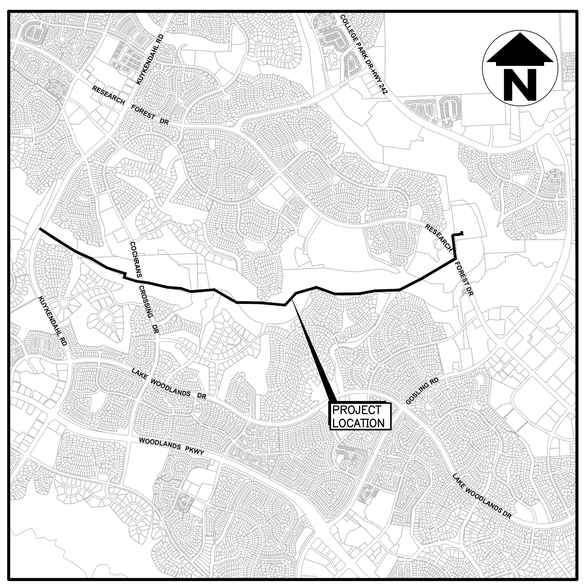
SAN JACINTO RIVER AUTHORITY
Woodlands Division
REHABILITATION OF BEAR BRANCH GRAVITY MAIN
CSP NO. 19-0050
CONTRACT NO. 19-0050



LOCATION MAP
N.T.S.
KEY MAP
#216–T,U,Y,Z
#217–S,T,W,X

DIRECTORS

LLOYD B. TISDALE	PRESIDENT
RONNIE ANDERSON	VICE-PRESIDENT
MARK MICHELETTI	TREASURER
KAAREN CAMBIO	SECRETARY
ED BOULWARE	ASSISTANT SECRETARY
JIM ALEXANDER	MEMBER
BRENDA COOPER	MEMBER

GENERAL MANAGER: JACE A. HOUSTON

ISSUE DATE: SEPTEMBER 2019

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STATE OF TEXAS
JOSE F. VELASQUEZ
110373
LICENSED
PROFESSIONAL ENGINEER
9-13-19
ARKK Engineers, LLC
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COVER SHEET

SJRA PROJECT NO. WDPR0082.1001.2N001

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EXISTING SYMBOLS

- TREE
- SIGN
- BRICK COLUMN
- SPRINKLER VALVE
- SPRINKLER
- MAIL BOX
- STREET LIGHT, GAS LIGHT
- SJRA MONU.
- STM./SAN./WTR./ MANHOLE
- B-INLET/BB-INLET
- E-INLET
- C-INLET
- GRATE INLET
- GRATE INLET
- CLEANOUT
- WATER VALVE
- FIRE HYDRANT
- WATER METER
- GAS METER
- GAS VALVE
- MH-ELECTRIC
- POWER POLE
- GUY WIRE
- METER POLE
- ELECTRIC BOX
- SBC MANHOLE
- PEDESTAL BOX
- SIGNAL POLE
- UTILITY MARKER
- SET/FOUND IRON ROD OR P.K. NAIL
- SET CONTROL POINT

EXISTING PLAN

- GUARD RAIL/HAND RAIL
- EDGE OF ASPHALT
- CURB LINE
- TREE LINE/BRUSH LINE
- FENCE
- BUILDING OVERHANG
- BUILDING
- GAS LINE
- R.O.W. LINE
- TEL. CONDUIT & BURIED CABLE
- ELECTRIC UNDERGROUND LINE
- MISC UNDERGROUND LINES
- TOP OF BANK
- TOE OF SLOPE
- FLOW — DIRECTION OF FLOW
- RAILROAD
- SAN. SWR. 24" AND SMALLER
- SAN. SWR. LINE 30" AND LARGER
- STM. SWR. 24" AND SMALLER
- STM. SWR. LINE 30" AND LARGER
- WATER LINE 24" AND SMALLER
- WATER LINE 30" AND LARGER
- OVERHEAD POWER

EXISTING PROFILE

- SANITARY SEWER 24" (AND SMALLER)
- SANITARY SEWER 30" (AND LARGER)
- STORM SEWER 24" (AND SMALLER)
- STORM SEWER 30" (AND LARGER)
- WATER LINE
- TELEPHONE CONDUIT
- ELECTRIC CONDUIT
- TOP OF BANK (LEFT)
- TOP OF BANK (RIGHT)
- RECORD DRAWING INFORMATION (NOT FIELD VERIFIED)
- STM./SAN. MANHOLE

PROPOSED PLAN

- GATE VALVE W/ ADJUSTABLE BOX
- BUTTERFLY VALVE W/ OPERATOR M.H.
- BUTTERFLY VALVE W/ BOX
- ACCESS MANHOLE W/ SERVICE M.H.
- CATHODIC PROTECTION RECTIFIER AND DEEP ANODE
- CATHODIC PROTECTION TEST STATION
- AIR VENT W/3 BOLLARDS
- WATER LINE 24" DIA & SMALLER
- WATER LINE 30" DIA & LARGER
- WATER LINE 30" DIA & LARGER TRENCHLESS
- WATER LINE 24" DIA & SMALLER TRENCHLESS
- FIREHYDRANT/FLUSH VALVE
- FIBER OPTIC CONDUIT
- TRENCHLESS FIBER OPTIC CONDUIT
- STANDARD FIBER OPTIC GROUND BOX
- TRAFFIC RATED FIBER OPTIC GROUND BOX

PROPOSED PROFILE

- WATER LINE 24" DIA & SMALLER
- WATER LINE 30" DIA & LARGER
- WATER LINE 30" DIA & LARGER TRENCHLESS
- GATE VALVE W/ BOX
- BUTTERFLY VALVE W/ OPERATOR M.H.
- INTERNAL ELLIPTICAL DISHED HEAD PLUG
- MANHOLE, AI/VR
- FIBER OPTIC CONDUIT
- HYDRAULIC GRADE LINE
- FIBER OPTIC GROUND BOX
- TRENCHLESS FIBER OPTIC CONDUIT

STANDARD ABBREVIATIONS

@	AT
AI/VR	AIR RELEASE/VACUUM RELEASE
B.L.	BUILDING LINE
B/F	BLIND FLANGE
B.F.V.	BUTTERFLY VALVE
℄	BASELINE
B/S	BACKSLOPE
℄	CENTER LINE
CLR.	CLEARANCE
C-C	CENTER TO CENTER
CIPP	CURED-IN-PLACE-PIPE
C.O.	CLEAN OUT
CONC.	CONCRETE
CP	CATHODIC PROTECTION
C.G.M.P.	CORRUGATED GALVANIZED METAL PIPE
C.M.P.	CORRUGATED METAL PIPE
C.P.P.	CORRUGATED PLASTIC PIPE
D.E.	DRAINAGE EASEMENT
DESC.	DESCRIPTION
D.I.C.L.	DUCTILE IRON CEMENT LINED
D.I.P.	DUCTILE IRON PIPE
DIA.	DIAMETER
DR	DRAIN LINE
D/W	DRIVEWAY
E.	EAST
E.P.	EDGE OF PAVEMENT
EL.	ELEVATION
ENT.	ENTERGY
ESMT	EASEMENT
EXIST.	EXISTING
F.H.	FIRE HYDRANT
F.L.	FLOOD LIGHT
F.M.	FORCE MAIN OR FLOW METER
F.V.	FLUSHING VALVE
FL.	FLOW LINE
G.V.	GATE VALVE
GRP	GROUNDWATER REDUCTION PROGRAM
HGL	HYDRAULIC GRADE LINE
H.M.A.C.	HOT MIX ASPHALTIC CONCRETE
H.P.	HIGH PRESSURE
I.P.	INTERMEDIATE PRESSURE
I.R.	IRON ROD
INFL.	INFLUENT
INV. EL.	INVERT ELEVATION
L.F.	LINEAR FEET
L.U.S.T.	LEAKING UNDERGROUND STORAGE TANK
LT.	LEFT
M.A.	MAINTENANCE ACCESS
M.C.D.	MULTI CONDUIT DUCT
M.H.	MANHOLE
MAX.	MAXIMUM
MIN.	MINIMUM
N.	NORTH
N.G.	NATURAL GROUND
N.F.V.	NOT FIELD VERIFIED
P.C.	POINT OF CURVATURE
P.O.C.	POINT ON CURVE
PI.	POINT OF INTERSECTION
PL	PROPERTY LINE
P.R.C.	POINT OF REVERSE CURVE
PRV	PRESSURE REDUCING VALVE
P.T.	POINT OF TANGENCY
PT.	POINT
PROP.	PROPOSED
PVI	POINT OF VERTICAL INTERSECTION
PVMT.	PAVEMENT
R.	RADIUS
R.C.P.	REINFORCED CONCRETE PIPE
R.O.W.	RIGHT-OF-WAY
R.P.	RADIUS POINT
RED.	REDUCER
(R)	RECORD DRAWING NOT FIELD VERIFIED
RT.	RIGHT
S.	SOUTH
SJRA	SAN JACINTO RIVER AUTHORITY
S.S.	SIDE SLOPE
S.S.E.	SANITARY SEWER EASEMENT
SAN.	SANITARY
SB/BH	SOIL BORING/ BORE HOLE
SBC	SOUTHWESTERN BELL TELEPHONE/ATT
STA.	STATION
STL	STEEL
STM.	STORM
SWR.	SEWER
T.C.	TOP OF CURB
T.A.E.	TEMPORARY ACCESS EASEMENT
T.C.E.	TEMPORARY CONSTRUCTION EASEMENT
TP	TOP OF PAVEMENT
TYP.	TYPICAL
U.E.	UTILITY EASEMENT
VPI.	VERTICAL POINT INTERSECTION
W.	WEST
W.L.	WATERLINE
W.L.E.	WATER LINE EASEMENT
W/	WITH

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SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

SAN JACINTO RIVER AUTHORITY
SJRA
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REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY: C. CHUDOBA
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A V: N/A

SHEET INDEX,
LEGEND AND
ABBREVIATIONS

GENERAL CONSTRUCTION NOTES:

1. THERE WILL BE NO SEPARATE PAYMENT FOR WORK SHOWN ON THESE PLANS, UNLESS SPECIFICALLY ESTABLISHED IN THE PROPOSAL SECTION OF THE CONTRACT DOCUMENTS. CONTRACTOR SHALL INCLUDE COST OF THIS WORK IN THE CONTRACT UNIT PRICE FOR ITEMS OF WHICH THIS WORK IS A COMPONENT OR INCIDENTAL.

2. CONTRACTOR SHALL DIAL 811 TO CONTACT EITHER TEXAS811 OR LONESTAR811 ONE-CALL CENTERS TO PROCESS UTILITY LOCATION REQUESTS A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

3. CONTRACTOR SHALL CONTACT SJRA AT 281-367-9511 TO PROCESS UTILITY LOCATION REQUESTS A MINIMUM OF 72 HOURS PRIOR TO CONSTRUCTION TO HAVE SJRA UTILITIES LOCATED.

4. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND ALL REGULATIONS OF UTILITY COMPANIES CONCERNING SAFETY AND HEALTH PRACTICES.

5. CONTRACTOR SHALL REMOVE ALL MUD, DIRT AND DEBRIS DEPOSITED OR DROPPED ON EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY DAILY. MATERIAL THAT IS HAZARDOUS TO TRAFFIC SHALL BE REMOVED IMMEDIATELY.

6. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE LICENSED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THESE PLANS. THE CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEM(S).

7. CONTRACTOR SHALL PROTECT ALL TREES ADJACENT TO WORK AREA. NO TREES OUTSIDE THE WORK AREA SHALL BE REMOVED WITHOUT PERMISSION OF OWNER.

8. CONTRACTOR SHALL GIVE NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR SHALL OBTAIN ALL CONSTRUCTION PERMITS PRIOR TO STARTING CONSTRUCTION.

9. CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY REGULATION OF MONTGOMERY COUNTY, TEXAS FOR FLOOD PLAIN MANAGEMENT PRIOR TO STARTING CONSTRUCTION.

10. CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY MONTGOMERY COUNTY, TEXAS PRIOR TO STARTING CONSTRUCTION OF UTILITIES AND/OR CULVERTS WITHIN COUNTY ROAD RIGHTS-OF-WAY, IF APPLICABLE.

11. CONTRACTOR SHALL NOTIFY THE SAN JACINTO RIVER AUTHORITY CONSTRUCTION MANAGER IN WRITING, AND AT (936-588-3111) AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION.

12. CONTRACTOR SHALL NOTIFY MONTGOMERY COUNTY'S ENGINEERING DEPARTMENT IN WRITING AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION, AS APPLICABLE.

13. CONTRACTOR SHALL NOTIFY THE WOODLANDS TOWNSHIP AND THE WOODLANDS WATER AGENCY (TWWA) IN WRITING AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION, AS APPLICABLE.

14. CONTRACTOR SHALL NOTIFY THE WOODLANDS DEVELOPMENT COMPANY IN WRITING AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION, AS APPLICABLE.

15. A COPY OF ALL WRITTEN NOTIFICATIONS SHALL BE SENT TO THE OWNER.

16. CONTRACTOR SHALL PROTECT AND/OR BRACE ALL UTILITY POLES AND OTHER STRUCTURES WITHIN AND ADJACENT TO THE WORK ZONE, AS NECESSARY TO COMPLETE THE WORK.

17. RESTORE ALL DISTURBED AREAS TO "AS GOOD OR BETTER CONDITIONS". RESTORATION INCLUDES RE-GRADING, LEVELING AND RE-SEEDING/SODDING/HYDROMULCH TO RESTORE ALL DISTURBED AREAS. CONTRACTOR MUST APPLY A BROADCAST FERTILIZER TO ALL AREAS THAT HAVE BEEN RESTORED. ALL DISTURBED AREAS MUST BE APPROVED BY THE OWNER.

18. CONTRACTOR IS MADE AWARE THAT THE BEAR BRANCH TRUNK MAIN DISCHARGES INTO A LIFT STATION AT THE WASTEWATER TREATMENT FACILITY NO. 2. SJRA WILL CLEAN THE LIFT STATION WET WELL PRIOR TO THE CONTRACTOR COMMENCING CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THAT THE LIFT STATION WET WELL HAS BEEN CLEANED AND MUST TAKE ADEQUATE PRECAUTIONS TO PREVENT DEBRIS FROM THE REHABILITATION EFFORTS FROM DISCHARGING TO THE LIFT STATION WET WELL. THE CONTRACTOR WILL INCLUDE COST FOR CLEANING, REMOVAL, AND DISPOSAL OF DEBRIS FROM THE LIFT STATION WET WELL AFTER ALL REHABILITATION WORK IS COMPLETE IN THE UNIT PRICE BID FOR RELATED ITEMS. NO SEPARATE PAYMENT WILL BE MADE FOR CLEANING, REMOVAL, AND DISPOSAL OF DEBRIS FROM THE LIFT STATION WET WELL.

CONTRACTOR WORK ZONE NOTES:

1. CONTRACTOR WILL BE REQUIRED TO MAINTAIN TWO LANES OPEN WHEN WORKING IN BOULEVARD SECTIONS. RESIDENTIAL SECTIONS WILL MAINTAIN ONE LANE OPEN WITH ADEQUATE SIGNAGE AND FLAGMEN TO FACILITATE USE OF THE LANE.

2. DRIVEWAY ACCESS WILL BE MAINTAINED OPEN AFTER WORKING HOURS. A MINIMUM OF ONE DRIVEWAY ACCESS WILL BE MAINTAINED OPEN AT ALL TIMES TO COMMERCIAL, APARTMENTS, AND/OR NON-RESIDENTIAL DEVELOPMENTS.

3. THE LENGTH OF THE WORK ZONE MUST BE MINIMIZED WITHIN THE MONTGOMERY COUNTY ROW OR EASEMENTS. THERE SHALL NOT BE MORE THAN 200-FEET OF TRENCH OPEN AT ANY ONE TIME. THE CONSTRUCTION ZONE WILL BE A ROLLING CONSTRUCTION ZONE WITH APPROPRIATE TRANSITIONS ON EACH END.

4. SIGNALIZED INTERSECTIONS: LANES WILL NOT BE CLOSED AT A SIGNALIZED INTERSECTION, UNLESS APPROVED BY THE COUNTY ENGINEER. AN APPROPRIATE TRANSITION AS DEFINED IN THE APPROVED TRAFFIC CONTROL PLAN WILL BE PROVIDED AT SIGNALIZED INTERSECTIONS.

5. TEMPORARY PAVEMENT MARKERS: TEMPORARY EPOXY-GLUED BUTTONS OR "CONSTRUCTION GRADE" TAPE PAVEMENT MARKERS SHOULD BE USED ON PERMANENT PAVEMENT.

6. CONTRACTOR TO SUBMIT PLAN FOR APPROVAL TO ENSURE THAT PEDESTRIAN TRAFFIC CARE SHALL BE TAKEN TO PROVIDE FOR TEMPORARY PEDESTRIAN TRAFFIC AND CROSSING AT AREAS SUCH AS SCHOOLS, PARKS, AND SHOPPING AREAS.

PAVING CONSTRUCTION NOTES:

1. REPLACEMENT PAVEMENT TO BE CONSTRUCTED IN ACCORDANCE WITH RULES, REGULATIONS AND REQUIREMENTS OF THE APPROPRIATE JURISDICTION.

2. WHERE PROPOSED PAVEMENT IS TO MATCH EXISTING PAVEMENT, EXISTING REBARS OR DOWELS PROJECTING FROM EXISTING PAVEMENT TO BE CLEANED AND TIED INTO PROPOSED PAVEMENT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #4 BARS, 24 INCHES LONG, DRILLED AND EMBEDDED 8 INCHES INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC EPOXY" OR EQUAL AT 12 INCHES CENTER TO CENTER.

THE WOODLANDS WATER AGENCY (TWWA) NOTES:

1. NOTIFY THE WOODLANDS WATER AGENCY (TWWA) AT 855-H2O-SAVE (855-426-7283) 48 HOURS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

   MICHAEL MOONEY, P.E.
   DEPUTY GENERAL MANAGER
   THE WOODLANDS WATER AGENCY
   832-813-6900 (GENERAL)
   832-813-6903 (DIRECT)

2. CONTRACTOR WILL NOTIFY THE WOODLANDS WATER AGENCY 24-HOURS PRIOR TO USING ANY DRAINAGE EASEMENTS FOR TEMPORARY ACCESS, TO ALLOW STAFF TO DOCUMENT THE EXISTING CONDITIONS OF THE EASEMENTS PRIOR TO BEING DISTURBED FOR CONSTRUCTION ACCESS.

3. RESTORE ALL DISTURBED AREAS TO "AS GOOD OR BETTER CONDITIONS". RESTORATION INCLUDES RE-GRADING, LEVELING AND RE-SEEDING/SODDING/HYDROMULCH TO RESTORE ALL DISTURBED AREAS. CONTRACTOR MUST APPLY A BROADCAST FERTILIZER TO ALL AREAS THAT HAVE BEEN RESTORED. ALL DISTURBED AREAS MUST BE APPROVED BY THE OWNER.

SPECIAL ENVIRONMENTAL CONDITIONS:

A. U.S. ARMY CORPS OF ENGINEERS (USACE) PERMITS FOR THE PROJECT:

   1. USACE NATIONWIDE PERMIT (NWP) 12 – UTILITY LINE ACTIVITIES WILL BE REQUIRED DUE TO IMPACTS FROM TEMPORARY CONSTRUCTION ACCESS. NOTIFICATION TO USACE IS NOT REQUIRED, BUT CONTRACTOR MUST COMPLY WITH THE TERMS AND CONDITIONS OF USACE NATIONWIDE PERMIT (NWP) 12.
      a. https://www.nao.usace.army.mil/Portals/31/docs/regulatory/NationwidePermits/Nationwide_Permit_12.pdf
      b. https://www.swg.usace.army.mil/Portals/26/docs/regulatory/PN%20January/2017%20NWP%20RC.pdf?ver=2017-01-12-140117-117

B. MONTGOMERY COUNTY FLOOD PERMT

   1. CONTRACTOR MUST OBTAIN A DEVELOPMENT PERMIT NON-STRUCTURE FROM MONTGOMERY COUNTY PERMIT OFFICE FOR INSTALLATION OF NEW MANHOLE WITHIN THE 100-YEAR FLOODPLAIN.

C. TEXAS PARKS & WILDLIFE DEPARTMENT (TPWD), (TPWD PROJECT NO. 4228):

   1. CONTRACTOR MUST COMPLY WITH THE MIGRATORY BIRD TREATY ACT, WHERE VEGETATION CLEARING WILL OCCUR OUTSIDE OF THE GENERAL BIRD NESTING SEASON (MARCH 15 TO SEPTEMBER 15) OR A SURVEY WILL BE CONDUCTED FOR ACTIVE NESTS, PRIOR TO CLEARING. NEST SURVEYS SHOULD BE CONDUCTED NO MORE THAN FIVE DAYS PRIOR TO CONSTRUCTION IN ORDER TO MAXIMIZE DETECTION OF ACTIVE NESTS. IF A NEST IS FOUND, A VEGETATION BUFFER AREA OF NO LESS THAN 150-FEET IN DIAMETER SHOULD REMAIN AROUND THE NEST UNTIL ALL YOUNG HAVE FLEDGED. THE CONTRACTOR SHALL NOT RESUME CONSTRUCTION IN THE AREA OF THE ENCOUNTER UNTIL AUTHORIZED TO DO SO BY THE OWNER.

   2. CONTRACTOR WILL BE RESPONSIBLE FOR INSTALLING PROPER EROSION AND SEDIMENTATION CONTROLS. EROSION AND SEDIMENTATION WILL BE MANAGED BY IMPLEMENTING MATTING AT STREAM CROSSINGS, MINIMIZING THE AMOUNT OF CLEARING AND GRUBBING, AND NOT EXCAVATING IN THE VICINITY OF STREAM BANKS.

      a. EROSION AND SEDIMENTATION CONTROLS MUST BE INSTALLED IN AREAS WHERE CONSTRUCTION ACTIVITIES ARE ANTICIPATED FOR THE COMING WEEKS. CONTRACTOR MUST REMOVE AND RELOCATE EROSION AND SEDIMENTATION CONTROLS AFTER WORK IS COMPLETED IN EACH PROJECT AREA.

   3. TO ENSURE COMPLIANCE WITH TEXAS PARKS AND WILDLIFE CODE, IF DEWATERING, MAINTENANCE, OR CONSTRUCTION RELATED ACTIVITIES WITHIN WATER RESOURCES ARE ANTICIPATED TO OCCUR, THE AUTHORITY SHOULD COORDINATE WITH THE TEXAS PARKS AND WILDLIFE DEPARTMENT KILLS AND SPILLS TEAM TO DEVELOP A PLAN TO AVOID IMPACTS TO AQUATIC RESOURCES.

D. STANDARD EMERGENCY CONDITION FOR THE DISCOVERY OF CULTURAL RESOURCES

   1. IF SIGNIFICANT CULTURAL RESOURCES ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY CEASE WORK IN THE AREA OF THE ENCOUNTER AND NOTIFY THE OWNER, WHO WILL IMMEDIATELY IMPLEMENT ACTIONS IN ACCORDANCE WITH THE ESA AND APPLICABLE STATE STATUTES. THE CONTRACTOR SHALL NOT RESUME CONSTRUCTION IN THE AREA OF THE ENCOUNTER UNTIL AUTHORIZED TO DO SO BY THE OWNER.

E. STANDARD EMERGENCY CONDITION FOR THE DISCOVERY OF THREATENED AND ENDANGERED SPECIES

   1. IF A THREATENED OR ENDANGERED SPECIES IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY CEASE WORK IN THE AREA OF THE ENCOUNTER AND NOTIFY THE OWNER, WHO WILL IMMEDIATELY IMPLEMENT ACTIONS IN ACCORDANCE WITH THE ESA AND APPLICABLE STATE STATUTES. THESE ACTIONS SHALL INCLUDE REPORTING THE ENCOUNTER TO THE TWDB, THE U.S. FISH AND WILDLIFE SERVICE, AND THE TEXAS PARKS AND WILDLIFE DEPARTMENT, OBTAINING ANY NECESSARY APPROVALS OR PERMITS TO ENABLE THE WORK TO CONTINUE, OR IMPLEMENT OTHER MITIGATION ACTIONS. THE CONTRACTOR SHALL NOT RESUME CONSTRUCTION IN THE AREA OF THE ENCOUNTER UNTIL AUTHORIZED TO DO SO BY THE OWNER.

PIPELINE COMPANY NOTES:

1. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UNDERGROUND PIPELINES PRIOR TO CONSTRUCTION.

2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE DEPTH, LOCATION AND EXISTENCE OF ALL EXISTING PIPELINES WHICH MAY CONFLICT WITH THE PROPOSED CONSTRUCTION. THIS DETERMINATION SHALL BE PERFORMED IN CONCERT WITH THE APPROPRIATE PIPELINE COMPANY IN A MANNER THAT MEETS THEIR APPROVAL.

3. THERE IS THE POSSIBILITY OF ENCOUNTERING UNKNOWN ACTIVE AND INACTIVE UNIDENTIFIED PIPELINES. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING AND COORDINATING WITH ALL THE PIPELINE COMPANIES PRIOR TO CONSTRUCTION. IN THE EVENT THE CONTRACTOR ENCOUNTERS AN UNIDENTIFIED PIPELINE CROSSING THAT CONFLICTS WITH THE PROPOSED CONSTRUCTION, THE CONTRACTOR SHALL EMPLOY THE FOLLOWING SEQUENCE:

   A. NOTIFY THE SJRA AND THE ENGINEER.

   B. THE CONTRACTOR SHALL MAKE A CONCERTED EFFORT TO IDENTIFY THE OWNER OF THE PIPELINE AND COORDINATE WITH THE OWNER OF THE PIPELINE ON THE RELOCATION EFFORTS. THE OWNER IS NOT RESPONSIBLE FOR ANY CLAIMS AND DOWNTIME RESULTING FROM THE DELAYS IN THE RELOCATION EFFORTS.

   C. IN THE EVENT THE CONTRACTOR CANNOT IDENTIFY THE OWNER OF THE PIPELINE CROSSING IN SPITE OF HIS DILIGENT EFFORTS, THE CONTRACTOR SHALL DOCUMENT (TELEPHONE CALLS, COORDINATION, MEETING ON SITE, ETC.) THE EFFORTS EXPENDED IN TRYING TO IDENTIFY THE OWNER OF THE PIPELINE AND SUBMIT A COPY TO THE OWNER. THE OWNER WILL ASSIST IN IDENTIFYING THE OWNER OF THE UNKNOWN PIPELINE COMPANY AFTER CONFIRMING THAT THE CONTRACTOR HAS MADE A DILIGENT EFFORT IN LOCATING THE OWNER OF THE UNKNOWN PIPELINE COMPANY. DURING SUCH TIME, THE CONTRACTOR SHALL RESCHEDULE HIS CONSTRUCTION ACTIVITIES. NEITHER THE OWNER NOR THE ENGINEER ARE RESPONSIBLE FOR ANY CLAIMS AND DOWN TIME RESULTING FROM THE DELAYS ENCOUNTERED FROM THE UNIDENTIFIED PIPELINE.

4. THE CONTRACTOR SHALL NOTIFY PIPELINE COMPANIES PRIOR TO EXCAVATION OR PRIOR TO CROSSING OVER OR UNDER THE PIPELINE COMPANY'S LINES. CLEARANCE BETWEEN THE PROPOSED UTILITY AND THE EXISTING PIPELINE SHALL MEET THE PIPELINE COMPANY'S REQUIREMENTS AND APPROVAL. A COPY OF ALL DOCUMENTATION SHALL BE PROVIDED TO THE ENGINEER BY THE CONTRACTOR.

5. THE CONTRACTOR SHALL BE AWARE THAT PIPELINE COMPANIES MAY REQUIRE LOCATING THEIR LINE UTILIZING NON-DESTRUCTIVE EQUIPMENT (VACUUM LOCATING DEVICES OR OTHER PERTINENT EQUIPMENT) PRIOR TO AND DURING THE CONSTRUCTION OPERATIONS. THE METHODOLOGY UTILIZED FOR LOCATING THE PIPELINE SHALL BE APPROVED BY THE PIPELINE COMPANY PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL COORDINATE WITH THE PIPELINE COMPANY AND UTILIZE SUITABLE METHODS AND EQUIPMENT APPROVED BY THE PIPELINE COMPANY TO PERFORM THE WORK AT NO ADDITIONAL COST TO THE PROJECT.

6. CONTRACTOR SHALL BE AWARE THAT PROTECTION OF PIPELINES ON THIS PROJECT MAY REQUIRE SPECIAL BRACING, SUPPORTING AND PROTECTION EFFORTS. SUCH EFFORTS MAY INCLUDE SPECIAL SUPPORT SYSTEMS OR STRUCTURES TO MEET PIPELINE COMPANY'S SATISFACTION. CONTRACTOR SHALL FULLY COORDINATE SUCH SUPPORTS AND PROTECTION EFFORTS WITH PIPELINE COMPANIES PRIOR TO CONSTRUCTION. SUCH SPECIAL BRACING, SUPPORTING AND PROTECTION EFFORTS SHALL BE TO THE SATISFACTION OF THE PIPELINE COMPANY, AT NO ADDITIONAL COST TO THE PROJECT.

7. NO EQUIPMENT, DEBRIS, MATERIALS OR SUPPLIES OF ANY KIND WILL BE PLACED, PARKED OR STORED IN, ON OR OVER THE PIPELINE EASEMENTS.

8. ANY CROSSING OF THE EASEMENTS BY VEHICLES AND HEAVY EQUIPMENT SHALL BE LIMITED AND RESTRICTED TO LOCATIONS THAT HAVE BEEN COVERED BY TWO LAYERS OF WOODEN MATS EXTENDING THE ENTIRE WIDTH OF THE EASEMENT AND APPROVED BY THE PIPELINE COMPANIES (NO SEPARATE PAY).

UTILITY NOTES:

ENTERGY (ELECTRICAL FACILITIES):

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES AND OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN (10) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS CARRIES BOTH CRIMINAL AND CIVIL LIABILITY.

2. CONTRACTOR SHALL COORDINATE WITH ENTERGY BEFORE WORKING WITHIN TEN (10) FEET OF OVERHEAD POWER LINES. CONTACT ENTERGY REPRESENTATIVE SHAWN KURTH AT (800) 368-3749, FOR POLES TO BE BRACED AND LINES TO BE DE-ENERGIZED AND/OR MOVED. CONTRACTOR SHALL BE RESPONSIBLE TO ENTERGY FOR ANY COSTS ASSOCIATED WITH BRACING OF POWER POLES OR DE-ENERGIZING AND/OR MOVING ANY CONFLICTING OVERHEAD POWER LINES.

3. TO STAKE ENTERGY UNDERGROUND FACILITIES, CONTRACTOR SHALL DIAL 811 TO CONTACT EITHER TEXAS811 OR LONESTAR811 ONE-CALL CENTERS TO PROCESS UTILITY LOCATION REQUESTS A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED, BEFORE STARTING EXCAVATION.

4. PRIVATE UNDERGROUND ELECTRICAL FACILITIES MAY EXIST IN THE AREA AND THESE WILL NOT BE STAKED BY ENTERGY PERSONNEL.

AT&T TEXAS/SWBT FACILITIES:

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN THE AREA.

6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER ROOSEVELT LEE JR. AT (713) 567-4552 OR EMAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

COMMUNICATION CABLES:

1. THE LOCATION OF VARIOUS COMMUNICATION FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. CONTRACTOR SHALL DIAL 811 TO CONTACT EITHER TEXAS811 OR LONESTAR811 ONE-CALL CENTERS TO PROCESS UTILITY LOCATION REQUESTS A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF COMMUNICATION FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING THE CONTRACTOR SHALL EXPOSE THE COMMUNICATION FACILITIES.

4. WHEN COMMUNICATION FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

5. SPECIFIC CONTACTS FOR THE FOLLOWING COMMUNICATION COMPANIES ARE AS FOLLOWS:

   AT&T
   GAIL GALLARDO
   713-660-5336

   CONSOLIDATED COMMUNICATIONS
   CHRIS JENKINS
   936-521-6823

   COMCAST
   DAVID MILLER
   713-341-8676

CENTERPOINT ENERGY GAS FACILITIES

CAUTION: UNDERGROUND GAS FACILITIES

LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE, LLC WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATIONS. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY
NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-207-2222

NOTICE:

For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig so that underground line can be marked. This verification does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITY LINES

Date

CenterPoint Energy/Natural Gas Facilities Verification ONLY.
(This signature verifies that you have shown CNP Natural Gas lines correctly – not to be used for conflict verification.) (Gas service lines are not shown.)
Signature valid for six months.

ARKK ENGINEERS
7322 Southwest Freeway, Suite 1040 • Houston, Texas 77074
(713) 400-2755 • www.arkkengineers.com • TX PE Firm No. 13872

STATE OF TEXAS
JOSE F. VELASQUEZ
110373
LICENSED
PROFESSIONAL ENGINEER
9-13-19
ARKK Engineers, LLC
Texas Registered Engineering Firm F-13872

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

SAN JACINTO RIVER AUTHORITY
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REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY: C. CHUDOBA
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A V: N/A

GENERAL CONSTRUCTION NOTES

SPECIAL CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL REGRADE THE AREA AS NECESSARY TO ALLOW FOR DRAINAGE DURING CONSTRUCTION. DRAINAGE SHALL BE MAINTAINED BY THE CONTRACTOR AT ALL TIMES. THE CONTRACTOR SHALL REGRADE THE AREA TO ITS ORIGINAL CONDITION AFTER CONSTRUCTION. THE CONTRACTOR SHALL PERFORM THE WORK AT NO ADDITIONAL COST TO THE PROJECT.

2. THE CONTRACTOR SHALL CONTACT AND COORDINATE WITH ALL AFFECTED PROPERTY OWNERS PRIOR TO COMMENCING CONSTRUCTION.

3. THE CONTRACTOR IS MADE AWARE THAT THE EXISTING SANITARY SEWER MAIN IS IN A DETERIORATED CONDITION. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE FLOW AND THE INTEGRITY OF THE EXISTING SANITARY SEWER MAIN DURING CONSTRUCTION.

4. THE CONTRACTOR IS MADE AWARE THAT CLEARING AND GRUBBING, I.E. REMOVAL AND DISPOSAL OF TREES, BUSHES (ALL SIZES, TYPES) WILL BE REQUIRED TO FACILITATE REHABILITATION OF SANITARY SEWER MAIN. THE CONTRACTOR SHALL TAG TREES AND STAKE THE AREAS REQUIRING CLEARING AND OBTAIN CONCURRENCE FROM THE OWNER PRIOR PERFORMING THE WORK. TREE CLEARING MUST OCCUR OUTSIDE OF NESTING SEASON (MARCH 15TH THROUGH SEPTEMBER 15TH).

   - CONTRACTOR WILL NOTIFY THE WOODLANDS DEVELOPMENT COMPANY (TWDC) AFTER TREES HAVE BEEN MARKED FOR REMOVAL. PRIOR TO ANY CLEARING, CONTRACTOR WILL WALK THE PROJECT ROUTE WITH A REPRESENTATIVE FROM TWDC TO OBTAIN APPROVAL FOR CLEARING WITHIN TWDC PROPERTY.

5. CONTRACTOR IS MADE AWARE THAT WORK WILL BE PERFORMED IN AREAS WITH NATURAL BIRD HABITATS AND HABITAT FOR ENDANGERED SPECIES (NO ENDANGERED SPECIES WERE DISCOVERED DURING ESA). COMPLETE ALL PROJECT CLEARING ACTIVITIES OUTSIDE OF MIGRATORY BIRD NESTING SEASON (BIRD NESTING SEASON IS MARCH 15TH THROUGH SEPTEMBER 15TH). IF A THREATENED OR ENDANGERED SPECIES IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY CEASE WORK IN THE AREA OF THE ENCOUNTER AND NOTIFY THE OWNER, WHO WILL IMMEDIATELY IMPLEMENT ACTIONS IN ACCORDANCE WITH THE ESA AND APPLICABLE STATE STATUTES. THESE ACTIONS SHALL INCLUDE REPORTING THE ENCOUNTER TO THE TWDB, THE U.S. FISH AND WILDLIFE SERVICE, AND THE TEXAS PARKS AND WILDLIFE DEPARTMENT, OBTAINING ANY NECESSARY APPROVALS OR PERMITS TO ENABLE THE WORK TO CONTINUE, OR IMPLEMENT OTHER MITIGATION ACTIONS. THE CONTRACTOR SHALL NOT RESUME CONSTRUCTION IN THE AREA OF THE ENCOUNTER UNTIL AUTHORIZED TO DO SO BY THE OWNER.

6. DUE TO THE GENERAL TERRAIN AND LOCATION OF THE PROJECT AREA, ACCESSIBILITY TO THE PROJECT AREA IS LIMITED, CLEARING AND GRUBBING IS REQUIRED FOR ACCESS AND TO FACILITATE REHABILITATION. APPROVED ACCESS ROUTES TO THE PROJECT AREA ARE SHOWN ON THE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING AN ACCESS ROUTE PLAN TO SJRA AND THE ENGINEER PRIOR TO COMMENCING WORK. CONTRACTOR IS MADE AWARE THAT THE ACCESS ROUTES MAY NEED TO BE ADJUSTED BASED ON FEEDBACK RECEIVED FROM PROPERTY OWNERS WHERE THE EASEMENT IS LOCATED (GOLF COURSE, THE WOODLANDS DEVELOPMENT COMPANY, AND THE WOODLANDS TOWNSHIP). SOME OF THE ACCESS ROUTES MAY REQUIRE TEMPORARY FILL TO LEVEL UP TO ALLOW ACCESS (NO SEPARATE PAY). SJRA IS NOT RESPONSIBLE FOR ANY COSTS RELATED TO ADJUSTMENT OF THE ACCESS ROUTES. NO ADDITIONAL PAYMENT SHALL BE MADE IF THE CONTRACTOR ENCOUNTERS ANY DELAYS RELATED TO THE ACCESS ROUTES. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH ALL PERTINENT PROPERTY OWNERS PRIOR TO COMMENCING WORK. UPON COMPLETION OF WORK, THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL TEMPORARY FACILITIES AND RESTORING ALL ACCESS ROUTE AREAS TO THEIR ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE PROJECT.

7. INSTALLATION OF CULVERT PIPES ACROSS DITCHES, PIPE LINES TO FACILITATE DRAINAGE AND MAINTAIN ACCESS FOR PERFORMING THE REHABILITATION OF THE SANITARY SEWER MAIN SHALL BE PAID UNDER SITE ACCESS PAY ITEM. UPON COMPLETION OF WORK, THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL PROJECT AREAS TO ORIGINAL CONDITION AT NO ADDITIONAL TO THE PROJECT.

   - CONTRACTOR IS MADE AWARE THAT THE CREEK AND DRAINAGE DITCHES ARE IN CLOSE PROXIMITY TO THE ACCESS ROUTES. DURING THE PERFORMANCE OF WORK, CONTRACTOR MUST TAKE ADEQUATE PRECAUTIONS AND BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE SLOPES/EMBANKMENTS OF THE CREEK AND DRAINAGE DITCHES AT NO ADDITIONAL COST TO THE PROJECT.

   - ANY ADJUSTMENTS OR MODIFICATIONS TO EXISTING STRUCTURES (MANHOLES, INLETS, PIPES) ALONG THE ACCESS ROUTES IS CONTRACTOR'S RESPONSIBILITY AT NO ADDITIONAL COST TO THE PROJECT.

   - MATTING OR ANY SPECIAL MATTING OR SPECIAL SURFACE REQUIRED TO FACILITATE ACCESS TO THE SANITARY SEWER OR TO MEET ANY ENTITY'S REQUIREMENTS WILL BE PAID PER THE PERTINENT BID ITEM IN THE PROPOSAL (INCLUDES INSTALLATION, MAINTENANCE, AND REMOVAL). THE WIDTH AND TYPE (DUAL, SINGLE) OF MATTING MUST BE ADEQUATE TO MAINTAIN ACCESS AT ALL TIMES. TYPE OF MATTING TO BE UTILIZED IS CONTRACTOR'S RESPONSIBILITY. MATTING OF AREAS FOR PERFORMING OVER-THE-HOLE SETUP WILL NOT BE SEPARATELY AND MUST BE INCLUDED IN THE UNIT PRICE BID FOR RELATED ITEMS.

8. DIVERSION PUMPING – CONTRACTOR MUST MAINTAIN SEWER FLOW AT ALL TIMES. CONTRACTOR MUST SUBMIT A DIVERSION PUMPING PLAN TO OWNER FOR REVIEW AND CONCURRENCE.

   - CONTRACTOR IS MADE AWARE THAT FLOW DATA PROVIDED IN THE SPECIFICATIONS IS FOR INFORMATION PURPOSE ONLY AND HAS NOT BEEN VERIFIED. THE FLOW DATA IS BASED ON A WASTEWATER SYSTEM MODEL USING POPULATION DATA, LAND USE, AND UNIT WASTEWATER USAGE PARAMETERS.

   - CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DIVERSION PUMPING SYSTEM PLAN TO HANDLE ALL DAILY DRY AND WET WEATHER FLOWS, INCLUDING PEAK FLOWS FOR ALL RAIN EVENTS DURING CONSTRUCTION.

9. WATER FOR CONSTRUCTION – OWNER WILL PROVIDE WATER NECESSARY FOR CONSTRUCTION AT NO ADDITIONAL COST TO THE CONTRACTOR. CONTRACTOR SHALL PROVIDE A FIRE HYDRANT WATER METER AND SHALL MONITOR ALL WATER USAGE AS METERED. THE CONTRACTOR MAY BE REQUIRED TO DRAW WATER AT SPECIFIC LOCATIONS AS DIRECTED BY THE OWNER. CONTRACTOR SHALL NOT USE RESIDENT'S WATER. IT IS EXPRESSLY UNDERSTOOD AND AGREED THAT THE OWNER ASSUMES NO RESPONSIBILITY FOR ANY LOSS RESULTING TO THE CONTRACTOR FROM ANY LOSS OF PRESSURE OR FAILURE OF THE WATER SYSTEM; HOWEVER, IN THE EVENT OF FAILURE THAT CAN BE ATTRIBUTED TO THE OWNER, THE OWNER DOES AGREE TO MAKE REPAIRS AND RESTORE SERVICE AS EXPEDITIOUSLY AS POSSIBLE. CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING:

   - PROVIDE CALIBRATED WATER METER WITH BACKFLOW PREVENTER (CALIBRATED EVERY 6 MONTHS)

   - MAINTAIN WATER USAGE LOG. CONTRACTOR MUST SUBMIT WATER USAGE LOG WITH EACH PAY ESTIMATE.

   - NOTIFY OWNER AND THE WOODLANDS WATER AGENCY (TWWA) WHEN WATER WILL BE USED FOR CIPP OPERATIONS

10. THE CONTRACTOR IS RESPONSIBLE FOR MAKING SURE THAT HIS PERSONNEL AND HIS SUB-CONTRACTORS PERSONNEL HAVE IDENTIFICATION BADGES, VESTS AND UNIFORMS WHILE WORKING ON THIS PROJECT.

GOLF COURSE NOTES:

1. CONTRACTOR IS MADE AWARE THAT THE WOODLANDS COUNTRY CLUB (CLUBCORP HOUSTON) PALMER GOLF COURSE WILL BE IN OPERATION DURING THE DURATION OF CONSTRUCTION OPERATIONS. CONTRACTOR AND HIS CREWS MUST MAINTAIN PROFESSIONAL ETIQUETTE AND WILL BE RESPONSIBLE FOR MAINTAINING ACCESS TO GOLF COURSE STAFF AND ITS MEMBERS AT ALL TIMES.

2. CONTRACTOR IS MADE AWARE THAT SEVERAL ACCESS ROUTES ARE LOCATED IN CLOSE PROXIMITY TO THE GOLF COURSE FAIRWAYS/GREENS. THE CONTRACTOR MUST AVOID FAIRWAYS AND GREENS BY STAYING AS CLOSE TO THE TREE LINE AS POSSIBLE. THE CONTRACTOR MUST COORDINATE WITH THE GOLF COURSE STAFF IF TRIMMING OR REMOVAL OF TREES IS REQUIRED.

3. THE CONTRACTOR WILL BE RESPONSIBLE FOR RESTORING ALL GOLF COURSE AREAS THAT HAVE BEEN DISTURBED DUE TO CONSTRUCTION AND ACCESS FOR CONSTRUCTION. THE CONTRACTOR MUST MATCH EXISTING GRASS/SOD THAT REQUIRES REPLACEMENT. THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING AND CONFIRMING WITH GOLF COURSE STAFF ON SPECIFIC GRASS/SOD FOR REPLACEMENT. REPLACEMENT SOD FOR ALL DISTURBED AREAS IS "TIFWAY 419 BERMUDA GRASS", TO BE PROCURED FROM ALL SEASONS TURF GRASS, 32601 FM 529, BROOKSHIRE, TX 77423 (281-375-7505). CONTRACTOR IS RESPONSIBLE FOR FOLLOWING PROPER INSTALLATION AND CARE PROCEDURES PER SUPPLIER'S RECOMMENDATIONS AS FOLLOWS:

   - CLEAR ROCKS, CLODS, OR OTHER DEBRIS THAT ARE ANY LARGER THAN 1 INCH IN DIAMETER

   - TILL TO A DEPTH OF AT LEAST 2 INCHES. ADD TOPSOIL TO ACHIEVE A TOTAL TOPSOIL DEPTH OF 4-6 INCHES AFTER FIRMING

   - ROLL THE PREPARED AREA WITH A LAWN ROLLER ONE-THIRD FULL OF WATER TO FIRM AND SETTLE THE SURFACE. LOW SPOTS SHOULD BE FILLED TO MATCH THE SURROUNDING GRADE SURFACE.

   - SCHEDULE TURFGRASS DELIVERY AFTER SITE PREP AND WHEN READY TO INSTALL THE TURFGRASS. PROMPT INSTALLATION ON THE DAY OF DELIVERY IS CRUCIAL.

   - PRIOR TO INSTALLING TURFGRASS SOD, MOISTEN THE SOIL AND INSTALL SOD IMMEDIATELY UPON DELIVERY. IN HOT WEATHER, PROTECT UNLAID TURF BY PLACING THE BLOCKS IN THE SHADE. COVER UNLAID TURF WITH A MOIST CLOTH, OR LIGHTLY WATER THE UNPROTECTED TURF.

   - BEGIN INSTALLING TURF ALONG THE LONGEST STRAIGHT LINE. BUTT EDGES AND ENDS AGAINST EACH OTHER TIGHTLY, WITHOUT STRETCHING. AVOID GAPS OR OVERLAPS. STAGGER BLOCKS IN EACH ROW IN A BRICK-LIKE FASHION, USING A LARGE SHARP KNIFE TO TRIM CORNERS, EDGES, ETC. AVOID LEAVING SMALL STRIPS AT OUTER EDGES AS THEY WILL NOT RETAIN MOISTURE. ON SLOPES, PLACE THE TURF BLOCKS SO THEY RUN ACROSS THE SLOPE RATHER THAN UP AND DOWN THE SLOPE.

   - TO PREVENT INDENTATIONS OR AIR POCKETS AVOID REPEATED WALKING OR KNEELING ON THE TURF WHILE IT IS BEING INSTALLED OR JUST AFTER WATERING

   - AFTER INSTALLING THE TURFGRASS, ROLL THE ENTIRE AREA TO IMPROVE TURFGRASS/SOIL CONTACT AND REMOVE AIR POCKETS

   - WATER THE SOD WITH 1 INCH OF WATER WITHIN A HALF HOUR OF INSTALLATION. WATER DAILY, KEEPING TURF MOIST UNTIL IT IS FIRMLY ROOTED (MINIMUM 2 WEEKS). THEN LESS FREQUENT AND DEEPER WATERING SHOULD BEGIN. WEATHER CONDITIONS WILL DICTATE THE AMOUNT AND FREQUENCY OF WATERING. BE CERTAIN THAT THE NEW SOD HAS ENOUGH MOISTURE TO SURVIVE HOT, DRY, OR WINDY PERIODS.

4. CONTRACTOR WILL BE RESPONSIBLE FOR RESTORING CART PATHS THAT HAVE BEEN DAMAGED DUE TO CONSTRUCTION AND ACCESS FOR CONSTRUCTION.

5. CONTRACTOR IS MADE AWARE THAT SEVERAL AREAS WITHIN THE GOLF COURSE ARE RESTRICTED (SAND PITS, GOLF COURSE FAIRWAYS, AND GRASS NURSING AREA) AND ACCESS MUST BE MAINTAINED BY THE CONTRACTOR.

6. CONTRACTOR MUST PROVIDE ADVANCE NOTICE (MINIMUM OF 4 WEEKS) TO THE GOLF COURSE STAFF ON CONSTRUCTION SCHEDULE SO THAT THE GOLF COURSE STAFF CAN MARK THEIR UTILITIES, SUCH AS IRRIGATION SYSTEMS AND OTHERS. CONTRACTOR WILL BE RESPONSIBLE FOR REPLACING ANY DAMAGED UTILITIES DUE TO CONSTRUCTION AND ACCESS FOR CONSTRUCTION.

7. THE CONTRACTOR IS MADE AWARE THAT WILDLIFE EXISTS IN THE WOODED AREAS WITHIN THE GOLF COURSE. CONTRACTOR MUST BARRICADE OPEN PITS DURING CONSTRUCTION HOURS AND ALL EXCAVATED AREAS MUST BE COVERED OVERNIGHT.

8. NOTIFY THE WOODLANDS COUNTRY CLUB (THE PALMER COURSE) GOLF COURSE PERSONNEL AT 281-863-1400 A MINIMUM OF 4 WEEKS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

9. CONTRACTOR IS MADE AWARE THAT WORK IN THE GOLF COURSE AREA WILL NOT BE PERMITTED DURING SPECIAL EVENTS AND/OR GOLF TOURNAMENTS. A SCHEDULE OF SPECIAL EVENTS AND TOURNAMENTS WILL BE PROVIDED TO THE CONTRACTOR AT THE PRE-CONSTRUCTION CONFERENCE. CONTRACTOR MAY HAVE TO RESCHEDULE REHABILITATION EFFORTS SO AS OCCUR DURING LOW USAGE TIMES.

SPECIFIC CONTACTS FOR THE FOLLOWING ENTITIES ARE AS FOLLOWS:

THE WOODLANDS COUNTRY CLUB – PALMER COURSE
KYLE BROWN – GOLF COURSE SUPERINTENDENT
281-863-1400 EXT.2360
KYLE.BROWN@CLUBCORP.COM

THE WOODLANDS DEVELOPMENT COMPANY
ANTONIO PAZ – SENIOR PROJECT MANAGER
281-719-6158
ANTONIO.PAZ@HOWARDHUGHES.COM

THE WOODLANDS TOWNSHIP
MARSHALL JORDAN
281-210-3815
MJORDAN@THEWOODLANDSTOWNSHIP-TX.GOV

THE WOODLANDS WATER AGENCY (TWWA)
MICHAEL O. MOONEY, P.E. – DEPUTY GENERAL MANAGER
832-813-6903
MMOONEY@WJPA.ORG

MONTGOMERY COUNTY ENGINEERING
DAN WILDS, P.E. – ASSISTANT COUNTY ENGINEER
936-538-3522
DAN.WILDS@MCTXORG

MONTGOMERY COUNTY
COMMISSIONER PRECINCT 3
CHARLES COBB – TRAFFIC OPERATIONS MANAGER
281-367-3977
CHARLES.COBB@MCTX.ORG

MONTGOMERY COUNTY ENGINEERING
DIANE COOPER, CFM – FLOODPLAIN ADMINISTRATOR
936-538-8111
DIANE.COOPER@MCTX.ORG

NOTE:
THE CONTACT INFORMATION IS BEING PROVIDED AS A GUIDE TO AID THE CONTRACTOR. CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING WITH ALL ENTITIES WITHIN THE PROJECT AREAS AND MEET THEIR REQUIREMENTS

ARKK ENGINEERS
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STATE OF TEXAS
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Texas Registered Engineering Firm F-13872

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

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REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY:
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A V: N/A

SPECIAL CONSTRUCTION NOTES

0 600' 1200'

SCALE 1" = 600' (FULL SIZE)
SCALE 1" = 1200' (HALF SIZE)

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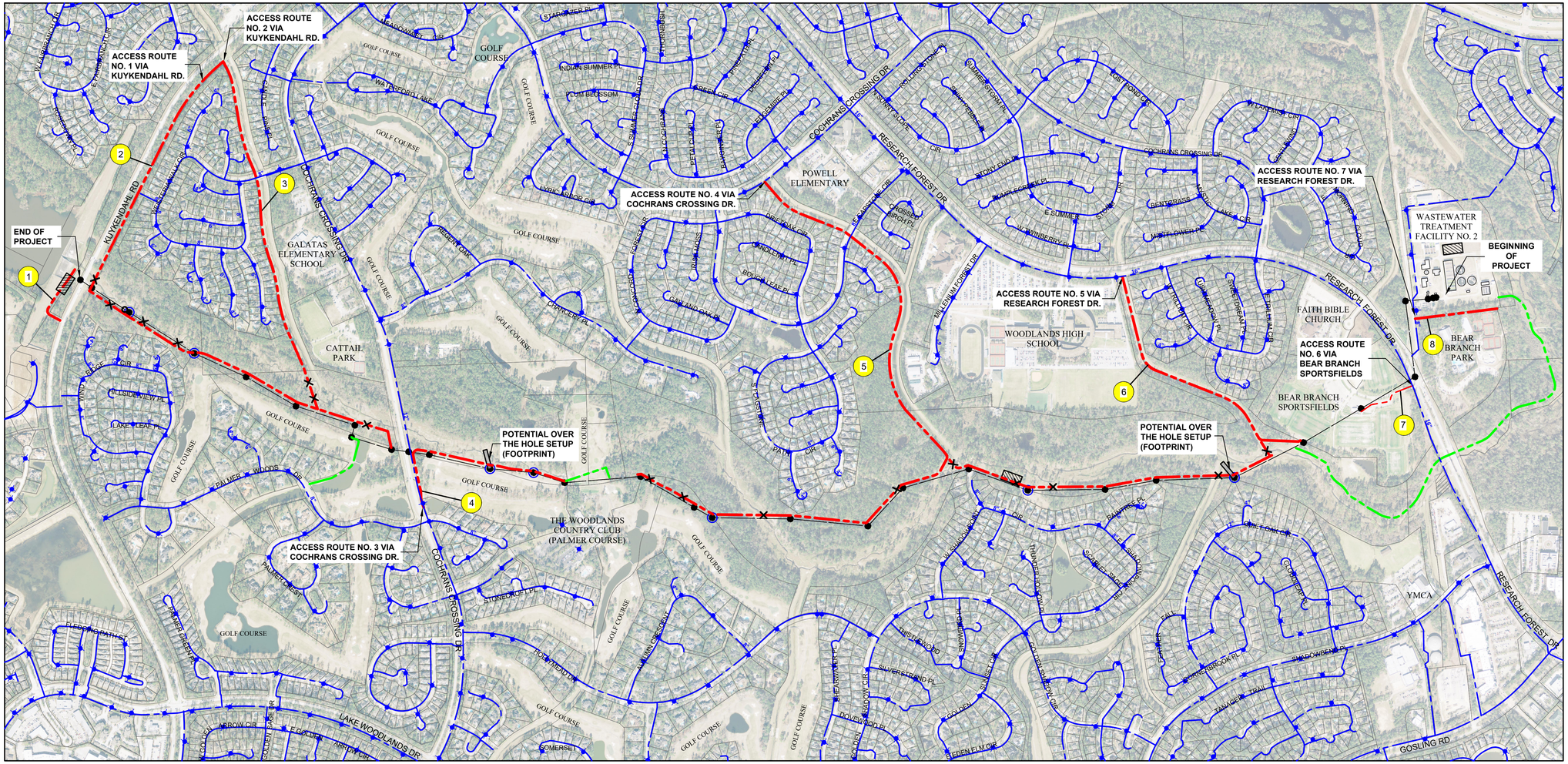
LAYOUT MAP

SHEET 5 OF 38

LEGEND
GRAVITY MAIN
MANHOLE
ZONE AE (100–YEAR FLOOD)
REGULATORY FLOODWAY (FLOODWAY AREAS IN ZONE AE)



0 600' 1200'

SCALE 1" = 600' (FULL SIZE)
SCALE 1" = 1200' (HALF SIZE)

POTENTIAL ACCESS ROUTES:

1. **ACCESS ROUTE NO. 1 - KUYKENDAHL RD.** - ACCESS ROUTE IS ALONG AN EXISTING CRUSHED ROCK ROAD THAT IS PARALLEL TO KUYKENDAHL RD.
2. **ACCESS ROUTE NO. 2 - KUYKENDAHL RD.** - ACCESS ROUTE IS ALONG AN EXISTING DIRT ROAD THAT IS PARALLEL TO KUYKENDAHL RD.
3. **ACCESS ROUTE NO. 3 - KUYKENDAHL RD.** - ACCESS ROUTE IS ALONG DRAINAGE EASEMENT THAT EXTENDS FROM KUYKENDAHL RD. TO THE BEAR BRANCH WATERWAY.
4. **ACCESS ROUTE NO. 4 - COCHRANS CROSSING DR.** - ACCESS ROUTE IS PARALLEL TO COCHRANS CROSSING DR. NEAR THE GOLF COURSE.
5. **ACCESS ROUTE NO. 5 - COCHRANS CROSSING DR.** - ACCESS ROUTE IS ALONG DRAINAGE EASEMENT THAT EXTENDS FROM COCHRANS CROSSING DR. TO THE BEAR BRANCH WATERWAY.
6. **ACCESS ROUTE NO. 6 - RESEARCH FOREST DR.** - ACCESS ROUTE IS ALONG DRAINAGE EASEMENT THAT EXTENDS FROM RESEARCH FOREST DR. TO THE BEAR BRANCH WATERWAY.
7. **ACCESS ROUTE NO. 7 - RESEARCH FOREST DR. (BEAR BRANCH SPORTSFIELDS)** - ACCESS ROUTE IS IN THE BEAR BRANCH SPORTSFIELD.
8. **ACCESS ROUTE NO. 8 - RESEARCH FOREST DR.** - ACCESS ROUTE IS SOUTH OF WASTEWATER TREATMENT FACILITY NO. 2.

POTENTIAL OPTIONS FOR ACCESS ROUTES

- MATTING (ALL TYPES)
- CRUSHED STONE
- SIZE, TYPE, THICKNESS AND MAINTENANCE IS CONTRACTOR'S RESPONSIBILITY

WATER FOR CONSTRUCTION NOTES:

1. THE CONTRACTOR MUST COORDINATE WITH OWNER AND THE WOODLANDS WATER AGENCY (TWWA) FOR WATER FOR CONSTRUCTION. CONTRACTOR MUST FOLLOW OWNER AND TWWA REQUIREMENTS.
2. CONTRACTOR IS MADE AWARE THAT THE OWNER AND TWWA WILL PROVIDE DESIGNATED LOCATIONS TO OBTAIN WATER FOR CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR TRANSPORT OF WATER TO THE PROJECT SITE REGARDLESS OF THE WATER ACCESS LOCATION.
3. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROCURING THEIR OWN WATER METER WITH BACKFLOW PREVENTER. WATER METER MUST BE CALIBRATED AND PROPER DOCUMENTATION MUST BE SUBMITTED.
4. CONTRACTOR MUST MAINTAIN AND PROVIDE WATER METER USAGE LOG WITH METER READINGS WITH EACH PAY ESTIMATE OR AS REQUIRED BY THE OWNER AND TWWA.
5. CONTRACTOR MUST NOTIFY OWNER, TWWA AND FIRE DEPARTMENT IN ADVANCE WHEN WATER WILL BE USED FOR FILLING OF CURED-IN-PLACE PIPE LINER FOR THE CURING PROCESS. THIS PROCESS REQUIRES THAT THE LINE SEGMENT(S) WITHIN THE SETUP BE COMPLETELY FILLED WITH WATER.
6. IN THE EVENT THE CONTRACTOR CHOOSES TO USE THE CREEK WATER FOR CONSTRUCTION AND IF APPROVED BY SJRA, CONTRACTOR MUST SUBMIT TEST RESULTS SHOWING THAT THE CREEK WATER IS SUITABLE FOR THE REHABILITATION OPERATIONS AND WILL NOT HAVE ANY DETRIMENTAL EFFECT ON THE LINER. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE EFFORTS EXPENDED BY THE CONTRACTOR.

LEGEND

- CONSTRUCTION ACCESS ROUTES
- DIVERSION PUMPING ROUTES
- ANTICIPATED TEMPORARY DRAINAGE CHANNEL CROSSING
- POSSIBLE OVER THE HOLE SETUP LOCATIONS
- 200' / 40' — OVER THE HOLE SETUP (NTS)
- POTENTIAL CONSTRUCTION STAGING AND STORAGE AREA
- EXISTING GRAVITY MAIN
- EXISTING FIRE HYDRANT (SEE NOTE 2)
- 6" — EXISTING WATER LINE & SIZE

ARKK ENGINEERS

7322 Southwest Freeway, Suite 1040 • Houston, Texas 77074
(713) 400-2755 • www.arkkengineers.com • TX PE Firm No. 13872

STATE OF TEXAS
JOSE F. VELASQUEZ
110373
LICENSED PROFESSIONAL ENGINEER
9-13-19

ARKK Engineers, LLC
Texas Registered Engineering Firm F-13872

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

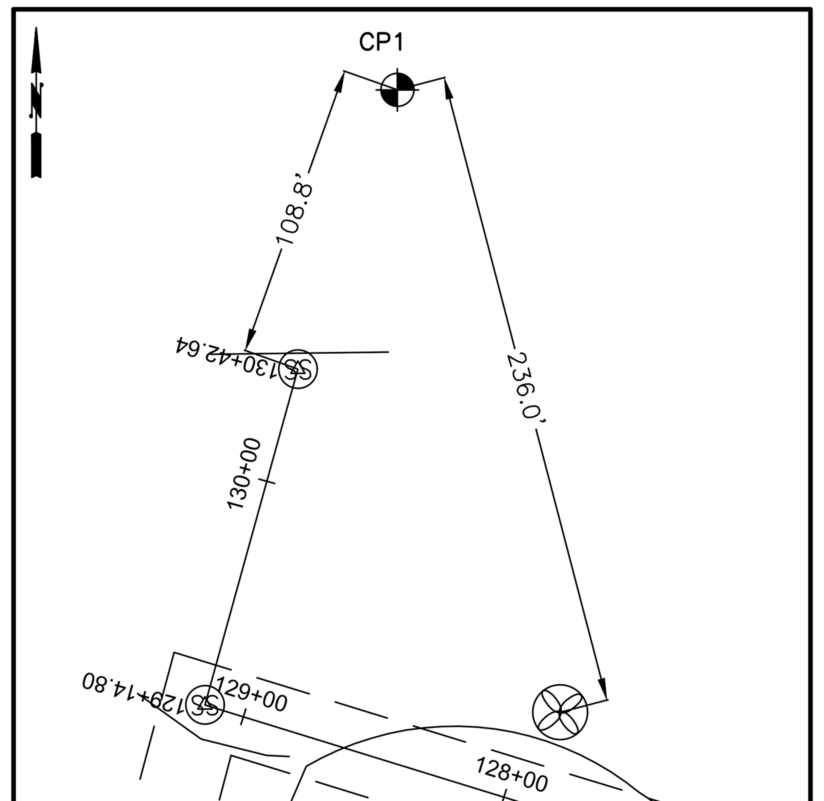
SAN JACINTO RIVER AUTHORITY SJRA www.SJRA.net

REHABILITATION OF BEAR BRANCH GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

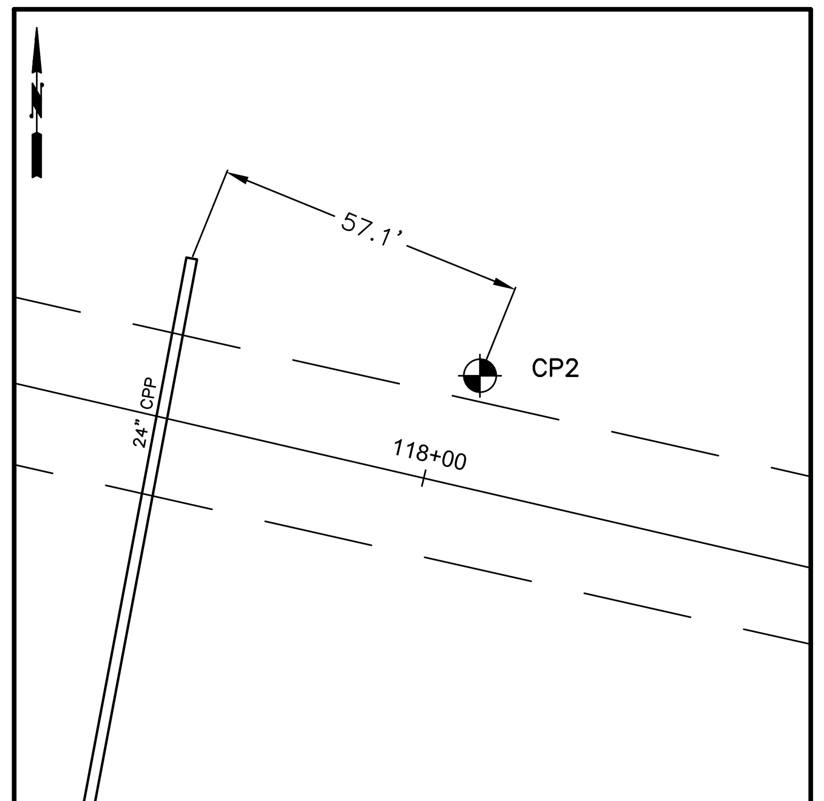
SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY: C. CHUDOBA
CHECKED BY: J. VELASQUEZ
SCALE: H: 1" = 600' V: N/A

SITE ACCESS MAP & WATER FOR CONSTRUCTION



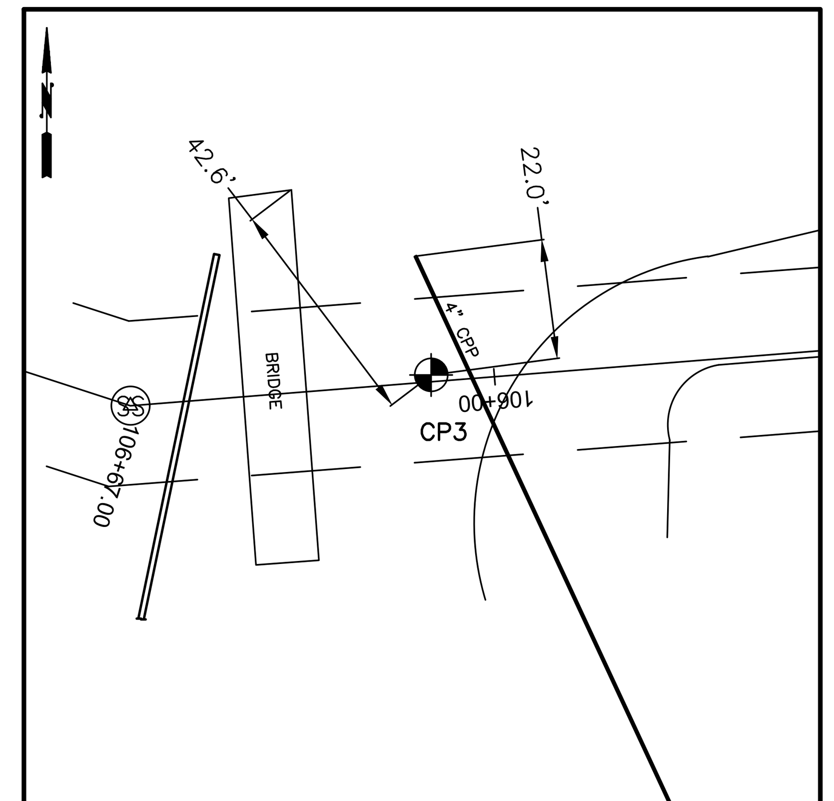
CP1: CAPPED IRON ROD

SCALE: 1"= 60'



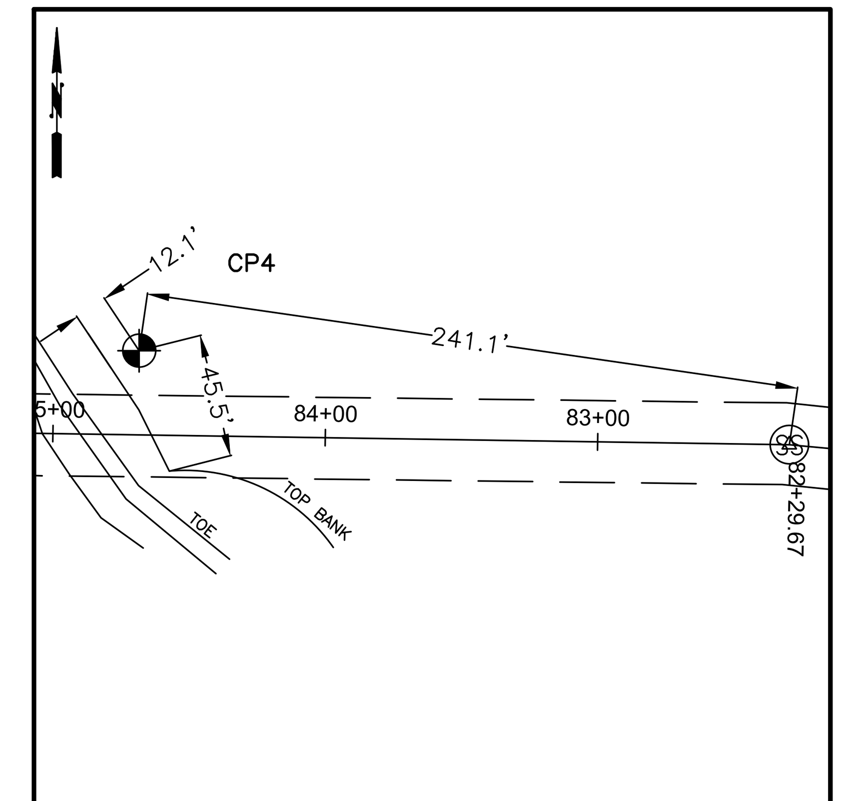
CP2: CAPPED IRON ROD

SCALE: 1"= 30'



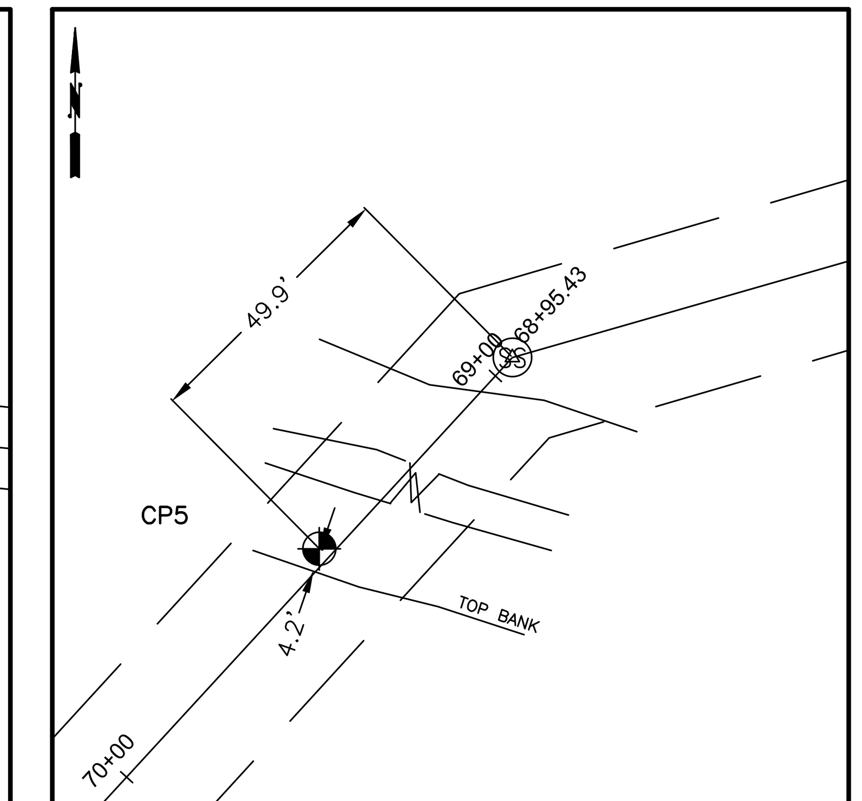
CP3: CAPPED IRON ROD

SCALE: 1"= 30'



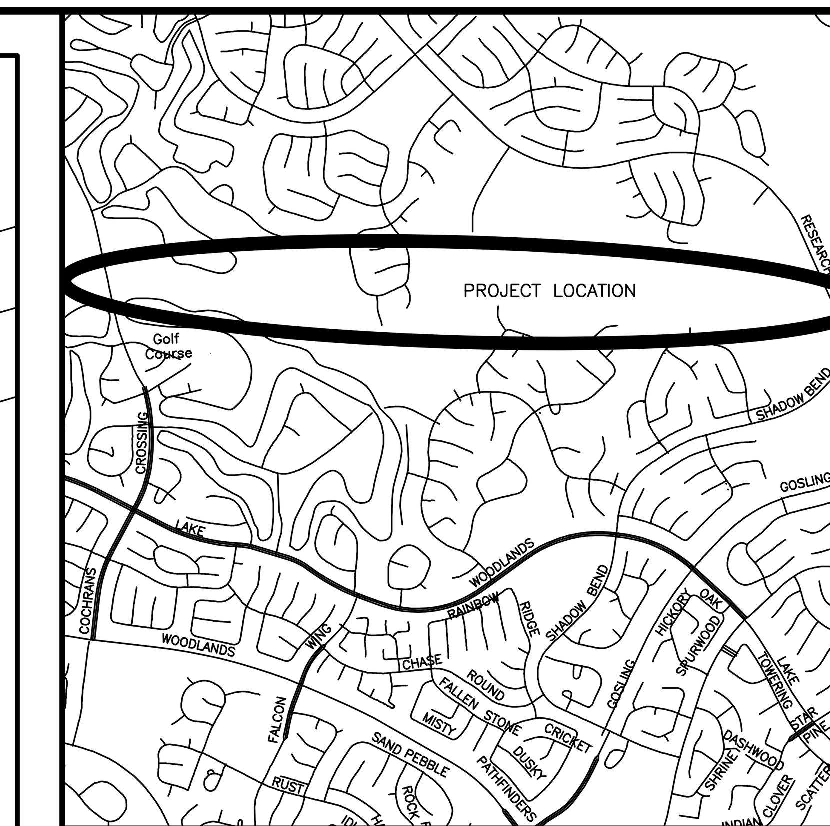
CP4: CAPPED IRON ROD

SCALE: 1"= 60'

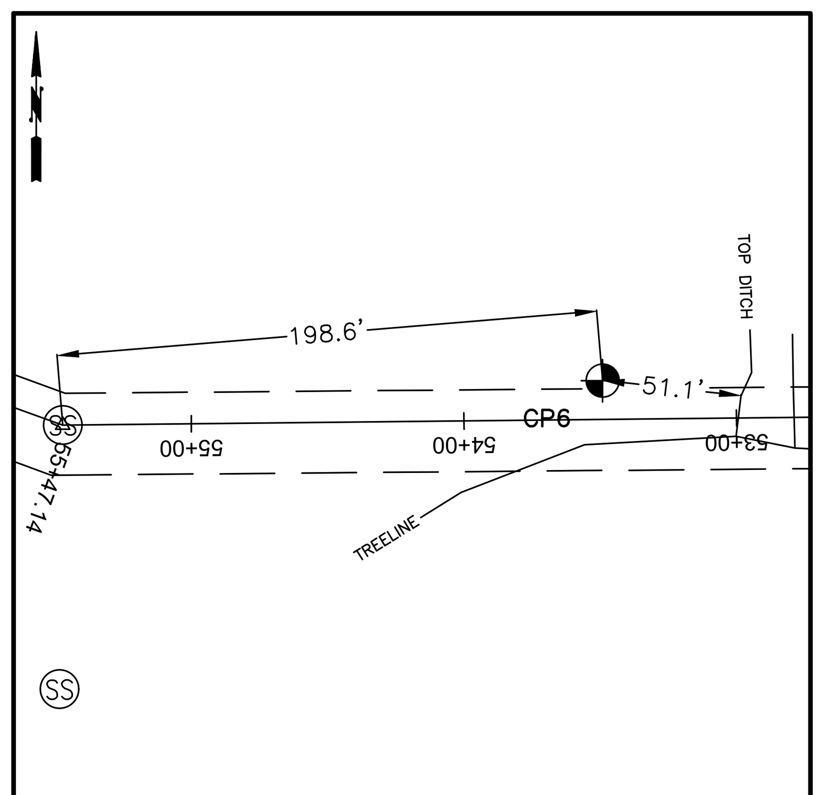


CP5: CAPPED IRON ROD

SCALE: 1"= 30'

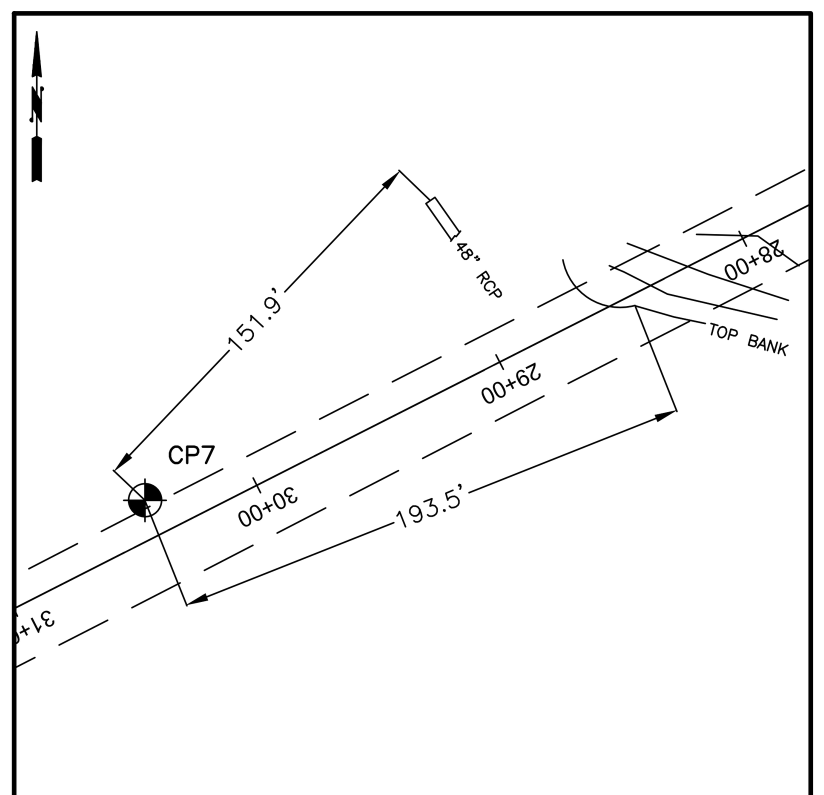


VICINITY MAP N.T.S.



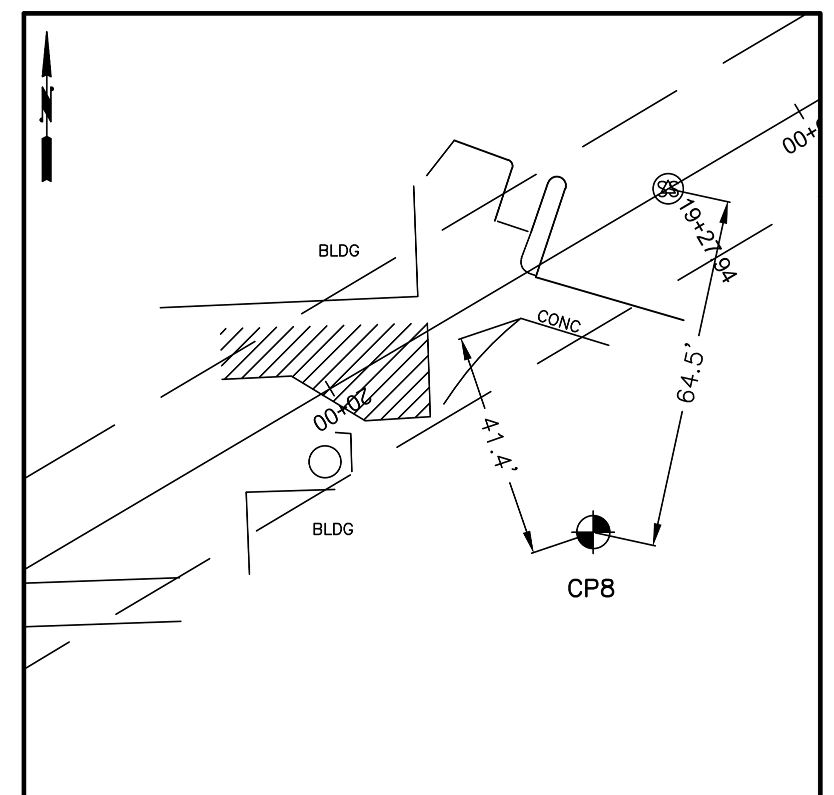
CP6: CAPPED IRON ROD

SCALE: 1"= 60'



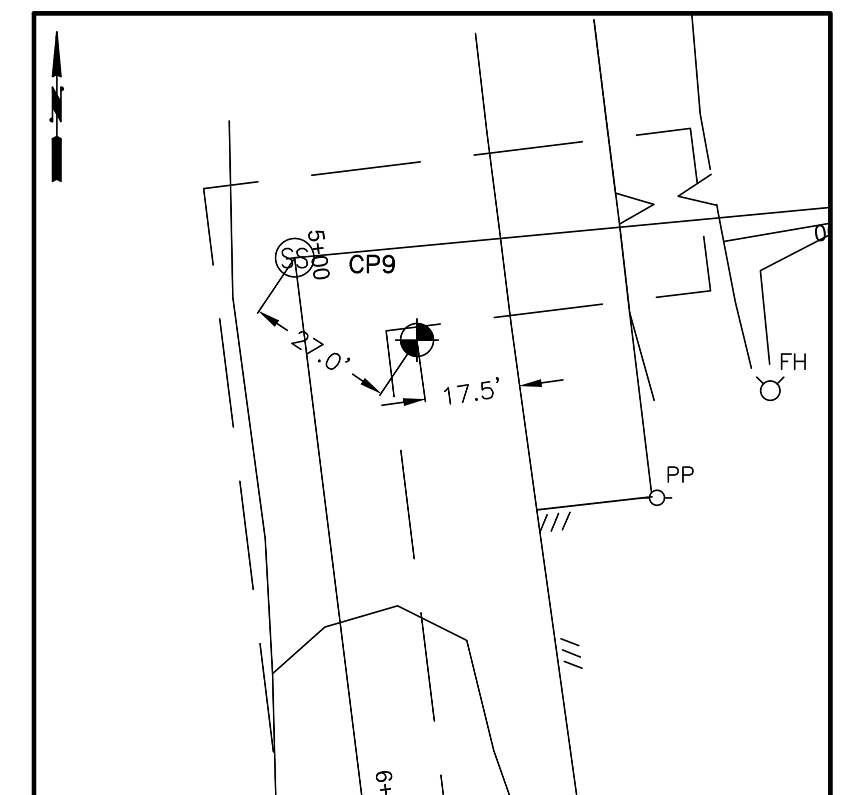
CP7: CAPPED IRON ROD

SCALE: 1"= 60'



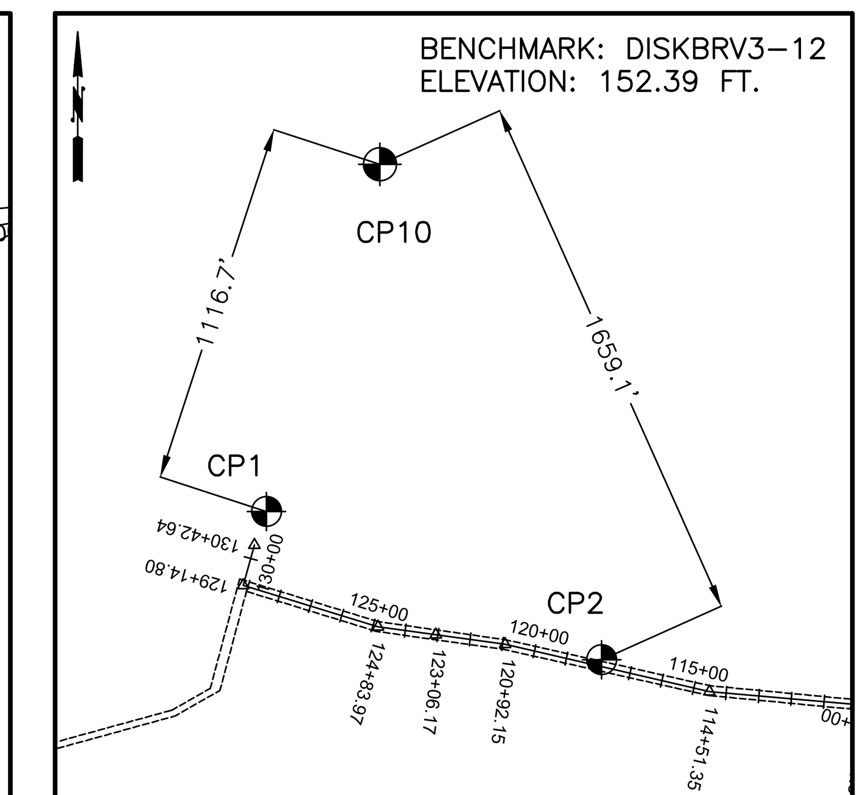
CP8: CAPPED IRON ROD

SCALE: 1"= 30'



CP9: CAPPED IRON ROD

SCALE: 1"= 30'



CP10: DISKBRV3-12

SCALE: 1"= 500'

BENCHMARK AND DATUM:

PRIMARY BENCHMARK
NGS DESIGNATION: PAM 13 ARP
PID: AJ6419
ELEVATION: 151.5'

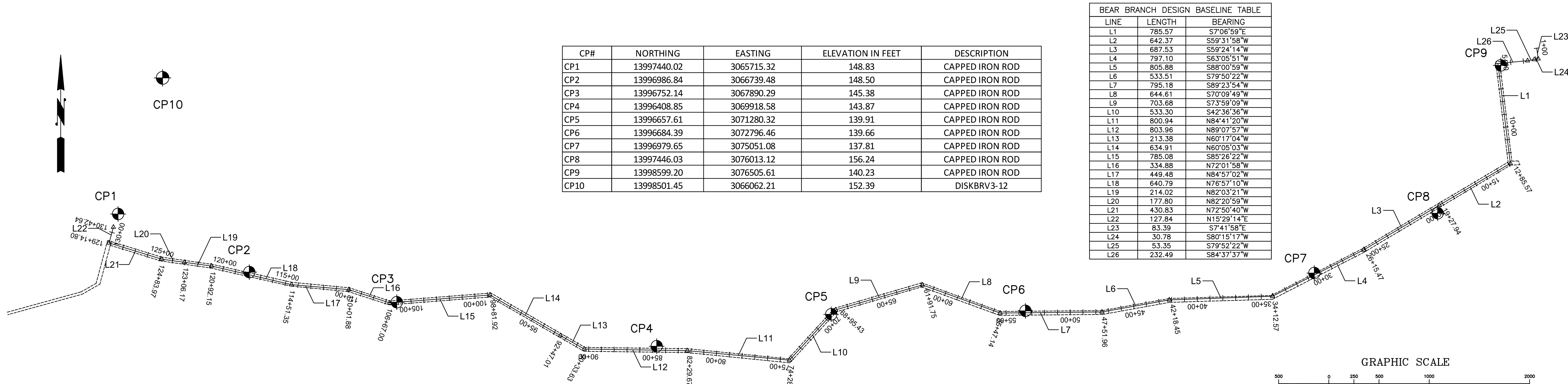
SECONDARY BENCHMARK
NAME: NG13-12 - FROM 1990 ASBUILT
NORTHING: 13,998,501.45'
EASTING: 3,066,062.21'
ELEVATION: 152.39'

HORIZONTAL DATUM: NAD83 TSCS SOUTH CENTRAL ZONE

VERTICAL DATUM: NAVD 88 GEOID 12B

ALL SHOW COORDINATES ARE GRID

GRID TO GROUND COMBINED SCALE FACTOR : 1.00032635



CP#	NORTHING	EASTING	ELEVATION IN FEET	DESCRIPTION
CP1	13997440.02	3065715.32	148.83	CAPPED IRON ROD
CP2	13996986.84	3066739.48	148.50	CAPPED IRON ROD
CP3	13996752.14	3067890.29	145.38	CAPPED IRON ROD
CP4	13996408.85	3069918.58	143.87	CAPPED IRON ROD
CP5	13996657.61	3071280.32	139.91	CAPPED IRON ROD
CP6	13996684.39	3072796.46	139.66	CAPPED IRON ROD
CP7	13996979.65	3075051.08	137.81	CAPPED IRON ROD
CP8	13997446.03	3076013.12	156.24	CAPPED IRON ROD
CP9	13998599.20	3076505.61	140.23	CAPPED IRON ROD
CP10	13998501.45	3066062.21	152.39	DISKBRV3-12

DESIGN BASELINE DATA PROVIDED BY ARKK ENGINEERS

BEAR BRANCH DESIGN BASELINE TABLE		
LINE	LENGTH	BEARING
L1	785.57	S7°06'59"E
L2	642.37	S59°31'58"W
L3	687.53	S59°24'14"W
L4	797.10	S63°05'51"W
L5	805.88	S88°00'59"W
L6	533.51	S79°50'22"W
L7	795.18	S89°23'54"W
L8	644.61	S70°09'49"W
L9	703.68	S73°59'09"W
L10	533.30	S42°36'36"W
L11	800.94	N84°41'20"W
L12	803.96	N89°07'57"W
L13	213.38	N60°17'04"W
L14	634.91	N60°05'03"W
L15	785.08	S85°26'22"W
L16	334.88	N72°01'58"W
L17	449.48	N84°57'02"W
L18	640.79	N76°57'10"W
L19	214.02	N82°03'21"W
L20	177.80	N82°20'59"W
L21	430.83	N72°50'40"W
L22	127.84	N15°29'14"E
L23	83.39	S7°41'58"E
L24	30.78	S80°15'17"W
L25	53.35	S79°52'22"W
L26	232.49	S84°37'37"W

I, the undersigned, a Registered Professional Land Surveyor of the State of Texas, do hereby certify that this survey was made on the ground and is true and correct to the best of my knowledge and belief.

Robert D. Ellis
Registered Professional
Land Surveyor No. 4006

STATE OF TEXAS
REGISTERED
ROBERT D. ELLIS
4006
PROFESSIONAL
LAND SURVEYOR

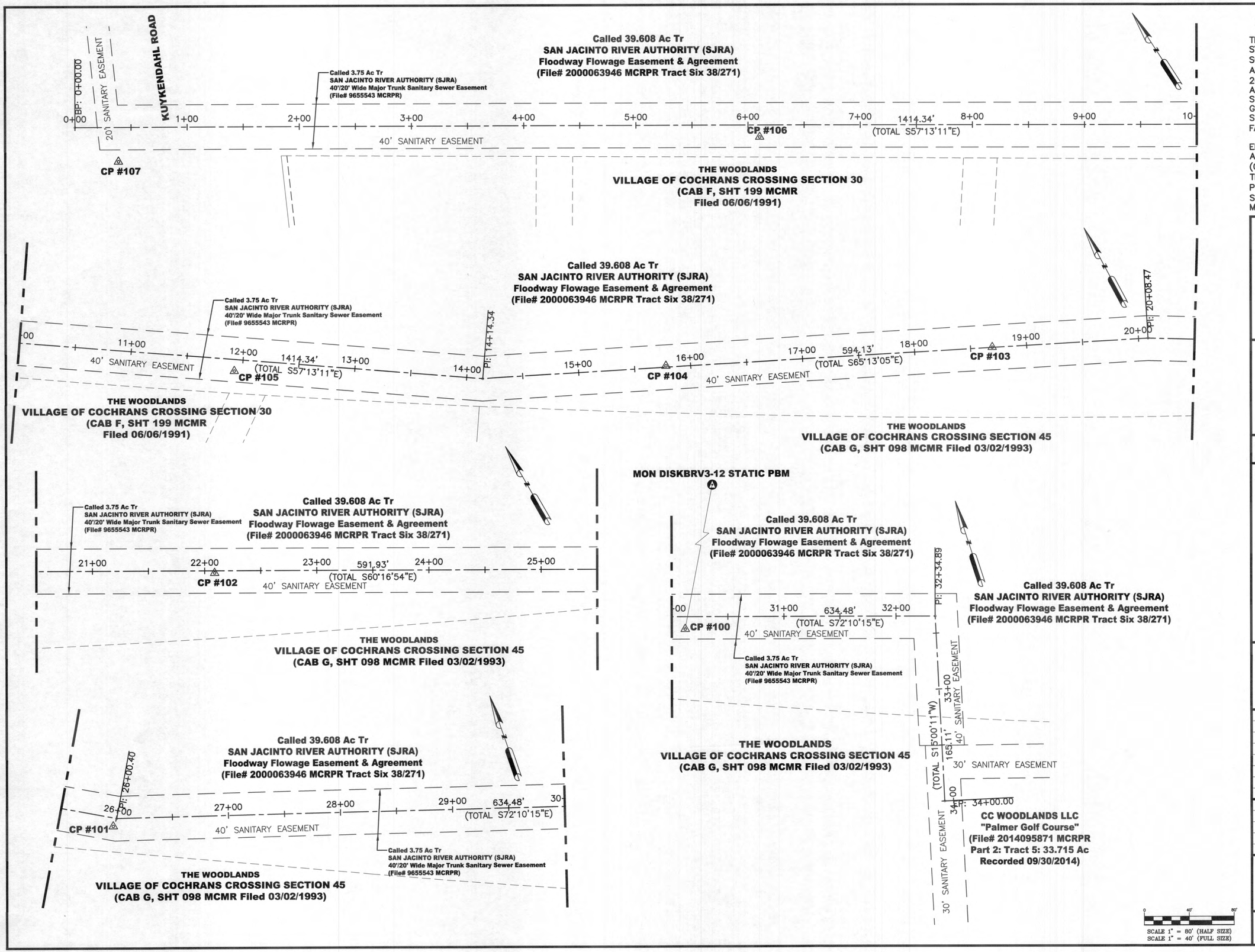
GRAPHIC SCALE

(IN FEET)
1 inch = 500 ft.

CONTROL SHEET FOR SJRA WOODLANDS SANITARY EASEMENT MONTGOMERY COUNTY, TEXAS

ELLIS SURVEYING SERVICES
2805 25th Avenue North
Texas City, Texas 77590
Tel. : 409-938-8700
www.ellissurvey.com

SCALE: 1" = 500'	PROJ. NUMBER 2533	DATE: 9-30-2016
PHONE: (409)-938-8700		SHEET 7 OF 38



SURVEY NOTE

THIS SURVEY IS REFERENCED TO TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE(4204), NORTH AMERICAN DATUM OF 1983(EPOCH 2010.0000). ALL COORDINATES SHOWN ARE IN GRID VALUES. ALL DISTANCES SHOWN HERE ARE SURFACE VALUES. GRID VALUES CAN BE CONVERTED TO SURFACE USING THE COMBINED SCALE FACTOR (CSF) OF 0.9999728.

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12B). ALL ELEVATIONS WERE TIED WITH LEVEL LOOP TO CP#1 PROVIDED BY ROBERT ELLIS(ELLIS SURVEYING SERVICES) BASED ON MONUMENT DISKBRV3–12.

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REGISTERED
WILLIAM H. REIMER III
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PROFESSIONAL LAND SURVEYOR
William H. Reimer III
04-05-2019

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TBPE REG NO: F-4528, TBPLS REG NO: 100282-00

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

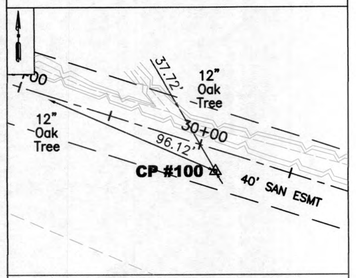
SAN JACINTO RIVER AUTHORITY
SJRA
www.SJRA.net

SURVEY CONTROL MAP
REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

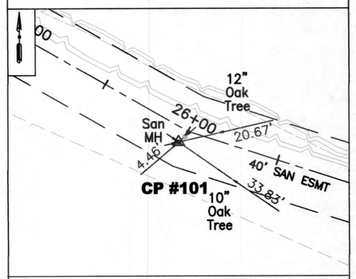
SJRA PROJECT NO: WDPR0082.1001.2N001
PROJECT NO:
DRAWN BY:
CHECKED BY:
SCALE: H:

CP #100 -- 60D NAIL



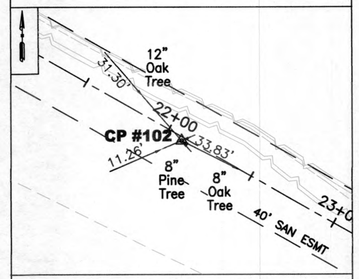
STA 30+11.99, 10.93' RT.
40' Sanitary Easement Baseline

CP #101 -- 60D NAIL



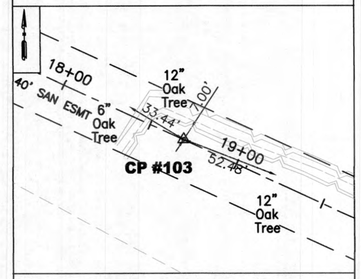
STA 25+98.68, 7.44' RT.
40' Sanitary Easement Baseline

CP #102 -- 60D NAIL

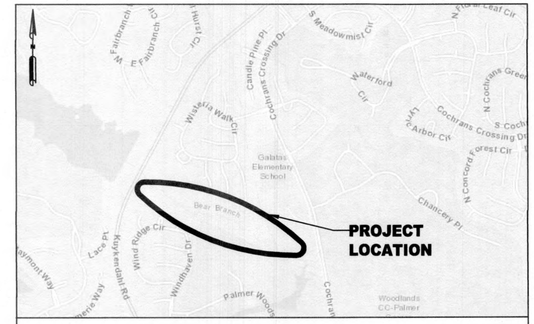


STA 22+08.86, 1.90' RT.
40' Sanitary Easement Baseline

CP #103 -- LATHE W/DOT

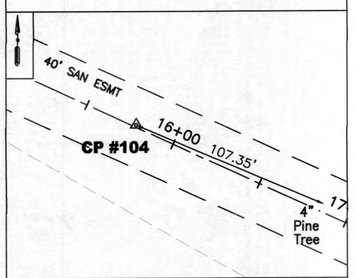


STA 18+69.37, 0.18' LT.
40' Sanitary Easement Baseline



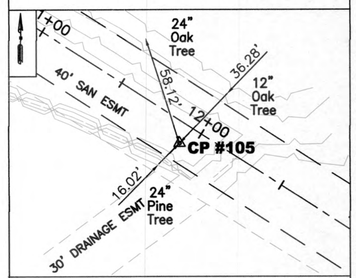
VICINITY MAP

CP #104 -- 60D NAIL



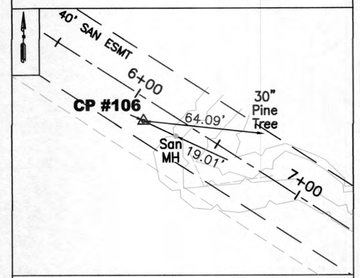
STA 15+78.00, 1.18' LT.
40' Sanitary Easement Baseline

CP #105 -- 60D NAIL



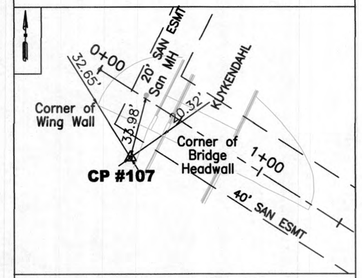
STA 11+92.90, 10.34' RT.
40' Sanitary Easement Baseline

CP #106 -- 60D NAIL



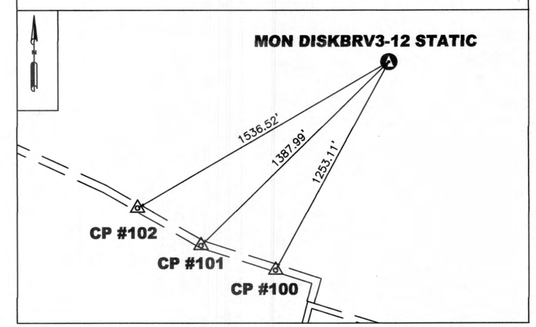
STA 6+10.46, 10.69' RT.
40' Sanitary Easement Baseline

CP #107 -- 60D NAIL



STA 0+38.71, 30.51' RT.
40' Sanitary Easement Baseline

CP-10 MONUMENT DISKBRV3-12 ELEVATION:152.39'



SURVEY NOTE

THIS SURVEY IS REFERENCED TO TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE(4204), NORTH AMERICAN DATUM OF 1983(EPOCH 2010.0000). ALL COORDINATES SHOWN ARE IN GRID VALUES. ALL DISTANCES SHOWN HERE ARE SURFACE VALUES. GRID VALUES CAN BE CONVERTED TO SURFACE USING THE COMBINED SCALE FACTOR (CSF) OF 0.9999728.

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12B). ALL ELEVATIONS WERE TIED WITH LEVEL LOOP TO CP#1. PROVIDED BY ROBERT ELLIS(ELLIS SURVEYING SERVICES) BASED ON MONUMENT DISKBRV3-12

SURVEY BASELINE POINT DATA/ TEMPORARY BENCHMARKS (GRID COORDINATES)

Point #	Northing	Easting	Elevation	Description	Station	Remarks
100	13,997,400.77	3,065,463.23	149.18	CP 60D NAIL	30+11.99, 10.93' RT.	40' SANITARY EASEMENT BL
101	13,997,531.59	3,065,069.57	149.93	CP 60D NAIL	25+98.68, 7.44' RT.	40' SANITARY EASEMENT BL
102	13,997,729.64	3,064,733.77	150.39	CP 60D NAIL	22+08.86, 1.90' RT.	40' SANITARY EASEMENT BL
103	13,997,889.10	3,064,434.46	150.88	CP Lathe w/DOT	18+69.37, 0.18' LT.	40' SANITARY EASEMENT BL
104	13,998,012.14	3,064,170.34	152.23	CP 60D NAIL	15+78.00, 1.18' LT.	40' SANITARY EASEMENT BL
105	13,998,190.87	3,063,829.49	153.13	CP 60D NAIL	11+92.90, 10.34' RT.	40' SANITARY EASEMENT BL
106	13,998,505.92	3,063,339.61	153.53	CP 60D NAIL	6+10.46, 10.69' RT.	40' SANITARY EASEMENT BL
107	13,998,798.82	3,062,848.18	162.26	CP 60D NAIL	0+38.71, 30.51' RT.	40' SANITARY EASEMENT BL

TEMPORARY BENCH MARKER/MONUMENT

Point #	Northing	Easting	Elevation	Description
312	13,998,501.41	3,066,062.08	152.38	MON DISKBRV3-12 STATIC

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(713) 400-2755 • www.arkkengineers.com • TX PE Firm No. 13872

STATE OF TEXAS REGISTERED WILLIAM H. REIMER III 4044 PROFESSIONAL LAND SURVEYOR
William H. Reimer III
04-05-2019

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TBPE REG NO. F-4528, TBPLS REG NO. 10028Z-00

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

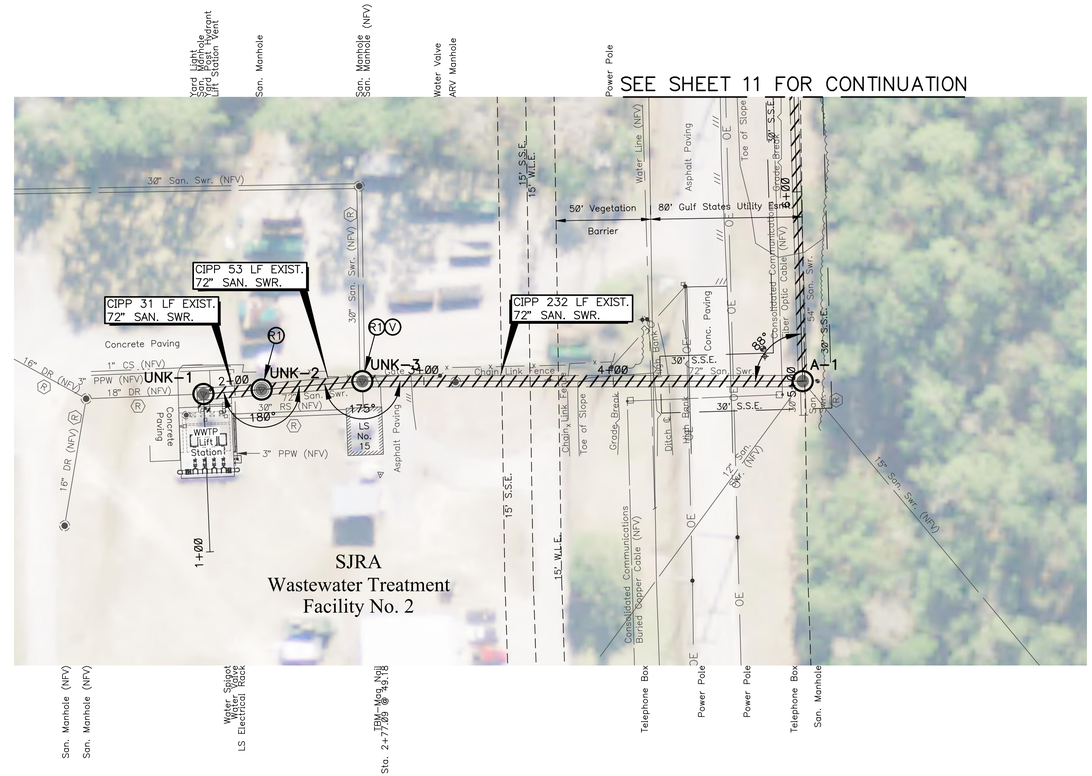
SAN JACINTO RIVER AUTHORITY SJRA www.SJRA.net

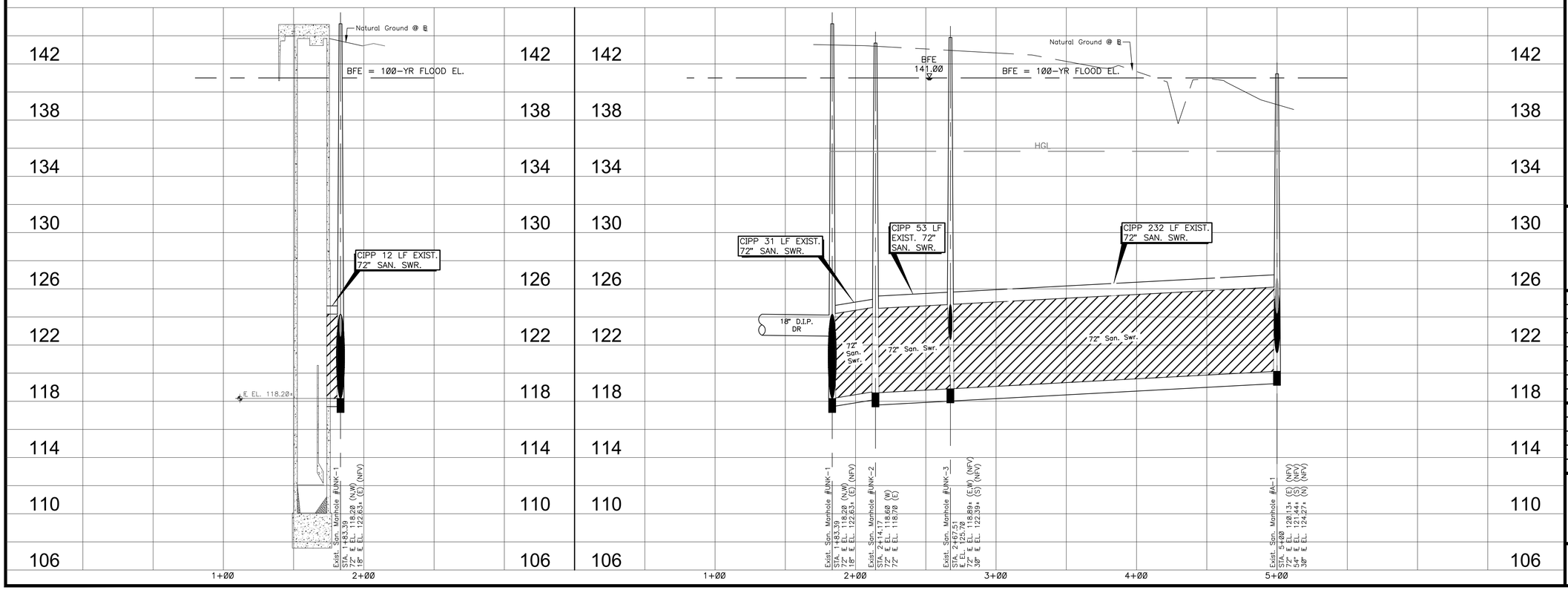
SURVEY CONTROL SWING TIES AND VICINITY MAP
REHABILITATION OF BEAR BRANCH GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
PROJECT NO:
DRAWN BY:
CHECKED BY:
SCALE: N.T.S.

SEE THIS SHEET FOR CONTINUATION





TBM:

SEE SURVEY/BASELINE CONTROL MAP FOR BENCHMARK REFERENCES. (SHEETS 7 - 9)

LEGEND

- POSSIBLE TREE REMOVAL
- CIPP (CURED-IN-PLACE-PIPE)
- R1 MANHOLE REHABILITATION (1-INCH SEWPERCOAT)
- R2 REMOVE & REPLACE RING AND COVER
- R3 REMOVE & REPLACE RING AND COVER W/ CONC. COLLAR (PER DETAIL)
- V VENTED MANHOLE W/ BOLLARD

0 40' 80'

SCALE 1" = 40' (FULL SIZE)
SCALE 1" = 80' (HALF SIZE)

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STATE OF TEXAS
JOSE F. VELASQUEZ
110373
LICENSED
PROFESSIONAL ENGINEER

9-13-19

ARKK Engineers, LLC
Texas Registered Engineering Firm F-13872

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

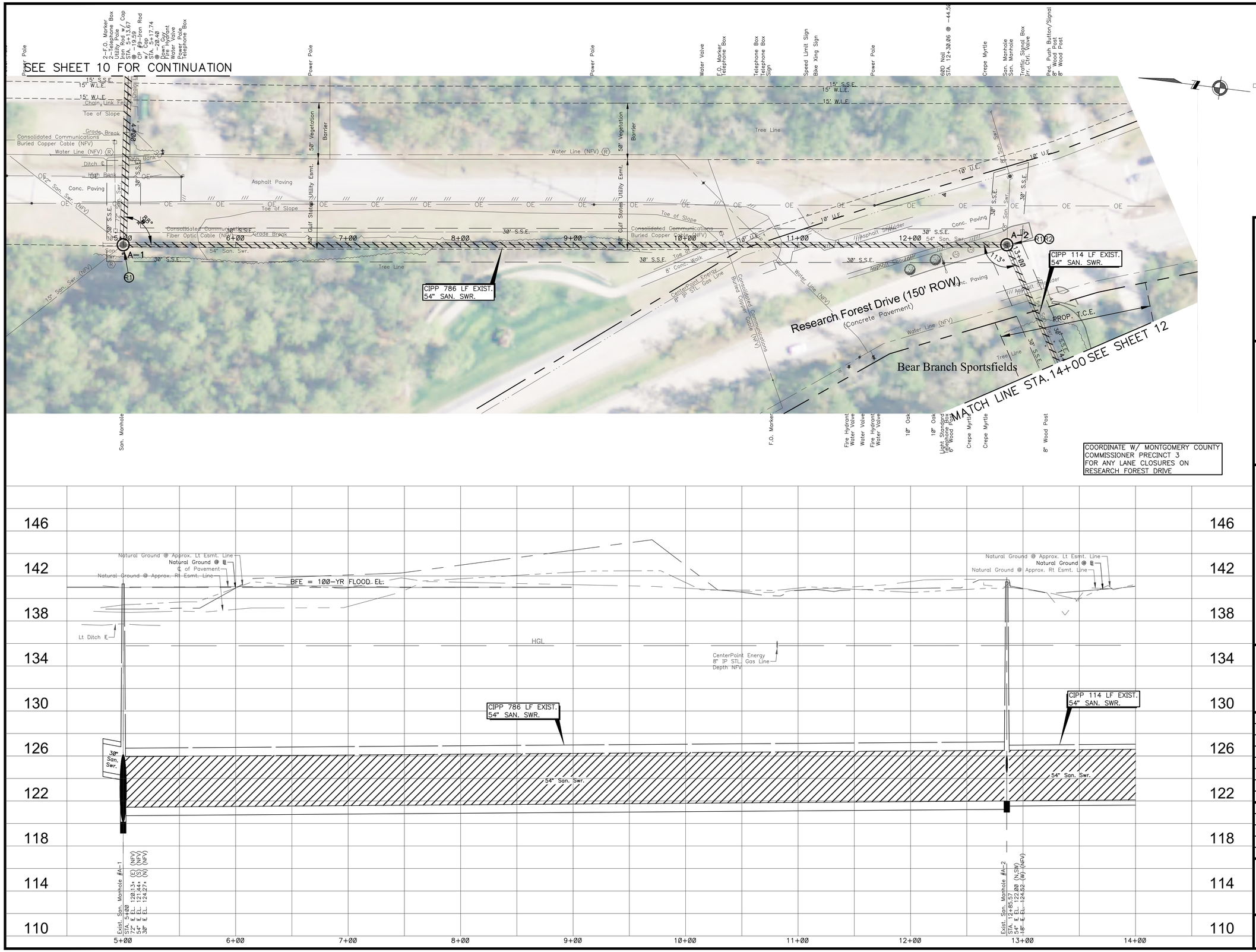
SAN JACINTO RIVER AUTHORITY
SJRA
www.SJRA.net

REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO:	WDPR0082.1001.2N001
ARKK PROJECT NO:	17-042
DRAWN BY:	C. CHUDOBA
CHECKED BY:	J. VELASQUEZ
SCALE:	H: 1" = 40' V: 1" = 4'

PLAN AND PROFILE
STA. 1+00 TO 5+00



TBM:

SEE SURVEY/BASELINE CONTROL MAP FOR BENCHMARK REFERENCES. (SHEETS 7 - 9)

LEGEND

- POSSIBLE TREE REMOVAL
- CIPP (CURED-IN-PLACE-PIPE)
- R1 MANHOLE REHABILITATION (1-INCH SEWPERCOAT)
- R2 REMOVE & REPLACE RING AND COVER
- R3 REMOVE & REPLACE RING AND COVER W/ CONC. COLLAR (PER DETAIL)
- V VENTED MANHOLE W/ BOLLARD

0 40' 80'

SCALE 1" = 40' (FULL SIZE)
SCALE 1" = 80' (HALF SIZE)

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STATE OF TEXAS
JOSE F. VELASQUEZ
110373
LICENSED
PROFESSIONAL ENGINEER

9-13-19

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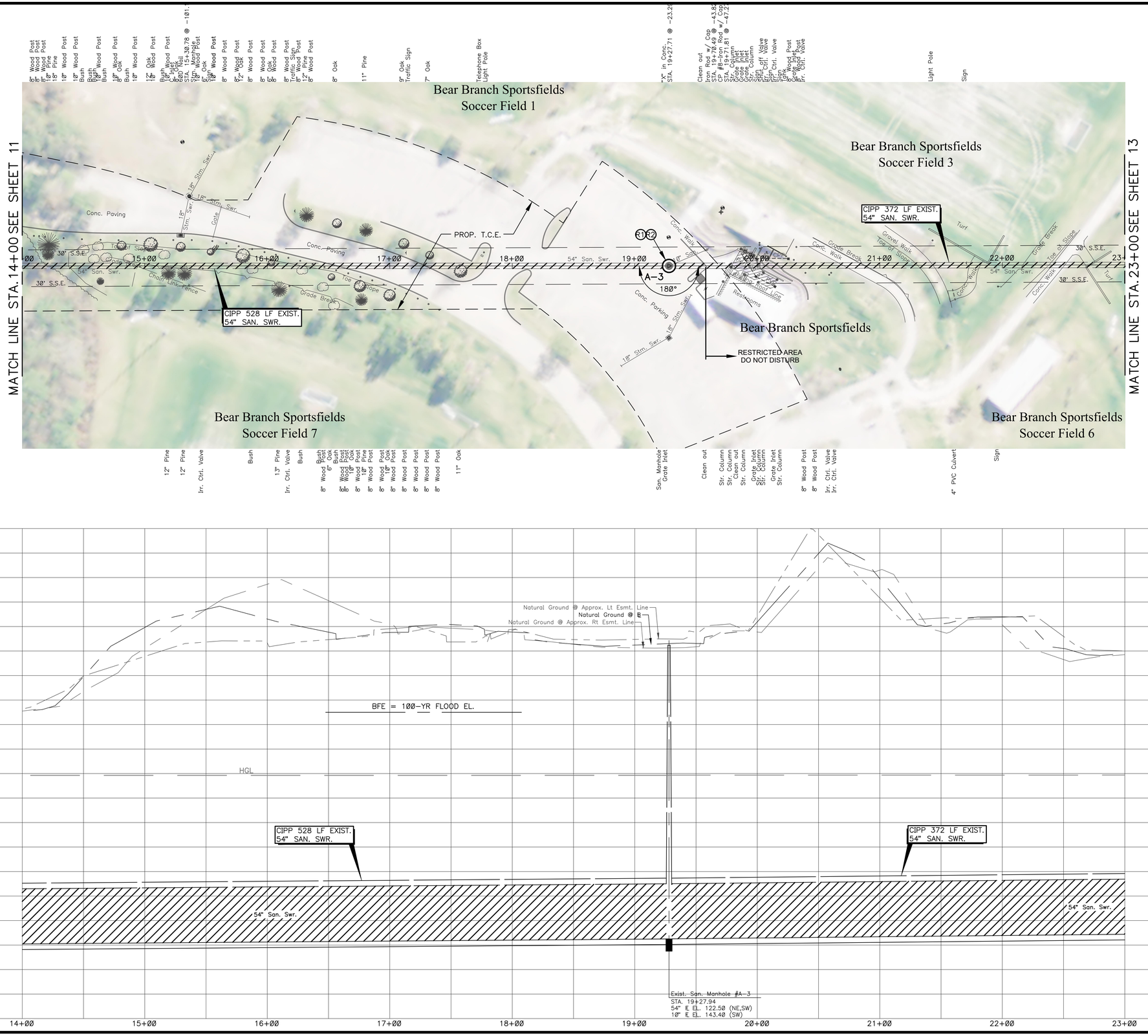
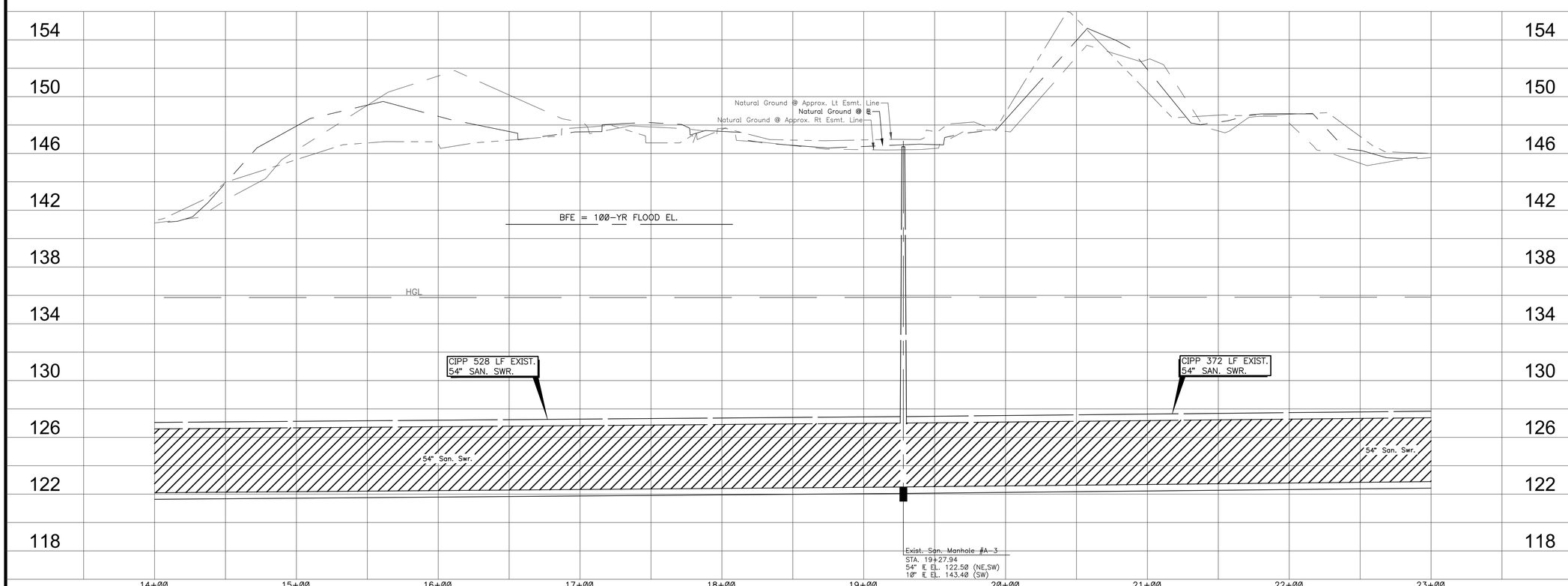
PLAN AND PROFILE
STA. 5+00 TO 14+00





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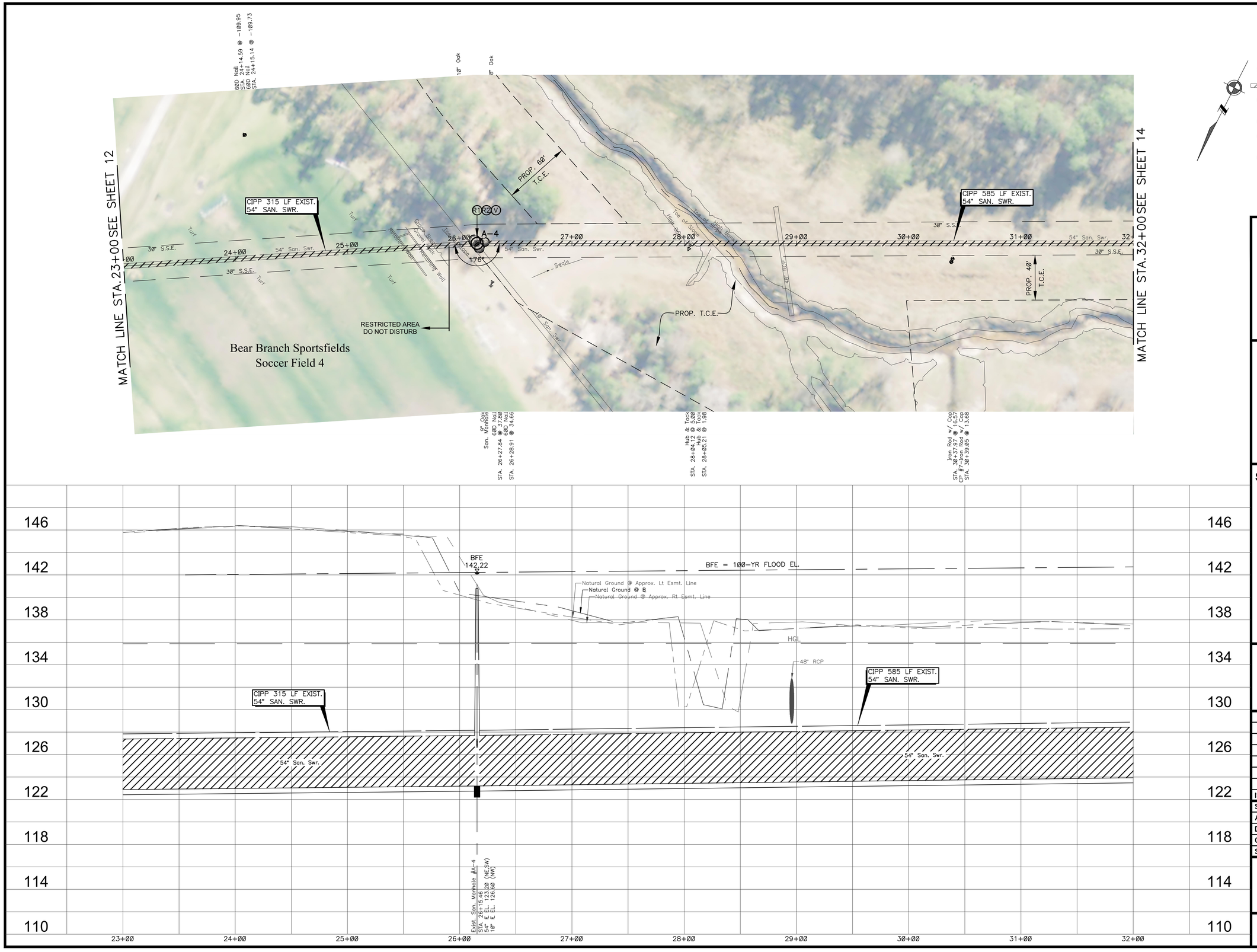
PLAN AND PROFILE
STA. 14+00 TO 23+00



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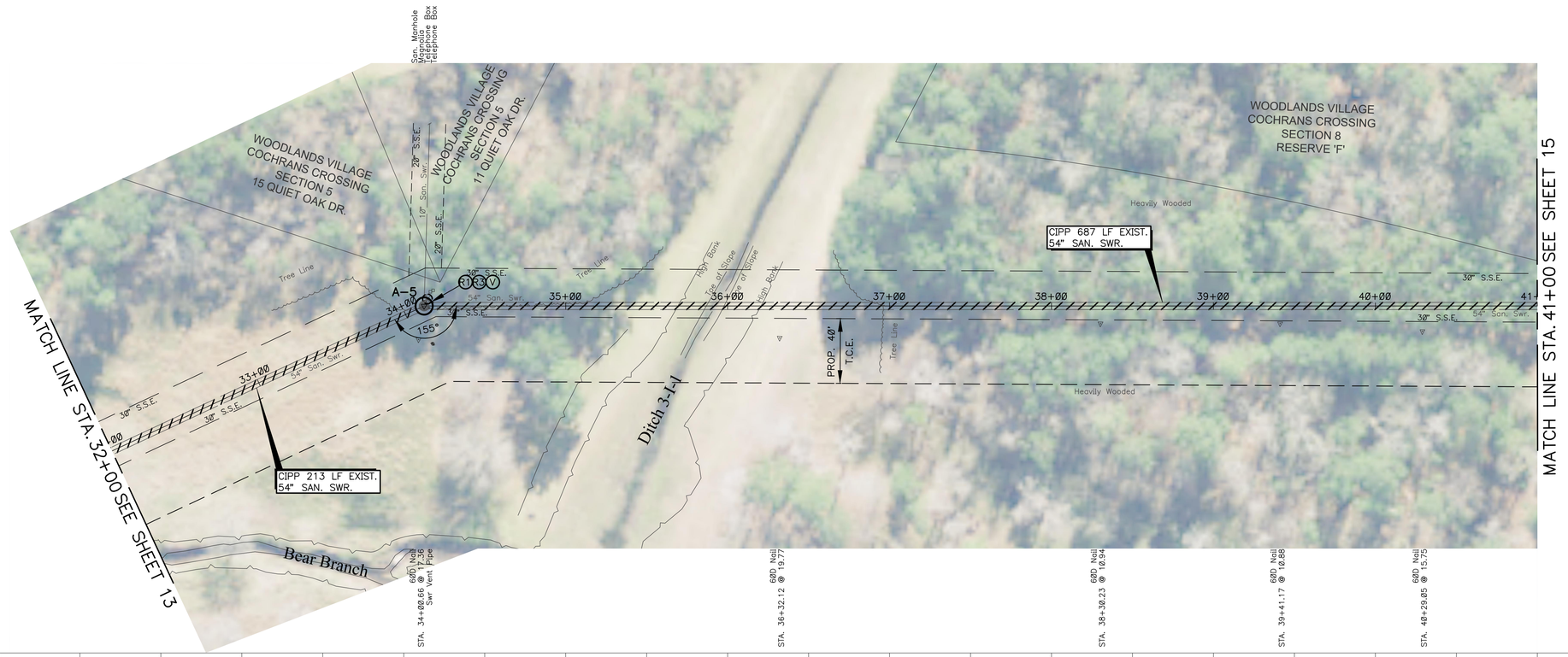
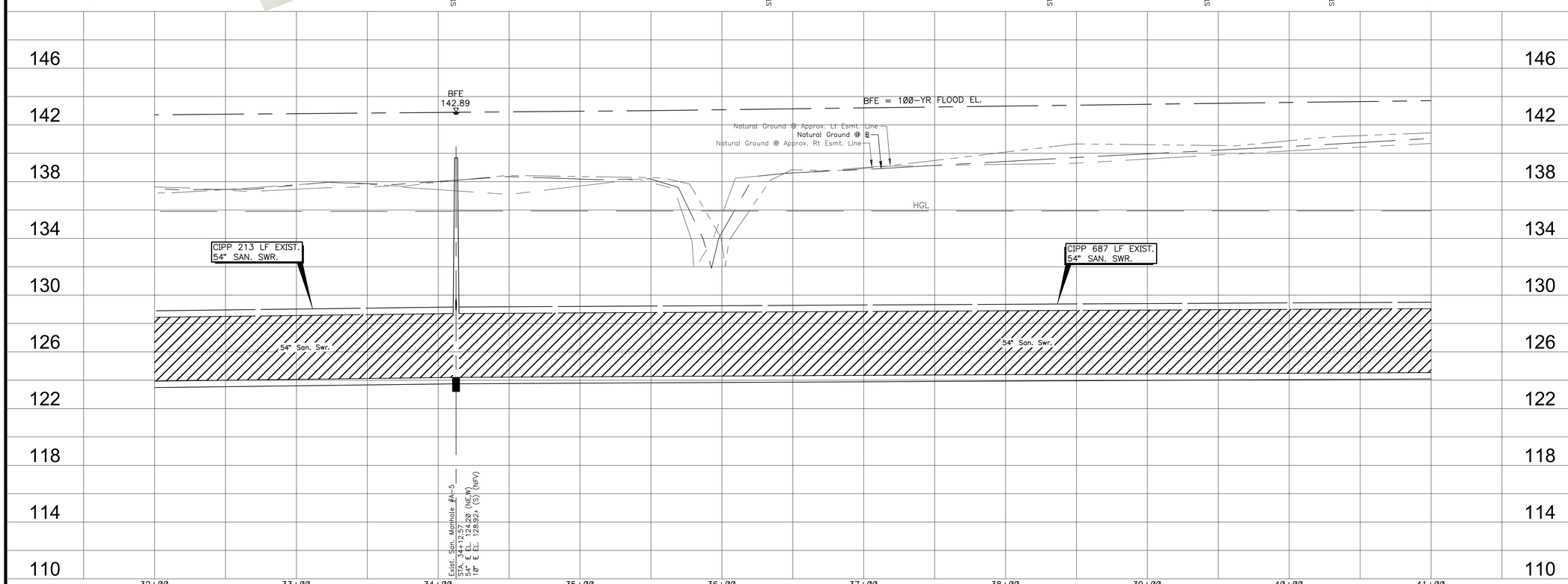
PLAN AND PROFILE
STA. 23+00 TO 32+00





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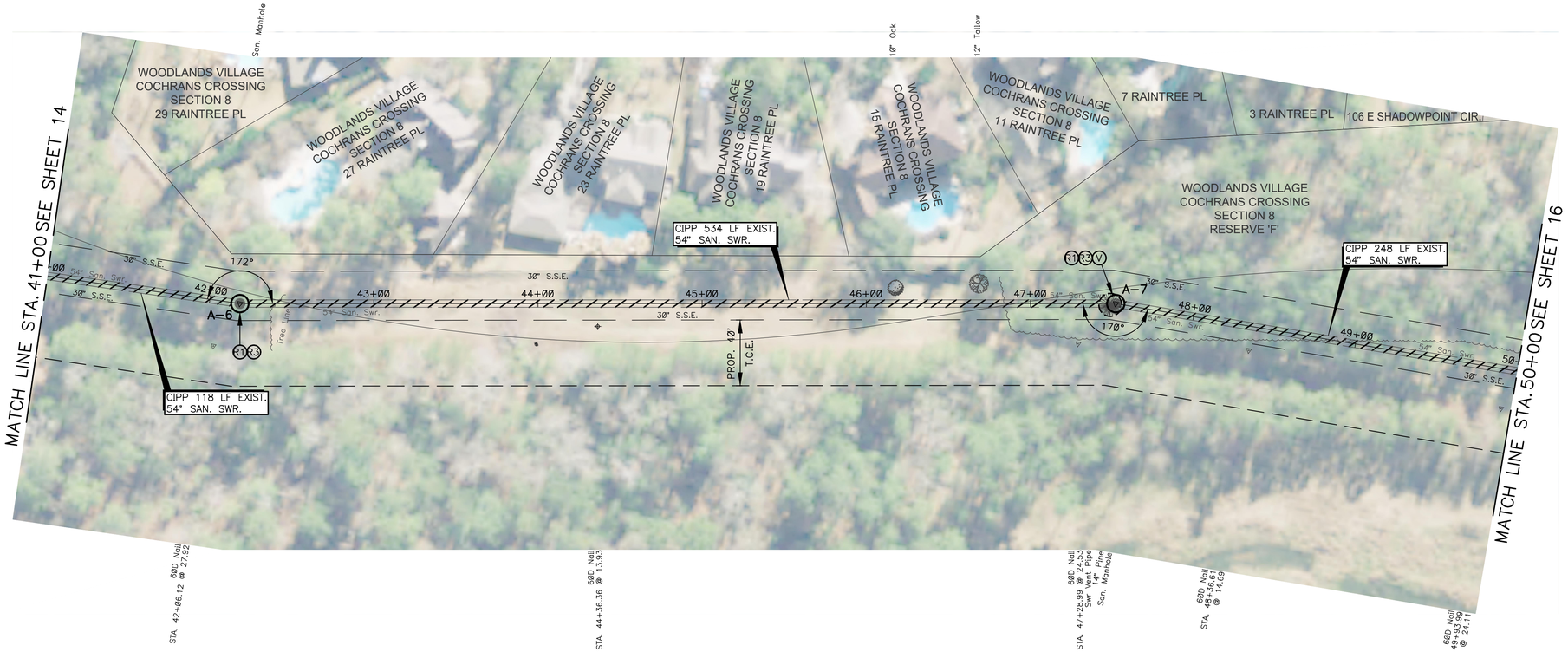
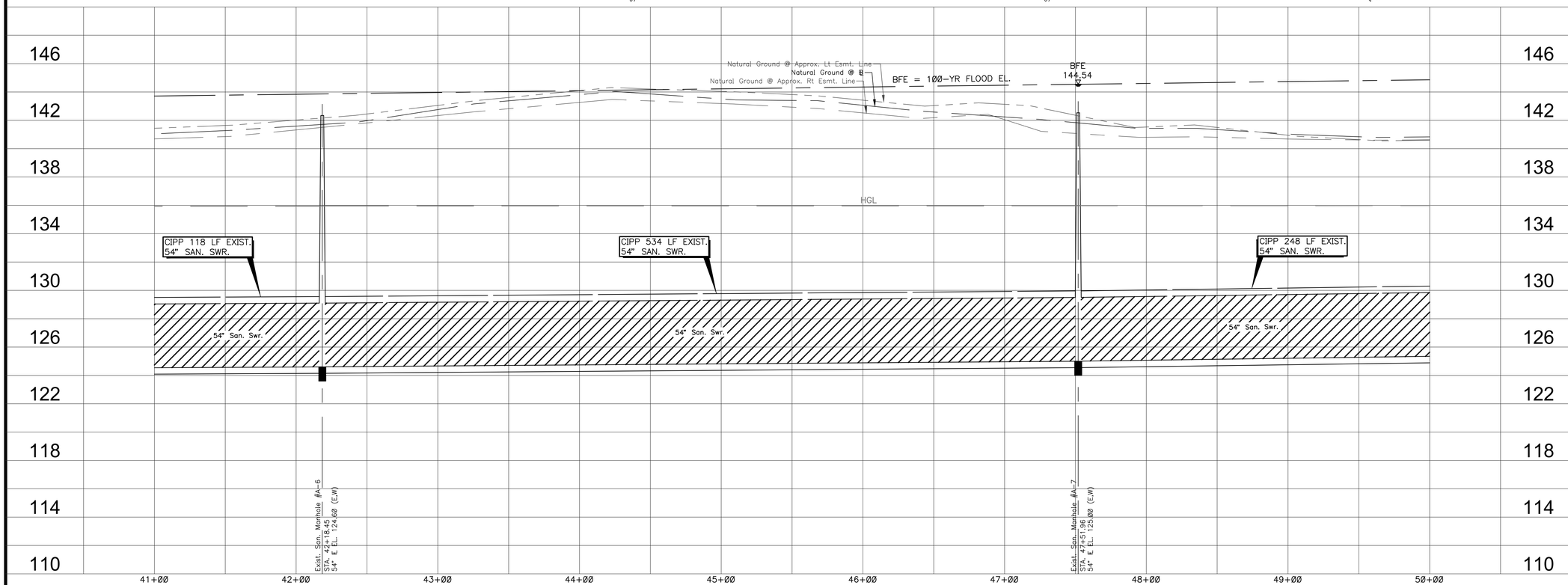
PLAN AND PROFILE
STA. 32+00 TO 41+00





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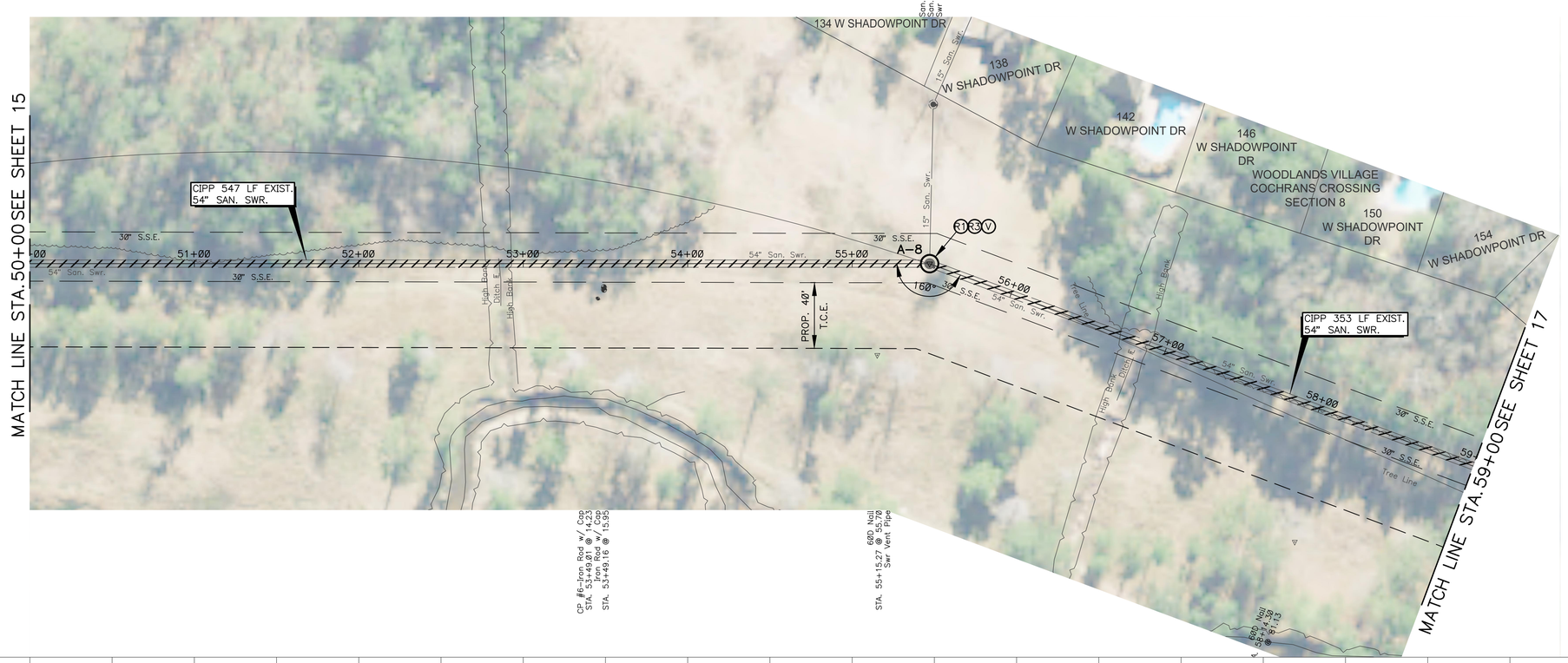
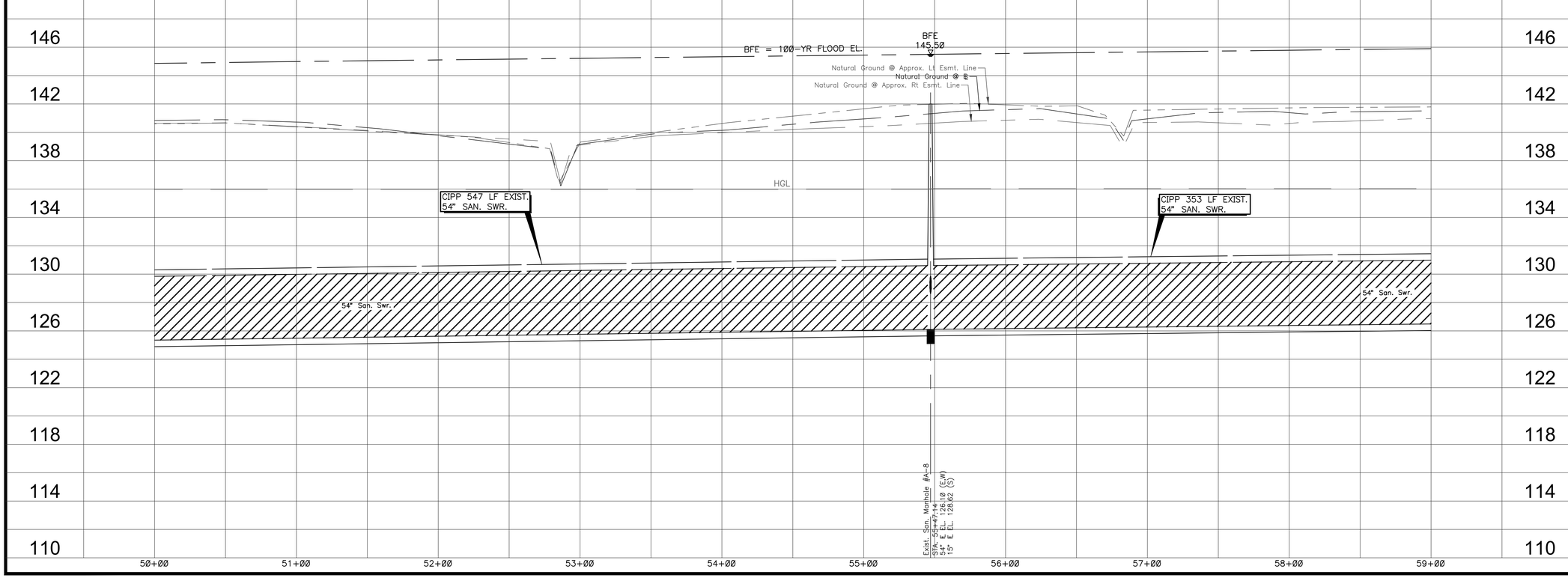
PLAN AND PROFILE
STA. 41+00 TO 50+00





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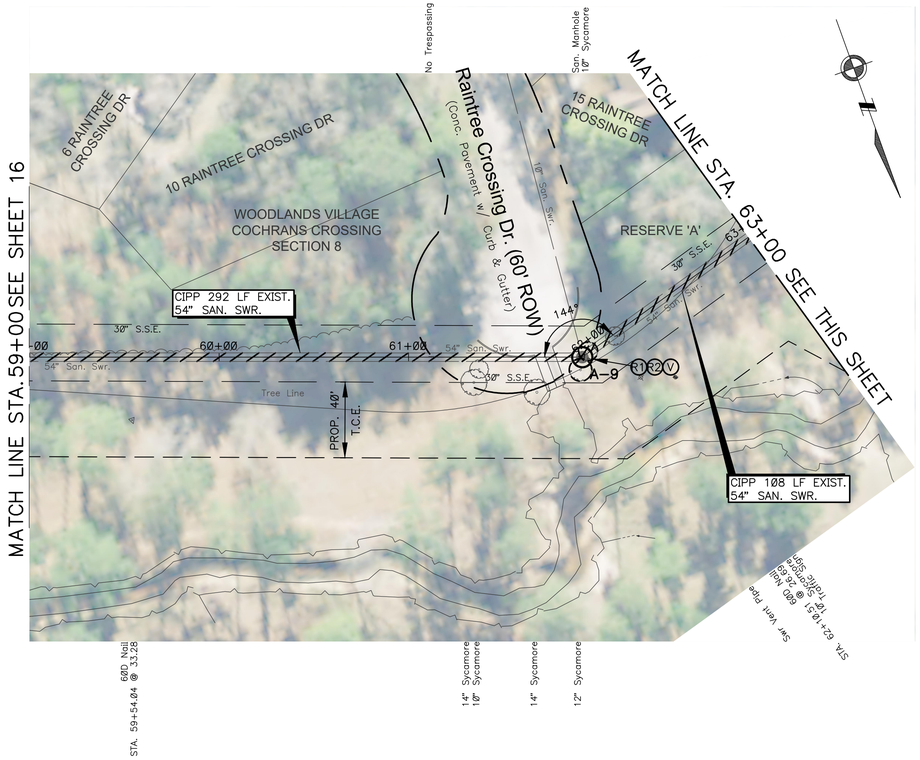
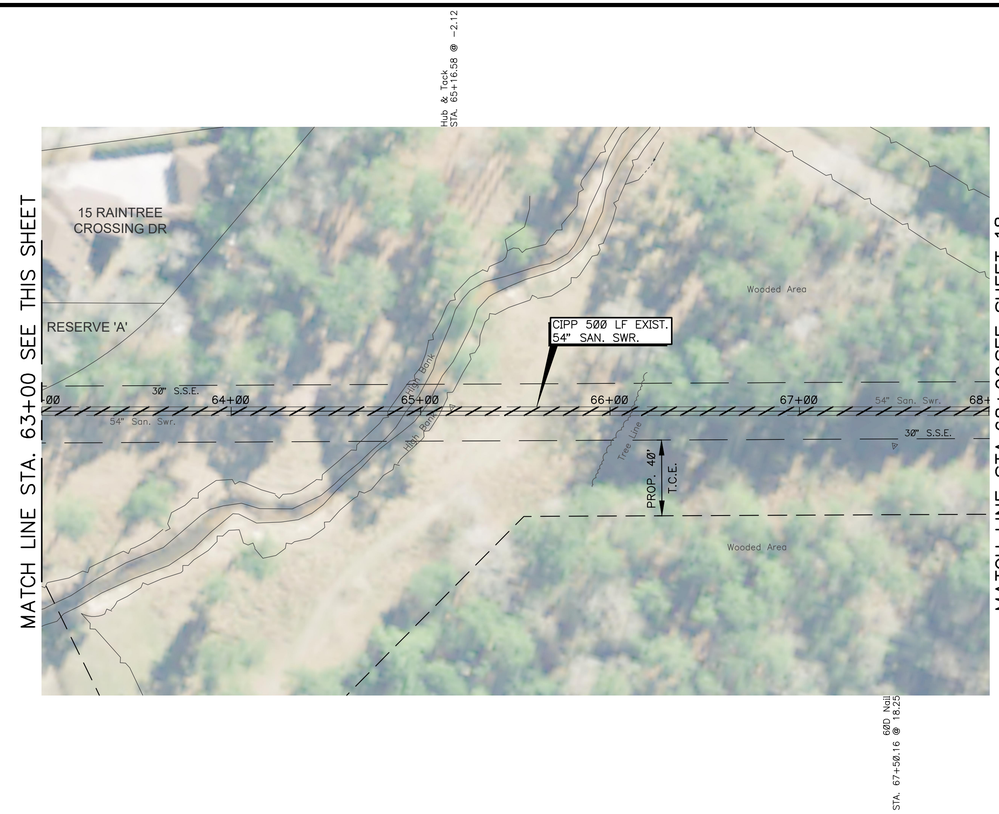
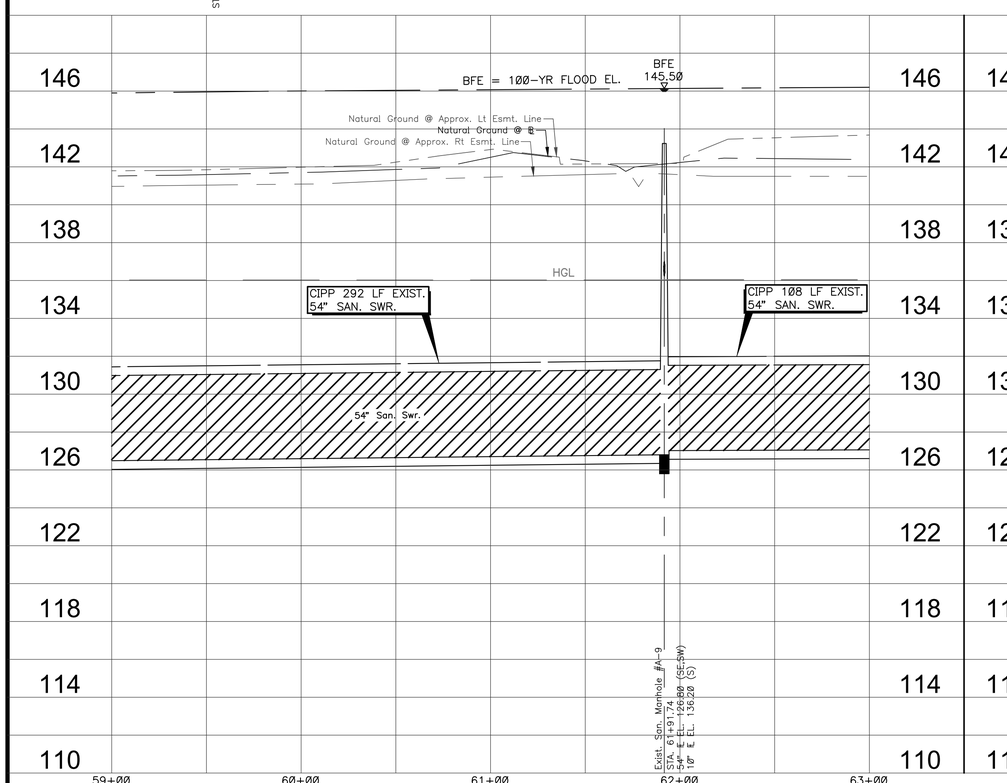
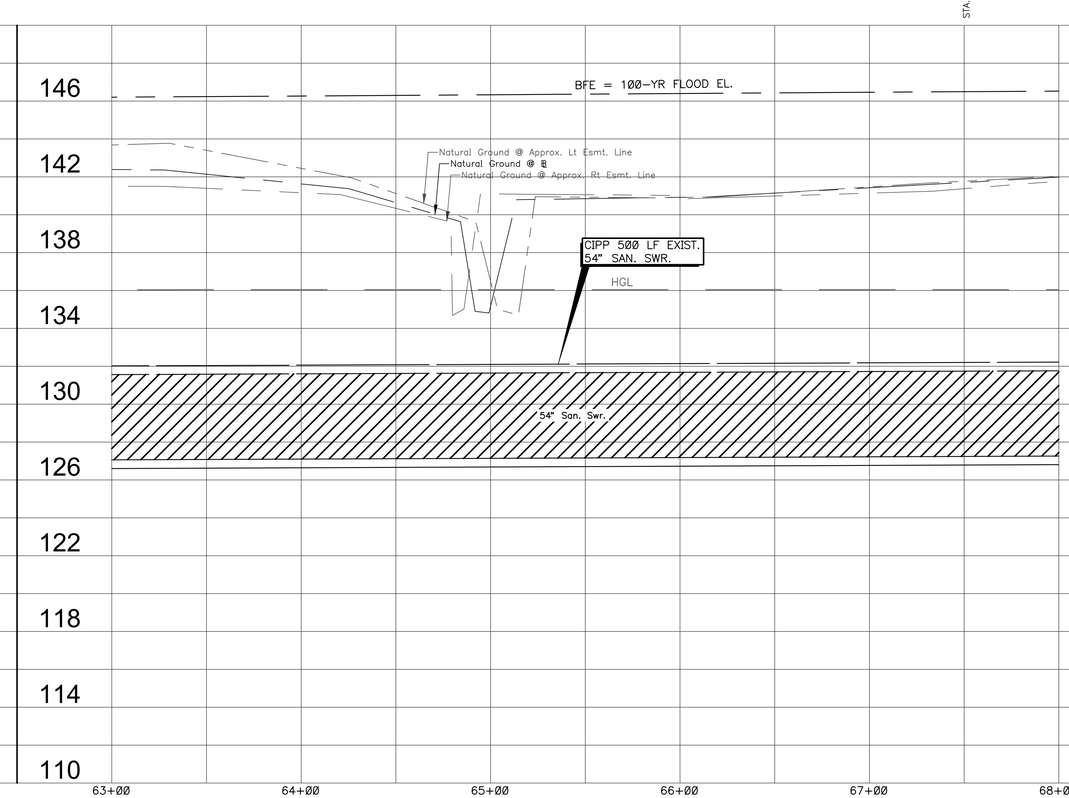
PLAN AND PROFILE
STA. 50+00 TO 59+00









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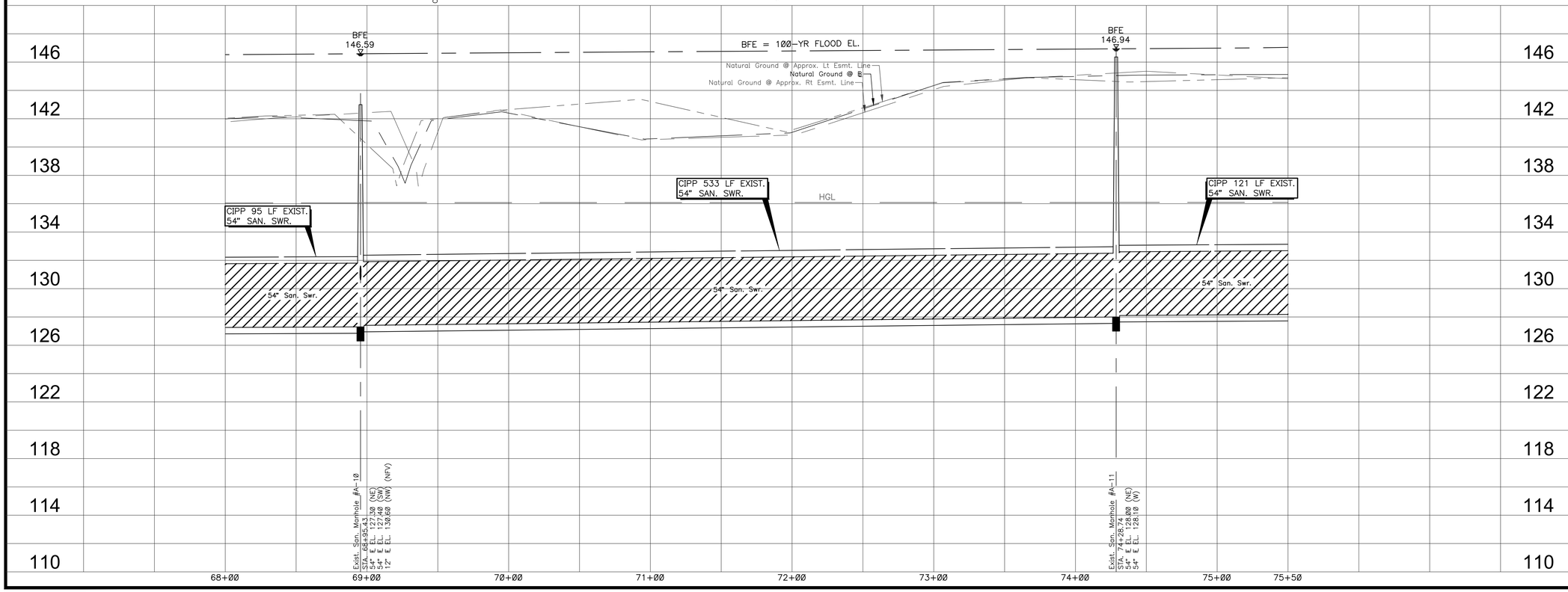
PLAN AND PROFILE
STA. 59+00 TO 68+00



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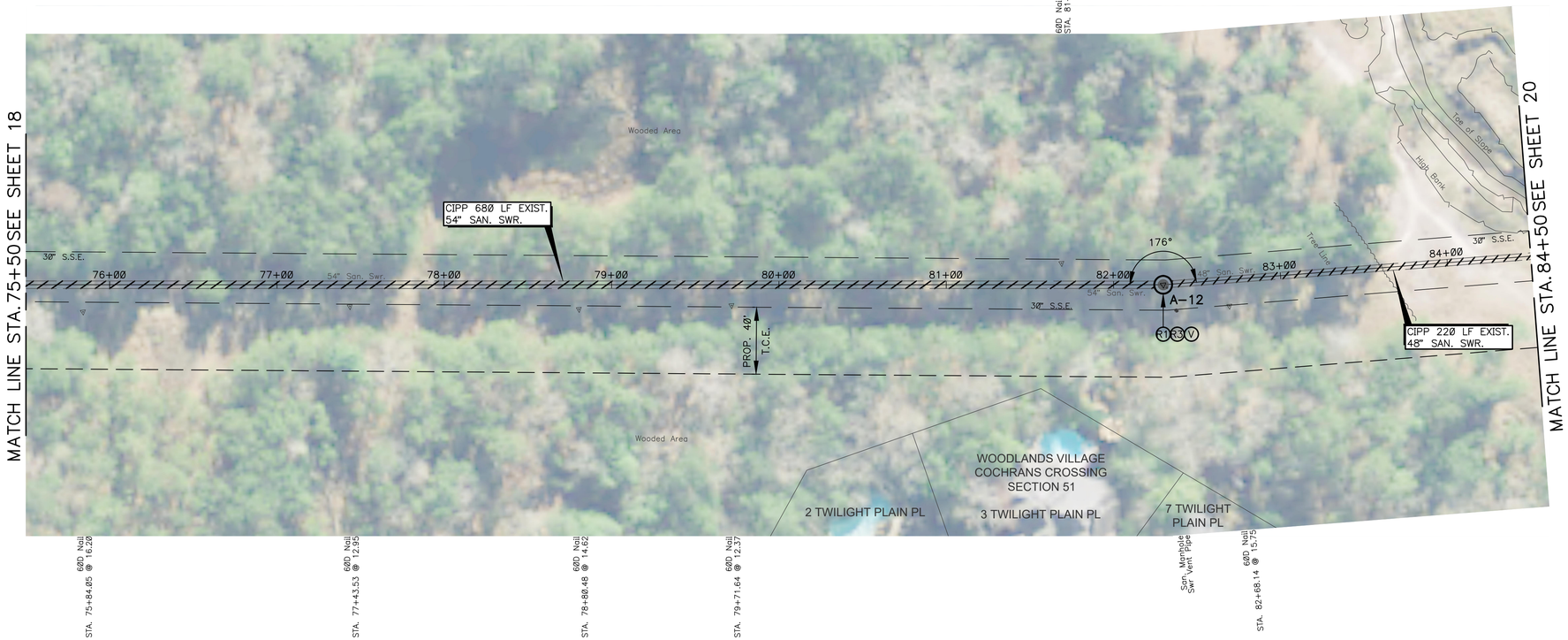
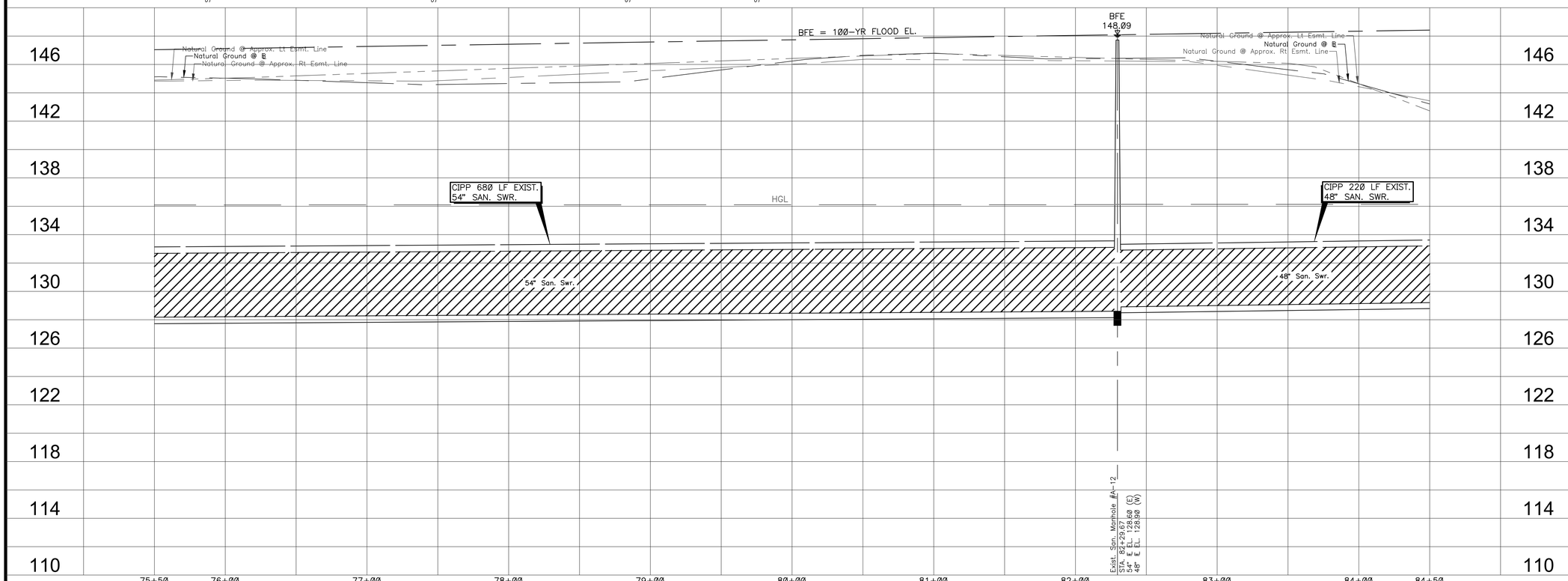
PLAN AND PROFILE
STA. 68+00 TO 75+50





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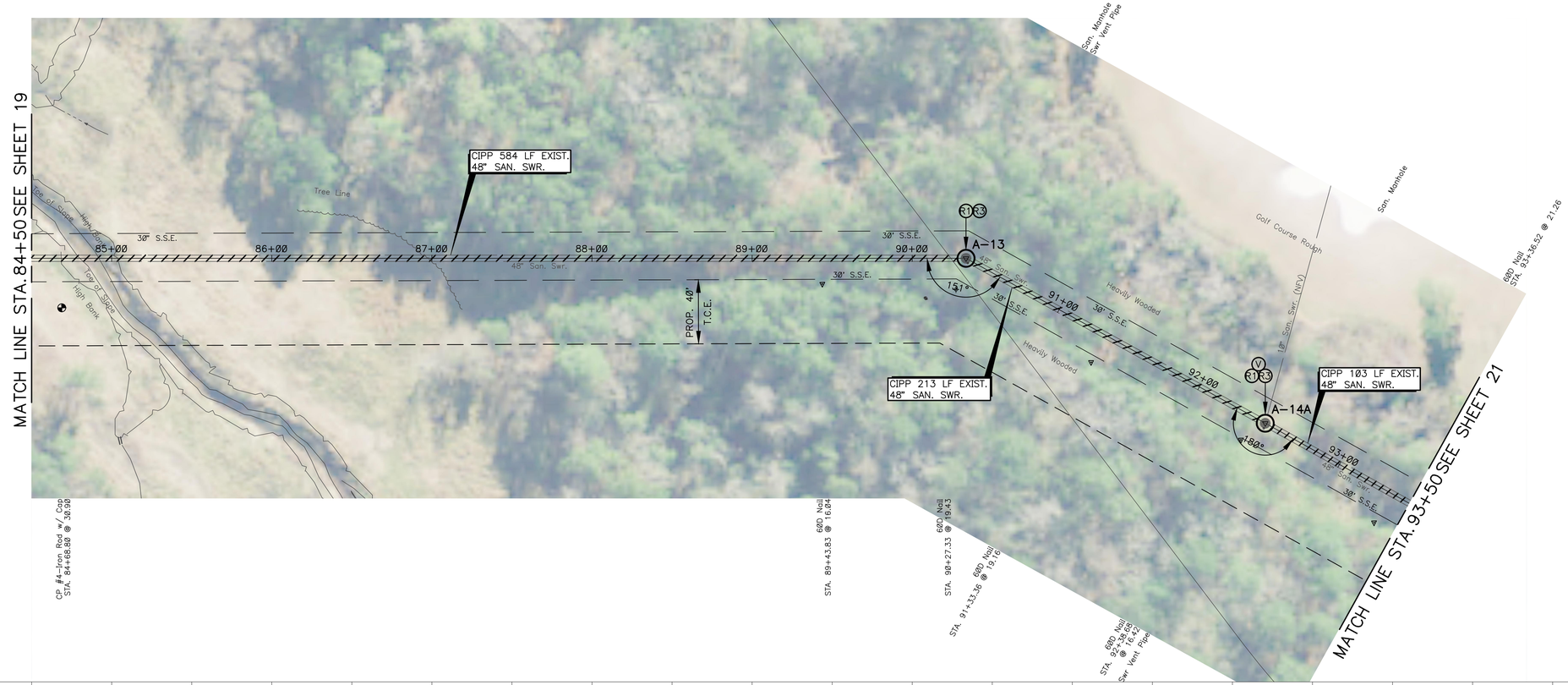
PLAN AND PROFILE
STA. 75+50 TO 84+50



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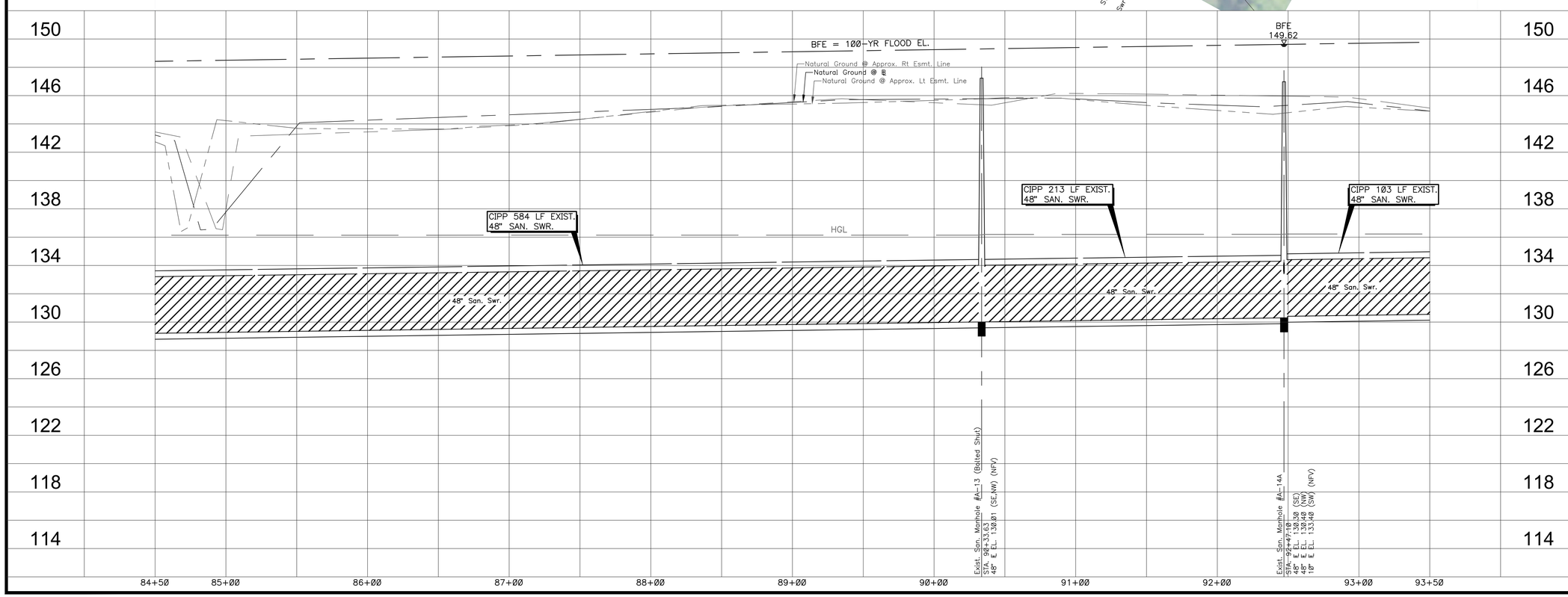

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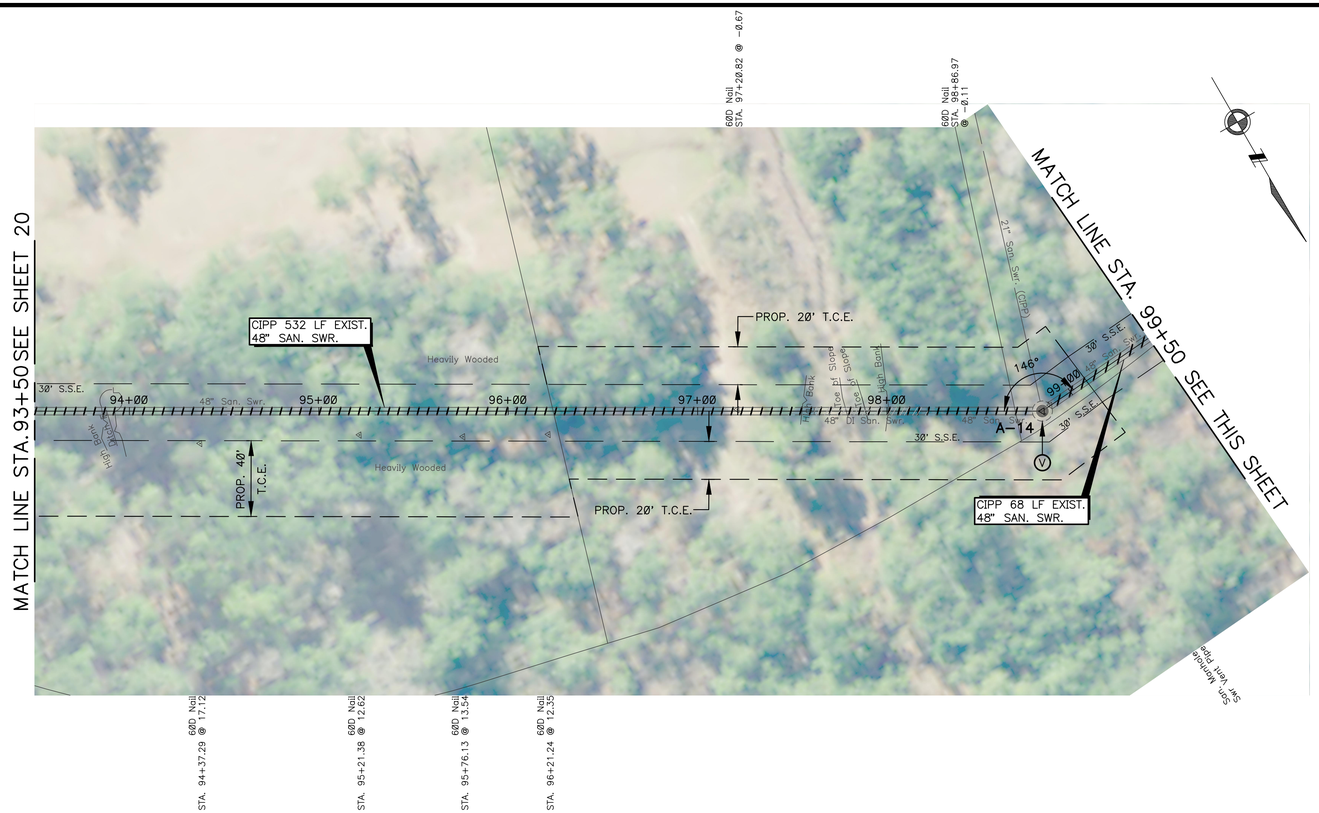
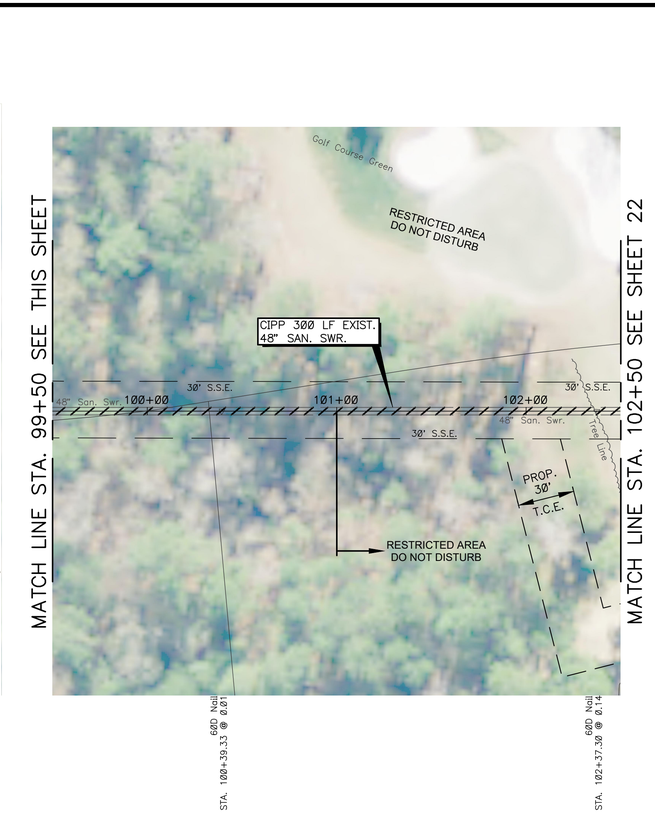
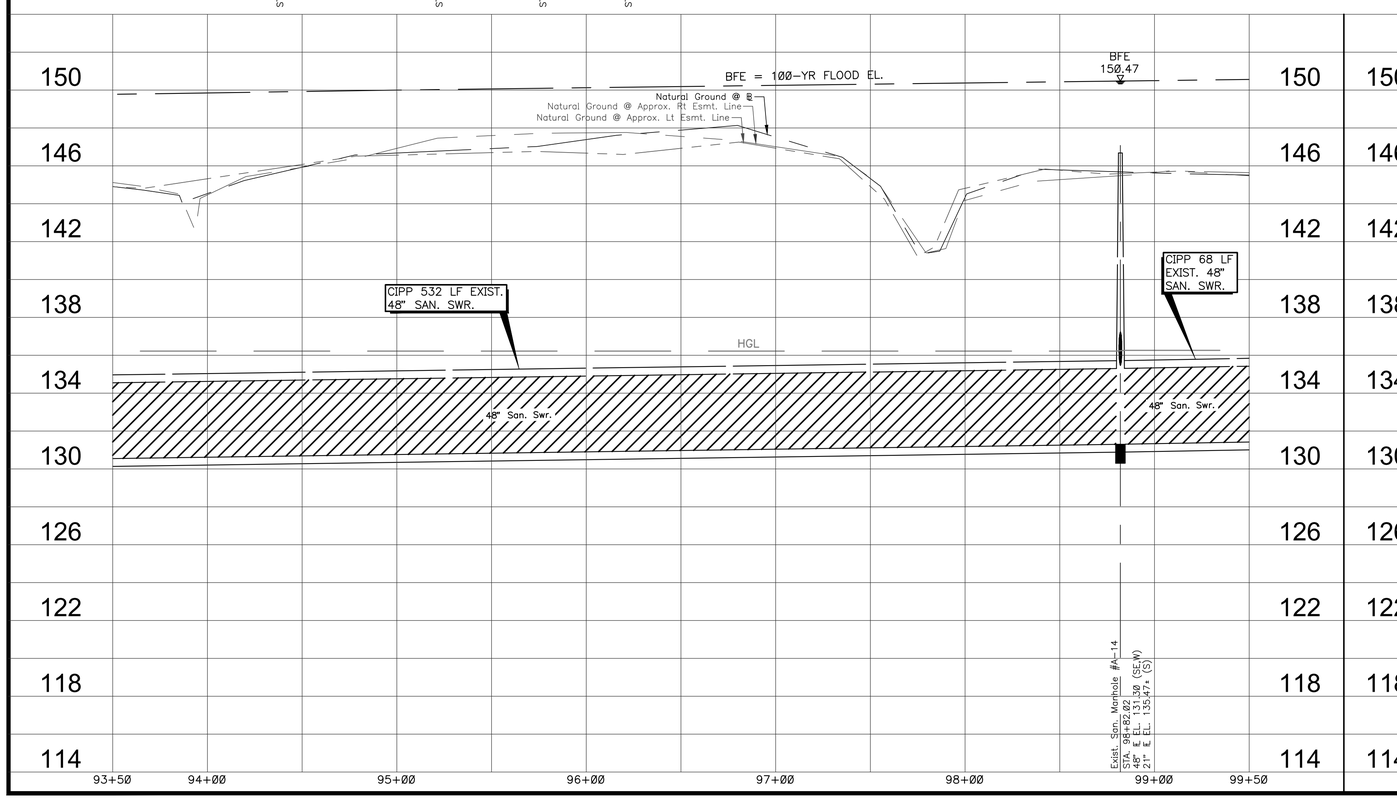
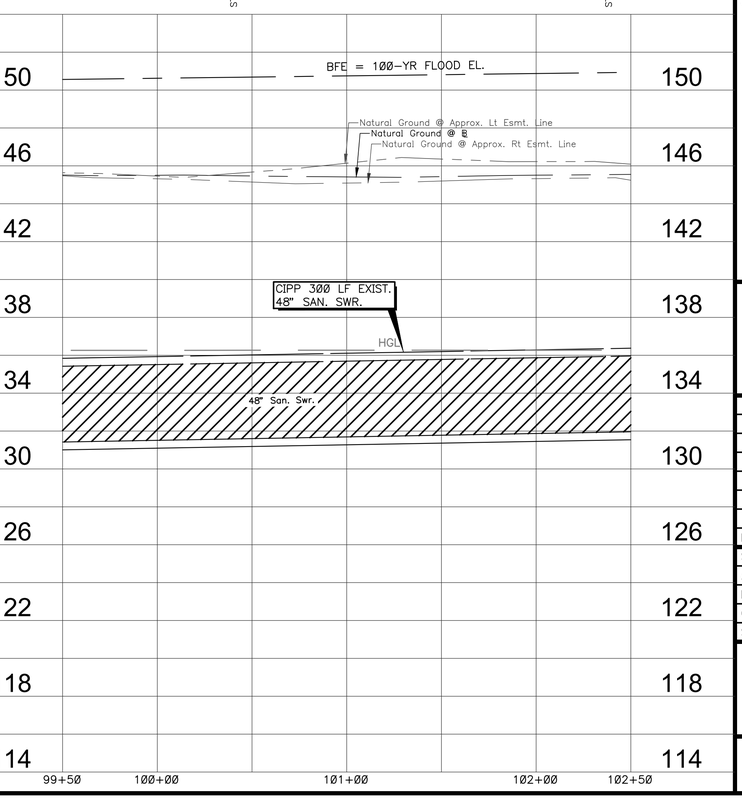
PLAN AND PROFILE
STA. 84+50 TO 93+50









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- R3 REMOVE & REPLACE RING AND COVER W/ CONC. COLLAR (PER DETAIL)
- V VENTED MANHOLE W/ BOLLARD

0 40' 80'

SCALE 1" = 40' (FULL SIZE)
SCALE 1" = 80' (HALF SIZE)

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STATE OF TEXAS
JOSE F. VELASQUEZ
110373
LICENSED
PROFESSIONAL ENGINEER
9-13-19

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SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

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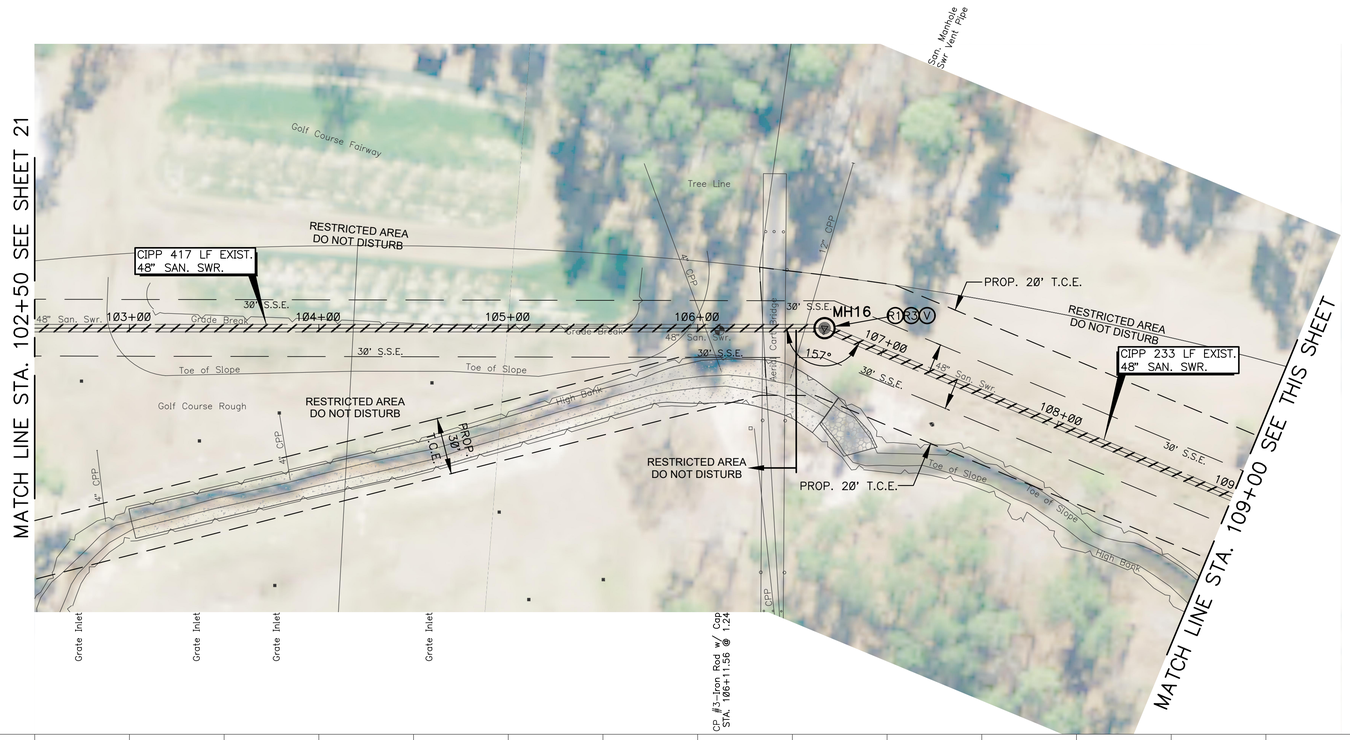
www.SJRA.net

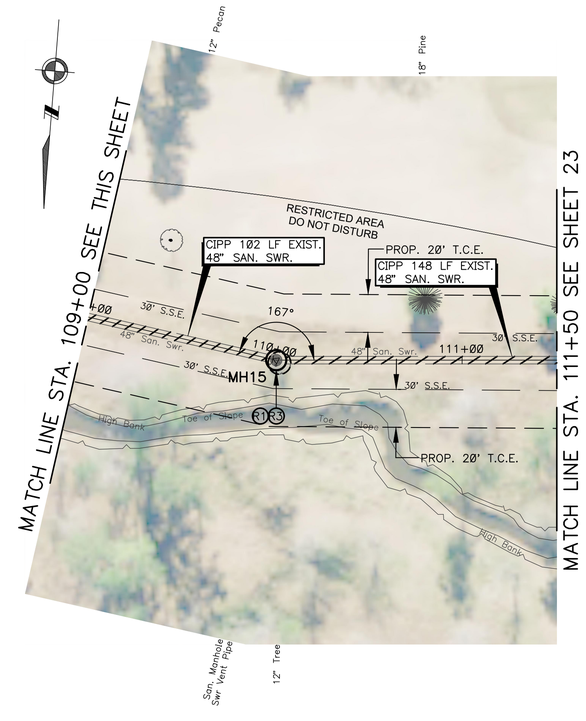
REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

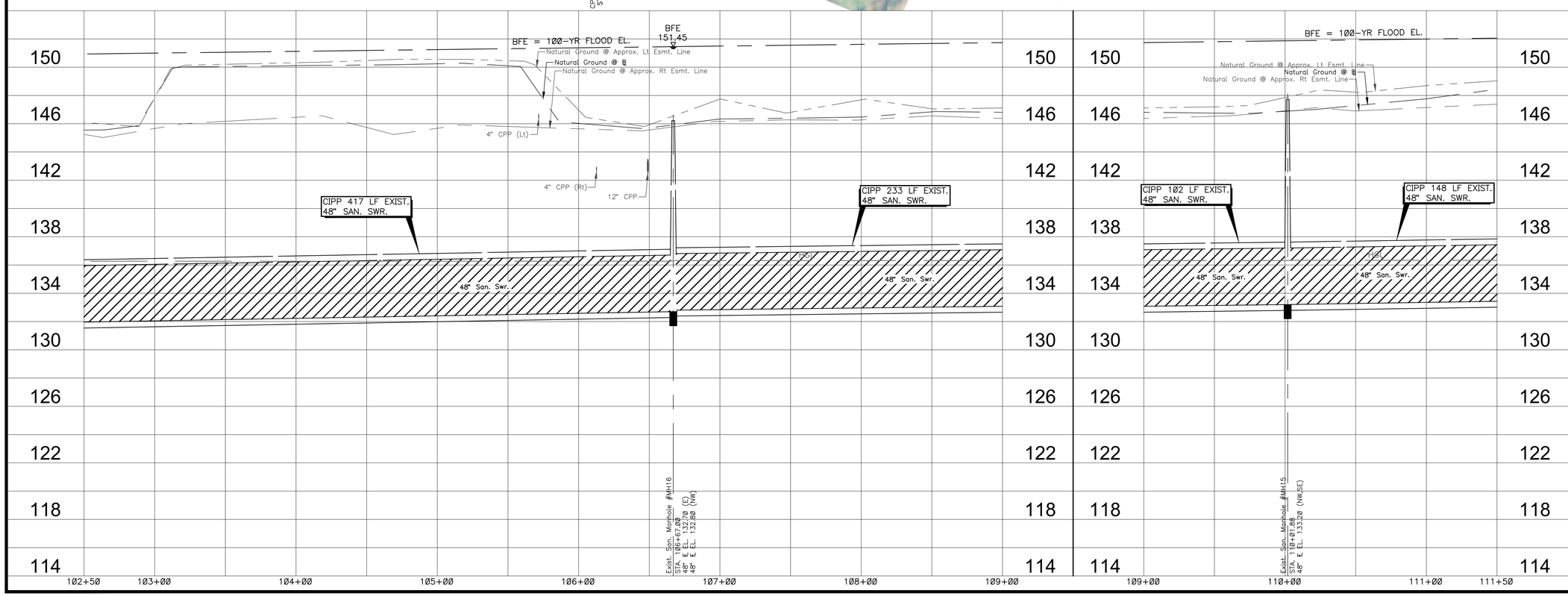
ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY: C. CHUDOBA
CHECKED BY: J. VELASQUEZ
SCALE: H: 1" = 40' V: 1" = 4'

PLAN AND PROFILE
STA. 93+50 TO 102+50







TBM:

SEE SURVEY/BASELINE CONTROL MAP FOR BENCHMARK REFERENCES. (SHEETS 7 - 9)

LEGEND

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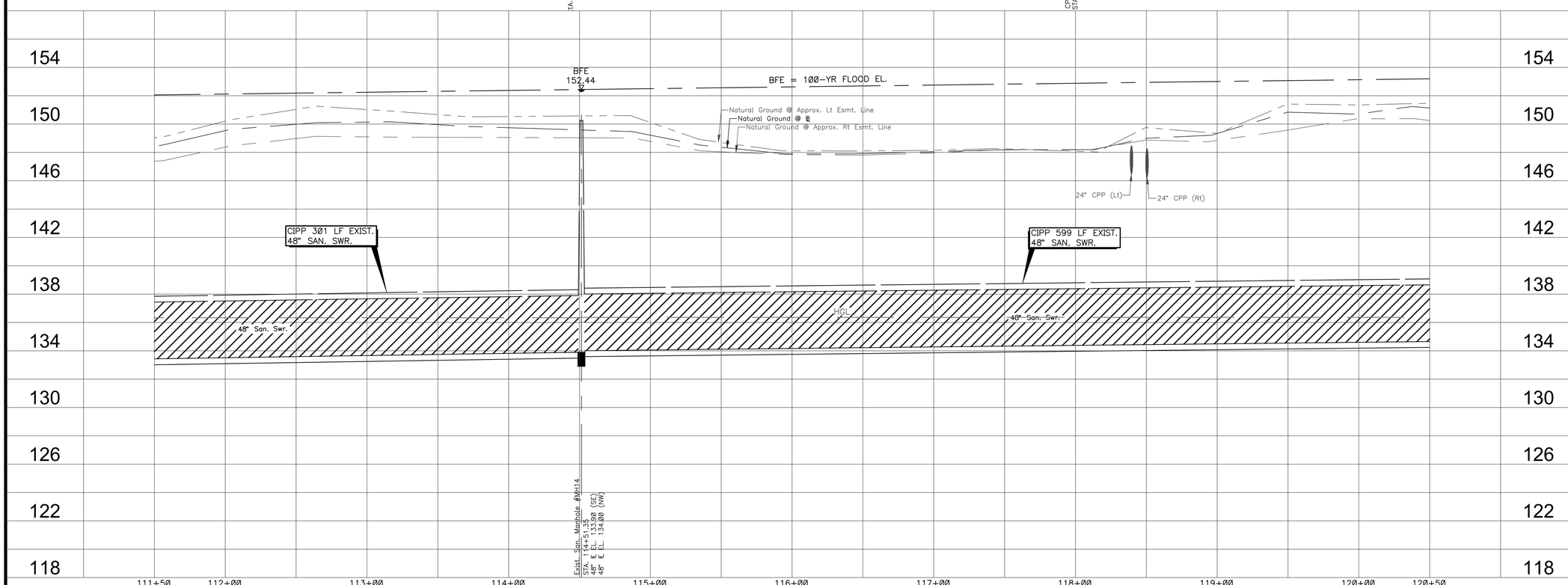
PLAN AND PROFILE
STA. 102+50 TO 111+50



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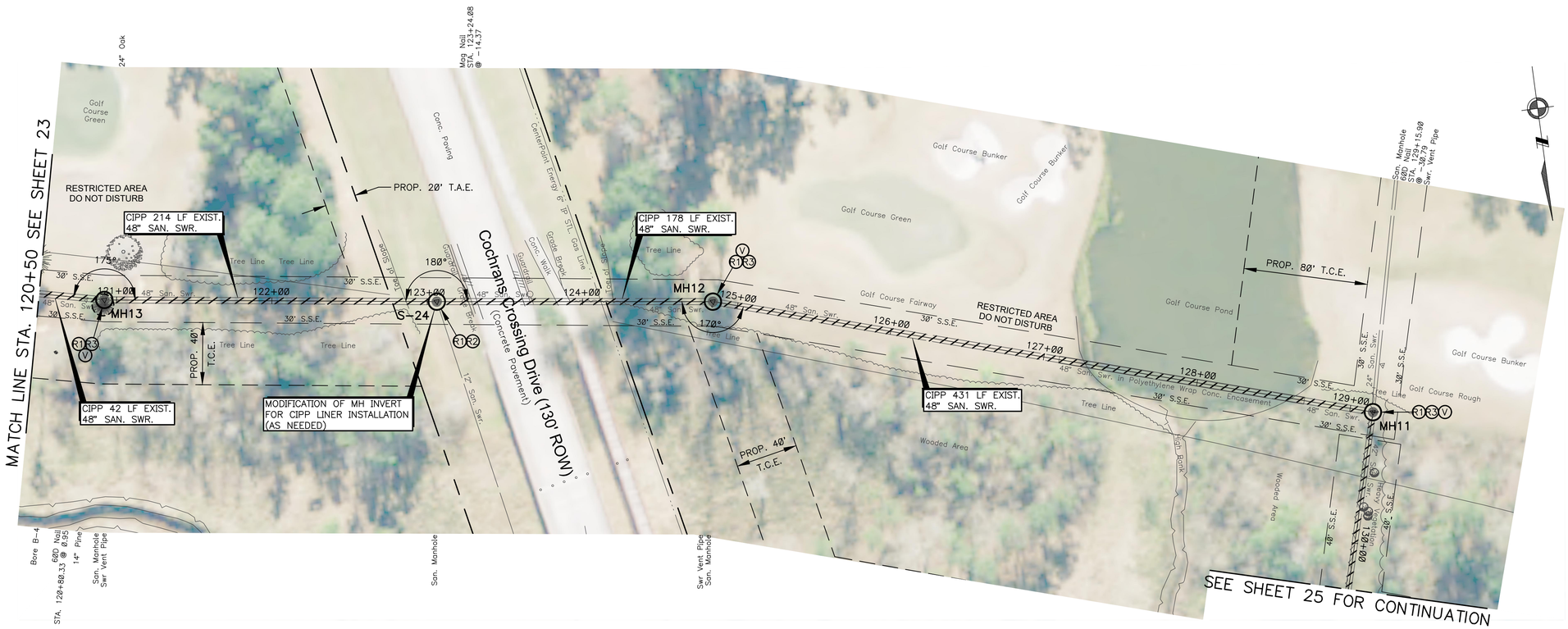
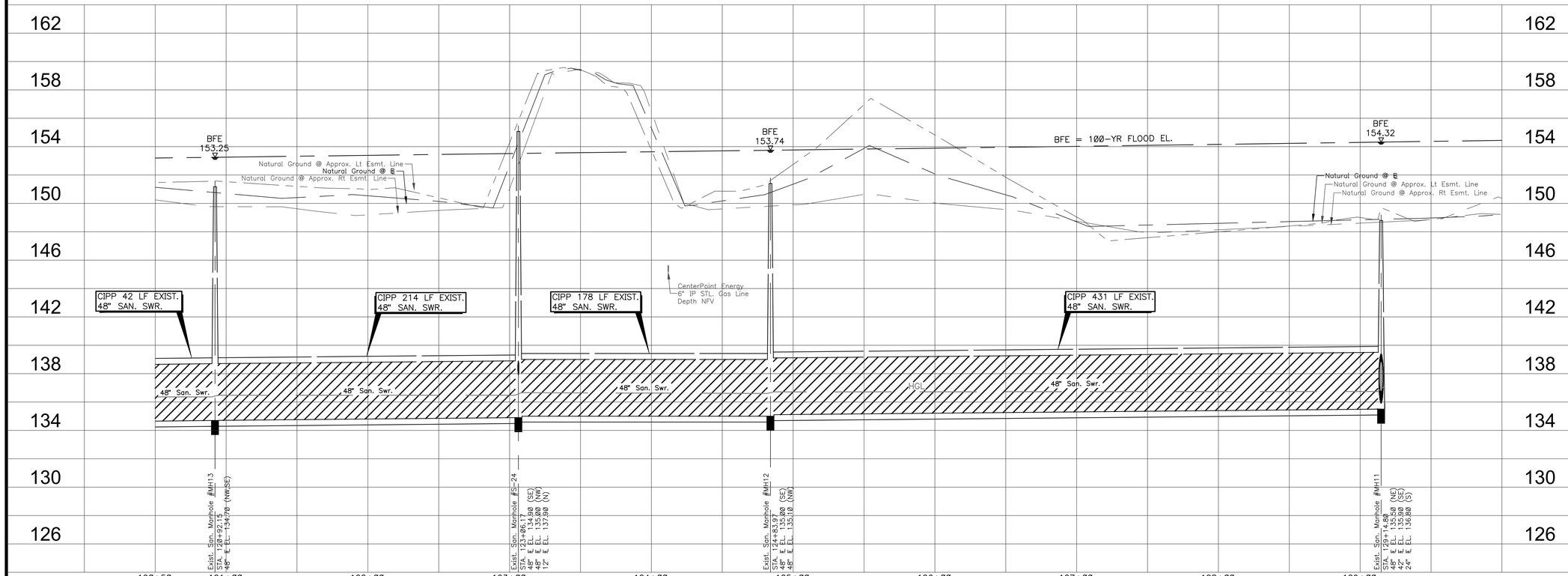
PLAN AND PROFILE
STA. 111+50 TO 120+50





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SEE SURVEY/BASELINE CONTROL MAP FOR BENCHMARK REFERENCES. (SHEETS 7 - 9)

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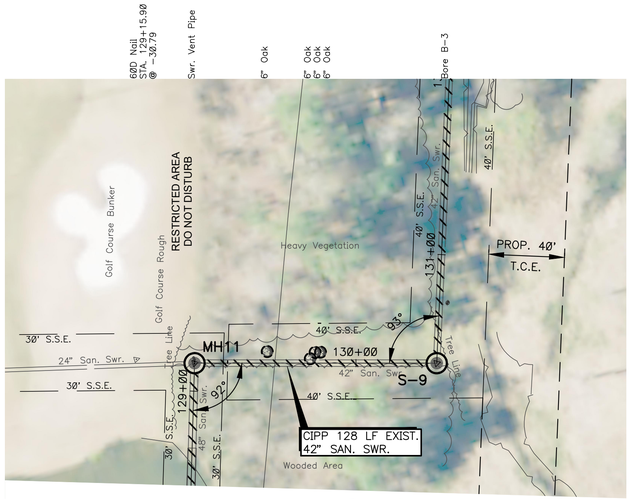
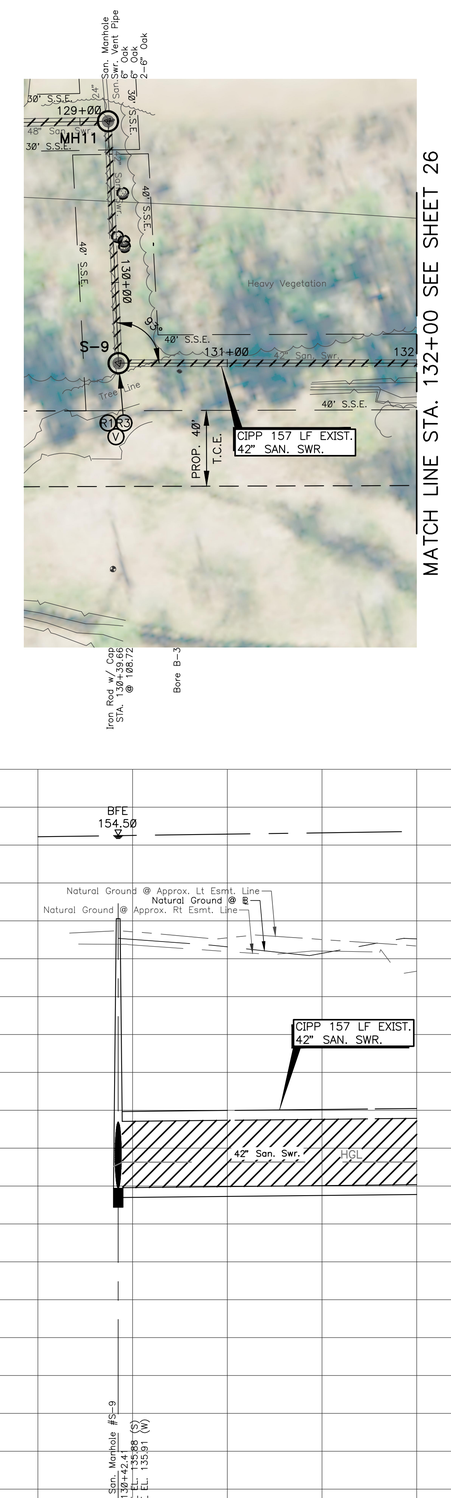
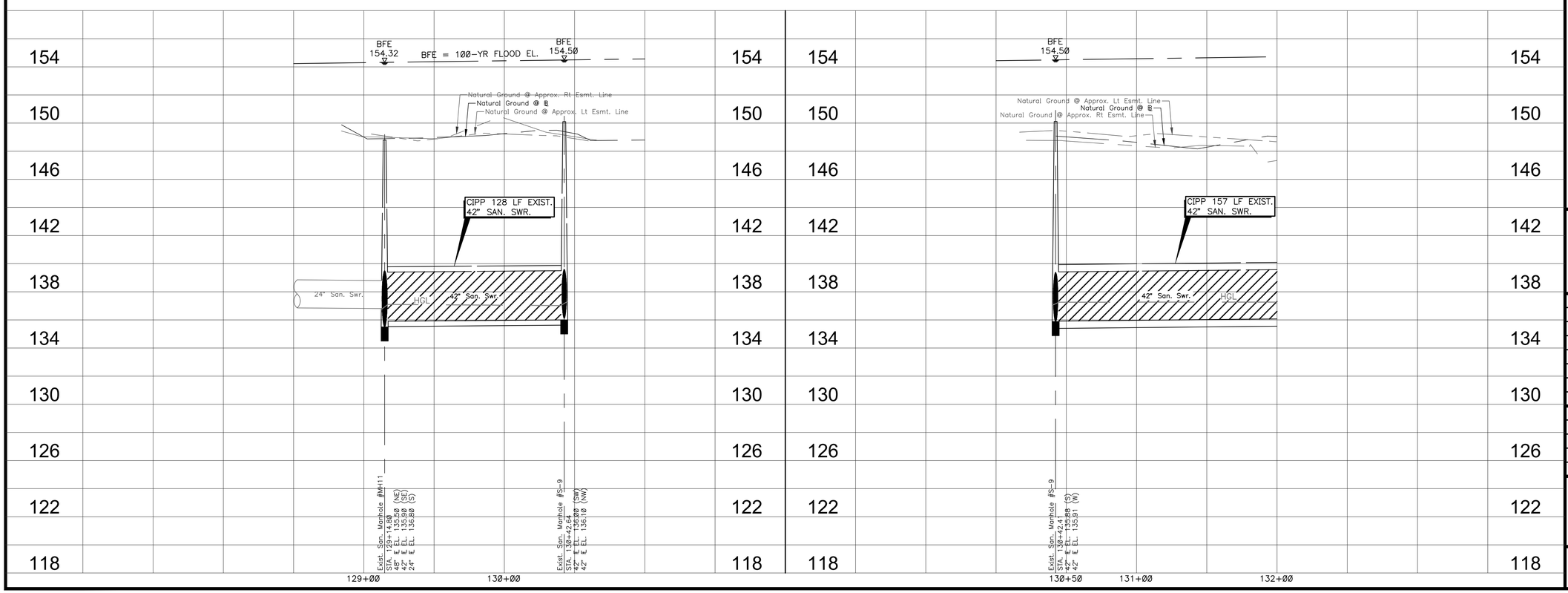
SCALE:	H: 1" = 40' V: 1" = 4'

PLAN AND PROFILE
STA. 120+50 TO 128+50







TBM:

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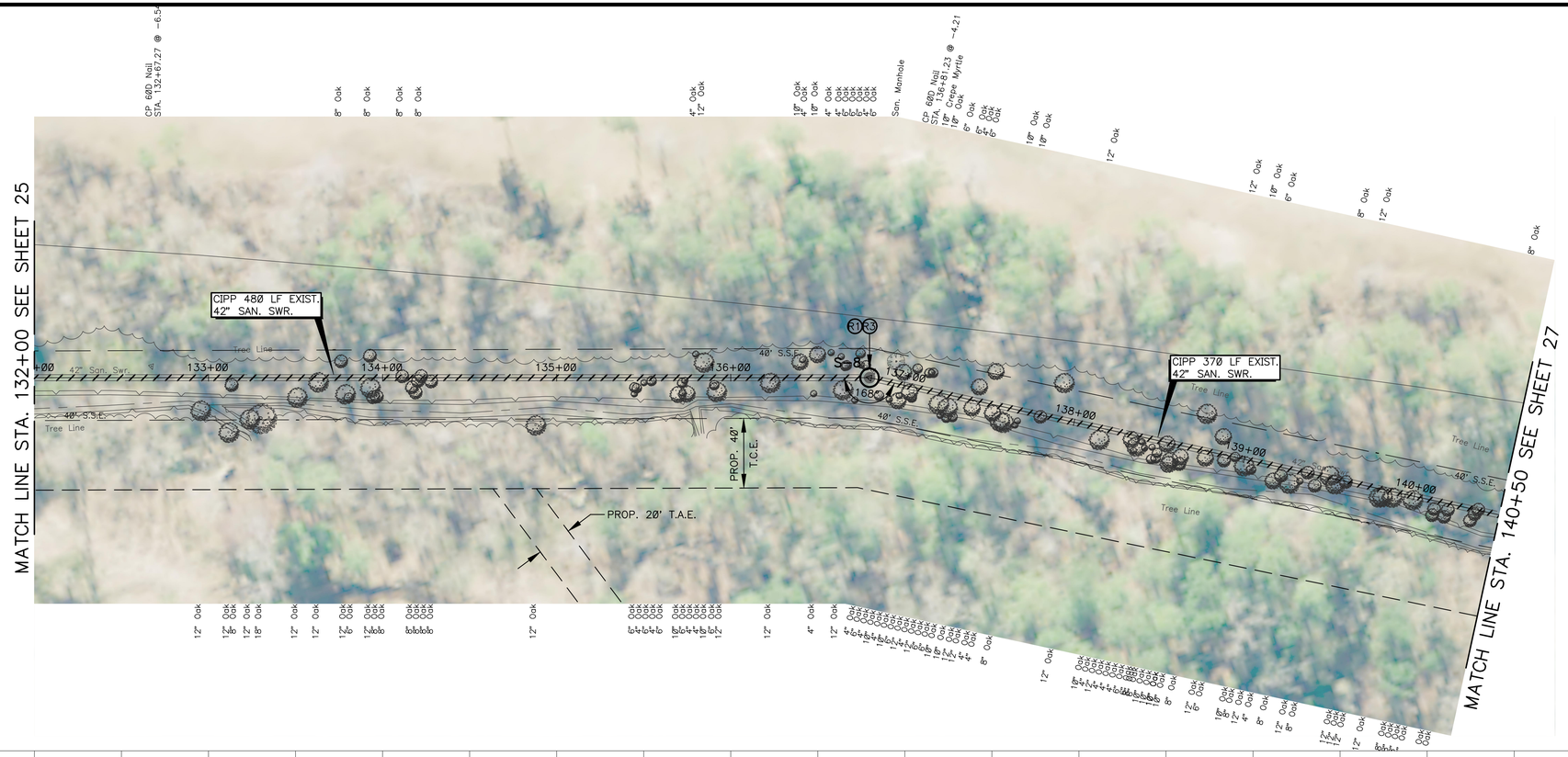
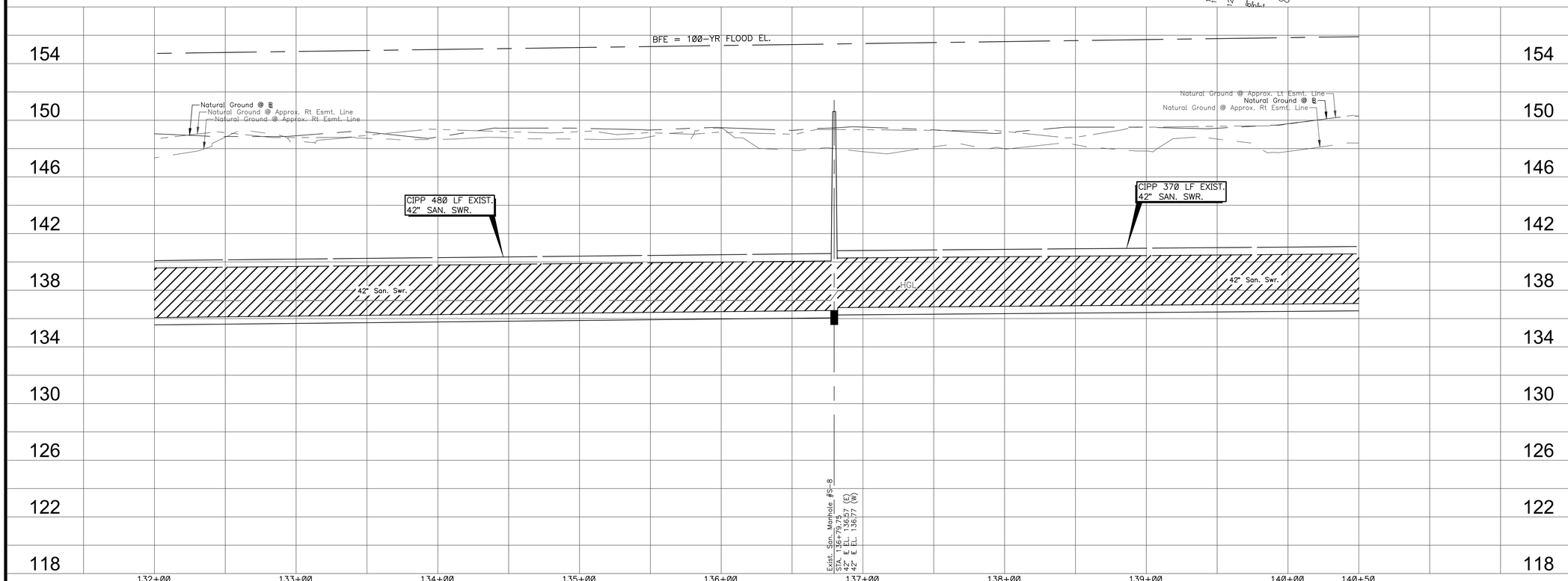
SCALE: H: 1" = 40' V: 1" = 4'

PLAN AND PROFILE
STA. 128+50 TO STA. 132+00





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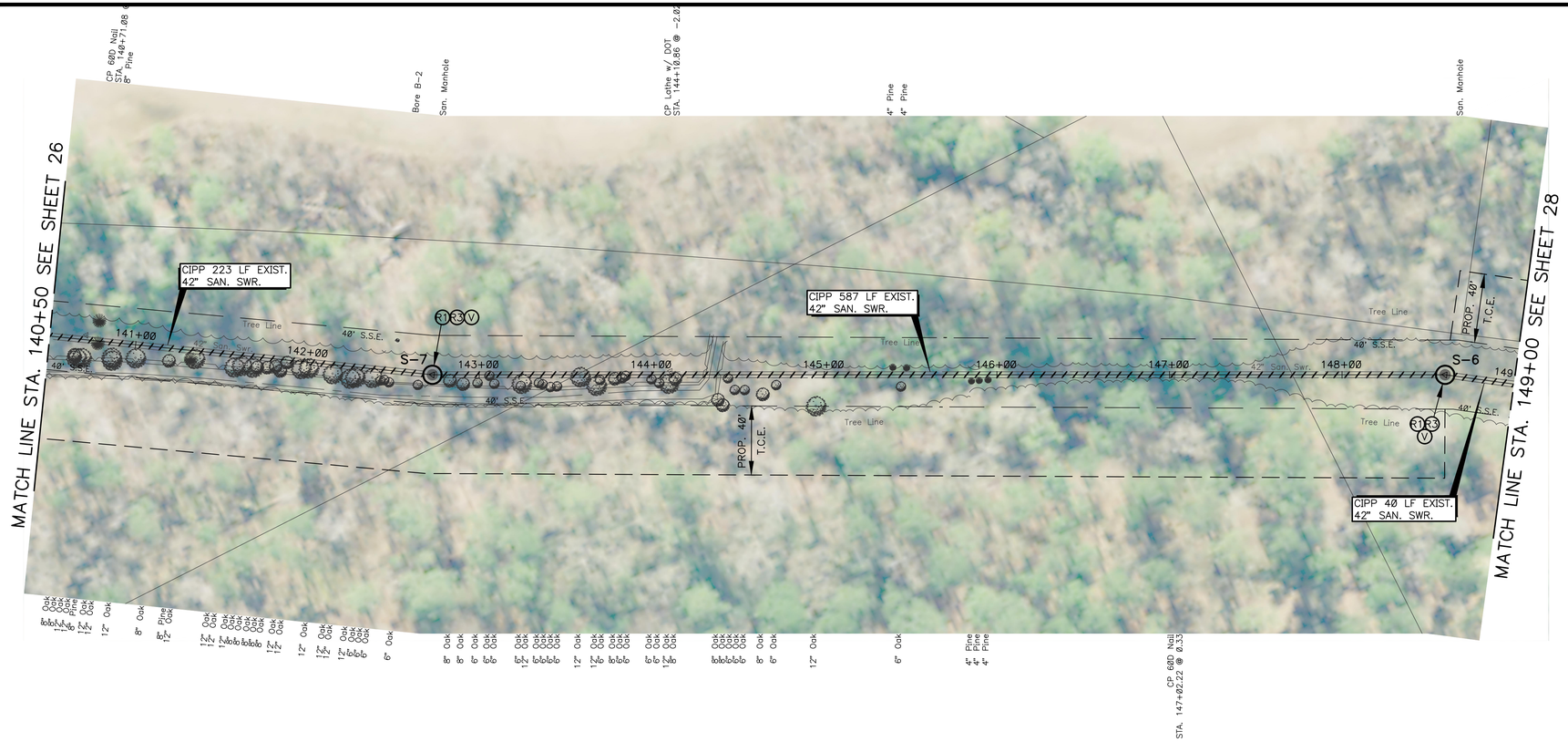
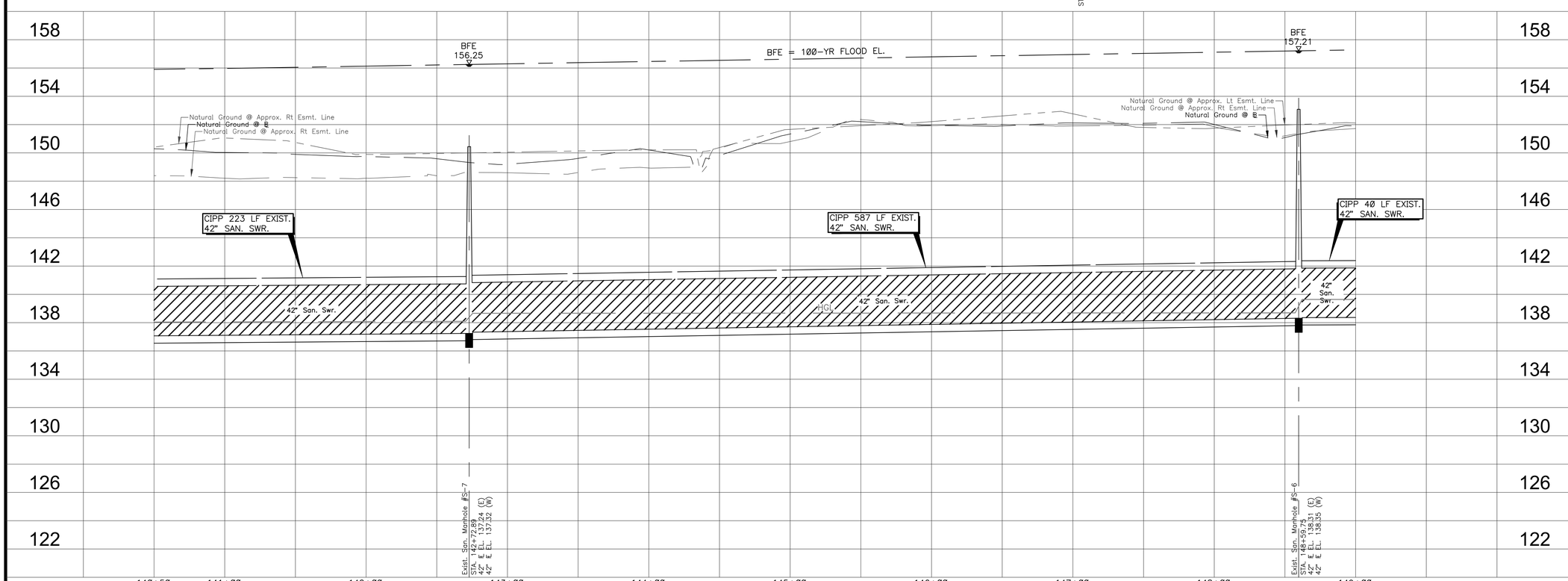
PLAN AND PROFILE
STA. 132+00 TO STA. 140+50





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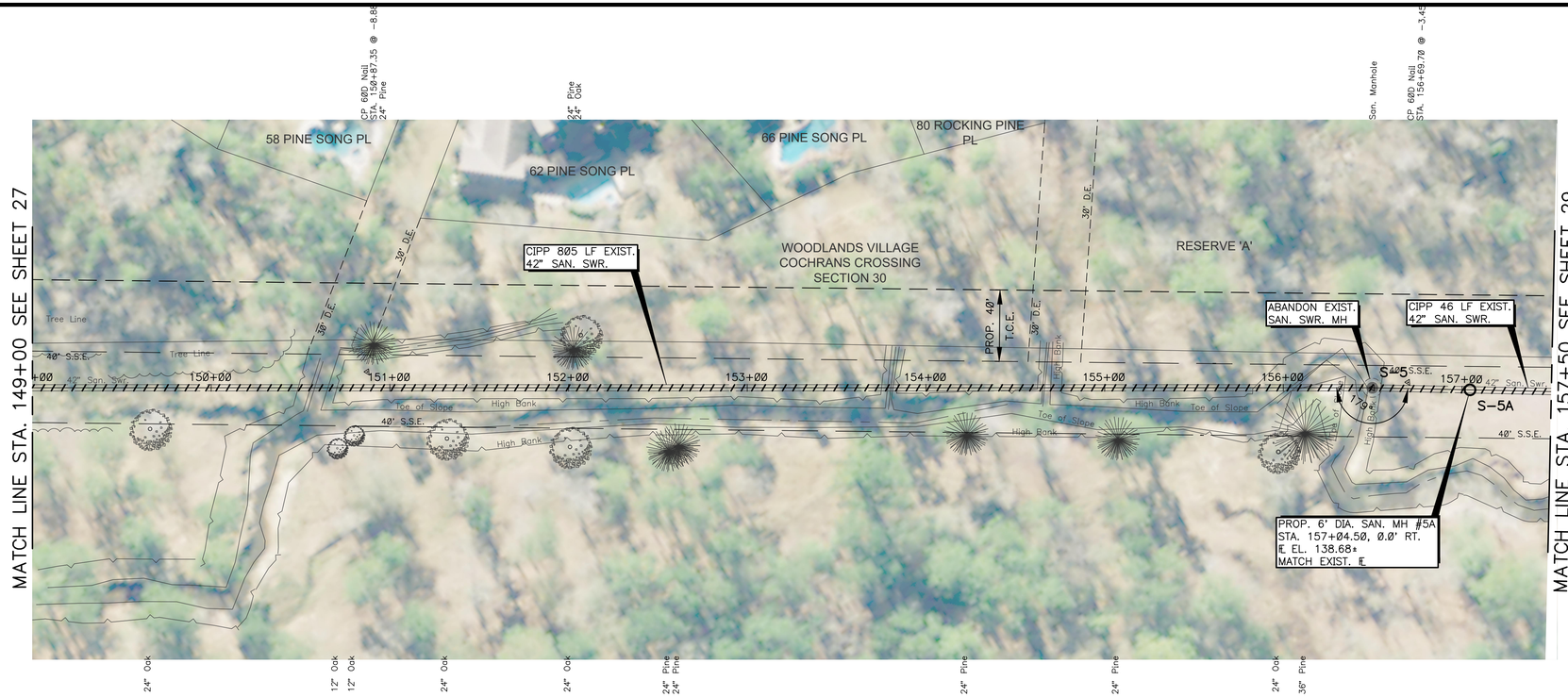
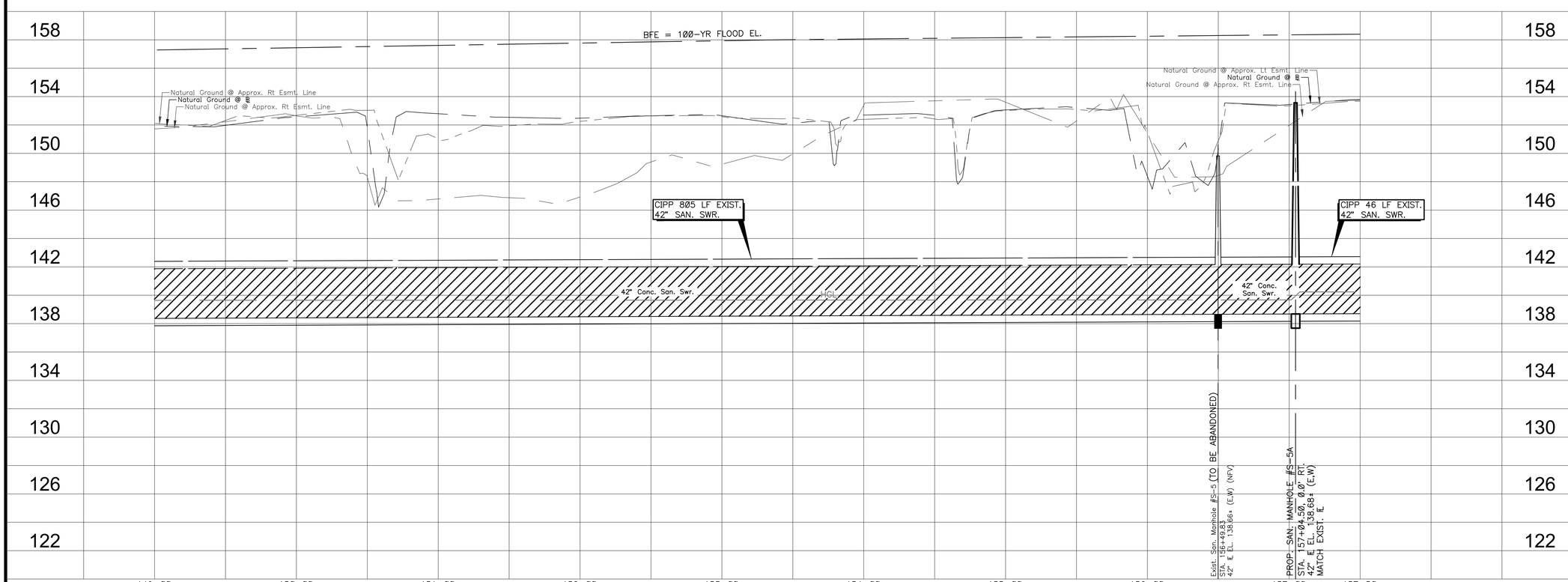
SCALE: H: 1" = 40' V: 1" = 4'

PLAN AND PROFILE
STA. 140+50 TO STA. 149+00





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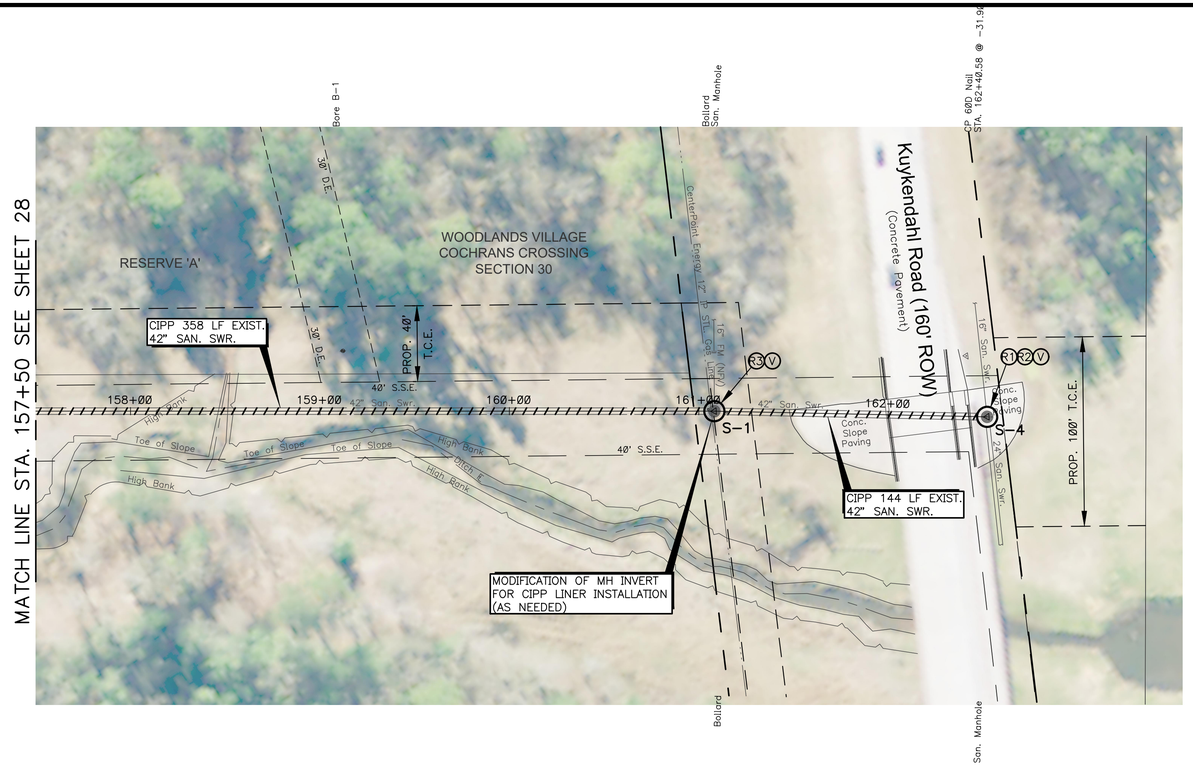
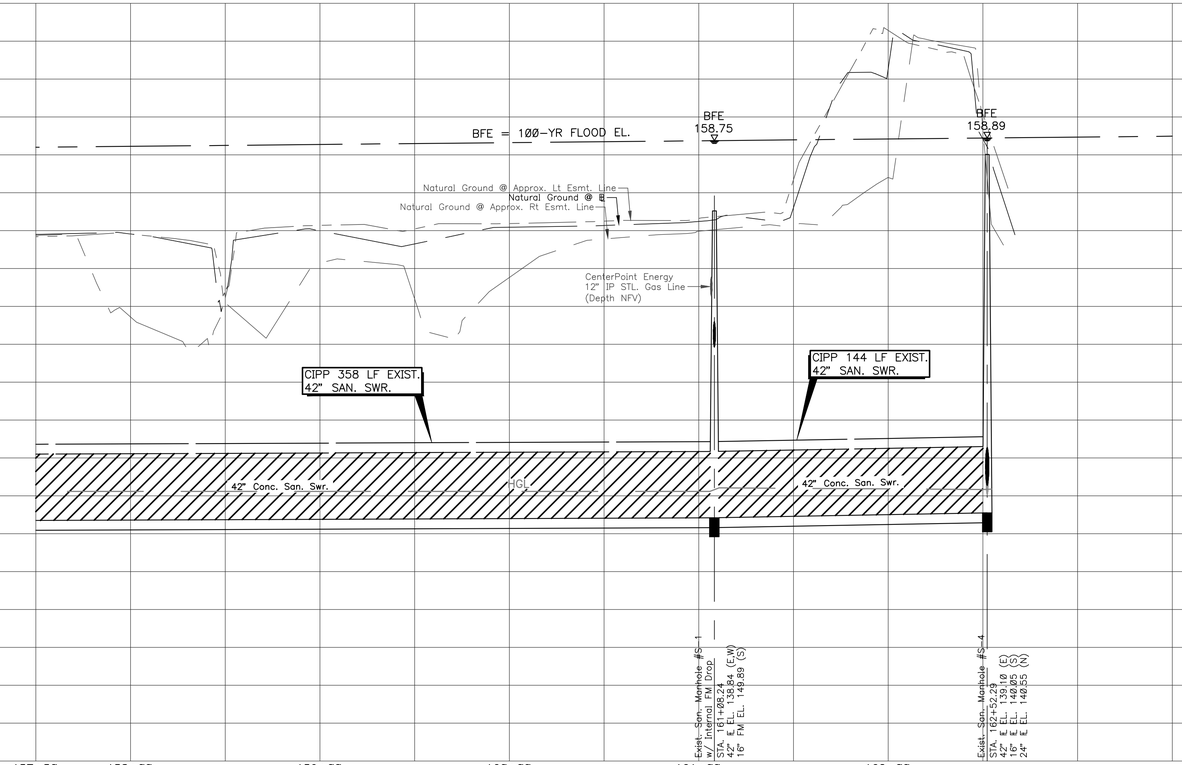
PLAN AND PROFILE
STA. 149+00 TO STA. 157+50





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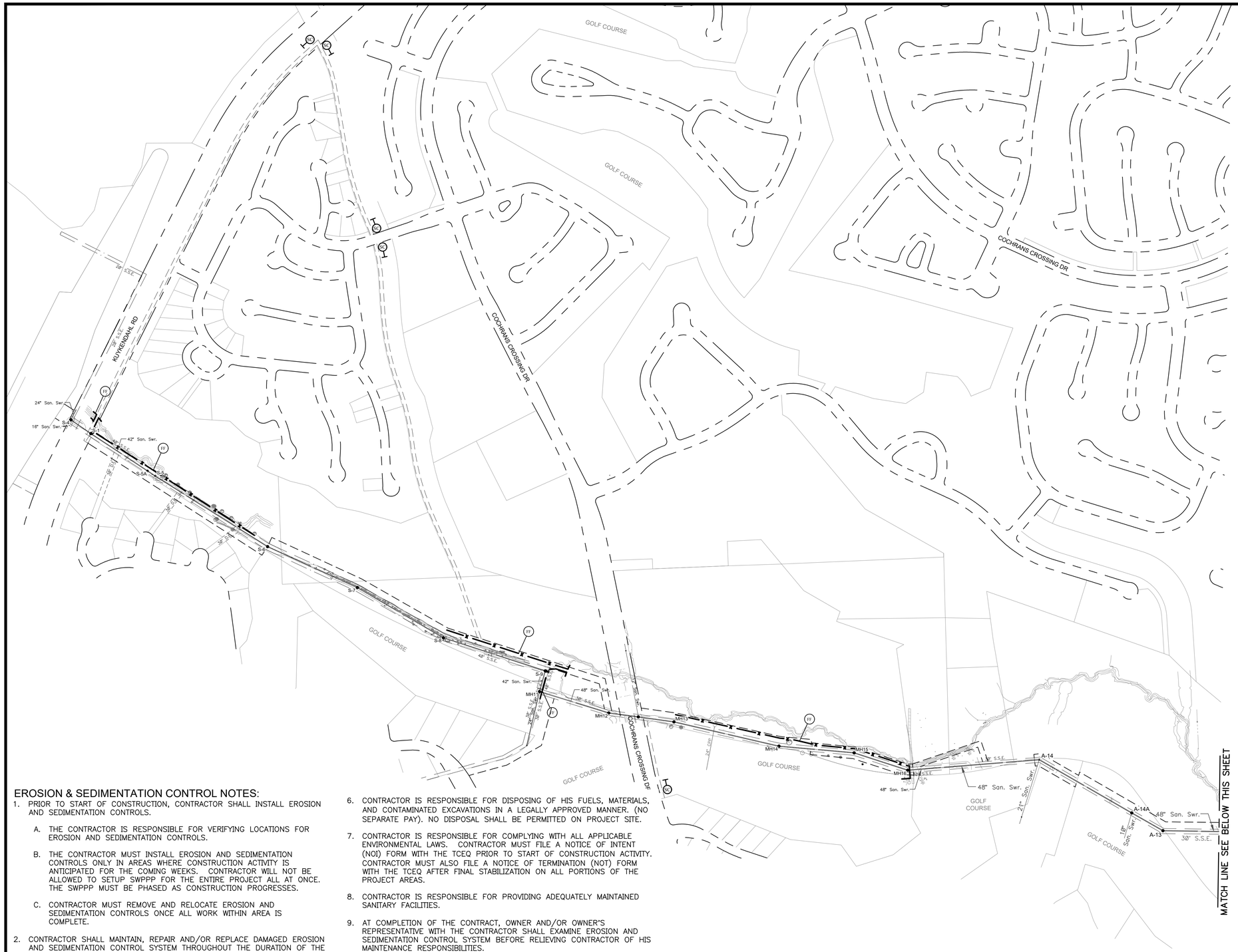
PLAN AND PROFILE
STA. 157+50 TO END



SCALE 1" = 300' (FULL SIZE)
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EROSION & SEDIMENTATION CONTROL NOTES:

1. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROLS.
   A. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATIONS FOR EROSION AND SEDIMENTATION CONTROLS.
   B. THE CONTRACTOR MUST INSTALL EROSION AND SEDIMENTATION CONTROLS ONLY IN AREAS WHERE CONSTRUCTION ACTIVITY IS ANTICIPATED FOR THE COMING WEEKS. CONTRACTOR WILL NOT BE ALLOWED TO SETUP SWPPP FOR THE ENTIRE PROJECT ALL AT ONCE. THE SWPPP MUST BE PHASED AS CONSTRUCTION PROGRESSES.
   C. CONTRACTOR MUST REMOVE AND RELOCATE EROSION AND SEDIMENTATION CONTROLS ONCE ALL WORK WITHIN AREA IS COMPLETE.
2. CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE DAMAGED EROSION AND SEDIMENTATION CONTROL SYSTEM THROUGHOUT THE DURATION OF THE PROJECT. (NO SEPARATE PAY).
3. CONTRACTOR SHALL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
4. CONTRACTOR SHALL LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORM WATER CONVEYANCE SYSTEMS. CONTRACTOR SHALL USE BERMS AROUND FUEL STORAGE AREAS. (NO SEPARATE PAY).
5. CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL OR TOXIC MATERIAL SPILLS ONTO THE PROJECT AREA AND THE ACTION TAKEN TO REMEDY THE PROBLEM.
6. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF HIS FUELS, MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER. (NO SEPARATE PAY). NO DISPOSAL SHALL BE PERMITTED ON PROJECT SITE.
7. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE ENVIRONMENTAL LAWS. CONTRACTOR MUST FILE A NOTICE OF INTENT (NOI) FORM WITH THE TCEQ PRIOR TO START OF CONSTRUCTION ACTIVITY. CONTRACTOR MUST ALSO FILE A NOTICE OF TERMINATION (NOT) FORM WITH THE TCEQ AFTER FINAL STABILIZATION ON ALL PORTIONS OF THE PROJECT AREAS.
8. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATELY MAINTAINED SANITARY FACILITIES.
9. AT COMPLETION OF THE CONTRACT, OWNER AND/OR OWNER'S REPRESENTATIVE WITH THE CONTRACTOR SHALL EXAMINE EROSION AND SEDIMENTATION CONTROL SYSTEM BEFORE RELIEVING CONTRACTOR OF HIS MAINTENANCE RESPONSIBILITIES.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR STREET CLEANING, ON A DAILY BASIS, OF ALL MUD AND DIRT DEPOSITED ON THE EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY.
11. FILTER FABRIC TO BE CLEANED OR REPLACED WHEN IT CEASES TO FUNCTION PROPERLY OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
12. LOCATION OF CONSTRUCTION ACCESS IS APPROXIMATE. EXACT LOCATION SHALL BE BASED ON THE ACTUAL SEQUENCING OF WORK AND LOCATIONS FOR EGRESS OF THE SITE BY THE CONTRACTOR.

LEGEND

- FILTER FABRIC BARRIER (FF)
- IPB — INLET PROTECTION BARRIER
- SC — STABILIZED CONSTRUCTION ENTERANCE/EXIT

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REHABILITATION OF
BEAR BRANCH
GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO:	WDPR0082.1001.2N001
ARKK PROJECT NO:	17-042
DRAWN BY:	
CHECKED BY:	J. VELASQUEZ
SCALE: H: 1" = 300'	V: N/A

STORM WATER POLLUTION
PREVENTION PLAN LAYOUT I

EROSION & SEDIMENTATION CONTROL NOTES:

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   B. THE CONTRACTOR MUST INSTALL EROSION AND SEDIMENTATION CONTROLS ONLY IN AREAS WHERE CONSTRUCTION ACTIVITY IS ANTICIPATED FOR THE COMING WEEKS. CONTRACTOR WILL NOT BE ALLOWED TO SETUP SWPPP FOR THE ENTIRE PROJECT ALL AT ONCE. THE SWPPP MUST BE PHASED AS CONSTRUCTION PROGRESSES.
   C. CONTRACTOR MUST REMOVE AND RELOCATE EROSION AND SEDIMENTATION CONTROLS ONCE ALL WORK WITHIN AREA IS COMPLETE.
2. CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE DAMAGED EROSION AND SEDIMENTATION CONTROL SYSTEM THROUGHOUT THE DURATION OF THE PROJECT. (NO SEPARATE PAY).
3. CONTRACTOR SHALL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
4. CONTRACTOR SHALL LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORM WATER CONVEYANCE SYSTEMS. CONTRACTOR SHALL USE BERMS AROUND FUEL STORAGE AREAS. (NO SEPARATE PAY).
5. CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL OR TOXIC MATERIAL SPILLS ONTO THE PROJECT AREA AND THE ACTION TAKEN TO REMEDY THE PROBLEM.
6. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF HIS FUELS, MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER. (NO SEPARATE PAY). NO DISPOSAL SHALL BE PERMITTED ON PROJECT SITE.
7. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE ENVIRONMENTAL LAWS. CONTRACTOR MUST FILE A NOTICE OF INTENT (NOI) FORM WITH THE TCEQ PRIOR TO START OF CONSTRUCTION ACTIVITY. CONTRACTOR MUST ALSO FILE A NOTICE OF TERMINATION (NOT) FORM WITH THE TCEQ AFTER FINAL STABILIZATION ON ALL PORTIONS OF THE PROJECT AREAS.
8. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATELY MAINTAINED SANITARY FACILITIES.
9. AT COMPLETION OF THE CONTRACT, OWNER AND/OR OWNER'S REPRESENTATIVE WITH THE CONTRACTOR SHALL EXAMINE EROSION AND SEDIMENTATION CONTROL SYSTEM BEFORE RELIEVING CONTRACTOR OF HIS MAINTENANCE RESPONSIBILITIES.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR STREET CLEANING, ON A DAILY BASIS, OF ALL MUD AND DIRT DEPOSITED ON THE EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY.
11. FILTER FABRIC TO BE CLEANED OR REPLACED WHEN IT CEASES TO FUNCTION PROPERLY OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
12. LOCATION OF CONSTRUCTION ACCESS IS APPROXIMATE. EXACT LOCATION SHALL BE BASED ON THE ACTUAL SEQUENCING OF WORK AND LOCATIONS FOR EGRESS OF THE SITE BY THE CONTRACTOR.

LEGEND

- FILTER FABRIC BARRIER (FF)
- IPB — INLET PROTECTION BARRIER
- (SC) — STABILIZED CONSTRUCTION ENTERANCE/EXIT

0 300' 600'

SCALE 1" = 300' (FULL SIZE)
SCALE 1" = 600' (HALF SIZE)

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WOODLANDS DIVISION

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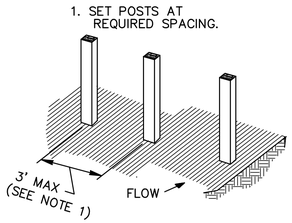
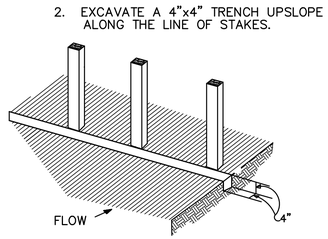
REHABILITATION OF BEAR BRANCH GRAVITY MAIN

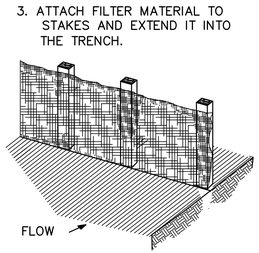
ISSUE	DATE	DESCRIPTION

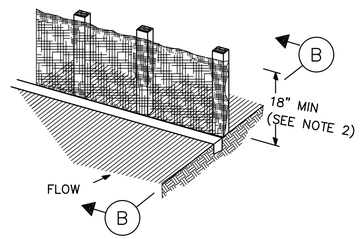
SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY:
CHECKED BY: J. VELASQUEZ
SCALE: H: 1" = 300' V: N/A

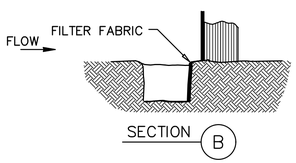
STORM WATER POLLUTION PREVENTION PLAN LAYOUT II

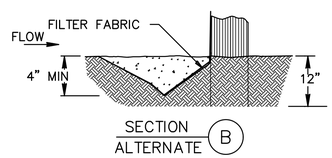


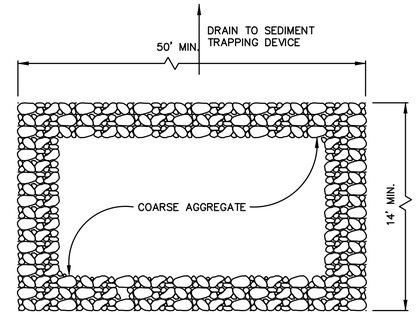




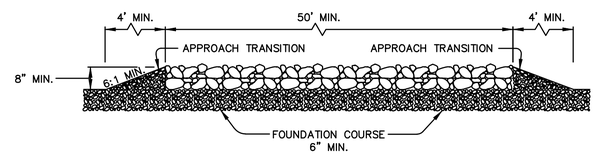








PLAN



PROFILE

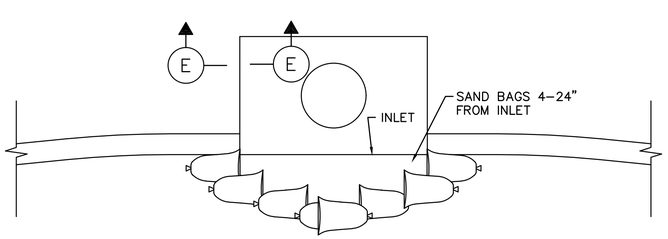
CONSTRUCTION ENTRANCE/EXIT (TYPE 1)

CONSTRUCTION NOTES:

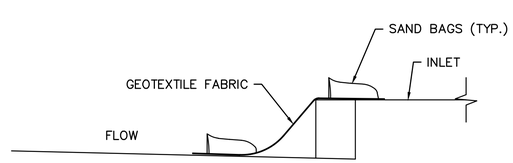
1. 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED FENCE WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
2. ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC FENCE SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
4. ALL FABRIC FENCE NEEDS TO BE REINFORCED WITH WIRE MESH.
5. SEE STANDARD SPECIFICATION FOR FILTER FABRIC FENCE.

GENERAL NOTES

1. THE LENGTH OF THE TYPE 1 CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, BUT NOT LESS THAN 50'.
2. THE COARSE AGGREGATE SHOULD BE OPEN GRADED WITH A SIZE OF 4" TO 8".
3. THE APPROACH TRANSITIONS SHOULD BE NO STEEPER THAN 6:1 AND CONSTRUCTED AS DIRECTED BY THE ENGINEER.
4. THE CONSTRUCTION EXIT FOUNDATION COURSE SHALL BE FLEXIBLE BASE, BITUMINOUS CONCRETE, PORTLAND CEMENT CONCRETE OR OTHER MATERIAL AS APPROVED BY THE ENGINEER.
5. THE CONSTRUCTION EXIT SHALL BE GRADED TO ALLOW DRAINAGE TO A SEDIMENT TRAPPING DEVICE.
6. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.



PLAN



SECTION E

INLET PROTECTION BARRIER

LAYOUT LEGEND

x — x	REINFORCED FILTER FABRIC FENCE
SC	STABILIZED CONSTRUCTION ACCESS (TYPE 1) LOCATION TO BE PROPOSED BY CONTRACTOR AND APPROVED BY THE ENGINEER.
IPB	INLET PROTECTION BARRIER

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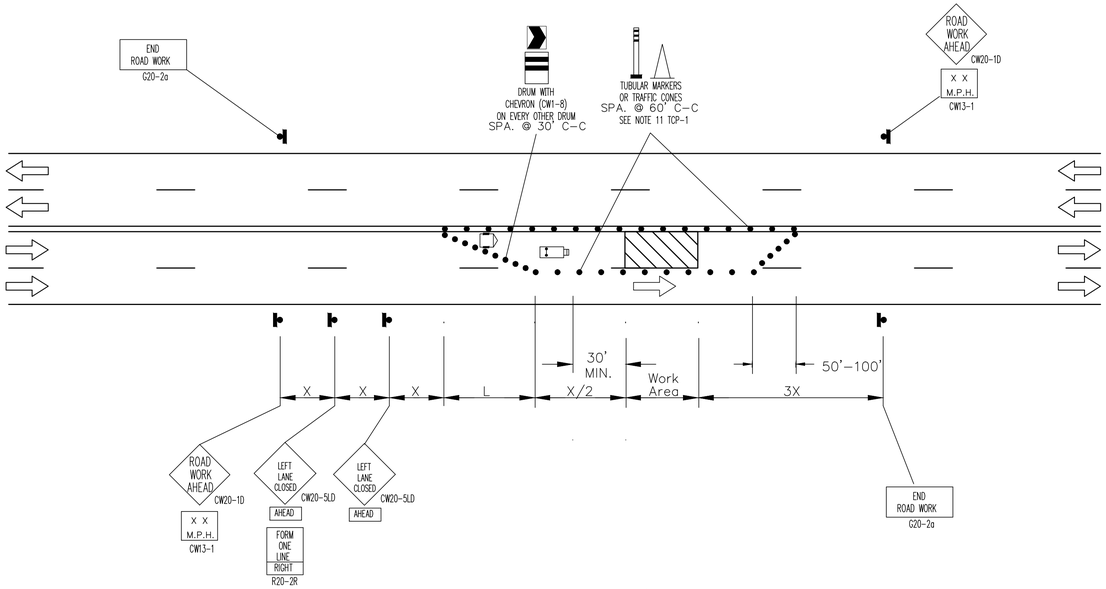
SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

REHABILITATION OF BEAR BRANCH GRAVITY MAIN

ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY:
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A V: N/A

SWPPP DETAILS



INSIDE LANE CLOSURE (4 LANE ROAD)

CONSTRUCTION WARNING SIGN SPACING

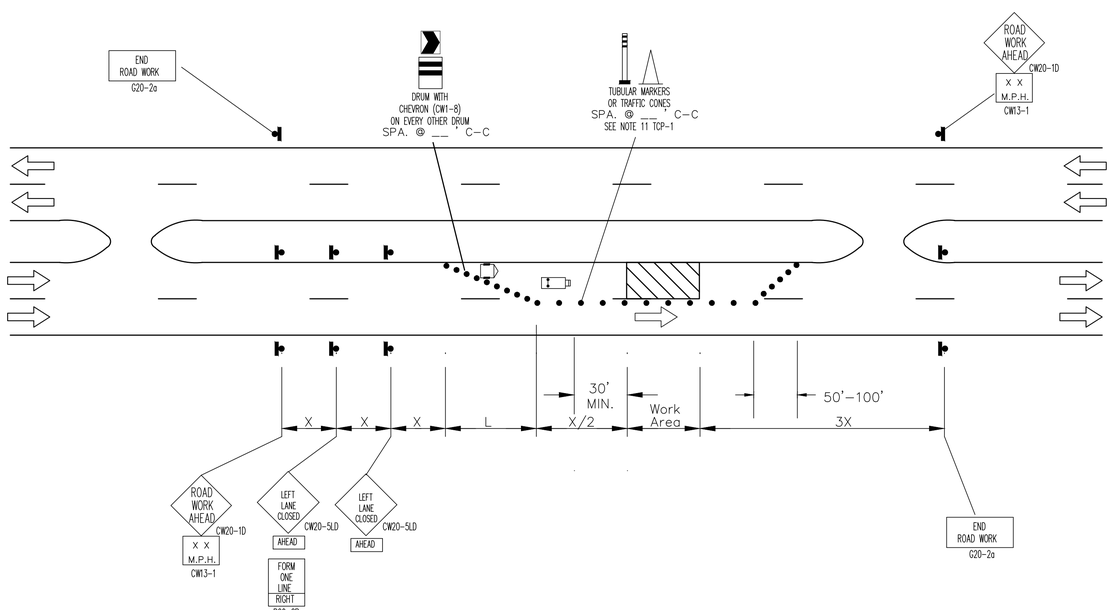
Posted Speed or 85% Speed (MPH)	X Min. Distance (feet)
30 or less	120
35	160
40	240
45	320
50	400
55	500
65	700

X=SIGN SPACING
L=TAPER
2XL=TANGENT

TYPICAL TRANSITION LENGTHS AND SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-175'

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit.
** Taper lengths have been rounded off.



INSIDE LANE CLOSURE (4 LANE BOULEVARD)

LEGEND

- CONSTRUCTION AREA
- OPEN TO TRAFFIC
- HEAVY WORK VEHICLE
- FLASHING ARROW BOARD (OPTIONAL)
- SIGN POST
- TUBULAR MARKERS ,CONES OR DRUMS
- FLAGGER
- X = SIGN SPACING
- L = TAPER LENGTH
- XX SPEED TO BE DETERMINED BY ENGINEER

NOTES:
1. TRAFFIC CONTROL OPERATIONS SHALL BE IMPLEMENTED DURING NORMAL WORKING HOURS. ALL TRAFFIC CONTROL MEASURES SHALL BE REMOVED WHEN WORK IS NOT IN PROGRESS.
2. ALL TRAFFIC CONTROL DURING CONSTRUCTION SHOULD BE STANDARD SIGNAGE, FLAGGERS & LIGHTING AND SHALL CONFORM TO THE REQUIREMENTS AS OUTLINED IN THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD) LATEST EDITION.

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act".

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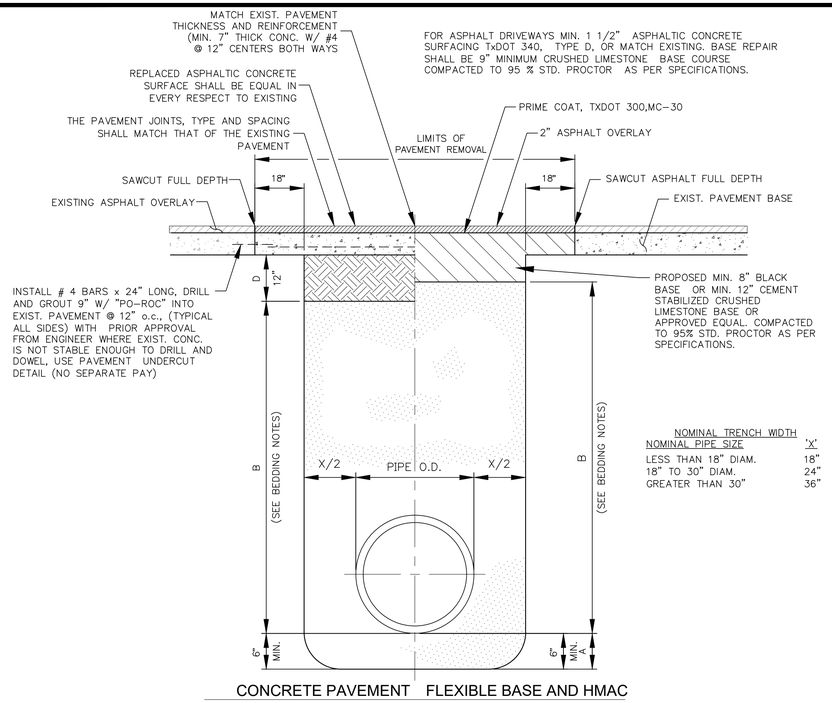
SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY: C. CHUDOBA
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A V: N/A

TRAFFIC CONTROL PLAN (INSIDE LANE CLOSURE 4 LANE ROAD)



NOMINAL TRENCH WIDTH	
NOMINAL PIPE SIZE	'X'
LESS THAN 18" DIAM.	18"
18" TO 30" DIAM.	24"
GREATER THAN 30"	36"

SANITARY SEWER TRENCH DETAIL FOR PIPES UNDER EXISTING PAVEMENT & PAVEMENT REPAIR DETAIL

NOT TO SCALE

BEDDING & BACKFILL NOTES:

A. CEMENT STABILIZED SAND (AS PER SPECIFICATIONS) PLACED BEFORE PIPE IS LAID UP TO FLOW LINE OF PIPE OR TO FLOW LINE OF PIPE OR ABOVE – MIN. DEPTH = 6".

B. CEMENT STABILIZED SAND (AS SPECIFIED) THOROUGHLY RODDED, PLACED AFTER PIPE IS LAID. CEMENT STABILIZED SAND TO 6 INCHES BELOW BOTTOM OF SUBGRADE FOR BACKFILL UNDER ALL DRIVEWAYS AND SIDEWALKS.

C. NATIVE EARTH BACKFILL, CONTAINING NO ROCKS OR OTHER DEBRIS NOR CONTAINING ANY DIRT CLODS EXCEEDING 6" IN ANY DIMENSION. PLACED IN 6" LAYERS, PROCESSED IF NECESSARY AND THOROUGHLY COMPACTED TO A DENSITY EQUIVALENT TO A MIN. OF 90% OF MAX. DRY DENSITY AS DETERMINED BY ASTM D698, UNLESS OTHERWISE NOTED.

D. SELECT EARTH BACKFILL, MAX. LIQUID LIMIT 40 ASTM D4318, P.I. MIN 7, MAX 20 CONTAINING NO ROCKS OR OTHER DEBRIS NOR CONTAINING ANY DIRT CLODS EXCEEDING 6" IN ANY DIMENSION. PLACED IN 6" LAYERS AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM STANDARD PROCTOR DRY DENSITY (ASTM D698) AND AT A MOISTURE CONTENT WITHIN TWO PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT.

E. FOR SANITARY SEWER FORCE MAINS, UTILIZE COMPACTED BANK SAND IN LIEU OF CEMENT STABILIZED SAND FOR NOTES A & B ABOVE.

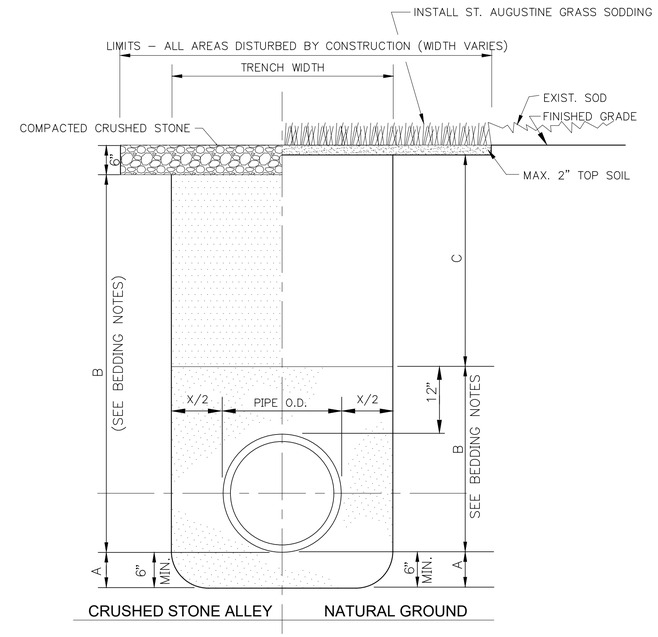
* IF OUTSIDE EDGE OF PIPE IS WITHIN 2' OF BACK OF CURB, BACKFILL SHALL BE PERFORMED AS UNDER PAVEMENT.

SODDING AND SEEDING NOTES:

1. SODDING OR SEEDING OR HYDROMULCH SHALL BE INSTALLED IN AREAS DISTURBED BY CONSTRUCTION. CONTRACTOR MUST APPLY A BROADCAST FERTILIZER TO ALL AREAS THAT HAVE BEEN RESTORED.

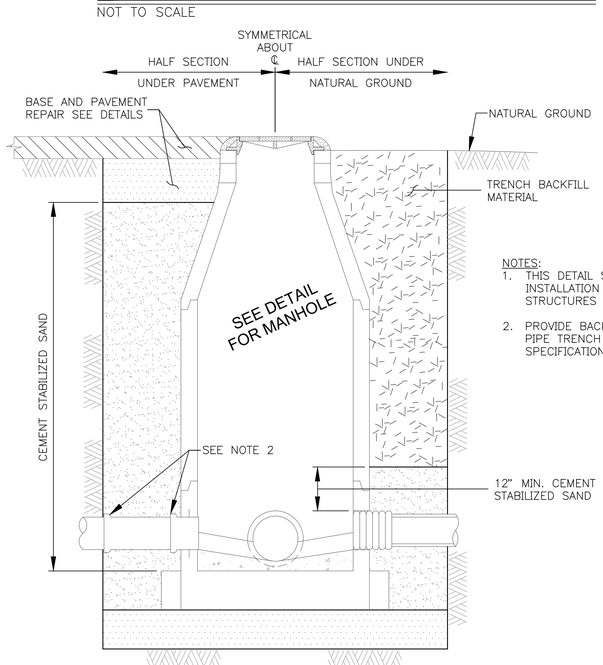
2. CONTRACTOR SHALL REPLACE SODDING IN AREAS DAMAGED BY CONSTRUCTION. SUCH REPLACEMENT SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.

3. IF EXISTING LANDSCAPING OTHER THAN GRASS IS WITHIN THESE AREAS, THE CONTRACTOR SHALL REBUILD OR REINSTALL THE LANDSCAPING OF THE AREA AFTER CONSTRUCTION TO AN EQUAL OR BETTER CONDITION.



SANITARY SEWER TRENCH DETAIL FOR PIPES UNDER NATURAL GROUND AND ALLEY

NOT TO SCALE

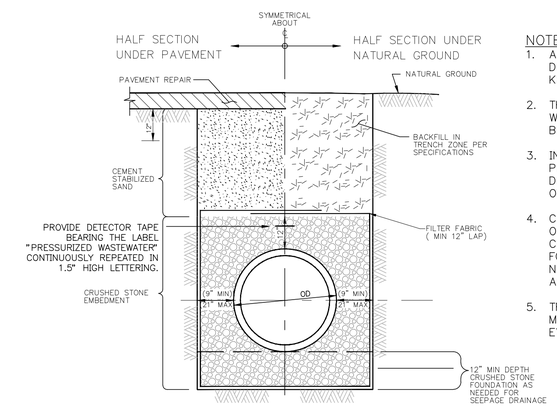


NOTES:
1. THIS DETAIL SHALL BE UTILIZED FOR INSTALLATION OF MANHOLES AND STRUCTURES IN INSERTION PITS.
2. PROVIDE BACKFILL TO MATCH ADJACENT PIPE TRENCH BACKFILL PER STANDARD SPECIFICATION.

TYPICAL CROSS - SECTION

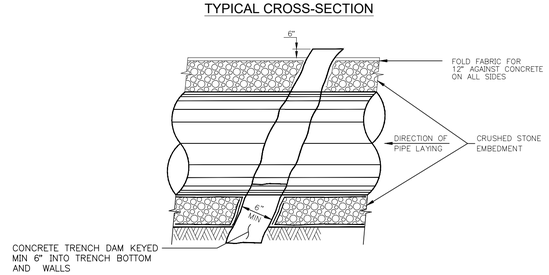
BACKFILL OF MANHOLES, INSERTION PITS, AND STRUCTURES

NOT TO SCALE



TYPICAL CROSS-SECTION

NOTES:
1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL IS TO BE USED TO PROVIDE A FIRM STABLE TRENCH BOTTOM WHERE MECHANICAL DEWATERING CANNOT PROVIDE A FIRM STABLE TRENCH BOTTOM.
3. IN THE EVENT A FIRM STABLE TRENCH BOTTOM CANNOT BE OBTAINED PRIOR TO IMPLEMENTING THIS DETAIL OR AFTER IMPLEMENTING THIS DETAIL, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OR OWNER'S REPRESENTATIVE.
4. CRUSHED STONE EMBEDMENT SHALL MEET ASTM D2321 CLASS IA, CLASS IB OR CLASS II MATERIAL. USE A SUITABLE GRADED MATERIAL WHERE CONDITIONS MAY CAUSE MIGRATION OF FINES AND LOSS OF PIPE SUPPORT. FOR SEVERE CONDITIONS A SPECIAL FOUNDATION MAY BE REQUIRED. NOTIFY THE ENGINEER OR OWNER'S REPRESENTATIVE IF SUCH CONDITIONS ARE PRESENT.
5. TRENCH DAM SHALL BE PLACED A MINIMUM OF ONE BETWEEN EACH MANHOLE WHEN INSTALLED WITH SANITARY SEWERS OR 300 FEET WHICH EVER IS LESS WHEN INSTALLED WITH SANITARY SEWERS OR WATERLINES.



LONGITUDINAL SECTION ALONG PIPE CENTERLINE AT FOUNDATION TRENCH DAM

WET CONDITION BEDDING

NOT TO SCALE

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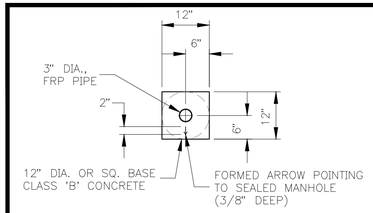
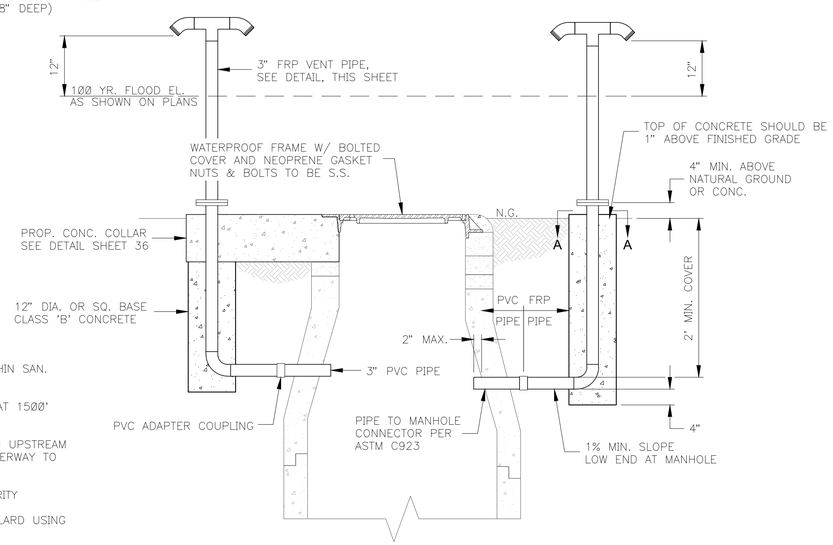
DRAWN BY:
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A' V: N/A

CONSTRUCTION DETAILS I



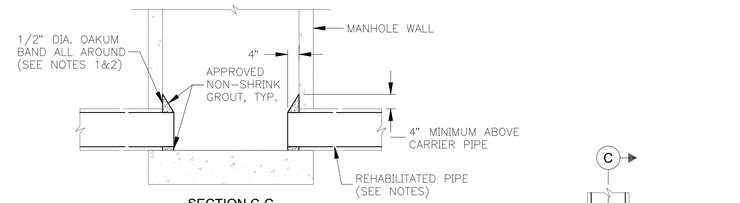
SECTION A-A



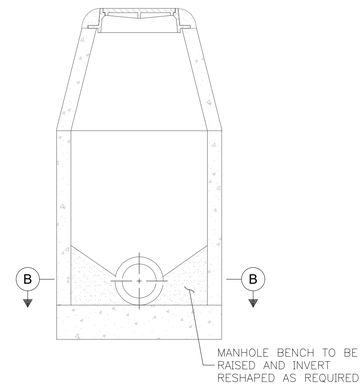
NOTES:
1. VENT TO BE INSTALLED WITHIN SAN. SWR. EASEMENT.
2. VENT PIPE TO BE PLACED AT 1500' MAX. SPACING
3. BOLLARD TO BE PLACED ON UPSTREAM SIDE OF BEAR BRANCH WATERWAY TO PROTECT VENT PIPE
4. BOLLARD OMITTED FOR CLARITY
5. SECURE VENT PIPE TO BOLLARD USING S.S. HARDWARE

SEALED AND VENTED MANHOLE

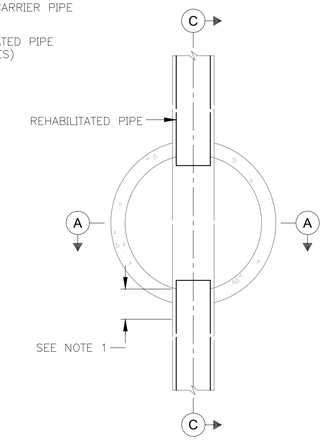
NOT TO SCALE



SECTION C-C



SECTION A-A

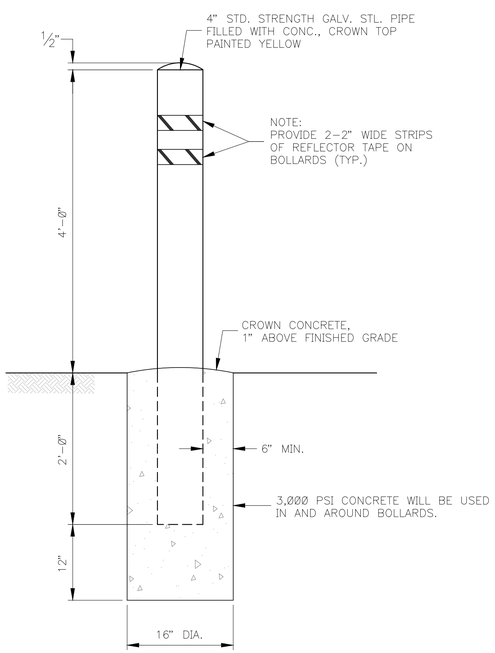


SECTION B-B

NOTES:
1. THE EXISTING ANNULAR SPACE BETWEEN MANHOLE WALL AND THE PIPE, IF ANY, SHALL BE FILLED WITH ACTIVATED OAKUM, MINIMUM 12 INCH OR ONE-HALF PIPE DIAMETER.
2. ALL OAKUM SHALL BE SOAKED IN SCOTCH SEAL 5600 OR EQUAL.

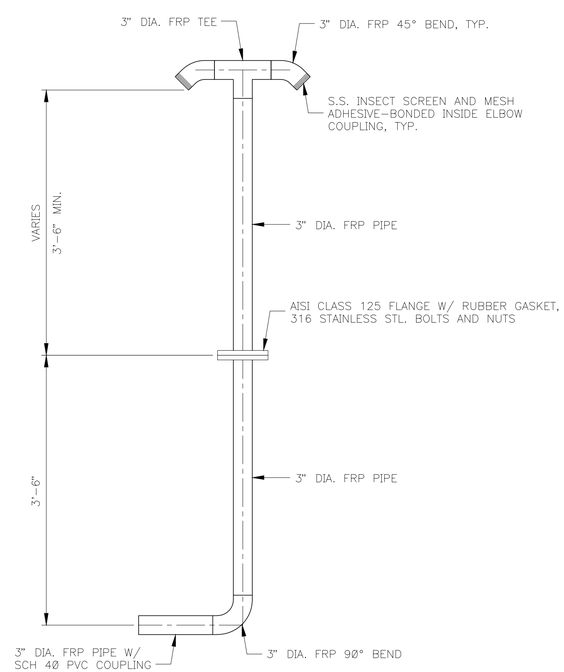
SANITARY SEWER SEALING OF PIPE BURSTING & CURED IN PLACE PIPE AT EXISTING MANHOLE

NOT TO SCALE



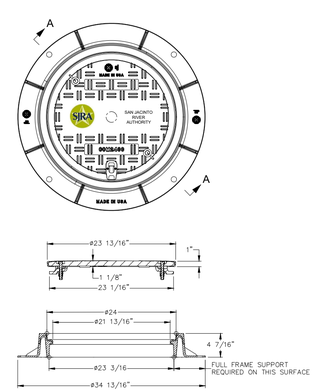
BOLLARD DETAIL

NOT TO SCALE



VENT DETAIL

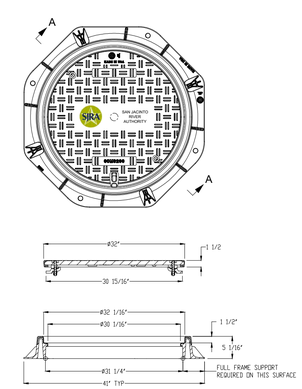
NOT TO SCALE



SECTION A-A

24" COMPOSITE SANITARY SEWER MANHOLE FRAME & COVER

NOT TO SCALE



SECTION A-A

32" COMPOSITE SANITARY SEWER MANHOLE FRAME & COVER

NOT TO SCALE

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STATE OF TEXAS
JOSE F. VELASQUEZ
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9-13-19

ARKK Engineers, LLC
Texas Registered Engineering Firm F-13872

SAN JACINTO RIVER AUTHORITY
WOODLANDS DIVISION

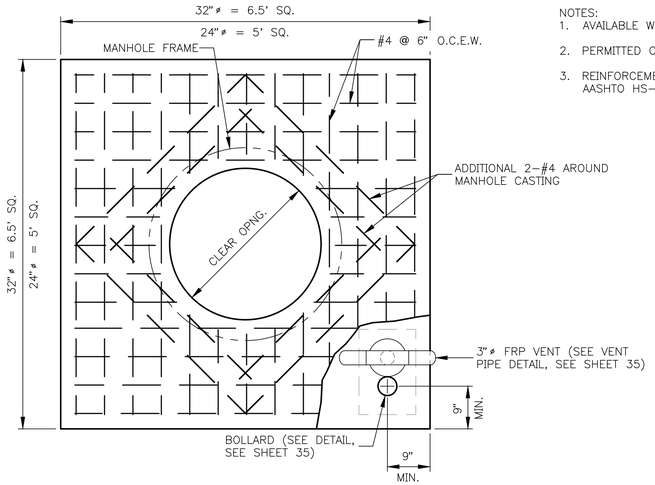
SAN JACINTO RIVER AUTHORITY
SJRA
www.SJRA.net

REHABILITATION OF BEAR BRANCH GRAVITY MAIN

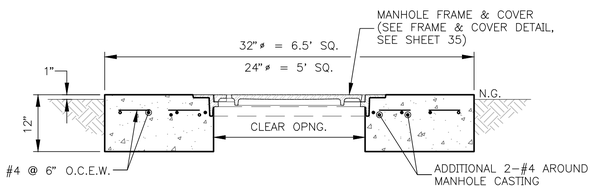
ISSUE	DATE	DESCRIPTION

SJRA PROJECT NO: WDPR0082.1001.2N001
ARKK PROJECT NO: 17-042
DRAWN BY:
CHECKED BY: J. VELASQUEZ
SCALE: H: N/A V: N/A

CONSTRUCTION DETAILS II

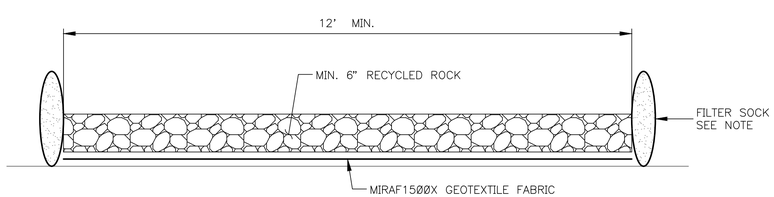


NOTES:
1. AVAILABLE WITH RING AND COVER CAST IN PLACE.
2. PERMITTED ONLY WITH WRITTEN APPROVAL FROM OWNER.
3. REINFORCEMENT SHALL MEET DESIGN REQUIREMENTS FOR AASHTO HS-20 LOADING.



RING & COVER COLLAR

NOT TO SCALE



NOTE:
1. GRAVEL ACCESS ROAD MAY REQUIRE A FILTER SOCK ON BOTH SIDES OF THE GEOTEXTILE FABRIC TO CONTAIN THE ROCKS IN THE FABRIC.

TEMPORARY GRAVEL ACCESS ROAD

NOT TO SCALE

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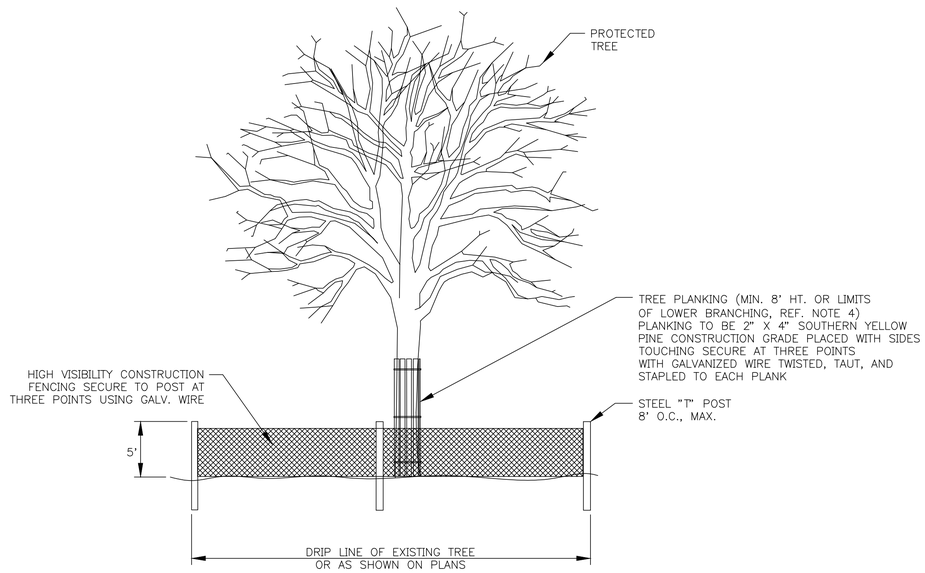
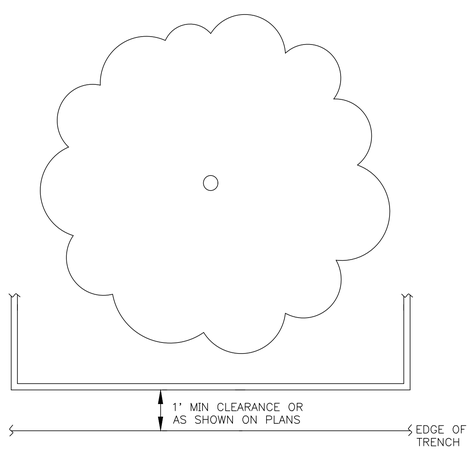
CONSTRUCTION DETAILS III



TREE PROTECTION DETAIL



TREE PROTECTION DETAIL

NOTES:

1. ALL TREES SHOWN ON THE PLANS SHALL BE PROTECTED THROUGHOUT CONSTRUCTION WITH TREE PROTECTION.
2. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO MOBILIZATION.
3. FENCING SHALL BE LOCATED AS SHOWN ON DRAWINGS, OR COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES AND WILL BE LOCATED AT THE OUTERMOST LIMITS OF THE TREE BRANCHES (DRIPLINE). THE DRIPLINE DEFINES THE 'ROOT ZONE'. WITHIN THE LIMITS OF FENCING, THE CONTRACTOR SHALL PREVENT THE FOLLOWING FROM OCCURRING WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE OWNER'S REPRESENTATIVE:
   A. SOIL COMPACTION IN THE ROOT ZONE AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIALS.
   B. ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES (GREATER THAN 3" CUT OR FILL) OR TRENCHING NOT REVIEWED OR AUTHORIZED.
   C. WOUNDS TO EXPOSED ROOTS, TRUNK, OR LIMBS BY MECHANICAL EQUIPMENT.
   D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CONCRETE TRUCK CLEANING, AND FIRES.
4. WHERE EXCEPTIONS RESULT IN A FENCE BEING CLOSER THAN 4 FEET TO A TRUNK, PROTECT THE TRUNK WITH STRAPPED-ON PLANKING TO A HEIGHT OF 8' (OR TO THE LIMITS OF THE LOWER BRANCHING) AS INDICATED ON TREE PROTECTION PLANS.
5. ALL GRADING WITHIN PROTECTED ROOT ZONE AREAS SHALL BE DONE BY HAND TO MINIMIZE ROOT DAMAGE AND SOIL COMPACTION. PRIOR TO GRADING, RELOCATE PROTECTIVE FENCING TO 2 FEET BEHIND THE GRADE CHANGE AREA. GRADE SHALL REMAIN UNCHANGED WHERE POSSIBLE.
6. ANY ROOT SEVERED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN 2 DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES DRYING OF THE ROOT DUE TO EVAPORATION.
7. TREES IMPACTED BY CONSTRUCTION ACTIVITIES SHALL BE WATERED THOROUGHLY ONCE A WEEK DURING PERIODS OF HOT AND/OR DRY WEATHER. TREE CROWNS SHALL BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.
8. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN 3" MAXIMUM SHALL BE PERMITTED WITHIN THE DRIPLINE OF TREES. NO PERMANENT SOIL OR MULCH IS PERMITTED ON THE ROOT FLARE OF ANY TREE.
9. PRUNING SHALL BE PERFORMED BY THE CONTRACTOR TO PROVIDE CLEARANCE FOR STRUCTURES OR CONSTRUCTION ACTIVITIES. PRUNING SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS, ONLY WITH PRIOR APPROVAL FROM AUTHORITY'S ENGINEER. ALL PRUNING MUST BE ACCORDING TO RECOGNIZED, APPROVED STANDARDS OF THE INDUSTRY (REFERENCE THE NAA PRUNING STANDARDS), AND BY AN EXPERIENCED AND QUALIFIED ARBORIST WHOSE PRIMARY BUSINESS IS TREE CARE.
10. PROVIDE CORRECTIVE PRUNING AT THE COMPLETION OF CONSTRUCTION TO REMOVE ANY BROKEN OR DAMAGED LIMBS, UNDER THE DIRECTION OF THE AUTHORITY'S ENGINEER.
11. IF REQUIRED, ROOT PRUNE BY TRENCHING A CLEAN 4" WIDE X 24" DEEP CUT BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH IRRIGATION TRENCHER TO MINIMIZE DAMAGE TO REMAINING ROOTS. MARK AND REVIEW TRENCH LINE WITH AUTHORITY'S ENGINEER PRIOR TO TRENCHING.
12. AS SOON AS 4" WIDE X 24" DEEP TRENCH IS CUT, EXPOSED ROOTS SHALL BE HAND CUT TO CREATE CLEAN ROOT CUTS. AS SOON AS HAND CUTS ARE COMPLETE, BACKFILL TRENCH WITH A SANDY LOAM TOPSOIL PLACED IN 6" LIFTS, AND COMPACTED AS REQUIRED BY SPECIFICATIONS.
13. IN AREAS WHERE LIME STABILIZATION ABUTS OR ENCROACHES UPON ROOT ZONES, AND WHERE ROOT PRUNING IS CALLED FOR, INSTALL 10-MIL. PLASTIC SHEETING TO FULL DEPTH OF ROOT PRUNING TRENCH AND 6" OVER TOP. CUT AND REMOVE EXPOSED PLASTIC AT COMPLETION OF WORK.

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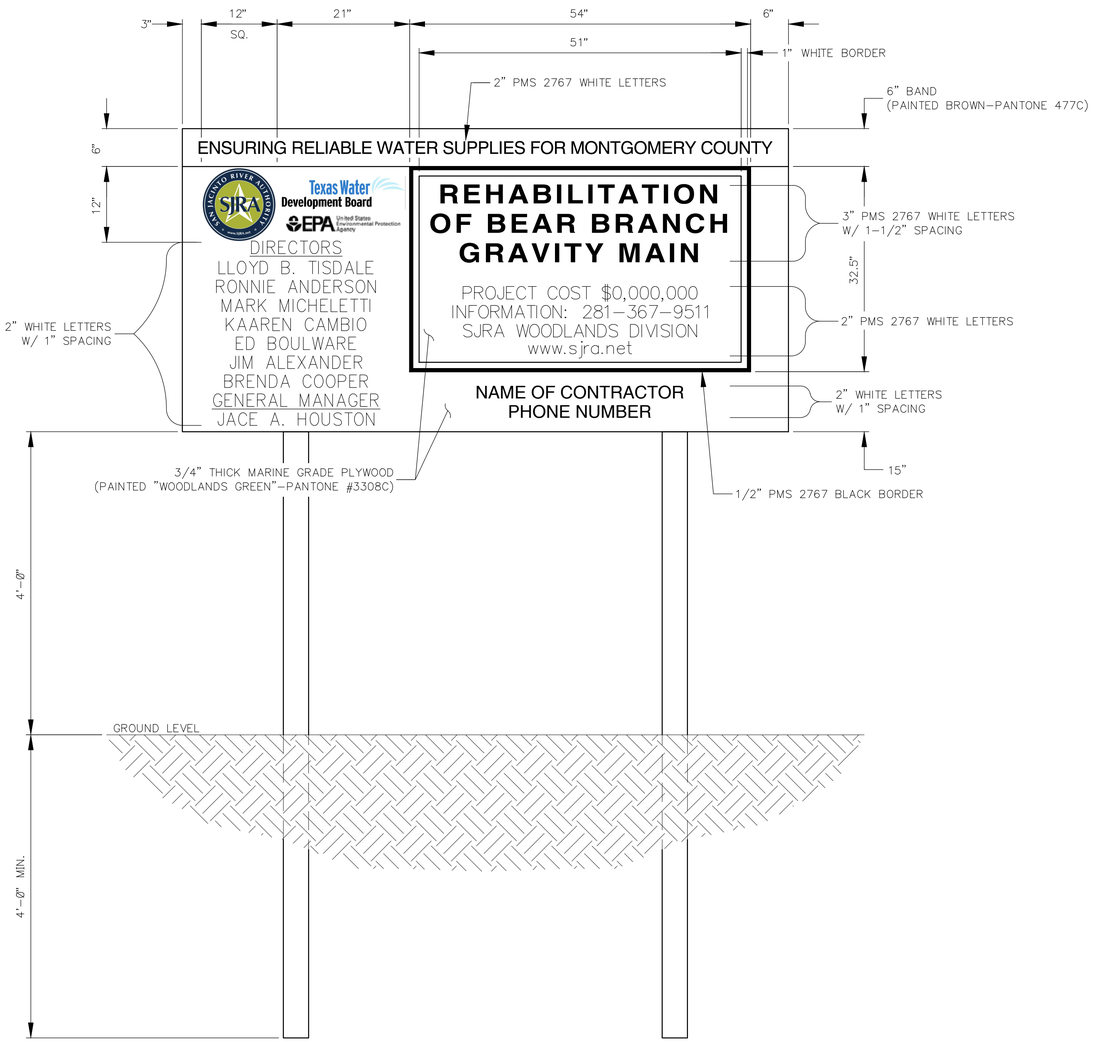
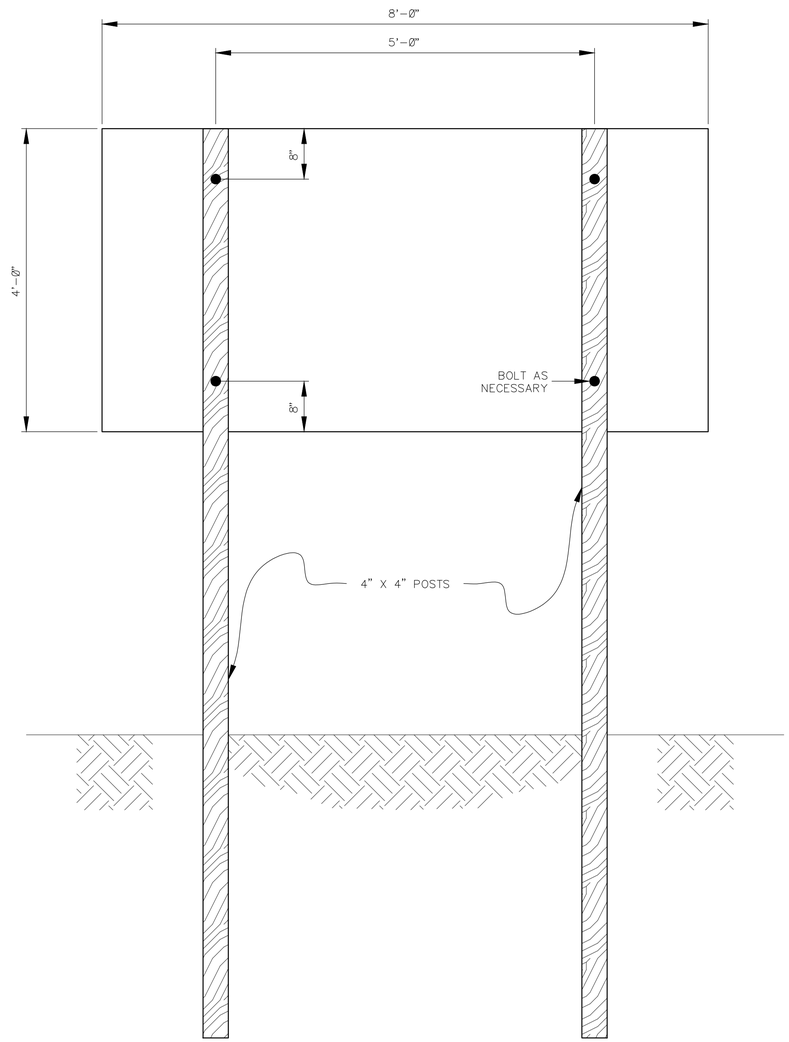
TREE PROTECTION DETAILS



FRONT VIEW



BACK VIEW

PROJECT SIGN

SCALE: 1" = 1'–0"

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CHECKED BY: J. VELASQUEZ
SCALE: H: AS SHOWN

PROJECT SIGN