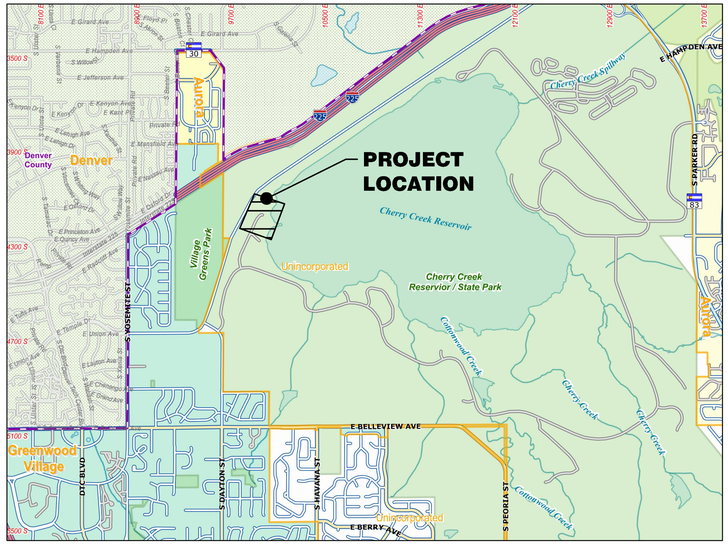
CONSTRUCTION PLANS
FOR
WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS
PART OF THE NORTHEAST QUARTER OF SECTION 10, TOWNSHIP 5 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ARAPAHOE, STATE OF COLORADO



VICINITY MAP
N.T.S.

SHEET INDEX	
SHEET NUMBER	**SHEET TITLE**
1	COVER STREET
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GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (811) AND OTHER AFFECTED UTILITIES TO LOCATE UNDERGROUND FACILITIES AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION. CONTRACTOR SHALL POTHOLE AND SURVEY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES THAT MAY BE AFFECTED BY CONSTRUCTION PRIOR TO START OF CONSTRUCTION. THE POTHOLING AND SURVEY WORK SHALL BE INCLUDED AND PAID FOR AS PART OF MOBILIZATION.
2. THE CONTRACTOR SHALL NOTIFY THE CHERRY CREEK BASIN WATER QUALITY AUTHORITY DESIGNATED REPRESENTATIVE 24 HOURS PRIOR TO STARTING WORK AND 24 HOURS PRIOR TO EACH DESIRED AND REQUIRED INSPECTION.
3. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS AND INCLUDES TRAFFIC CONTROL IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. THE AUTHORITY'S REVIEW OF PLANS AND CONSTRUCTION IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE SAFETY MEASURES IN, ON , OR NEAR THE CONSTRUCTION SITE.
4. ANY SETTLEMENT OR SOIL ACCUMULATIONS BEYOND THE CONSTRUCTION LIMITS DUE TO GRADING OR EROSION SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR.
5. AREAS BEING DISTURBED BY THE GRADING SHALL BE RESEEDED WITH SEED MIXES SPECIFIED ON THE DRAWINGS.
6. PERMISSION TO REPRODUCE THESE PLANS IS EXPRESSLY GIVEN TO THE AUTHORITY FOR PURPOSES ASSOCIATED WITH PLAN REVIEW APPROVAL, PERMITTING, INSPECTION AND CONSTRUCTION OF THE WORK.
7. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, UNLESS OTHERWISE SHOWN OR STATED. CONTRACTOR WILL HAVE THE PLAN SET AND CONTRACT DOCUMENTS ON-SITE WHILE WORK IS IN PROGRESS.
8. THE TOPOGRAPHIC MAPPING SHOWN WAS PREPARED BY CARROLL AND LANGE, INC IN 2009. ALL DESIGN IMPROVEMENTS SHALL BE STAKED BY THE CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING THE WORK FROM THE STAKES ACCORDING TO THE LAYOUT DIMENSIONS, ELEVATIONS AND LOCATIONS PROVIDED ON THE DRAWINGS. THE CONTRACTOR SHALL PRESERVE SAID STAKES DURING CONSTRUCTION.
9. TREE PROTECTION AND REMOVAL: THERE ARE SEVERAL TREES LOCATED ALONG THE LIMITS OF GRADING THAT ARE TO BE SAVED AND PROTECTED. CONTRACTOR IS TO FLAG TREES TO BE REMOVED AND VERIFY WITH THE ENGINEER PRIOR TO REMOVING ANY TREES. CONTRACTOR SHALL INSTALL ORANGE FENCING AROUND TREES TO BE PROTECTED.
10. EARTHWORK SHALL BE COMPLETE IN PLACE WITH ALL EXCESS MATERIAL TO BE DISTRIBUTED ONSITE AT THE DIRECTION OF THE ENGINEER. COMPACTION REQUIREMENTS SHALL BE 95% OF THE MAXIMUM DRY DENSITY. MOISTURE REQUIREMENTS WILL BE WITHIN 2% OF THE OPTIMUM MOISTURE CONTENT. TESTS MAY BE PERFORMED BY THE OWNER. IF A FAILED TEST IS RECEIVED THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE TEST AND ANY CORRECTIVE ACTIONS NECESSARY.
11. TOPSOIL SHALL BE STRIPPED PRIOR TO GRADING, STOCKPILED DURING GRADING, AND REDISTRIBUTED OVER GRADED AREAS PRIOR TO SEEDING.
12. THE WATER CONTROL ITEM IS INCLUDED TO CONTROL BASE FLOW, GROUND WATER, AND RUNOFF TO PROTECT FROM DAMAGE DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING WATER CONTROL AND IMPLEMENTING IT TO MINIMIZE DAMAGE AND DELAYS TO THE PROJECT FROM RUNOFF AND GROUNDWATER. GROUNDWATER SHALL BE MAINTAINED A MINIMUM OF 2' BELOW THE LOWEST SUBGRADE ELEVATION FOR EACH STRUCTURE. ANY DAMAGE TO THE WORK RESULTING FROM SURFACE FLOWS, BASE FLOWS, GROUNDWATER, OR FLOOD FLOWS INCLUDING BUOYANCY FORCES ON PIPELINES AND OTHER FACILITIES SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTORS SOLE COST. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND SATISFYING THE REQUIREMENTS OF ANY APPLICABLE PERMITS PERTAINING TO WATER AND EROSION CONTROL.
13. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING STABLE EXCAVATIONS AND TEMPORARY SLOPES AND FOR SATISFYING ALL APPLICABLE OSHA, FEDERAL, STATE AND LOCAL REGULATIONS. TEMPORARY EXCAVATIONS SHALL PROVIDE, AT MINIMUM, THE TRENCH DIMENSIONS AND CLEARANCES SHOWN OR SPECIFIED. TEMPORARY CONSTRUCTION SLOPES SHALL BE SLOPED, SHORED, SHEETED, AND/OR BRACED IN ACCORDANCE WITH STABILITY REQUIREMENTS AND APPLICABLE REGULATIONS, AND SHALL BE NO STEEPER THAN THE SLOPES SHOWN OR SPECIFIED WITHOUT THE APPROVAL OF THE ENGINEER. ANY SUCH APPROVALS BY THE ENGINEER WILL NOT RELIEVE THE CONTRACTOR FROM SOLE RESPONSIBILITY FOR PROVIDING STABLE EXCAVATIONS AND TEMPORARY SLOPES.
14. EXISTING FACILITIES NOT INDICATED TO BE REMOVED SHALL BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND, AS APPROVED BY ENGINEER.
15. CONTRACTOR SHALL FIELD VERIFY THE LOCATION (HORIZONTAL AND VERTICAL) AT CONNECTIONS TO ALL EXISTING INFRASTRUCTURE. THIS INFORMATION SHALL BE COLLECTED AND SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION AND/OR PRIOR TO INSTALLATION OF ANY NEW FACILITIES SHOWN ON THESE CONTRACT DRAWINGS. THE ENGINEER WILL DETERMINE IF ANY MINOR MODIFICATIONS TO THE NEW FACILITIES SHOWN ON THE CONTRACT DRAWINGS ARE NECESSARY SUCH AS HORIZONTAL AND VERTICAL ADJUSTMENTS.
16. CONTRACTOR SHALL CONFINE WORK TO THE CONSTRUCTION LIMITS SHOWN ON THE GESC PLAN. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING AND MAINTAINING TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES AND REMOVAL OF SUCH MEASURES FOLLOWING CONSTRUCTION. ANY AUTHORIZED DISTURBANCE BEYOND THE CONSTRUCTION LIMITS SHALL BE RESTORED AND REVEGETATED AT THE CONTRACTORS COST.
17. IF HEAVY EQUIPMENT TO BE USED ON THE PROJECT HAS BEEN USED IN ANOTHER STREAM, RIVER, LAKE, POND, OR WETLAND, ONE OF THE FOLLOWING DISINFECTION PRACTICES IS NECESSARY PRIOR TO CONSTRUCTION TO PREVENT THE SPREAD OF NEW ZEALAND MUD SNAILS, ZEBRA MUSSELS, QUAGGA MUSSELS, WHIRLING DISEASE, AND ANY OTHER AQUATIC INVASIVE SPECIES INTO THIS DRAINAGE. THESE PRACTICES ARE ALSO NECESSARY AFTER PROJECT COMPLETION, PRIOR TO THE EQUIPMENT BEING USED IN ANOTHER STREAM, RIVER, LAKE, POND, OR WETLAND:

    A) REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, ETC.) AND SPRAY /SOAK EQUIPMENT IN A 1:15 SOLUTION OF SPARQUAT INSTITUTIONAL CLEANER AND WATER. KEEP EQUIPMENT MOIST FOR AT LEAST 10 MINUTES OR

    B) REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, ETC.) AND SPRAY/SOAK EQUIPMENT WITH WATER GREATER THAN 140 DEGREES FAHRENHEIT FOR AT LEAST 10 MINUTES.

    CLEAN HAND TOOLS, BOOTS, AND OTHER EQUIPMENT THAT WILL BE USED IN THE WATER WITH ONE OF THE ABOVE OPTIONS AS WELL. THE COST OF DISINFECTING EQUIPMENT AND TOOLS SHALL BE INCIDENTAL TO THE PROJECT AND BE INCLUDED IN THE COST OF THE WORK.

AGENCY LIST

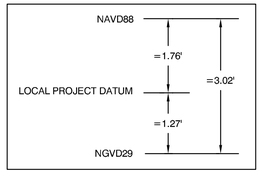
ARAPAHOE COUNTY
6924 S. LIMA STREET
CENTENNIAL, CO 80112
TEL: 720-874-6500

UNITED STATES ARMY CORPS OF ENGINEERS
TRI-LAKES PROJECT OFFICE
9307 S. WADSWORTH BLVD.
LITTLETON, CO 80128
TEL: 303-979-4120
CONTACT: TIMOTHY ROSE

CHERRY CREEK RESERVOIR DATUM DESCRIPTION

THE CHERRY CREEK DAM WAS BUILT USING ELEVATIONS IN A LOCAL PROJECT VERTICAL DATUM. BASED ON A SEPTEMBER 2010 SURVEY, CONDUCTED BY THE USACE OMAHA DISTRICT SURVEYS & MAPPING SECTION, THE LOCAL PROJECT DATUM IS APPROXIMATELY 1.27 FEET ABOVE THE NGVD29 DATUM AND 1.76 FEET BELOW THE NAVD88 DATUM. THE NAVD88 DATUM IS APPROXIMATELY 3.02 FEET ABOVE THE NGVD29 DATUM AT CHERRY CREEK DAM. ANY CONVERSIONS BETWEEN DATUMS SHOULD BE COORDINATED THROUGH THE USACE OMAHA DISTRICT SURVEYS SECTION TO ENSURE ACCURACY THESE VALUES ARE APPROXIMATIONS.

THE ELEVATION ON THE CHERRY CREEK STAFF GAGE, WHICH IS LOCATED ON THE DOWNSTREAM SIDE OF THE INTAKE STRUCTURE, ARE IN LOCAL PROJECT DATUM PLUS APPROXIMATELY 0.20 FEET (1.47 FEET ABOVE NGVD29 DATUM ND 1.56 FEET BELOW NAVD88 DATUM). THIS 0.20 FEET DIFFERENCE CORRESPONDS CLOSELY TO THE SETTLEMENT OBSERVED IN THE UPSTREAM END OF THE CONDUITS AT THE INTAKE SINCE ORIGINAL CONSTRUCTION. IF THE STAFF GAGE IS USED TO MONITOR POOL ELEVATION, SUBTRACT 0.20 FEET FROM THE ELEVATION TO APPROXIMATE THE ELEVATION IN LOCAL PROJECT DATUM.



PROJECT TEAM

OWNER (PROPERTY LEASER):
COLORADO STATE PARKS
CHERRY CREEK STATE PARK
4201 S. PARKER ROAD
AURORA, CO 80014
TEL: 303-766-6564
CONTACT: TIM METZGER

PROJECT STAKEHOLDER:
CHERRY CREEK BASIN WATER QUALITY AUTHORITY
8390 E. CRESCENT PKWY., SUITE 500
GREENWOOD VILLAGE, CO 80111
TEL: 303-779-4525
CONTACT: CHUCK REID

CIVIL ENGINEER:
J3 ENGINEERING CONSULTANTS, INC
3151 S. VAUGHN WAY, SUITE 680
AURORA, CO 80014
TEL: 303-368-5601
CONTACT: JOSH R. DUNCAN, P.E., CFM

SURVEYING:
CALVADA, INC.
6551 S. REVERE PKWY, SUITE 165
CENTENNIAL, CO 80111
TEL: 720-4881-1303
CONTACT: ROB SNODGRASS, PLS

GEOTECHNICAL
CTL THOMPSON, INC.
1971 WEST 12TH AVENUE
DENVER, CO 80204
TEL: 303-825-0777
CONTACT: DAVID GLATER, P.E., C.P.G.

ECOLOGIST
ECOSYSTEM SERVICES
1455 WASHBURN STREET
ERIE, CO 80516
TEL: 970-812-3267
CONTACT: GRANT GURNEE, P.W.S.

ENGINEER'S CERTIFICATION:

"I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS FOR WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS WERE PREPARED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF THE INFRASTRUCTURE DESIGN AND CONSTRUCTION STANDARDS AND THE STORMWATER MANAGEMENT MANUAL."

JOSH R. DUNCAN, P.E., CFM — DATE
REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO NO. 40694
FOR AND ON BEHALF OF J3 ENGINEERING CONSULTANTS, INC.

CHERRY CREEK BASIN WATER QUALITY AUTHORITY ACKNOWLEDGEMENT:

CHERRY CREEK BASIN WATER QUALITY AUTHORITY HEREBY ACKNOWLEDGES THAT THE DRAINAGE FACILITIES FOR THE WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS SHALL BE CONSTRUCTED ACCORDING TO THE DESIGN PRESENTED IN THESE PLANS AND ACCOMPANYING CONTRACT DOCUMENTS.

JAMES R. SWANSON, P.E. — DATE
CAPITAL PROJECTS CONSULTANT, CHERRY CREEK BASIN WATER QUALITY AUTHORITY

OWNERS ACKNOWLEDGEMENT:

CHERRY CREEK STATE PARKS HEREBY ACKNOWLEDGES THAT THE DRAINAGE FACILITIES FOR THE WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS SHALL BE CONSTRUCTED ACCORDING TO THE DESIGN PRESENTED IN THESE PLANS AND ACCOMPANYING CONTRACT DOCUMENTS.

TIM METZGER — DATE
PARK MANAGER, CHERRY CREEK STATE PARK

PREMISE ACKNOWLEDGEMENT:

CHERRY CREEK MARINA AND YACHT CLUB HEREBY ACKNOWLEDGES THAT THE DRAINAGE FACILITIES FOR THE WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS SHALL BE CONSTRUCTED ACCORDING TO THE DESIGN PRESENTED IN THESE PLANS AND ACCOMPANYING CONTRACT DOCUMENTS.

TODD BROPHY — DATE
OWNER, CHERRY CREEK MARINA AND YACHT CLUB

BENCHMARK

TOPOGRAPHIC MAPPING ON THE DRAWINGS WAS PREPARED BY CARROLL AND LANGE, INC. BASED ON A TOPOGRAPHIC SURVEY CONDUCTED IN 2009. HORIZONTAL CONTROL FROM ARAPAHOE COUNTY CONTROL POINTS. VERTICAL CONTROL FROM BM 3" BRASS CAP @NW CORNER OF HEADWALL ON SOUTH END OF NEWARK WAY CUL-DE-SAC, NORTH OF COTTONWOOD CREEK STAMPED: "USGS, SEPT, 1992 ELEV. 5632.33". NAVD 1929 DATUM.

To request marking of underground facilities

811 Know what's **below.** **Call** before you dig.
Call 811 or visit call811.com for more information

It is the contractor's responsibility to contact UNCC a minimum of 2 days prior to the start of construction operations.
J3 Engineering Consultants, Inc claims no responsibility for the underground facilities depicted in this plan set.

ENGINEERING CONSULTANTS
Contact: Josh R. Duncan, PE, CFM
6565 S. Peoria St., Unit B - Centennial, CO 80111-6500
(303) 368-5601 - FAX (303) 368-5603
Email: jduncan@j3engineering.net

WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS
COVER STREET

Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy. Suite 500
Greenwood Village, Colorado 80111
Tel: (303) 779-4525
FAX: (303) 779-2050
Contact: Chuck Reid
Greenwood Village, Colorado

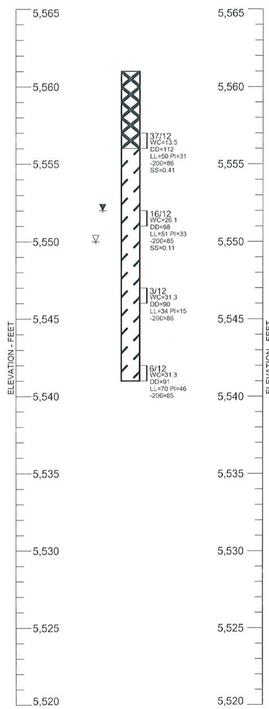
DOCUMENT AMENDMENTS

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	08-10-2012	99% SUBMITTAL

COLORADO REGISTERED JOSH R. DUNCAN 40694 06-10-2013 PROFESSIONAL ENGINEER

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 1

GEOTECHNICAL BORE LOG INFORMATION



LEGEND:

- FILL, CLAY, SANDY, VERY STIFF, MOIST, BROWN.
- CLAY, SANDY, SOFT TO VERY STIFF, MOIST, BROWN (CL).
- DRIVE SAMPLE. THE SYMBOL 37/12 INDICATES 37 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- WATER LEVEL MEASURED AT TIME OF DRILLING.
- WATER LEVEL MEASURED AFTER DRILLING ON JUNE 5, 2012.

NOTES:

1. THE BORING WAS DRILLED ON MAY 30, 2012 USING 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A TRUCK-MOUNTED DRILL RIG.
2. THE BORING ELEVATION WAS PROVIDED BY CALVADA SURVEYING, INC.
3. WC - INDICATES MOISTURE CONTENT (%).
   DD - INDICATES DRY DENSITY (pcf).
   LL - INDICATES LIQUID LIMIT (%).
   PI - INDICATES PLASTICITY INDEX (%).
   -200 - INDICATES PASSING NO. 200 SIEVE (%).
   SS - INDICATES WATER SOLUBLE SULFATE CONCENTRATION (%).
4. THIS LOG IS SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS AS CONTAINED IN THIS REPORT.

JR ENGINEERING CONSULTANTS
CHERRY CREEK STATE PARK WEST BOAT RAMP
WATER QUALITY POND
PROJECT NO. DN46,097-125

Summary Log of Exploratory Boring

FIG. 2

WETLAND SEED MIX

COMMON NAME	SCIENTIFIC NAME	VARIETY	PLS LBS/ACRES
WOOLY SEDGE	CAREX LANUGINOSA	NATIVE	0.25
ALKALI SACATON	SPOROBOLUS AIROIDES	NATIVE	3.00
PRAIRIE CORDGRASS	SPARTINA PECTINATA	NATIVE	6.00
GREEN NEEDLEGRASS	NASSELLA VIRIDULA	LODORM	15.00
SWITCHGRASS	PANICUM VIRGATUM	BLACKWELL	15.00
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	ARRIBA	10.00
HIGH PLAINS WET MEADOW MIX	WESTERN NATIVE SEED CO.		10.00
LOUISIANA SAGE	ARTEMISIA LUDOVICIANA	NATIVE	0.25
NUTTALL'S SUNFLOWER	HELIANTHUS NUTTALLII	NATIVE	0.25
BLUE VERVAIN	VERBENA HASTATA	NATIVE	0.25
YARROW	ACHILLEA LANULOSA	NATIVE	0.25
TOTAL POUNDS PLS/ACRES			60.25

UPLAND SEED MIX

COMMON NAME	SCIENTIFIC NAME	VARIETY	PLS LBS/ACRES
SIDEOATS GRAMA	BOUTELOUA CURTIPENDULA	BUTTLE	5.00
BLUE GRAMA	CHONDROSUM GRACILE	LOVINGTON	3.00
PRAIRIE SANDREED	CALAMOVILFA LONGIFOLIA	NATIVE	6.00
SWITCHGRASS	PANICUM VIRGATUM	BLACKWELL	5.00
INDIAN RICEGRASS	ORYZOPSIS HYMENOIDES	RIMROCK	1.00
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	ARRIBA	5.00
SAND BLUESTEM	ANDROPOGON HALLII	WOODWARD	2.00
SAND DROPSEED	APOROBOLUS CRYPTANDRUS	NATIVE	2.00
FRINGED SAGE	ARTEMISIA FRIGIDA	NATIVE	0.05
ASTER	ASTER LAEVIS	NATIVE	0.01
PUPLE PRAIRIE CLOVER	DALEA PURPUREA	NATIVE	0.50
BLANKET FLOWER	GAILLARDIA ARISTATA	NATIVE	0.50
TANSY ASTER	MACHAERANTHERA TANACETAFOLIA	NATIVE	0.10
LARGE-FLOWERED PENSTEMON	PENSTEMON GRANDIFLORUS	NATIVE	0.10
WAND PENSTEMON	PENSTEMON VIRGATUS	NATIVE	0.05
PRAIRIE CONEFLOWER	RATIBIDA COLUMNIFERA	NATIVE	0.10
SHOWY GOLDENEYE	VIGIUERA MULTIFLORA	NATIVE	0.20
TOTAL POUNDS PLS/ACRES			30.60

GENERAL PROJECT NOTES:

1. EXISTING UTILITIES - THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND WERE BASED ON THE BEST AVAILABLE INFORMATION AND RECORDS. THE DEPICTED LOCATION OF THE EXISTING UTILITIES MAY NOT BE EXACT AND OTHER UTILITIES MAY ALSO BE PRESENT. LOCATION OF THE EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EXACT LOCATIONS AND ELEVATIONS OF ALL UTILITIES PRIOR TO EXCAVATION AND CONSTRUCTION. TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO CALL 811 OR VISIT WWW.CALL811.COM.
2. EXISTING FACILITIES - EXISTING FACILITIES NOT INDICATED TO BE REMOVED SHALL BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND, AS APPROVED BY ENGINEER. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONFLICT.
3. SURVEY INFORMATION - TOPOGRAPHIC MAPPING SHOWN ON THE DRAWINGS WAS PREPARED BY CARROLL AND LANGE BASED ON FIELD SURVEY CONDUCTED IN 2009. THE SURVEY WAS PROVIDED TO J3 ENGINEERING FROM THE CHERRY CREEK BASIN WATER QUALITY AUTHORITY. ACTUAL FEATURES AND TOPOGRAPHY MAY VARY. IN ADDITION TO THE TOPOGRAPHIC SURVEY, UNDERGROUND UTILITIES IDENTIFIED ON THE PLANS WERE LOCATED BY UNDERGROUND CONSULTING SOLUTIONS, LLC AND THE MARKINGS WERE SURVEYED BY CALVADA SURVEYING IN JUNE, 2012. THE CONTRACTOR SHALL VERIFY SITE CONDITIONS AND UNDERGROUND UTILITIES BEFORE THE START OF WORK.
4. GEOTECHNICAL INFORMATION - A GEOTECHNICAL REPORT HAS BEEN PERFORMED BY CTL THOMPSON, INC. AND SHALL BE OBTAINED BY CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MEET ALL REQUIREMENTS ASSOCIATED WITH THE GEOTECHNICAL REPORT DURING THE CONSTRUCTION OPERATIONS, INCLUDING BUT NOT LIMITED TO COMPACTION REQUIREMENTS, DEWATERING METHODS, OVER-EXCAVATION REQUIREMENTS, CONSIDERATION OF MATERIALS LIKELY TO EXHIBIT REFUSAL, MATERIALS STANDARDS AND PLACEMENT SPECIFICATIONS, ETC. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER OF CONFLICT OR DISCREPANCY BETWEEN THE GEOTECHNICAL REPORT REQUIREMENTS AND THE ASSOCIATED MUNICIPAL STANDARDS AND SPECIFICATIONS.
5. REFERENCE STANDARDS - EXCEPT WHERE OTHERWISE PROVIDED FOR IN THESE PLANS AND SPECIFICATIONS, THE CDOT STANDARDS AND SPECIFICATIONS AND URBAN DRAINAGE AND FLOOD CONTROL DISTRICT (UDFCD) SPECIFICATIONS SHALL APPLY.
6. QUANTITIES & BID TABULATION - ALL ESTIMATES OR QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR / SUBCONTRACTOR, WHO SHALL BE RESPONSIBLE FOR DETERMINING ALL QUANTITIES AND PROVIDING THE WORK AND MATERIALS AS SHOWN ON THESE PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM AN INDEPENDENT TAKE-OFF OF ALL QUANTITIES, TO NOTIFY THE OWNER AND ENGINEER OF ANY DISCREPANCIES (INCLUDING UNLISTED ITEMS), AND TO SUBMIT AN ADD-ALTERNATE BID IDENTIFYING THE DISCREPANCIES PRIOR TO FINAL EXECUTION OF THE CONSTRUCTION CONTRACT.
7. RETAINING WALLS - RETAINING WALLS DEPICTED IN THESE DRAWINGS REFERENCE TOP OF WALL AND BOTTOM OF WALL ELEVATIONS AT FINISHED GRADE. ADDITIONAL WALL BURY DEPTH MAY BE REQUIRED BASED ON MANUFACTURE SPECIFICATIONS AND/OR STRUCTURAL DESIGN, BY OTHERS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING SHOP DRAWINGS AND PROVIDING A BID PRICE WHICH REFLECTS THE TOTAL WALL QUANTITY, INCLUDING THE BURY DEPTH.
8. WATERWAY/STREAM WORK - ANY WORK THAT WILL TAKE PLACE IN AND AROUND A STREAM OR DRAINAGEWAY MAY BE SUBJECT TO PERIODIC FLOODING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF SURFACE AND SUBSURFACE WATER DURING THE COURSE OF THE WORK. ANY DAMAGE TO THE WORK RESULTING FROM SURFACE FLOWS, BASE FLOWS, OR FLOOD FLOWS INCLUDING BUOYANCY FORCES ON PIPELINES AND OTHER FACILITIES SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTOR'S SOLE COST. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND SATISFYING THE REQUIREMENTS OF ANY APPLICABLE PERMITS PERTAINING TO WATER AND EROSION CONTROL. GRADING, EROSION AND SEDIMENT CONTROL PLANS HAVE BEEN APPROVED BY ARAPAHOE COUNTY AND SHALL REMAIN IN FULL FORCE DURING CONSTRUCTION ACTIVITIES AND AS REQUIRED BY THE MUNICIPALITY. THE COST OF THE GESC PERMIT AND ALL OTHER INCIDENTAL COSTS ASSOCIATED WITH PERMIT COMPLIANCE AND SURFACE AND SUBSURFACE FLOODING PROTECTION SHALL BE PAID FOR BY THE CONTRACTOR.
9. DEWATERING - IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE APPLICABILITY, MEANS, AND METHODS OF ANY DEWATERING ACTIVITIES REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT AND AS DIRECTED ON THE PLAN OR GEOTECHNICAL REPORT. ADDITIONALLY, IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN AND COMPLY WITH THE APPROPRIATE PERMITS, SUCK AS, BUT NOT LIMITED TO, CDPHE PERMIT(S) AND THE NOTICE OF INTENT TO CONSTRUCT A DEWTERING WELL T THE STATE ENGINEERS OFFICE. THIS EFFORT SHALL BE REFLECTED IN THE CONTRACTOR'S CONSTRUCTION SCHEDULE AND BASE BID AS NECESSARY.
10. FEDERAL FLOODPLAIN PERMITTING - CONSTRUCTION OF THE IMPROVEMENTS WITHIN THIS PLAN SET MAY LIE IN A FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) DESIGNATED FLOODPLAIN. THE CONTRACTOR IS TO ENSURE ALL PERMITS AND ASSOCIATED APPROVALS NECESSARY TO PERFORM WORK ARE OBTAINED PRIOR TO CONSTRUCTION ACTIVITIES.
11. USAGE LAND MANAGEMENT - UNITED STATES ARMY CORPS OF ENGINEERS MANAGES THE LAND USE ACTIVITIES WITHIN CHERRY CREEK STATE PARK. THE CONTRACTOR IS TO ENSURE ALL PERMITS AND ASSOCIATED APPROVALS NECESSARY TO PERFORM WORK AND TO DEMONSTRATE THAT FLOOD STORAGE IS NOT REDUCED ARE OBTAINED PRIOR TO CONSTRUCTION ACTIVITIES.
12. WATERS OF THE US PERMITTING - CONSTRUCTION OF THE IMPROVEMENTS WITHIN THIS PLAN SET LIES WITHIN POTENTIAL WATERS OF THE US. ECOSYSTEM SERVICES COORDINATED WITH THE OSACE TO DETERMINE THAT NO PERMIT IS REQUIRED SUBJECT TO LIMITATIONS. NO DEVIATIONS TO THE PLAN SET ARE NOT PERMITTED WITHOUT PRIOR APPROVAL OF THE OWNER, ENGINEER AND BIOLOGIST. TO ENSURE THAT THE NO PERMIT DESIGNATION IS NOT COMPROMISED.
13. STABLE EXCAVATION AND DEMOLITION LIABILITY - THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING STABLE EXCAVATIONS AND TEMPORARY SLOPES AND FOR SATISFYING ALL APPLICABLE OSHA, FEDERAL, STATE AND LOCATION REGULATIONS. TEMPORARY EXCAVATIONS SHALL PROVIDE, AT MINIMUM, THE TRENCH DIMENSIONS AND CLEARANCES SHOWN OR SPECIFIED BY MUNICIPAL STANDARDS, REQUIREMENTS OR DETAILS WITH THE APPROVED CONSTRUCTION PLANS AND PROJECT GEOTECHNICAL REPORT OR BY STANDARD ENGINEERING PRACTICE. TEMPORARY CONSTRUCTION SLOPES SHALL BE SLOPED, SHORED, SHEETED, AND/OR BRACED IN ACCORDANCE WITH STABILITY REQUIREMENTS OR APPLICABLE REGULATIONS, AND SHALL BE NO STEEPER THAN THE SLOPES SHOWN OR SPECIFIED WITH THE APPROVAL OF THE ENGINEER. ANY SUCH APPROVALS BY THE ENGINEER WILL NOT RELIEVE THE CONTRACTOR FROM SOLE RESPONSIBILITY FOR PROVIDING STABLE EXCAVATIONS AND TEMPORARY SLOPES.
14. LIMITS OF WORK - THE LIMITS OF CONSTRUCTION (LOC) FOR THIS PROJECT IS SHOWN WITHIN THE GRADING, EROSION AND SEDIMENT CONTROL PLANS. CONTRACTOR SHALL LIMIT ALL CONSTRUCTION ACTIVITIES AND DISTURBANCES TO LIMITS OF CONSTRUCTION OR AS ALLOWED BY THE MUNICIPAL INSPECTOR.
15. WORK CONDITIONS - THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING SAFETY OF ALL PEOPLE AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
16. PLANS AND CLARIFICATIONS - THE CONTRACTOR SHALL ENSURE ONE COPY OF THE APPROVED PLANS ARE ON SITE AT ALL TIMES. FURTHER, THE CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ALL SUB-CONTRACTORS WITH THE APPROVED PLANS AND VERIFYING THAT ALL CONSTRUCTION IS IN ACCORDANCE WITH THAT PLAN SET(S). THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR CLARIFICATIONS OR DISCREPANCIES ON ANY INFORMATION SHOWN ON THE DRAWINGS.
17. WEED CONTROL - CONTRACTOR SHALL MAINTAIN CONTROL OF WEEDS ON THE CONSTRUCTION SITE, AND WITHIN 50 FEET OF THE CONSTRUCTION SITE, IF NECESSARY, STARTING WITH CONSTRUCTION STARTUP AND CONTINUING THROUGH THE END OF THE PRESCRIBED MAINTENANCE PERIOD IDENTIFIED BY MUNICIPAL STANDARDS OR IN THE PROJECT SPECIFICATIONS. ANNUAL WEEDS MAY REQUIRE MOWING SEVERAL TIMES PER GROWING SEASON TO PREVENT SEED SET. BIENNIAL AND PERENNIAL WEEDS AND NOXIOUS WEEDS MAY REQUIRE SPOT APPLICATION OF APPROVED HERBICIDES BY A STATE CERTIFIED WEED CONTROL SPECIALIST TO PREVENT SEED SET. ALL WEED CONTROL SHALL BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL STANDARDS.
18. TREE PROTECTION - ALL TREES ARE TO BE PROTECTED DURING CONSTRUCTION UNLESS IDENTIFIED ON THE PLANS FOR REMOVAL. THE CONTRACTOR IS TO IDENTIFY TREES FOR REMOVAL AND THEN NOTIFY THE CONSTRUCTION MANAGER / ENGINEER PRIOR TO ANY TREE REMOVAL. THE CONSTRUCTION MANAGER / ENGINEER WILL VERIFY THE TREES IDENTIFIED FOR REMOVAL PRIOR TO THE CONTRACTOR COMMENCING TREE MITIGATION. IN THE EVENT A PROTECTED TREE IS DAMAGED OR DESTROYED DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR THE MITIGATION REQUIREMENTS AND MAY PAY DAMAGES UP TO THREE TIMES MARKET VALUE OF THE TREE.
19. EXISTING BOAT RACKS AND OTHER EQUIPMENT MAY LIE WITHIN THE LIMITS OF CONSTRUCTION. THIS EQUIPMENT WILL BE REMOVED BY OTHERS PRIOR TO THE CONTRACTOR COMMENCING CONSTRUCTION.
20. THE PROJECT SITE IS LOCATED WITH CHERRY CREEK STATE PARK. A PORTION OF THE PROJECT LIES WITHIN THE PREMISE BOUNDARY LEASED TO THE CHERRY CREEK MARINA AND YACHT CLUB. THE PREMISE BOUNDARY IS GENERALLY DEFINED BY THE CHAIN LINK FENCE.

SYMBOLS AND LINETYPES LEGEND

- CENTER LINE OF STREET
- BOUNDARY LINE
- RIGHT OF WAY LINE
- LOT LINE
- EASEMENT LINE
- WATERLINE W/ GATE VALVE & TEE
- SANITARY SEWER W/ MANHOLE
- STORM SEWER W/ INLET & F.E.S.
- CURB, GUTTER, CROSSPAN SIDEWALK & RAMP
- FIRE HYDRANT
- PROPOSED CONTOURS 5800
- EX. WATERLINE W/ VALVE & TEE (WL)
- EX. SANITARY SEWER W/ MANHOLE (SAN)
- EX. STORM SEWER W/ INLET & F.E.S.
- EX. UNDERGROUND ELECTRICITY LINE (UGE)
- EX. OVERHEAD ELECTRICITY LINE (OHE)
- EX. GAS LINE (GAS)
- EX. TELEPHONE LINE (T)
- EX. FIBER OPTIC LINE (FO)
- EX. EASEMENT LINE
- EX. RAILROAD TRACKS
- EX. FIRE HYDRANT
- EX. STREET LIGHT
- EXISTING CONTOURS 5700

LIST OF ACRONYMS AND ABBREVIATIONS

AC	ACRE	MH	MANHOLE
ASS'Y	ASSEMBLY	MJ	MECHANICAL JOINT
A.T.	ACCESS TRACT	MIN	MINIMUM
BMP	BEST MANAGEMENT PRACTICES	N.T.S.	NOT TO SCALE
BNDY	BOUNDARY	NO.	NUMBER
BOW	BACK OF WALK	NWSEL	NORMAL WATER SURFACE ELEVATION
BW	BOTTOM OF WALL	PL	PROPERTY LINE
CFS	CUBIC FEET PER SECOND	PMF	PROBABLE MAXIMUM FLOOD
CL	CENTERLINE	PSI	POUNDS PER SQUARE INCH
CONC	CONCRETE	PROP	PROPOSED
D.U.E.	DRAINAGE AND UTILITY EASEMENT	PVC	POLY VINYL CHLORIDE
DIA.	DIAMETER	Q10	10 YEAR DISCHARGE
DIP	DUCTILE IRON PIPE	Q100	100 YEAR DISCHARGE
D.W.E.E	DENVER WATER EXCLUSIVE EASEMENT	RCBC	REINFORCED CONCRETE BOX CULVERT
E.A.E.	EMERGENCY ACCESS EASEMENT	RCP	REINFORCED CONCRETE PIPE
ELEV	ELEVATION	ROW	RIGHT OF WAY
EX	EXISTING	SAN	SANITARY SEWER
FES	FLARED END SECTION	SB	STILLING BASIN
FG	FINISHED GRADE	SEC.	SECTION
FH	FIRE HYDRANT	SF	SQUARE FEET
FHAD	FLOOD HAZARD AREA DELINEATION	STA	STATION
FIRM	FLOOD INSURANCE RATE MAP	STM	STORM SEWER
℄	FLOW LINE	TB	THRUST BLOCK
FS	FIRE SERVICE	TBC	TOP BACK OF CURB
FT	FOOT	TEMP	TEMPORARY
FUT	FUTURE	TOF	TOP OF FOUNDATION
G.E.	GAS EASEMENT	TOP	TOP OF PIPE
GPM	GALLONS PER MINUTE	TOS	TOP OF SLAB
GV	GATE VALVE	TW	TOP OF WALL
HC	HANDICAP	TYP	TYPICAL
HORZ	HORIZONTAL	U.E.	UTILITY EASEMENT
HP	HIGH POINT	VERT	VERTICAL
HW	HEAD WALL	VN	NORMAL VELOCITY
INT	INTERSECTION OR INTERCEPT	W/	WITH
INV	INVERT	W/L	WATER LINE
IRR	IRRIGATION	WQ	WATER QUALITY
KB	KICK BLOCK	WQCV	WATER QUALITY CAPTURE VOLUME
LF	LINEAR FEET	WSEL	WATER SURFACE ELEVATION
LP	LOW POINT	YR	YEAR
MAX	MAXIMUM	#	NUMBER

BENCHMARK

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Contact: Josh R. Duncan, PE, CFM
6565 S. Dayton St., Suite B - Centennial, CO 80111-6500
(303) 368-5601 - FAX (303) 368-5603
Email: Jduncan@J3Engineering.net

WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS

NOTES AND LEGENDS

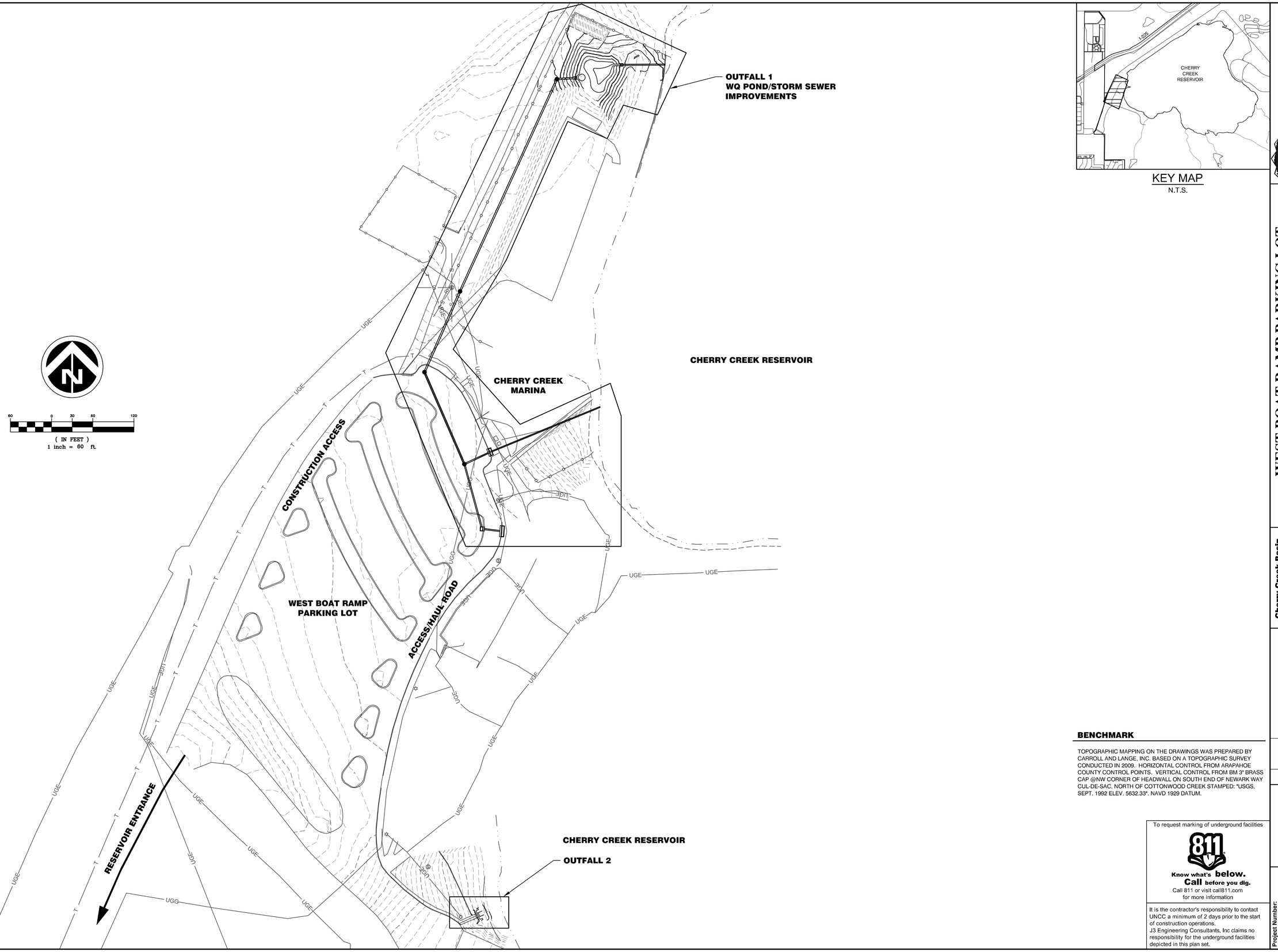
Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy.
Suite 500
Greenwood Village, Colorado
Tel: (303) 773-4525
FAX: (303) 773-2050
Contact: Chuck Reid
Greenwood Village, Colorado

DOCUMENT AMENDMENTS

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	06-10-2012	90% SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER — COLORADO — JOSHUA R. DUNCAN — 40694 — 06-10-2013

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 2



KEY MAP
N.T.S.

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WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS
OVERALL SITE MAP

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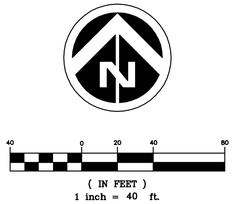
REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO
JOSHUA R. DUNCAN
40694
06-10-2013

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 3



EX. BOAT STORAGE AREA
BOATS AND STORAGE RACKS TO
REMOVED BY OTHERS BEFORE
CONSTRUCTION BEGINS.

EX. 6' CHAIN LINK FENCE

PREMISE BOUNDARY

PREMISE BOUNDARY

CONTRACTOR TO PROTECT EXISTING
GATE. IN THE EVENT THE CONTRACTOR
NEEDS TO REMOVE THE GATE OR A
PORTION OF FENCE FOR
CONSTRUCTION ACCESS, THE
CONTRACTOR SHALL REMOVE AND
RESTORE FENCE AND GATE.

EX. POND

1

CONTRACTOR TO PROTECT EXISTING CONCRETE WALL AND
FOOTER. CONTRACTOR TO REMOVE AND RESTORE A
PORTION OF CONCRETE WALL FOR INSTALLATION OF
PROPOSED OUTFALL PIPE PER RECOMMENDED DETAIL ON
THIS SHEET.

2

CLEARING AND GRUBBING AREA.
0.70± AC
CONTRACTOR TO SALVAGE AND STOCKPILE TOPSOIL.

EX. BRICK

REMOVE TREES AND SHRUBS FOR INSTALLATION OF
FES AND STORM SEWER. CONTRACTOR TO REMOVE
NOXIOUS WEEDS (I.E. RUSSIAN OLIVE, ETC.) WITHIN THE
CONSTRUCTION LIMITS AND ALONG THE PERIMETER OF
THE WATER QUALITY FACILITY.

CLEARING AND GRUBBING AREA.
0.70± AC
CONTRACTOR TO SALVAGE AND
STOCKPILE TOPSOIL.

CONTRACTOR TO PROTECT EXISTING VEGETATION WHERE
DISTURBANCE IS NOT REQUIRED. CONTRACTOR TO CAREFULLY
REMOVE NOXIOUS WEEDS (I.E. RUSSIAN OLIVES, ETC.) WITHIN
EXISTING VEGETATION TO BE PROTECTED. CONTRACTOR IS TO
ALSO NOTIFY DESIGN ENGINEER IF PROTECTED VEGETATION IS
DAMAGED.

EX. ASPHALT

EX. SPLIT RAIL FENCE

EX. 6' CHAIN LINK FENCE

CONTRACTOR TO PROTECT
ABANDONED EXISTING
SANITARY SEWER
MANHOLE

REMOVE AND RESET 24'±
LF EXISTING CHAINLINK
FENCE

UNDERGROUND ELECTRIC
RELOCATE /LOWER TO AVOID CONSTRUCTION.

EX. ASPHALT

REMOVE APPROXIMATELY 58 ± SY OF
ASPHALT.

EX. GRAVEL DRIVE

RELOCATE UNDERGROUND
TELEPHONE

CLEAR AND GRUB 0.003± AC.
CONTRACTOR TO SALVAGE AND
STOCKPILE TOPSOIL.

EX. 6 VERT. CURB (TYP.)

REMOVE EX. INLET.

SAWCUT, REMOVE AND REPLACE
CURB AND GUTTER 11± LF OR
REMOVE TO NEAREST JOINT.

CONTRACTOR TO REMOVE EXISTING 18"
CMP FOR AN APPROXIMATE LENGTH OF 5 LF
BEHIND EXISTING INLET. PIPE END IS TO BE
SUFFICIENTLY FILLED OR CRUSHED TO
PREVENT FUTURE SETTLEMENT.

CONTRACTOR TO ABANDON 18" CMP PER
CDOT REQUIREMENTS. THE ENDS OF THE
CORRUGATED METAL PIPE TO REMAIN
SHALL BE CRUSHED. PIPE ENDS ARE TO BE
SUFFICIENTLY FILLED OR CRUSHED TO
PREVENT FUTURE SETTLEMENT.

REMOVE AND REPLACE 19±
SY OF CONCRETE WALK.

REMOVE APPROXIMATELY 299±SY
OF ASPHALT.

SAWCUT

EX. 18" CMP

SAWCUT, REMOVE AND REPLACE
CURB AND GUTTER 23± LF OR
REMOVE TO NEAREST JOINT.

CONTRACTOR TO REMOVE
EXISTING 18" CMP FOR AN
APPROXIMATE LENGTH OF 40 LF
OF EXPOSED STORM PIPE,
BACKFILL AND RESTORE TO
EXISTING SURFACE CONDITIONS.

RELOCATE UNDERGROUND GAS

STORM SEWER TRENCH
(TYP.)

EX. 6 CHAIN LINK FENCE

EX. ASPHALT

REMOVE APPROXIMATELY 29±SY
OF ASPHALT.

EX. CONC.

REMOVE AND REPLACE 20±SY OF
CONCRETE WALK.

CLEARING AND GRUBBING AREA.
0.006± AC
CONTRACTOR TO SALVAGE AND
STOCKPILE TOPSOIL.

SAWCUT, REMOVE AND REPLACE
CURB AND GUTTER 26± LF OR
REMOVE TO NEAREST JOINT.

EX. ASPHALT

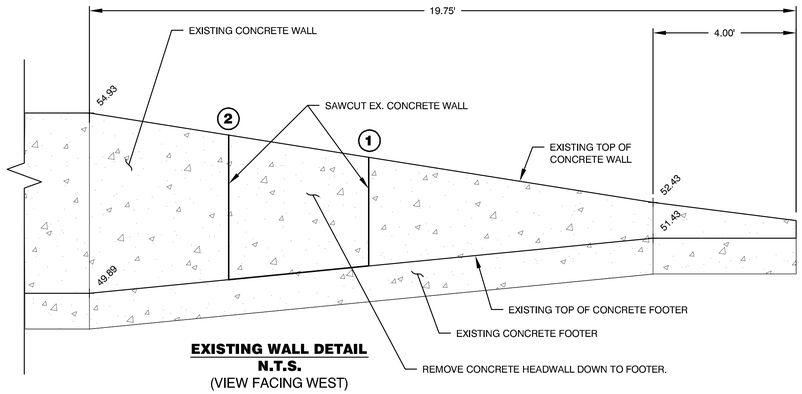
SAWCUT, REMOVE AND REPLACE
CURB AND GUTTER 42± LF OR
REMOVE TO NEAREST JOINT.

6 VERT. CURB (TYP.)

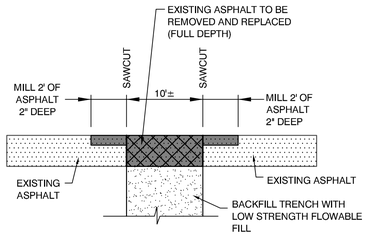
UGE

LEGEND

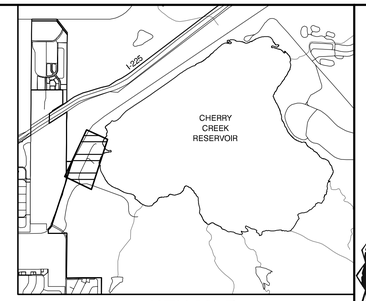
- ASPHALT REMOVAL
- CONCRETE REMOVAL
- CLEARING AND GRUBBING
- EX. CURB & GUTTER REMOVAL



EXISTING WALL DETAIL
N.T.S.
(VIEW FACING WEST)



ASPHALT REMOVAL/REPLACEMENT DETAIL
N.T.S.



KEY MAP
N.T.S.

NOTES:

1. EXISTING FACILITIES NOT INDICATED TO BE REMOVED SHALL BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND, AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONFLICT.
2. UNLESS OTHERWISE NOTED THE CONTRACTOR IS TO PROTECT ALL EXISTING SITE FEATURES AND IS RESPONSIBLE FOR THE REPLACEMENT OF DAMAGED SITE FEATURES TO CONDITION EQUAL TO OR BETTER THAN EXISTING CONDITIONS.
3. CONTRACTOR TO RESTORE ALL DISTURBED AREAS BY CONSTRUCTION ACTIVITIES.
4. CONTRACTOR SHOULD REFER TO THE ACCOMPANYING GRADING, EROSION, AND SEDIMENT CONTROL PLANS FOR ADDITIONAL DISTURBANCE ITEMS SUCH AS, BUT NOT LIMITED TO, THE CONCRETE WASHOUT AREA, VEHICLE TRACKING CONTROL, STAGING AREAS, STOCKPILES, ETC. THESE ITEMS MAY REQUIRE ADDITIONAL DEMOLITION AND RESTORATION EFFORTS.
5. CONTRACTOR SHOULD REFER TO THE ACCOMPANYING GRADING EROSION AND SEDIMENT CONTROL PLANS FOR THE LIMITS OF CONSTRUCTION.

BENCHMARK

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WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS CONSTRUCTION PLANS

DEMOLITION PLAN

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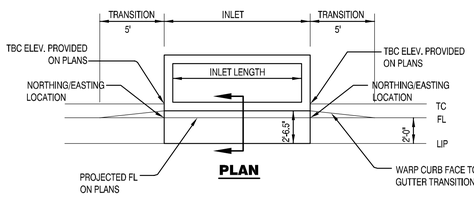
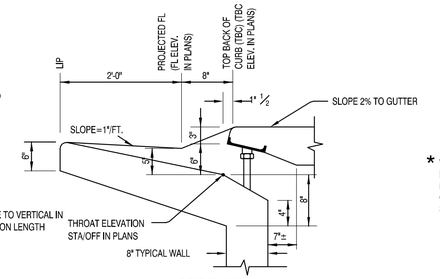
COLORADO REGISTERED PROFESSIONAL ENGINEER JOSHUA R. DUNCAN 40694 06-10-2013

Project Number:	52400101
Designed By:	JRD
Drawn By:	JAN
Checked By:	JRD
Sheet Number:	4

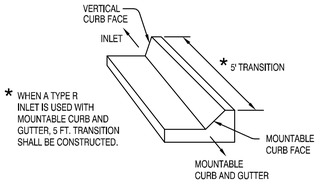
CURB OPENING INLET WITH MOUNTABLE CURB & GUTTER



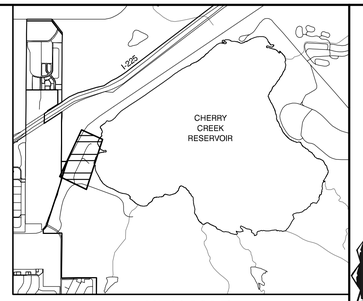
PLAN



SECTION

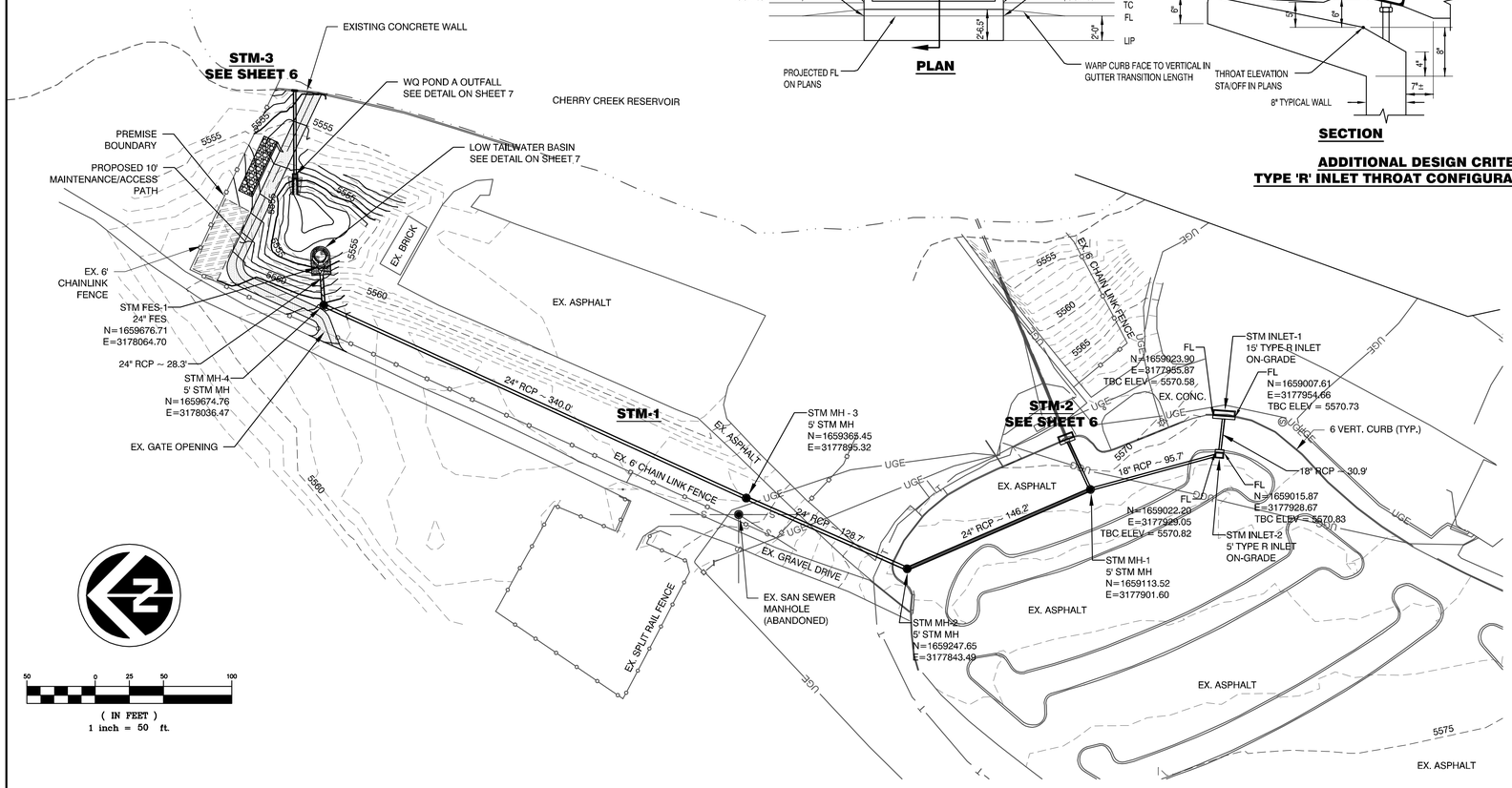


TRANSITION CURB



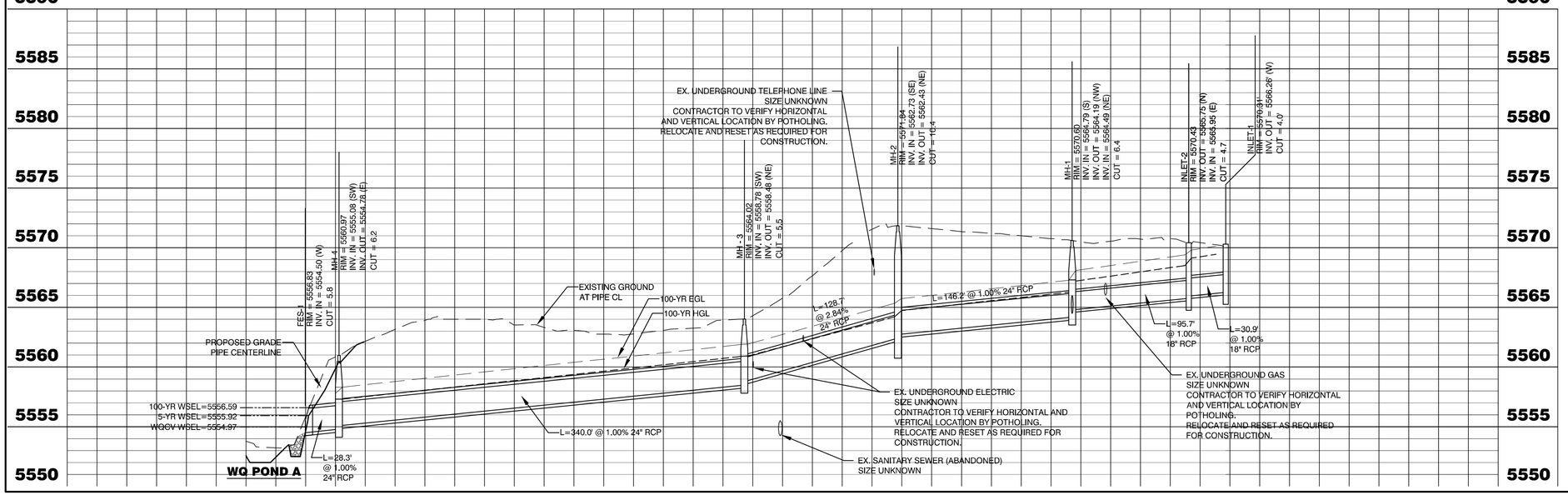
KEY MAP
N.T.S.

ADDITIONAL DESIGN CRITERIA
TYPE 'R' INLET THROAT CONFIGURATION DETAIL



50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

STM-1
HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 5'



NOTES:

1. CONTRACTOR TO MAINTAIN A MINIMUM OF 0.50% GRADE AT FLOWLINE INTO SUMP INLETS.
2. ALL STORM SEWER INLETS ARE IN SUMP CONDITION, UNLESS OTHERWISE NOTED.
3. ALL PROPOSED STORM SEWER SHALL BE BEDDED PER CDOT M-206-1.
4. ALL PROPOSED STORM SEWER MANHOLES SHALL BE PER CDOT M-604-20.
5. ALL PROPOSED TYPE R INLETS SHALL BE PER CDOT DETAIL M-604-12.
6. ALL PROPOSED FLARED END SECTIONS SHALL BE PER CDOT M-603-10.
7. ALL PROPOSED TYPE 'C' INLET SHALL BE PER CDOT M-604-10.
8. ALL PROPOSED MANHOLES SHALL BE PER CDOT M-604-20.
9. STORM SEWER PIPE LENGTHS ARE MEASURED FROM CENTER TO CENTER OF STRUCTURES. ALSO, STORM SEWER PIPE LENGTHS INCLUDE FLARED END SECTIONS (FES).
10. ALL STORM SEWER PIPES SHALL BE CLASS III REINFORCED CONCRETE PIPE (RCP), UNLESS OTHERWISE NOTED.
11. STORM SEWER MANHOLE LOCATIONS ARE TO CENTER OF STRUCTURE.
12. STORM SEWER TYPE R INLET LOCATIONS ARE TO FRONT FACE OF BOX.
13. FLARED END SECTION (FES) LOCATIONS ARE TO THE END AND CENTER OF THE FES.
14. IN THE EVENT THAT EXISTING DRY UTILITIES ARE FOUND TO BE IN CONFLICT WITH THE PROPOSED IMPROVEMENTS. THE DRY UTILITIES WILL NEED TO BE SUPPORTED AND ADJUSTED AS NECESSARY.
15. CONTRACTOR SHOULD REFER TO THE ACCOMPANYING GRADING, EROSION AND SEDIMENT CONTROL PLANS FOR THE LIMITS OF CONSTRUCTION.

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Email: jduncan@J3Engineering.net

WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS
STORM SEWER PLAN AND PROFILE

Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy, Suite 500
Greenwood Village, Colorado
Tel: (303) 773-1025
FAX: (303) 773-2050
Contact: Chuck Reid
Greenwood Village, Colorado

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3	01-04-2013	FINAL SUBMITTAL
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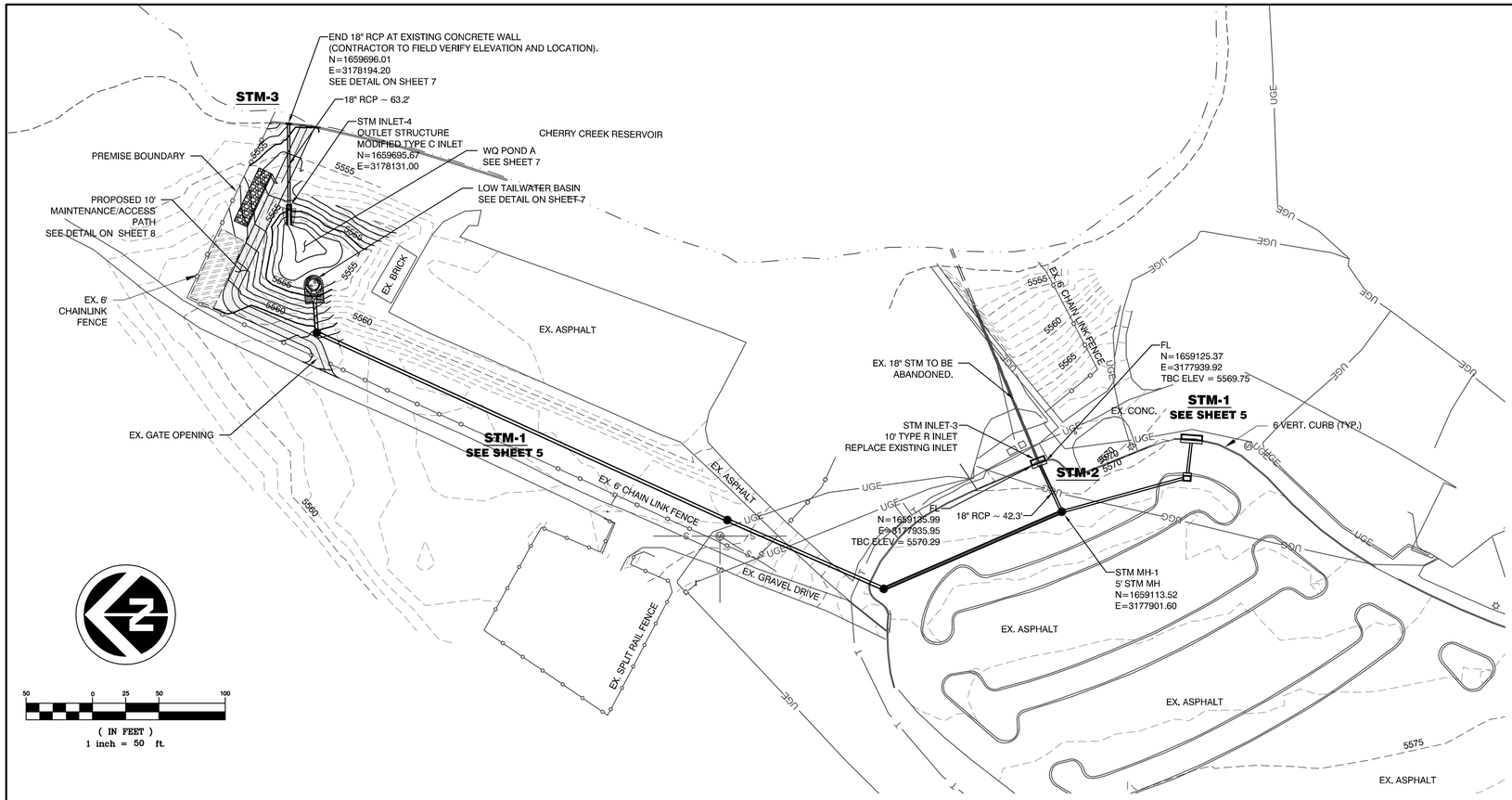
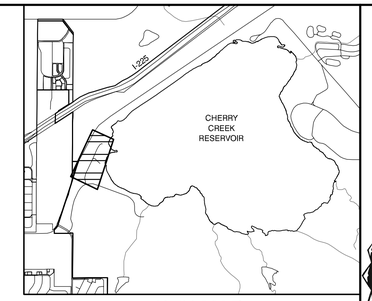
REGISTERED PROFESSIONAL ENGINEER
COLORADO
JOSHUA R. DUNCAN
40694
06-10-2013

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 5



50 0 25 50 100

(IN FEET)
1 inch = 50 ft.

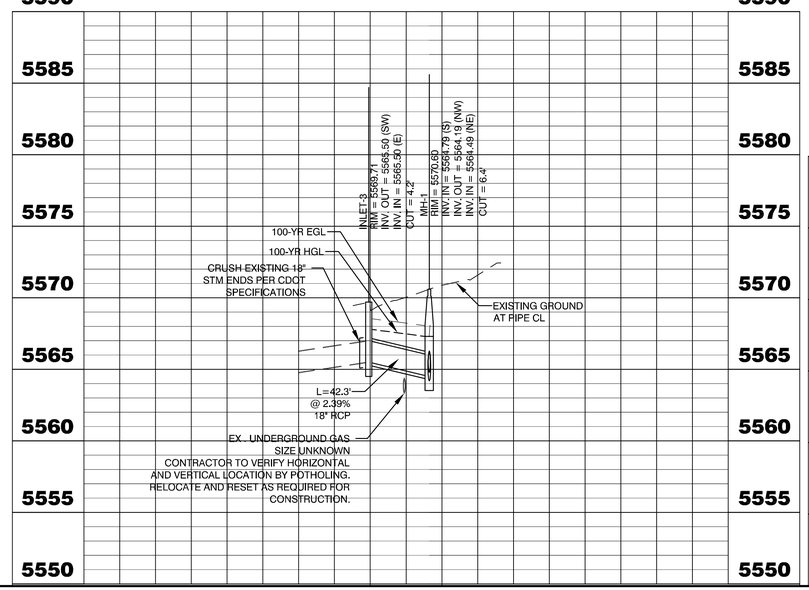


KEY MAP
N.T.S.

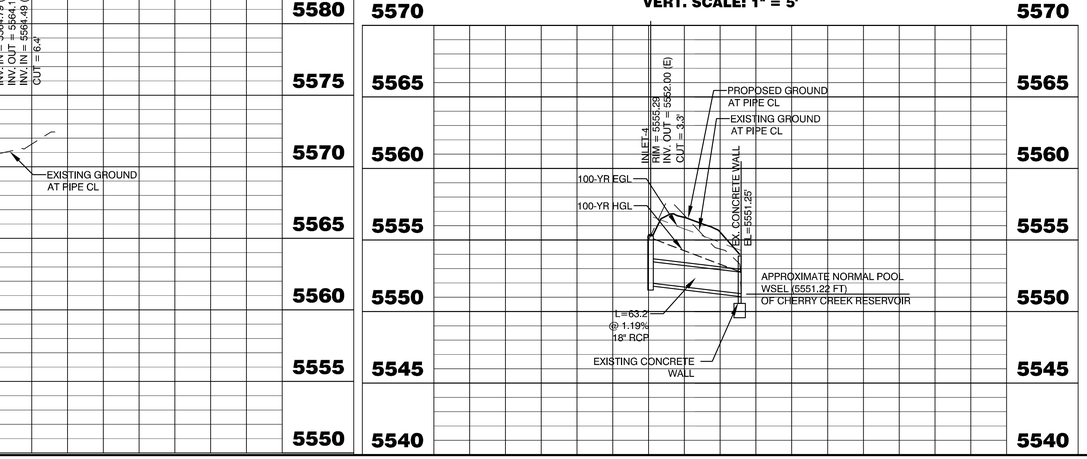
NOTES:

1. CONTRACTOR TO MAINTAIN A MINIMUM OF 0.50% GRADE AT FLOWLINE INTO SUMP INLETS.
2. ALL STORM SEWER INLETS ARE IN SUMP CONDITION, UNLESS OTHERWISE NOTED.
3. ALL PROPOSED STORM SEWER SHALL BE BEDDED PER CDOT M-206-1.
4. ALL PROPOSED STORM SEWER MANHOLES SHALL BE PER CDOT M-604-20.
5. ALL PROPOSED TYPE R INLETS SHALL BE PER CDOT DETAIL M-604-12.
6. ALL PROPOSED FLARED END SECTIONS SHALL BE PER CDOT M-603-10.
7. ALL PROPOSED TYPE 'C' INLET SHALL BE PER CDOT M-604-10.
8. ALL PROPOSED MANHOLES SHALL BE PER CDOT M-604-20.
9. STORM SEWER PIPE LENGTHS ARE MEASURED FROM CENTER TO CENTER OF STRUCTURES. ALSO, STORM SEWER PIPE LENGTHS INCLUDE FLARED END SECTIONS (FES).
10. ALL STORM SEWER PIPES SHALL BE CLASS III REINFORCED CONCRETE PIPE (RCP), UNLESS OTHERWISE NOTED.
11. STORM SEWER MANHOLE LOCATIONS ARE TO CENTER OF STRUCTURE.
12. STORM SEWER TYPE R INLET LOCATIONS ARE TO FRONT FACE OF BOX.
13. FLARED END SECTION (FES) LOCATIONS ARE TO THE END AND CENTER OF THE FES.
14. IN THE EVENT THAT EXISTING DRY UTILITIES ARE FOUND TO BE IN CONFLICT WITH THE PROPOSED IMPROVEMENTS. THE DRY UTILITIES WILL NEED TO BE SUPPORTED AND ADJUSTED AS NECESSARY.
15. CONTRACTOR SHOULD REFER TO THE ACCOMPANYING GRADING, EROSION AND SEDIMENT CONTROL PLANS FOR THE LIMITS OF CONSTRUCTION.

STM-2
HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 5'



STM-3
HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 5'



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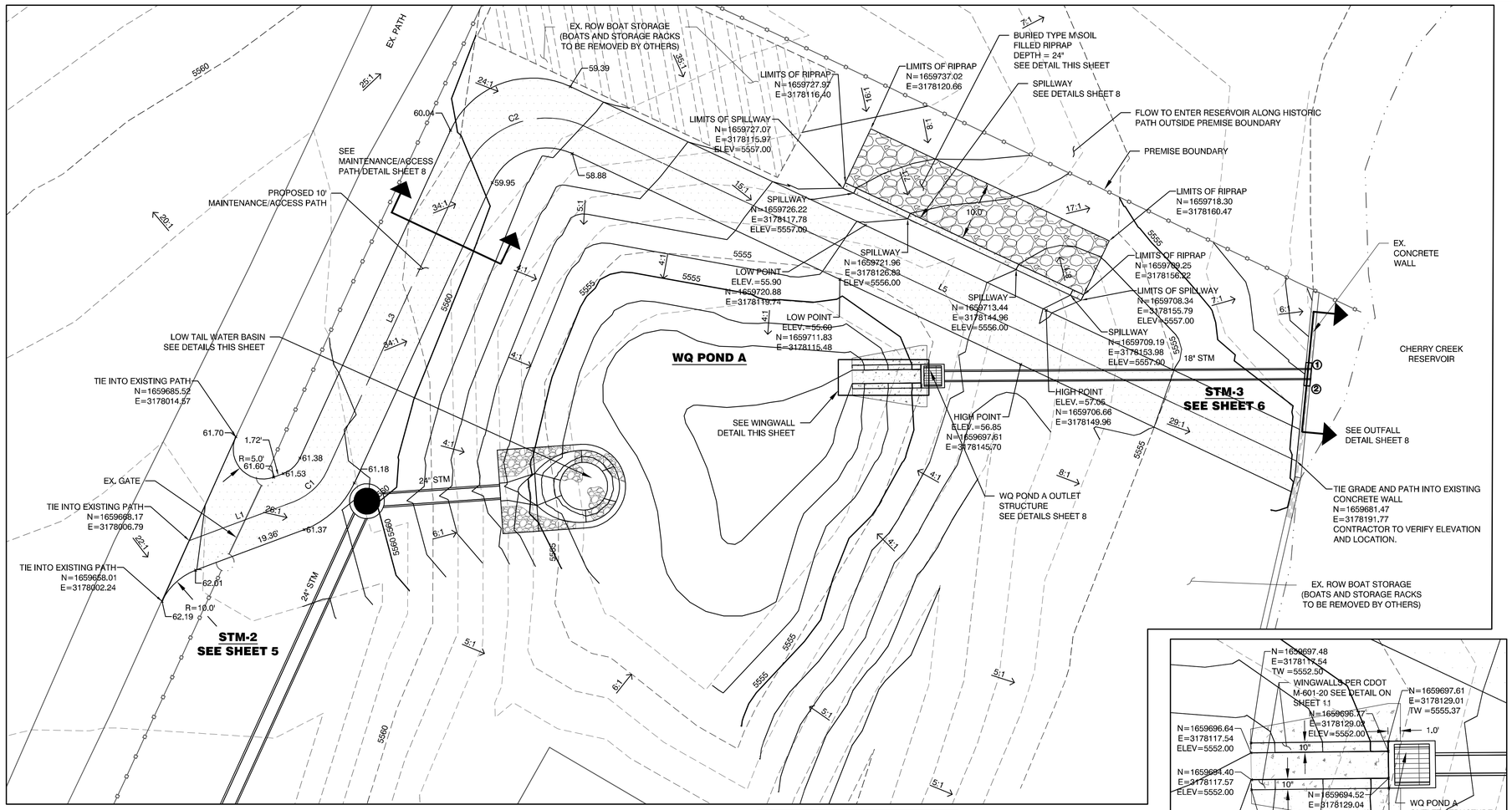
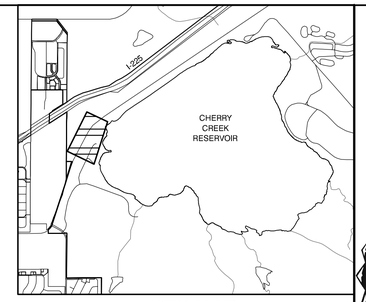


WINGWALL DETAIL
SCALE: 1"=5'



KEY MAP
N.T.S.

(IN FEET)
1 inch = 10 ft.

PARTICLES SIZES FOR SOIL FILL IN RIPRAP	
PARTICLE	%
CLAY	25 - 60
SILT	20 - 55
SAND	20 - 50

FILL SOIL REQUIREMENTS:

THE SOIL MATERIAL CHARACTERISTICS MUST BE NON-EROSIVE, HAVE GOOD WATER RETENTION PROPERTIES, AND SUITABLE FOR GOOD PLANT GROWTH. THE FILL SOIL SHOULD BE SUITABLE FOR EROSION RESISTANCE AND PLANT GROWTH BY ITSELF OR WHEN MIXED INTO RIPRAP.

IT SHALL HAVE SUFFICIENT PHYSICAL CHARACTERISTICS SO THAT IT CAN BE MIXED 35% BY VOLUME OF PLACED ROCK. WORK IN AN EVEN DISTRIBUTION TO FILL RIPRAP VOIDS, BUT NOT HAVE EXCESSIVE CLUMPING OR OTHERWISE DISPLACE RIPRAP. ON-SITE MATERIAL AND/OR IMPORTED MATERIALS AND MIXES MAY BE USED WITH APPROVAL OF THE ENGINEER. MIXTURES OF TOPSOIL, WETLANDS, WITH 20 TO 40% CLAY MINIMUM ARE REQUIRED. IT SHALL BE THOROUGHLY WETTED, MIXED AND STOCKPILED SEPARATELY FROM RIPRAP, AND AWAY FROM THE ROCK PLACEMENT AREA.

RIPRAP GRADATION:

CLASSIFICATION AND GRADATION OF ORDINARY RIPRAP			
RIPRAP DESIGNATION	% SMALLER THAN GIVEN SIZE BY WEIGHT	INTERMEDIATE ROCK DIMENSIONS (INCHES)	d50 (INCHES)*
TYPE M	70-100 50-70 35-50 2-10	21 18 12 4	12**

*d50 = MEANS PARTICLE SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.
** RIPRAP WITH 35% TOPSOIL (BY VOLUME) AND BURY IT WITH 4 TO 6 INCHES OF TOPSOIL, ALL VIBRATION COMPACTED, AND REVEGETATE.

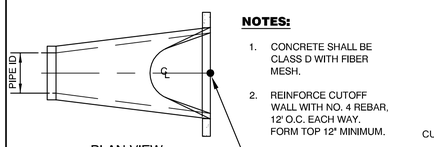
SOIL RIPRAP NOTES:

1. MIX UNIFORMLY 65% RIPRAP BY VOLUME WITH 35% OF APPROVED SOIL BY VOLUME PRIOR TO PLACEMENT. SEE PROJECT SPECIFICATIONS AND FILL SOIL REQUIREMENTS FOR PHYSICAL CHARACTERISTICS.
2. PLACE FILL SOIL MIX TO RESULT IN SECURELY INTERLOCKED ROCK AT THE DESIGN THICKNESS AND GRADE. COMPACT AND LEVEL TO ELIMINATE ALL VOIDS AND PROJECTING RIPRAP ABOVE DESIGN GRADE. COVER WITH APPROVED TOP SOIL 6" AFTER SETTLING.
3. CRIMP OR TACKIFY MULCH OR USE APPROVED HYDROMULCH AS CALLED FOR IN THE GRADING EROSION AND SEDIMENT CONTROL PLANS AND PROJECT SPECIFICATIONS.
4. RECOMMENDED SEED MIX AND MULCH LOCATED ON THE GRADING EROSION AND SEDIMENT CONTROL PLANS.

LINE TABLE		
LINE #	BEARING	DISTANCE
L1	N69°32'14"E	18.61
L3	N24°39'12"E	55.23
L5	S64°48'43"E	131.39

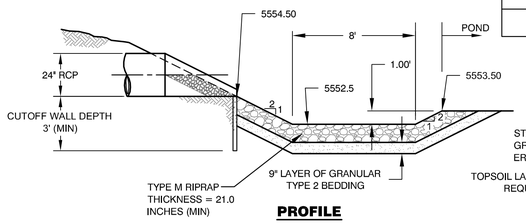
CURVE TABLE					
CURVE #	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	7.83	10.00	044°53'01"	N47°05'43"E	7.63
C2	23.70	15.00	090°32'05"	N69°55'15"E	21.31

WQ POND A	
EXISTING REQUIRED WQCV	343 CF
PROPOSED REQUIRED WQCV	6,186 CF
PROVIDED TOTAL WQCV	8,550 CF
WQ WSEL	5554.66
5-YR WSEL	5555.60
100-YR WSEL	5556.61

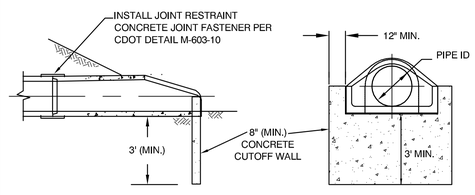


NOTES:

1. CONCRETE SHALL BE CLASS D WITH FIBER MESH.
2. REINFORCE CUTOFF WALL WITH NO. 4 REBAR, 12' O.C. EACH WAY. FORM TOP 12" MINIMUM.

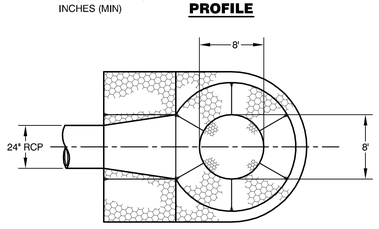


PROFILE



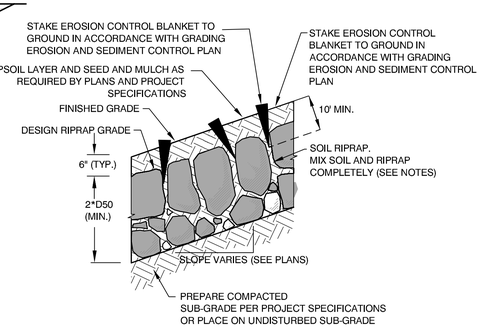
SECTION AT CENTERLINE
END VIEW

CONCRETE FLARED END SECTION WITH CUTOFF WALL
N.T.S.



PLAN

LOW TAILWATER RIPRAP BASIN
N.T.S.



TYPICAL SECTION - SOIL RIPRAP WITH EROSION CONTROL FABRIC

SOIL RIPRAP TREATMENT DETAILS
N.T.S.

GRADATION FOR GRANULAR BEDDING		
	PERCENT WEIGHT BY PASSING SQUARE-MESH SIEVES	
U.S. STANDARD SIEVE SIZE	TYPE I CDOT SECT. 703.01	TYPE II CDOT SECT. 703.09 CLASS A
3 INCHES	-----	90-100
1 1/2 INCHES	-----	-----
3/4 INCHES	-----	20-90
3/8 INCHES	100	-----
#4	95-100	0-20
#16	45-80	-----
#50	10-30	-----
#100	2-10	-----
#200	0-2	0-3

THICKNESS REQUIREMENTS FOR GRANULAR BEDDING			
RPRAP DESIGNATION	MINIMUM BEDDING THICKNESS (INCHES)		
	FINE-GRAINED SOILS*		COARSE-GRAINED SOILS**
	TYPE I	TYPE II	TYPE II
V (d50 = 6 IN), L (d50 = 9 IN)	4	4	6
M (d50 = 12 IN)	4	4	6
H (d50 = 18 IN)	4	6	8
VH (d50 = 24 IN)			

* MAY SUBSTITUTE ONE 12-INCH LAYER OF TYPE II BEDDING. THE SUBSTITUTION OF ONE LAYER OF TYPE II BEDDING SHALL NOT BE PERMITTED AT DROP STRUCTURES. THE USE OF A COMBINATION OF FILTER FABRIC AND TYPE II BEDDING AT DROP STRUCTURES IS ACCEPTABLE.
** FIFTY PERCENT OR MORE BY WEIGHT RETAINED ON THE #40 SIEVE.

BENCHMARK

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WEST BOAT RAMP PARKING LOT WATER QUALITY IMPROVEMENTS CONSTRUCTION PLANS

POND A DETAILED GRADING

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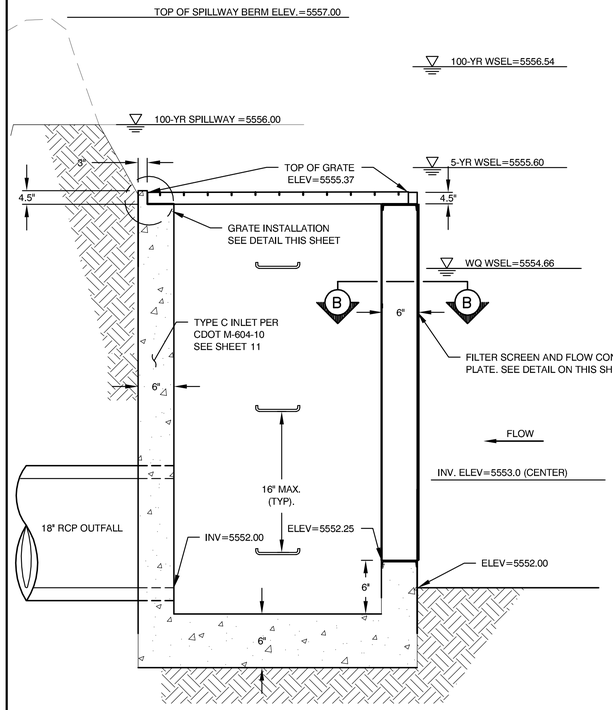
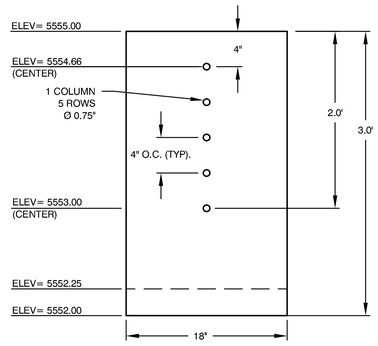
COLORADO REGISTERED PROFESSIONAL ENGINEER JOSHUA R. DUNCAN 40694 06-10-2013

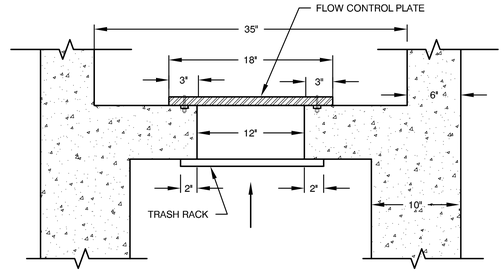
Project Number:	Drawn By:
52400101	JAN
Designed By:	Checked By:
JRD	JRD
Sheet Number:	7

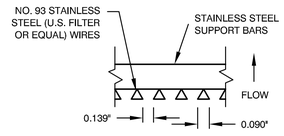


SECTION D-D
N.T.S.



STEEL PERFORATED FLOW CONTROL PLATE
N.T.S.



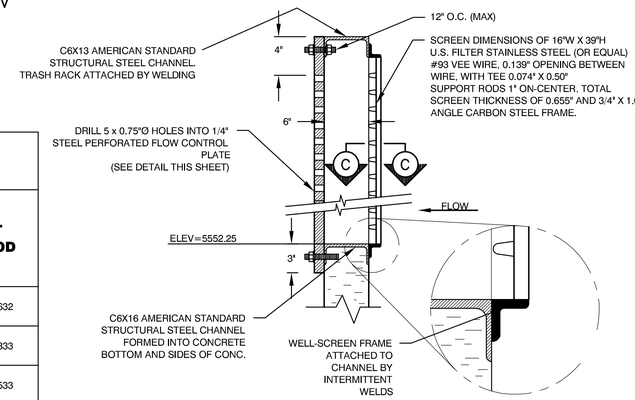


TRASH RACK DETAIL
SECTION C-C
N.T.S.

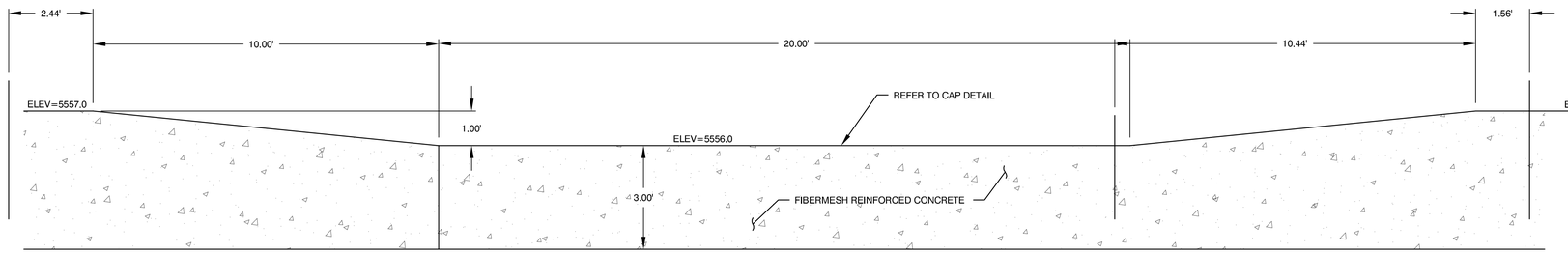
PHYSICAL REQUIREMENTS FOR SEPARATOR FABRIC

PROPERTY	CLASS B		TEST METHOD
	ELONGATION < 50%[2]	ELONGATION > 50%[2]	
GRAB STRENGTH, N (LBS)	800 (180)	510 (115)	ASTM D 4632
PUNCTURE RESISTANCE, N (LBS)	310 (70)	180 (40)	ASTM D 4833
TRAPEZOIDAL TEAR STRENGTH, N (LBS)	310 (70)	180 (40)	ASTM D 4533
APPARENT OPENING SIZE, MM (US SIEVE SIZE)	AOS < 0.3 MM (US SIEVE SIZE NO. 50)		ASTM D 4751
PERMITTIVITY, SEC	0.02 DEFAULT VALVE, MUST ALSO BE GREATER THAN THAT OF SOIL		ASTM D 4491
PERMEABILITY, CM/SEC	K FABRIC > SOIL FOR ALL CLASSES		ASTM D 4491
ULTRAVIOLET DEGRADATION AT 500 HOURS	50% STRENGTH RETAINED FOR ALL CLASSES		ASTM D 4355

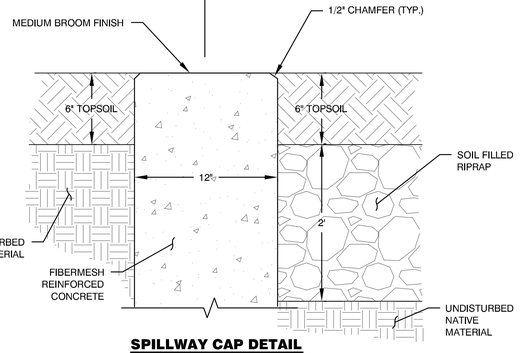
STRENGTH VALUES ARE IN THE WEAKER PRINCIPLE DIRECTION
AS MEASURED IN ACCORDANCE WITH ASTM D 4632



FILTER SCREEN AND FLOW CONTROL PLATE
N.T.S.



SPILLWAY
SCALE: N.T.S.



SPILLWAY CAP DETAIL
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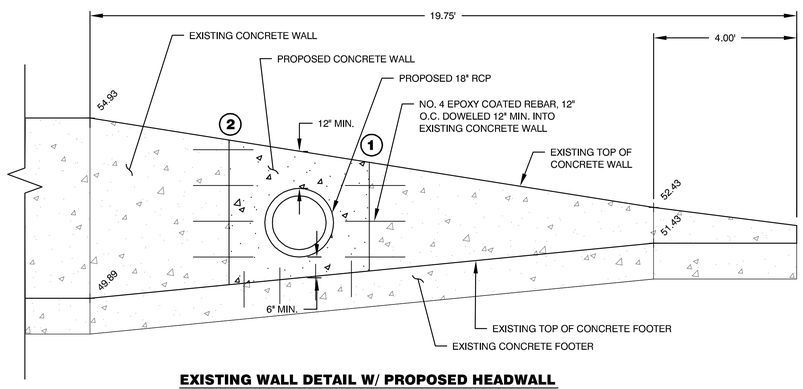
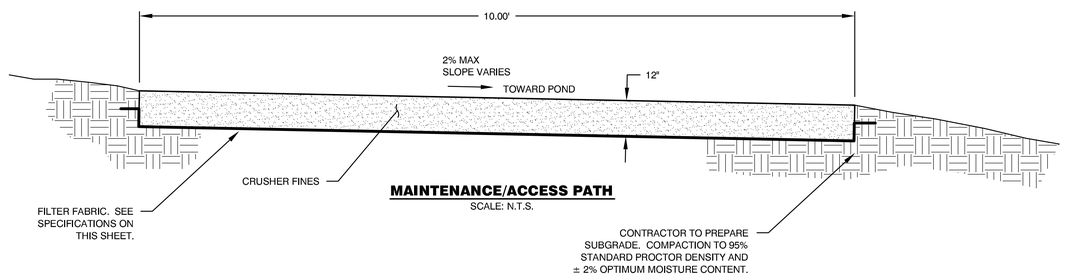


EXISTING WALL DETAIL W/ PROPOSED HEADWALL
N.T.S.



MAINTENANCE/ACCESS PATH
SCALE: N.T.S.

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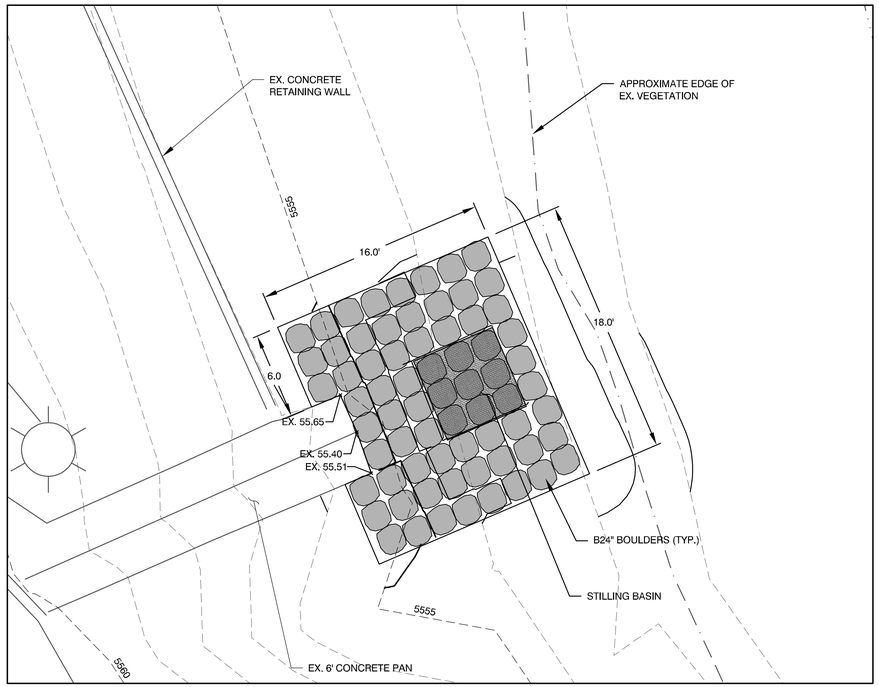
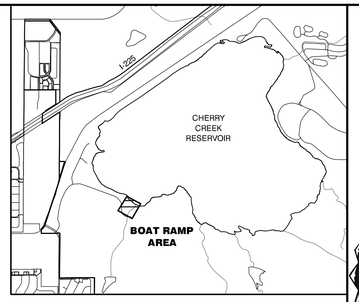
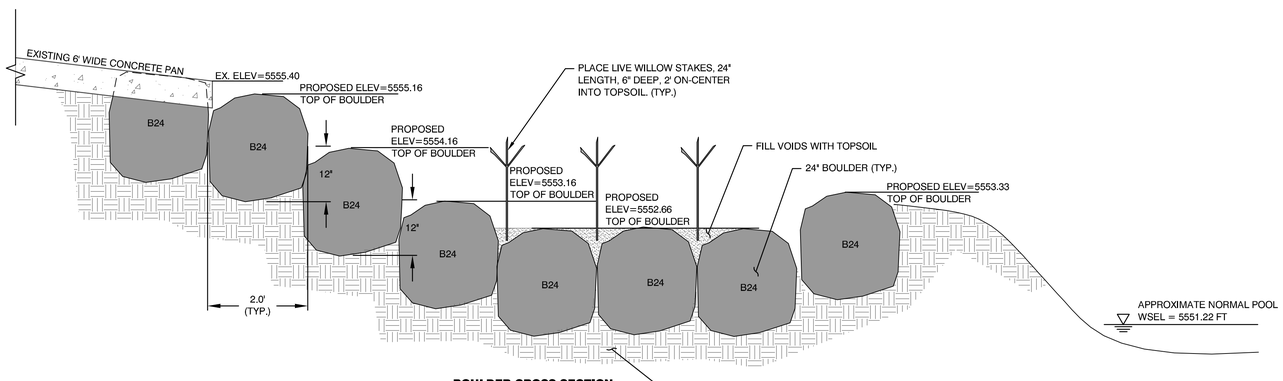


PLAN VIEW
SCALE: 1"=5'

DETAILED GRADING PLAN
SCALE: 1" = 5'



KEY MAP
N.T.S.



BOULDER CROSS SECTION
SCALE: N.T.S.

CLASSIFICATION OF BOULDERS

BOULDER CLASSIFICATION	NOMINAL SIZE AND [RANGE IN SMALLEST DIMENSION OF INDIVIDUAL ROCK BOULDERS (INCHES)]	MAXIMUM RATIO OF LARGEST TO SMALLEST ROCK DIMENSION OF INDIVIDUAL BOULDERS
B18	18 [17–20]	2.5
B24	24 [22–26]	2.0
B30	30 [28–32]	2.0
B36	36 [34–38]	1.75
B42	42 [40–44]	1.65
B48	48 [45–51]	1.50

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WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS
OUTFALL 2

Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy.
Suite 500
Greenwood Village, Colorado
Tel: (303) 779-4525
FAX: (303) 773-2050
Contact: Chuck Reid
Greenwood Village, Colorado

DOCUMENT AMENDMENTS

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	08-10-2012	90% SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER JOSHUA R. DUNCAN 40694 06-10-2013 COLORADO

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 9

VERTICAL CURB & GUTTER

MEDIAN CURB & GUTTER

LEGEND FOR RADII
A = 1/8" TO 1¼"
B = 1"
C = 1½"
D = 1½" TO 2"

TYPICAL CURB & GUTTER AT DRIVEWAY

TYPICAL HIGH SPEED TYPE 2 (FROM CDOT M&S STANDARDS)

CURB AND GUTTER TYPE 2
(SECTION IM)
(6" MOUNTABLE – 1' GUTTER)

CURB AND GUTTER TYPE 2
(SECTION IIM)
(6" MOUNTABLE – 2' GUTTER)

NOTES:

1. NO. 4 REBAR SHALL BE USED IN ALL CURB RETURNS WITH 25' OR LARGER RADII. THE REBAR SHALL BE USED FROM BEGINNING TO END OF THE CURB RETURN.
2. AT THE LOW POINT(S) OF EACH MEDIAN A DRAIN SYSTEM SHALL BE DESIGNED TO CONVEY STORM AND IRRIGATION FLOWS.
3. NATIVE SUBGRADE UNDER CURB AND GUTTER TO BE COMPACTED TO THE SPECIFICATIONS IN CHAPTER 8 OF THESE STANDARDS.
4. CHANGES TO THE HIGH SPEED TYPE 2 CURB AND GUTTER DETAIL IN THE CDOT M&S STANDARDS SHALL OVERRULE THIS DETAIL.
5. GUTTER CROSS SLOPE SHALL BE ½" PER FOOT WHEN DRAINING AWAY FROM CURB AND 1" PER FOOT WHEN DRAINING TOWARD CURB.

Drawn By: SBW
Checked By:
Approved By:

CURB, GUTTER AND SIDEWALK
VERTICAL CURB

Issued: 5/10/05
Revised: 8/31/06

Drawing Number:
SP. 1

ENGINEERING CONSULTANTS
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WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS

DETAILS

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 10

COLORADO REGISTERED PROFESSIONAL ENGINEER JOSHUA R. DUNCAN 40694 06-10-2013

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	06-19-2012	90% SUBMITTAL

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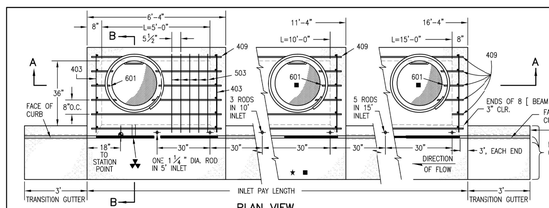
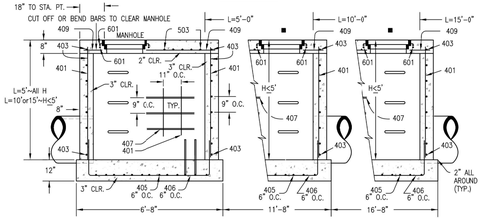


PLAN VIEW

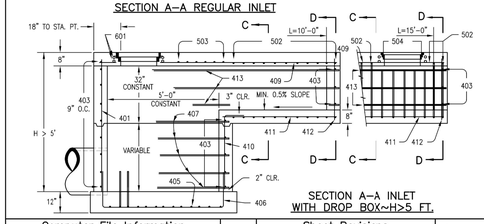
* FOR LENGTH (L) GREATER THAN 5 FT. PROVIDE MAINTENANCE ACCESS AT BOTH ENDS.

■ ADDITIONAL MANHOLE RING AND COVER REQUIRED WHEN L=10 FT. OR MORE. CUT REINFORCEMENT BAR ACCORDINGLY.

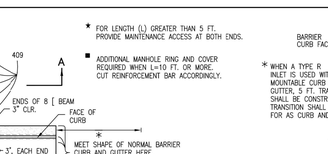
* MEET SHAPE OF NORMAL BARRIER CURB AND GUTTER HERE.



SECTION A–A REGULAR INLET



SECTION A–A INLET WITH DROP BOX~H>5 FT.

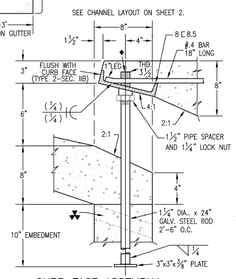


* WHEN A TYPE R INLET IS USED WITH MOUNTABLE CURB AND GUTTER, 5 FT. TRANSITION SHALL BE CONSTRUCTED. TRANSITION SHALL BE PAID FOR AS CURB AND GUTTER.

TRANSITION CURB

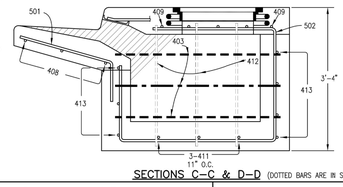
GENERAL NOTES:
SEE SHEET 2.

SEE CHANNEL LAYOUT ON SHEET 2.



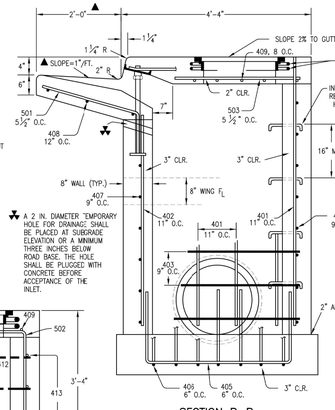
CURB FACE ASSEMBLY

◆ PLACE ENTIRE ASSEMBLY BEFORE POURING CONCRETE.



SECTIONS C–C & D–D (DOTTED BARS ARE IN SECTION D–D)

▲ FOR A 1'-0" PAN SLOPE 2" PER FT.



SECTION B–B END VIEW

NOTE: MANHOLE RING AND COVER, STATION POINT AND OUTFLOW PIPE SHALL BE LOCATED AT THE SAME END OF THE INLET.

Computer File Information		Sheet Revisions		Colorado Department of Transportation	CURB INLET TYPE R	STANDARD PLAN NO.
Creation Date: 07/04/06 Initials: SJR	R-0	Date:	Comments	4201 East Arkansas Avenue, Denver, Colorado 80222		M-604-12
Last Modification Date: 07/04/06 Initials: LTA	R-0			Phone: (303) 757-9083 Fax: (303) 757-9820		
Full Path: www.dot.state.co.us/DesignSupport/	R-0			Project Development Branch SRJ/LTA	Issued By: Project Development Branch on July 04, 2006	Sheet No. 1 of 2
Drawing File Name: 6040120102.dwg	R-0					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	R-0					

* VARIABLE REFER TO TABLE TWO.

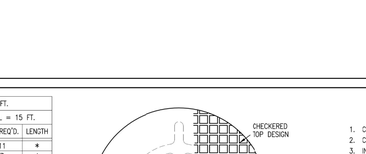
■ INCLUDE #4, 18 IN. BARS (SEE CHANNEL LAYOUT).

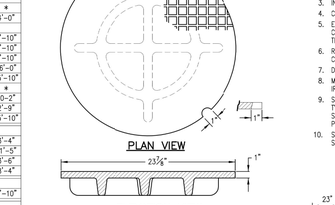
TABLE ONE ~ BAR LIST FOR CURB INLETS, TYPE "R"

"H"	LENGTH 401	402	410	NO. REQ'D. REGULAR 403	407	NO. REQ'D. DROP BOX 403	407	L = 5 FT. CONC. CU. YDS.	STEEL LBS.	L = 10 FT. CONC. CU. YDS.	STEEL LBS.	L = 15 FT. CONC. CU. YDS.	STEEL LBS.
3'-0"	2'-8"	1'-8"		0	7			3.2	285	5.3	497	7.4	706
3'-6"	3'-2"	2'-2"		0	7			3.4	305	5.7	528	7.9	747
4'-0"	3'-8"	2'-8"		2	9			3.7	326	6.0	559	8.4	786
4'-6"	4'-2"	3'-2"		2	9			3.9	334	6.4	571	8.8	803
5'-0"	4'-8"	3'-8"		4	11			4.1	354	6.7	602	9.3	844
5'-6"	5'-2"	4'-2"	3'-5"	6	13	15	6	4.4	375	6.0	607	7.4	850
6'-0"	5'-8"	4'-8"	3'-11"	6	13	16	6	4.6	382	6.2	616	7.6	860
6'-6"	6'-2"	5'-2"	4'-5"	8	15	18	8	4.8	402	6.4	637	7.8	880
7'-0"	6'-8"	5'-8"	4'-11"	20	17	19	10	5.0	423	6.6	658	8.0	897
7'-6"	7'-2"	6'-2"	5'-5"	20	17	20	10	5.3	430	6.9	664	8.3	907
8'-0"	7'-8"	6'-8"	5'-11"	22	19	22	12	5.5	451	7.1	684	8.5	927
8'-6"	8'-2"	7'-2"	6'-5"	24	21	23	14	5.7	471	7.3	702	8.7	944
9'-0"	8'-8"	7'-8"	6'-11"	24	21	24	14	6.0	479	7.6	711	9.0	954
9'-6"	9'-2"	8'-2"	7'-5"	26	23	26	16	6.2	499	7.8	732	9.2	974
10'-0"	9'-8"	8'-8"	7'-11"	28	25	27	18	6.4	520	8.0	749	9.4	992
10'-6"	10'-2"	9'-2"	8'-5"	28	25	28	18	6.7	527	8.3	759	9.7	1001
11'-0"	10'-8"	9'-8"	8'-11"	30	27	30	20	6.9	547	8.5	779	9.9	1022

NOTES: FOR L=5 FT., L=10 FT., AND L=15 FT.:
REGULAR INLETS: TOTAL QUANTITIES NEEDED ARE OUTSIDE THE HEAVY BLACK LINE.
DROP BOX INLETS: TOTAL QUANTITIES NEEDED ARE INSIDE THE HEAVY BLACK LINE.
STEEL WEIGHTS DO NOT INCLUDE STRUCTURAL STEEL CHANNEL.

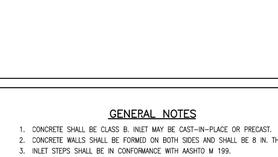
TABLE TWO ~ BARS AND QUANTITIES VARIABLE WITH "H"



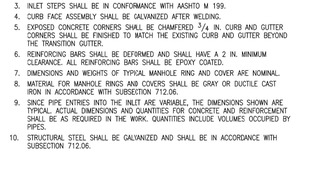


GENERAL NOTES

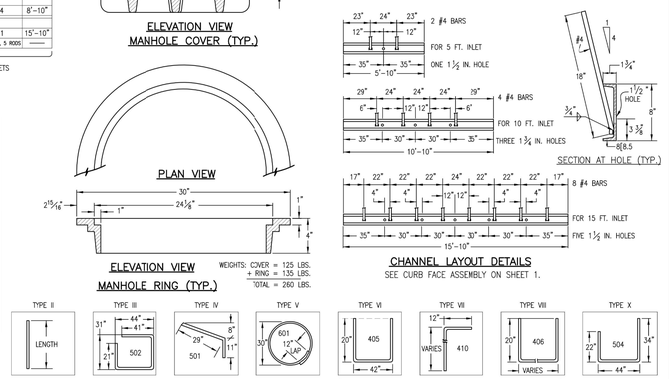
1. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST–IN–PLACE OR PRECAST.
2. CONCRETE WALLS SHALL BE FORMED ON BOTH SIDES AND SHALL BE 8 IN. THICK.
3. INLET STEPS SHALL BE IN CONFORMANCE WITH AASHTO M 199.
4. CURB FACE ASSEMBLY SHALL BE GALVANIZED AFTER WELDING.
5. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 IN. CURB AND GUTTER CORNERS SHALL BE FINISHED TO MATCH THE EXISTING CURB AND GUTTER BEYOND THE TRANSITION GUTTER.
6. REINFORCING BARS SHALL BE DEFORMED AND SHALL HAVE A 2 IN. MINIMUM CLEARANCE. ALL REINFORCING BARS SHALL BE EPOXY COATED.
7. DIMENSIONS AND WEIGHTS OF TYPICAL MANHOLE RING AND COVER ARE NOMINAL.
8. MATERIAL FOR MANHOLE RINGS AND COVERS SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06.
9. SINCE PIPE ENTRIES INTO THE INLET ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK. QUANTITIES INCLUDE VOLUMES OCCUPIED BY PIPES.
10. STRUCTURAL STEEL SHALL BE GALVANIZED AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.



CHANNEL LAYOUT DETAILS
SEE CURB FACE ASSEMBLY ON SHEET 1.



SECTION AT HOLE (TYP.)

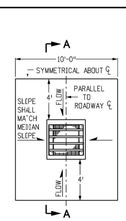


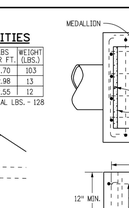
BAR BENDING DIAGRAMS ~ (DIMENSIONS ARE OUT–TO–OUT OF BAR)

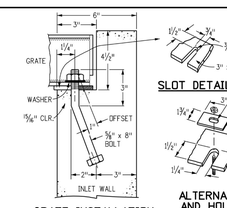
Computer File Information		Sheet Revisions		Colorado Department of Transportation	CURB INLET TYPE R	STANDARD PLAN NO.
Creation Date: 07/04/06 Initials: SJR	R-0	Date:	Comments	4201 East Arkansas Avenue, Denver, Colorado 80222		M-604-12
Last Modification Date: 07/04/06 Initials: LTA	R-0			Phone: (303) 757-9083 Fax: (303) 757-9820		
Full Path: www.dot.state.co.us/DesignSupport/	R-0			Project Development Branch SRJ/LTA	Issued By: Project Development Branch on July 04, 2006	Sheet No. 2 of 2
Drawing File Name: 6040120202.dwg	R-0					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	R-0					

STEEL GRATE QUANTITIES

NO. PIECES	DESCRIPTION	LENGTH	LBS PER FT.	WEIGHT (LBS.)
4	S4 x 7.7 BEAM	40"	7.70	103
2	3½" x ¼" FLAT	26⅝"	2.98	13
2	3" x ¼" FLAT	26⅝"	2.55	12
		TOTAL LBS. = 128		







GENERAL NOTES

1. INLET TYPE C IS NOT HS–20 RATED AND SHALL NOT BE PLACED IN PAVED ROADWAYS. THIS INLET SHALL BE USED ONLY OUTSIDE PAVED ROADWAYS.
2. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST–IN–PLACE OR PRECAST.
3. REINFORCING BARS SHALL BE EPOXY COATED AND JEFORMED #4, AND SHALL HAVE A MINIMUM 2 IN. CLEARANCE. CUT OR BEND AROUND PIPES AS REQUIRED.
4. CONCRETE SLOPE AND DITCH PAVING SHALL BE IN ACCORDANCE WITH SECTION 507. REINFORCEMENT FOR CONCRETE SLOPE PAVING SHALL BE 6 X 6 – W1.4 X W1.4 OR 6 X 6 – W2.1 X W2.1.
5. STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED, AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
6. THE STANDARD INLET GRATES SHALL BE USED ON ALL TYPE C INLETS UNLESS CLOSE MESH GRATES ARE SPECIFIED ON THE PLANS.
7. CLOSE MESH GRATES ARE RECOMMENDED WHERE FOOT TRAFFIC OR BICYCLE ROUTES ARE IN CLOSE PROXIMITY TO GRATE. THIS GRATE IS NOT ADA COMPLIANT OR BICYCLE FRIENDLY AND SHALL NOT BE PLACED DIRECTLY IN SIDEWALKS, CROSSWALKS OR BIKE PATHS.
8. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FT. – 6 IN., AND SHALL CONFORM TO AASHTO M 199.
9. SEE STANDARD PLAN M-604-11, FOR REINFORCEMENT AROUND THE PIPE OPENING.
10. ALL INLETS SHALL HAVE A 4 IN. DIA. METAL MEDALLION WITH A "NO DUMPING DRAINS TO STREAM" MESSAGE ON IT. THE MEDALLION SHALL HAVE A FISH SYMBOL WITH A BLUE BACKGROUND. IT SHALL BE FIRMLY ATTACHED TO THE TOP OF THE INLET WITH A PERMANENT FASTENER.

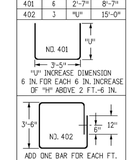
QUANTITIES FOR ONE INLET

H	CONCRETE (CU. YDS.)	STEEL (LBS.)	NO. STEPS REQ'D.
2'–5"	0.9	75	0
3'–0"	1.0	80	0
3'–6"	1.2	96	0
4'–0"	1.3	101	1
4'–6"	1.4	116	2
5'–0"	1.5	122	2
5'–6"	1.7	137	2
6'–0"	1.8	142	3
6'–6"	1.9	158	3
7'–0"	2.0	163	3
7'–6"	2.2	179	4
8'–0"	2.3	184	4
8'–6"	2.4	199	4
9'–0"	2.5	205	5
9'–6"	2.7	220	5
10'–0"	3.0	235	6
11'–6"	3.4	251	6

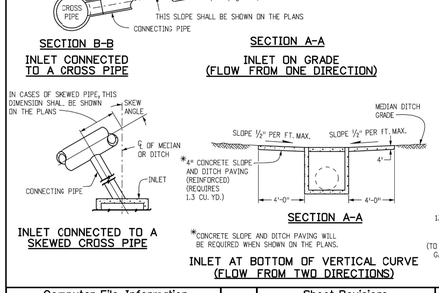
▼ PIPE INSIDE DIAMETER SHALL BE 30 IN. OR LESS. CONCRETE AND STEEL QUANTITIES ARE FOR ONE ENTIRE INLET BEFORE DEDUCTION FOR VOLUME OCCUPIED BY PIPE. WEIGHT OF STEEL INCLUDES A RING FOR THE MAXIMUM PIPE DIAMETER.

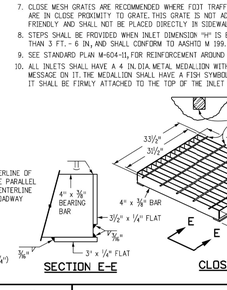
BAR LIST FOR H = 2 FT.–6 IN. AND BENDING DIAGRAM

MARK	NO. REQ'D.	HEIGHT	LENGTH
401	2	2'–3"	7'–11"
401	6	2'–7"	8'–7"
402	3	"H"	15'–0"



402 BARS SHALL BE EQUALLY SPACED FROM EACH OTHER.



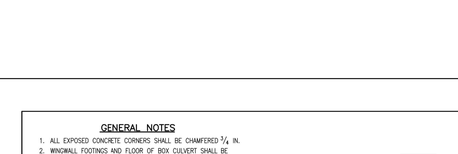


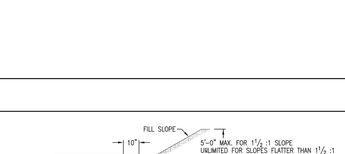
Computer File Information		Sheet Revisions		Colorado Department of Transportation	INLET, TYPE C	STANDARD PLAN NO.
Creation Date: 07/04/12 Initials: DD	R-0	Date:	Comments	4201 East Arkansas Avenue, Denver, Colorado 80222		M-604-10
Last Modification Date: 07/04/12 Initials: LTA	R-0			Phone: (303) 757-9083 Fax: (303) 757-9820		
Full Path: www.coloradodot.info/business/designsupport	R-0			Project Development Branch DD/LTA	Issued By: Project Development Branch July 4, 2012	Sheet No. 1 of 1
Drawing File Name: 6041010101.dgn	R-0					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	R-0					

GENERAL NOTES

1. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 IN.
2. WINGWALL FOOTINGS AND FLOOR OF BOX CULVERT SHALL BE PLACED MONOLITHICALLY.
3. DIMENSIONS "h", "ho", "hinge", "k", "L", "m" AND ANGLES FOR WINGWALLS SHALL BE AS SHOWN ON THE PLANS.
4. REINFORCING STEEL SHALL BE GRADE 60.
5. THE MINIMUM SPLICE LENGTH FOR COMMON BAR SIZES SHALL BE:

BAR	#4	#5	#6
SPLICE LENGTH	1'–3"	1'–7"	2'–0"





DESIGN DATA:

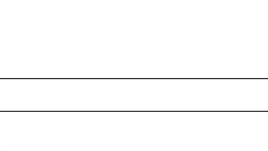
UNIT STRESSES: f_s = 24,000 PSI
f_c = 1,200 PSI
n = 9

EQUIVALENT FLUID PRESSURE = 36 LBS./CU. FT.
MAXIMUM TOE PRESSURE = 1 TON/SQ. FT.

ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE CONCRETE IS POURED.

WINGWALL AND APRON CONCRETE SHALL BE:
CONCRETE CLASS B, OR D (BOX CULVERT) FOR CBC's.
CONCRETE CLASS B, OR D (WALL) FOR PIPES.

LIVE LOAD SURCHARGE HAS NOT BEEN CONSIDERED. WALLS WITHIN ⅔ OF THE EDGE OF THE ROADWAY SHOULDER WILL REQUIRE A SPECIAL DESIGN IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.



Computer File Information		Sheet Revisions		Colorado Department of Transportation	WINGWALLS FOR PIPE OR BOX CULVERTS	STANDARD PLAN NO.
Creation Date: 07/04/05 Initials: SJR	R-0	Date:	Comments	4201 East Arkansas Avenue, Denver, Colorado 80222		M-601-20
Last Modification Date: 07/04/06 Initials: LTA	R-0			Phone: (303) 757-9083 Fax: (303) 757-9820		
Full Path: www.dot.state.co.us/DesignSupport/	R-0			Project Development Branch SRJ/LTA	Issued By: Project Development Branch on July 04, 2006	Sheet No. 1 of 1
Drawing File Name: 601020101.dwg	R-0					
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Email: jduncan@1Engineering.net

WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS

DETAILS

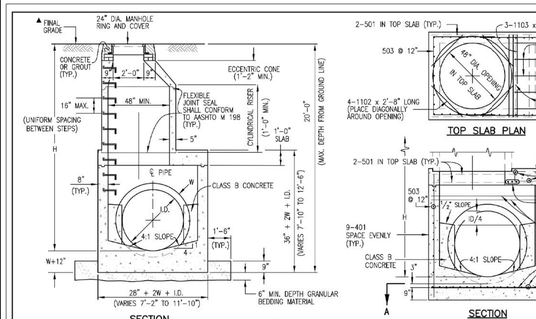
Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy. Suite 500
Greenwood Village, Colorado 80111
Tel: (303) 773-1605 FAX: (303) 773-2050
Contact: Chuck Reid
Greenwood Village, Colorado

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	08-10-2012	90% SUBMITTAL

DOCUMENT AMENDMENTS

REGISTERED PROFESSIONAL ENGINEER JOSHUA R. DUNCAN 40694 06-10-2013

Project Number: 52400101	Drawn By: JAN
Designed By: JRD	
Checked By: JRD	Sheet Number: 11



SECTION

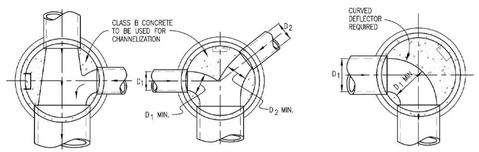
SECTION

MANHOLE BOX BASE

MARK	SIZE	TYPE	WT. ℔/FT.	BARS	I.D. 54"	I.D. 60"	I.D. 66"	I.D. 72"	I.D. 84"	I.D. 96"	FORMULAS
401	4	I	0.668	NO. REQ'D.	18	18	18	18	18	18	401
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-4"	12'-2"	BAR LENGTH = 32"+2W+I.D.
				WEIGHT ℔	97.2	104.2	111.2	118.2	132.3	146.3	
402	4	III	0.668	NO. REQ'D.	5	5	5	5	5	5	402
				LENGTH	5'-5"	6'-0"	6'-7"	7'-2"	8'-4"	9'-6"	BAR LENGTH = I.D. + 2W
				WEIGHT ℔	18.1	20.0	22.0	23.9	27.8	31.7	
501	5	I	1.043	NO. REQ'D.	17	17	17	17	17	17	501
				LENGTH	7'-5"	8'-0"	8'-7"	9'-2"	10'-4"	11'-4"	BAR LENGTH = 24" + I.D. + 2W
				WEIGHT ℔	131.5	141.8	152.2	162.5	183.2	203.9	
502	5	I	1.043	NO. REQ'D.	22	23	25	26	29	32	502
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	NUMBER BARS REQ'D. = 3 + (24+I.D.+2W / 5") +1
				WEIGHT ℔	114.7	119.9	130.4	135.6	151.2	166.9	
503	5	II	1.043	NO. REQ'D.	16	16	18	18	20	24	503
				LENGTH	12'-10"	13'-5"	14'-0"	14'-7"	15'-9"	16'-11"	NUMBER BARS REQ'D. = 2 (13+I.D.+2W / 12") +1
				WEIGHT ℔	214.2	223.9	262.8	273.8	328.5	423.5	BAR LENGTH = 4'-9"+2(16+W+I.D./2)
504	5	I	1.043	NO. REQ'D.	12	14	14	16	18	20	504
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-0"	11'-8"	NUMBER BARS REQ'D. = 2 (2W+I.D.-4 / 12") +1
				WEIGHT ℔	101.2	126.6	135.1	164.1	206.5	253.8	BAR LENGTH = 32"+2W+I.D.
11C1	11	I	5.313	NO. REQ'D.	4	4	4	4	4	4	TYP.
				LENGTH	7'-2"	7'-9"	8'-4"	8'-11"	10'-1"	11'-3"	BAR LENGTH = 21" + I.D. + 2W
				WEIGHT ℔	152.3	164.7	177.1	189.5	214.3	239.1	
11C2	11	I	5.313	NO. REQ'D.	4	4	4	4	4	4	BENDING
				LENGTH	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	TYPE I: STRAIGHT
				WEIGHT ℔	56.7	56.7	56.7	56.7	56.7	56.7	
11C3	11	I	5.313	NO. REQ'D.	3	3	3	3	3	3	TYPE II: 4'-9" — 16"+W+I.D./2
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	
				WEIGHT ℔	79.7	79.7	79.7	79.7	79.7	79.7	
REINFORCING STEEL, TOTAL ℔					985.6	1,037.5	1,127.2	1,204.0	1,380.2	1,601.6	TYPE III: 12" — I.D.+2W-38" — 12"
CONCRETE – CUBIC YARDS – TOTAL					6.0	6.6	7.3	8.0	9.5	11.1	

NOTE: QUANTITIES ARE BASED ON SAME SIZE PIPE ENTRANCE TO AND EXIT FROM, BASE AND A 4 FT. MANHOLE ENTRANCE INTO TOP SLAB OF BASE.

QUANTITIES FOR CONCRETE MANHOLE BOX BASE



SECTION A–A
(STEEL IN BOTTOM OF BASE)

TYPICAL CHANNELIZATION DETAILS

GENERAL NOTES

1. SINCE ALL PIPE ENTRIES INTO THE BASE ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK.
2. THE PRECAST FLAT TOP MAY BE USED ON ANY MANHOLE. THE ECCENTRIC CONE MAY BE USED WHEN THE MANHOLE "H" HEIGHT IS AT LEAST 8 FT.
3. THE MANHOLE RING FRAME SHALL BE SET IN A BED OF GROUT. THE FRAME SHALL BE SURROUNDED WITH A CEMENT GROUT IN UNPAVED AREA, OR A CONCRETE COLLAR IN PAVED AREA. SEE DETAILS ON SHEETS 2 AND 3.
4. DESIGN OF BOX BASE IS BASED ON STRAIGHT RUNS OF PIPE. OR CHANGE IN DIRECTION OF LESS THAN 45°. SPECIAL DESIGN IS REQUIRED FOR 45° OR GREATER.
5. PRECAST MANHOLES AND REINFORCEMENT SHALL CONFORM TO AASHTO M 199 (ASTM C 478).
6. CAST–IN–PLACE MANHOLES SHALL BE CLASS B CONCRETE.
7. STEPS ARE REQUIRED WHEN THE MANHOLE DEPTH EXCEEDS 3 FT.–6 IN. AND SHALL CONFORM TO AASHTO M 199.
8. ALL REINFORCING STEEL SHALL BE GRADE 60 AND EPOXY COATED. VERTICAL STEEL SHALL BE PLACED AT CENTERLINE OF WALL. ALL BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.
9. ALL PIPE ENTRIES INTO THE BASE OF MANHOLE SHALL BE CONNECTED BY OPEN CHANNELIZATION ADJUSTED FOR PIPE SIZE, SHAPE, SLOPE, AND DIRECTION OF FLOW. DETAILS SHOWN ARE TYPICAL FOR INSTALLATIONS WITH ALL INVERTS OF SAME RELATIVE ELEVATION. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, SPECIAL BASE/CHANNEL DETAILS WILL BE SHOWN ON THE PLANS.
10. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH CLASS B CONCRETE OR APPROVED GROUT.
11. STUB–OUTS SHALL EXTEND 2 FT. MINIMUM BEYOND OUTSIDE WALL SURFACE OF MANHOLE AND BE SATISFACTORILY PLUGGED.
12. THE SLOPE OF THE MANHOLE COVER SHALL MATCH THE ROADWAY PROFILE AND CROSS SLOPE.

▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.

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Last Modification Date: 07/04/06	Initials: LTA			
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Drawing File Name: 6040200103.dwg				
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English				

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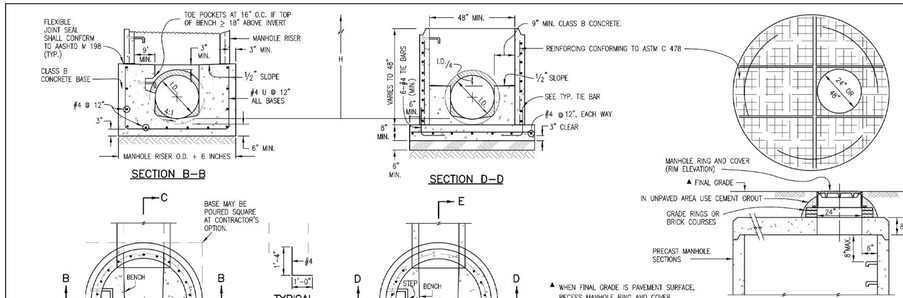
Project Development Branch SRJ/LTA

MANHOLES

STANDARD PLAN NO. M-604-20

Issued By: Project Development Branch on July 04, 2006

Sheet No. 1 of 3



PRECAST MANHOLE BASES NOTES:

1. THE BASE SLAB SHALL BE POURED MONOLITHICALLY WITH BOTTOM RISER SECTION.
2. PRECAST MANHOLE BASES SHALL FIT THE CONDITIONS AND LOCATIONS FOR WHICH THEY ARE INTENDED WITHOUT ANY FIELD MODIFICATIONS. ANY MANHOLE BASE WHICH REQUIRES FIELD CUTTING OR MODIFICATION IN ORDER TO FIT THE LOCATIONS INTENDED WILL BE REJECTED BY THE ENGINEER AND REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO THE DEPARTMENT.
3. PRECAST MANHOLE BASES SHALL BE BEDDED ON AN APPROVED GRANULAR BEDDING MATERIAL AS SHOWN ABOVE.

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Last Modification Date: 07/04/06	Initials: LTA			
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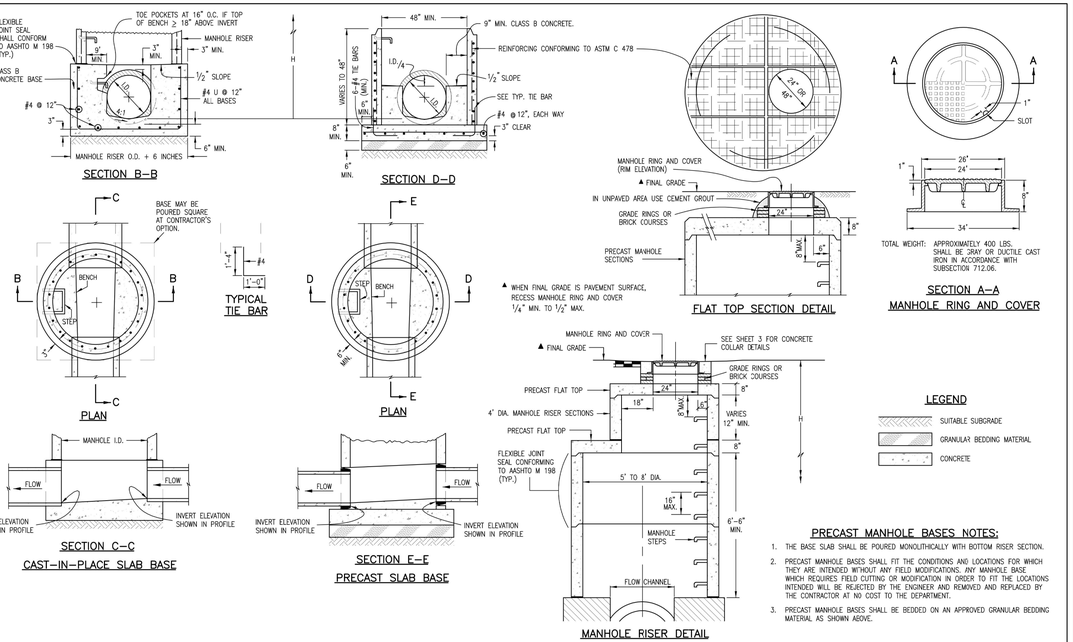
MANHOLES

STANDARD PLAN NO. M-604-20

Issued By: Project Development Branch on July 04, 2006

Sheet No. 2 of 3



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Drawing File Name: 6040200203.dwg				
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MANHOLES

STANDARD PLAN NO. M-604-20

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Sheet No. 3 of 3

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6565 S. Boston St., Suite B - Centennial, CO 80111-4500
(303) 368-5601 - FAX (303) 368-5603
Email: jduncan@1Engineering.net

WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS

DETAILS

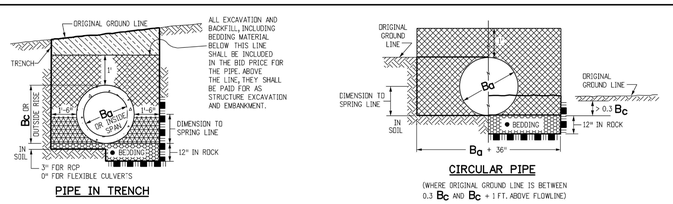
Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy.
Suite 500
Greenwood Village, Colorado
Tel: (303) 790-4505
FAX: (303) 773-2050
Contact: Chuck Reid
Greenwood Village, Colorado

DOCUMENT AMENDMENTS

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	08-10-2012	90% SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER — JOSHUA R. DUNCAN — 40694 — 06-10-2013 — COLORADO

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 12



PIPE IN TRENCH

- THE BEDDING MATERIAL FOR RIGID PIPE IN SOIL SHALL BE 3 IN. OF LOOSE STRUCTURE BACKFILL (CLASS 1 OR 2).BEDDING IS NOT REQUIRED FOR FLEXIBLE PIPE IN SOIL. BEDDING MATERIAL FOR RIGID OR FLEXIBLE PIPE IN ROCK SHALL BE 12 IN.OF LOOSE STRUCTURE BACKFILL, CLASS 1.

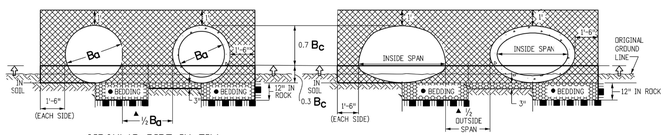
CIRCULAR PIPE

(WHERE ORIGINAL GROUND LINE IS BETWEEN 0.3 B_C AND B_C + 1 FT. ABOVE FLOWLINE)

▲ WHEN TWO OR MORE CONDUITS ARE LAID SIDE-BY-SIDE, THEY SHALL BE PLACED SO THAT THEY ARE ½ OUTSIDE DIAMETER, OR ½ OUTSIDE SPAN, OR 3 FT. APART, WHICHEVER IS LESS. HOWEVER, IF END SECTIONS ARE USED, THE MINIMUM SPACING SHALL BE 1 FT. BETWEEN END SECTIONS.

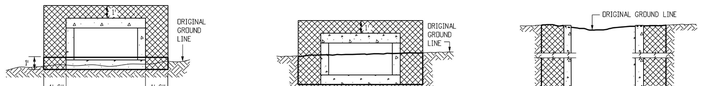
GENERAL NOTES

1. EXCAVATION AND BACKFILL PATTERNS DIFFERENT FROM THOSE INDICATED ON THESE SHEETS WILL BE SHOWN ELSEWHERE ON THE PLANS.
2. EXCAVATION FOR CHANNEL CHANGE OR CHANNEL IMPROVEMENT WILL BE EITHER UNCLASSIFIED EXCAVATION OR MUCK EXCAVATION AND WILL BE NOTED ON THE PLANS. EXCAVATION FROM THE CHANNEL FLOWLINE TO THE DEPTH REQUIRED FOR THE NEW STRUCTURE AND INCIDENTAL CHANNEL EXCAVATION WILL BE PAID FOR AS STRUCTURE EXCAVATION.
3. STRUCTURE FOOTINGS WHICH ARE LOCATED IN ROCK SHALL BE POURED OUT TO UNDISTURBED ROCK WITHOUT FORMING IN CONFORMANCE WITH SUBSECTION 601.09(c).
4. STRUCTURAL PLATE CULVERTS SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS.
5. B_d EQUALS THE INSIDE DIAMETER OF 4 PIPE AND B_E EQUALS THE OUTSIDE DIAMETER OF A PIPE FOR THIN WALL PIPES, IT IS ASSUMED THAT $B_d = B_E$.
6. APPROXIMATE STRUCTURE EXCAVATION AND BACKFILL QUANTITIES, UP TO 1 FT. OVER THE PIPE WILL BE SHOWN ON THE PLANS, FOR INFORMATION ONLY.



CIRCULAR PIPE IN FILL

ARCH OR ELLIPTICAL PIPE IN FILL



CASE 1

APPLIES WHEN THE ORIGINAL GROUND LINE IS LESS THEN 1 FT. ABOVE THE BOTTOM OF THE BOX CULVERT. THE EMBANKMENT SHALL BE BUILT UP TO 1 FT.ABOVE THE BOTTOM OF THE BOX CULVERT AND THEN EXCAVATED TO THE BOTTOM OF THE BOX CULVERT. THIS EMBANKMENT AND EXCAVATION WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

CASE 2

APPLIES WHEN THE ORIGINAL GROUND LINE IS MORE THAN 1 FT. ABOVE THE BOTTOM OF THE BOX CULVERT.

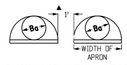
CONCRETE BOX CULVERT

IN BOTH CASES, THE TRENCH (OUTLINED BY THE THICK SOLID LINE) SHALL THEN BE EXCAVATED TO ACCOMMODATE CONSTRUCTION OF THE BOX CULVERT.

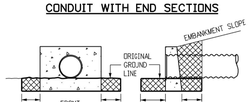
DROP INLETS AND DIVISION BOXES

LEGEND

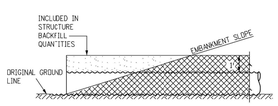
- STRUCTURE EXCAVATION LIMITS
- STRUCTURE BACKFILL, CLASS 1 OR 2, AS SHOWN ON PLANS
- STRUCTURE BACKFILL, CLASS 1
- EMBANKMENT MATERIAL
- EARTH
- ROCK
- BEDDING
- CONCRETE
- = WHEN FLOW LINE OF CULVERT IS LESS THAN 0.3 B_C BELOW THE ORIGINAL GROUND LINE, EMBANKMENT SHALL BE BUILT UP TO 0.3 B_C ABOVE THE FLOW LINE AND TRENCH EXCAVATED TO THE BOTTOM OF PIPE OR AS SHOWN.



CONDUIT WITH END SECTIONS



HEADWALL



END OF PIPE

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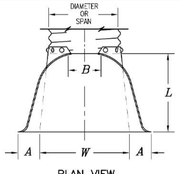
EXCAVATION AND BACKFILL FOR STRUCTURES

STANDARD PLAN NO. M-206-1

Issued By: Project Development Branch July 4, 2012

Sheet No. 1 of 2

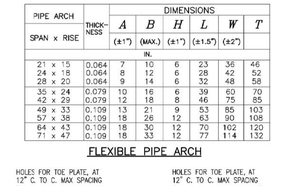
PIPE DIA.	THICKNESS	DIMENSIONS A	B	H	L	W	T
		IN.					
12	0.064	6	6	6	21	24	34
18	0.064	8	10	6	31	36	46
21	0.064	9	12	6	36	42	52
24	0.064	10	13	6	41	48	58
30	0.079	12	16	6	51	60	70
36	0.079	14	19	9	60	72	94
42	0.109	16	22	11	69	84	106
48	0.109	18	27	12	78	90	112
54	0.109	18	30	12	84	102	124
60	0.109	18	33	12	87	114	136
66	0.109	18	36	12	87	120	142
72	0.109	18	39	12	87	126	148
78	0.109	18	42	12	87	132	154
84	0.109	18	45	12	87	138	160



FLEXIBLE ROUND PIPE

PLAN VIEW

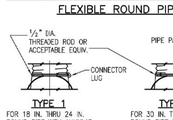
PIPE ARCH SPAN x RISE	THICKNESS	DIMENSIONS A (±1")	B (MAX.)	H (±1")	L (±1.5")	W (±2")	T
		IN.					
21 x 15	0.064	7	10	6	23	36	46
24 x 18	0.064	8	12	6	28	42	52
28 x 20	0.064	9	14	6	32	48	58
35 x 24	0.079	10	16	6	39	60	70
42 x 29	0.079	12	18	8	46	75	85
49 x 33	0.109	13	21	9	53	85	103
57 x 38	0.109	18	26	12	63	90	108
64 x 43	0.109	18	30	12	70	102	120
71 x 47	0.109	18	33	12	77	114	132



FLEXIBLE PIPE ARCH

GENERAL NOTES

1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL PIPE REQUIRED TO PROVIDE THE DESIGN LENGTH SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. THE INSIDE CONFIGURATION AND THE JOINT OF CONCRETE END SECTION AND PIPE SHALL MATCH.
5. END SECTIONS FOR CMP ARCH PIPE SHALL MATCH THE DIMENSIONS OF THE PIPE SHOWN ON THE PLANS.
6. GALVANIZED TOE PLATE AS SHOWN IS REQUIRED ON END SECTIONS FOR CORRUGATED STEEL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH ⅞ IN. GALVANIZED BOLTS, NUTS AND WASHERS.
7. GALVANIZED STEEL SHALL CONFORM TO AASHTO M 111. W 218 OR M 232.
8. FOR TYPE SD END SECTIONS, BARS SHALL BE FABRICATED FROM NPS-3 GALVANIZED STEEL, SCHEDULE 40 PIPE WHICH SHALL CONFORM TO ASTM A 53.
9. FOR A TYPE SD END SECTION, THE INSTALLATION OF ALTERNATIVE 1 OR ALTERNATIVE 2 END SECTION SHALL BE THE CONTRACTOR'S OPTION.
10. CONCRETE PIPE JOINT FASTENERS, WHERE SHOWN ON PLANS, SHALL BE INSTALLED SO THAT A MINIMUM OF 15 LINEAR FEET OF THE OUTLET END OF THE PIPE ARE MECHANICALLY LOCKED TOGETHER. END SECTION LENGTHS WHEN USED, SHALL BE INCLUDED IN THE 15 LF REQUIREMENT.
11. CONNECTIONS OF METAL END SECTIONS TO PLASTIC PIPE SHALL BE APPROVED BY THE ENGINEER. PLASTIC END SECTIONS SHALL NOT BE USED.
12. THE END SECTION STYLE, EITHER REGULAR OR SAFETY, SHALL BE AS SHOWN ON THE PLANS.

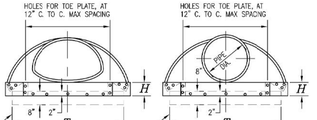


TYPE 1
FOR 18 IN. THRU 24 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

TYPE 2
FOR 30 IN. THRU 36 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

TYPE 3
FOR 12 IN. THRU 84 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS AND ALL SIZES WITH HELICAL CORRUGATIONS AND FOR ALL METAL PIPE ARCH CULVERTS. SHOP ATTACH A 24 IN. MIN. LENGTH OF ANNULAR PIPE WITH GALV. RIVETS OR BOLTS, SPOT WELDS, OR 2 IN. LONG SKIP WELDS ON 8 IN. CTRS. REPAIR BURNT GALVANIZING IN ACCORDANCE WITH SUBSECTION 707.09.

TYPICAL CONNECTIONS



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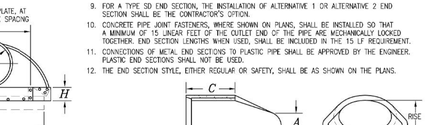
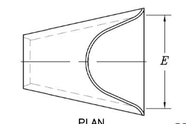


SECTION F–F

END VIEW

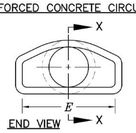
END SECTION AND CONNECTION DETAILS FOR ROUND AND ARCH METAL PIPES



PLAN

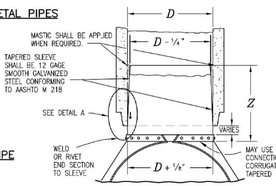
SECTION X–X

PIPE I.D.	DIMENSIONS A	C	L	E
	IN.			
18	10	48	78	36
24	10	48	78	48
30	14	36	96	60
36	18	36	96	72
42	24	36	96	78
48	28	24	96	84
54	30	36	96	90
60	36	36	96	96
72	34	20	96	108



END VIEW

REINFORCED CONCRETE CIRCULAR PIPE

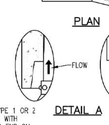


D	Z (MIN.)
IN.	
18 – 24	12
30 AND 36	16
42 AND LARGER	24

NOTE: METAL END SECTION SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING.

STEEL END SECTION FOR CONCRETE CIRCULAR PIPE

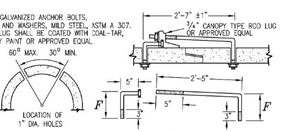
(ALTERNATIVE FOR CONCRETE END SECTION)



PLAN

DETAIL A

PIPE DIAMETER	F
IN.	
18 – 30	5
35 – 42	6
48 – 60	7
72 – 84	9



CONCRETE JOINT FASTENER (TWO PER JOINT)

EQUIVALENT CIRCULAR DIA.	DIMENSIONS NOMINAL SPAN x RISE	A	C	L	E
	IN.				
24	30 x 19	9	33	72	48
30	38 x 24	10	18	72	60
36	45 x 29	12	24	84	72
42	53 x 34	16	36	96	78
48	60 x 38	21	36	96	84
54	68 x 43	26	36	96	90
60	76 x 48	30	36	96	96

END SECTION FOR REINFORCED CONCRETE ELLIPTICAL PIPE

END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE

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CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

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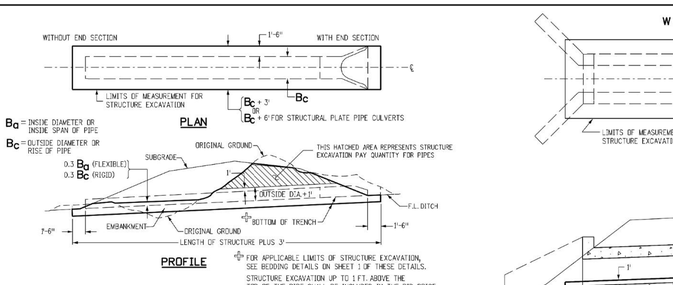
CONCRETE AND METAL END SECTIONS

STANDARD PLAN NO. M-603-10

Issued By: Project Development Branch on July 04, 2006

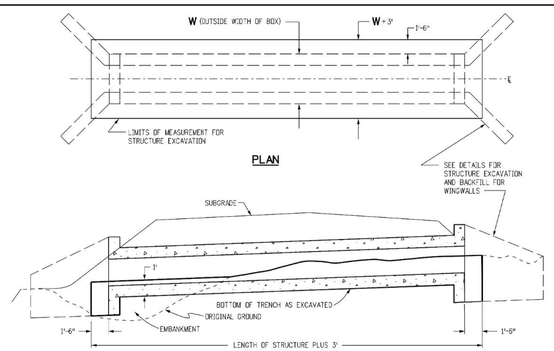
Sheet No. 1 of 2



PLAN

PROFILE

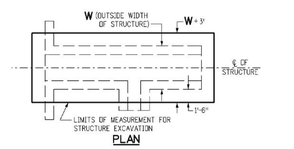
STRUCTURE EXCAVATION MEASUREMENT FOR PIPE CULVERTS



PLAN

PROFILE

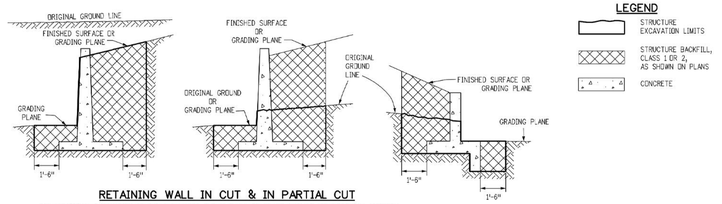
STRUCTURE EXCAVATION MEASUREMENT FOR CONCRETE BOX CULVERTS



PLAN

PROFILE

STRUCTURE EXCAVATION MEASUREMENT FOR DIVISION BOXES



RETAINING WALL IN CUT & IN PARTIAL CUT

ANY ADDITIONAL EXCAVATION BEHIND THE LIMITS SHOWN SHALL BE FILLED WITH CLASS 1 BACKFILL MATERIAL. THE ADDITIONAL EXCAVATION AND BACKFILL WILL NOT BE MEASURED AND PAID FOR.

WINGWALL

LEGEND

- STRUCTURE EXCAVATION LIMITS
- STRUCTURE BACKFILL, CLASS 1 OR 2, AS SHOWN ON PLANS
- CONCRETE

Computer File Information		Sheet Revisions	
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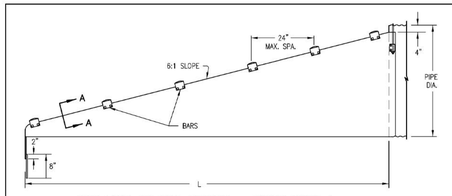
EXCAVATION AND BACKFILL FOR STRUCTURES

STANDARD PLAN NO. M-206-1

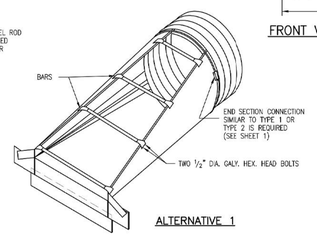
Issued By: Project Development Branch July 4, 2012

Sheet No. 2 of 2

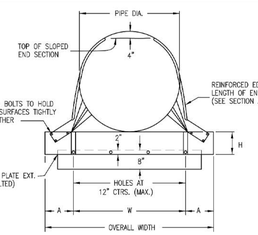


SIDE VIEW OF END SECTION – ALTERNATIVE 1

SECTION A–A



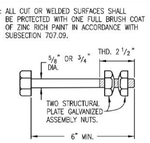
ALTERNATIVE 1



FRONT VIEW – ALTERNATIVE 1

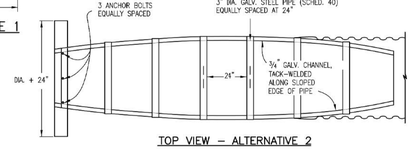
(BARS NOT SHOWN)

NOTE: ALL CUT OR WELDED SURFACES SHALL BE PROTECTED WITH ONE FULL BRUSH COAT OF ZINC RICH PAINT IN ACCORDANCE WITH SUBSECTION 707.09.



TYPICAL ANCHOR BOLT

(GALVANIZED)



TOP VIEW – ALTERNATIVE 2

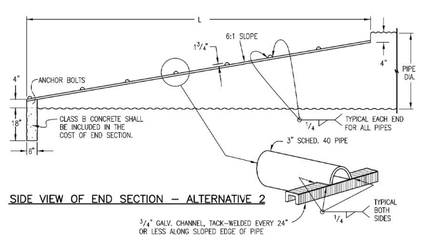
END SECTIONS FOR CIRCULAR PIPES

PIPE DIA. (IN.)	MIN. THICK (IN.)	DIMENSION (IN.) A	H	W	OVERALL WIDTH	SLOPE	LENGTH (L)
15	.064	8	6	21	37	6:1	30
18	.064	8	6	24	40	6:1	48
21	.064	8	6	27	43	6:1	66
24	.079	8	6	30	46	6:1	84
30	.079	12	9	36	60	6:1	120
36	.109	12	9	42	66	6:1	156

BAR END DETAILS

(FOR ALTERNATIVE 1)

TYPE SD END SECTIONS FOR SIDE DRAIN



SIDE VIEW OF END SECTION – ALTERNATIVE 2

BAR END DETAIL

(FOR ALTERNATIVE 2)

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CONCRETE AND METAL END SECTIONS

STANDARD PLAN NO. M-603-10

Issued By: Project Development Branch on July 04, 2006

Sheet No. 2 of 2

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6565 S. Boyd St., Suite B - Centennial, CO 80111-4600
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Email: jduncan@1Engineering.net

WEST BOAT RAMP PARKING LOT
WATER QUALITY IMPROVEMENTS
CONSTRUCTION PLANS
DETAILS

Cherry Creek Basin Water Quality Authority
8390 E. Crescent Pkwy, Suite 500
Greenwood Village, Colorado
Tel: (303) 779-4525
FAX: (303) 773-2050
Contact: Chuck Reid
Greenwood Village, Colorado

DOCUMENT AMENDMENTS

No.	Date	Description
4	06-10-2013	APPROVAL
3	01-04-2013	FINAL SUBMITTAL
2	09-28-2012	100% SUBMITTAL
1	09-10-2012	90% SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER — JOSHUA R. DUNCAN — COLORADO — 40694 — 06-10-2013

Project Number: 52400101
Designed By: JRD
Drawn By: JAN
Checked By: JRD
Sheet Number: 13