BOULDER COUNTY PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

2021
MORTON HEIGHTS SUBDIVISION
PAVING, DRAINAGE & SIDEWALK IMPROVEMENTS
BOULDER COUNTY PROJECT NO. RS-MOR-001

SCOPE OF WORK:

This project includes the installation of concrete curbs/gutters, concrete sidewalk, a raised concrete crosswalk, storm sewer improvements, roadway re-paving and two pedestrian trail connections. All of the improvements are within the Morton Heights Subdivision located just outside of the town of Niwot, Colorado.

This entire project is located within unincorporated Boulder County.

ROADWAY DESIGN:

Walker Ave. is classified by Boulder County as a residential collector (RC) roadway.

- Posted speed limit on Walker Ave. is 25 mph.
- Design speed for Walker Ave. is 25 mph.

Morton Road is classified by Boulder County as a residential collector (RC) roadway.

- Posted speed limit on Morton Road is 15 mph in the school zone.
- Posted speed limit on Morton Road, outside of the school zone is 25 mph.
- Design speed for Morton Road, outside of the school zone is 30 mph.

Marathon Road is classified by Boulder County as a residential collector (RC) from Walker Ave. East to the school entrance. Past the school entrance, Marathon Road is classified as a local (L) road.

- Design speed for the portion of Marathon Rd. classified as residential collector is 20 mph. Due to existing physical restrictions.

INDEX OF SHEETS:

1. COVER SHEET
2. OVERALL SITE PLAN IMPROVEMENTS
3. LIMITS OF CONSTRUCTION
4. M & E STANDARD PLANS
5-8. GENERAL NOTES
9-10. SUMMARY OF QUANTITIES
11-16. SURVEY CONTROL
17-18. TEMPORARY CONSTRUCTION EASEMENTS
19-20. EXISTING UTILITIES/TESTHOLE LOCATIONS
21-25. REMOVALS (CLEAR/GRUB, CONCRETE, ASPHALT)
26-68. STORM DRAINAGE
69-70. CONCRETE
80-85. ROADWAY PAVING
86-104. GRADING
105-112. SIGNAGE AND STRIPING
113-123. PEDESTRIAN TRAILS
124-141. STORMWATER MANAGEMENT PLAN (SWMP)

APPROVED FOR CONSTRUCTION:

MICHAEL A. THOMAS, P.E.  DATE  COUNTY ENGINEER

FOR CONSTRUCTION
ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-001
GENERAL NOTES (1)

51. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING, INSTALLING, AND MAINTAINING THE REQUIRED CONSTRUCTION ZONE TRAFFIC CONTROL DEVICES AND PERSONNEL PER SPECIAL PROVISIONS. SECTION 850 OF THE STANDARD SPECIFICATIONS AND CONSTRUCTION AND RIGHT-OF-WAY CONTRACT. THIS CONTRACT IS PROMPTED FROM STARTING WORK AT ANY LOCATION IF A TRAFFIC CONTROL PLAN HAS NOT BEEN SUBMITTED AND APPROVED BY THE BOLUDE COUNTY ENGINEER OR TRAFFIC ENGINEER.

52. CONTRACTOR SHALL PROVIDE SAFETY, MARKET ACCESS FOR ALL ADJACENT PROPERTY OWNERS, EMERGENCY SERVICES, SCHOOL BUS DELIVERIES, ETC. AT ALL TIMES.

53. REMOVAL OF TEMPORARY PAVEMENT MARKINGS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

54. THE CONTRACTOR SHALL MAINTAIN PAVEMENT MARKINGS ON THE PROJECT AT ALL TIMES THROUGHOUT THE CONSTRUCTION PERIOD.

55. TRAFFIC WILL USE THE PRESENT ROADWAY DURING CONSTRUCTION.

56. ONLY ONE LANE WILL BE CLOSED TO TRAFFIC AT ANY TIME, UNLESS DIRECTED BY THE ENGINEER AS THE CONTRACTOR SHALL ONLY CLOSE THE SECTION OF ROADWAY REQUIRED TO PERFORM THE WORK FOR THE CURRENT CONSTRUCTION PHASE.

57. TWO LANES OF TRAFFIC SHALL BE MAINTAINED DURING ALL NON-WORKING HOURS.

58. THE CONTRACTOR SHALL NOT LEAVE A VERTICAL EDGE NEXT TO THE TRAVELED ROAD DURING NON-WORKING HOURS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

59. THERE SHALL BE NO SITE CONSTRUCTION ACTIVITIES ON SATURDAYS, SUNDAYS OR HOLIDAYS UNLESS THERE IS SPECIFIC WRITTEN APPROVAL BY BOLUDE COUNTY.

901. SIGN POSTS:
A. SIGN POSTS SHALL BE 2' X 2' X 10' (14 GAUGE) GALVANIZED PERFORATED SQUARE STEEL TUBING.
B. SIGN POST BASES SHALL BE 1 1/4" X 1 1/4" X 4" GALVANIZED PERFORATED SQUARE STEEL TUBING.
C. BASES SHALL BE INCLUDED IN THE COST FOR SIGN POSTS. TOPS OF BASES SHALL BE 3' ABOVE FINISHED GRADE. THE SIGN POST BASES SHALL BE INSTALLED IN THE BASE AND BURIED BOTH WAYS.
D. SIGN POST LOCATIONS SHALL BE APPROVED BY THE ENGINEER AND ROAD MAINTENANCE.
E. POST LOCATIONS IN CONCRETE MEDIAN OR ISLAND SHALL HAVE 6" DIAMETER PVC PIPE SLEEVE INSTALLED PRIOR TO POURING CONCRETE.
F. SIGN TALLNESS ON ALL SIGN PANELS SHALL BE 100+

902. MARKINGS:
A. FINAL PAINTING STRIPING SHALL BE MODIFIED EPOXY PER COST MATERIAL SPECIFICATIONS.
B. ALL STOP LINES, CROWDS AND PAINTING MARKING SYMBOLS SHALL BE WHITE, PREPARED THERMOPLASTIC, "HIGHWAY" OR EQUIVALENT.
C. STOP LINES SHALL BE 2' WIDE; CROWDS SHALL BE 2' X 9', UNLESS OTHERWISE NOTED.
D. MARKING ARROWS SHALL BE ELONGATED.
E. MARKING ARROWS FOR BARE LANES SHALL BE PREDUCTED PER FIG. GC-3 B WITH HELMET CYCLE SYMBOL.
F. PREPARED THERMOPLASTIC INSTALLATION ON CONCRETE SHALL HAVE THE CONCRETE CURVE REMOVED PRIOR TO INSTALLATION & A SANDING AGENT APPLIED TO THE CONCRETE BEFORE INSTALLATION. INSTALLATION SHALL FOLLOW THE MANUFACTURER'S SPECIFICATIONS.
Erosion and Stormwater Notes

ER1. A Boulder County Stormwater Quality Permit (SWQP) is required for this project. Because it:
   - Disturbs one acre or more in size
   - Is within 100 horizontal feet of a watercourse
   - For more information refer to the Boulder County Website
   - The Boulder County Stormwater Quality Permit Application can be accessed via:
     https://www.boulderco.gov/transportation/permit-stormwater-quality-permit/

ER2. No earthwork activity can commence until initial BMP installation is complete and Boulder County Inspector/Representative has approved the installation.

ER3. The contractor shall protect all work areas and facilities from water at all times. Area and facilities subjected to flooding, regardless of the source of water shall be properly drained and restored at no cost to the owner. This shall include removal of any debris caused by flooding.

ER4. All erosion control measures shall be installed at the limits of construction and at areas with disturbed soil, on or off site, prior to any other ground disturbing activity. All erosion control measures shall be maintained in good repair by the contractor, until such time as the entire disturbed areas are stabilized with hard surface or landscaping. Erosion control measures shall be placed where additional erosion features are being constructed.

ER5. It will be the responsibility of the contractor to maintain existing BMPs and ensure their complete removal from the project once 70% of the previous vegetation has been re-established.


Stormwater Control Measures

1. Contractor/permittee shall periodically inspect all installed control measures, provide maintenance, and make repairs as necessary to prevent their failure.

2. Silt fence or an equivalent shall be placed as perimeter controls on all construction activities that occur on land, unless otherwise specified in the contract documents, or otherwise requested. Remove perimeter controls within 30 days after the date of warranty performance of the work or, in accordance with BMPs.

3. Vehicle tracking controls shall be used at all vehicle and equipment access points to the site to prevent sediment exiting the project site onto public roads. Access shall be provided only at locations approved by the Engineer. Vehicle tracking controls shall be recorded on the SWMP site map.

4. All inlets and culverts shall be protected during onsite construction activities. Inlet protection locations shall be recorded on the SWMP site map.

5. Concrete walled in designated sedimentation areas shall be collected, removed from the project site, and disposed of properly. All concrete also includes concrete removed from forms, slabs, etc.

6. The contractor/permittee must maintain a spill kit on site when working around surface waters. If pollutants are spilled into any surface water during the course of construction activities, the contractor/permittee must report the spill to the owner's representative or engineer immediately.

7. All existing mature trees within the designated project area are to be fenced protected in place at all times while otherwise directed by the Engineer. Prior to the Initiation of work, the Contractor/permittee shall mark all trees and large shrubs to be removed as part of construction activities. Areas of tree removal shall be determined and marked in collaboration between the Contractor/permittee and the Engineer.

8. All excavation activities occurring within 10 feet of the stream shall be performed by hand and if necessary, roots shall be cleanly cut out. No trees shall be cut down. If exposed, tree roots shall be backfilled and watered on the same day. Cutting and trimming root stimulator shall be applied. Soil shall not be compacted within the drip line of mature trees unless otherwise approved by the Engineer.

Waste Management

1. The Contractor/permittee shall not burn, bury, or otherwise discharge construction or demolition waste on the site unless otherwise noted.

2. The Contractor/permittee shall provide a portable toilet and associated maintenance schedule for the construction area sufficient to accommodate the construction crew and all other authorized persons to be onsite during construction activities.

Hazardous Materials

1. The Contractor/permittee shall transport, use, and store hazardous materials in accordance with all regulatory requirements. Spilled hazardous materials, including hazardous liquid wastes, shall be removed from the site and property restored to its pre spill state in accordance with regulatory requirements.

2. The Contractor/permittee shall immediately report spills to the proper regulatory authority and shall immediately notify the Engineer.

3. Handling of construction fuels and lubricants:
   A. The Contractor/permittee shall employ persons qualified to handle construction equipment fuels and lubricants.
   B. The Contractor/permittee shall refuel and service equipment away from floodplains of rivers, streams and other bodies of water. The Contractor/permittee shall ensure equipment that enters the water is free from external sources of fuel, oil, and mud.

C. The Contractor/permittee shall prevent handling and fueling operations from contaminating ground surface water and ground water. The Contractor/permittee shall use containment berms and an implementable base course on other system or to contain spilled fuel.

General Care of Water

CARE OF WATER SHALL INCLUDE THE DESIGN OF ALL TEMPORARY CARE OF WATER PROVISIONS INCLUDING COFFER DAMS, SLEEPS, PUMPING SYSTEMS, PIPELINES, CHANNELS, PUMPS, DRAINS, AND OTHER PROTECTIVE AND DEMATERIALIZATION WORKS TO ALLOW FOR WORK TO BE PERFORMED UNDER DRY CONDITIONS.

1. No construction equipment shall be operated below the existing water surface unless specifically authorized by the stormwater quality permit issued by Boulder County, and any other applicable local, state or federal license or permit.

2. The Contractor/permittee is responsible for all care of water not including but not limited to designing, supplying, constructing, operating, and removing all care of water provision including: coffee dams and sediment removal systems, design, supplies, installing, maintaining, and removing protective works for water operations of care of water systems. Care of water shall include provisions for handling groundwater, rainstorms, runoff, snow, snowmelt, and ice that may enter the work area.

3. Protective works shall be designed by the Contractor/permittee as necessary to include exchanges, isolation, and heating systems to ensure that debarking systems operate continuously and do not become frozen during cold weather.

4. The Contractor/permittee shall provide and maintain sediment ponds or other means, remove sediment from waters collected within active construction areas prior to allowing it to enter or return into the watercourse. Contractor/permittee shall dispose of sediments in a suitable off-site waste disposal facility.

5. The Contractor/permittee shall monitor water turbidity during construction activities and shall shut down work at times of excess turbidity in order to prevent the water from being carried to a location within the stream.
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**ENVIRONMENTAL NOTES:**

1. The migratory bird treaty act (mbta) projects migratory birds and their nests and eggs for projects that could potentially have an impact. The following conditions apply.

2. Free trimming/removal of trees trimming and/or removal activities shall be completed before birds begin to nest or after the young have fledged in Colorado. Most nesting and removal activities occur during April 1 and August 31. However, some birds may nest as early as February. A nesting bird survey shall be conducted by a biologist before any tree removal or trimming activities begin.

3. Clearing/grading activities that may disturb nesting birds shall be completed before birds begin to nest or after the young have fledged in Colorado. Most nesting and removal activities occur between April 1 and August 31. If work activities are planned between those dates, nests shall be removed before nesting begins and appropriate measures taken to assure no new nests are constructed. Failure to remove and keep nests from becoming established may postpone project construction.

4. Birds of prey. If construction occurs between February 15 and August 31, a pre-construction survey for nesting raptors must be completed within a half-mile buffer of the project limits. If any nesting raptors occur within this buffer area, follow the Colorado parks & wildlife’s recommended buffer zones and seasonal restrictions for Colorado raptors’ guidelines.

5. Waste materials. All stocked project materials shall be placed away from sensitive areas and confined so that no material(s) or their runoff enters wetlands or waters of the U.S. whether flowing or dry.

6. Invasive aquatic species. The United States army corps of engineers (usace) and the Colorado parks & wildlife have the following conditions for work in streams if heavy equipment is used. Heavy equipment is used. It was previously working in another stream, river, lake, pond or wetland within 10 days of working on the project. The following decontamination practices is necessary to protect the stream, river, lake, pond or wetland and other aquatic animals into the stream, river, lake, pond or wetland as necessary after project completion. Prior to equipment being used in another stream, river, lake, pond or wetland for the same purpose.

7. If once vegetation has been completed, the engineer and the contractor will conduct a walkthrough of the project site, the walkthrough is to identify any areas which need to be maintained or evaluated to determine responsible party until cdp’s permit is closed.
P1. PLAN QUANTITIES OF SURFACING MATERIALS ARE BASED ON THE FOLLOWING UNIT WEIGHTS AND APPLICATION RATES:

- HOT MIX ASPHALT @ 150 LBS/C.Y.
- TACK COAT DILUTED ENHANCED ASPHALT (SLOW SETTING @ 0.10 GAL/S.Y. (DILUTED 1:1 WITH WATER))
- AGGREGATE BASE COURSE @ 135 LBS/C.Y.

THE ENGINEER SHALL RESERVE THE RIGHT TO ADJUST RATES OF APPLICATION IN THE FIELD AS CONDITIONS WARRANT.

P2. TACK COAT WILL NOT BE REQUIRED FOR NEW PAVEMENT PLACED ON AN AGGREGATE BASE COURSE.

P3. SCAFFOLD AND GRASS FROM THE EXISTING ASPHALT SURFACE PRIOR TO PLACING HOT MIX ASPHALT. THIS WORK WILL NOT BE MEASURED OR PAID FOR SEPARATELY, HOWEVER SHALL BE CONSIDERED SUBSEQUENT TO THE WORK.

P4. ANY LAYER OF NOT MIX ASPHALT PAVING THAT IS TO BE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE SUCCEEDING LAYER IS PLACED.

P5. ENHANCED ASPHALT (SLOW SETTING) SHALL CONSIST OF 1 PART WATER AND 1 PART ENHANCED ASPHALT. ENHANCED ASPHALT (SLOW SETTING) WILL NOT BE MEASURED AND PAID FOR SEPARATELY, HOWEVER SHALL BE CONSIDERED SUBSEQUENT TO THE WORK.

P6. A TACK COAT OF ENHANCED ASPHALT (SLOW SETTING) IS TO BE APPLIED TO IMPROVE BOND AT THE FOLLOWING LOCATIONS:

- BEFORE PLACING NEW PAVEMENT OVER EXISTING PAVEMENT
- ALONG THE FACE OF ALL CURBS, GUTTERS, MANHOLES, ADJACENT EXISTING PAVEMENT, AND OTHER SURFACES AGAINST WHICH ASPHALT WILL BE PLACED BETWEEN PAVEMENT COURSES

P7. DUE TO THE NATURE OF THE PROJECT INDEMNITIES WILL NOT BE USED FOR ASPHALT PAVEMENT SMOOTHNESS. PROVIDE A BENEFICIAL PAVED AND SEEPAGE IN ACCORDANCE WITH SUBSECTION 401.10 OF THE SPECIFICATIONS.

DRAINAGE NOTES:

D1. THE CONTRACTOR IS REQUIRED TO KEEP ALL DRAINAGE FACILITIES FUNCTIONAL AND MAINTAIN UNOBSTRUCTED DRAINAGE FLOW TO THESE FACILITIES AT ALL TIMES DURING CONSTRUCTION.

D2. SEE STORMWATER MANAGEMENT PLAN FOR DETAILS ON DRAINAGE AND PHASES OF DRAINAGE PROTECTION DURING THE PROJECT.
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<td>EA</td>
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<tr>
<td>E20-00270</td>
<td>BOLLARD (STANDARD STEEL)</td>
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<td>E20-00270</td>
<td>BOLLARD (FOLDABLE, LOCKABLE)</td>
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<tr>
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<td>CONSTRUCTION SURVEYING</td>
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<tr>
<td>E25-0361</td>
<td>MOBILIZATION (SPECIAL) (PHASE 1)</td>
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<tr>
<td>E26-00002</td>
<td>MOBILIZATION (SPECIAL) (PHASE 2)</td>
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<td>GAL</td>
<td>9</td>
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<tr>
<td>E27-00008</td>
<td>MODIFIED EPOXY PVMT MKG (YELLOW)</td>
<td>GAL</td>
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<td>E30-00007</td>
<td>TRAFFIC CONTROL, INSPECTION</td>
<td>DAY</td>
<td>40</td>
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<td>E30-00012</td>
<td>TRAFFIC CONTROL, MANAGEMENT</td>
<td>DAY</td>
<td>15</td>
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<td>PORTABLE MESSAGE SIGN PANEL</td>
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**FORCE ACCOUNT ITEMS**

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<td>F/A POTHOLE UTILITIES</td>
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<td>700-00380</td>
<td>F/A EROSION CONTROL</td>
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</table>
NOTE:
FOR VERTICAL BM LOCATION, SEE SITE #2 PLAN SHEET

SURVEY NOTES:


2. THE PRIMARY BENCH MARK USED TO DETERMINE THE BASIS OF ELEVATIONS FOR THIS MAP IS CP-1, A CHECKED "A" IN TOP OF CURB IN SOUTH PARKING LOT OF NIWOT ELEMENTARY SCHOOL AS SHOWN ON ALTA/ASPS LAND TITLE SURVEY PREPARED BY EHMHART LAND SURVEYING DATED APRIL 14, 2016. NAVD 1988 ELEVATION = 5188.70 FEET. ELEVATION CHECK WAS MADE TO NGSS STATION TESSAR, A STAINLESS STEEL ROOD IN ALUM BOX MARKED "TESSAR 1999". NAVD 1988 ELEVATION = 5348.99 FEET.

3. EASEMENTS SHOWN ON THIS MAP ARE BASED ON POSITIONS SHOWN ON EXISTING SUBDIVISION PLATS. NO ADDITIONAL RESEARCH WAS PROVIDED.

4. THE POSITIONS OF UNDERGROUND UTILITY LINES SHOWN IN THIS DRAWING SET WERE DETERMINED FROM:

A. FIELD SURVEY – UTILITY LINES WERE MARKED ON THE GROUND BY UNDERGROUND CONSULTING SERVICES, INC. AND BEST AVAILABLE INFORMATION.

B. THE EXISTING UTILITIES FOR SITE #1, WERE FIELD LOCATED AND 20 EXPLORATORY DRILLINGS WERE CONDUCTED BY ACT UNDERGROUND, LLC. THE EXISTING UTILITY LINE WORK SHOWN IN THIS PLAN SET WAS EDITED BY BOULDER COUNTY SO THAT IT WOULD MATCH THE LOCATED UTILITY LINE LOCATIONS.

C. GOODREE AND ASSOCIATES WAS CONTRACTED IN ORDER TO CONFIRM THAT THIS PROJECT IS COMPLIANT WITH THE RECENTLY ENACTED UNDERGROUND UTILITY LAWS SB-167 AND ASSE 38.

5. ACCORDING TO COLORADO LAW, THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) MUST BE NOTIFIED TO MARK ALL UNDERGROUND LINES AT LEAST THREE DAYS PRIOR ANY EXCAVATION OR CONSTRUCTION. CONTRACTOR SHALL CALL 811 OR 1-800-922-9555.


7. LINEAR DIMENSIONS SHOWN ON THIS MAP ARE U.S. SURVEY FEET.
### Point Table

<table>
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<tr>
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<th>Easting</th>
<th>Description</th>
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<td>5000.00</td>
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WALKER AVE
MORTON RD
8761 MORTON ROAD
8789 MORTON ROAD
6945 WALKER AVE
6895 WALKER AVE
NIWOT ELEMENTARY SCHOOL
8778 MORTON ROAD
NIWOT RD
8720 NIWOT ROAD
8758 NIWOT ROAD
8817 MORTON ROAD
NIWOT ELEMENTARY SCHOOL
MARATHON RD
SCHOOL ENTRANCE
8799 MORTON ROAD
8817 MORTON ROAD
1500 SQ. FT.
238.4'
1,192 SQ. FT.
310 SQ. FT.
1/8"=50'
ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
ENGINEERING DIVISION
TEMP CONSTRUCTION EASEMENTS (1)
LEGEND:

QUALITY LEVEL "A"
- W(A) POTABLE WATER
  OWNER: LEIF JAND WATER DISTRICT
- G(A) NATURAL GAS
  OWNER: XCEL ENERGY

QUALITY LEVEL "B"
- T(O) TELEPHONE (COMMUNICATIONS)
  OWNER: CENTURYLINK
- C(D) COMMUNICATIONS DUCT BANK
  OWNER: CENTURYLINK
- F(O) FIBER OPTIC
  OWNER: SAWY BANDWIDTH
- T(R) TRAFFIC SIGNAL CONTROL (ELECTRICAL)
  OWNER: BOULDER COUNTY
- G(N) NATURAL GAS
  OWNER: XCEL ENERGY

QUALITY LEVEL "C"
- S(C) SANITARY SEWER
  OWNER: WMC SANITATION DISTRICT

QUALITY LEVEL "D"
- O(E) OVERHEAD ELECTRICAL
  OWNER: XCEL ENERGY
  OWNER: UNITE PRIVATE NETWORKS
  (NOTE: FIBER OPTIC LINES, OVERHEAD)

QUALITY LEVEL "D":
- G(D) NATURAL GAS
  OWNER: XCEL ENERGY
- W(D) POTABLE WATER
  OWNER: LEIF JAND WATER DISTRICT
- T(D) TELEPHONE (COMMUNICATIONS)
  OWNER: CENTURYLINK

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 38-02
STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA.

UTILITY QUALITY LEVELS
A PROFESSIONAL OPINION OF THE QUALITY AND RELIABILITY OF UTILITY INFORMATION. SUCH RELIABILITY IS DETERMINED BY THE MEANS AND METHODS OF THE PROFESSIONAL, EACH OF THE FOUR EXISTING UTILITY DATA QUALITY LEVELS IS ESTABLISHED BY DIFFERENT METHODS OF DATA COLLECTION AND INTERPRETATION.

UTILITY QUALITY LEVEL A
PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXCAVATION ON EXISTING UTILITIES AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES. USUALLY AT SPECIFIC POINTS, MINIMALLY INFRINGING EXCAVATION IS TYPICALLY USED TO MINIMIZE THE POTENTIAL FOR UTILITY DAMAGE. THE PRECISE HORIZONTAL AND VERTICAL LOCATION, AS WELL AS OTHER UTILITY ATTRIBUTES, IS SHOWN ON PLAN DOCUMENTS. ACCURACY IS TYPICALLY SET TO 15-MM VERTICAL AND TO APPLICABLE HORIZONTAL SURVEYING AND MAPPING ACCURACY AS DEFINED OR EXPECTED BY THE PROJECT OWNER.

UTILITY QUALITY LEVEL B
INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES. QUALITY LEVEL B DATA SHOULD BE REPRODUCIBLE BY SURFACE GEOPHYSICS AT ANY POINT OF THEIR DEPTH. THIS INFORMATION IS SURVEYED TO APPLICABLE TOLERANCES DEFINED BY THE PROJECT AND REDUCED ONTO PLAN DOCUMENTS.

UTILITY QUALITY LEVEL C
INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGMENT TO CORRELATE THIS INFORMATION TO QUALITY LEVEL D INFORMATION.

UTILITY QUALITY LEVEL D
INFORMATION DERIVED FROM EXISTING RECORDS OR ORAL RECORDS.
NOTES:
1. CONTRACTOR SHALL CALL 811 (1-800-222-1811) FOR UTILITY LOCATES PRIOR TO ANY EXCAVATION.
2. THIS DRAWING IS FOR INFORMATION ONLY.
NOTES:
1. CONTRACTOR SHALL CALL 811 (1-800-922-1987) FOR UTILITY LOCATES PRIOR TO ANY EXCAVATION.
2. THIS DRAWING IS FOR INFORMATION ONLY.
NOTES:

1. CONTRACTOR SHALL CALL 811 (1-800-822-1987) FOR UTILITY LOCATES PRIOR TO ANY EXCAVATION.

2. THIS DRAWING IS FOR INFORMATION ONLY.
NOTES:
1. TESTHOLE INDICATES THAT QUALITY LEVEL "QL-A" WAS ACHIEVED AT LOCATION SHOWN.
2. ALL QUALITY LEVEL "QL-A" ELEVATIONS SHOWN ARE TO THE TOP OF THE UTILITY, UNLESS OTHERWISE NOTED.
3. TESTHOLES EXCAVATED BY BADGER DAYLIGHTING (ACT UNDERGROUND, LLC) ON 06/25/2018.
4. COPIES OF FIELD NOTES CREATED BY BADGER DAYLIGHTING AND GIVEN TO BOULDER COUNTY ARE AVAILABLE UPON REQUEST.
5. ELEVATIONS SHOWN ARE ON TOP OF THE LOCATED UTILITY.
STORM DRAIN OUTFALL

- Reset existing grouted riprap
- Slope outlet to match outlet pipe @ 3%
- West side of channel leave existing riprap in place
- Match existing width
- 18" deep
- Subgrade-native soil compact to 95%, max std. proctor density
- 9" type L buried soil riprap 
  - 2 x 250 (9") = excavation depth of 18" in bottom of irrigation ditch

N.T.S.
NIWOT ROAD

EXISTING COMUNICATIONS DUCT BANK
EXISTING 18" CMP STORM LINE TO REMAIN ACTIVE DURING CONSTRUCTION

WASHINGTON AVE

NEW 8' WIDE CONCRETE DRAIN PAN
ONTO GROUTED RPRAP

EXISTING 18" CMP STORM LINE (REMAINS IN PLACE)

CAUTION:

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-001
STORM PLAN & PROFILE-1

1. EXISTING WATERLINE TO BE REPLACED BY LEFTHAND WATER DISTRICT, DURING THE CONSTRUCTION OF THIS PROJECT.

2. CONTRACTOR SHALL NOTIFY LEFTHAND WATER DISTRICT ONE WEEK PRIOR TO EXCAVATION OF THE STORM SEWER, TO ALLOW THE DISTRICT ADVANCE NOTICE FOR THE WATERLINE REPLACEMENT/RELOCATION WORK. FOUR WORKING DAYS ARE NEEDED TO REPLACE THE AFECTED STRETCH OF EXISTING AC WATERLINE IN WALKER AVE.

3. LEFTHAND WATER DISTRICT CONTACT: STEVE BUCKSHEE (303)550-4200 OR 5buckshee@lefthandwater.org

4. ALL STORM MANHOLE ARE FLAT-TOP WITH ECCENTRIC FLAT SLAB MANHOLE LIDS.

5. CONTRACTOR SHALL TAKE CARE TO LINE THE STORM MANHOLE LD UP WITH MANHOLE STARS.

6. PIPE LENGTHS SHOWN ARE 20', MEASURED FROM C TO C OF STRUCTURE(S).
EMBANKMENT CONSTRUCTION NOTES:

1. EMBANKMENT CONSTRUCTION SHALL CONSIST OF CONSTRUCTING ALL FILL AREAS, INCLUDING PREPARATION OF THE AREAS UPON WHICH THEY ARE TO BE PLACED, THE PLACING AND COMPACTING OF APPROVED MATERIAL WITHIN AREAS WHERE UNSUITABLE MATERIALS HAVE BEEN REMOVED, AND THE PLACING AND COMPACTING OF EMBANKMENT MATERIAL IN HOLES, PITS, AND OTHER DEPRESSIONS WITHIN THE PROJECT AREA.

2. ONLY APPROVED MATERIALS SHALL BE USED IN THE CONSTRUCTION OF EMBANKMENTS AND BACKFILLS.

3. APPROVED MATERIALS SHALL CONSIST OF CLEAN ONSITE COHESIVE OR APPROVED IMPORTED SOILS, ONSITE COHESIVE OR IMPORTED SOILS SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS, USING EQUIPMENT AND PROCEDURES THAT PRODUCE RECOMMENDED MOISTURE CONTENTS AND DENSITIES THROUGHOUT THE LIFT AND EMBANKMENT HEIGHT. ONSITE OR IMPORTED COHESIVE SOILS SHALL BE COMPACTED WITHIN A MOISTURE CONTENT RANGE OF TWO PERCENT (2%) ABOVE TO TWO PERCENT (2%) BELOW THE OPTIMUM MOISTURE CONTENT AND COMPACTED TO NINETY-FIVE PERCENT (95%) OF THE MAXIMUM STANDARD PROCTOR DENSITY (ASTM D698).

4. THE GROUND SURFACE UNDERLYING ALL FILLS SHALL BE CAREFULLY PREPARED BY REMOVING ALL ORGANIC MATTER, SCARIFICATION TO A DEPTH OF EIGHT (8) INCHES AND RECOMPACTING TO NINETY-FIVE PERCENT (95%) OF THE MAXIMUM STANDARD PROCTOR DENSITY (ASTM D698) AT OPTIMUM MOISTURE CONTENT + OR - TWO PERCENT (2%) PRIOR TO FILL PLACEMENT.

5. EMBANKMENT MATERIAL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING EIGHT (8) INCHES (LOOSE MEASUREMENT) AND SHALL BE COMPACTED TO NINETY-FIVE PERCENT (95%) OF THE MAXIMUM STANDARD PROCTOR DENSITY (ASTM D698) AT OPTIMUM MOISTURE CONTENT + OR - TWO PERCENT (2%) TO ADEQUATELY SPREAD EQUIPMENT SHALL BE USED ON EACH LIFT TO OBTAIN UNIFORM THICKNESS PRIOR TO COMPACTING. AS THE COMPACTING OF EACH LAYER PROGRESSES, CONTINUOUS LEVELING AND MANIPULATING REQUIRED TO ENSURE UNIFORM DENSITY.

6. MATERIALS WHICH ARE REMOVED FROM EXCAVATIONS BENEATH THE WATER TABLE MAY BE USED IN THE OPTIMUM MOISTURE CONTENT AND SHALL BE REQUIRED TO BE DRIED OUT PRIOR TO REUSING THEM.

7. CROSS HAULING OR OTHER ACTION AS APPROPRIATE WILL BE ORDERED WHEN NECESSARY TO ENSURE THAT THE BEST AVAILABLE MATERIAL IS PLACED IN CRITICAL AREAS OF EMBANKMENTS INCLUDING THE TOP TWO (2) FEET OF ALL EMBANKMENTS. NO ADDITIONAL PAYMENT WILL BE MADE FOR CROSS HAULING ORDERED BY ENGINEER.

8. FROZEN MATERIALS SHALL NOT BE USED IN CONSTRUCTION OF EMBANKMENTS.

9. DURING THE CONSTRUCTION OF THE DITCHES/SWALE, THE DITCH BOTTOM SHALL BE MAINTAINED IN SUCH CONDITION THAT IT WILL BE WELL DRAINED AT ALL TIMES.

10. EMBANKMENT (FILL) AND STRUCTURAL BACKFILL WORK EITHER COMPLETED OR IN A STAGE OF COMPLETION THAT IS EITHER ERODED OR WASHED AWAY OR BECOMES UNSTABLE AS A RESULT OF EITHER RAINS, SNOW MELT, CHANNEL FLOWS, OR LACK OF PROPER WATER CONTROL SHALL BE EITHER REMOVED AND REPLACED, RECOMPACTED, OR REMOVED AS DIRECTED BY THE ENGINEER AND IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS AT CONTRACTOR'S SOLE EXPENSE.

11. REMOVED UNSUITABLE MATERIALS SHALL BE HAULED AWAY AND DISPOSED OF AT CONTRACTOR'S EXPENSE. PLACEMENT OF REPLACEMENT MATERIALS FOR REMOVED UNSUITABLE MATERIALS SHALL BE PURCHASED, PLACED, AND COMPACTED AT CONTRACTOR'S EXPENSE.

12. PROOF ROLLING: PROOF ROLLING WITH A HEAVY RUBBER TIRED ROLLER SHALL BE REQUIRED, IF DESIGNATED ON THE DRAWINGS OR WHEN ORDERED BY ENGINEER.

13. PROOF ROLLING SHALL BE DONE AFTER SPECIFIED COMPACTION HAS BEEN OBTAINED. AREAS FOUND TO BE WEAK AND THOSE AREAS WHICH FAILED SHALL BE RIPPED, SCARIFIED, METED IF NECESSARY, AND RECOMPACTED TO THE REQUIREMENTS FOR DENSITY AND MOISTURE AT CONTRACTOR'S EXPENSE.

14. PROOF ROLLING SHALL BE DONE WITH EQUIPMENT AND IN A MANNER ACCEPTABLE TO ENGINEER. PROOF ROLLING AS SHOWN ON THE DRAWINGS OR AS ORDERED BY ENGINEER SHALL NOT BE MEASURED AND PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE UNIT PRICES BID FOR THE WORK.

WALKER AVE. DITCH SECTION

NOTES:
1. COMPACT FILL/EMBANKMENT IN 3' LIFTS AS PLACED.

INSTALL GEOTEXTILE MATERIAL UNDER RIPRAP (DRAINAGE CLASS I)

SOIL RIPRAP DITCH USING TYPE M 0.5"-1.25" RIPRAP DEPTH
TYPE L 0.5"-1.0" RIPRAP DEPTH (SEE RIPRAP NOTES SHEET 56)

MATERIAL 6' DEPTH

PLACE 4' TOPSOIL AND HAND BROADCAST NATIVE SEED MIX PRIOR TO INSTALLING BLANKET

INSTALL SOIL RETENTION BLANKET (SRB)

PER CU YD M-5106

SUBGRADE NATIVE SOIL COMACT TO 95%, MAX STD. PROCTOR DENSITY

NOTES:
1. COMPACT FILL/EMBANKMENT IN 3' LIFTS AS PLACED.

WALKER AVE. DITCH SECTION AND NOTES
NOTE:
FINAL PAVED SURFACE WILL BE SEVERAL INCHES HIGHER THAN EXISTING ROAD SURFACE SHOWN.

EXISTING EDGE OF ASPHALT (R.O.W.)

END GRADING OF DITCH (TIE TO EXISTING DITCH)

DO NOT DISTURB EXISTING VEGETATION IN THIS AREA OF THE DRAINAGE DITCH

EXHISTING GRADE OF DITCH

1. SURFACE U.T.L. INVESTIGATION (S.U.I.) WAS NOT PERFORMED ON THIS SECTION OF THE PROJECT.
2. EXISTING UTILITIES THAT WERE IN POTENTIAL CONFLICT WITH THE PROPOSED STORM PIPE(S) WERE POTTED AND SURVEYED IN ORDER TO IDENTIFY THEIR LOCATION AND ELIMINATE CONFLICTS DURING CONSTRUCTION.
3. CONTRACTOR SHALL CONTACT 811 FOR UTILITY MARKINGS PRIOR TO EXCAVATION.
4. ALL STORM PIPES ARE TO HAVE A MINIMUM OF 12" OF COVER.
1. Soil retention blankets shall be approved photodegradable or biodegradable.
2. Install soil retention blankets per cost standard detail M-216-1.
3. Excavate 2X the mean riprap diameter prior to placement (example: type L (9") riprap requires 18" deep excavation).
4. Hand broadcast native seed mix and topsoil on top of final ditch riprap layer. See detail S2, sheet 56.
**RIPRAP NOTES:**

**RIPRAP DESIGNATION & DESIGNATION:

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Species Name</th>
<th>Variety</th>
<th>% of Mix</th>
<th>HPLS/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Oats Grama</td>
<td>Bouteloua curtipendula</td>
<td>Vail</td>
<td>15%</td>
<td>2.74</td>
</tr>
<tr>
<td>Blue Grama</td>
<td>Bouteloua gracilis</td>
<td>Native, Alma, or Nachita</td>
<td>20%</td>
<td>0.84</td>
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<td>Buffalograss</td>
<td>Buchloe dactyloides</td>
<td>Native</td>
<td>19%</td>
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<tr>
<td>Western Wheatgrass</td>
<td>Pascopyrum smithii</td>
<td>Arriba</td>
<td>12.5%</td>
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<td>Little Bluestem</td>
<td>Schizachyrium scoparium</td>
<td>Cimarron or Pastura</td>
<td>13%</td>
<td>1.74</td>
</tr>
<tr>
<td>Green Needlegrass</td>
<td>Stipa vittata</td>
<td>Lodens or Native</td>
<td>12%</td>
<td>2.31</td>
</tr>
<tr>
<td>Totals:</td>
<td></td>
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<td>100%</td>
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**Foothills Seed Mix**

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<tr>
<th>Common Name</th>
<th>Species Name</th>
<th>Variety</th>
<th>% of Mix</th>
<th>HPLS/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Oats Grama</td>
<td>Bouteloua curtipendula</td>
<td>Vail</td>
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<td>1.62</td>
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<tr>
<td>Blue Grama</td>
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<td>Native, Alma, or Nachita</td>
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<td>0.63</td>
</tr>
<tr>
<td>Slender Wheatgrass</td>
<td>Elymus trachycaulus</td>
<td>San Luis</td>
<td>20%</td>
<td>4.56</td>
</tr>
<tr>
<td>Junegrass</td>
<td>Koeleria macrantha</td>
<td>Native</td>
<td>10%</td>
<td>0.15</td>
</tr>
<tr>
<td>Western Wheatgrass</td>
<td>Pascopyrum smithii</td>
<td>Arriba</td>
<td>10%</td>
<td>3.17</td>
</tr>
<tr>
<td>Switchgrass</td>
<td>Panicum virgatum</td>
<td>Blackwell or Niagara</td>
<td>2%</td>
<td>6.03</td>
</tr>
<tr>
<td>Little Bluestem</td>
<td>Schizachyrium scoparium</td>
<td>Cimarron or Pastura</td>
<td>8%</td>
<td>1.07</td>
</tr>
<tr>
<td>Green Needlegrass</td>
<td>Stipa vittata</td>
<td>Lodens or Native</td>
<td>12%</td>
<td>1.93</td>
</tr>
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<td></td>
<td>100%</td>
<td>14.95</td>
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**Mountain Seed Mix**

<table>
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<tr>
<th>Common Name</th>
<th>Species Name</th>
<th>Variety</th>
<th>% of Mix</th>
<th>HPLS/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Grama</td>
<td>Bouteloua gracilis</td>
<td>Native, Alma, or Nachita</td>
<td>20%</td>
<td>0.64</td>
</tr>
<tr>
<td>Canada Wildrye</td>
<td>Elymus canadensis</td>
<td>Native</td>
<td>10%</td>
<td>3.03</td>
</tr>
<tr>
<td>Thapsikgale Wheatgrass</td>
<td>Elymus canadensis</td>
<td>Citanna</td>
<td>25%</td>
<td>5.58</td>
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<tr>
<td>Slender Wheatgrass</td>
<td>Elymus trachycaulus</td>
<td>San Luis</td>
<td>25%</td>
<td>5.48</td>
</tr>
<tr>
<td>Junegrass</td>
<td>Koeleria macrantha</td>
<td>Native</td>
<td>10%</td>
<td>0.15</td>
</tr>
<tr>
<td>Sandberg’s Bluegrass</td>
<td>Poa secunda</td>
<td>Native</td>
<td>10%</td>
<td>0.38</td>
</tr>
<tr>
<td>Totals:</td>
<td></td>
<td></td>
<td>100%</td>
<td>15.46</td>
</tr>
</tbody>
</table>

**RIPRAP NOTES:**

1. **THERE ARE THREE TYPES OF RIPRAP MATERIAL FOUND IN THIS PROJECT.**

   **RIPRAP** - CONSISTS OF A CRUSHED BLOCK CENTERED IN A CHAMBER AND UNDER EXPOSED RIPRAP MATERIAL. **SOIL RIPRAP** - RIPRAP PRE-WİRED WITH NATIVE SOIL. SEE PLACEMENT NOTES BELOW.

2. **GRÖNLİED ROCK** - RIPRAP WITH GRÖNLİED PLACED UNDER AND AROUND TO HOLD IT IN PLACE AND PREVENT EROSION OF THE MATERIAL UNDERNEATH.

3. **SOIL RIPRAP PLACEMENT:**

   **SOURCE: VIVE HIGH DENSITY FLOOD ZONES REPORT**

   **SECTION 31-370 SUBSECTION 3.02 (REVISED 10/2017)**

   **A.** ADJACENT STOCKPILES OF RIPRAP AND SOIL SHALL BE CREATED AND MIXED DONE AT THE STOCKPILE LOCATION, NOT AT THE LOCATION WHERE SOIL RIPRAP IS TO BE PLACED.

   **B.** MIX THREE-FIVE PERCENT (35%) SOIL BY VOLUME WITH STOCKPiled RIPRAP, USING ADDITIONAL MIXTURE AND CONTROL PROCEDURES THAT ENSURE A HOMOGENEOUS MATURE, WHERE THE SOIL FILLS THE INTERSECTING Voids IN THE RIPRAP WITHOUT DISPLACING RIPRAP.

   **C.** WITH PRIOR APPROVAL OF ENGINEER, LAYERING THE RIPRAP AND SOIL INSTEAD OF PREVIOUSLY MAY BE ALLOWED IF THE NATIVE SOIL IS GRANULAR.

**D.** PLACE A FIRST LAYER OF SMALLER SOIL RIPRAP OF APPROXIMATE 0.50 THICKNESS, THEN PLACE THE TOP LAYER WITH SURFACE ROCKS THAT ARE LARGE 0.50 OR GREATER, FILLING Voids AS NECESSARY WITH SMALLER PLANTED RIPRAP TO CREATE A SMOOTH SURFACE ON THE DITCH SIDES AND BOTTOM.

**E.** THE MIXTURE SHALL BE CONSOLIDATED BY LARGE VOLUMETRIC EQUIPMENT OR BACKHOE BUCKET TO CREATE A Tight, DENSE INTERLOCKING MASS.

**F.** THE SOIL SHALL BE FURTHER WETTED TO ENCOURAGE Voids FILLING WITH SOIL.

**G.** ANY LARGE Voids SHALL BE FILLED WITH ROCK AND SMALL Voids FILLED WITH SOIL.

**H.** EXCESSIVELY THICK ZONES OF SOIL PRIOR TO WASHING AWAY SHALL NOT BE CREATED (FOR EXAMPLE, NO THICKNESS GREATER THAN SIX (6) INCHES).

**I.** FOR BURIED SOIL RIPRAP, THE TOP SURFACE SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL SUCH THAT NO ROCK POINTS ARE PROTRUDING.

**J.** THE FINAL SURFACE SHALL BE THOROUGHLY WETTED FOR GOOD COMPACTION, SMOOTHED AND COMPACTED BY VIBRATING EQUIPMENT, THE SURFACE SHALL THEN BE HARD Raked TO REMOVE PLANTING OR SEEDING.
1. This drawing is a diagram and is intended for general information only.

2. Pipe installations will require field layout and design of the tracer wire system, in order to meet field conditions.

3. Wire shown away from pipe for clarity. Wire shall be installed on the top of the pipe. The wire shall be fastened to the pipe with tape or plastic ties at 5' intervals.

4. Access boxes should not be installed within the roadway, unless directed by the county engineer.

WHERE THE ANODE WIRE WILL BE CONNECTED TO THE TRACER WIRE ACCESS BOX, A MINIMUM OF TWO FEET OF EXCESS/SLACK WIRE IS REQUIRED AFTER MEETING FINAL ELEVATION.

NOT TO SCALE

TRACER WIRE SCHEMATIC
WHERE THE ANODE WIRE WILL BE CONNECTED TO THE TRACER WIRE ACCESS BOX, A MINIMUM OF TWO FEET OF EXCESS/BLACK WIRE IS REQUIRED AFTER MEETING FINAL ELEVATION (TYP)

TRACER WIRE SHALL BE ROUTED AROUND MANHOLES ON THE NORTH AND/OR EAST SIDE (TYP)

LOCATE THE MARKER POST IN-LINE WITH THE ACCESS BOX (TYP)

ATTACH ANODE DIRECTLY BENEATH AND IN-LINE WITH THE MAINLINE TRACER WIRE (TYP)

3-WAY LOCKABLE CONNECTOR (TYP)

TRACER WIRE SHALL BE ROUTED AROUND MANHOLES ON THE NORTH AND/OR EAST SIDE (TYP)

ATTACH ANODE DIRECTLY BENEATH AND IN-LINE WITH THE MAINLINE TRACER WIRE (TYP)

WHERE THE ANODE WIRE WILL BE CONNECTED TO THE TRACER WIRE ACCESS BOX, A MINIMUM OF TWO FEET OF EXCESS/BLACK WIRE IS REQUIRED AFTER MEETING FINAL ELEVATION (TYP)

LEGEND:
- MAINLINE TRACER WIRE: OPEN TRENCH INSTALLATION #4 WAX HOPE INSULATED COPPER WIRE COLOR COATED GREEN (TYP)
- GRADE LEVEL-IN-GROUND ACCESS BOX AND DRIVE-IN MAGNESIUM GROUNDING ANODE
- 48” TALL POLYETHYLENE MARKER POST (GREEN IN COLOR)
- DRIVE-IN MAGNESIUM GROUNDING ANODE ROD

NOTES:
1. THIS DRAWING IS A DIAGRAM AND IS INTENDED FOR GENERAL INFORMATION ONLY.
2. PIPE INSTALLATIONS WILL REQUIRE FIELD LAYOUT AND DESIGN OF THE TRACER WIRE SYSTEM, IN ORDER TO MEET FIELD CONDITIONS.
3. WIRE SHALL BE INSTALLED ON THE TOP OF THE PIPE, THE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 5’ INTERVALS.
4. ACCESS BOXES SHOULD NOT BE INSTALLED WITHIN THE ROADWAY, UNLESS DIRECTED BY THE COUNTY ENGINEER.
STORM SEWER (PLAN VIEW)

NOT TO SCALE

MAINLINE TRACER WIRE:
OPEN TRENCH INSTALLATION
#14 AWG HOPE INSULATED COPPER WIRE
COLOR COATED GREEN (TYP)

ACCESS BOX (SECTION VIEW)

NOT TO SCALE

TAPE OR PLASTIC TE (TYP)
THE MAINLINE TRACER WIRE TO TOP OF PIPE

STORM SEWER (SECTION VIEW)

NOT TO SCALE

MAINLINE TRACER WIRE:
OPEN TRENCH INSTALLATION
#14 AWG HOPE INSULATED COPPER WIRE
COLOR COATED GREEN (TYP)

ACCESS BOX (SECTION VIEW)

NOT TO SCALE

TAPE OR PLASTIC TE (TYP)
THE MAINLINE TRACER WIRE TO TOP OF PIPE

DRIVE-IN MAGNESIUM GROUNDING ANODE ROD (1.5 lbs)

WIRE CONNECTS TO MAINLINE WIRE (SEE SECTION VIEW)

GROUND WIRE:
OPEN TRENCH INSTALLATION
#14 AWG HOPE INSULATED COPPER WIRE
COLOR COATED RED (TYP) CONNECTED TO GROUND ROD

COIL 2' OF EXTRA RED AND GREEN WIRE IN ACCESS BOX

GROUND SURFACE

GRADE LEVEL / IN-GROUND TRACER WIRE ACCESS BOX

WIRE ACCESS BOX COLOR COATED GREEN
DENVER TYPE 16 STORM INLET - PLAN VIEW

INLET PAY ITEMS

SCALE: 1"=2'

STATION SHOWN ON PLANS

INLET FRAME AND GRADE
NOT SHOWN IN THIS
VIEW FOR CLARITY
(SEE SECTIONS AND DETAILS)

GUTTER TRANSITION
TYPICAL BOTH SIDES

#4's @ 12"(MAX)
EACH WAY (TYP.)

DENVER TYPE 16 STORM INLET - PLAN VIEW

SCALE: 1"=2'

INLET PAY ITEMS

SCALE: 1"=2'

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SCALE: 1"=2'
NOTES:

1. GRATE AND FRAME MODELS SHOWN ARE EAST JORDAN IRONWORKS (https://www.ejio.com).

2. CONTRACTOR SHALL SUBMIT DRAWINGS AND SPECS FOR ANY GRATE SUBSTITUTIONS, AT LEAST 10 WORKING DAYS PRIOR TO INSTALL FOR REVIEW BY PROJECT ENGINEER.
1. ALL PRECAST MANHOLES SHALL CONFORM WITH ASTM C-478.

2. ALL MANHOLES SHALL COMPLY WITH AASHTO HS-20 LOADING AND WITHSTAND IMPACT UP TO 3' BURY DEPTH ON FLAT TOP.

3. MANHOLE STEPS PER OSHA STD 01-01-009.

4. MOVING AND SETTING OF MANHOLES SHALL INCLUDE THE USE OF A SPREADER BAR TO PREVENT DAMAGE TO PRECAST MATERIALS.

5. CONFIRM PRECAST MANHOLE BASE, RER AND FLAT TOP DIMENSIONS WITH PRECAST DESIGN ENGINEER PRIOR TO ORDERING AND INSTALLATION.

NOTE:

- ALIGN MANHOLE UD OPENING WITH STAIRS

- PRECAST FLAT TOP

- RING/COVER (SIZE DETAIL)

- GRADE RINGS/EXTENSION COLLARS USE AS NEEDED (MAX 4 EACH)

- MANHOLE STEPS SPACED @12" TO 16" VERTICALLY

- PRECAST RISER

- PRECAST BASE 3" LEVELING COURSE (MAX 5% PER AGGREGATE)

- 6" FOUNDATION (CLASS I STRUCTURAL FILL)

PRECAST MANHOLE FOUNDING NOTES:

1. MANHOLE FOUNDATION: USE A MINIMUM OF 6 INCHES OF STRUCTURAL BACKFILL (CLASS I) BEDDING MATERIAL COMPACTED TO 95% PROCTOR IN AN AREA NOT LESS THAN THE BASE AREA BUT PREFERABLY 6 INCHES BEYOND THE OUTSIDE RADIUS OF THE MANHOLE BASE.

2. LEVELING COURSE: A MINIMUM 3 INCHES THICK LEVELING COURSE IN AN AREA THAT MATCHES THE FOUNDATION. THE NOMINAL MAXIMUM AGGREGATE SIZE WITHIN THE LEVELING COURSE SHALL NOT BE GREATER THAN 1 INCH.
H-7 HUGGER Band

A simple, economical coupling for corrugated pipe

The H-7 HUGGER Band is a simple, low-cost coupling for helically corrugated pipe with rerolled annular ends. Like other HUGGER Bands, it is economical, simple and easy to install. The H-7 HUGGER Band provides excellent soil tightness.

The H-7 HUGGER Band is available for pipe in diameters from 12 to 36 inches. It is available in galvanized steels or Aluminized Steel Type 2 for added corrosion resistance.

Within the size range given, the H-7 HUGGER Band meets the specifications of AASHTO's Joint Performance Criterias in the Standard Joint category. Details are shown to the right.

Source: https://www.conteches.com

H-7 HUGGER Band 3/4" x 1/2" Corrugation

H-7 Standard Joint HEL-COR®

Connection Detail
Scarfing angles are attached with spot welds, rivets or hand welds.

Section

HUGGER Band

Universal reformed ends

<table>
<thead>
<tr>
<th>Pipe Size, In.</th>
<th>Nominal Thickness, In.</th>
<th>Type of Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.064 x 0.109</td>
<td>scarfing angle</td>
</tr>
<tr>
<td>16</td>
<td>0.052</td>
<td>scarfing angle</td>
</tr>
</tbody>
</table>

Note: The H-7 HUGGER Band is also available with a single-bolt scarfing angle or with bolt, bar and strap connectors.
Notes:

1. ORIGINAL DRAINAGE STRUCTURE WAS CONSTRUCTED IN 2009. PLANS BY CENTENNIAL ENGINEERING, AND AVAILABLE UPON REQUEST. NO AS-BUILT INFORMATION IS AVAILABLE.

2. CONTRACTOR SHALL ADJUST THE LENGTH OF THE PIPE PATCH AS NEEDED IN ORDER TO ACCOMMODATE THE CONSTRUCTION OF NEW CURB AND GUTTER OVER THE TOP OF THE PATCH.

3. PIPE PATCH LENGTH DIMENSIONS SHOWN IN THIS DETAIL ARE APPROXIMATE BASED ON BEST POSSIBLE INFORMATION AVAILABLE. CONTRACTOR SHALL CONFIRM ALL FIELD DIMENSIONS.

4. CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER IF THE EXISTING 18" CORRUGATED METAL PIPE LOCATED IN NARROW ROAD IS EXPOSED FOR VISUAL INSPECTION.

**Corrugated Metal Pipe Patching Detail**

**Pipe Trench**

**Scale: 1" = 1'-0"**

**Paved Surface**

**Subgrade**

**Topsoil**

**Undisturbed Earth**

**Structure**

**Backfill Class 1**

**PIECE LOOSELY PLACED**

**Embayment Material (Height Varies)**

**Trench Width**

**D = 18'-10 1/4"**

**Dv = 18'-10 1/4"**

**1'-6"**

**1'-6"**

**EXISTING 18" CMP STORM PIPE**

**NEW CMP PIPE TO FIT BETWEEN ENDS OF EXISTING PIPE (TIP)**

**Install header band(s) (see detail)**

**SEE PIPE TRENCH DETAIL FOR PIPE BEDDING**

**REPLACE 8' SECTION OF EXISTING PIPE**

**REMOVE EXISTING 16" CMP STORM PIPE AND METAL DETECTABLE WARNING PLATES**

**REMOVE EXISTING 12" PVC PIPE**

**NEW CORRUGATED METAL PIPE PATCH**

**60 CORRUGATED METAL PIPE PATCHING DETAIL**

**SCALE: 1" = 1'-0"**

**BOULDER COUNTY PUBLIC WORKS**

**ENGINEERING DIVISION**

**FOR CONSTRUCTION**
RAISED CROSSWALK (PLAN VIEW)

SCALE: 1"=20'

STATION: MORTON RD 4476.42

NOTES:
1. PLACE 6" x 8" THERMOPLASTIC CROSSWALK BARS ON RAISED CROSSWALK, SPACED 4' APART.
2. INSTALL DIRECTIONAL ARROWS PER MUTCD FIGURE 3B-30, OF CHAPTER 6.
3. ALL STRIPING AND THERMOPLASTIC PAINTING MARKING SHALL BE PER MUTCD OR BOULDER COUNTY MULTIMODAL STANDARDS.

CURB MOUNTED DELINEATOR

SCALE: 1"=2'

NOTES:
1. KEY-WAY IS 5" WIDE X 1'-0" DEEP; SEE COT 6-009-1.
2. ROUND TOP CURB EDGES WITH 1" FILLET.

CONCRETE CURB (COT 8-045-1; OTHER CURB LENGTHS AND LOCATIONS)

RAISED CROSSWALK (SECTION A-A)

SCALE: 1"=2'

RAISED CROSSWALK (SECTION B-B)

SCALE: 1"=2'

ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-001
MORTON RD RAISED X-WALK

Boulder County Public Works
RAISED CROSSWALK (ISOMETRIC VIEW)

CROSSWALK LANDING AREA
6" HIGH RED CURB
CURB MOUNTED DELINEATOR (SEE DETAIL)

6" WIDE
TWO-WAY CYCLE
TRACK RAMP
FILL @ 3:1
FOR 12"

NEW DETECTABLE
WARNING PAD
(2" X 10", RED BRICK)

SEE PLAN VIEW
FOR LOCATIONS OF CURB
AND DELINEATORS
PLACE
2" X 10" X 12 GA
PERFORATED TUBING
12" ABOVE CURB TOP
FOR DELINEATOR MOUNTING
(BOTH SIDES OF RAMP)

CURB MOUNTED DELINEATOR (SEE DETAIL)

CURB MOUNTED DELINEATOR (SEE DETAIL)

EAST ROUND RAMP
CURB MOUNTED DELINEATOR (SEE DETAIL)

8" WIDE
PEDESTRIAN CURB
TAPE AT BOTH ENDS
FOR SNOW PLOW SAFETY

12" LONG END
TAPES @ EACH END

CONCRETE JOINTS
SPACED @ 10' O.C.

SEE PLAN VIEW
FOR PAVEMENT MARKINGS
AS DIRECTIONAL MARKINGS
ARE NOT SHOWN ON THIS
VIEW FOR CLARITY

RAISED CROSSWALK TO MATCH NEW SIDEWALK ELEVATION

2" X 9" CROSSWALK MARKERS
(Thermoplastic)

9"
B.0'
10.0'

NEW DETECTABLE
WARNING PAD
(2" X 10", RED BRICK)

NEW SIDEWALK
(TIE TO EXISTING)

RAISED CROSSWALK (ISOMETRIC VIEW)

SCALE 1:20

BOULDER COUNTY PUBLIC WORKS
ENGINEERING DIVISION

FOR CONSTRUCTION

RS-MOR-001

RAISED CROSSWALK-ISO VIEW

RS-MOR-001

DRAWN 07/30/2001
DRAWN 07/30/2001

RS-MOR-001

RS-MOR-001

75
CYCLE TRACK CURB (ISOMETRIC VIEW)

8" WIDE X 6" HIGH CURB

APERTED CURB (0-6")
(SNOWFLOW SAFE)

PLATE
2" X 10" X 12 GA
PERFORATED TUBING
12" ABOVE CURB TOP
FOR DELINEATOR MOUNTING

NOTES:
1. TAPER BOTH SIDES OF EACH DRIVEWAY ENTRANCE.
A MEDIAN COVER
BRICK CONCRETE
STAMP PATTERN

NOTES:
1. COLORED & STAMPED MEDIAN COVER
   • COLOR: DAVOS - BRICK RED, #60
   • STAMP PATTERN: BASKET WEAVE

B STORM PIPE CONCRETE ENCASEMENT

NOTES:
1. WHEN WATER MAIN ACROSS UNDER THE STORM SEWER, THE SEWER SHALL BE ENCASED WITH 5 INCHES OF CONCRETE THAT EXTENDS 10 FEET ON EACH SIDE OF THE CROSSING.
2. CLEARANCE BETWEEN PIPE SHALL BE 18" OR GREATER. WHEN CLEARANCE CAN NOT BE OBTAINED, CONCRETE ENCASEMENT SHALL BE PLACED UNDER COVER STORM PIPE AS SHOWN.

C DRIVEWAY CUT DETAIL (PLAN VIEW)
CONCRETE CURB DETAIL

NOTES:
1. CURB DEPTH CAN BE REDUCED TO A MINIMUM OF 6" FOR SHORT DISTANCES TO AVOID CONFLICT WITH SHALLOW STORM PIPE.

CONCRETE DRAIN PAN DETAIL

NOTES:
1. THICKNESS OF ASPHALT PATCH SHALL MATCH EXISTING OR 6" MINIMUM THICKER.
2. DRAIN PAN REQUIRES FIBERGLASS REINFORCEMENT AT MINIMUM 1.5 LBS PER CUBE YARD.
CURB RAMP WITH DOME PAVER OPTION (ADA)

NOTES:

"w" = 6'-0" (TYPICAL SIDEWALK WIDTH IN BOULDER COUNTY)
"w" = 8'-0" OR 10'-0" (TYPICAL MULTI-USE PATH WIDTH IN BOULDER COUNTY)

SCALING: 1" = 7'

BOULDER COUNTY PUBLIC WORKS
ENGINEERING DIVISION
ADA RAMP DETAIL
RS-001
07/30/2021
1. Under any new concrete or asphalt patching, subgrade should be uniform material compacted to a minimum 95% standard proctor density.

2. Per geotech report, 2017 overlay program, job no 16-0032, by Ground Engineering:
   Existing asphalt depth of Walker Ave is 7.5" from station 0400 (shown on these plans) to approximately station +50. Existing asphalt depth of Walker Ave from station 1450 to 5450 (+/-) is 4.5".

3. Soil riprap ditch lining varies in size. See profile view for information.

4. Refer to the stormwater management plan for erosion control design.

Notes:

Walker Ave.

Stations: +30.35 to +440.00
MORTON RD.

(LOOKING EAST)

SCALE 1"=4'

STATIONS: 44+87.41 TO 21+50.41

3" HOT MIX ASPHALT OVERLAY
2" (GR 5X)(SO)(PG 58-28)
1" (GR 5S) (SO)(PG 58-28)

ABC ROAD SHOULDERING MATERIAL
(6" DEPTH)

EXISTING ROADSIDE DITCH

TIE TO EXISTING GRADE

MILL 1" OF EXISTING ASPHALT

DRIVE LANE

G

HORIZONTAL SCALE: 1"=4'

ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-O01
TYPICAL SECTION-MORTON RD (2)
MORTON ROAD

WALKER AVE.

ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS

FOR CONSTRUCTION
RS-MOR-001
MORTON RD-PLAN AND PROFILE

MORTON RD.

MATCH WIDTH OF EXISTING ASPHALT ON NORTH SIDE OF ROADWAY

GRADE EDGE OF NEW ASPHALT TO MATCH EXISTING

EXISTING 6" WIDE CONCRETE SIDEWALK

PROJECT CONTROL LINE AND EDGE OF EXISTING CONCRETE SIDEWALK

BEGIN TYPICAL ROAD SECTION AT EDGE OF EXISTING SIDEWALK (SEE TYPICAL SECTION)

NOTES:
1. SEE STORM SEWER PLAN AND PROFILE FOR STORM MANHOLE UD ELEVATIONS

BEGINNING COORDINATES:

STA: 0+00.00
ELEV=5160.93
GRADE BREAK

STA: 0+05.62
ELEV=5160.93
GRADE BREAK

STA: 0+12.37
ELEV=5160.93
GRADE BREAK

STA: 0+25.26
ELEV=5160.93
GRADE BREAK

STA: 0+33.00
ELEV=5160.93
GRADE BREAK

STA: 0+43.75
ELEV=5160.93
GRADE BREAK

STA: 0+62.50
ELEV=5160.93
GRADE BREAK

STA: 1+00.00
ELEV=5160.93
GRADE BREAK

STA: 2+00.00
ELEV=5160.93
GRADE BREAK

STA: 2+48.76
ELEV=5160.93
GRADE BREAK

STA: 3+00.00
ELEV=5160.93
GRADE BREAK

STA: 3+49.00
ELEV=5160.93
GRADE BREAK

END FOR PAVING BEGIN RAISED CONCRETE X-WALK

NIWOT ELEMENTRY SCHOOL

END FOR PAVING TIE TO EXISTING E

END CONCRETE CROSSWALK

ATTACH NEW ROADWAY SECTION TO EXISTING SIDEWALK AT ELEVATION SHOWN ON PROFILE

NOTE:
STA: 4+51.34 TO 4+51.34
ADJUST SURFACE OF HMA OVERLAY TO EDGE OF NEW CONCRETE CROSSWALK

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

RS-MOR-001
PAIUTE AVE.
HORIZONTAL SCALE: 1"=4'
ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-001
TYPICAL SECTION-PAIUTE AVE

3.5" HOT MIX ASPHALT OVERLAY
2" (GR SX)(50)(PG 58-28)
1.5" (GR S) (50)(PG 58-28)

MILL 1" OF EXISTING ASPHALT

EXISTING GRADE

ABG ROAD SHOULDERING MATERIAL
(6" DEPTH)

TE TO EXISTING GRADE

STATIONS: 0+11.53 TO 5+00.00

BOULDER COUNTY PUBLIC WORKS
ENGINEERING DIVISION
TYPICAL SECTION-PAIUTE AVE
RS-MOR-001
APPROACH DETAIL

PROFILE ADJUSTMENT DETAIL

HMA TRANSITION MILLING DETAIL
NOTE:
SET ELEVATION OF RAMP(S) AND CURBS TO MATCH ASPHALT OVERLAY SURFACE OF MARATHON RD.

TAPER CURB DOWN TO BE FLUSH W/ STREET

NOTES:
1. ELEVATIONS SHOWN ARE ABBREVIATED FOR CLARITY.
2. ADD 5200.00 TO EACH ELEVATION SHOWN.
3. SEE MARATHON RD TYPICAL SECTION AND SECTION VIEWS FOR ADDITIONAL GRADING INFO.
TWO-WAY CYCLE TRACK-PAVEMENT MARKINGS

EXISTING GRAVEL DRIVEWAY
(SEE STRIPING PLAN FOR LOCATIONS AND LENGTHS)

WHITE, 4" WIDE EDGE LINE

ADJUST BICYCLE SYMBOL TO FIT WITHIN STRIPES
(SYMBOL TO BE WHITE, SHOWN @ 50% OF HALF SCALE)

EXISTING 4' SYMBOL SPACING

WHITE 8" TACKED WARNING STRIPES @ ALL DRIVEWAY LOCATIONS

3" LONG CURB TAPER (TYPICAL)

CURB MOUNTED DELINEATOR (SEE STRIPING PLAN FOR LOCATIONS)

EXISTING - YELLOW, 4" WIDE CENTER LINE

8" WIDE CONCRETE CURB

CURB MOUNTED "NO PARKING" SIGN
(SEE STRIPING PLAN FOR LOCATIONS)

TWO-WAY CYCLE TRACK-PAVEMENT MARKINGS
SCALE: 1"=5'

ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-001
CYCLE TRACK MARKINGS-MORTON RD
RS-MOR-001
ANCHOR CAGE SUPPORT REBAR

USE CARDBOARD FORM TUBE AT NEEDED LENGTH TO SECURE EARTH INSTALL FOUR VERTICAL #4 REBAR AT 37" LONG AT 1 1/2" CLEAR AT TOP

INSTALL FOUR 15"Ø #3 REBAR HOOP TIES WITH 12" LAP. ONE AT BOTTOM, ONE AT MIDDLE, AND TWO AT TOP.

FOUR #4 REBAR AT 37" LONG

(OPTIONAL) INSTALL #3 REBAR THRU THE FORM FOR SUPPORT (TYP).

CARDBOARD FORM 18"Ø BOLLARD BASE CONCRETE FOUNDATION (TYP) F’c=4,000 PSI @ 28 DAYS

BACK ELEVATION

LEGEND:
1  Ø1/2" x 12" TYPE L ANCHOR BOLT-H.D.G. 
2  Ø1/2" TYPE A FLAT NARROW WASHER GALVANIZED STEEL 
3  Ø1/2" HEX NUT GALVANIZED STEEL 
4  Ø1/2" LOCKING PIN 
5  Ø1/2" H.W. (OPTIONAL)

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER’S SPECIFICATIONS.
2. ALL DIMENSIONS ARE CONSIDERED TRUE AND REFLECT MANUFACTURER’S SPECIFICATIONS.
3. DO NOT SCALE DRAWING.
4. CONTRACTORS NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 4209-05A.

BOLLARD BASE (BASE DETAILS NOT SHOWN)
ANCHORAGE SYSTEM PROVIDED BY CUSTOMER SEE BOLLARD ANCHOR SYSTEM (BAS) DRAWING

CAGE SUPPORT REBAR

NOTE: ANY SUBSTITUTION OF BOLLARD MANUFACTURER MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO INSTALL.

BILL OF MATERIAL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HRPF1</td>
<td>HRP BASE - WELDMENT</td>
</tr>
<tr>
<td>2</td>
<td>HRPF2</td>
<td>HRP BASE - WELDMENT</td>
</tr>
<tr>
<td>3</td>
<td>HRPF3</td>
<td>WELDING BASE TO BOLT</td>
</tr>
<tr>
<td>4</td>
<td>HRPW1</td>
<td>LUMBER HINGE BOLT SS 18-8</td>
</tr>
<tr>
<td>5</td>
<td>HRPW2</td>
<td>HINGE BOLT - SS 18-8</td>
</tr>
<tr>
<td>6</td>
<td>HRPW3</td>
<td>HEX NUT - SS 316</td>
</tr>
<tr>
<td>7</td>
<td>HRPW4</td>
<td>HEX NUT - SS 316</td>
</tr>
<tr>
<td>8</td>
<td>HRPW5</td>
<td>HEX NUT - SS 316</td>
</tr>
</tbody>
</table>

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER’S SPECIFICATIONS.
2. ALL DIMENSIONS ARE CONSIDERED TRUE AND REFLECT MANUFACTURER’S SPECIFICATIONS.
3. DO NOT SCALE DRAWING.
4. CONTRACTORS NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 4209-05A. 

ROUND POST MODEL HRPB - TRAFFICGUARD® ROUND POST, FOOTING / ANCHOR SYSTEM DETAILS

REVISION DATE 04/06/2016

TRAFFICGUARD DIRECT, INC.
P.O. BOX 201
GENEVA, IL 30134
TOLL FREE: 1-877-727-7347
FAX: (800) 817-7194
www.trafficguard.net

ANCHOR BOLT PROVIDE 1-1/2" PROJECTION ABOVE THE CONCRETE PIER
SHARED USE PATH TYPICAL
SECTION SIDE SLOPES 3:1 MAX.

NOTES:
* GREATER WIDTHS MAY BE REQUIRED IN AREAS OF HEAVY TRAIL USAGE.
** SHOULDER SLOPE SHOULD BE 2.0% WITH A MAXIMUM ALLOWED SLOPE OF 6:1.
ANCHOR HEXAGONAL WIRE AND GEOTEXTILE TO THE GROUND, PRIOR TO COVERING WITH CRUSHER FINES.
AVOID LEAVING SHARP EDGES OR LOOSE ENDS EXPOSED THAT CAN CAUSE INJURIES.

A. BOLLARD PLACEMENT

B. TRAIL CONNECTIONS "PLAN VIEW"

C. BOLLARD INSTALLATION DETAIL

ENGINEERING DIVISION
BOULDER COUNTY PUBLIC WORKS
FOR CONSTRUCTION
RS-MOR-001
TRAIL DETAILS

4" STEEL BOLLARD FILLED WITH CONCRETE (PAINTED SAFETY YELLOW) SEE DETAIL

4" STAINLESS STEEL PIPE FILLED W/ CONCRETE
APPLY 2 COATS OF SAFETY YELLOW PAINT (FEDERAL COLOR - 13591)

4" DIA. STD GALV.

CONCRETE CAP

CONCRETE FOOTING

4" STEEL BOLLARD FILLED WITH CONCRETE (PAINTED SAFETY YELLOW) SEE DETAIL

REGULAR BOLLARD

CONSIST STORAGE BOLLARD (WITH PAILLOCK, SEE DETAIL)

REGULAR BOLLARD

NOTES:
W = 6" COMANCHE TRAIL CONNECTION
W = 5" MORTON TRAIL CONNECTION
W-TOTAL = 10" = COMANCHE
W-TOTAL = 5" = MORTON

SCALE: 1"=2'
SWMP TEMPLATE (PLAN SHEETS) FOR PROJECTS WITH 1 ACRE OR MORE OF DISTURBANCE (5/6/2021)

1. SITE DESCRIPTION

The Contractor shall comply with all CDOT contractual requirements and all requirements associated with the COPS-SCP on this project. The SWMP Administrator for Construction shall update the SWMP to reflect current project site conditions.

A. PROJECT SITE LOCATION:

Location or address of construction office:

The project site is located within the Morton Heights Subdivision, within Unincorporated Boulder County Colorado.

The Morton Heights subdivision is located east of the Town of Niwot, Colorado and south of Niwot Road.

Location or address of construction office: No on-site construction office is planned for this project.

B. PROJECT SITE DESCRIPTION:

This construction site is located on an existing subdivision which was originally platted in several filings, beginning in the early 1960's. The subdivision is primarily 0.75 acre lots, each lot has a house, some small out buildings and grass yard.

With this construction project, the County will be improving the existing storm sewer system by installing new concrete storm pipes, inlets and curbs/gutters. Once the stormwater improvements have been constructed, several of the subdivision roads (community use roads) will be re-paved.

Additional improvements include improved sidewalk connections to the local elementary school. The sidewalk improvements will improve access from the school to the local trail system. Improved sidewalk connections will allow students and parents to walk to school, rather than drive.

Construction activities will include:

- Clearing/gribbling of the existing site.
- Relocation of some existing utilities, which will be conducted by the respective utility owners.
- Grading for the new sidewalks, roadside ditches, curbs and gutters.
- Excavation for the new concrete storm sewer components that include new pipe, storm manholes, and storm inlets.
- Paving operations will be the final step of construction on this project.

C. PROPOSED SCHEDULE FOR SEQUENCE FOR MAJOR CONSTRUCTION ACTIVITIES:

Stabilize all areas that are not paved or landscaped through establishment of vegetation cover.

- Several existing utilities will be relocated by the owners of each utility. Erosion control will be installed as needed by each utility owner.
- Clearing/gribbling will take place in areas that require excavation/Will.
- Excavation within the limits of the receiving irrigation ditch, Boulder/Whitlock Ditch Company, will take place outside of the ditch company's irrigation season. Stormwater runoff will be accepted by the Boulder/Whitlock irrigation ditch which matches the current surface water runoff pattern.
- Storm sewers improvements will be installed.
- Roadside ditches will be graded to improve stormwater runoff.
- Concrete sidewalks and curb & gutter will be formed and poured.
- Existing asphalt roadways will be milled and overlaid or reclaimed through the use of full depth reclamation and new hot mix asphalt will be installed.

D. ACRES OF DISTURBANCE:

1. Total area of construction site (LOC (PERMITTED AREA)): 4.36 acres
2. Total area of proposed disturbance: 2.30 acres
3. Total area of grading: 0.72 acres
4. Total area of pre-project impervious surface: 129,717 sq. ft.
5. Total area of final impervious surface: 136,410 sq. ft.

D. EXISTING SOIL DATA:

USDA soil types for this project and the Morton Heights subdivision are:

- CoC - Colby Silty Clay Loam - 1 to 3 percent slopes
- GoC - Colby Silty Clay Loam - 3-5 percent slopes
- WiC - Weld-Colby Complex - 3-5 percent slopes

Primarily silty clay soils should reduce soil erosion to a point.

Riprap (mix of mixed) being used on roadside ditches to prevent soil erosion at pipe outlets and in 2' flat bottom roadside ditches that have enough slope to cause soil erosion. Roadside ditches were designed using Urban Drainage Flood Control District soil stability charts, which address flow rates and longitudinal ditch slope.

Data Sources(s): https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

F. EXISTING VEGETATION, INCLUDING PERCENT OF VEGETATIVE COVER:

During design, the SWMP Administrator for Design will consult with the Engineer to determine the SWMP Administrator for Design or the SWMP Administrator for Construction will conduct the Vegetation Transact. If the site is disturbed, an Adequate Reference Site(s) may be utilized, refer to the permit.

Pre-Construction Date of survey: Percent Existing Vegetative Cover:

Description of existing vegetation:

Method for determining percent vegetative cover:

Include a map or table showing transect locations, photos documenting pre-Construction vegetative cover, and methodology used to determine existing vegetative cover to SWMP Tab 17:

Post-Construction Date of survey: Percent Vegetative Cover:

Description of vegetation: Date of COPS-SCP Closure:

The method used to determine pre-construction percent cover shall be used to determine post construction percent cover.

Include map or table showing transect locations, photos documenting post-Construction vegetative cover, and methodology used to determine existing vegetative cover to SWMP Tab 17:

G. POTENTIAL POLLUTANTS SOURCES:

Refer to Potential Pollutants Sources in SWMP Section 4A. The SWMP Administrator for Construction shall prepare a list of all potential pollutants and their locations in accordance with subsection 107.25.
H. RECEIVING WATER:

- Outfall locations: West side of Morton Heights subdivision – The existing stormwater runoff takes several above ground paths, none of which are well defined or capable of carrying large amounts of surface water.
- A new 24” x 38” elliptical RCP will outfall at the Boulder White Rock Ditch in virtually the same outfall location as the historic path mentioned above. The elliptical concrete pipe will allow the stormwater to be contained below ground, therefore improving the drainage patterns of the west side of the subdivision.
- East side of the subdivision: Outfall point will remain as is. The east side of the subdivision currently drains to a roadside ditch which runs parallel to Niwot Rd. The outfall will be improved by removing existing clogged/damaged storm pipes, re-grading the existing roadside ditch in order to handle the 5 year storm event and eliminating two residential driveway access points anc storm pipe crossings that currently block stormwater runoff flow from the eastern side of the subdivision.
- Names of immediate receiving water(s) on site: Both East and West sides of Morton Heights subdivision drain to Boulder White Rock Irrigation Ditch.
- Ultimate receiving water(s): Both sides of Morton Heights ultimately drain to Panama Reservoir No. 1 which overflows to Boulder Creek. Panama Reservoir is listed on the CDFHE website as not having enough information to assess for 303d. Boulder Creek is listed on the CDFHE web site as a 303d designated waterway.
- Horizontal distance to nearest ultimate receiving water from project: 14.300 feet (2.7 miles).
- Description of all stream crossings located within the Construction Site Boundary:

  There are no stream crossings within the Morton Heights subdivision.

I. ALLOWABLE NON-STORMWATER DISCHARGES:

<table>
<thead>
<tr>
<th>Discharge Description</th>
<th>Site Map #</th>
<th>Method Statement (Location)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncontaminated Springs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete Washout Water (in-ground washout structure) #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscape Irrigation Return Flows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges from Diversions of State Waters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Fire Fighting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#Concrete washout water associated with the washing of concrete tools and concrete mixer chutes can be discharged to the ground if site is managed accordingly to prevent the water from leaving the site as surface runoff or reaching receiving waters.

J. DESCRIPTION OF DRAINAGE PATTERNS FROM THE SITE:

Both East and West sides of Morton Heights subdivision drain to the Boulder White Rock Irrigation Ditch. The SWMP and construction drawings have been reviewed by the Engineering consultant hired by the ditch company.

K. ALTERNATIVE DIVERSION CRITERIA:

When applicable, the Contractor is to provide a method statement based on data provided by the Hydraulic Engineer. The alternative diversions must be approved by CDFHE’s Water Quality Control Division prior to implementation. The diversion method must be designed to minimize the discharge of pollutants and prevent the potential for pollution or degradation to state waters as a result of the diverted flow through the diversion structure. In addition, the alternative diversion method must minimize the discharge of pollutants throughout the installation, implementation and removal of the diversion.

L. ALTERNATIVE TEMPORARY STABILIZATION SCHEDULE:

If applicable, provide a description of the alternative temporary stabilization schedule. If temporary stabilization exceeds the 14-day schedule, then the SWMP must document the constraints necessitating the alternative schedule, provide the alternative schedule, and identify all the locations where the alternative schedule is applicable on the site map.

2. SITE MAP COMPONENTS:

Pre-construction:

A. PROJECT CONSTRUCTION POTENTIAL SITE BOUNDARIES: Shown in the SWMP plans.

B. FLOW ARROWS THAT DEPICT STORMWATER FLOW DIRECTIONS ON-SITE, RUN-ON AND RUNOFF DIRECTION: Shown in the SWMP plans.

C. ALL AREAS OF GROUND SURFACE DISTURBANCE: Shown in the SWMP plans.

D. AREAS OF CUT AND FILL: Shown in the grading and roadway typical sections.

C. AREAS USED FOR STORING AND STOCKPLING OF MATERIALS, STAGING AREAS (field trailer, fueling, etc.) AND LOCATIONS OF ALL WASTE ACCUMULATION AND BATCH PLANTS INCLUDING MASONRY MIXING STATIONS:

Areas used for stockpiling, staging, fueling and mixing were not aware at the time of design. The contractor shall be responsible for updating the SWMP to address areas needed for operations necessary to complete the project.

D. LOCATION OF ALL STRUCTURAL CONTROL MEASURES IDENTIFIED IN THE SWMP: Shown in the SWMP plans.

G. LOCATION OF NON-STRUCTURAL CONTROL MEASURES AS APPLICABLE IN THE SWMP: Shown in the SWMP plans.

H. SPRINGS, STREAMS, WETLANDS, DIVERSIONS, AND OTHER STATE WATERS, INCLUDING AREAS THAT REQUIRE PRE-EXISTING VEGETATION BE MAINTAINED WITHIN 50 FEET OF A RECEIVING WATER:

No streams, springs, or wetlands are within the existing Morton Heights subdivision.

I. LOCATIONS OF ALL STREAM CROSSING LOCATED WITHIN THE CONSTRUCTION SITE BOUNDARY:

There are no stream crossings within the subdivision/construction site.

J. PROTECTION OF TREES, SHRUBS, SENSITIVE HABITAT, AND CULTURAL RESOURCES:

There are not trees, shrubs or cultural resources that will need to be protected.
3. QUALIFIED STORMWATER MANAGERS:

A. SWMP ADMINISTRATOR FOR DESIGN: CDOT Certified Individual responsible for developing SWMP Plan Sheets and SWMP Site Maps during the design phase.

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Information</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allison Kelly, P.E.</td>
<td>303-441-3900</td>
<td>cdot.gov</td>
</tr>
</tbody>
</table>

B. SWMP ADMINISTRATOR FOR CONSTRUCTION: (As defined in Section 208) The Contractor shall designate a SWMP Administrator for Construction upon accepting co-permittee of the permit. The SWMP Administrator for Construction shall become the operator for the SWMP and assume responsibility for all design changes to the SWMP Implementation and maintenance in accordance to 208.03. The SWMP shall remain the property of CDOT. The SWMP Administrator for Construction shall be responsible for implementing, maintaining and revising SWMP, including the title and contact information. The activities and responsibilities of the SWMP Administrator for Construction shall address all aspects of the project’s SWMP. (Update this information below for each new SWMP Administrator for Construction) A copy of TEC Certification must be included in the SWMP.

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Information</th>
<th>Certification</th>
</tr>
</thead>
</table>

C. EROSION CONTROL INSPECTOR: (As defined in Section 208) The Contractor may designate an Erosion Control Inspector. The Erosion Control Inspector shall complete duties in accordance with subsection 208.03 (c) (Copy of TEC Certification must also be included in the SWMP).

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Information</th>
<th>Certification</th>
</tr>
</thead>
</table>

D. PERMANENT STABILIZATION SUBJECT MATTER EXPERT: This qualified individual will be either a Regional Environmental Staff member, or an Independent Contractor Controller (Independent Assurance Program). This expert is a project team leader responsible for ensuring project adherence to requirements of the 207 and 212 Project Special Provisions as follows, and will be available for questions regarding permanent stabilization requirements.


1. Review the Topsoil Management Plan and the Permanent Stabilization Site Maps.
2. Attend the Environmental Pre-Construction Conference.
3. Coordinate the Site Pre-vegetation Conference.
4. Review and recommend approval of products.
5. Review and recommend approval of the Quantities Verification Presenters.
6. Attend the Substantial Landscape Completion Walkthrough.
7. Attend the Initial Landscape Completion Walkthrough.

4. STORMWATER MANAGEMENT CONTROLS FOR FIRST CONSTRUCTION ACTIVITIES

A. POTENTIAL POLLUTANT SOURCES:

(Refer to Table 208.02(d) of the Stormwater Management Manual for Pollutant Sourcing)

- Evaluate, identify, locate and describe all potential sources of pollutants at the site in accordance with subsection 107.25, CDPS-SCP and place in the SWMP. All control measures related to potential pollutants shall be shown on the SWMP Site Map by the Contractor’s SWMP Administrator for Construction.

B. OFFSITE DRAINAGE (RUN ON WATER):

- Describe and record control measures on the SWMP Site Map that have been implemented to address off site runoff water in accordance with subsection 208.03.

C. VEHICLE TRACKING CONTROL:

- Control measures shall be implemented in accordance with subsection 208.04.

D. PERIMETER CONTROL:

1. Perimeter control shall be established as the first item on the SWMP to prevent the potential for pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to State waters. Perimeter control shall be in accordance with subsection 208.04.
2. Perimeter control may consist of barriers, silt fence, erosion logs, existing landforms, or other control measures as approved.

5. DURING CONSTRUCTION

A. MATERIALS HANDLING AND SPILL PREVENTION AND RESPONSE PLAN:

1. Prior to construction commencing the Contractor shall submit a Spill Response Plan, see subsection 208.06.
2. Materials handling shall be in accordance with subsection 208.06.

B. OTHER CDPS PERMITS:

1. List applicable CDPS permits associated with the permitted site and activities.

C. STOCKPILE MANAGEMENT:

1. Shall be done in accordance with subsections 107.25 and 208.07.

D. CONCRETE WASHOUT:

1. Concrete washout water or water from field laboratories and paving equipment shall be contained in accordance with subsection 208.05.

E. SAWY CUTTING:

1. Shall be done in accordance with subsections 107.25, 208.04, 208.05.

F. STREET SWEEPING:

1. Shall be done in accordance with subsection 208.04.

6. INSPECTIONS

A. Water Quality inspections shall be in accordance with subsection 208.03(c).
8. Permanent Stabilization inspections shall be in accordance with subsections 207.03 and 212.05.

7. CONTROL MEASURE MAINTENANCE
   Maintenance shall be in accordance with subsection 208.04(4).

8. RECORD KEEPING
   Records shall be kept in accordance with subsection 208.03(d).

9. INTERIM, PERMANENT STABILIZATION, and LONG TERM STORMWATER MANAGEMENT
   The Contractor shall comply with all interim stabilization and permanent stabilization requirements in accordance with subsection 208.04(e).

A. SEEDING PLAN:
   The following seed mix(es) and rates are for drill seeding method as shown on the Permanent Stabilization Site Maps shall be used:

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>BOTANICAL NAME</th>
<th>LBS. PLS PER ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Oats Grama</td>
<td>Bouteloua Gracilis</td>
<td>0.68</td>
</tr>
<tr>
<td>Blue Grama (Native, Alamo, or Hachita)</td>
<td>Bouteloua Gracilis</td>
<td>0.84</td>
</tr>
<tr>
<td>Buffalo grass (Native)</td>
<td>Buchloa Dachlyoides</td>
<td>9.33</td>
</tr>
<tr>
<td>Western Wheatgrass (Arabes)</td>
<td>Pascopyrum Smithii</td>
<td>3.96</td>
</tr>
<tr>
<td>Western Wheatgrass (Native)</td>
<td>Pascopyrum Smithii</td>
<td>3.96</td>
</tr>
<tr>
<td>Little Blue Stem (Cimaron or Pastura)</td>
<td>Schizachyrium Scoparium</td>
<td>1.74</td>
</tr>
<tr>
<td>Green Needlegrass (Lodorn or Native)</td>
<td>Stipa Veldolu</td>
<td>2.31</td>
</tr>
</tbody>
</table>

   Total: 24.88

B. SEEDING APPLICATION METHOD:
   The following seeding methods shall be used for all areas shown on the Permanent Stabilization Site Maps. Soil compaction shall be minimized for areas where permanent stabilization will be achieved through vegetative cover.

<table>
<thead>
<tr>
<th>SEEDING METHOD (subsections 212.07)</th>
<th>ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeding (Native) Drill, CDDOT Pay Item 212-00706</td>
<td>0.72</td>
</tr>
<tr>
<td>Seeding (Native) Broadcast, CDDOT Pay Item 212-00708</td>
<td>0.72</td>
</tr>
<tr>
<td>Seeding (Wetland) Drill, CDDOT Pay Item 212-00709</td>
<td>0.72</td>
</tr>
<tr>
<td>Seeding (Wetland) Broadcast, CDDOT Pay Item 212-00711</td>
<td>0.72</td>
</tr>
</tbody>
</table>

   TOTAL: 2.16

SOIL STABILIZATION METHODS:
   Minimum soil stabilization methods (attached mulch) for all disturbances to receive seeding:
   1. Apply certified weed free hay or certified weed free straw and mechanically crimp into the soil in combination with natural mulch tackifier in accordance with Section 213.
   2. Install Soil Retention Blankets in accordance with Standard Plan M-216-1 and Section 2.

D. SPECIAL REQUIREMENTS:
   1. Soil amendments, seedbed preparation, and permanent stabilization mulching shall be accomplished within four working days of placing the topsoil on the de-compacted civil subgrades. If placed topsoil is not mulched with permanent stabilization mulch within four working days, the Contractor shall complete interim stabilization methods in accordance with subsection 208.04(e) at no additional cost to the County.
   2. Complete permanent stabilization mulching within 24 hours of hydraulic application of native seed.

3. The Contractor shall submit a proposed Permanent Stabilization Phasing Plan to the Engineer for approval showing how implementation of SWMP Permanent Stabilization Plans will minimize damage to seeded areas.

E. SOIL AMENDMENT REQUIREMENTS:
   Minimum amendment material requirements for all disturbances to receive seeding.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount/ Acre</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>212-00700 Organic Fertilizer (low N)</td>
<td>Pounds</td>
<td></td>
</tr>
<tr>
<td>212-00701 Compost (Mechanically Applied)</td>
<td>CY</td>
<td></td>
</tr>
<tr>
<td>212-00703 Humate</td>
<td>Pounds</td>
<td></td>
</tr>
<tr>
<td>212-00704 Mycorrhizae</td>
<td>Pounds</td>
<td></td>
</tr>
<tr>
<td>212-00705 Elemental Sulfur</td>
<td>Pounds</td>
<td></td>
</tr>
</tbody>
</table>

F. Permanent Stabilization Application Under Structures:
   Under structures shade patterns should be considered and the use of Median Cover Material (Stone) or other stabilized options with an approved Project Special Provision should be used. See SWMP Site Map for locations.

G. RESEEDING OPERATIONS/ CORRECTIVE STABILIZATION:
   Prior to partial acceptance:
   1. All seeded areas shall be reviewed during the 7-day inspections by the SWMP Administrator for Construction and/or Expansion Control Inspector for bare soils caused by surface or wind erosion. Bare areas caused by surface or gully erosion, blown away mulch, etc., shall be re-grassed, seeded, and have the designated mulching applied as necessary, at no additional cost to the project.
   2. The Contractor shall maintain seeding/mulch/tackifier/blanket/IRM, mow to control weeds in the seeded areas until Partial Acceptance of the stormwater construction work.

H. LOCATION AND DESCRIPTION OF PLANNED PERMANENT CONTROL MEASURES:
   Permanent Water Quality Required. Yes _____ No _X_

10. PRIOR TO PROJECT FINAL ACCEPTANCE:
   A. When directed by the Engineer, removal and disposal of temporary control measures shall be included in the cost of work.
   B. At the end of the project, all ditch checks shall consist of either temporary erosion logs (or equivalent) or permanent riprap.
   C. At storm drains shall be cleaned prior to the Final Acceptance of the project. If required, include work in 202-0402 Clear Culvert.
   Refer to Specification 206.10 for items to be completed prior to requesting partial acceptance of water quality work.
## 11. NARRATIVES

### Control Measure Matrixes During Construction:

1. Control measure narratives have been included for the CDOT Standard Specifications and Standard Plan M-208 and M-216 along with any non-standard control measures approved during the design process. If a Non-Standard Control Measure not included in the SWMP is proposed and approved by the Engineer the SWMP Administrator for Construction shall do the following: Place an "X" in the column for non-standard and complete a Non-Standard Control Measure Specification and Narrative covering the what, when, where and why the control measure is being used shall be added to the SWMP. The appropriate "X" shall also be added to the implementation phase(s).

2. The SWMP Administrator for Construction shall place an "X" in the column in Use On-Site when the control measure has been installed.

3. A "B" in the Initial Activities Column indicates that the control measure shall be installed before construction activity starts. Locations and quantities will be discussed during the Environmental Pre-Construction Conference with the Regional Water Pollution Control Manager.

### Structural Control Measures

Structural control measures that may be potentially used on the project for erosion and sediment control practices may include, but are not limited to the following:

<table>
<thead>
<tr>
<th>APPLICATION: CONTROL MEASURE</th>
<th>NARRATIVE</th>
<th>M-208 STANDARD or &quot;X&quot; for NON-STANDARD</th>
<th>IN USE ON-SITE</th>
<th>CONTROL MEASURE IMPLEMENTATION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PROTECTION OF EXISTING WETLANDS</td>
<td>Fence (plastic) shall be placed in combination with erosion logs to prevent encroachment of construction traffic and sediment into state waters prior to start of construction disturbances. Fence (plastic) shall be placed adjacent to the wetlands; erosion logs shall be placed between the plastic fence and disturbance area. Log shall be placed to direct flows away from or filter water running into wetlands from disturbance areas.</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>PROTECTION OF EXISTING TREE/LANDSCAPING FENCE</td>
<td>Fence (plastic) shall be used in areas indicated in the plans to prevent encroachment of construction traffic and sediment for the protection of sensitive habitat, mature trees, and/or existing landscaping prior to start of construction disturbances.</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>CHECK DRAIN/DITCH CHECK</td>
<td>Erosion log, silt fence, rock check dam</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Storm Drain Inlet Protection In Paved Roadways (Type 1, 2 and 3 as shown on M-208-1, Sheet 5 of 11)</td>
<td>Manufactured storm drain inlet protection placed prior to construction disturbances as detailed in M-208-1, to protect existing inlets or immediately upon completion of new inlets to prevent sediment from entering the inlet throughout construction.</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Storm Drain Inlet Protection In Native Seed Areas (M-604 Standard Inlet Type Cnd D)</td>
<td>Erosion logs or aggregate bags placed around inlet grate to prevent sediment from entering inlet. Place prior to construction disturbances to protect existing inlets or immediately upon completion of new inlets.</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>CULVERT INLETS/OUTLET PROTECTION</td>
<td>Erosion logs, aggregate bags</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>TYPE C: TYPE D AND TYPE 13 PROTECTION</td>
<td>Erosion logs, aggregate bags, erosion bales</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>STOCKPILE PROTECTION</td>
<td>Temporary berm, erosion logs, aggregate bags</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>TOE OF EMBANKMENT PROTECTION</td>
<td>Erosion logs, temporary berm, silt fence, topsoil</td>
<td>M-208</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>PERIMETER CONTROL</td>
<td>Erosion logs, silt fence, temporary berm, topsoil</td>
<td>M-208</td>
<td>B</td>
</tr>
</tbody>
</table>
**SEDIMENT CONTROL/ SLOPE CONTROL**

Placed on the contour of a slope to contain and slow down construction runoff. Place prior to the start of construction disturbances.

**TEMPORARY SEDIMENT TRAP**

Used to capture sediment-laden runoff from disturbed areas < 3 acres during construction. Place prior to the start of construction disturbances. Outlets that withdraw water from or near the surface may be installed when discharging from basins and impoundments.

**EMBANKMENT PROTECTION OR TEMPORARY SLOPE DRAIN**

Placed as a conduit or chute to drain runoff down slope and to prevent erosion of slope.

**OUTLET PROTECTION**

Material placed as an energy dissipator to prevent erosion at outlet structure.

**CONCRETE WASHOUT**

In-ground or fabricated construction control, used for waste management of concrete and concrete equipment cleaning. Place prior to the start of concrete activities.

**VEHICLE TRACKING PAD**

Source control, placed to prevent tracking of sediment from disturbed area to offsite surface. Place prior to the start of construction disturbances.

**Engineered SEDIMENT BASIN**

Constructed early in the project, prior to storm sewer/ditches and in accordance with 206.05(s)(p) to capture storm flow. Outlet structure and/or outlet shall be modified for temporary sediment control using an approved non-standard detail. Outlets that withdraw water from or near the surface shall be installed when discharging from basins and impoundments, unless infeasible.

**NON-STRUCTURAL Control Measures** that may be potentially used on the project for erosion and sediment control practices may include, but are not limited to:

Erosion control devices are used to limit the amount of soil loss on site. Sediment control devices are designed to capture sediment on the project site. Construction controls are control measures related to construction access and staging. Control Measure locations are indicated on the SWMP Site Map.

* Use of vegetative buffer strip requirements. The CDOT Water Quality Control Division Technical Memorandum dated August 27, 2015 clarifies the requirements for utilization of existing vegetation as a buffer type of sediment control measure, while maintaining compliance with the CDPS permit for Stormwater Discharges Associated with Construction Activity – CDPS Permit No. COR4000000. In general, the division does not recommend vegetation buffers be implemented as a sediment removal control measure for runoff from disturbed areas of construction sites, unless implemented as a "finishing" component of a treatment train comprised of additional, adequate up- or gradient Control Measures. The entire memorandum can be found at: [https://www.colorado.gov/pacific/sites/default/files/Vegetative%20Buffer%20Memo.pdf](https://www.colorado.gov/pacific/sites/default/files/Vegetative%20Buffer%20Memo.pdf)

<table>
<thead>
<tr>
<th>APPLICATION/CONTROL MEASURE</th>
<th>NARRATIVE</th>
<th>M-STD/“For NON-STD”</th>
<th>IN USE ON SITE</th>
<th>CONTROL MEASURE IMPLEMENTATION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>VEGETATIVE BUFFER STRIP</em></td>
<td>Fence (plastic) Finishing component for filtering sediment-laden runoff from disturbance area. Area within CDOT ROW or temporary easement to be identified on SWMP prior to construction starting.</td>
<td>M-208</td>
<td>X</td>
<td>Initial Activity: X Interim Activities: X Permanent Stabilization: X</td>
</tr>
<tr>
<td>GRADE APPLICATIONS (LANDFORM)</td>
<td>Erosion or created landform may be used as a control measure if they prevent sediment from entering or leaving the disturbance area. If a landform directs flow of water to a concentrated point, the outlet point shall be protected to prevent erosion. Area to be identified on SWMP prior to construction starting.</td>
<td>M-208</td>
<td>X</td>
<td>Initial Activity: X Interim Activities: X Permanent Stabilization: X</td>
</tr>
<tr>
<td>TOPSOIL MANAGEMENT STOCKPILE/SALVAGE</td>
<td>Prior to any site disturbance work commencing, existing topsoil shall be scraped to a depth six inches or as specified, and placed in stockpiles or windows. Upon completion of final grading, topsoil shall be evenly distributed over embankment to a depth of six inches or as specified.</td>
<td>M-208</td>
<td>X</td>
<td>Initial Activity: X Interim Activities: X Permanent Stabilization: X</td>
</tr>
<tr>
<td>SURFACE ROUGHENING / GRADING TECHNIQUES</td>
<td>Temporary stabilization of disturbance and to minimize wind and erosion.</td>
<td>X</td>
<td></td>
<td>Initial Activity: X Interim Activities: X Permanent Stabilization: X</td>
</tr>
<tr>
<td>SEEDING (TEMPORARY)</td>
<td>Temporary stabilization used for over wintering of disturbance or used to control erosion for areas scheduled for future construction.</td>
<td>X</td>
<td></td>
<td>Initial Activity: X Interim Activities: X Permanent Stabilization: X</td>
</tr>
<tr>
<td>BONDED FIBER MATRIX or MULCHING (HYDRAULIC)</td>
<td>Not to be used in areas of concentrated flows, i.e., ditch lines. To be either Interim or Permanent Stabilization placed as a surface cover for erosion control. May be used as surface cover when work is temporarily halted and as approved by the Engineer for stockpiles.</td>
<td>X</td>
<td></td>
<td>Initial Activity: X Interim Activities: X Permanent Stabilization: X</td>
</tr>
</tbody>
</table>
12. TABULATION OF STORMWATER QUANTITIES

A. Control Measure sediment removal and disposal shall be paid for as: 208 Removal and Disposal of Sediment (equipment) and 208 Removal and Disposal of Sediment (labor). All other control measure maintenance shall be included in the cost of the control measure.


<table>
<thead>
<tr>
<th>PSP Spec.</th>
<th>Pay Item</th>
<th>Description</th>
<th>Pay Unit</th>
<th>Initial Const</th>
<th>Interim Const.</th>
<th>Permanent Stabilization</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>202-0402</td>
<td>Clean Culvert</td>
<td>Each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
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<tr>
<td>202-0150</td>
<td>Blading</td>
<td>Hour</td>
<td></td>
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<tr>
<td>202-0155</td>
<td>Dousing</td>
<td>Hour</td>
<td></td>
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<tr>
<td>202-01594</td>
<td>Combination Loader</td>
<td>Hour</td>
<td></td>
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<tr>
<td>207-00700</td>
<td>Topsoil (Onsite)</td>
<td>CY</td>
<td></td>
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<td>0</td>
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<tr>
<td>207-00706</td>
<td>Seeding Media</td>
<td>CY</td>
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<tr>
<td>207-00702</td>
<td>Topsoil (Offsite)</td>
<td>CY</td>
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<td>310</td>
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<tr>
<td>207-00703</td>
<td>Topsoil (wetland)</td>
<td>CY</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>207-00704</td>
<td>Subgrade Soil Preparation</td>
<td>SY</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>208-00001</td>
<td>Silt Dike</td>
<td>LF</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>208-00004</td>
<td>Silt Berm</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>208-0012</td>
<td>Erosion Log Type 1 (9'')</td>
<td>LF</td>
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<tr>
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<td>1425</td>
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<td>208-0013</td>
<td>Erosion Log Type 2 (12')</td>
<td>LF</td>
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<tr>
<td>208-00007</td>
<td>Erosion Log Type 2 (8')</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>208-00008</td>
<td>Erosion Log Type 2 (12')</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>208-00009</td>
<td>Erosion Log Type 2 (18')</td>
<td>LF</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>208-00111</td>
<td>Erosion Bales (Weed Free)</td>
<td>Each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>208-00015</td>
<td>Sand Bag</td>
<td>LF</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>208-00030</td>
<td>Sediment Basin</td>
<td>Each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

208-00053 Storm Drain Inlet Protection (Type II) (84 Inch) Each
208-00054 Storm Drain Inlet Protection (Type III) Each
208-00055 Rigid Inlet Protection Device Each
208-00056 Storm Drain Inlet Protection (Type IV) Each
208-00057 Storm Drain Inlet Protection (Type II (144 Inch) Each
208-00058 Storm Drain Inlet Protection (Type II (204 Inch) Each
208-00060 Temporary Slope Drains LF
208-00070 Vehicle Tracking Pad Each
208-00071 **Maintenance Aggregate (Vehicle Tracking Pad) CY
208-00075 Pre-fabricated Vehicle Tracking Pad Each
208-00103 Removal and Disposal of Sediment (labor) Hour 40
208-00105 Removal and Disposal of Sediment (Equipment) Hour 40
208-00106 Sweeping (Sediment Removal) Hour 40
208-00107 Removal of Trash Hour
208-00207 Erosion Control Management (ECM) Day 75
<table>
<thead>
<tr>
<th>Item Code</th>
<th>Item Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>208-00300</td>
<td>Temporary Item</td>
<td>LF</td>
</tr>
<tr>
<td>208-00301</td>
<td>Temporary Diorization</td>
<td>LF</td>
</tr>
<tr>
<td>212-00700</td>
<td>Organic Fertilizer</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00701</td>
<td>Compost (Mechanically Applied)</td>
<td>CY</td>
</tr>
<tr>
<td>212-00702</td>
<td>Biotic Soil Amendments (Hydraulic Applied)</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00703</td>
<td>Humate</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00704</td>
<td>Mycorrhiza</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00705</td>
<td>Elemental Sulfur</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00706</td>
<td>Seeding (Native) Dirt</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00707</td>
<td>Seeding (Native) Hydraulic</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00708</td>
<td>Seeding (Native) Broadcast</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00709</td>
<td>Seeding (Welland) Drill</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00710</td>
<td>Seeding (Welland) Hydraulic</td>
<td>Acre</td>
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<tr>
<td>212-00711</td>
<td>Seeding (Welland) Broadcast</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00009</td>
<td>Seeding (Temporary)</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00002</td>
<td>Mulching (Weed Free Hay)</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00003</td>
<td>Mulching (Weed Free)</td>
<td>Acre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Item Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>212-00700</td>
<td>Organic Fertilizer</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00701</td>
<td>Compost (Mechanically Applied)</td>
<td>CY</td>
</tr>
<tr>
<td>212-00702</td>
<td>Biotic Soil Amendments (Hydraulic Applied)</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00703</td>
<td>Humate</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00704</td>
<td>Mycorrhiza</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00705</td>
<td>Elemental Sulfur</td>
<td>Pounds</td>
</tr>
<tr>
<td>212-00706</td>
<td>Seeding (Native) Dirt</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00707</td>
<td>Seeding (Native) Hydraulic</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00708</td>
<td>Seeding (Native) Broadcast</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00709</td>
<td>Seeding (Welland) Drill</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00710</td>
<td>Seeding (Welland) Hydraulic</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00711</td>
<td>Seeding (Welland) Broadcast</td>
<td>Acre</td>
</tr>
<tr>
<td>212-00009</td>
<td>Seeding (Temporary)</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00002</td>
<td>Mulching (Weed Free Hay)</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00003</td>
<td>Mulching (Weed Free)</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00004</td>
<td>Mulching (Weed Free Straw)</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00007</td>
<td>Mulching Wood Strain</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00112</td>
<td>Spray-on Mulch Blanket</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00113</td>
<td>Spray-on Mulch Blanket</td>
<td>LB</td>
</tr>
<tr>
<td>213-00020</td>
<td>Compost Blanket</td>
<td>SY</td>
</tr>
<tr>
<td>213-00061</td>
<td>Mulch Tackifier</td>
<td>LB</td>
</tr>
<tr>
<td>213-00150</td>
<td>Bonded Fiber Matrix</td>
<td>Acre</td>
</tr>
<tr>
<td>213-00151</td>
<td>Bonded Fiber Matrix</td>
<td>LB</td>
</tr>
<tr>
<td>214-00008</td>
<td>Extended Landscape Preservation</td>
<td>LS</td>
</tr>
<tr>
<td>216-00101</td>
<td>Soil Retention Blanket (Straw/Coconut) (Photodegradable Class 1)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00111</td>
<td>Soil Retention Blanket (Excelsior) (Photodegradable Class 1)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00122</td>
<td>Soil Retention Blanket (Coconut)  (Photodegradable Class 2)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00201</td>
<td>Soil Retention Blanket (Straw/Coconut) (Biodegradable Class 1)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00211</td>
<td>Soil Retention Blanket (Excelsior) (Biodegradable Class 1)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00222</td>
<td>Soil Retention Blanket (Coconut)  (Biodegradable Class 2)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00301</td>
<td>Turf Reinforcement Mat (Class 1)</td>
<td>SY</td>
</tr>
<tr>
<td>216-00302</td>
<td>Turf Reinforcement Mat (Class 2)</td>
<td>SY</td>
</tr>
</tbody>
</table>

*It is anticipated that additional control measures and control measure quantities not shown on the SWMP Site Maps shall be required on the project for unforeseen conditions and replacement of items that are beyond their useful service life, see subsections 208.03 and 208.04. Quantities for all control measures shown above are estimated, and have been increased for unforeseen conditions and normal control measure life expectancy. Quantities shall be adjusted according to the conditions encountered in the field as directed and approved by the Engineer. Payment shall be for the actual work completed and material used.

**Pay item 208-00071 is included for anticipated maintenance of vehicle tracking pads based on the service life of the control measure in the field. The use of the material shall be directed and approved by the Engineer.

***F/A refers to CDOT's Force Account Pay items.

13. BIOLOGICAL IMPACTS and DEWATERING

A. ENVIRONMENTAL IMPACTS:

1. Wetland Impacts: NO
2. Streams Impacts: NO
3. Threatened and Endangered Species: NO species are anticipated to be impacted by the project.

H. DEWATERING: (Not covered under the CDPR guidance document Low Risk Discharge Guidance: Discharges of Uncontaminated Groundwater to land); https://www.colorado.gov/pacific/sites/default/files/CDPR%20GW%20DEWATERING%20GROW%20GRO%20GROW%20GROUNDWATER%20PERMIT.pdf

1. Dewatering: Refer to other environmental permits in accordance with subsection 107.02 and the permits contained in Tab 16 of this SWMP.
2. If groundwater does not meet water quality standards for receiving water a separate CDPR Dewatering Permit shall be obtained by the Contractor from CDPR in accordance with subsections 107.02 and 107.25.

14. NOTES:

A. The SWMP Administrator for Construction shall update the SWMP to reflect current project site conditions.
SOIL RETENTION Blanket Area=1180 SQ. FT.

SOIL RETENTION Blanket Area=1736 SQ. FT.

RIPRAP/SEEDED Area=173 SO. FT.

RIPRAP/SEEDED Area=17 SO. FT.

RIPRAP OUTLET PAVING (SEE RIPRAP SHEETS)

RIPRAP OUTLET PAVING (SEE RIPRAP SHEETS)

RIPRAP/SEEDED Area=1793 SQ. FT.

SPEARAD 4' OF TOPSOIL & NATIVE SEED MIX, THEN MULCH WITH WEED-FREE STRAW (1600 SQ. FT.)

NOTES:

- SURFACE ROUGHENING MAY BE ACCOMPLISHED BY FURROWING, SCARIFYING, RIPING, OR DEBIRING THE SOIL TO CREATE A 2'-4' VARIATION IN THE SOIL SURFACE.

- SURFACE ROUGHENING IS USED AS A TEMPORARY CONTROL MEASURE TO REDUCE THE SPEED OF RUNOFF, INCREASE INFILTRATION, REDUCE EROSION, TRAP SEDIMENT, AND PREPARE THE SOIL FOR SEEDING AND PLANTING BY CAPTURING MOISTURE FOR SEED.
SPEREAD 4" OF TOPSOIL & NATIVE SEED MIX, THEN MULCH WITH WEED-FREE STRAW (995 SQ. FT.)

ROUGHEN THE EXISTING SURFACE AND SPREAD 4" OF TOPSOIL & NATIVE SEED MIX, THEN MULCH WITH WEED-FREE STRAW (1729 SQ. FT.)

EXISTING DIRT FOOTPATH (TO BE ABANDONED)

NOTES:
- SURFACE ROUGHENING MAY BE ACCOMPLISHED BY PLOWING, SCARRIFYING, RIPPING, OR DENING THE SOIL TO CREATE A 2-4" VARIATION IN THE SOIL SURFACE.
- SURFACE ROUGHENING IS USED AS A TEMPORARY CONTROL MEASURE TO REDUCE THE SPEED OF RUNOFF, INCREASE INFILTRATION, REDUCE EROSION, TRAP SEDIMENT, AND PREPARE THE SOIL FOR SEEDING AND PLANTING BY CAPTURING MOISTURE FOR SEED.
- SURFACE ROUGHENING SHOULD BE USED ALONG THE CONTOUR OF SLOPES.