



Grandview Reserve Phase 2 Early Grading (Initial GEC) Stormwater Management Plan (SWMP)

December 2023

HR Green Project No: 201662.20

El Paso County No. SF-XXX ← PUDSP236

Prepared For (Applicant/Owner):

D.R. Horton

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Prepared By:

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▷ **DESIGNATOR STORMWATER MANAGER**

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▷ **GEC ADMINISTRATOR:**

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Company: Melody Homes, Inc., a Delaware corporation
Title: Division of Regulatory Compliance
Phone Number: 303.552.6192
Address: 9555 S. Kingston Court, Suite 200, Englewood CO 80112

Identify QSM in the SWMP and provide documentation of their credentials and/or state: "The QSM will be sufficiently qualified for the required duties per the ECM Appendix I.5.2.A"



Engineer's Statement

The Stormwater Management Plan was prepared under my direction and supervision and is correct to the best of my knowledge and belief. Said Plan has been prepared according to the criteria established by the County and State for Stormwater Management Plans.

Name: Ken Huhn, P.E. Date: 12/15/2023

Phone Number: 720-602-4965

Seal

You can delete this. Our EPC Review Engineers only sign this signature line on the SWMP Checklist, not on the SWMP itself. Same with your certification above, that is only needed on the checklist, but you can leave it on here if your want, it's up to you.

~~Review Engineer's Statement~~

~~The Stormwater Management Plan was reviewed and found to meet the checklist requirements except where otherwise noted or allowed by an approved deviation request.~~

~~_____ Date: _____~~

~~Review Engineer~~



I. Site Location & Description

Location

The Grandview Reserve Phase 2 site is located in unincorporated El Paso County, Colorado. The Phase 2 location (referred to as the site herein) is located northwest of Grandview Reserve Filings 1-4 and Channel B, and southeast of the intersection of Eastonville Road & Rex Road.

The site lies within a tract of land within Sections 21 and 28, Township 12 South, Range 64 West of the 6th Principal Meridian, in El Paso County, State of Colorado. A Vicinity Map is included in **Appendix A**.

The site is bound by a segment of Rex Road to be developed with this project to the northeast and undeveloped land that has historically been used as ranching lands. The east of the site will be a future phase of the Grandview Reserve Subdivision. The south and west of the site is bound by Grandview Reserve Filings 1-4 and Channel B.

The Gieck Ranch Tributary #2 "Channel B" is a part of the Gieck Ranch Drainage Basin tributary to Black Squirrel Creek. The channel draining through the site is an ongoing project with associated CLOMR Report and the PCD File No. is CDR228 with El Paso County. The channel will be constructed according to its CLOMR report and the Grandview Reserve improvements will follow any requirements of that report. There is another floodplain channel to the north of Rex Road that will not be disturbed by this phase of development and studies as a future project.

The existing surrounding platted developments include the Grandview Reserve Phase 1 Filings 1-4, and the Meridian Ranch Subdivision is west of the site on the west side of Eastonville Road.

Description of Property

The site is approximately 70.67 acres of proposed residential development with associated right of way, open space tracts, public improvements, and stormwater treatment infrastructure.

The existing groundcover and topography of the site is native grasses/weeds and exposed soil on gently rolling hillside with slopes ranging from 2% to 4%.

Per a NRCS soil survey, the site is made up of Type A Columbine gravelly sandy loam. The NRCS soil survey is presented in **Appendix A**.

Gieck Ranch Tributary #2 (Channel B) traverses the site along its southwestern boundary and forms the southwest boundary for Phase 2. The channel is being studied in a separate project, a CLOMR report is ongoing and pending approval for this channel. Gieck Ranch Tributary #3 (Channel C) traverses the site along its northeastern boundary and forms the northeast boundary for Phase 2 along Rex Road. This channel will not be disturbed by this phase of development and will be studied at a later date.

There are no known irrigation facilities in the area.

Address SWMP Checklist Item 14 more clearly/completely. Make a statement that covers all allowable non-storm discharges or address each type individually.

There are no known existing utilities or other encumbrances on site.

Neighboring Areas

The surrounding area to the north is a parcel of land currently zoned A35 and dedicated to grazing with an area of 186.58 acres. To the west and south of the property is Grandview Phase 1, Filings 1-4, which has a

Address SWMP Checklist Item 15.

dedicated land use of single family residential. To the east is the future phase 3 of Grandview Reserve which will also be dedicated to single family residential.

Construction Activity

The proposed development is to only include the early grading activities. Early grading will include overlot grading out future building pads, the over excavation of roadways by a depth of two feet, and the installation of temporary sediment basins, two of which will serve as the property's permanent extended detention basins. No utilities or proposed roadways will be installed during this time. No grading will take place within the FEMA identified 100-year zone A floodplain, map number 08041C0553G, effective date 12/7/2018, until the appropriate CLOMR permit has been approved.

Construction will begin with setting up perimeter erosion control measures and construction fencing which will then be followed by the over excavation of roadway corridors. Temporary stabilization measures such as silt fence installation and vehicle tracking control will be installed prior to construction. Stabilized staging area(s) and stockpile management area(s) are shown on the GEC plans. During construction, temporary stabilization measures such as sediments basins, earth dikes and drainage swales, check dams, and temporary erosion control blankets will be utilized to control stormwater runoff. The two proposed ponds will serve as temporary sediment basins to collect stormwater runoff and sediment during construction activities for disturbed areas. One other temporary sediment basin will capture runoff and sediment for the areas of disturbance greater than one acre that are not tributary to the larger permanent ponds. Once construction activities have been completed, all areas not within future ROW development will receive temporary seeding and mulching. Upon stabilization, temporary erosion control measures will be left in place until the next stage of construction activities are completed.

No off-site disturbance is anticipated. No control measures will be located outside the property line and limits of disturbance.

II. Construction Phasing

Phasing and Sequence Schedule

The proposed sequence of major construction activities and Construction Control Measures for the project as are follows:

1. Install VTC, SSA, S, TSB and other perimeter erosion and stormwater control measures (i.e. silt fence, construction fence etc.) (Summer 2025)
2. Clear grub and grade site for improvements. Install the initial phase control measures for perimeter control and temporary conditions stormwater diversion including silt fence, diversion ditches, check dams, and the required temporary sediment basins per Early Grading GEC and Drainage plans. (Summer 2025).
3. Landscaping, restoration and final stabilization. Ensuring final stabilizations is achieved prior to site closure is to take place as part of a future full construction phasing SWMP and is not within the scope of this report.

Also discuss any non-structural control measures



Clarify that this is in relation to the SWMP, not the CDs.

Construction Documentation

Construction drawings are provided with this document showing the Early Grading and Erosion Control plan for this project and are intended to be a “living” document used by the SWMP Manager to document construction activities. See Appendix E for record log.

III. Pre-Development Conditions and Soils

Floodway

Based on FEMA Firm map 08041C0552G & 08041C0556G (eff. 12/7/2018), the site contains flood Zone A through the site which is part of the Gieck Ranch Tributary #2. See FEMA Firm Maps in **Appendix A**. This floodplain (Channel B) is being studied and revised in the Gieck Ranch Tributary # 2 CLOMR report. A copy of the current revised floodplain map is also provided in **Appendix A**. There is an additional Zone A floodplain northeast of the site (Channel C) which will not be altered with this projects improvements. The grading proposed within the Channel B floodplain will only be done once the corresponding CLOMR has been approved. **It is proposed that the early grading shown outside of the floodplain can be completed without the CLOMR approval.**

Existing Vegetation

The existing vegetative cover is 90 percent as evidenced by a field survey and aerial imagery. The existing vegetation includes native grasses and weeds, and shrubs.

Existing Drainage Patterns

Gieck Ranch Tributary #2 (Channel B) traverses the site along its southwestern boundary and forms the southwest boundary for Phase 2. The channel is being studied in a separate project, a CLOMR report is ongoing and pending approval for this channel. Gieck Ranch Tributary #3 (Channel C) traverses the site along its northeastern boundary and forms the northeast boundary for Phase 2 along Rex Road. This channel will not be disturbed by this phase of development and will be studied at a later date.

Existing Slopes

Phase 2 of Grandview Reserve generally slopes south east with varied slopes between 1% and 6%.

Soils

According to the US Department of Agriculture Natural Resources Conservation Service Soil Survey of El Paso County, Colorado, the primary soil through site is Type A columbine gravelly sandy loam.

The existing soil type has a slight potential for erosion which can be mitigated by employing appropriate downstream construction BMPs before/during/after construction to limit potential impacts to stormwater discharges. The potential impacts are sediment discharge into the existing Gieck Ranch Tributary #3 and downstream properties.

IV. Description of Potential Pollutants

Potential sources of sediment to stormwater runoff include earth moving and concrete activities associated with grading, residential structure construction including concrete foundations and hardscape, and landscaping.

Potential pollutants and sources other than sediment to stormwater runoff include trash, debris, fueling and equipment failure. Materials of significance stored on the project site include: sediment, concrete washout, cement, trash & debris, fuels and oils.

Construction activities can produce a variety of pollutants that can potentially cause stormwater contamination. Grading activities remove rocks, vegetation and other erosion controlling surfaces and can result in the exposure of underlying soil to the elements, which can then be displaced into water sources.

Wind and erosion and vehicular transport can produce sediment debris.

Potential Sources of Pollution:

1. Potential sources of pollution from construction activities include

- a. Disturbed or stored soils
- b. Vehicle tracking of sediment
- c. Loading & unloading operations
- d. Outdoor Storage activities
- e. Vehicle and Equipment Maintenance/Fueling
- f. Dust or Particulate Generating Processes
- g. Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents etc.
- h. On-site waste management (waste piles, liquid wastes, dumpsters)
- i. Concrete truck/equipment washing (washing truck chute and associated fixtures)
- j. Dedicated asphalt, concrete batch plants and masonry mixing stations
- k. Non-industrial waste (worker trash and portable toilets)

Address off-site soil tracking (ie: for sediment that is tracked off-site passed the VTC) per SWMP Checklist Item 13. Example: street sweeping as needed.

SWMP Checklist Item 12. Note that this project does not anticipate utilizing onsite batch plants in the SWMP text.

V. Areas and Volumes

The phase total 70.67 acres is expected to be disturbed per the Early Grading and Erosion Control Plan for over excavation of proposed lot pads and roadway corridors. The early grading will be the entirety of the construction process for this submittal with an anticipated limits of disturbance/construction of the entire 70.67 acres of the site.

Early Grading Earthwork Quantities:

Cut Quantity : 90,400 c.y.

Fill Quantity: 215,140 c.y.

Net: 127,740 c.y. Fill

The full build-out earthwork quantities cannot be quantified at this stage as each respective lot disturbance and construction will vary by architecture, layout, and plot plan.

VI. Self-Inspections

Self-inspections of the Construction Control Measures must be completed by the certified GEC Administrator. The below provides the minimum to satisfy the El Paso County self-inspection requirements. A more frequent self-inspection schedule may be required to ensure Control Measures are operating in compliance with the approved GEC plan.

1. Inspection Schedules:

- a. The GEC Administrator shall make a thorough inspection of the Control Measures:
 - i. At least once every fourteen (14) calendar days.
 - ii. Within 24 hours following any precipitation event (i.e. rain, snow, hail etc.) that causes surface erosion.
 - Alternatively, the GEC Administrator can perform a thorough inspection of the Control Measures once every seven (7) days and forego post-precipitation inspections.
- b. For sites where construction activities have completed and final stabilization measures installed but final stabilization has not yet been achieved, the GEC Administrator shall make a thorough inspection of the Control Measures:
 - i. At least once every month
 - ii. Within 72 hours following any precipitation event that causes surface erosion

2. Inspection Procedures:

- a. Site Inspection & Observation Items:
 - i. Limits of disturbance perimeter and stormwater discharge points
 - ii. All disturbed areas to ensure necessary Construction Control Measures are in place to control potential stormwater runoff.
 - iii. Areas used for material/waste storage.
 - iv. Any areas having a signification potential for storm water pollution (i.e site entrances, concrete washout areas etc.)
 - v. All Construction Control Measures identified on the GEC plans.
- b. Inspection Requirements:
 - i. Determine any locations, or potential locations, where pollutants and stormwater may be exiting the site/entering the receiving waters.
 - ii. Evaluate Construction Control measures and determine if they are constructed in accordance with the latest revision of the approved GEC plan and operating effectively.
 - iii. Provide recommendations for the need of additional Construction Control measures and the maintenance of existing measures in disrepair to ensure complication with the El Paso County Stormwater Construction Manual.
- c. Construction Control Measure Maintenance/Replacement:
 - i. The GEC administrator shall ensure sediment has been removed from perimeter controls and relocated to an area without the potential for sediment to discharge from the site
 - ii. The GEC administrator shall ensure diversion ditches and temporary sediment ponds have not accumulated excess sediment that impedes their functionality.
 - iii. The GEC administrator shall ensure that failed Control Measures are repaired/reinstalled within three (3) calendar days, according to the El Paso County Stormwater Control Measure details, to ensure pollutants and/or sediment do not discharge from the site. GEC details are provided in Appendix B.
- d. Documentation:
 - i. Update the GEC plan to document the installation/revision of Control Measures
 - ii. Identify Control Measure deficiencies and that noncompliance is resolved within three (3) calendar days.
 - iii. Identify Self-Inspection schedule in most recent inspection form

Per SWMP Checklist Item 25, the inspection logs need to be signed by the GEC Admin.

- iv. Complete and submit Self-Inspection forms to the El Paso County within five (5) business days of the completed inspection
- v. Ensure Self-Inspections are available, either physically or electronically, throughout the duration of the project
- vi. Self-Inspection Report shall contain at least the following:
 - Inspection Date
 - Name and title of the GEC Administrator performing inspection
 - Location(s) of illicit discharges of stormwater, sediment or pollutants from the site
 - Location(s) of Construction Control Measures in need of maintenance/repair
 - Location(s) of Construction Control Measures that failed to operate as designed or proved inadequate
 - Location(s) of additional Construction Control Measures not shown on the latest, approved revision of the GEC plan
 - Any deviations from the minimum inspection schedule

VII. Materials Handling

1. General Materials Handling Practices:

- a. Potential pollutants shall be stored and used in a manner consistent with the manufacturer's instructions in a secure location. To the extent practical, material storage areas should be located away from storm drain inlets and should be equipped with covers, roofs or secondary containment as required to prevent stormwater from contacting stored materials. Chemicals that are not compatible shall be stored in segregated areas so that spill materials cannot combine and react.
- b. Disposal of materials shall be in accordance with the manufacturer's instructions and applicable local, state, and federal regulations.
- c. Materials no longer required for construction shall be removed from the site as soon as possible.
- d. Adequate garbage, construction waste, and sanitary waste handling and disposal facilities shall be provided as necessary to keep the site clear of obstruction and Control Measures clear and functional.

SWMP Checklist Item 13. Discuss inspection procedure for checking waste disposal bins for leaks and overflowing capacity. And discuss frequency that they will be emptied (or at what level of capacity would trigger the need to be emptied).

2. Specific Materials Handling Practices:

- a. All pollutants, including waste materials and demolition debris, that occur onsite during construction shall be handled in a way that does not contaminate stormwater.
- b. All chemicals including liquid products, petroleum products, water treatment chemicals, and wastes stored onsite shall be covered and protected from vandalism.
- c. Maintenance, fueling, and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, degreasing operation, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants, shall be conducted under cover during wet weather and on an impervious surface to prevent release of contaminants onto the ground. Materials spilled during maintenance operations shall be cleaned up immediately and properly disposed of.
- d. Wheel wash water shall be settled and discharged onsite by infiltration.
- e. Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturer's recommendations for application rates and procedures.

Portable toilets will be located a minimum of 10ft from stormwater inlets and 50ft from state waters. They will be secured at all four corners to prevent overturning and cleaned on a weekly basis. They will be inspected daily for spills.

- f. pH-modifying sources shall be managed to prevent contamination of runoff and stormwater collected onsite. The most common sources of pH-modifying materials are bulk cement, cement kiln dust (CKD), fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters.

VIII. Spill Prevention & Response Plan

1. The primary objective in responding to a spill is to quickly contain the material and prevent or minimize their mitigation into stormwater runoff and conveyance systems. If the release has impacted onsite stormwater, it is critical to contain the released materials onsite and prevent their release into receiving waters.
2. Spill Response Procedures:
 - a. Notify site superintendent immediately when a spill, or the threat of a spill, is observed. The superintendent shall assess the situation and determine the appropriate response.
 - b. If spills represent an imminent threat of escaping onsite facilities and entering the receiving waters, site personnel shall respond immediately to contain the release and notify the superintendent once the situation has stabilized.
 - c. The site superintendent shall be responsible for completing a spill reporting form and for reporting the spill to the appropriate agency.
 - d. Spill response equipment shall be inspected and maintained as necessary to replace any materials used in spill response activities.
3. Spill kits shall be on-hand at all fueling sites. Spill kit locations shall be reported to the GEC administrator.
4. Absorbent materials shall be on-hand at all fueling areas for use in containing advertent spills. Containers shall be on-hand at all fueling sites for disposal of used absorbents.
5. Recommended components of spill kits include the following:
 - a. Oil absorbent pads
 - b. Oil absorbent booms
 - c. 55-gallon drums
 - d. 9-mil plastic bags
 - e. Personal protective equipment including gloves and goggles
6. Concrete wash water: unless confined in a pre-defined, bermed containment area, the cleaning of concrete truck delivery chutes is prohibited at the job site.
7. Notification procedures:
 - a. In the event of an accident or spill, the GEC administrator shall be notified.
 - b. Depending on the nature of the spill and material involved, the Colorado Department of Public Health and Environment, downstream water users, or other agencies may also need to be notified.
 - c. Any spill of oil which 1) violates water quality standards, 2) produces a "sheen" on a surface water, or 3) causes a sludge or emulsion, or any hazardous substance release, or hazardous waste release which exceeds the reportable quantity, must be reported immediately by telephone to the National Response Center Hotline at (800) 424-8802.

IX. Implementation of Control Measures

Stormwater control measures must be installed according to El Paso County design specifications, presented in Appendix D, and the approved Grading and Erosion Control plan this report supports. Within the context of this SWMP's construction activities the following control measures, at a minimum, are required:

- Perimeter Silt Fence
- Vehicle Tracking Control
- Stabilized Staging Area
- Concrete Washout
- Construction Fence
- Stockpile Management
- Inlet Protection
- Culvert Inlet Protection
- Check Dams
- Erosion Control Blanket
- Diversion Ditches (Earth Dikes & Drainage Swales)
- Temporary Sediment Basins
- Temporary Seeding & Mulching

Add surface roughening

Additional control measures may be required at the discretion of the County Stormwater Inspector.

X. Final Stabilization & Long-Term Stormwater Management Plan

1. Ensure stabilization is achieved prior to site closure. Final stabilization is to take place as a part of a future construction phasing SWMP and is not within the scope of this report.
2. Temporary seeding and mulching will be installed to provide interim stabilization prior to final landscaping installation (Refer to approved Landscape Plan). Final stabilization will be achieved at time of final landscaping. See approved landscaping plans for final stabilization details. Final stabilization is met when 70% of pre disturbance levels, not including noxious weeds, are stabilized. Final stabilization must be achieved prior to removal of temporary stormwater control measures. Anticipated date of final stabilization is Fall 2025; however this is subject to change. Long term stormwater management will be provided in the onsite, private full spectrum detention ponds. See the Permanent Control Measure Plans for construction details of the permanent full spectrum detention pond. See below for seeding and mulching details:
 - a. Prior to seeding, fill any eroded rills and gullies with topsoil.
 - b. Ensure all areas are seeded and mulched per the County Stormwater Construction Manual.
 - c. Continue monthly self-inspections of final stabilization methods and the stormwater management system to ensure proper function. If repairs are needed, reseed and re-mulch as needed.
 - d. Control noxious weeds in a manner acceptable to the GEC inspector.
 - e. Seed Mix: See Appendix D for approved seed mixes.
 - f. Seeding Requirements:

SWMP Checklist Item 26. Add a note stating that this project does not rely on control measures owned or operated by another entity.

- i. Drill seed whenever possible, seed depth must be 1/3 to 1/2 inch when drill-seeding. Cross drilling should be used whenever possible with the seed divided between the two operations. The second drilling should be perpendicular to the first.
- ii. When drill seeding is not possible or on slopes greater than 3:1, hydro-seeding with tackifier may be substituted at the discretion of the GEC inspector. Hydro-seeding must be lightly raked into soil. Seeding rates are presented in Appendix D.
- iii. All seeded areas must be mulched.
- g. Mulching Requirements:
 - i. Mulching shall be completed as soon as practical after seeding but no more than fourteen (14) days after planting. Erosion control blanket can be used in place of the below mulching methods.
 - ii. Hay or straw mulch:
 - 1. Only certified weed-free and certified-seed free mulch may be used. Must be applied at 2 tons/acre and adequately secured.
 - 2. Crimping shall not be used on slopes greater than 3:1, tackifier must be used in place.
 - iii. Hydraulic mulching:
 - 1. Allowable on steep slopes or areas with limited access
 - 2. If hydro-seeding is used, mulching must be applied secondly.
 - 3. Wood cellulose fibers mixed with water must be applied at a rate of 2,000-2,500 lbs/acre, and tackifier applied at a rate of 100 lbs/acre.

XI. References

El Paso County – Drainage Criteria Manual, latest revision October 31, 2018

El Paso County – Engineering Criteria Manual, latest revision October 14, 2020

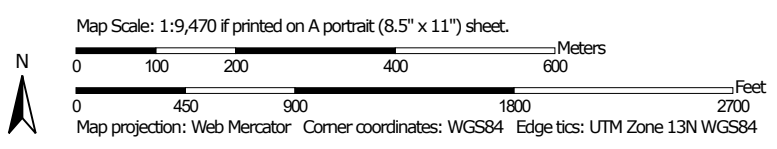
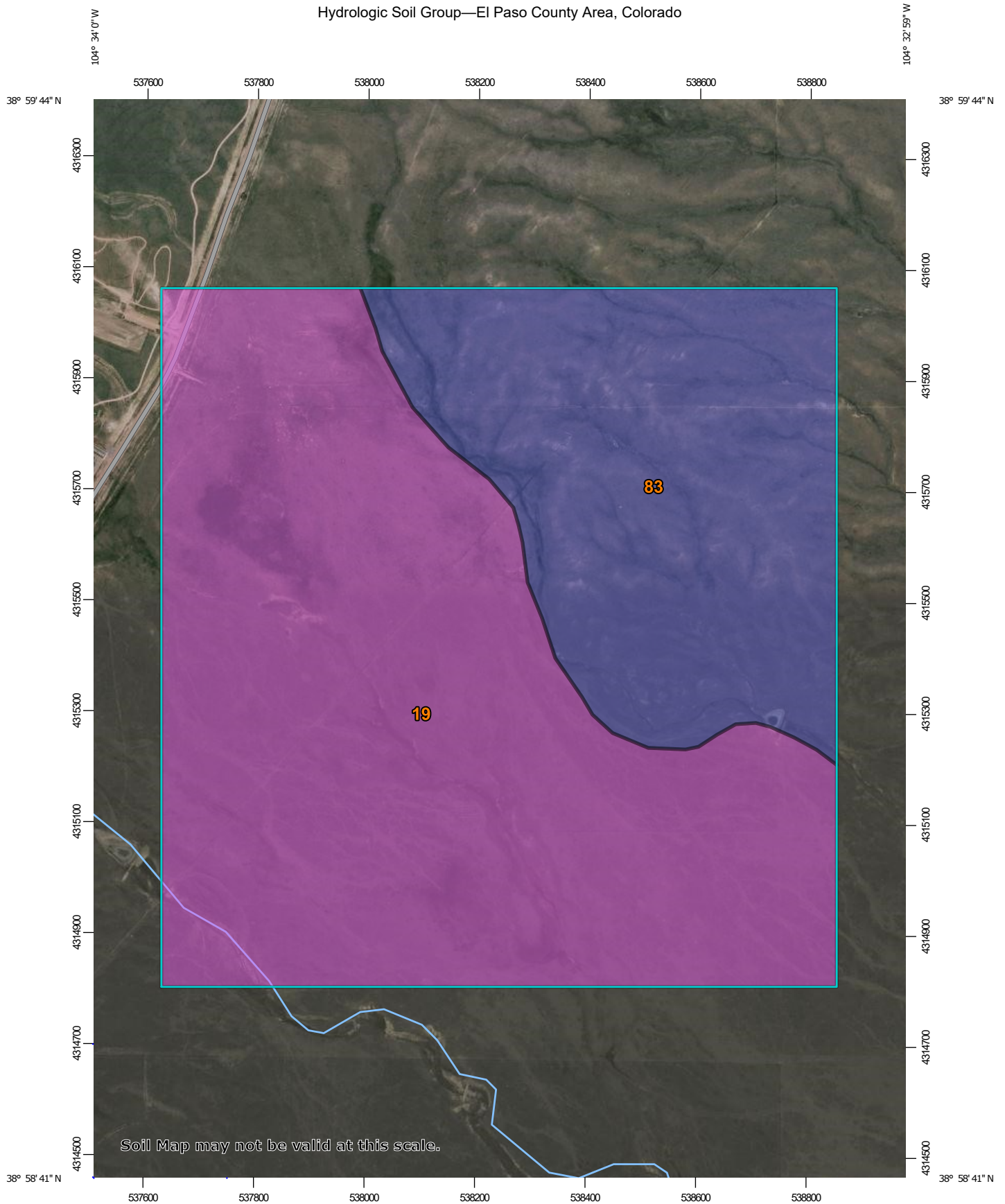
Mile High Flood District Urban Storm Drainage Criteria Manual Volumes 1, 2, and 3; latest revisions



Grandview Reserve Phase 2
Stormwater Management Plan
Project No.: 201662.20
El Paso County, Colorado

APPENDIX A – VICINITY MAP & NRCS SOIL SURVEY & FEMA MAP

Hydrologic Soil Group—El Paso County Area, Colorado



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

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 1:24,000.

Warning: Soil Map may not be valid at this scale.

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
 Survey Area Data: Version 20, Sep 2, 2022

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

Date(s) aerial images were photographed: Sep 11, 2018—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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	254.0	66.5%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	127.8	33.5%
Totals for Area of Interest			381.8	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

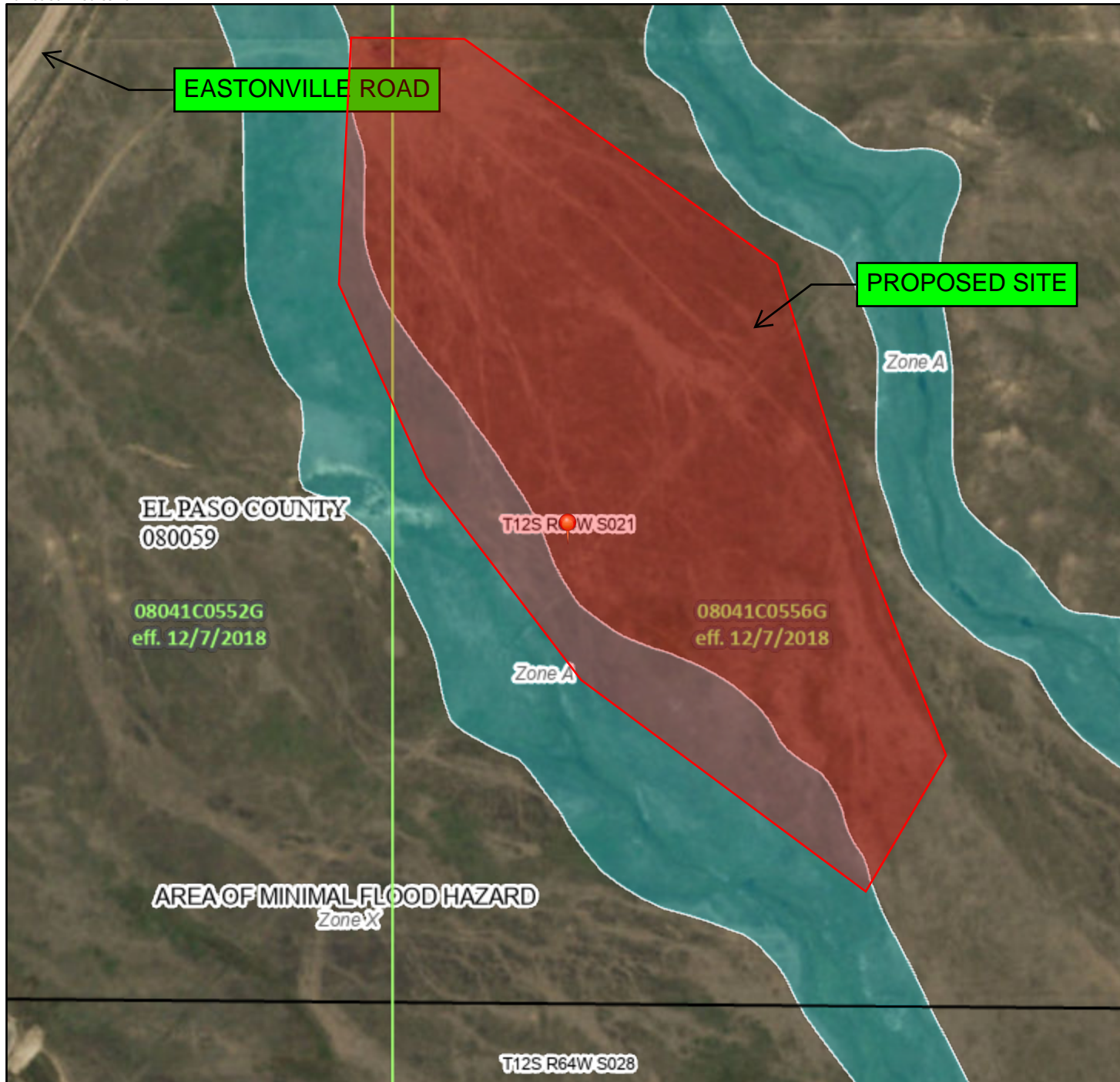
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMMette



104°33'58"W 38°59'28"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 |

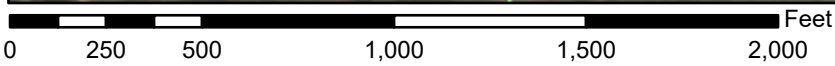


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 **12/14/2023 at 12:16 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.



1:6,000

104°33'20"W 38°59'N

Basemap Imagery Source: USGS National Map 2023



Grandview Reserve Phase 2
Stormwater Management Plan
Project No.: 201662.20
El Paso County, Colorado

APPENDIX B – GEC PLANS (see early Grading Plans)



APPENDIX C – CALCULATIONS

SEDIMENT BASIN A - POND A
SEDIMENT BASIN STAGE-STORAGE CALCULATIONS

Elevation	Area	Area	Volume	Volume	Cumm Vol	Cumm Vol	Proration	Proration	Elev.
	S.F.	Acre	Cu. Ft.	Acre-Ft	Cu. Ft.	Acre-Ft	Enter Vol.	Enter Vol.	ft.
							in Cu-Ft*	in Acre-Ft*	
6966.5	0								
6967.0	592		99		99	0.002			
6968.0	11497		4,899		4,998	0.115	20,597	0.473	6,968.89
6969.0	24552		17,617		22,615	0.519			
6970.0	34874		29,562		52,177	1.198	61,792	1.419	6,970.24
6971.0	44697		39,684		91,862	2.109			
6972.0	53878		49,216		141,078	3.239			
6973.0	62472		58,122		199,200	4.573			
6974.0									
6975.0									
6976.0									
6977.0									
6978.0									
6979.0									
6980.0									
6981.0									
6982.0									
6983.0									
6984.0									
6985.0									
6986.0									
6987.0									

COLUMN 1	COLUMN 2	CENTROID EL.
ORIFICE 1-1	ORIFICE 1-2	6,968.89
ORIFICE 2-1	ORIFICE 2-2	6,969.22
ORIFICE 3-1	ORIFICE 3-2	6,969.55
ORIFICE 4-1	ORIFICE 4-2	6,969.88

SED Basin riser pipe orifice calculations		
$A_0 =$		area per row of orifices spaced on 4" centers (in ²)
$V =$	1.4185	design volume (acre feet) * < 15 ac.
$T_0 =$	72	time to drain the prescribed volume (hrs) (Typically 72 hours for EURV)
$H =$	1.357	depth of volume (ft)
$S =$	0.0001	Trickel channel slope (ft/ft) [Use 0.0001 for flat slope]
		$S = 0\%$
$A_0 =$	3.6810 in ²	3.6702 in ²
$Dia =$	2.16 in	*EXCEEDS 1", USE TWO COLUMNS @ $A_0 = 1.86$ in ²
	4.32	Dia=/2 1.86 in ² = 1-9/16 in. dia.
	8.65	Dia=/4
	17.29	Dia=/8
	34.59	Dia=/16
	69.18	Dia=/32

SEDIMENT VOLUME CALCULATIONS			
Disturbed area-acres	20.810	Acre	
Undisturbed area-acres	11.210	Acre	
Total Area-acres	32.020	Acre	
Sediment volume	61,792	cu-ft	1.4185 Acres-ft
Volume below lowest hole	20,597	cu-ft	0.4728 Acres-ft
Volume above lowest hole	61,792	cu-ft	1.4185 Acres-ft
Total Volume	82,369	cu-ft	1.8909 Acres-ft

Note: Enter values in highlighted cells only.

SEDIMENT BASIN B - POND B
SEDIMENT BASIN STAGE-STORAGE CALCULATIONS

Elevation	Area S.F.	Area Acre	Volume Cu. Ft.	Volume Acre-Ft	Cumm Vol Cu. Ft.	Cumm Vol Acre-Ft	Proration Enter Vol. in Cu-Ft*	Proration Enter Vol. in Acre-Ft*	Elev. Cu-Ft
6932.0	0								
6933.0	17869		5,961		5,961	0.137	23,575		6,933.73
6934.0	30861		24,071		30,032	0.689			
6935.0	34515		32,671		62,703	1.439	70,724		6,935.22
6936.0	38511		36,495		99,198	2.277			
6937.0	42664		40,570		139,767	3.209			
6938.0	46975		44,802		184,570	4.237			
6939.0	51087		49,017		233,586	5.362			
6940.0									
6941.0									
6942.0									
6943.0									
6944.0									
6945.0									
6946.0									
6947.0									
6948.0									
6949.0									
6950.0									
6951.0									
6952.0									
6953.0									

COLUMN 1	COLUMN 2	CENTROID EL.
ORIFICE 1-1	ORIFICE 1-2	6,933.73
ORIFICE 2-1	ORIFICE 2-2	6,934.06
ORIFICE 3-1	ORIFICE 3-2	6,934.39
ORIFICE 4-1	ORIFICE 4-2	6,934.72
ORIFICE 5-1	ORIFICE 5-2	6,935.05

SED Basin riser pipe orifice calculations		
$A_0 =$	area per row of orifices spaced on 4" centers (in ²)	
$V =$	1.6236 design volume (acre feet) * <15 ac.	
$T_0 =$	72 time to drain the prescribed volume (hrs) (Typically 72 hours for EURV)	
$H =$	1.488 depth of volume (ft)	
$S =$	0.0001 Trickle channel slope (ft/ft) [Use 0.0001 for flat slope]	
		$S = 0\%$
$A_0 =$	4.0940 in ²	4.0819 in ²
Dia	2.28 in	*EXCEEDS 1", USE TWO COLUMNS @ $A_0 = 2.05$ in ²
	4.56	Dia = /2 2.05 in ² = 1-5/8" Dia.
	9.12	Dia = /4
	18.24	Dia = /8
	36.48	Dia = /16
	72.95	Dia = /32

SEDIMENT VOLUME CALCULATIONS			
Disturbed area-acres	23.820	Acre	
Undisturbed area-acres	12.820	Acre	
Total Area-acres	36.640	Acre	
Sediment volume	70,724	cu-ft	1.6236 Acres-ft
Volume below lowest hole	23,575	cu-ft	0.5412 Acres-ft
Volume above lowest hole	70,724	cu-ft	1.6236 Acres-ft
Total Volume	94,275	cu-ft	2.1643 Acres-ft

Note: Enter values in highlighted cells only.

SEDIMENT BASIN C
SEDIMENT BASIN STAGE-STORAGE CALCULATIONS

Elevation	Area S.F.	Area Acre	Volume Cu. Ft.	Volume Acre-Ft	Cumm Vol Cu. Ft.	Cumm Vol Acre-Ft	Proration Enter Vol. in Cu-Ft*	Proration Enter Vol. in Acre-Ft*	Elev. Cu-Ft
6942.5	0								
6943.0	4181		698		698	0.016			
6944.0	7102		5,577		6,275	0.144			
6945.0	8602		7,840		14,115	0.324	15,810		6,945.18
6946.0	10225		9,402		23,517	0.540	31,620		6,946.74
6947.0	11766		10,986		34,504	0.792			
6943.5									
6944.5									
6945.5									
6946.5									
6947.5									
6948.5									
6949.5									
6950.5									
6951.5									
6952.5									
6953.5									
6954.5									
6955.5									
6956.5									
6957.5									
6958.5									

COLUMN 1	COLUMN 2	CENTROID EL.
ORIFICE 1-1	ORIFICE 1-2	6,945.18
ORIFICE 2-1	ORIFICE 2-2	6,945.51
ORIFICE 3-1	ORIFICE 3-2	6,945.84
ORIFICE 4-1	ORIFICE 4-2	6,946.17
ORIFICE 5-1	ORIFICE 5-2	6,946.50

SED Basin riser pipe orifice calculations			
$A_0 =$			area per row of orifices spaced on 4" centers (in ²)
$V =$	0.3629		design volume (acre feet) * <15 ac.
$T_0 =$	72		time to drain the prescribed volume (hrs) (Typically 72 hours for EURV)
$H =$	1.557		depth of volume (ft)
$S =$	0.0001		Trickel channel slope (ft/ft) [Use 0.0001 for flat slope]
			$S = 0\%$
$A_0 =$	1.0301	1.0271	in ² in ²
Dia	1.14		in *EXCEEDS 1", USE TWO COLUMNS @ $A_0 = 1.027$ in ²
	2.29		Dia=/2 Area of 0.51 in ² = Dia. Of 0.8" = 13/16"
	4.57		Dia=/4
	9.15		Dia=/8
	18.30		Dia=/16
	36.59		Dia=/32

SEDIMENT VOLUME CALCULATIONS			
Disturbed area-acres	8.200	Acre	
Undisturbed area-acres	4.200	Acre	
Total Area-acres	12.400	Acre	
Sediment volume	31,620	cu-ft	0.7259 Acres-ft
Volume below lowest hole	15,810	cu-ft	0.3629 Acres-ft
Volume above lowest hole	15,810	cu-ft	0.3629 Acres-ft
Total Volume	31,620	cu-ft	0.7259 Acres-ft

Note: Enter values in highlighted cells only.

<u>BMP FEATURE</u>	<u>TOTAL TRIBUTARY AREA (AC)</u>	<u>DISTURBED AREA (AC)</u>	<u>UNDISTURBED AREA (AC)</u>	<u>BOTTOM SIZE (FT)</u>	<u>SEDIMENT VOLUME (AC-FT)</u>	<u>BASIN VOLUME (AC-FT)</u>	<u>BOTTOM ELEVATION</u>	<u>CREST ELEVATION</u>	<u>CREST WxL (FT)</u>	<u>TOP OF POND ELEVATION</u>	<u>LOWEST ORIFICE ELEVATION</u>	<u>AREA OF ORIFICES (SQ IN)</u>	<u># OF ORIFICE COLUMNS</u>	<u>DIA. OF ORIFICES</u>	<u>RISER PIPE INVERT</u>	<u>DAYLIGHT ELEVATION</u>	<u>OUTLET PIPE LENGTH (FT)</u>	<u>OUTLET PIPE SLOPE</u>
SB-A	32.02	20.81	11.21	400' x 140'	1.42	4.57	6966.50	6971.50	60' x 40'	6973.00	6968.89	1.86	2	1-9/16"	6967.56	6964.75	65	4.3%
SB-B	36.64	23.82	12.82	115' x 260'	1.62	5.36	6932.00	6939.00	77.5' x 40'	6939.00	6933.73	2.05	2	1-5/8"	6932.40	6929.20	72	4.4%
SB-C	12.40	8.20	4.20	85' x 124'	0.73	0.79	6942.50	6946.50	18' x 15'	6947.00	6945.18	0.51	2	13/16"	6943.85	6942.00	50	3.7%



APPENDIX D – EL PASO COUNTY CONSTRUCTION CONTROL MEASURES



Grandview Reserve Phase 2
Stormwater Management Plan
Project No.: 201662.20
El Paso County, Colorado

APPENDIX E – SPILL PREVENTION PLAN

Spill Prevention, Control and Countermeasure (SPCC) Plan

Facility Name: _____
Address: _____

Contact Name: _____
Phone: _____
Fax: _____
Email: _____

Certification: I hereby certify that I have examined the facility, and, being familiar with the provisions of 40 CFR part 112, attest that this SPCC plan has been prepared, or updated within 5 years, in accordance with good engineering practices and meets the requirements listed in 40 CFR part 112.

This plan has been certified by:

Date of certification: _____

Engineer's Seal

Copies of this plan are located at the facility and are available to all employees.

Location(s) of plan(s): _____

I. FACILITY INFORMATION

a. Facility Name: _____

b. Mailing Address: _____

c. Physical address if different: _____

d. Owner Name: _____

e. Owner Address: _____

f. Primary Contact Name: _____

Work Phone Number: _____

Home Phone Number: _____

Mobile Phone Number: _____

g. Secondary Contact Name: _____

Work Phone Number: _____

Home Phone Number: _____

Mobile Phone Number: _____

h. Date of Initial Operation: _____

II. SITE ASSESSMENT

a. Location:

Describe where facility is located. For example, "This site is located along Broad Creek about 2 miles north of its confluence with the Choptank River at Holland Point. Road access is from. . . . The site is located on Talbot County ADC map 22 (H5). Latitude is ____ and longitude is ____."

VII. FACILITY INSPECTIONS

a. Routine Inspections

Name facilities and the frequency with which they are inspected. For example, “The fuel pumps are inspected daily. The materials storage area is inspected monthly.” Describe all facility containers, piping, etc. that is to be inspected. Name the person who has responsibility to implement preventative maintenance programs, oversee on-site inspections, coordinate employee training, maintain records, update the plan as necessary, and ensure that reports are submitted to the proper authorities.

b. Annual Inspections

Include a description of annual comprehensive inspections. For example, “A site inspection is also conducted annually by appropriate responsible personnel to verify that the description of potential pollutant sources are accurate, that the map reflects current site conditions, and that the controls to reduce the pollutants identified in this plan are being implemented and are adequate. This annual inspection will be conducted above and beyond the routine inspections done focusing on designated equipment and areas where potential sources are located.”

VIII. RECORD KEEPING

Describe record keeping procedures. For example, “Record keeping procedures consist of maintaining all records a minimum of three years. The following items will be kept on file: current SPCC plan, internal site reviews, training records, and documentation of any spills or maintenance conducted in regards to these sites.” *Maintenance Inspection, Employee Training, and Record Keeping* logs are included in this template for your use.

X. RECORD KEEPING OF INCIDENTAL SPILLS

Record Keeper: _____. Record Keeper responsibilities include maintaining records of incidents, updating the SPCC plan as necessary and ensuring reports are submitted to the proper authorities when necessary.

Incident No.	Type of Incident	Date of Occurrence	How it was Cleaned Up



APPENDIX F – CSWMP REPORT REVISION LOG

