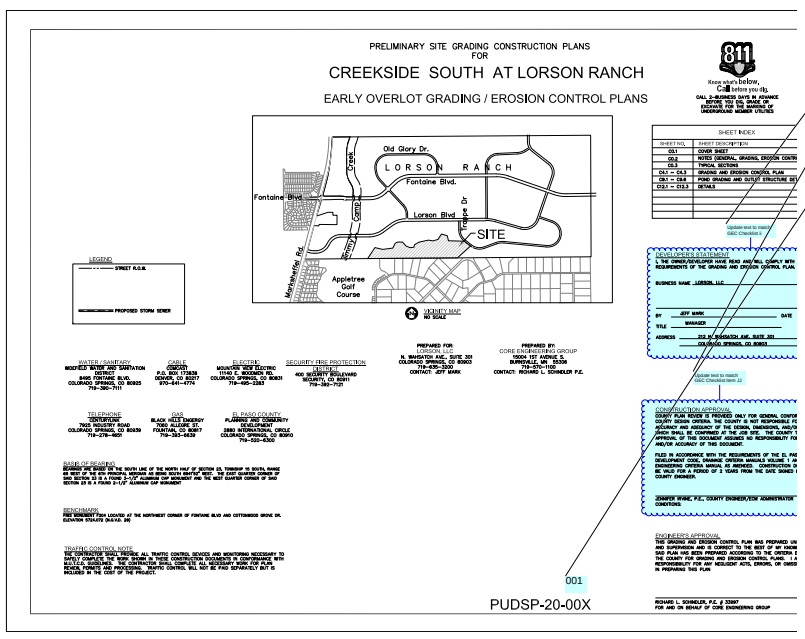


Summary of Comments on P:\100\100.051\prelim plan\early grading\100.051early grading cover sheet C0.1 (1)

Page: 1

Author: Christina Furchak Subject: Cloud+ Date: 4/15/2020 3:14:47 PM

Update text to match GEC Checklist ii

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:10:26 PM

BLOCK UPDATED

Author: Christina Furchak Subject: Cloud+ Date: 4/15/2020 3:14:52 PM

Update text to match GEC Checklist Item JJ

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:10:14 PM

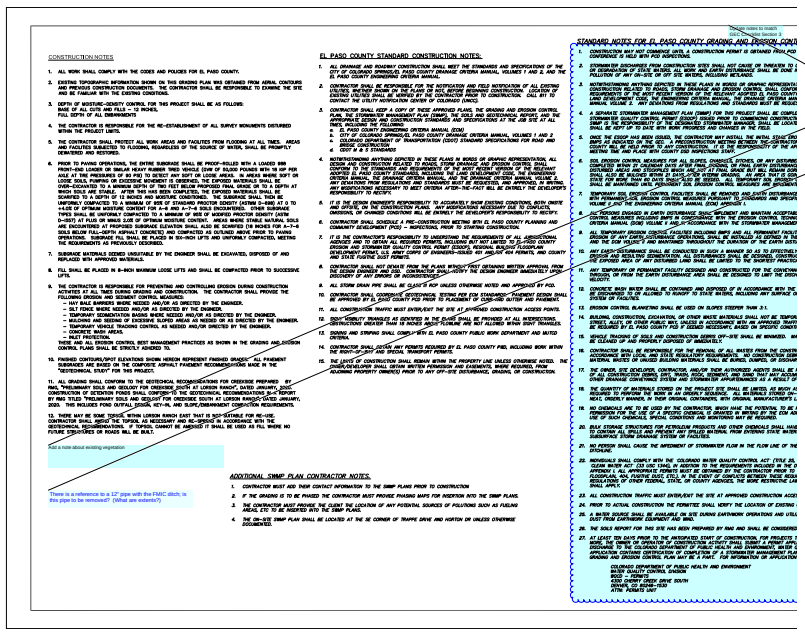
BLOCK UPDATED

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 3:16:37 PM

001

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:10:01 PM

ADDED



CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CODES AND POLICIES FOR EL PASO COUNTY.
2. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THIS GRADING PLAN WAS OBTAINED FROM AERIAL CONTOURS WITH PROVIDED CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE TO EXAMINE THE SITE AND BE FAMILIAR WITH THE EXISTING CONDITIONS.
3. DEPTH OF MOISTURE-DENSITY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
   BASE OF ALL CUTS AND FILLS – 12 INCHES.
   FULL DEPTH OF ALL EMBANKMENTS
4. THE CONTRACTOR IS RESPONSIBLE FOR THE RE-ESTABLISHMENT OF ALL SURVEY MONUMENTS DISTURBED WITHIN THE PROJECT LIMITS.
5. THE CONTRACTOR SHALL PROTECT ALL WORK AREAS AND FACILITIES FROM FLOODING AT ALL TIMES. AREAS AND FACILITIES SUBJECTED TO FLOODING, REGARDLESS OF THE SOURCE OF WATER, SHALL BE PROMPTLY DEWATERED AND RESTORED.
6. PRIOR TO PAVING OPERATIONS, THE ENTIRE SUBGRADE SHALL BE PROOF-ROLLED WITH A LOADED 8RB FRONT-END LOADER OR SIMILAR HEAVY RUBBER TIRED VEHICLE (GVW OF 25,000 POUNDS WITH 18 KIP PER AXLE AT THE PRESSURES OF 80 PSI) TO DETECT ANY SOFT OR LOOSE AREAS. IN AREAS WHERE SOFT OR LOOSE SOILS PUMPING OR EXCESSIVE MOVEMENT IS OBSERVED, THE EXPOSED MATERIALS SHALL BE REMOVED AND REPLACED WITH ROCK OR SOIL FILL AS DIRECTED BY THE ENGINEER. IN AREAS IN WHICH AT WHICH SOILS ARE STABLE, AFTER THIS HAS BEEN COMPLETED, THE EXPOSED MATERIALS SHALL BE SCARIFIED TO A DEPTH OF 12 INCHES AND MOISTURE CONDITIONED. THE SUBGRADE SHALL THEN BE UNIFORMLY COMPACTED TO A MINIMUM OF 95% OF STANDARD PROCTOR DENSITY (ASTM D-698) AT 0 TO +4.0 (+1.0 TO +5.0 FOR MOISTURE CONTENT) TO A DEPTH OF 12 INCHES. SOILS SUBJECT TO SHRINK-SWELL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD PROCTOR DENSITY (ASTM D-698) AT 0 TO +4.0 (+1.0 TO +5.0 FOR MOISTURE CONTENT) OF OPTIMUM MOISTURE CONTENT. AREAS WHERE STABLE NATURAL SOILS ARE ENCOUNTERED AT PROPOSED SUBGRADE ELEVATION SHALL ALSO BE SCARIFIED (18 INCHES FOR A 7-8 SOILS BELOW FULL-DEPTH ASPHALT CONCRETE) AND COMPACTED AS OUTLINED ABOVE PRIOR TO PAVING OPERATIONS. SUBGRADE FILL SHALL BE PLACED IN 9X-INCH LIFTS AND UNIFORMLY COMPACTED, MEETING THE REQUIREMENTS AS PREVIOUSLY DISCUSSED.
7. SUBGRADE MATERIALS DEEMED UNSUITABLE BY THE ENGINEER SHALL BE EXCAVATED, DISPOSED OF AND REPLACED WITH APPROVED MATERIALS.
8. FILL SHALL BE PLACED IN 8-INCH MAXIMUM LOOSE LIFTS AND SHALL BE COMPACTED PRIOR TO SUCCESSIVE LIFTS.
9. THE CONTRACTOR IS RESPONSIBLE FOR PREVENTING AND CONTROLLING EROSION DURING CONSTRUCTION ACTIVITIES AT ALL TIMES DURING GRADING AND CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING EROSION AND SEDIMENT CONTROL MEASURES:
   - HAY BALE BARRIERS WHERE NEEDED AND/OR AS DIRECTED BY THE ENGINEER.
   - SILT FENCE WHERE NEEDED AND/OR AS DIRECTED BY THE ENGINEER.
   - TEMPORARY SEDIMENTATION BASINS WHERE NEEDED AND/OR AS DIRECTED BY THE ENGINEER.
   - MULCHING AND RESEEDING OF EXCESSIVE SLOPED AREAS AS NEEDED OR AS DIRECTED BY THE ENGINEER.
   - DUST CONTROL/WATERING CONTROL AS NEEDED AND/OR DIRECTED BY THE ENGINEER.
   - CONCRETE WASH AREAS.
   - INLET PROTECTION.

   THESE AND ALL EROSION CONTROL BEST MANAGEMENT PRACTICES AS SHOWN IN THE GRADING AND EROSION CONTROL PLANS SHALL BE STRICTLY ADHERED TO.
10. FINISHED CONTOURS/SPOT ELEVATIONS SHOWN HEREON REPRESENT FINISHED GRADES. ALL PAVEMENT SUBGRADES ARE BASED ON THE COMPOSITE ASPHALT PAVEMENT RECOMMENDATIONS MADE IN THE "GEOTECHNICAL STUDY" FOR THIS PROJECT.
11. ALL GRADING SHALL CONFORM TO THE GEOTECHNICAL RECOMMENDATIONS FOR CREEKSIDE PREPARED BY RMG, "PRELIMINARY SOILS AND GEOLOGY FOR CREEKSIDE SOUTH AT LORSON RANCH", DATED JANUARY, 2020. CONSTRUCTION OF DETENTION PONDS SHALL CONFORM TO THE GEOTECHNICAL RECOMMENDATIONS IN THE REPORT BY RMG TITLED "PRELIMINARY SOILS AND GEOLOGY FOR CREEKSIDE SOUTH AT LORSON RANCH", DATED JANUARY, 2020. THIS INCLUDES POND OUTFALL SCOUR, HEY-IN, AND SLOPE/EMBANKMENT CONSTRUCTION REQUIREMENTS.
12. THERE MAY BE SOME TOPSOIL WITHIN LORSON RANCH EAST THAT IS NOT SUITABLE FOR RE-USE. CONTRACTOR SHALL PROOF THE TOPSOIL AS NECESSARY AND RE-SPECIFY IN ACCORDANCE WITH THE GEOTECHNICAL RECOMMENDATIONS. IF TOPSOIL CANNOT BE PROOFED IT SHALL BE USED AS FILL WHERE NO FUTURE STRUCTURES OR ROADS WILL BE BUILT.

Add a note about existing vegetation

There is a reference to a 12" pipe with the FMIC ditch; is this pipe to be removed? (What are extents?)

EL PASO COUNTY STANDARD CONSTRUCTION NOTES:

1. ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS, EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSPECTION AND FIELD INVESTIGATION OF ALL EXISTING UTILITIES AND STRUCTURES PRIOR TO CONSTRUCTION. ANY DEVIATIONS FROM THE PLANS AND/OR EXISTING UTILITIES SHALL BE REPORTED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
3. CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLANS, THE STORMWATER MANAGEMENT PLAN (SMMP), THE SOILS AND GEOTECHNICAL REPORTS AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES. THE PRECEDENCE IS:
   a. EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
   b. CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2.
   c. COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
   d. CDOT M & S STANDARDS
4. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT AGENCIES EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUME 1 AND 2, THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL, VOLUME 3. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING, BY EL PASO COUNTY ENGINEERING. ANY REQUEST TO MEET CRITERIA AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
5. IT IS THE GEOTECH ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH UNDER AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
6. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (PCD) – INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL PERMITS REQUIRED BY THE JURISDICTIONAL AGENCIES. THESE INCLUDE EROSION AND STORMWATER QUALITY CONTROL PERMIT ESSOPS, REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-404/401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.
8. CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER. ANY DEVIATIONS MADE WITHOUT THE DESIGN ENGINEER'S WRITTEN APPROVAL MAY RESULT IN DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.
9. ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PCD.
10. CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING FOR EITH STANDARD PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCD PRIOR TO PLACEMENT OF CASS-HBC GUTTER AND PAVEMENT.
11. ALL CONSTRUCTION TRAFFIC MUST INVOLVE/VIST THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
12. ROAD CONCRETE TRANSITS AS DEFINED IN THE ECM SHALL BE PROVIDED AT ALL INTERSECTIONS. CONTRACTORS GREATER THAN 10 INCHES ABOVE FLOWLINE ARE NOT ALLOWED. WHEN SUCH TRANSITS.
13. GRADING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY PUBLIC WORK DEPARTMENT AND MUTCD CRITERIA.
14. CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY PWD, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
15. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.

ADDITIONAL SWMP PLAN CONTRACTOR NOTES:

1. CONTRACTOR MUST ADD THEIR CONTACT INFORMATION TO THE SWMP PLANS PRIOR TO CONSTRUCTION
2. IF THE GRADING IS TO BE PHASED THE CONTRACTOR MUST PROVIDE PHASING MAPS FOR INSERTION INTO THE SWMP PLANS.
3. THE CONTRACTOR MUST PROVIDE THE CLIENT THE LOCATION OF ANY POTENTIAL SOURCES OF POLLUTIONS SUCH AS FUELING AREAS, ETC TO BE INSERTED INTO THE SWMP PLANS.
4. THE ON-SITE SWMP PLAN SHALL BE LOCATED AT THE SE CORNER OF TRAFFIC DRIVE AND HORTON OR UNLESS OTHERWISE DOCUMENTED.

STANDARD NOTES FOR EL PASO COUNTY GRADING AND EROSION CONTROL

1. CONSTRUCTION MAY NOT COMMENCE UNTIL A CONSTRUCTION PERMIT IS OBTAINED FROM EPC PCD CONFIDENCE IS HELD WITH PCD INSPECTIONS.
2. STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE DISCHARGE OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN ACCORDANCE WITH THE POLLUTION OF ANY ON-SITE OR OFF SITE WATERS, INCLUDING WETLANDS.
3. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT AGENCIES EL PASO COUNTY LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, VOLUME 1 AND 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING, BY EL PASO COUNTY ENGINEERING.
4. A SEPARATE STORMWATER MANAGEMENT PLAN (SMMP) FOR THIS PROJECT SHALL BE COMPLETED AND SUBMITTED FOR EL PASO COUNTY PCD EROSION CONTROL REVIEW AND ACCEPTANCE. THE SMMP SHALL BE ACCEPTED BY EL PASO COUNTY PCD PRIOR TO COMMENCING CONSTRUCTION. THE SMMP SHALL BE KEPT UP TO DATE WITH BMP PROGRESS AND CHANGES IN THE FIELD.
5. ONCE THE ESSOP HAS BEEN ISSUED, THE CONTRACTOR MUST INSTALL THE INITIAL EROSION CONTROL BMPS AS INDICATED ON THE SCD. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR AND EL PASO COUNTY PCD INSPECTIONS MUST BE SCHEDULED. IT IS THE RESPONSIBILITY OF THE ON-SITE MEETING WITH EL PASO COUNTY PCD INSPECTIONS TO CALL.
6. SOIL EROSION CONTROL MEASURES FOR ALL DISTRICT CHANNELS, DITCHES, OR ANY DISTURBANCE COMPLETED WITHIN 21 CALENDAR DAYS AFTER FINAL GRADING OR FINAL WORK WITHIN THE DISTURBED AREAS AND STOCKPILES WHICH ARE NOT AT FINAL GRADE BUT WILL REMAIN DORMANT FOR 21 DAYS OR MORE, MUST BE SEEDED AND MULCHED. ALL AREAS THAT IS DISTURBED SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE ESTABLISHED.
7. TEMPORARY SOIL EROSION CONTROL FACILITIES SHALL BE REMOVED AND EARTH DISTURBANCE WITH PERMANENT SOIL EROSION CONTROL MEASURES PERFORMED TO STANDARDS AND SPECIFICATIONS OF VOLUME 2 AND THE ENGINEERING CRITERIA MANUAL (ECM) APPENDIX I.
8. ALL PERSONS ENGAGED IN EARTH DISTURBANCE SHALL IMPLEMENT AND MAINTAIN ACCEPTABLE CONTROL MEASURES INCLUDING BMPS IN CONFORMANCE WITH THE EROSION CONTROL REQUIREMENTS OF THE ENGINEERING CRITERIA MANUAL (ECM) VOLUME 1 AND 2 IN ACCORDANCE WITH THE STORMWATER MANAGEMENT PLAN (SMMP).
9. ALL TEMPORARY EROSION CONTROL FACILITIES INCLUDING BMPS AND ALL PERMANENT FACILITIES DESIGNED TO ADDRESS EROSION OF ANY EARTH/AGGREGATE OPERATIONS SHALL BE INSTALLED AS DEFINED IN THE SMMP AND THE ESSOP PLANS TO AND MAINTAINED THROUGHOUT THE DURATION OF THE EARTH DISTURBANCE.
10. ANY EARTH DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY REDUCE THE ACCELERATED EROSION AND RESULTANT SEDIMENTATION. ALL DISTURBED GROUND LEFT EXPOSED MUST BE STABILIZED AND SHALL BE SEEDED TO THE SPECIFIED PRACTICE.
11. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE DESIGNED TO LIMIT THE EROSIVE VELOCITY.
12. CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE BMP. BY ENCAMPMENT TO BE ALLOWED TO RUNOFF TO STATE WATERS, INCLUDING ANY SURFACE WATERS, OR INTO A DRAINAGE SYSTEM OR FACILITIES.
13. EROSION CONTROL BLANKETING SHALL BE USED ON SLOPES STEEPER THAN 3:1.
14. BUILDING CONSTRUCTION, EXCAVATION, OR OTHER WASTE MATERIALS SHALL NOT BE TEMPORARILY STORED, ALLOY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN AND THE ESSOP PLANS TO AND MAINTAINED THROUGHOUT THE DURATION OF THE EARTH DISTURBANCE.
15. VEHICLE TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MUST BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE AT ALL TIMES. ALL WASTE MATERIALS WILL BE DISPOSED OF IN ACCORDANCE WITH THE MATERIAL WASTES OF UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED INTO STATE WATERS.
17. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION DEBRIS, DIRT, MUDS, ROCK, SEDIMENT, AND DUST THAT MAY ACCUMULATE ON OTHER DRAINAGE CONVEYANCE SYSTEM AND STORMWATER IMPROVEMENTS AS A RESULT OF THE PROJECT.
18. THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE MINIMIZED TO THE EXTENT REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE, STORED IN MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.
19. NO CHEMICALS ARE TO BE USED BY THE CONTRACTOR THAT HAVE THE POTENTIAL TO BE TRANSPORTED BY WATER TO THE STORMWATER RECEIVING SYSTEM EXCEPT IN QUANTITIES AND FOR THE USE OF SUCH THAT WILL NOT BE HARMFUL TO THE ENVIRONMENT.
20. BULK STORAGE STRUCTURES FOR PETROLEUM PRODUCTS AND OTHER CHEMICALS SHALL HAVE SECONDARY CONTAINMENT ADEQUATE TO PREVENT CONTAMINATION FROM ENTERING STATE WATERS AND THE SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES.
21. NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE FLOW LINE OF THE STREET.
22. MATERIALS SHALL COMPLY WITH THE COLORADO WATER QUALITY CONTROL ACT (TITLE 25, ARTICLE 8, COLORADO REVISED STATUTES) AND THE FEDERAL CLEAN WATER ACT (33 USC 1344). IN ADDITION TO THE REQUIREMENTS INCLUDED IN THIS PLAN, THE CONTRACTOR SHALL OBTAIN ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (FLOODPLAIN, EPA FUGITIVE DUST ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REGULATIONS AND ANY OTHER FEDERAL, STATE, OR COUNTY AGENCIES, THE MORE RESTRICTIVE LAW SHALL APPLY.
23. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
24. PRIOR TO ACTUAL CONSTRUCTION THE PERMITTEE SHALL NOTIFY THE LOCATION OF EXISTING UTILITIES.
25. A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTH DISTURBANCE OPERATIONS AND UTILIZED TO CONTROL FUGITIVE DUST FROM EXTENSIVE EARTHWORK AND WIND.
26. THE SOILS REPORT FOR THIS SITE HAS BEEN PREPARED BY RMG AND SHALL BE CONSIDERED PART OF THE SWMP.
27. AT LEAST TEN DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT ARE NOT SUBJECT TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY CONTROL DIVISION GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION AND EROSION CONTROL PLAN, OR AT THE ATTACHED INFORMATION OF APPLICATION TO:

   COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
   WATER QUALITY CONTROL DIVISION
   WQCD – PERMITS
   4300 CHERRY CREEK DRIVE SOUTH
   DENVER, CO 80246-1530
   ATTN: ACTIVITY UNIT

Page: 2

Author: Christina Furdhak Subject: Cloud+ Date: 4/15/2020 3:21:17 PM

Update notes to match GEC Checklist Section 3

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:57:54 PM

NOTES UPDATED

Author: Christina Furdhak Subject: Engineer Date: 4/15/2020 3:32:07 PM

Add a note about existing vegetation

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:21:24 PM

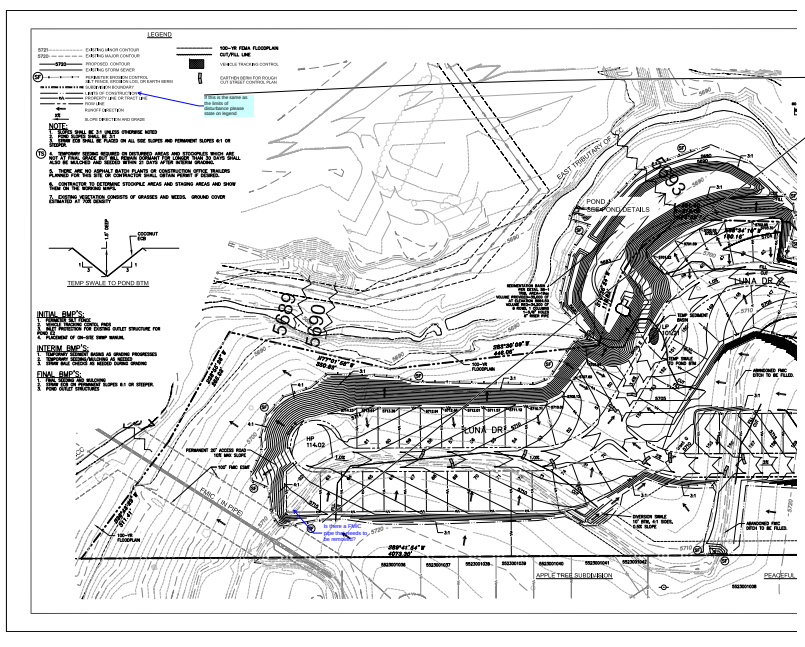
NOTE ADDED

Author: dsdrice Subject: Text Box Date: 4/30/2020 3:02:56 PM

There is a reference to a 12" pipe with the FMIC ditch; is this pipe to be removed? (What are extents?)

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:21:15 PM

ADDED NOTE TO PLAN: PIPE TO REMAIN AND IS OUTSIDE LIMITS OF CONSTRUCTION



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Author: Christina Furchak Subject: Engineer Date: 4/15/2020 3:48:22 PM

If this is the same as the limits of disturbance please state on legend

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:58:14 PM

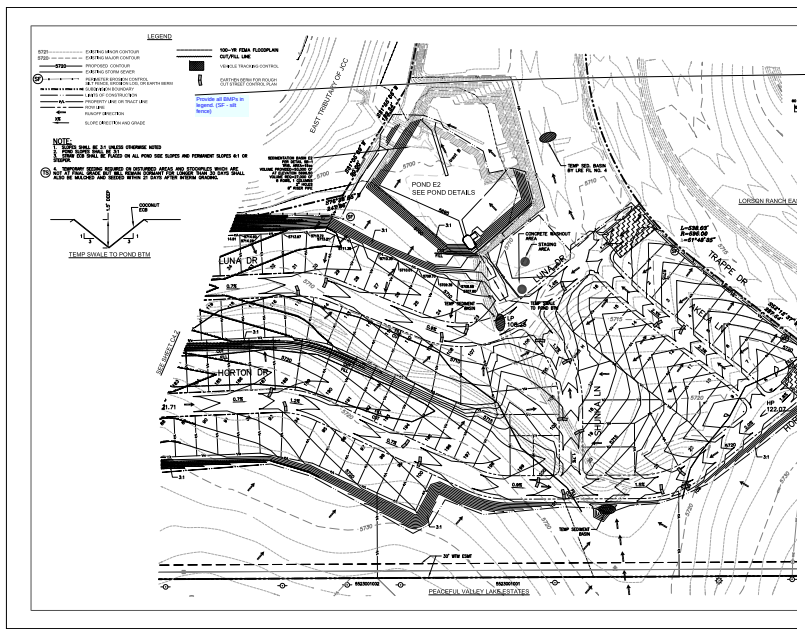
LIMITS OF DISTURBANCE ADDED TO THIS LINE

Author: dsdrice Subject: Callout Date: 4/30/2020 3:03:16 PM

Is there a FMIC pipe that needs to be removed?

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:58:24 PM

ADDED NOTE TO PLAN: PIPE TO REMAIN AND IS OUTSIDE LIMITS OF CONSTRUCTION



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Author: dsdrice Subject: Text Box Date: 4/30/2020 3:03:44 PM

Provide all BMPs in legend. (SF - silt fence)

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 1:59:01 PM

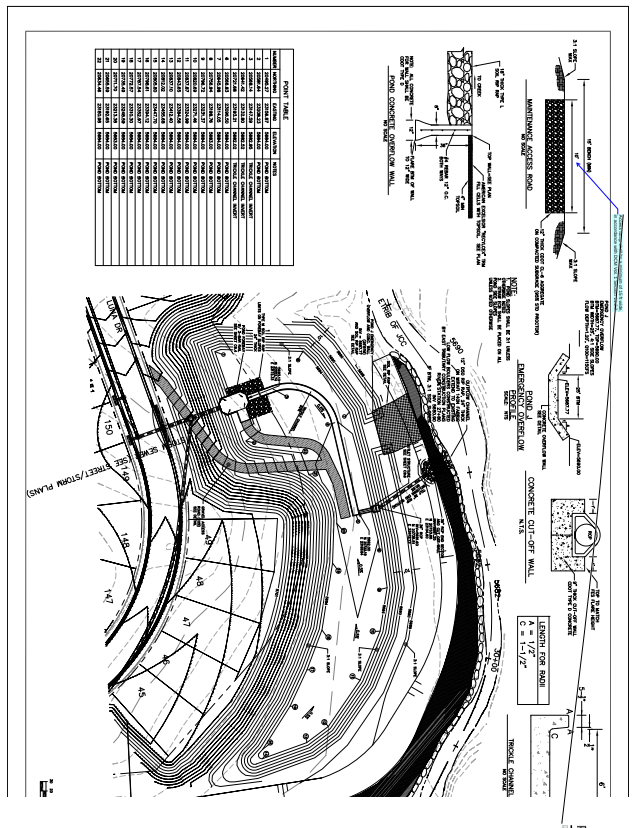
SET FENCE IS JUST UNDER EXISTING STORM SEWER

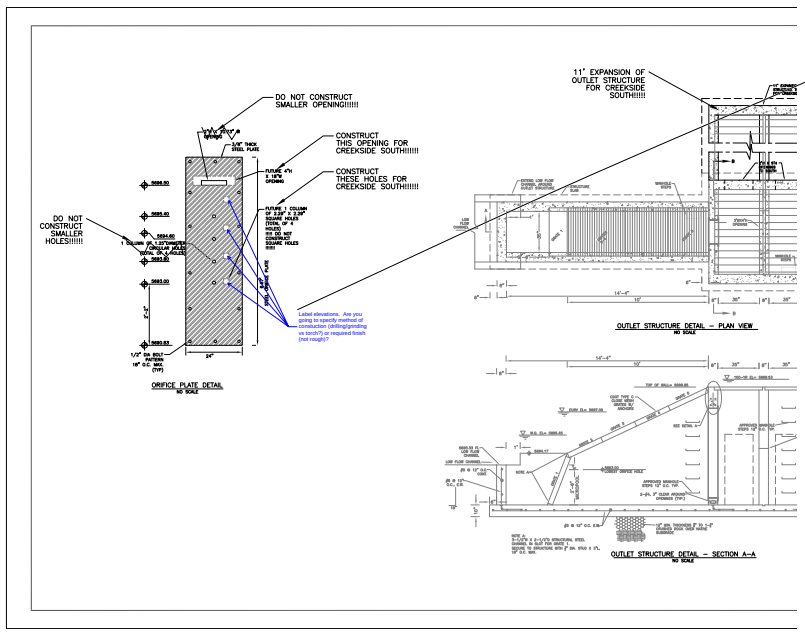
Comment: Access ramp shall be a minimum of 15 ft wide, in accordance with DCM Vol. 1 Section 11.2.2

Author: Kitzinger - Subject: Sticky Note Date: 5/11/2021 09:37 PM

Comment: Access ramp shall be a minimum of 15 ft wide, in accordance with DCM Vol. 1 Section 11.2.2

Author: Kitzinger - Subject: Sticky Note Date: 5/11/2021 09:37 PM





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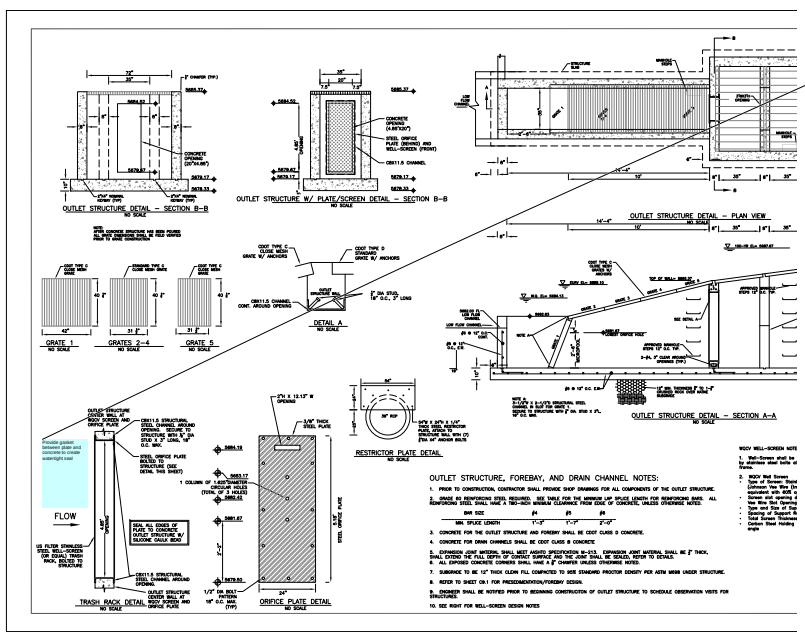
Author: dsdrice Subject: Callout Date: 4/30/2020 3:06:47 PM

Label elevations. Are you going to specify method of constuction (drilling/grinding vs torch?) or required finish (not rough)?

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 2:24:11 PM

ELEVATIONS LABLED. DRILL/CUT HOLES. SMOOTH EDGES.



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Author: Christina Furchak Subject: Engineer Date: 4/15/2020 3:54:40 PM

Provide gasket between plate and concrete to create watertight seal

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 2:26:45 PM

GASKET ADDED

16) THENCE N31°05'09"E A DISTANCE OF 90.00 FEET;
17) THENCE N58°54'51"W A DISTANCE OF 4.71 FEET;
18) THENCE N31°55'05"E A DISTANCE OF 182.34 FEET;
19) THENCE N11°17'09"E A DISTANCE OF 285.14 FEET;
20) THENCE N00°29'43"E A DISTANCE OF 173.06 FEET;
21) THENCE N11°46'57"E A DISTANCE OF 127.69 FEET;
22) THENCE N21°18'01"E A DISTANCE OF 20.20 FEET TO THE SOUTHERLY RIGHT-OF-WAY LINE OF LORSON BOULEVARD AS SHOWN IN THE PLAT OF " LORSON RANCH EAST FILING NO. 1" AS RECORDED UNDER RECEPTION NO. 219714288 IN THE RECORDS OF EL PASO COUNTY, COLORADO;

THENCE ALONG SAID LINE THE FOLLOWING FOUR (4) COURSES:
1) THENCE S86°49'28"E A DISTANCE OF 128.25 FEET;
2) THENCE N89°35'58"EA DISTANCE OF 125.90 FEET;
3) THENCE S47°05'28"E A DISTANCE OF 38.26 FEET;
4) THENCE S00°24'02"E A DISTANCE OF 38.12 FEET TO A POINT ON THE WEST LINE OF THAT PARCEL DESCRIBED IN A WARRANTY DEED UNDER RECEPTION NO. 217154370 IN THE EL PASO COUNTY RECORDS;

THENCE ALONG THE WEST LINES OF SAID PARCEL THE FOLLOWING FOUR (4) COURSES;
1) THENCE S00°24'02"E A DISTANCE OF 429.71 FEET TO A POINT OF CURVE;
2) THENCE 538.03 FEET ALONG THE ARC OF A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 595.00 FEET, A. CENTRAL ANGLE OF 51°48'35", THE CHORD OF 519.88 FEET BEARS S26°18'20"E TO A POINT OF TANGENT;
3) THENCE S52°12'37"E A DISTANCE OF 365.17 FEET TO A POINT ON A TANGENT CURVE;
4) THENCE 160.11 FEET ALONG THE ARC OF A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 780.00 FEET, A CENTRAL ANGLE OF 11°45'39", THE CHORD OF 159.83 FEET BEARS S58°05'27"E TO THE WEST LINE OF THAT EASEMENT DESCRIBED IN BOOK 2669 AT PAGE 715 OF THE EL PASO COUNTY RECORDS;

THENCE S38°22'41"W ALONG SAID EASEMENT LINE 250.28 FEET;
THENCE S00°19'53"E ALONG SAID EASEMENT LINE 188.88 FEET TO THE EAST-WEST CENTERLINE OF SECTION 23;
THENCE S89°41'54"W ALONG SAID CENTERLINE 4073.30 FEET TO THE POINT OF BEGINNING;

2.0 SEQUENCE OF MAJOR ACTIVITIES – Exhibit 1 Construction

The anticipated date for beginning construction activities is April, 2020 and will be complete in December, 2020. Implementation of the storm water management plan should be in place prior to initiating construction activities. Infrastructure for all residential lots will be installed in one phase. The anticipated sequence of construction is as follows:

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2. Site Clearing/Grubbing and topsoil stockpiling.
3. Rough Grade Site
4. Construct new detention/sediment ponds
5. Construct underground water/sewer/storm.
6. Construct curb/gutter and pavement.
7. Final stabilize areas outside of ROW.
8. Construct gas/electric/cable/phone in the ROW areas.
9. Final stabilize ROW.
10. Final erosion control measures as areas are completed
11. Remove construction BMP's

Item 6. Add anticipated starting and completion dates for each for each stage of work

3.0 PRE-DEVELOPMENT CONDITIONS

According to the current FEMA Flood Insurance Rate Map (FIRM) number 08041CO957 G, this site is not located within the 100-year floodplain. A portion of the offsite grading will be within the 100-year floodplain. See Appendix A.

Summary of Comments on Microsoft Word - 100.051-swmp

Page: 6

Author: Christina Furchak Subject: Engineer Date: 4/14/2020 1:34:23 PM

Item 6. Add anticipated starting and completion dates for each for each stage of work

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:39:51 PM

approximate dates added.

Existing Vegetation:
The site is currently undeveloped and has been used as a pasture for the past several years. The East Tributary has also been used as pasture for cattle grazing and includes sparse to dense brush and several trees throughout the site. Ground cover is estimated at 70% density.

Existing Slopes:
Existing slopes are around 2-4% that direct runoff northerly to the East Tributary of Jimmy Camp Creek. No grading will be done in the floodway of the East Tributary of Jimmy Camp Creek.

Existing Drainage Patterns:
Pre-development drainage patterns are split into two areas (east/west). The easterly areas which comprised about half of the site flows north to the East Tributary. A detention pond was graded in 2019 next to the East Tributary that collects runoff from existing residential developments east of Trappe Drive. The existing detention pond outlets west into the East Tributary. Pre-development drainage patterns also include the westerly portions of the site flowing west/north directly to the East Tributary of Jimmy Camp Creek. This westerly portion is roughly half of the entire site. The East Tributary of Jimmy Camp Creek north of this site was reconstructed in 2013 and the portion north of this site will be selectively armored with a low flow channel in 2020 per construction plans prepared by Kiowa Engineering. This project does not change the grading within the creek. A separate permit for grading within the creek will be secured by Kiowa Engineering. The drainage patterns will remain the same after construction.

Existing Soil Types:
The following table summarizes the characteristics of the soil type.

Table 3.1: SCS Soils Survey.

Soil	Hydro. Group	Shrink/Swell Potential	Permeability	Surface Runoff Potential	Erosion Hazard
3-Ascalon Sandy Loam (2%)	B	Moderate	Moderate	Slow to Medium	Moderate
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52-Manzanat Clay Loam (11%)	C	Moderate to high	Slow	Medium	Moderate
54-Midway Clay Loam (10%)	D	High	Slow	Medium to Rapid	Moderate to High
56-Nelson-Tassel sandy loam (29%)	B	Moderate	Moderately Rapid	Slow	Moderate
104-Vona Sandy Loam (12%)	C	Moderate to High	Slow	Medium	Moderate
108-Vona Sandy Loam (35%)	B	Moderate	Moderate	Medium	Moderate

Page: 7

Item 9. Include method used to determine ground cover (i.e., visual, aerial inspection)

Author: Christina Furchak Subject: Engineer Date: 4/14/2020 10:37:44 AM
Item 9. Include method used to determine ground cover (i.e., visual, aerial inspection)

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:40:08 PM
visual in field.

6.2.3 Designate Washout Areas
A concrete washout will be installed to detail as shown in Exhibit 1, and will be placed more than 500 feet away from any waters of the state.

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

See section 7 for the Spill Plan.

6.2.5 Control Equipment/Vehicle Washing
Washing any equipment will not be allowed on-site

6.2.6 Any Additional BMPs
There are no additional BMP's anticipated

6.2.7 Allowable Non-Stormwater Discharge Management
There are no visible natural springs or irrigation or other non-stormwater discharges anticipated to be encountered. The existing FMIC irrigation facility is underground in a pipe and does not discharge onto this site.

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

Item 22. Include WQ Pond for long-term stormwater quality

7.0 SPILL PREVENTION AND CONTROL PLAN

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

7.1 SPILL PREVENTION BEST MANAGEMENT PRACTICES
This section describes spill prevention methods Best Management Practices (BMP) that will be practiced to eliminate spills before they happen.

7.1.a Equipment Staging and Maintenance

Page: 16

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:08:34 PM
Item 22. Include WQ Pond for long-term stormwater quality

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:41:46 PM
note added

add "or snow melt"

8.0 INSPECTIONS

8.1 Inspections
Inspections will occur at least every 14 days and within 24 hours of a precipitation event producing runoff, which from past experience this occurs with precipitation of 1/4 inch of rain or more. The primary site for tracking weather data and rainfall measurements will be taken from Weather Underground and a rain gauge will be onsite for verification only.

1. Inspection Personnel:
The contract Stormwater Inspector will conduct the site inspections as mentioned above in Section 1.

2. Inspection Schedule and Procedures:
The inspection schedule will be routinely accomplished every 14 days and after every storm event for the entire site with all BMP's evaluated for performance and need. Any BMP found to be ineffective will be re-accomplished or replaced with a new BMP to provide the level of protection needed. BMP's found to be no longer needed will be removed. Inspections will also be accomplished as soon as practical, but within 24 hours of the end of a precipitation event causing surface erosion~~: over 1/4" or more.~~
The general procedures for correcting problems when they are identified will be to document the problem in the log and devise a solution utilizing all resources available to formulate BMP's that will correct the problem as soon as possible.
A copy of the inspection report to be used for the site is attached. See Appendix.

8.2 Delegation of Authority
Duly Authorized Representative(s) or Position(s):
Authorized representatives for the SWMP plan will be: Jeff Mark – Primary Contact
SWMP INSPECTOR – Trevor Terrill

8.3 Revisions to the SWMP
The SWMP Inspector and/or the site superintendent have the authority to add/subtract/revise BMP's as necessary to accommodate ~~construction activities.~~ However, the engineer should be notified when any major redirection of runoff, offsite runoff, pond modifications, or other substantial changes are made to this SWMP. Changes should be documented per Section 9.0.

stormwater flow and prevent runoff.

9.0 RECORDKEEPING AND TRAINING

9.1 Recordkeeping
Records will be retained for a minimum period of at least 3 years after the permit is terminated.
Major activities will start on 4/01/2020:
Date(s) when construction activities permanently cease on a portion of the site: 10/2020
Date(s) when an area is either temporarily or permanently stabilized: 12/2020

9.2 Changes to the SWMP
Any changes will be referenced in APPENDIX. See Section 8.3 for authority to change the SWMP.

9.3 Training
Individual(s) Responsible for Training:

Update. See comment on next page.

Page: 19

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:00:20 PM
add "or snow melt"

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:43:06 PM
added

Author: Christina Furchak Subject: Line Date: 4/15/2020 12:00:42 PM

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:43:14 PM
removed

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:06:39 PM
stormwater flow and prevent runoff.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:43:59 PM
note added

Author: Christina Furchak Subject: Line Date: 4/15/2020 12:06:46 PM

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:44:06 PM
removed

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:05:10 PM
Update. See comment on next page.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:44:39 PM
updated.

All personnel on site will trained on the site specific SWMP requirements to be conducted by the SWMP Inspector and/or the site superintendent.

9.4 SWMP Location
The on-site SWMP will be located at the SW corner of Trappe Drive and Horton Drive as indicated on Exhibit 1.

10.0 FINAL STABILIZATION

Final stabilization will be accomplished by contractors to re-vegetate the area of disturbance per the approved plans and specifications. Final stabilization will include permanent seeding/mulching of disturbed areas, sediment forebays, erosion control blankets, turf reinforcement mats, and permanent BMP's.

Once 70% of the pre-development vegetative cover has been established and has been accepted, temporary BMP's will be removed and the permit will be terminated and filed.

Long term stormwater quality will be achieved by on-site full spectrum detention ponds with WQ outlet structures.

Final stabilization is anticipated to be completed in December, 2020

Final stabilization will be completed when 70% of the pre-development vegetative cover has been established. This will take longer than 2 months.

Page: 20

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:04:04 PM

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Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:45:02 PM
changed to 6/2021

PRELIMINARY DRAINAGE PLAN

CREEKSIDE SOUTH AT LORSON RANCH

JANUARY 15, 2020

PUD SP-20-X001

Engineering Review
04/28/2020 12:04:22 PM
dsdkuehster
stevekuehster@elpasoco.com
(719) 520-6813
EPC Planning & Community Development Department

Engineering Review
04/30/2020 12:55:45 PM
dsdrice
JeffRice@elpasoco.com
(719) 520-7877
EPC Planning & Community Development Department

Prepared for:

Lorson, LLC
212 N. Wahsatch Ave, Suite 301
Colorado Springs, Colorado 80903
(719) 635-3200

Prepared by:

Core Engineering Group, LLC
15004 1ST Avenue South
Burnsville, MN 55306
(719) 570-1100

Project No. 100.051

CORE ENGINEERING GROUP

Summary of Comments on Microsoft Word - 100.051;PDR-FDR

Page: 1

Author: Steve Kuehster Subject: EPC ENG Review Date: 4/28/2020 1:04:22 PM

Author: dsdrice Subject: Text Box Date: 4/22/2020 5:52:01 PM
001

Author: dsdrice Subject: EPC ENG Review Date: 4/30/2020 1:55:45 PM

16) THENCE N31°05'09"E A DISTANCE OF 90.00 FEET;
17) THENCE N58°54'51"W A DISTANCE OF 4.71 FEET;
18) THENCE N31°55'05"E A DISTANCE OF 182.34 FEET;
19) THENCE N11°17'09"E A DISTANCE OF 285.14 FEET;
20) THENCE N00°29'43"E A DISTANCE OF 173.06 FEET;
21) THENCE N11°46'57"E A DISTANCE OF 127.69 FEET;
22) THENCE N21°18'01"E A DISTANCE OF 20.20 FEET TO THE SOUTHERLY RIGHT-OF-WAY LINE OF LORSON BOULEVARD AS SHOWN IN THE PLAT OF " LORSON RANCH EAST FILING NO. 1" AS RECORDED UNDER RECEPTION NO. 219714288 IN THE RECORDS OF EL PASO COUNTY, COLORADO;

THENCE ALONG SAID LINE THE FOLLOWING FOUR (4) COURSES:
1) THENCE S86°49'28"E A DISTANCE OF 128.25 FEET;
2) THENCE N89°35'58"EA DISTANCE OF 125.90 FEET;
3) THENCE S47°05'28"E A DISTANCE OF 38.26 FEET;
4) THENCE S00°24'02"E A DISTANCE OF 38.12 FEET TO A POINT ON THE WEST LINE OF THAT PARCEL DESCRIBED IN A WARRANTY DEED UNDER RECEPTION NO. 217154370 IN THE EL PASO COUNTY RECORDS;

THENCE ALONG THE WEST LINES OF SAID PARCEL THE FOLLOWING FOUR (4) COURSES;
1) THENCE S00°24'02"E A DISTANCE OF 429.71 FEET TO A POINT OF CURVE;
2) THENCE 538.03 FEET ALONG THE ARC OF A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 595.00 FEET, A. CENTRAL ANGLE OF 51°48'35", THE CHORD OF 519.88 FEET BEARS S26°18'20"E TO A POINT OF TANGENT;
3) THENCE S52°12'37"E A DISTANCE OF 365.17 FEET TO A POINT ON A TANGENT CURVE;
4) THENCE 160.11 FEET ALONG THE ARC OF A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 780.00 FEET, A CENTRAL ANGLE OF 11°45'39", THE CHORD OF 159.83 FEET BEARS S58°05'27"E TO THE WEST LINE OF THAT EASEMENT DESCRIBED IN BOOK 2669 AT PAGE 715 OF THE EL PASO COUNTY RECORDS;

THENCE S38°22'41"W ALONG SAID EASEMENT LINE 250.28 FEET;
THENCE S00°19'53"E ALONG SAID EASEMENT LINE 188.88 FEET TO THE EAST-WEST CENTERLINE OF SECTION 23;
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Page: 6

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Page: 7

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Author: Christina Furchak Subject: Engineer Date: 4/14/2020 10:37:44 AM
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Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:08:34 PM
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Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:41:46 PM
note added

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Update. See comment on next page.

Page: 19

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:00:20 PM
add "or snow melt"

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removed

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Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:44:06 PM
removed

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:05:10 PM
Update. See comment on next page.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:44:39 PM
updated.

All personnel on site will trained on the site specific SWMP requirements to be conducted by the SWMP Inspector and/or the site superintendent.

9.4 SWMP Location
The on-site SWMP will be located at the SW corner of Trappe Drive and Horton Drive as indicated on Exhibit 1.

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Final stabilization will be accomplished by contractors to re-vegetate the area of disturbance per the approved plans and specifications. Final stabilization will include permanent seeding/mulching of disturbed areas, sediment forebays, erosion control blankets, turf reinforcement mats, and permanent BMP's.

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Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:04:04 PM

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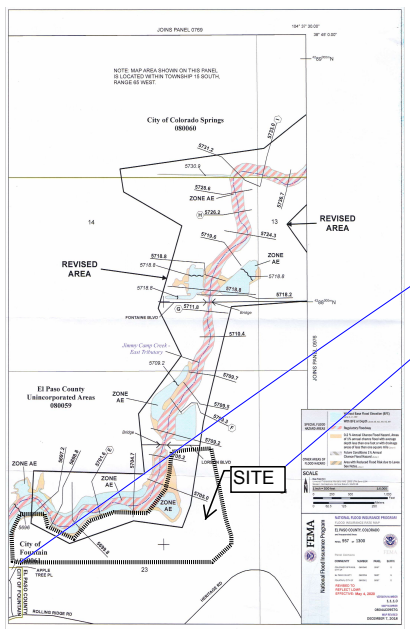
Author: RSchindler Subject: Sticky Note Date: 5/11/2020 3:45:02 PM
changed to 6/2021

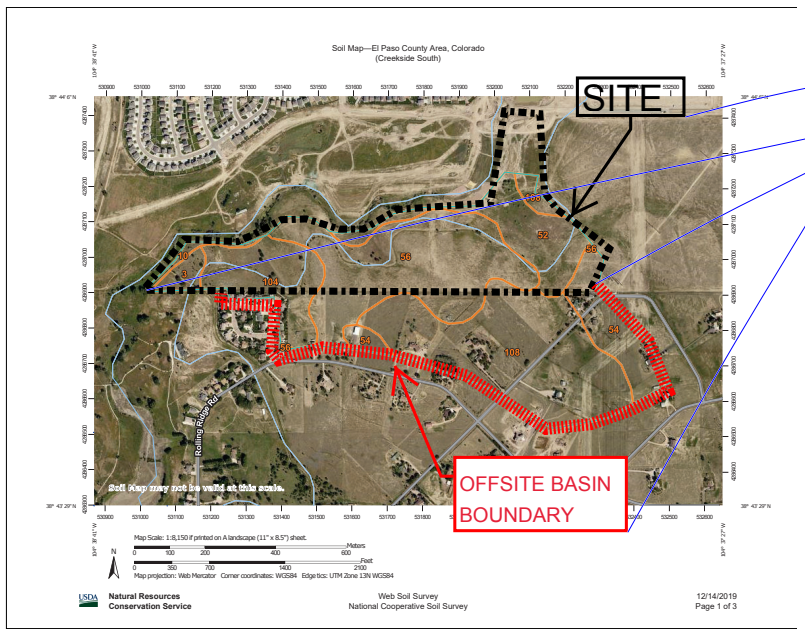


Page: 23

Author: RSchindler Subject: Polygonal Line Date: 1/22/2020 10:41:58 PM -06'00'

Author: RSchindler Subject: Callout Date: 1/21/2020 11:35:23 PM -06'00'

SITE



Page: 24

Author: RSchindler Subject: Callout Date: 1/22/2020 12:02:44 AM -06'00'

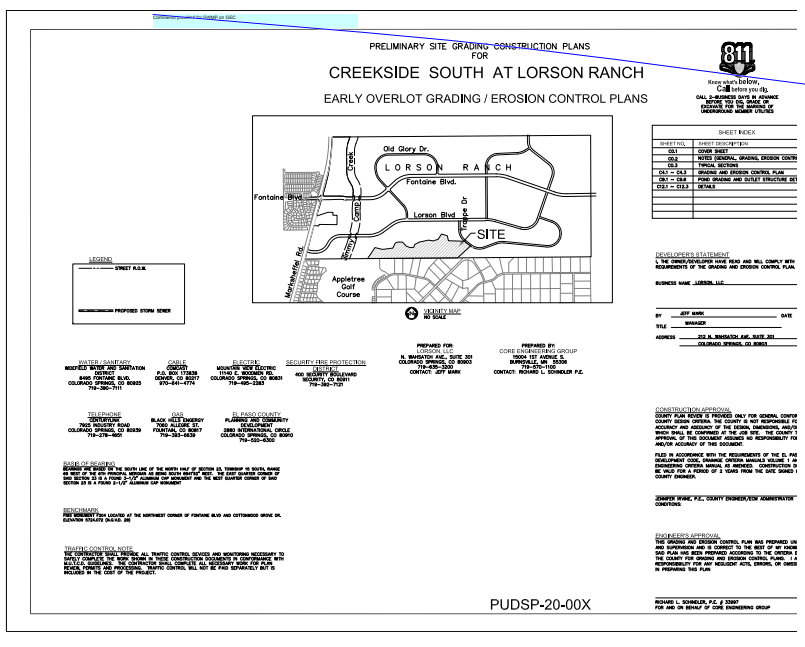
SITE

Author: RSchindler Subject: Polygonal Line Date: 1/22/2020 10:41:11 PM -06'00'

Author: RSchindler Subject: Polygonal Line Date: 1/22/2020 12:04:25 AM -06'00'

Author: RSchindler Subject: Callout Date: 1/22/2020 12:06:00 AM -06'00'

OFFSITE BASIN BOUNDARY



Page: 26

Author: Christina Furchak Subject: Engineer Date: 4/15/2020 12:13:30 PM

Comments provided for SWMP on GEC

2020. The 100-year flow rate for design is 5,500cfs for the south section. The middle section is from Design Point ET-3 north 2,800 feet to the future extension of Fontaine Boulevard. The channel for this section was reconstructed and stabilized in 2014 in accordance with the 1987 Wilson DBPS. LOMR Case No. 14-08-0534P was approved by FEMA for this middle section. The northern section is from Fontaine Boulevard and extends north to the north property line. The north section was constructed in 2018 as part of Lorson Ranch East Filing No. 1 improvements. The channel consists of a stabilized low flow channel and soil rip rap armored outer bends and followup LOMR Case No. 19-08-0605P has been approved. The 100-year flow rate for design is from FEMA FIS data and is from 4,400cfs to 4,750cfs for this section. The low flow channel is sized using 10% of the 100-yr FEMA flow rates and is from 440cfs to 475cfs.

Creekside South at Lorson Ranch is located within the ***"Jimmy Camp Creek Drainage Basin"***, which is a fee basin in El Paso County.

2.0 DRAINAGE CRITERIA

The supporting drainage design and calculations were performed in accordance with the City of Colorado Springs and El Paso County "Drainage Criteria Manual (DCM)", dated November, 1991, the El Paso County "Engineering Criteria Manual", Chapter 6 and Section 3.2.1 Chapter 13 of the City of Colorado Springs Drainage Criteria Manual dated May 2014, and the UDFCD "Urban Storm Drainage Criteria Manual" Volumes 1, 2 and 3 for inlet sizing and full spectrum ponds. No deviations from these published criteria are requested for this site. The proposed improvements to the Lorson Ranch Development will be in substantial compliance with the "Jimmy Camp Creek Drainage Basin Planning Study", prepared by Kiowa Engineering Corp., Colorado Springs, CO.

The Rational Method as outlined in Section 6.3.0 of the May 2014 "Drainage Criteria Manual" and in Section 3.2.8.F of the El Paso County "Engineering Criteria Manual" was used for basins less than 130 acres to determine the rainfall and runoff conditions for the proposed development of the site. The runoff rates for the 5-year initial storm and 100-year major design storm were calculated.

Current updates to the Drainage Criteria manual for El Paso County states the if detention is necessary, Full Spectrum Detention will be included in the design, based on this criteria, Full Spectrum Detention will be required for this development

3.0 EXISTING HYDROLOGICAL CONDITIONS

The site is currently undeveloped with native vegetation (grass with no shrubs) and slopes in a northerly direction to the East Tributary of Jimmy Camp Creek.

The Soil Conservation Service (SCS) classifies the soils within the Creekside South at Lorson Ranch site and the offsite drainage basin boundary as; 3-Ascalon Sandy Loam (2%), 10-Blendon Sandy Loam (1%), 52-Manzanst clay loam (11%), 54-Midway Clay Loam (10%), 56-Nelson-Tassel fine sandy loams (29%), 104-Vona Sandy Loam (12%), 108-Wiley silt loam (35%). The sandy loams are considered hydrologic soil group A/B soils with moderate to moderately rapid permeability. The clay loams are considered hydrologic soil group C/D soils with slow permeability. All of these soils are susceptible to erosion by wind and water, have low bearing strength, moderate to high shrink-swell potential, and high frost heave potential. The sandy loams are comprised of the hydrologic soil group B with moderate to moderately rapid permeability. The Manzanst and Midway clay loams are considered hydrologic soil group C and D soils with slow permeability. The clay loam soils are susceptible to erosion by wind and water, have low bearing strength, moderate to high shrink-swell potential, and high frost heave potential (see table 3.1 below). The clay loams are difficult to vegetate. The clay loams are difficult to vegetate. These soils can be mitigated easily by limiting their use as topsoil.

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Author: Steve Kuehster Subject: Highlight Date: 4/27/2020 12:10:40 PM

Author: Steve Kuehster Subject: Highlight Date: 4/27/2020 12:10:38 PM
the

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 8:34:27 AM
changed wording

Drainage concepts for each of the basins are briefly discussed as follow:

Basin E7
This basin consists of runoff from residential development. Runoff will be directed east to Trappe Drive and then routed north via existing curb and gutter to a low point in Trappe Drive where it will be collected by an existing Type R inlet constructed as part of Lorson Ranch East Filing No. 4. Basin E7 was included in the final drainage report for Lorson Ranch East Filing No. 4. The developed flow from this 0.60-acre basin E7 is 1.2cfs for the 5-year storm event and 2.7cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin E8.1
This basin consists of runoff from 2.5-acre rural residential land and open space areas under the existing electric powerline. Runoff will be directed northwesterly to Horton Drive, then routed west in Horton Drive to Design Point 16 via curb and gutter where it will be collected by a Type R inlet. The developed flow from this 4.00-acre is 4.0cfs for the 5-year storm event and 12.9cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin OS-E2.1
This offsite basin consists of runoff from existing offsite 5.0-acre rural residential development located south of Lorson Ranch. These flows will be directed north through onsite basin E8.2 to Design Point 14 and intercepted by a storm sewer system in Horton Drive. The developed flow from this 36.66-acre basin OS-E2.1 is 15.3cfs for the 5-year storm event and 68.1cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin E8.2
This basin consists of runoff from 2.5-acre rural residential development land. These flows will be directed north to Design Point 14 and intercepted by a storm sewer system in Horton Drive, and will also intercept overland runoff from basin OS-E2.1 The developed flow from this 1.70-acre basin E8.2 is 1.2cfs for the 5-year storm event and 4.9cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin OS-E2.2
This offsite basin consists of runoff from offsite existing 5.0-acre rural residential development. These flows will be directed north through onsite basin E8.3 to Horton Drive, then southwesterly in Horton Drive to Design Point 15 and a Type R inlet. The developed flow from this 6.52-acre basin is 3.4cfs for the 5-year storm event and 15.4cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin E8.3
This basin consists of runoff from 2.5-acre rural and urban residential development. These flows will be directed north to Horton Drive, then southwesterly in Horton Drive to Design Point 15 via curb and gutter where it will be collected by a Type R inlet, and will also intercept overland runoff from basin OS-E2.2 The developed flow from this 5.37-acre basin E8.3 is 4.7cfs for the 5-year storm event and 14.3cfs for the 100-year storm event. See the appendix for detailed calculations.

southeasterly? to DP 17

Basin E8.4
This basin consists of runoff from the urban residential development. These flows will be directed south to Horton Drive, then southwesterly in Horton Drive to Shunka Lane. The developed flow from this 1.20-acre basin is 1.9cfs for the 5-year storm event and 4.3cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin E8.5
This basin consists of runoff from the urban residential development. These flows will be directed north and east to Shunka Lane, then northerly in Shunka Lane and Luna Drive to Design Point 19 via curb and gutter where it will be collected by a Type R inlet. The developed flow from this 4.27-acre basin is

Page: 8

Author: dsdrice Date: 4/30/2020 2:26:56 PM
m 2.5-acre rural and

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 8:39:51 AM
changed to on-site 2.5ac lot

Author: dsdrice Subject: Callout Date: 4/30/2020 2:28:14 PM
to DP 17

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 8:40:00 AM
added text

Author: dsdrice Subject: Callout Date: 4/30/2020 2:27:24 PM
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Author: RSchindler Subject: Sticky Note Date: 5/11/2020 8:40:08 AM
southeasterly

6.8cfs for the 5-year storm event and 15.0cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin E8.6
This basin consists of runoff from the urban residential development. These flows will be directed west to Akela Lane, then northerly in Akela Lane and west in Luna Drive to Design Point 15 via curb and gutter where it will be collected by a Type R inlet. The developed flow from this 1.02-acre basin is 2.0cfs for the 5-year storm event and 4.5cfs for the 100-year storm event. See the appendix for detailed calculations

Basin E8.7
This basin consists of runoff from the urban residential development. These flows will be directed east to Akela Lane, then northerly in Akela Lane and west in Luna Drive to Design Point 15 via curb and gutter where it will be collected by a Type R inlet. The developed flow from this 0.71-acre basin is 1.4cfs for the 5-year storm event and 3.1cfs for the 100-year storm event. See the appendix for detailed calculations

19?

Basin E8.8
This basin consists of runoff from the urban residential development. These flows will be directed south to Horton Drive and west to Shunka Lane, then northerly in Shunka Lane and west in Luna Drive to Design Point 15 via curb and gutter where it will be collected by a Type R inlet. The developed flow from this 2.43-acre basin is 4.1cfs for the 5-year storm event and 9.1cfs for the 100-year storm event. See the appendix for detailed calculations

Basin E8.9
This basin consists of runoff from the urban residential development. These flows will be directed south to Luna Drive, then southeasterly in Luna Drive to Design Point 21 via curb and gutter where it will be collected by Type R inlets. The developed flow from this 1.52-acre basin is 2.4cfs for the 5-year storm event and 5.4cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin E8.10
This basin consists of runoff from the urban residential development. These flows will be directed south to Luna Drive, then southwesterly in Luna Drive to Design Point 21 via curb and gutter where it will be collected by Type R inlets. The developed flow from this 0.38-acre basin is 0.9cfs for the 5-year storm event and 2.0cfs for the 100-year storm event. See the appendix for detailed calculations

Basin E8.11
This basin consists of runoff from backyards of urban residential development and open space areas draining directly to Pond E2. The developed flow from this 3.99-acre basin is 3.2cfs for the 5-year storm event and 12.2cfs for the 100-year storm event. See the appendix for detailed calculations

Basin OS-I1.1
This offsite basin consists of runoff from offsite existing 5.0-acre rural residential development. These flows will be directed north through onsite basin I1.2 to Design Point 4 and intercepted by a Type R inlet in Horton Drive. The developed flow from this 15.54-acre basin is 6.7cfs for the 5-year storm event and 30.7cfs for the 100-year storm event. See the appendix for detailed calculations.

Basin I1.2
This basin consists of runoff from 2.5-acre rural residential development. These flows will be directed north to Design Point 4 and intercepted by a Type R inlet in Horton Drive, and will also intercept runoff from basin OS-I1.1 The developed flow from this 6.23-acre basin is 5.8cfs for the 5-year storm event and 17.6cfs for the 100-year storm event. See the appendix for detailed calculations

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Author: dsdrice Subject: Highlight Date: 4/30/2020 2:21:34 PM

Author: dsdrice Subject: Callout Date: 4/30/2020 2:25:10 PM

19?

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 8:45:39 AM
changed to 19 and 20

Design Point 7a
Design Point 7a is the total pipe flow in a 30" RCP storm sewer in Luna Drive and is located west of Design Point 7. The total pipe flow is 18.2cfs and 29.6cfs in the 5/100-year storm events.

Design Point 8
Design Point 8 is located in Luna Drive (east side) at a low point east of Pond J

(5-year storm)
Tributary Basins: I6 **Inlet/MH Number:** Inlet I6
Upstream flowby: 2.0+4.3 = 6.3cfs **Total Street Flow:** 8.3cfs

Flow Intercepted: 8.3cfs **Flow Bypassed:** 0
Inlet Size: 10' type R, sump

Street Capacity: Street slope = 1.0%, capacity = 9.0cfs, capacity okay since flow is from both ways

(100-year storm)
Tributary Basins: I6 **Inlet/MH Number:** Inlet I6
Upstream flowby: 0.3+9.3+39.1=48.7cfs **Total Street Flow:** 53.1cfs

Flow Intercepted: 15.9cfs **Flow Bypassed:** 37.2cfs to Des. Pt 10
Inlet Size: 10' type R, sump

Street Capacity: Street slope = 1.0%, capacity = 37.3cfs (half street). Flow overtops crown and flows on west side of Luna Dr. Only flow from Basin J5 (6.9cfs) is on westside. Capacity okay

Design Point 9
Design Point 9 is the total pipe flow in a 36" RCP storm sewer in Luna Drive and is located west of Design Point 8. The total pipe flow is 22.4cfs and 53.7cfs in the 5/100-year storm events.

Verify the depth of flow and amount of encroachment at I6 and I7. State where overflows will go. Will the 100-year depth affect Lots 149-151? If so, the required building elevation one foot above that should be provided.

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Author: dsdrice Subject: Callout Date: 4/30/2020 2:19:56 PM

Verify the depth of flow and amount of encroachment at I6 and I7. State where overflows will go. Will the 100-year depth affect Lots 149-151? If so, the required building elevation one foot above that should be provided.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 10:47:29 AM
flow depth 7.8" at flow line, no lot encroachment

Design Point 10
Design Point 10 is located in Luna Drive (west side) at a low point east of Pond J

(5-year storm)
Tributary Basins: J5+I7 **Inlet/MH Number:** Inlet I6
Upstream flowby: 0 **Total Street Flow:** 5.0cfs

Flow Intercepted: 5.0cfs **Flow Bypassed:** 0
Inlet Size: double 20' type R, sump

I7

Street Capacity: Street slope = 1.0%, capacity = 9.0cfs, capacity okay since flow is from both ways

(100-year storm)
Tributary Basins: J5+I7 **Inlet/MH Number:** Inlet I6
Upstream flowby: 37.2cfs **Total Street Flow:** 50.3cfs

Flow Intercepted: 50.3cfs **Flow Bypassed:** 0
Inlet Size: double 20' type R, sump

Design Point 11
Design Point 11 is the total pipe flow in a 42" RCP storm sewer in Luna Drive and is located west of Design Point 10. The total pipe flow is 27.4cfs and 104.0cfs in the 5/100-year storm events.

It's not clear where these are on the plan.

Design Point 12
Design Point 12 is the total pipe flow in a 48" RCP storm sewer in Luna Drive and is located west of Design Point 11. The total pipe flow is 45.6cfs and 133.6cfs in the 5/100-year storm events and outlets into Pond J.

Design Point 13
Design Point 13 is located west of Pond J and is the total flow from the outlet structure for Pond J in a 36" RCP storm sewer. The total outflow is 1.2cfs and 55.5cfs in the 5/100-year storm events from the Pond J full spectrum EDB worksheets. The Pond Outflow Channel is a trapezoidal swale with a 5' bottom, 3:1 side slopes, 0.5% channel slope, and is lined with 12" D50 rip rap. This flow enters the low flow channel of the East Tributary of Jimmy Camp Creek in a rip rap swale. Kiowa Engineering has accommodated the low flow channel for this swale.

Design Point 14
Design Point 14 is the overland runoff flowing north to a 36" storm sewer (end section) located at Horton Drive and Shunka Lane. The total flow into the storm sewer system is 15.8cfs and 70.0cfs in the 5/100-year storm events. The Hw/D is 1.72' for a 36" RCP end section in the 100-year storm event.

Design Point 15
Design Point 15 is located on the south side of Horton Drive at Shunka Lane. This design point was added to verify the street capacity of Horton Drive on the south side of the street from the west. The total street flow is 6.2cfs and 22.9cfs in the 5/100-year storm events from Basins OS E2.2 & E8.3. The street capacity of Horton Drive at 0.7% slope is 7.5cfs (5-yr) and 31.2cfs (100-yr). The street capacity is not exceeded at this design point from the west.

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Author: dsdrice Subject: Highlight Date: 4/30/2020 9:54:38 AM

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 10:47:42 AM
i-7

Author: dsdrice Subject: Callout Date: 4/30/2020 1:22:04 PM
I7

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 10:58:59 AM
i-7

Author: dsdrice Subject: Callout Date: 4/30/2020 9:43:02 AM
It's not clear where these are on the plan.

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lines added to plans

Detention Pond J (Full Spectrum Design)

This is an on-site permanent full spectrum extended detention pond that includes water quality and discharges directly into the East Tributary. Pond J is designed using the UDCF Full Spectrum spreadsheets. The outlet structure is a standard full spectrum sloped outlet structure and the overflow spillway is a concrete weir set above the outlet structure designed by the full spectrum spreadsheets to match pre-developed rates. The full spectrum print outs are in the appendix of this report. See map in appendix for watershed areas.

- Watershed Ares: 54 acres including offsite 5-acre rural residential lots
- Watershed Imperviousness: 26%
- Hydrologic Soils Group B (90%), C/D (10%)
- Forebay: 0.024ac-ft, 24" depth, std concrete forebay
- Zone 1 WQCV: 0.575ac-ft, WSEL: 5684.13, 0.3cfs
- Zone 2 EURV: 1.272ac-ft, WSEL: 5685.10, Top EURV wall set at 5685.37, 6'x6' outlet with 6:1 slope, 1.1cfs
- (5-yr): 1.442ac-ft, WSEL: 5685.31, 1.2cfs
- Zone 3 (100-yr): 3.545ac-ft, WSEL: 5687.67, 55.5cfs
- Pipe Outlet: 36" RCP at 0.5% with restrictor plate up 25"
- Overflow Spillway: 25' wide bottom, elevation=5687.77, 4:1 side slopes, flow depth=1.2'
- Pre-development release rate into creek compliance from full spectrum pond spreadsheets
- Pond Bottom Elevation: 5681.67

Water Quality Design

Water quality will be provided by two permanent extended detention basins (Pond E2, J) for all of the developed areas of this site.

7.0 DRAINAGE AND BRIDGE FEES

Creekside South at Lorson Ranch is located within the Jimmy Camp Creek drainage basin which is currently a fee basin in El Paso County. Current El Paso County regulations require drainage and bridge fees to be paid for platting of land as part of the plat recordation process. Lorson Ranch Metro District will be constructing the major drainage infrastructure as part of the district improvements.

Lorson Ranch Metro District will compile and submit to the county on a yearly basis the Drainage and bridge fees for the approved plats, and shall show all credits they have received for the same yearly time frame.

Creekside South at Lorson Ranch contains approximately 64.257 acres. The open space areas and developed areas will be assessed Drainage, Bridge and Surety fees. Future development tracts will defer fees until platting of the tracts. The 2020 drainage fees are $18,350, bridge fees are $858 and Drainage Surety fees are $7,285 per impervious acre per Resolution 17-348. The drainage and bridge fees are calculated when the final plat is submitted. The fees are due at plat recordation.

2020 fees drainage $19,084 bridge $893 surety $7,285

Table 7.1: Public Drainage Facility Costs (non-reimbursable)

Item	Quantity	Unit	Unit Cost	Item Total
Rip Rap	200	CY	$50/CY	$10,000
Manholes	11	EA	$3000/EA	$33,000
Inlets	12	EA	$3,000	$36,000

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Author: Steve Kuehster Subject: text box Date: 4/28/2020 12:32:39 PM

2020 fees drainage $19,084 bridge $893 surety $7,285

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:03:40 AM

added to report

Step 3: Stabilize Drainageways

East Tributary of Jimmy Camp Creek is a major drainageway located west of this site. In 2020 the East Tributary of JCC adjacent to this site will be reconstructed and stabilized per county criteria. The design included a low flow channel bottom and selectively armored sides.

Step 4: Implement Site Specific & Source Control BMP's

There are no potential sources of contaminants that could be introduced to the County's MS4. During construction source control will be provided with the proper installation of erosion control BMPs to limit erosion and transport of sediment. Area disturbed by construction will be seeded and mulched. Cut and fill slopes will be reseeded, and the slopes equal to or greater than three-to-one will be protected with erosion control fabric. Silt fences will be placed at the bottom of re-vegetated and rough graded slopes. Inlet protection will be used around proposed inlets. In addition, temporary sediment basins will be constructed so runoff will be treated prior to discharge. Construction BMPs in the form of vehicle tracking control, sediment basins, concrete washout area, rock socks, buffers, and silt fences will be utilized to protect receiving waters.

9.0 CONCLUSIONS

This drainage report has been prepared in accordance with the City of Colorado Springs/El Paso County Drainage Criteria Manual. The proposed development and drainage infrastructure will not cause adverse impacts to adjacent properties or properties located downstream. Several key aspects of the development discussed above are summarized as follows:

- Developed runoff will be conveyed via curb/gutter and storm sewer facilities
- The East Tributary of Jimmy Camp Creek will be reconstructed within this study area
- Detention and water quality for this preliminary plan area will be provided in two permanent ponds

10.0 REFERENCES

1. City of Colorado Springs/El Paso County Drainage Criteria Manual DCM, dated November, 1991
2. Soil Survey of El Paso County Area, Colorado by USDA, SCS
3. Jimmy Camp Creek Drainage Basin Planning Study, Dated March 9, 2015, by Kiowa Engineering Corporation
4. City of Colorado Springs "Drainage Criteria Manual, Volume 2
5. El Paso County "Engineering Criteria Manual"
6. Lorson Ranch East MDDP, June 30, 2017 by Core Engineering.
7. Final construction plans "East Fork Jimmy Camp Creek Channel Design", Dated xx 2018, by Kiowa Engineering Corporation
8. El Paso County Resolution #15-042, El Paso County adoption of Chapter 6 and Section 3.2.1 of the City of Colorado Springs Drainage Criteria Manual dated May, 2014.
9. Final Drainage Report for Lorson Ranch East Filing No. 4 by Core Engineering, approved September 12, 2019 (SF19-008)

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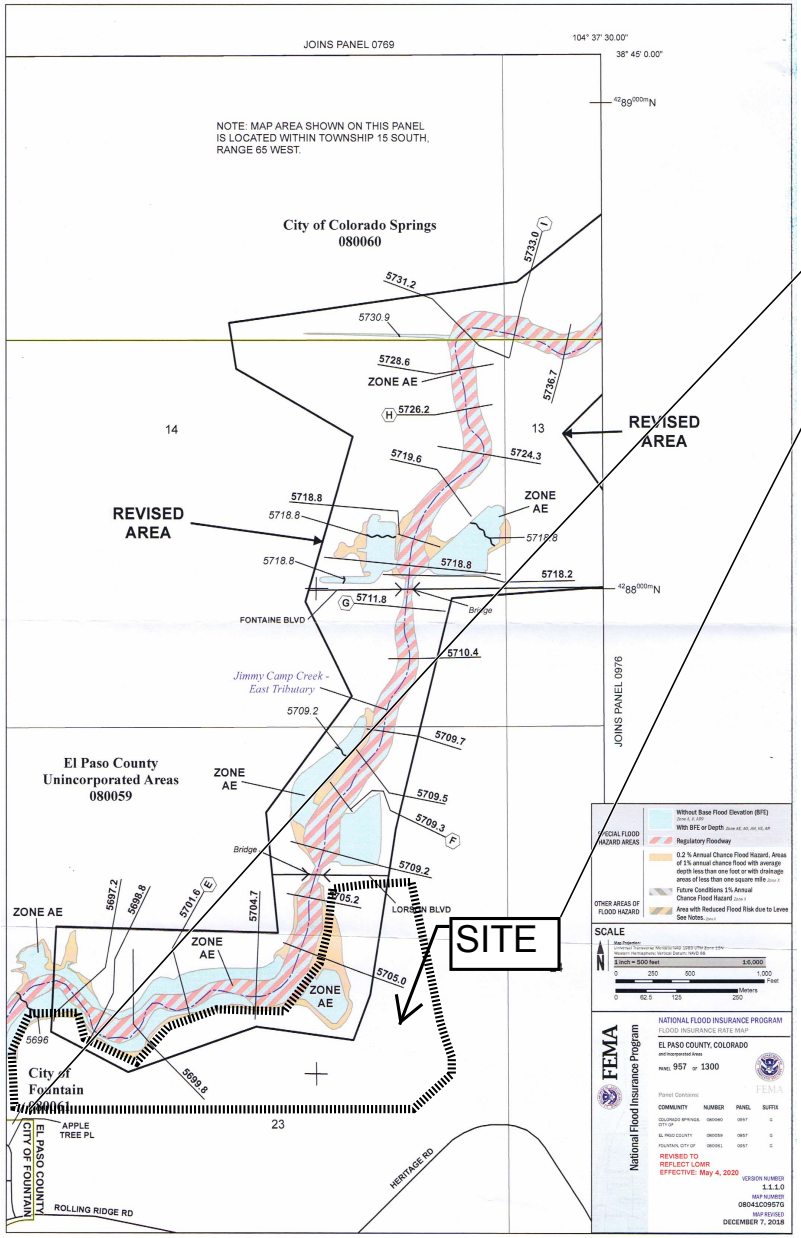
Author: Steve Kuehster Subject: Pen Date: 4/28/2020 12:41:23 PM

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:06:16 AM
date added



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Author: RSchindler Subject: Polygonal Line Date: 1/22/2020 10:41:58 PM -06'00'

Author: RSchindler Subject: Callout Date: 1/21/2020 11:35:23 PM -06'00'

SITE

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Author: RSchindler Subject: Callout Date: 1/22/2020 12:02:44 AM -06'00'

SITE

Author: RSchindler Subject: Polygonal Line Date: 1/22/2020 10:41:11 PM -06'00'

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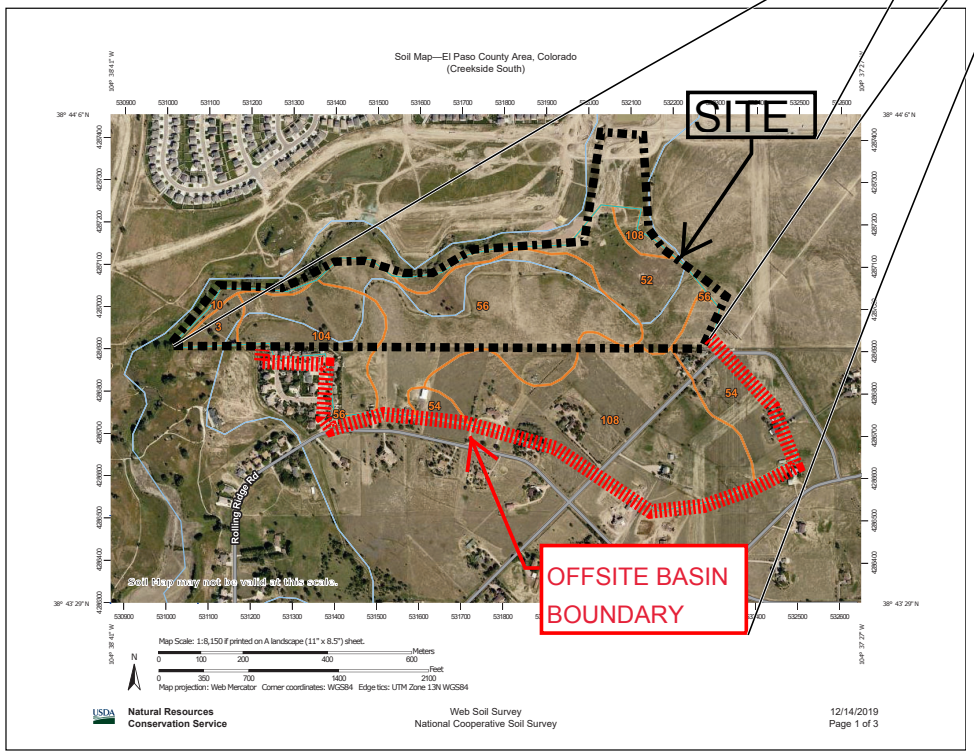
OFFSITE BASIN BOUNDARY



INLET E8.1

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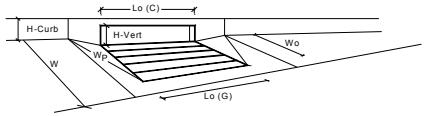
Author: RSchindler Subject: Text Box Date: 1/22/2020 6:57:25 PM -06'00'

INLET E8.1

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.4	6.5	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	25.00	25.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.29	0.38	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.51	0.61	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.75	0.82	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**11.5**	**18.9**	**cfs**
WARNING: Inlet Capacity less than Q Peak for Major Storm	$Q_{PEAK\ REQUIRED}$ =	9.4	33.0	cfs

INLET E8.5

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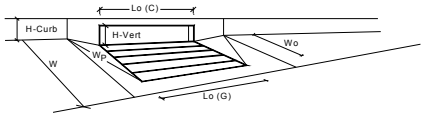
Author: RSchindler Subject: Text Box Date: 1/22/2020 6:39:26 PM -06'00'

INLET E8.5

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	8.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	25.00	25.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.50	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	0.76	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	0.89	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**15.2**	**32.0**	**cfs**
WARNING: Inlet Capacity less than Q Peak for Major Storm	$Q_{PEAK\ REQUIRED}$ =	15.0	33.1	cfs

INLET E8.9

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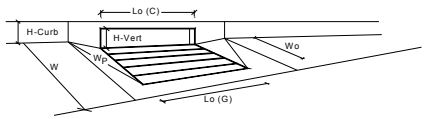
Author: RSchindler Subject: Text Box Date: 1/22/2020 7:00:17 PM -06'00'

INLET E8.9

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	2	2	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.2	7.2	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.18	0.43	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.39	0.68	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.65	0.85	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**4.7**	**23.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	3.1	22.0	cfs

INLET I1

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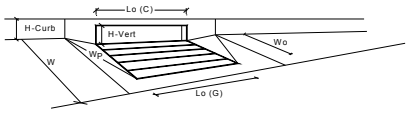
Author: RSchindler Subject: Text Box Date: 1/22/2020 12:36:49 PM -06'00'

INLET I1

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input)				
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.5	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	20.00	20.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Grate Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	N/A	N/A	
Clogging Factor for Multiple Units	Clog =	N/A	N/A	
Grate Capacity as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	N/A	N/A	cfs
Interception with Clogging	Q_{wa} =	N/A	N/A	cfs
Grate Capacity as a Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	N/A	N/A	cfs
Interception with Clogging	Q_{oa} =	N/A	N/A	cfs
Grate Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	N/A	N/A	cfs
Interception with Clogging	Q_{ma} =	N/A	N/A	cfs
Resulting Grate Capacity (assumes clogged condition)	Q_{Grate} =	**N/A**	**N/A**	**cfs**
Curb Opening Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	1.33	1.33	
Clogging Factor for Multiple Units	Clog =	0.03	0.03	
Curb Opening as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	12.9	16.0	cfs
Interception with Clogging	Q_{wa} =	12.5	15.5	cfs
Curb Opening as an Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	39.0	40.5	cfs
Interception with Clogging	Q_{oa} =	37.7	39.2	cfs
Curb Opening Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	20.9	23.7	cfs
Interception with Clogging	Q_{ma} =	20.2	22.9	cfs
Resulting Curb Opening Capacity (assumes clogged condition)	Q_{Curb} =	**12.5**	**15.5**	**cfs**
Resultant Street Conditions		MINOR	MAJOR	
Total Inlet Length	L =	20.00	20.00	feet
Resultant Street Flow Spread (based on street geometry from above)	T =	18.7	20.8	ft.>T-Crown
Resultant Flow Depth at Street Crown	d_{CROWN} =	0.4	0.9	inches
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.38	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	0.61	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	0.82	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**12.5**	**15.5**	**cfs**
WARNING: Inlet Capacity less than Q Peak for Major Storm	$Q_{PEAK\ REQUIRED}$ =	11.1	43.4	cfs

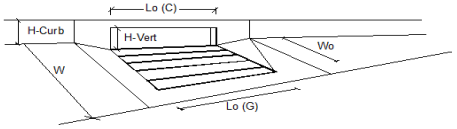
INLET I2

Author: RSchindler Subject: Text Box Date: 1/22/2020 12:48:56 PM -06'00'

INLET I2

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Design Discharge for Half of Street (from Sheet *Inlet Management*)	Q_w =	**8.7**	**47.4**	cfs
Water Spread Width	T =	16.7	17.0	ft
Water Depth at Flowline (outside of local depression)	d =	5.5	9.4	inches
Water Depth at Street Crown (or at T_{MAX})	d_{CROWN} =	0.0	3.8	inches
Ratio of Gutter Flow to Design Flow	E_o =	0.358	0.205	
Discharge outside the Gutter Section W, carried in Section T_x	Q_x =	5.6	33.6	cfs
Discharge within the Gutter Section W	Q_w =	3.1	8.7	cfs
Discharge Behind the Curb Face	Q_{BACK} =	0.0	5.1	cfs
Flow Area within the Gutter Section W	A_W =	0.75	1.40	sq ft
Velocity within the Gutter Section W	V_W =	4.1	6.2	fps
Water Depth for Design Condition	d_{LOCAL} =	8.5	12.4	inches
Grate Analysis (Calculated)		MINOR	MAJOR	
Total Length of Inlet Grate Opening	L =	N/A	N/A	ft
Ratio of Grate Flow to Design Flow	$E_{o\text{-}GRATE}$ =	N/A	N/A	
Under No-Clogging Condition		MINOR	MAJOR	
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Interception Capacity	Q_i =	N/A	N/A	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient for Multiple-unit Grate Inlet	GrateCoef =	N/A	N/A	
Clogging Factor for Multiple-unit Grate Inlet	GrateClog =	N/A	N/A	
Effective (unclogged) Length of Multiple-unit Grate Inlet	L_e =	N/A	N/A	ft
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Actual Interception Capacity	Q_a =	**N/A**	**N/A**	cfs
Carry-Over Flow = Q_o-Q_a (to be applied to curb opening or next d/s inlet)	Q_b =	**N/A**	**N/A**	cfs
Curb or Slotted Inlet Opening Analysis (Calculated)		MINOR	MAJOR	
Equivalent Slope S_e (based on grate carry-over)	S_e =	0.087	0.059	ft/ft
Required Length L_T to Have 100% Interception	L_T =	17.33	46.62	ft
Under No-Clogging Condition		MINOR	MAJOR	
Effective Length of Curb Opening or Slotted Inlet (minimum of L, L_T)	L_e =	5.00	5.00	ft
Interception Capacity	Q_i =	4.0	7.8	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient	CurbCoef =	1.00	1.00	
Clogging Factor for Multiple-unit Curb Opening or Slotted Inlet	CurbClog =	0.10	0.10	
Effective (Unclogged) Length	L_e =	4.50	4.50	ft
Actual Interception Capacity	Q_a =	**3.6**	**7.1**	cfs
Carry-Over Flow = $Q_{b(GRATE)}$-Q_a	Q_b =	**5.1**	**40.3**	cfs
Summary		MINOR	MAJOR	
Total Inlet Interception Capacity	Q =	**3.6**	**7.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	Q_b =	**5.1**	**40.3**	**cfs**
Capture Percentage = Q_a/Q_o =	C% =	**42**	**15**	**%**

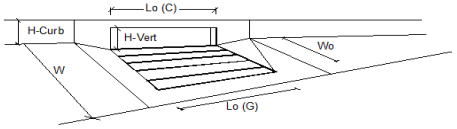
INLET I5

Author: RSchindler Subject: Text Box Date: 1/22/2020 1:05:59 PM -06'00'

INLET I5

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Design Discharge for Half of Street (from Sheet *Inlet Management*)	Q_w =	**7.8**	**46.1**	cfs
Water Spread Width	T =	16.0	17.0	ft
Water Depth at Flowline (outside of local depression)	d =	5.3	9.3	inches
Water Depth at Street Crown (or at T_{MAX})	d_{CROWN} =	0.0	3.7	inches
Ratio of Gutter Flow to Design Flow	E_o =	0.374	0.206	
Discharge outside the Gutter Section W, carried in Section T_x	Q_x =	4.9	32.8	cfs
Discharge within the Gutter Section W	Q_w =	2.9	8.5	cfs
Discharge Behind the Curb Face	Q_{BACK} =	0.0	4.8	cfs
Flow Area within the Gutter Section W	A_W =	0.72	1.38	sq ft
Velocity within the Gutter Section W	V_W =	4.0	6.2	fps
Water Depth for Design Condition	d_{LOCAL} =	8.3	12.3	inches
Grate Analysis (Calculated)		MINOR	MAJOR	
Total Length of Inlet Grate Opening	L =	N/A	N/A	ft
Ratio of Grate Flow to Design Flow	$E_{o\text{-}GRATE}$ =	N/A	N/A	
Under No-Clogging Condition		MINOR	MAJOR	
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Interception Capacity	Q_i =	N/A	N/A	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient for Multiple-unit Grate Inlet	GrateCoef =	N/A	N/A	
Clogging Factor for Multiple-unit Grate Inlet	GrateClog =	N/A	N/A	
Effective (unclogged) Length of Multiple-unit Grate Inlet	L_e =	N/A	N/A	ft
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Actual Interception Capacity	Q_a =	**N/A**	**N/A**	cfs
Carry-Over Flow = Q_o-Q_a (to be applied to curb opening or next d/s inlet)	Q_b =	**N/A**	**N/A**	cfs
Curb or Slotted Inlet Opening Analysis (Calculated)		MINOR	MAJOR	
Equivalent Slope S_e (based on grate carry-over)	S_e =	0.090	0.059	ft/ft
Required Length L_T to Have 100% Interception	L_T =	16.13	45.96	ft
Under No-Clogging Condition		MINOR	MAJOR	
Effective Length of Curb Opening or Slotted Inlet (minimum of L, L_T)	L_i =	5.00	5.00	ft
Interception Capacity	Q_i =	3.8	7.7	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient	CurbCoef =	1.00	1.00	
Clogging Factor for Multiple-unit Curb Opening or Slotted Inlet	CurbClog =	0.10	0.10	
Effective (Unclogged) Length	L_e =	4.50	4.50	ft
Actual Interception Capacity	Q_a =	**3.5**	**7.0**	cfs
Carry-Over Flow = $Q_{b(GRATE)}$-Q_a	Q_b =	**4.3**	**39.1**	cfs
Summary		MINOR	MAJOR	
Total Inlet Interception Capacity	Q =	**3.5**	**7.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	Q_b =	**4.3**	**39.1**	**cfs**
Capture Percentage = Q_a/Q_o =	C% =	**44**	**15**	**%**

INLET I6

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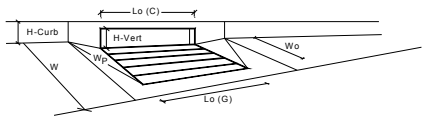
Author: RSchindler Subject: Text Box Date: 1/22/2020 4:08:59 PM -06'00'

INLET I6

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	7.9	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.33	0.49	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.57	0.75	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**8.3**	**15.9**	**cfs**
WARNING: Inlet Capacity less than Q Peak for Minor and Major Storms		$Q_{PEAK\ REQUIRED}$ =	8.3	53.1	cfs

INLET I7

Page: 54

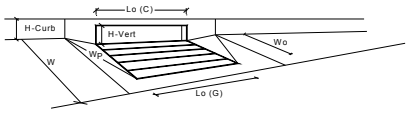
Author: RSchindler Subject: Text Box Date: 1/22/2020 4:05:47 PM -06'00'

INLET I7

Author: dsdrice Subject: Highlight Date: 4/30/2020 9:56:37 AM

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	7.9	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	20.00	20.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Grate Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	N/A	N/A	
Clogging Factor for Multiple Units	Clog =	N/A	N/A	
Grate Capacity as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	N/A	N/A	cfs
Interception with Clogging	Q_{wa} =	N/A	N/A	cfs
Grate Capacity as a Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	N/A	N/A	cfs
Interception with Clogging	Q_{oa} =	N/A	N/A	cfs
Grate Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	N/A	N/A	cfs
Interception with Clogging	Q_{ma} =	N/A	N/A	cfs
Resulting Grate Capacity (assumes clogged condition)	Q_{Grate} =	**N/A**	**N/A**	**cfs**
Curb Opening Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	1.33	1.33	
Clogging Factor for Multiple Units	Clog =	0.02	0.02	
Curb Opening as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	11.4	52.5	cfs
Interception with Clogging	Q_{wa} =	11.3	51.6	cfs
Curb Opening as an Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	68.5	89.1	cfs
Interception with Clogging	Q_{oa} =	67.3	87.6	cfs
Curb Opening Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	26.0	63.6	cfs
Interception with Clogging	Q_{ma} =	25.6	62.5	cfs
Resulting Curb Opening Capacity (assumes clogged condition)	Q_{Curb} =	**11.3**	**51.6**	**cfs**
Resultant Street Conditions		MINOR	MAJOR	
Total Inlet Length	L =	40.00	40.00	feet
Resultant Street Flow Spread (based on street geometry from above)	T =	12.7	26.7	ft.>T-Crown
Resultant Flow Depth at Street Crown	d_{CROWN} =	0.0	2.3	inches
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.21	0.49	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.43	0.75	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.68	0.89	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**11.3**	**51.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.0	50.3	cfs

INLET J2

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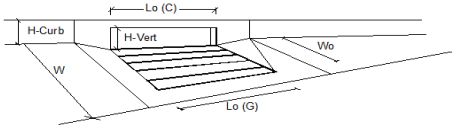
Author: RSchindler Subject: Text Box Date: 1/22/2020 11:01:04 AM -06'00'

INLET J2

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Design Discharge for Half of Street (from Sheet *Inlet Management*)	Q_o =	**1.1**	**2.2**	cfs
Water Spread Width	T =	5.0	7.5	ft
Water Depth at Flowline (outside of local depression)	d =	2.7	3.3	inches
Water Depth at Street Crown (or at T_{MAX})	d_{CROWN} =	0.0	0.0	inches
Ratio of Gutter Flow to Design Flow	E_o =	0.893	0.722	
Discharge outside the Gutter Section W, carried in Section T_x	Q_x =	0.1	0.6	cfs
Discharge within the Gutter Section W	Q_w =	1.0	1.6	cfs
Discharge Behind the Curb Face	Q_{BACK} =	0.0	0.0	cfs
Flow Area within the Gutter Section W	A_W =	0.28	0.39	sq ft
Velocity within the Gutter Section W	V_W =	3.5	4.1	fps
Water Depth for Design Condition	d_{LOCAL} =	5.7	6.3	inches
Grate Analysis (Calculated)		MINOR	MAJOR	
Total Length of Inlet Grate Opening	L =	N/A	N/A	ft
Ratio of Grate Flow to Design Flow	$E_{o\text{-}GRATE}$ =	N/A	N/A	
Under No-Clogging Condition		MINOR	MAJOR	
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Interception Capacity	Q_i =	N/A	N/A	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient for Multiple-unit Grate Inlet	GrateCoef =	N/A	N/A	
Clogging Factor for Multiple-unit Grate Inlet	GrateClog =	N/A	N/A	
Effective (unclogged) Length of Multiple-unit Grate Inlet	L_e =	N/A	N/A	ft
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Actual Interception Capacity	Q_a =	**N/A**	**N/A**	cfs
Carry-Over Flow = Q_o-Q_a (to be applied to curb opening or next d/s inlet)	Q_b =	**N/A**	**N/A**	cfs
Curb or Slotted Inlet Opening Analysis (Calculated)		MINOR	MAJOR	
Equivalent Slope S_e (based on grate carry-over)	S_e =	0.188	0.155	ft/ft
Required Length L_T to Have 100% Interception	L_T =	4.45	6.92	ft
Under No-Clogging Condition		MINOR	MAJOR	
Effective Length of Curb Opening or Slotted Inlet (minimum of L, L_T)	L =	4.45	5.00	ft
Interception Capacity	Q_i =	1.1	2.0	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient	CurbCoef =	1.00	1.00	
Clogging Factor for Multiple-unit Curb Opening or Slotted Inlet	CurbClog =	0.10	0.10	
Effective (Unclogged) Length	L_e =	4.50	4.50	ft
Actual Interception Capacity	Q_a =	**1.1**	**1.9**	cfs
Carry-Over Flow = $Q_{b(GRATE)}$-Q_a	Q_b =	**0.0**	**0.3**	cfs
Summary		MINOR	MAJOR	
Total Inlet Interception Capacity	Q =	**1.1**	**1.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	Q_b =	**0.0**	**0.3**	**cfs**
Capture Percentage = Q_a/Q_o =	C% =	**100**	**85**	**%**

INLET J4

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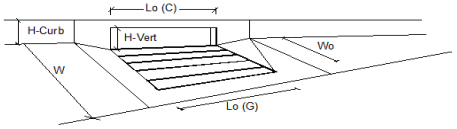
Author: RSchindler Subject: Text Box Date: 1/22/2020 4:07:33 PM -06'00'

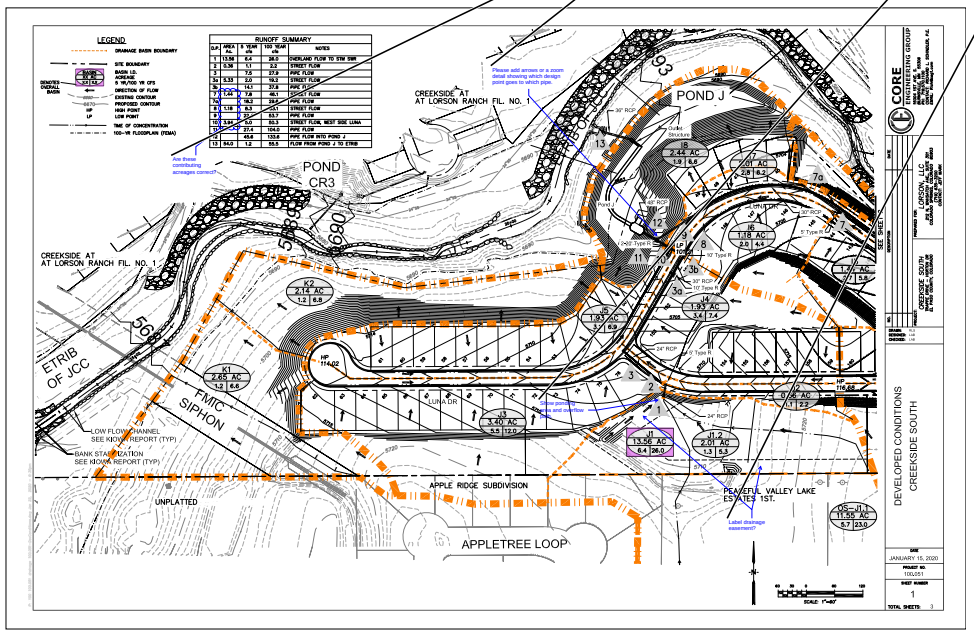
INLET J4

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity		MINOR	MAJOR	
Design Discharge for Half of Street (from Sheet *Inlet Management*)	**Q_o =**	**8.6**	**19.2**	cfs
Water Spread Width	T =	13.9	17.0	ft
Water Depth at Flowline (outside of local depression)	d =	4.9	6.1	inches
Water Depth at Street Crown (or at T_{MAX})	d_{CROWN} =	0.0	0.5	inches
Ratio of Gutter Flow to Design Flow	E_o =	0.429	0.309	
Discharge outside the Gutter Section W, carried in Section T_x	Q_x =	4.9	13.3	cfs
Discharge within the Gutter Section W	Q_w =	3.7	5.9	cfs
Discharge Behind the Curb Face	Q_{BACK} =	0.0	0.0	cfs
Flow Area within the Gutter Section W	A_W =	0.64	0.86	sq ft
Velocity within the Gutter Section W	V_W =	5.7	6.9	fps
Water Depth for Design Condition	d_{LOCAL} =	7.9	9.1	inches
Grate Analysis (Calculated)		MINOR	MAJOR	
Total Length of Inlet Grate Opening	L =	N/A	N/A	ft
Ratio of Grate Flow to Design Flow	$E_{o\text{-}GRATE}$ =	N/A	N/A	
Under No-Clogging Condition		MINOR	MAJOR	
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Interception Capacity	Q_i =	N/A	N/A	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient for Multiple-unit Grate Inlet	GrateCoef =	N/A	N/A	
Clogging Factor for Multiple-unit Grate Inlet	GrateClog =	N/A	N/A	
Effective (unclogged) Length of Multiple-unit Grate Inlet	L_e =	N/A	N/A	ft
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Actual Interception Capacity	**Q_a =**	**N/A**	**N/A**	cfs
Carry-Over Flow = Q_o-Q_a (to be applied to curb opening or next d/s inlet)	**Q_b =**	**N/A**	**N/A**	cfs
Curb or Slotted Inlet Opening Analysis (Calculated)		MINOR	MAJOR	
Equivalent Slope S_e (based on grate carry-over)	S_e =	0.100	0.078	ft/ft
Required Length L_T to Have 100% Interception	L_T =	16.97	28.69	ft
Under No-Clogging Condition		MINOR	MAJOR	
Effective Length of Curb Opening or Slotted Inlet (minimum of L, L_T)	L =	10.00	10.00	ft
Interception Capacity	Q_i =	6.9	10.3	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient	CurbCoef =	1.25	1.25	
Clogging Factor for Multiple-unit Curb Opening or Slotted Inlet	CurbClog =	0.06	0.06	
Effective (Unclogged) Length	L_e =	8.75	8.75	ft
Actual Interception Capacity	**Q_a =**	**6.6**	**9.9**	cfs
Carry-Over Flow = $Q_{b(GRATE)}$-Q_a	**Q_b =**	**2.0**	**9.3**	cfs
Summary		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**6.6**	**9.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**2.0**	**9.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**77**	**52**	**%**



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Author: dsdrice Subject: Callout Date: 4/30/2020 9:45:59 AM

Please add arrows or a zoom detail showing which design point goes to which pipe.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:11:24 AM

arrows added

Author: dsdrice Subject: Cloud+ Date: 4/22/2020 5:58:56 PM

Are these contributing acreages correct?

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:11:17 AM

yes. acreage only includes direct tributary basin.

Author: dsdrice Subject: Callout Date: 4/30/2020 1:49:32 PM

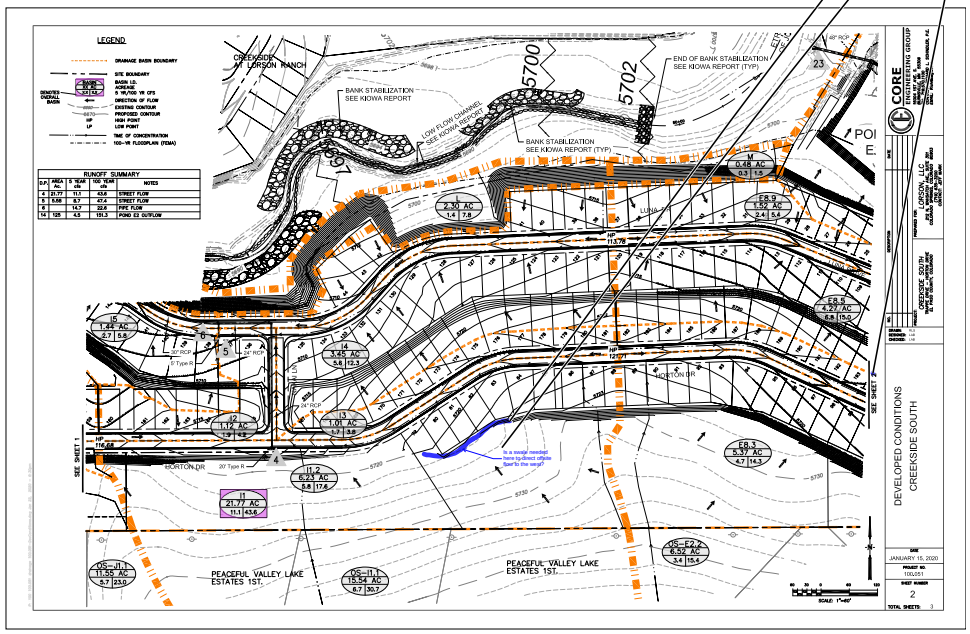
Show ponding area and overflow path.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:47:41 AM

POND ELEV. ADDED AND ARROW

Author: dsdrice Subject: Callout Date: 4/22/2020 10:14:27 PM

Label drainage easement?



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Author: dsdrice Date: 4/29/2020 6:57:15 PM

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:58:26 AM
sheet 3

Author: dsdrice Date: 4/29/2020 6:55:57 PM

Author: dsdrice Subject: Callout Date: 4/29/2020 6:56:46 PM
Is a swale needed here to direct offsite flow to the west?

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 11:57:53 AM
would prefer overland drainage through lots 80-81. a swale woudl concrentrate flow and would require culvert to access lot 79.

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Author: Steve Kuehster Subject: arrow & box Date: 4/28/2020 12:26:18 PM

Show the access road contours or note.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 12:02:15 PM

note added

Author: dsdrice Subject: Callout Date: 4/22/2020 6:02:49 PM

Please provide DP and flows entering from LRE4 or otherwise label total combined pond inflow rates.

Author: RSchindler Subject: Sticky Note Date: 5/11/2020 12:02:32 PM

labeled added