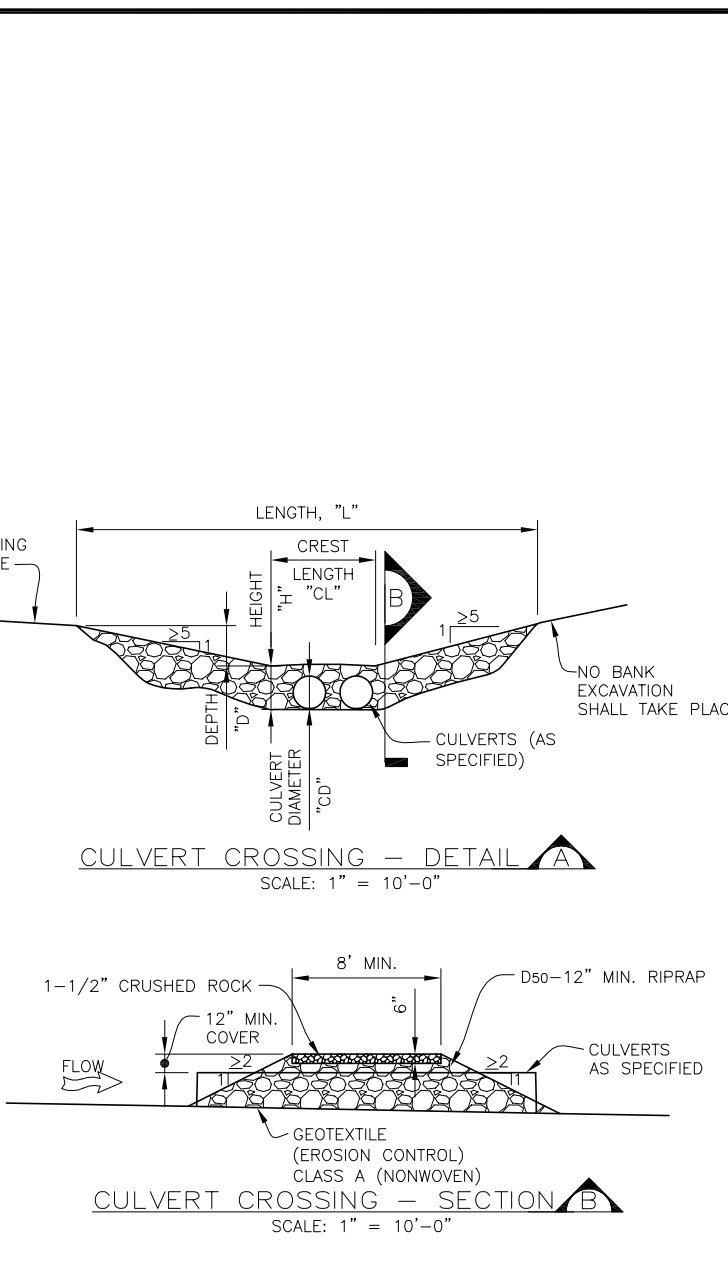


FORD CROSSING INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATIONS OF TEMPORARY STREAM CROSSING.
 - STREAM CROSSING TYPE (FORD OR CULVERT).
 - FOR FORD CROSSINGS: LENGTH, "L", CREST LENGTH, "Lc", AND DEPTH, "D".
 - FOR CULVERT CROSSINGS: LENGTH, "L", CREST LENGTH, "Lc", CROSSING HEIGHT, "H", DEPTH, "D", CULVERT DIAMETER, "Dc", AND NUMBER, TYPE AND CLASS OR GAUGE OF CULVERTS.
- TEMPORARY STREAM CROSSINGS ENGINEER MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO STREAM CROSSING OR EXISTING STREAM CHANNEL DURING BASEFLOW OR FLOOD EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- SEE SHEET 1 FOR RIPRAP AND 1-1/2" CRUSHED ROCK GRADATIONS.
- FOR A TEMPORARY STREAM CROSSING THAT WILL CARRY LOADS, THE TEMPORARY STREAM CROSSING MUST BE DESIGNED BY THE DESIGN ENGINEER.

TEMPORARY STREAM CROSSING MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT TEMPORARY STREAM CROSSINGS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- SEDIMENT ACCUMULATED UPSTREAM OF STREAM CROSSINGS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CROSSING IS WITHIN 6-INCHES OF THE CREST (FORD CROSSING) OR GREATER THAN AN AVERAGE DEPTH OF 12-INCHES (CULVERT CROSSING).
- STREAM CROSSINGS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION.
- WHEN STREAM CROSSINGS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

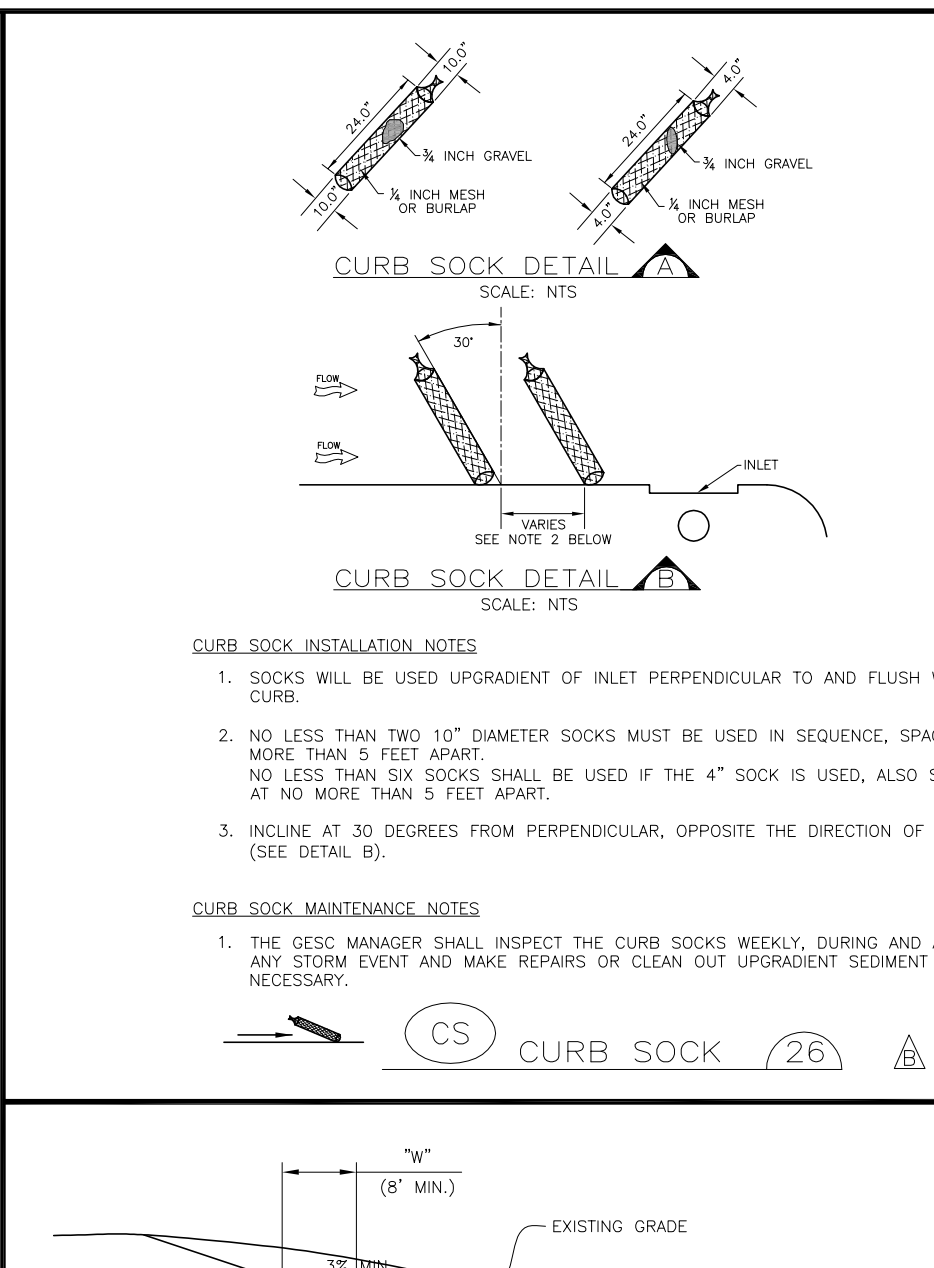


CULVERT CROSSING INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATIONS OF TEMPORARY STREAM CROSSING.
 - STREAM CROSSING TYPE (FORD OR CULVERT).
 - FOR FORD CROSSINGS: LENGTH, "L", CREST LENGTH, "Lc", AND DEPTH, "D".
 - FOR CULVERT CROSSINGS: LENGTH, "L", CREST LENGTH, "Lc", CROSSING HEIGHT, "H", DEPTH, "D", CULVERT DIAMETER, "Dc", AND NUMBER, TYPE AND CLASS OR GAUGE OF CULVERTS.
- TEMPORARY STREAM CROSSINGS ENGINEER MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO STREAM CROSSING OR EXISTING STREAM CHANNEL DURING BASEFLOW OR FLOOD EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- SEE SHEET 1 FOR RIPRAP AND 1-1/2" CRUSHED ROCK GRADATIONS.
- FOR A TEMPORARY STREAM CROSSING THAT WILL CARRY LOADS, THE TEMPORARY STREAM CROSSING MUST BE DESIGNED BY THE DESIGN ENGINEER.

TEMPORARY STREAM CROSSING MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT TEMPORARY STREAM CROSSINGS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
- SEDIMENT ACCUMULATED UPSTREAM OF STREAM CROSSINGS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CROSSING IS WITHIN 6-INCHES OF THE CREST (FORD CROSSING) OR GREATER THAN AN AVERAGE DEPTH OF 12-INCHES (CULVERT CROSSING).
- STREAM CROSSINGS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION.
- WHEN STREAM CROSSINGS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

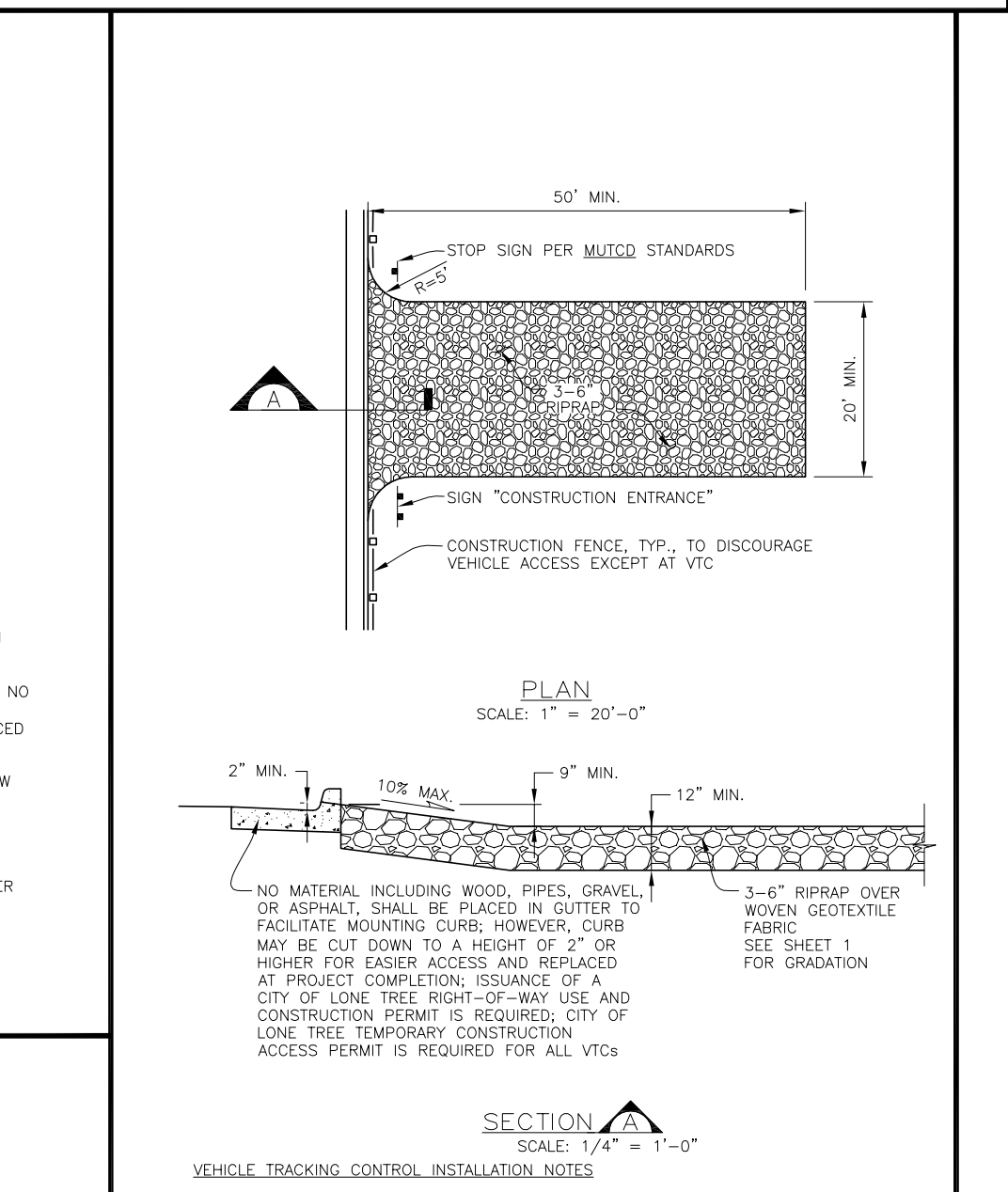


CURB SOCK INSTALLATION NOTES

- SOCKS WILL BE USED UPSTREAM OF INLET PERPENDICULAR TO AND FLUSH WITH CURB.
- NO LESS THAN TWO 10" DIAMETER SOCKS MUST BE USED IN SEQUENCE, SPACED NO MORE THAN 5 FEET APART. NO LESS THAN SIX SOCKS SHALL BE USED IF THE 4" SOCK IS USED, ALSO SPACED AT NO MORE THAN 5 FEET APART.
- INCLINE AT 30 DEGREES FROM PERPENDICULAR, OPPOSITE THE DIRECTION OF FLOW (SEE DETAIL B).

CURB SOCK MAINTENANCE NOTES

- THE GESC MANAGER SHALL INSPECT THE CURB SOCKS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.

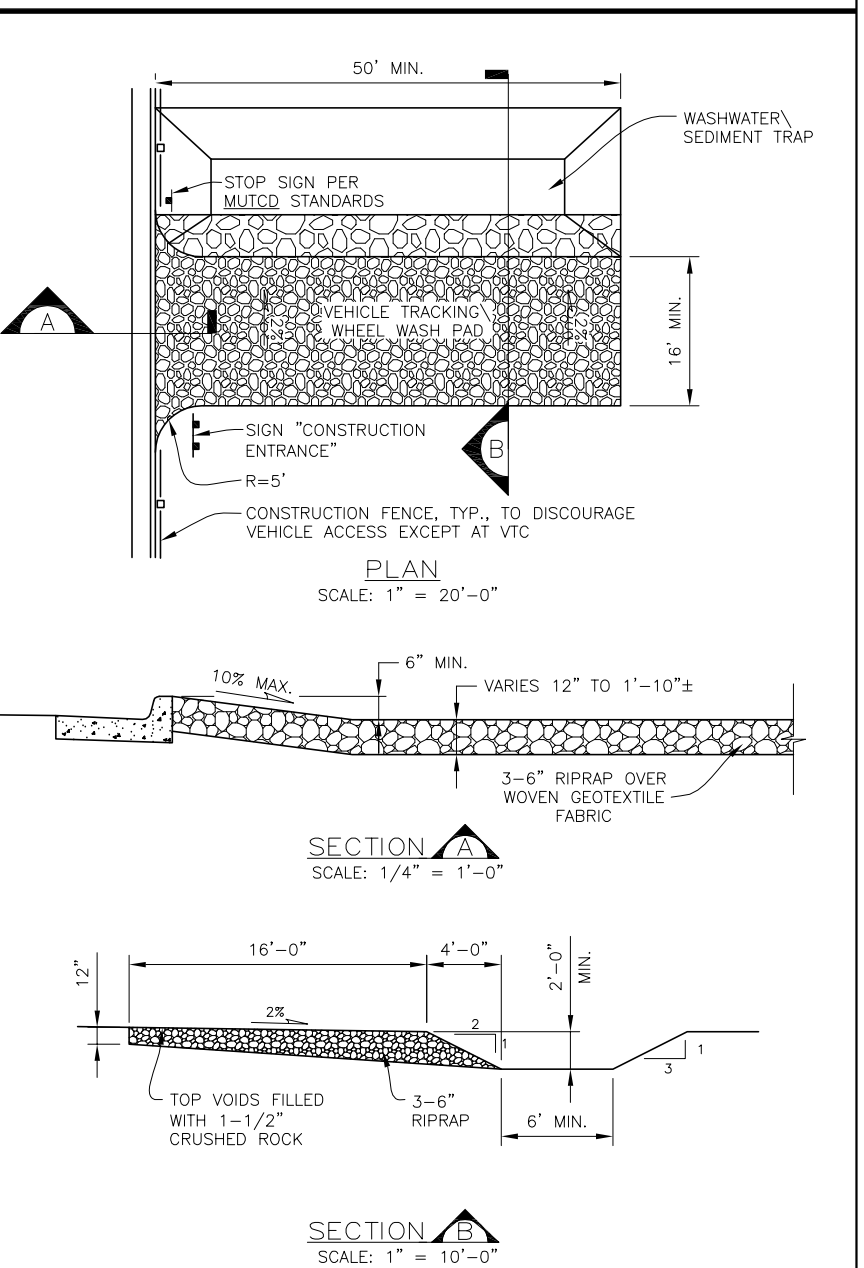
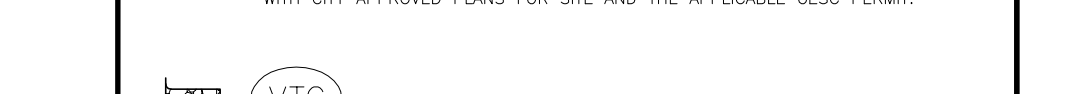


VEHICLE TRACKING CONTROL INSTALLATION NOTES

- VEHICLE TRACKING CONTROL PADS SHALL BE INSTALLED AT EVERY ACCESS POINT TO SITE.
- VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTABLE. THE STONES SHALL BE 3" WITH A MAXIMUM SIZE OF 6". THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTION.
- WOMEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE VTC STONE TO HELP MINIMIZE MIGRATION OF THE STONE INTO THE UNDERLYING BASE MATERIAL.
- ANY CRACKED OR DAMAGED CURB AND GUTTER AND SIDEWALK SHALL BE REPLACED BY PERMITEE.
- A STOP SIGN INSTALLED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED, SHALL BE INSTALLED FOR EXISTING TRAFFIC AT THE VTC.
- A CITY OF LONE TREE TEMPORARY CONSTRUCTION ACCESS PERMIT IS REQUIRED FOR EACH ACCESS/EXIT POINT FROM THE SITE.

VEHICLE TRACKING CONTROL MAINTENANCE NOTES

- GESC MANAGER SHALL INSPECT VEHICLE TRACKING CONTROL PADS DAILY. ACCUMULATED SEDIMENTS SHALL BE REMOVED FROM PAD SURFACE. STONE SURFACE SHALL BE CLEAN AND LOOSE ENOUGH TO RUB SLIGHTLY UNDER WHEEL LOADS SUFFICIENTLY TO CAUSE LOOSE GRAVEL TO DISLODGE MULTISECTION FROM VEHICLE TIRES. WHEN STONE BECOMES COMPACTED AND/OR FILLED WITH SEDIMENT SO THAT THE EFFECTIVENESS OF THE PAD IS DIMINISHED, CONTRACTOR SHALL STOP TURF USAGE OR OTHERWISE LOOSEN THE STONE. PLACE ADDITIONAL NEW STONE, OR REPLACE STONE AS NECESSARY TO RESTORE EFFECTIVENESS.
- VEHICLE TRACKING CONTROL SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE STONE MATERIAL AND GEOTEXTILE REMOVED OR, IF APPROVED BY THE CITY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN CONFORMANCE WITH CITY APPROVED PLANS FOR SITE AND THE APPLICABLE GESC PERMIT.

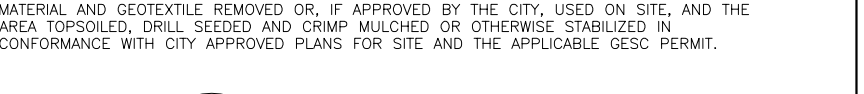


VEHICLE TRACKING CONTROL WITH WHEEL WASH INSTALLATION NOTES

- ALTHOUGH NOT NORMALLY USED, THE CITY PRESERVES THE RIGHT TO REQUIRE VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES AT SITES WHERE TRACKING ONTO PAVED AREAS BECOMES A SIGNIFICANT PROBLEM.
- IF VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES ARE REQUIRED, ALL WHEELS ON VEHICLE LEAVING THE SITE MUST BE CLEANED BY WASHING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A WATER SOURCE.
- VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTABLE. THE STONES SHALL BE 3" WITH A MAXIMUM SIZE OF 6". THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTION.
- WOMEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE VTC STONE TO HELP MINIMIZE MIGRATION OF THE STONE INTO THE UNDERLYING BASE MATERIAL.
- ANY CRACKED OR DAMAGED CURB AND GUTTER AND SIDEWALK SHALL BE REPLACED BY PERMITEE.
- A CITY OF LONE TREE TEMPORARY CONSTRUCTION ACCESS PERMIT IS REQUIRED FOR EACH ACCESS/EXIT POINT FROM THE SITE.

VEHICLE TRACKING CONTROL WITH WHEEL WASH MAINTENANCE NOTES

- GESC MANAGER SHALL INSPECT VEHICLE TRACKING CONTROL PADS DAILY. ACCUMULATED SEDIMENTS SHALL BE REMOVED FROM PAD SURFACE. STONE SURFACE SHALL BE CLEAN AND LOOSE ENOUGH TO RUB SLIGHTLY UNDER WHEEL LOADS SUFFICIENTLY TO CAUSE LOOSE GRAVEL TO DISLODGE MULTISECTION FROM VEHICLE TIRES. WHEN STONE BECOMES COMPACTED AND/OR FILLED WITH SEDIMENT SO THAT THE EFFECTIVENESS OF THE PAD IS DIMINISHED, CONTRACTOR SHALL STOP TURF USAGE OR OTHERWISE LOOSEN THE STONE. PLACE ADDITIONAL NEW STONE, OR REPLACE STONE AS NECESSARY TO RESTORE EFFECTIVENESS.
- VEHICLE TRACKING CONTROL SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE STONE MATERIAL AND GEOTEXTILE REMOVED OR, IF APPROVED BY THE CITY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN CONFORMANCE WITH CITY APPROVED PLANS FOR SITE AND THE APPLICABLE GESC PERMIT.



Sheet Revisions

Date	Description	By
6/30/05	ADOPTED FROM DOUGLAS COUNTY GESC PLANS	MLP
5/ /08	EDIT UPDATES	GAW
11/ /08	ADD CURB SOCK DETAIL (REF UFDC, V3 FIGURE C5-23), MISC. NOTE EDITS	GAW
12/ /09	UPDATE VTC & WW	GAW

NOTE: SCALES SHOWN ARE FOR 24"x36" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

CITY OF LONE TREE
DEPARTMENT OF PUBLIC WORKS
Engineering Division

GESC GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS
SHEET 3 OF 3

APPENDIX H – GESC Inspection Reports

CONSTRUCTION STORMWATER SITE INSPECTION REPORT

Facility Name		Permittee					
Date of Inspection		Weather Conditions					
Permit Certification #		Disturbed Acreage					
Phase of Construction		Inspector Title					
Inspector Name							
Is the above inspector a qualified stormwater manager? (permittee is responsible for ensuring that the inspector is a qualified stormwater manager)			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">YES</td> <td style="width: 50%; text-align: center;">NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	YES	NO	<input type="checkbox"/>	<input type="checkbox"/>
YES	NO						
<input type="checkbox"/>	<input type="checkbox"/>						

INSPECTION FREQUENCY					
Check the box that describes the minimum inspection frequency utilized when conducting each inspection					
At least one inspection every 7 calendar days	<input type="checkbox"/>				
At least one inspection every 14 calendar days, with post-storm event inspections conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosions	<input type="checkbox"/>				
<ul style="list-style-type: none"> • This is this a post-storm event inspection. Event Date: _____ 	<input type="checkbox"/>				
Reduced inspection frequency - Include site conditions that warrant reduced inspection frequency	<input type="checkbox"/>				
<ul style="list-style-type: none"> • Post-storm inspections at temporarily idle sites 	<input type="checkbox"/>				
<ul style="list-style-type: none"> • Inspections at completed sites/area 	<input type="checkbox"/>				
<ul style="list-style-type: none"> • Winter conditions exclusion 	<input type="checkbox"/>				
Have there been any deviations from the minimum inspection schedule? If yes, describe below.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">YES</td> <td style="width: 50%; text-align: center;">NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	YES	NO	<input type="checkbox"/>	<input type="checkbox"/>
YES	NO				
<input type="checkbox"/>	<input type="checkbox"/>				

INSPECTION REQUIREMENTS*
i. Visually verify all implemented control measures are in effective operational condition and are working as designed in the specifications
ii. Determine if there are new potential sources of pollutants
iii. Assess the adequacy of control measures at the site to identify areas requiring new or modified control measures to minimize pollutant discharges
iv. Identify all areas of non-compliance with the permit requirements, and if necessary, implement corrective action
*Use the attached Control Measures Requiring Routine Maintenance and Inadequate Control Measures Requiring Corrective Action forms to document results of this assessment that trigger either maintenance or corrective actions

AREAS TO BE INSPECTED			
Is there evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system or discharging to state waters at the following locations?			
	NO	YES	If "YES" describe discharge or potential for discharge below. Document related maintenance, inadequate control measures and corrective actions Inadequate Control Measures Requiring Corrective Action form
Construction site perimeter	<input type="checkbox"/>	<input type="checkbox"/>	
All disturbed areas	<input type="checkbox"/>	<input type="checkbox"/>	
Designated haul routes	<input type="checkbox"/>	<input type="checkbox"/>	
Material and waste storage areas exposed to precipitation	<input type="checkbox"/>	<input type="checkbox"/>	
Locations where stormwater has the potential to discharge offsite	<input type="checkbox"/>	<input type="checkbox"/>	
Locations where vehicles exit the site	<input type="checkbox"/>	<input type="checkbox"/>	
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	

REPORTING REQUIREMENTS

The permittee shall report the following circumstances orally within twenty-four (24) hours from the time the permittee becomes aware of the circumstances, and shall mail to the division a written report containing the information requested within five (5) working days after becoming aware of the following circumstances. The division may waive the written report required if the oral report has been received within 24 hours.

All Noncompliance Requiring 24-Hour Notification per Part II.L.6 of the Permit		
a. Endangerment to Health or the Environment Circumstances leading to any noncompliance which may endanger health or the environment regardless of the cause of the incident (See Part II.L.6.a of the Permit) <i>This category would primarily result from the discharge of pollutants in violation of the permit</i>		
b. Numeric Effluent Limit Violations <ul style="list-style-type: none"> o Circumstances leading to any unanticipated bypass which exceeds any effluent limitations (See Part II.L.6.b of the Permit) o Circumstances leading to any upset which causes an exceedance of any effluent limitation (See Part II.L.6.c of the Permit) o Daily maximum violations (See Part II.L.6.d of the Permit) <i>Numeric effluent limits are very uncommon in certifications under the COR400000 general permit. This category of noncompliance only applies if numeric effluent limits are included in a permit certification.</i>		

Has there been an incident of noncompliance requiring 24-hour notification?	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	If "YES" document below

Date and Time of Incident	Location	Description of Noncompliance	Description of Corrective Action	Date and Time of 24 Hour Oral Notification	Date of 5 Day Written Notification *

*Attach copy of 5 day written notification to report. Indicate if written notification was waived, including the name of the division personnel who granted waiver.

After adequate corrective action(s) and maintenance have been taken, or where a report does not identify any incidents requiring corrective action or maintenance, the individual(s) designated as the Qualified Stormwater Manager, shall sign and certify the below statement:

“I verify that, to the best of my knowledge and belief, all corrective action and maintenance items identified during the inspection are complete, and the site is currently in compliance with the permit.”

Name of Qualified Stormwater Manager

Title of Qualified Stormwater Manager

Signature of Qualified Stormwater Manager

Date

Notes/Comments

APPENDIX I – Control Measure Corrective Action Log

Description

Describe the control measure and what pollutant sources it will provide effective treatment for (part I.C.2.a.iv of the permit). Include the mechanism used for treatment of the pollutant source.

Implementation

Describe how the control measure will be implemented in accordance with good engineering, hydrologic and pollution control practices. Include the phase(s) of construction the control measure will be implemented for.

Installation Procedures

Describe the process required to install the control measure and have it adequately treat the intended pollutant source. Include specific depths, lengths, materials, and any other applicable information necessary to properly install the control measure.

Inspection Expectations

Describe how often the control measure will be inspected and what key features should be checked during each inspection (is the silt fence tail entrenched, are the straw wattles staked ever 4 feet, etc.)

Maintenance Requirements

Describe maintenance requirements, such as how to repair damaged sections, what qualifies as a failed control measure and when it needs to be replaced. Also include criteria that would trigger maintenance (i.e. 50% capacity of the control measure has been reached).

Control Measure Diagram



APPENDIX J – GESC Amendment Log

APPENDIX K – Opinion of Probable Cost



CITY OF
LONE TREE

**GESC Permit
Opinion of Probable Cost**

Project: Floor & Decor - Lone Tree	Date: April 20, 2023
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BMP No.	BMP	ID	Unit	Installation Unit Cost	Quantity	Cost
1	Check Dam	CD	LF	\$ 24.00	0	\$ -
2	Compost Blanket	CB	SF	\$0.36	0	\$ -
3	Compost Filter Berm	CFB	LF	\$ 2.00	0	\$ -
4	Concrete Washout Area	CWA	EA	\$ 100.00	1	\$ 100.00
5	Construction Fence	CF	LF	\$ 2.00	1,983	\$ 3,966.00
6	Construction Markers	CM	LF	\$ 0.20	0	\$ -
7	Curb Sock	CS	LF	\$ 8.00	0	\$ -
8	Dewatering	DW	EA	\$ 600.00	0	\$ -
9	Diversion Ditch	DD	LF	\$ 1.60	0	\$ -
10	Erosion Control Blanket	ECB	SY	\$ 5.00	0	\$ -
11	Inlet Protection	IP	LF	\$ 20.00	5	\$ 100.00
12	Reinforced Check Dam	RCD	LF	\$ 36.00	0	\$ -
13	Reinforced Rock Berm	RRB	LF	\$ 9.00	0	\$ -
14	RRB for Culvert Protection	RRC	LF	\$ 9.00	0	\$ -
15	Sediment Basin	SB	AC (1)	(2)	0.0	\$ -
16	Sediment Control Log	SCL	LF	\$ 2.00	566	\$ 1,132.00
17	Sediment Trap	ST	EA	\$ 600.00	0	\$ -
18A	Seeding and Mulching - Mobilization	SM	EA	\$ 1,000.00	1	\$ 1,000.00
18B	Seeding and Mulching - Installation	SM	AC	\$ 750.00	1.0	\$ 757.50
19	Silt Fence	SF	LF	\$ 2.00	991	\$ 1,982.00
20	Stabilized Staging Area	SSA	SY	\$ 2.00	591	\$ 1,182.76
21	Surface Roughening	SR	AC	\$ 600.00	0.0	\$ -
22	Temporary Slope Drain	TSD	LF	\$ 30.00	0	\$ -
23	Temporary Stream Crossing	TSC	EA	\$ 1,000.00	0	\$ -
24	Terracing	TER	AC	\$ 600.00	0.0	\$ -
25	Vehicle Tracking Control	VTC	EA	\$ 1,000.00	2	\$ 2,000.00
26	VTC with Wheel Wash	WW	EA	\$ 1,500.00	0	\$ -
27	Temporary Batch Plant Restoration		AC	\$ 5,000.00	0.0	\$ -
(1) Upstream Tributary Acre				SUB-TOTAL		\$ 12,220.26
(2) SB Cost = \$1000 +\$200(Upstream Tributary Acres)				15% CONTINGENCY		\$ 1,833.04
				GESC SURETY TOTAL (1)		\$ 14,053.30

NOTE: (1) **MINIMUM SURETY shall be \$2,500.00** (Per Section 16-31-110 of City Zoning Code)