# Appendix A

# 100% Design Plan Drawings
# Exposed Siphon

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## LEGEND

| | |
|---|---|
| EXISTING TREES | |
| EXISTING TREES TO PRESERVE | |
| EXISTING CONTOURS (MAJOR) | 60 |
| EXISTING CONTOURS (MINOR) | 61 |
| PROPOSED CONTOURS (MAJOR) | 60 |
| PROPOSED CONTOURS (MINOR) | 61 |
| EXISTING FENCE | |
| GRADING SLOPE | |
| ALIGNMENT | 1+00 |
| DEMOLISH EXISTING STRUCTURE | |
| GRADING (CUT) | |
| GRADING (FILL) | |
| CAST IN PLACE CONCRETE | |
| REVEGETATION AREA | |
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| ENGINEERED STREAM BED MATERIAL | |

# US Fish and Wildlife Service

CONSTRUCTION PLANS FOR

# REPLACEMENT OF LOS MOLINOS MUTUAL WATER COMPANY SIPHON UNDER MILL CREEK

# 100% DESIGN PLAN

JANUARY 2015

PROJECT OWNER

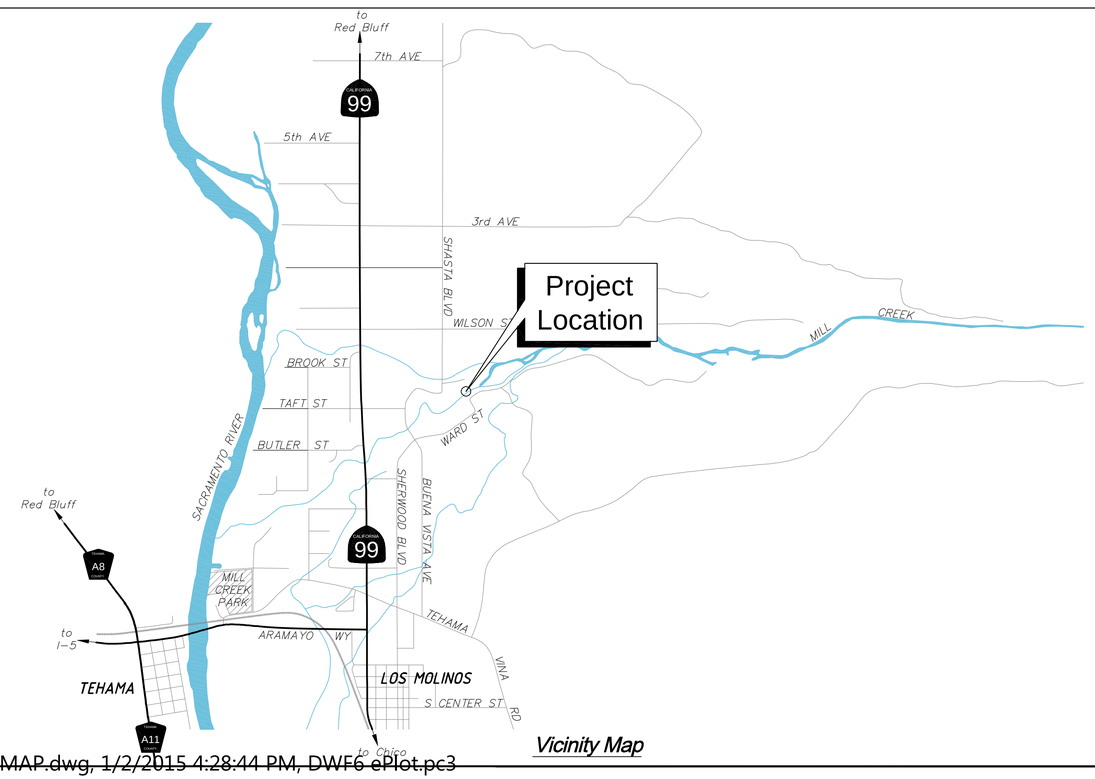
LOS MOLINOS MUTUAL WATER COMPANY

APPROVED BY:

xxxxxxxxxxxx, title (date)

xxxxxxxxxxxx, title (date)

xxxxxxxxxxxx, title (date)




Vicinity Map

Client / Agency

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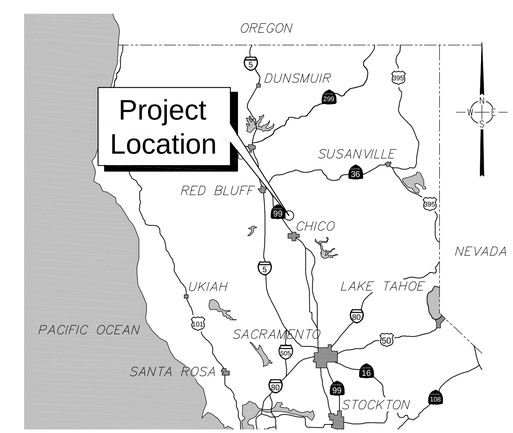


Project Location Map

| Drawing Name | Designer | Drafter | Checked | Job Number | Date |
|---|---|---|---|---|---|
| SIPHON BASEMAP.dwg | jp | tvs | kmr | 50655 | 02 January 2015 (16:28) |

Sheet 1 of 12

Sheet Number G1

GENERAL

1. SUMMARY
1.1. THE PROJECT OWNER WILL DESIGNATE A REPRESENTATIVE, REFERRED TO HEREIN AS THE ENGINEER, TO OVERSEE THE CONSTRUCTION AND COORDINATE WITH LOS MOLINOS MUTUAL WATER COMPANY, CONTRACTOR AND PERMITTING AGENCIES.
1.2. THE WORK WILL BE PERFORMED AT SIPHON SITE ON MILL CREEK IN TEHAMA COUNTY. THE WORK INCLUDES BUT IS NOT LIMITED TO: EXCAVATION; SPOILS DISPOSAL; STRUCTURAL FILL PLACEMENT; FORMING, PLACING, AND FINISHING PORTLAND CEMENT CONCRETE; FURNISHING AND INSTALLING BOULDER CLUSTERS AND ENGINEERED STREAMBED MATERIAL; AND SITE CLEANUP AND RESTORATION.
1.3. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS TO COMPLETE ALL WORK ON THE PLANS AND DESCRIBED IN THE SPECIFICATIONS.

TEMPORARY ACCESS

1. SUMMARY
1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO DEVELOP AND MAINTAIN ADEQUATE CONSTRUCTION ACCESS TO THE WORK.
2. SUBMITTALS
2.1. CONTRACTOR SHALL SUBMIT A TEMPORARY SITE ACCESS PLAN DESCRIBING METHODS TO BE USED FOR ACCESS TO JOB SITE. THE PLAN SHALL DESCRIBE: THE APPROACH FOR CONSTRUCTION ACCESS TO PROJECT SITE; METHODS FOR DELIVERY OF MATERIALS AND TRANSFER TO STAGING AND WORK AREAS; INSTALLATION OF TEMPORARY CONSTRUCTION BMPs TO PROTECT SOILS, VEGETATION, AND WATER QUALITY DURING CONSTRUCTION; AND METHODS TO PROTECT VEGETATION AND GROUND SURFACES OUTSIDE THE AREAS OF WORK.
2.2. NO WORK SHALL OCCUR UNTIL THE PLAN IS APPROVED BY THE ENGINEER.
3. EXECUTION
3.1. ANY WORK REQUIRED TO MAKE ACCESS ROADS SERVICEABLE FOR CONSTRUCTION OPERATIONS SHALL BE AT THE CONTRACTOR'S EXPENSE.
3.2. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING FACILITIES AND ACCESS ROADS UTILIZED FOR PERFORMANCE OF THE WORK TO MEET PRE-CONSTRUCTION CONDITIONS.

TEMPORARY STREAM DIVERSION AND DEWATERING

1. SUMMARY
1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO PROVIDE TEMPORARY STREAM DIVERSIONS AND ANY DEWATERING ACTIVITIES NECESSARY TO PERFORM THE WORK.
2. SUBMITTALS
2.1. CONTRACTOR SHALL PROVIDE A STREAM DIVERSION AND DEWATERING PLAN THAT DESCRIBES THE MATERIALS AND METHODS TO BE USED TO INSTALL AND MAINTAIN STREAM DIVERSIONS. THE PLAN SHALL OUTLINE THE SEQUENCE OF WORK AND THE METHODS FOR DEWATERING AND REWATERING THE CREEK.
2.2. NO WORK SHALL OCCUR UNTIL THE PLAN IS APPROVED BY THE ENGINEER.
3. CONDITIONS AND REQUIREMENTS
3.1. THE WORK WILL BE CONSTRUCTED WHEN RIVER FLOWS ARE GENERALLY LOW. EACH TEMPORARY STREAM DIVERSION SHALL BE SIZED TO ACCOMMODATE TYPICAL SUMMER FLOWS WITHOUT UNDUE EROSION. IN THE EVENT THAT FLOW IS FORECASTED TO RISE SIGNFICANTLY ABOVE THE TYPICAL SUMMER FLOW DURING THE CONSTRUCTION PERIOD, THE ENGINEER MAY REQUIRE THE WORK TO BE HALTED (EXCEPT FOR THE INSTALLATION AND MAINTENANCE OF CONSTRUCTION BMPs) AND THE TEMPORARY STREAM DIVERSIONS TO BE REMOVED. IN THE EVENT THAT WORK IS RESUMED, RE-INSTALLATION OF TEMPORARY STREAM DIVERSIONS WILL BE PAID FOR AS EXTRA WORK.
3.2. THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN THE TEMPORARY DIVERSION DAMS DURING THE COURSE OF THE PROJECT IN FULLY FUNCTIONING CONDITION AT NO ADDITIONAL COST TO THE OWNER. THE ENGINEER MAY REQUIRE THAT WORK BE HALTED WHILE ANY NECESSARY REPAIRS OR REPLACEMENTS ARE MADE.
3.3. THE CONTRACTOR SHALL PROVIDE AT LEAST 24 HOURS ADVANCE NOTICE TO THE ENGINEER PRIOR TO REINTRODUCING RIVER FLOWS INTO ANY CONSTRUCTED CHANNEL.
3.4. DEWATERING OF EXCAVATION TRENCH/SHORING: THE CONTRACTOR SHALL PROVIDE A PLAN TO ACHIEVE WORKABLE GROUND CONDITION FOR PIPE INSTALLATION & MATERIALS CONFORMING WITH THE PLANS, SPECIFICATIONS AND PERMIT CONDITION. THE SEEPAGE FLOW DEWATERING PLAN SHALL BE SUBMITTED A MINIMUM OF 2 WORKING DAYS PRIOR TO EXCAVATION WORK, FOR APPROVAL BY THE ENGINEER.
3.5. THE GENERAL DIVERSION RETURN FLOW REQUIREMENT: CONSTRUCTION WATER SHALL BE PUMP INTO AN INFILTRATION POND ON THE FLOODPLAIN TO RETURN THIS WATER TO MILL CREEK AS GROUNDWATER. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE NO DIRECT FLOW OF CONSTRUCTION WATER FLOW INTO MILL CREEK AND TAKE NECESSARY STEPS TO MAINTAIN INFILTRATION. IF WATER QUALITY TREATMENT CONDITIONS IN PROJECT PERMIT REQUIRE DIFFERENT METHOD, THE PERMIT REQUIREMENT SHALL PREVAIL.
4. PRODUCTS
4.1. PRELIMINARY TOP ELEVATIONS ARE SHOWN ON THE PLANS FOR REFERENCE. THE CONTRACTOR SHALL EVALUATE AND SET TOP ELEVATIONS BASED ON SPECIFIC DESIGNS TO BE IMPLEMENTED AND APPROVED BY THE ENGINEER. DAMS MAY BE DESIGNED AS SOLID BARRIERS OR WITH A GATED OPENING TO ALLOW GRADUAL REDUCTION AND INCREASE OF FLOWS.
4.2. DAMS SHALL BE CONSTRUCTED USING CLEAN MATERIALS THAT DO NOT POSE A RISK OF SEDIMENT DISCHARGE WHEN INSTALLED OR IF OVERTOPPED. DAMS MAY BE CONSTRUCTED ONSITE USING GRAVEL BAG AND PLASTIC SHEETING MATERIALS, OR MAY BE INSTALLED AS SOLID OR INFLATABLE IMPORTED BARRIERS SUCH AS WATER FILLED DAMS.
5. EXECUTION
5.1. TEMPORARY DIVERSION DAMS SHALL BE INSTALLED PRIOR TO PERFORMING WORK IN THE CHANNEL.
5.2. IF AQUATIC RELOCATION IS REQUIRED BY PROJECT PERMITS, CONTRACTOR SHALL ACCOMMODATE AQUATIC RELOCATION ACTIVITIES TO BE PERFORMED BY OTHERS AS DIRECTED BY THE ENGINEER.
5.3. DIVERSION DAMS MAY BE INSTALLED ON THE STREAMBED OR BY EXCAVATING BELOW STREAM GRADE AFTER AN INITIAL DIVERSION AND ISOLATION OF THE CHANNEL HAS BEEN COMPLETED.
5.4. DIVERSION DAMS SHALL BE COMPLETELY REMOVED AFTER COMPLETION OF CONSTRUCTION AND THE STREAMBED RESTORED.

TEMPORARY CONSTRUCTION BMPS

1. SUMMARY
1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO DEVELOP AND MAINTAIN ADEQUATE TEMPORARY CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPS) TO PROTECT WATER QUALITY AND PREVENT EROSION, AS SPECIFIED IN PROJECT PERMITS, AND AS SHOWN ON THE PLANS.
2. CONDITIONS AND REQUIREMENTS
2.1. THE OWNER WILL PROVIDE ALL REQUIRED PERMITS FOR THE PROJECT. THE CONTRACTOR SHALL COMPLY WITH ALL PERMIT PROVISIONS OF THE PROJECT.
2.2. MATERIAL STORAGE WILL BE LIMITED TO STAGING AREAS AND STOCKPILE AREAS APPROVED BY THE ENGINEER.
2.3. ALL CONSTRUCTION RELATED MATERIAL IMPORTED TO THE SITE SHALL BE CLEAN OR WASHED FREE OF ADHERED SOIL AND DELETERIOUS MATERIAL PRIOR TO FINAL PLACEMENT.
2.4. CONSTRUCTION EQUIPMENT SHALL BE INSPECTED FOR LEAKS AND STEAM CLEANED OFF-SITE PRIOR TO DEPLOYMENT. DURING CONSTRUCTION CONTRACTOR SHALL ROUTINELY INSPECT EQUIPMENT FOR LEAKS AND REMOVE ANY LEAKING EQUIPMENT FROM SERVICE UNTIL REPAIRED. CONTRACTOR SHALL MAINTAIN SPILL CLEANUP MATERIALS ONSITE AND RESPOND TO SPILLS AND LEAKS IMMEDIATELY TO CONTAIN AND REMOVE THE POLLUTANTS FROM THE SITE.
2.5. EXCAVATION, BACKFILL, AND PLACEMENT OF CONCRETE SHALL BE IN WORK AREAS ISOLATED FROM THE ACTIVE FLOWING CREEK.
3. PRODUCTS
3.1. CONSTRUCTION FENCING SHALL BE 48-INCH HIGH-DENSITY ORANGE POLYETHYLENE SAFETY FENCING WITH A MESH OPENING OF APPROXIMATELY 1 INCH BY 4 INCHES. FENCING SHALL BE ATTACHED TO STEEL OR WOOD POSTS INSTALLED IN THE GROUND AT LEAST 18 INCHES AND AT A MAXIMUM SPACING OF 12 FEET.
3.2. SILT BARRIER SHALL BE AS SHOWN ON THE PLANS WITH A 12-INCH DIAMETER COIR LOG INSTALLED IN A TRENCH ON THE UPSTREAM SIDE OF THE BARRIER,
3.3. GRAVEL BAGS SHALL BE MADE FROM A WOVEN GEOTEXTILE FABRIC. GRAVEL SHALL BE CLEAN GRANULAR MATERIAL LARGER THAN 0.25 INCHES.
3.4. PLASTIC SHEETING SHALL BE 6-mil MINIMUM POLYETHYLENE OR APPROVED EQUAL.
4. EXECUTION
4.1. TEMPORARY CONSTRUCTION BMPS AS SHOWN ON THE PLANS AND AS REQUIRED BY PROJECT PERMITS SHALL BE INSTALLED PRIOR TO MATERIAL DELIVERY AND CONSTRUCTION ACTIVITIES. NO SITE ACCESS FOR CONSTRUCTION OF THE WORK WILL BE PERMITTED UNTIL TEMPORARY CONSTRUCTION BMPS ARE INSTALLED AND APPROVED BY THE ENGINEER AT PROJECT SITE.
4.2. ADEQUATE PLASTIC SHEETING AND SILT BARRIER MATERIALS SHALL BE ON HAND TO COVER CONSTRUCTION MATERIALS IN THE EVENT THAT PRECIPITATION IS FORECAST. COVERS SHALL BE 6-mil PLASTIC SHEETING ENCIRCLED WITH A COIR LOG SILT BARRIER AND ANCHORED WITH GRAVEL BAGS. COVERS SHALL BE INSTALLED PRIOR TO PRECIPITATION. IF PRECIPITATION IS FORECAST OVERNIGHT OR OVER A WEEKEND, COVERS SHALL BE INSTALLED AT THE END OF THE WORK DAY.
4.3. AT THE COMPLETION OF CONSTRUCTION, TEMPORARY CONSTRUCTION BMPS SHALL BE COMPLETELY REMOVED FROM EACH DIVERSION SITE AND DISPOSED OF BY THE CONTRACTOR.
4.4. AREAS DISTURBED BY INSTALLATION OF TEMPORARY CONSTRUCTION BMPS, AND ANY OTHER AREAS DISTURBED BY CONSTRUCTION ACTIVITIES, SHALL BE LIGHTLY GRADED AND TREATED WITH WOOD CHIPS.

CLEARING AND GRUBBING

1. SUMMARY
1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO CLEAR AND GRUB TREES, PLANTS, BUSHES, WOOD, ORGANIC MATERIAL, AND OTHER MATERIALS NOT TO BE INCORPORATED IN THE WORK FROM THE AREA OF GRADING AS SHOWN ON THE PLANS.
2. CONDITIONS AND REQUIREMENTS
2.1. CLEARING AND GRUBBING OPERATIONS IN SENSITIVE AREAS NEAR THE CREEK AND DAMAGE TO EXISTING VEGETATION SHALL BE MINIMIZED. CLEARING AND GRUBBING OPERATIONS ARE SUBJECT TO THE REQUIREMENTS OF THE APPLICABLE PROVISIONS OF PROJECT PERMITS.
2.2. LOGS, BRANCHES, ROOTS, PLANTS, ORGANIC MATERIAL, REFUSE, AND OTHER MATERIAL REMOVED SHALL BE DISPOSED OF OFF THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING THE DISPOSAL SITE AND OBTAINING PERMISSION FOR DISPOSAL, FOR COMPLYING WITH APPLICABLE LAWS AND REGULATIONS FOR TRANSPORT OF MATERIALS TO BE DISPOSED, AND FOR APPROPRIATE DISPOSAL OF MATERIALS.
3. PRODUCTS
3.1. TREE WOUND PAINT SHALL BE BITUMINOUS BASED PAINT OF STANDARD MANUFACTURE SPECIFICALLY DESIGNATED FOR USE ON TREE WOUNDS AND CUTS.
4. EXECUTION
4.1. UTILITIES SHALL BE LOCATED BY UNDERGROUND SERVICE ALERT (USA) PRIOR TO COMMENCING CLEARING AND GRUBBING OPERATIONS AND UTILITIES SHALL BE PROTECTED.
4.2. THE ENGINEER WILL MARK THE TREES TO BE REMOVED IN THE FIELD. TREES TO BE REMOVED SHALL BE FELLED AND CUT FOR TRANSPORT. STUMPS AND ROOTS SHALL BE GRUBBED IN AREAS TO BE GRADED. GRUBBING SHALL REMOVE ROOTS LARGER THAN 3 INCHES IN DIAMETER TO A DEPTH OF AT LEAST 18 INCHES BELOW THE GROUND SURFACE. DEPRESSIONS FORMED BY GRUBBING SHALL BE REGRADED AS PART OF THE WORK OR FILLED WITH NATIVE MATERIAL TO BE FLUSH WITH THE ADJACENT GROUND SURFACE.
4.3. TREES AND VEGETATION TO REMAIN SHALL BE PROTECTED. NO GRADING SHALL OCCUR WITHIN 5 FEET OF TREES INDICATED ON THE PLANS AS PROTECTED. MINOR ADJUSTMENTS IN SLOPE STEEPNESS OR LIMITS OF EXCAVATION AND FILL MAY BE REQUIRED TO AVOID GRADING WITHIN 5 FEET OF THESE TREES. TREES INDICATED BY A "P" ON THE PLANS ARE TO BE PROTECTED, ALTHOUGH GRADING MAY OCCUR VERY CLOSE TO, OR AROUND, THE TRUNKS. EXCAVATION AND FILL IN THE VICINITY OF TREES SO INDICATED SHALL BE PERFORMED BY HAND, TO THE EXTENT NECESSARY TO AVOID DAMAGE TO THE TREES.
4.4. TREES LOCATED NEAR ACCESS ROUTES OR WITH BRANCHES THAT INTERFERE WITH THE WORK SHALL BE PRUNED TO PREVENT DAMAGE BY EQUIPMENT. BRANCHES SHALL BE CUT NEAR THE BOLE OF THE TREE OR ADJACENT BRANCH. CUTS SHALL BE NEATLY MADE, WITHOUT SPLINTERING OR TEARING THE BRANCH. CUTS ON BRANCHES LARGER THAN 1 ½ INCHES SHALL BE PAINTED WITH AN APPROVED TREE WOUND PAINT.

INSTREAM GRADING WORK

1. SUMMARY
1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO CONDUCT INSTREAM GRADING AND OTHER RELATED TASKS DESCRIBED IN THIS SECTION AND AS SHOWN ON THE DRAWINGS. WORK INCLUDED IN THIS SECTION INCLUDES:

1.1.1. FIELD LAYOUT OF STRUCTURES AND ADJUSTMENT TO FIELD CONDITIONS;
1.1.2. COORDINATION WITH THE OWNER OR OWNER'S REPRESENTATIVE TO MAKE FIELD ADJUSTMENTS TO THE CONFIGURATION OF IN-STREAM STRUCTURES, AS NOTED ON THE DRAWINGS;
1.1.3. CONSTRUCTION OF FEATURES AND STRUCTURES, INCLUDING ASSOCIATED EXCAVATION AND BACKFILL; ALSO INCLUDING COORDINATION FOR INSTALLATION OF PLANTINGS/REVEGETATION.

1.2. THE CONTRACTOR SHALL HAVE EXPERIENCE IN INSTREAM CONSTRUCTION AND SHALL HAVE EQUIPMENT AND TRAINED PERSONNEL APPROPRIATE TO THE WORK TO BE PERFORMED.

1.3. QUALITY ASSURANCE
1.3.1. WRITTEN GUARANTEE AGAINST DEFECTS
BEFORE FINAL ACCEPTANCE, THE CONTRACTOR SHALL PROVIDE A WRITTEN GUARANTEE AGAINST DEFECTS RESULTING FROM POOR INSTALLATION OF BIOENGINEERED STRUCTURES TO THE CONTRACTING OFFICER FOR A PERIOD OF 1 YEAR AFTER THE CONTRACTING OFFICER'S ACCEPTANCE OF THE COMPLETED INSTALLATION.
1.3.2. RECORD DRAWINGS
THROUGHOUT THE CONSTRUCTION PERIOD, THE CONTRACTOR SHALL KEEP WRITTEN AND PHOTOGRAPHIC NOTES RECORDING CONSTRUCTION EFFORTS AND ANY CHANGES, ADDITIONS, OR DELETIONS FROM THE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING RED-LINED RECORD ("AS-BUILT") DRAWINGS FOR USE BY OTHERS. THE RECORD DRAWINGS SHALL SHOW AS-BUILT CONDITIONS, INCLUDING INFORMATION ON THE CONSTRUCTION OF THE BIOENGINEERED STRUCTURES. THE CONTRACTOR SHALL DRAFT ALL CHANGES ON ONE SET OF BLUELINE DRAWINGS. AT THE CONTRACTOR'S OPTION, THE ORIGINAL CONSTRUCTION DRAWINGS CAN BE PROVIDED BY THE CONTRACTING OFFICER IN ELECTRONIC (AUTOCAD) FORMAT.

1.4. ENVIRONMENTAL REQUIREMENTS
SEE "TEMPORARY CONSTRUCTION BMPS" NOTES

2. MATERIALS
BOULDERS SHALL BE SOUND, DURABLE MATERIAL FREE FROM MAJOR CRACKS OR DEFECTS. BOULDERS MAY BE QUARRIED FROM EXCAVATION OR FROM BLASTED ROCK. BOULDERS SHALL BE SUB-ANGULAR OR ANGULAR AND BLOCKY IN SHAPE, AND WITH THE MAXIMUM AXIS DIMENSION NOT MORE THAN TWO TIMES THE MINIMUM AXIS DIMENSION. UNLESS OTHERWISE APPROVED BY THE CONTRACTING OFFICER,

EXCAVATED STREAMBED MATERIAL SHALL BE STOCKPILED AT DESIGNATED LOCATION SHOWN ON PLAN. UPON COMPLETION OF SIPHON PIPELINE AND CONCRETE CAP WORK, BACKFILL WITH EXCAVATED STREAMBED MATERIAL.

3. EXECUTION
3.1. SITE VERIFICATION OF CONDITIONS
THE CONTRACTOR SHALL VERIFY SITE CONDITIONS AT THE LOCATIONS OF GRADING WORK AND IDENTIFY ANY SITE CONDITIONS THAT WOULD REQUIRE MODIFICATIONS TO THE DESIGN. THE CONTRACTOR SHALL VERIFY THAT SUITABLE WATER CONTENT, SOIL, AND OTHER ENVIRONMENTAL CONDITIONS EXIST TO CONDUCT INSTREAM GRADING WORK.

3.2. BOULDER CLUSTERS
BOULDER CLUSTERS ARE INTENDED TO FUNCTION AS A FISH MIGRATION PATH DURING VERY LOW FLOW BY PROVIDING A SMALL CHANNEL, HYDRAULIC DROPS AND HYDRAULIC COVER. BOULDER CLUSTERS SHALL BE CONSTRUCTED BY EXCAVATING INTO THE STREAMBED, PLACING BANK BOULDERS IN AN ARC OR WEDGE SHAPE TO FORM A SMALL POCKET INSIDE THE PROPOSED LOW FLOW CHANNEL.

BOULDERS SHALL BE PLACED INDIVIDUALLY BY MACHINE, AND EACH ROCK SHALL BE ADJUSTED AND PUSHED INTO THE STRUCTURE TO PROVIDE STABLE BEARING ON AT LEAST 3 POINTS ON OTHER ROCKS IN THE STRUCTURE. FOLLOWING PLACEMENT OF THE BOULDERS, LARGER VOIDS SHALL BE CHINKED BY HAND WITH SMALLER ROCKS OR SPALLS.

VEGETATED REINFORCED SOIL SLOPE (VRSS)

1. SUMMARY
1.1. VEGETATED REINFORCED SOIL SLOPES ARE INTENDED TO STABILIZE THE STREAMBANK USING LAYERS OF VEGETATED FABRIC ENCAPSULATED SOIL. THE VRSS MAY BE CONSTRUCTED IN SECTIONS OF 6 LAYERS AS SHOWN ON THE DRAWINGS. VRSS SHALL BE CONSTRUCTED OVER A STABLE BASE FORMED BY A ROCK SCOUR APRON. AFTER THE FOUNDATION HAS BEEN COMPLETED, THE VRSS SHALL BE CONSTRUCTED IN LAYERS USING A FORM OR BATTER BOARD AS FOLLOWS:
2. MATERIAL
2.1. OUTER VRSS FABRIC
OUTER VRSS FABRIC SHALL BE AN OPEN WEAVE COIR BLANKET WITH A MINIMUM WEIGHT OF 700 GRAMS PER SQUARE METER AND MINIMUM OPEN AREA OF 35%. OUTER VRSS FABRIC SHALL BE BONTERRA CF-7, ROLANKA BIOD-MAT70, OR APPROVED EQUIVALENT.
2.2. INNER VRSS FABRIC
INNER VRSS FABRIC SHALL BE NORTH AMERICAN GREEN C125BN OR APPROVED EQUIVALENT. INNER VRSS FABRIC SHALL MEET THE FOLLOWING TEST REQUIREMENTS:

| TEST | TEST METHOD | REQUIREMENT |
|---|---|---|
| TENSILE STRENGTH – MD | ASTM D 6818 | 140 LBS/FT |
| ELONGATION – MD | ASTM D 6818 | 15% MAX |

2.3. NATIVE SOIL BACKFILL
SELECT NATIVE SOIL SHALL BE SILTY LOAM OR SANDY LOAM SOIL MATERIAL EXCAVATED FROM THE PROJECT AREA THAT IS FREE OF ROCKS, CLODS, ROOTS, AND LARGE ORGANIC MATERIAL, AND OTHER DELETERIOUS MATERIAL. IT SHALL BE EXCAVATED FROM AREAS THAT DO NOT HAVE SIGNIFICANT SOURCES OF SEEDS AND ROOTS OF NON-NATIVE INVASIVE VEGETATION, AS DESIGNATED BY THE ENGINEER.

2.4. BRUSH LAYER CUTTINGS
CUTTINGS ARE STOCKS OR BRANCHES TAKEN FROM LIVE GROWING MATERIAL AND STRIPPED OF ALL LATERAL BRANCHES OR TWIGS, FORMING A SINGULAR POLE. CUTTINGS CAN BE ANY TREE OR SHRUB SPECIES DESIGNATED AS SUCH, BUT GENERALLY ARE SPECIES THAT SPROUT EASILY AT NODES WHEN PLACED IN DIRECT CONTACT WITH SOIL.

3. EXECUTION
3.1. INSTALL TEMPORARY BATTER BOARD NEAR THE FRONT OF THE FOUNDATION. PLACE OUTER VRSS FABRIC (BONTERRA CF-7 OR BIOD-MAT70) FROM THE BACK OF THE EXCAVATION OR THE MINIMUM EMBEDMENT DISTANCE EXCAVATION UP TO AND OVER THE BATTER BOARD LEAVING 3.5 FT OF FABRIC EXTENDING BEYOND THE TOP OF THE BATTER BOARD. SIMILARLY PLACE VRSS INNER FABRIC (NORTH AMERICAN GREEN C125BN) ON TOP OF THE OUTER VRSS FABRIC.

3.2. FILL AREA BETWEEN THE BATTER BOARD AND THE BACK OF THE EXCAVATION WITH A LAYER OF NATIVE SOIL BACKFILL. PLACE THIS MATERIAL IN A 6-IN TO 9-IN FACE HEIGHT AND COMPACT AT 85 TO 90 PERCENT RELATIVE COMPACTION. WHEN THIS LAYER IS INSTALLED IT SHOULD SLOPE DOWNWARD TOWARD THE BACK OF THE EXCAVATION AT 1:10 (V:H) SLOPE.

3.3. MACHINE-PULL THE FABRIC THAT EXTENDED BEYOND THE BATTER BOARD OVER ON TOP OF THE COMPACTED SOIL AND SECURE BY STAKING.

3.4. PLACE A 1-IN LAYER OF NATIVE SOIL OVER THE FABRIC.

3.5. PLACE THE BRUSH LAYER CUTTINGS. PLACE 1-IN TO 2-IN OF SOIL AROUND AND OVER THE BRUSH LAYER CUTTINGS TO ENSURE THAT EACH CUTTING HAS CONTACT WITH ROOTING MEDIUM. THEE FINISH SURFACE OF THE LAYER SHALL BE LEVEL OR SLOPING SLIGHTLY BACK TOWARDS THE BANK

3.6. PLACE THE NEXT FABRIC ENCAPSULATED SOIL LIFT BY REPEATING STEPS A THROUGH E. REFER TO THE PLANS FOR SPECIFIED FACE SETBACK AND FABRIC SETBACK DISTANCES AND THE BENCH LOCATIONS

3.7. FOR THE TOP LIFT, THE BACKFILL SHALL SLOPE UPWARD TOWARD THE BACK EXCAVATION AT THE SLOPE NECESSARY TO ACHIEVE THE SPECIFIED TOP ELEVATION, BUT IN NO CASE STEEPER THAN 1:2.5(V:H) SLOPE. AFTER PULLING THE FABRIC OVER ON TOP OF THE COMPACT SOIL, SECURE IT WITH A STAKE.

HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS:

REFER TO ATTACHMENT "SECTION 331100 FOR HDPE PIPE AND FITTINGS" FOR DESIGN SPECIFICATIONS OF NEW HDPE PIPELINE.

CONCRETE AND CEMENT SLURRY:

REFER TO NOTES ON SHEET S1 FOR DESIGN SPECIFICATIONS OF INLET AND OUTLET STRUCTURES AND CEMENT SLURRY BACKFILL.


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PRELIMINARY NOT FOR CONSTRUCTION

| Revisions | | |
|---|---|---|
| No. | Date | Description |

| Drawing Information | |
|---|---|
| Date | 02 January 2015 (16:28) |
| Designer | jp |
| Drafter | tvs |
| Checked | kmr |
| File Name | SIPHON BASEMAP.dwg |
| Plotted Scale | 0 ½ 1 |

Siphon Replacement

GENERAL NOTES

Job Number 50655

Sheet Number G2

Sheet 2 of 12

ACCESS NOTES:

1. THE CONTRACTOR SHALL PROVIDE A TEMPORARY DETOUR ROAD DURING CONSTRUCTION WORK ON SOUTH BANK. THE DETOUR ROAD SHALL BE MINIMUM OF 12 FEET WIDE AND COMPACTED TO SUITABLE DRIVABLE CONDITION OR AS DIRECTED BY ENGINEER IN FIELD.
2. THE CONTRACTOR SHALL PROVIDE ADEQUATE TRAFFIC CONTROL FEATURES TO DIRECT VEHICLES SAFELY INTO THE DETOUR ROAD.
3. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL ACCESS ROADS TO PRE-PROJECT CONDITION OR BETTER UPON COMPLETION OF PROJECT.
4. THE STAGING AREA IDENTIFIED ON THE PLAN IS APPROXIMATE. THE CONTRACTOR SHALL COORDINATE WITH LAND OWNER AND ENGINEER TO DEFINE THE AREA SUITABLE FOR USE.

N

0' 100' 200' 300' 400'

SCALE 1"=100'

Client / Agency


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REGISTERED PROFESSIONAL ENGINEER JIMMY JINHUI PAN No. 79516 Exp: 06/30/16 CIVIL STATE OF CALIFORNIA

PRELIMINARY
NOT FOR CONSTRUCTION

| Revisions | | |
|---|---|---|
| No. | Date | Description |
| | | |

| Drawing Information | |
|---|---|
| Date | 08 January 2015 (11:26) |
| Designer | jp |
| Drafter | tvs |
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| File Name | SIPHON BASEMAP.dwg |
| Plotted Scale | 0 ½ 1 |

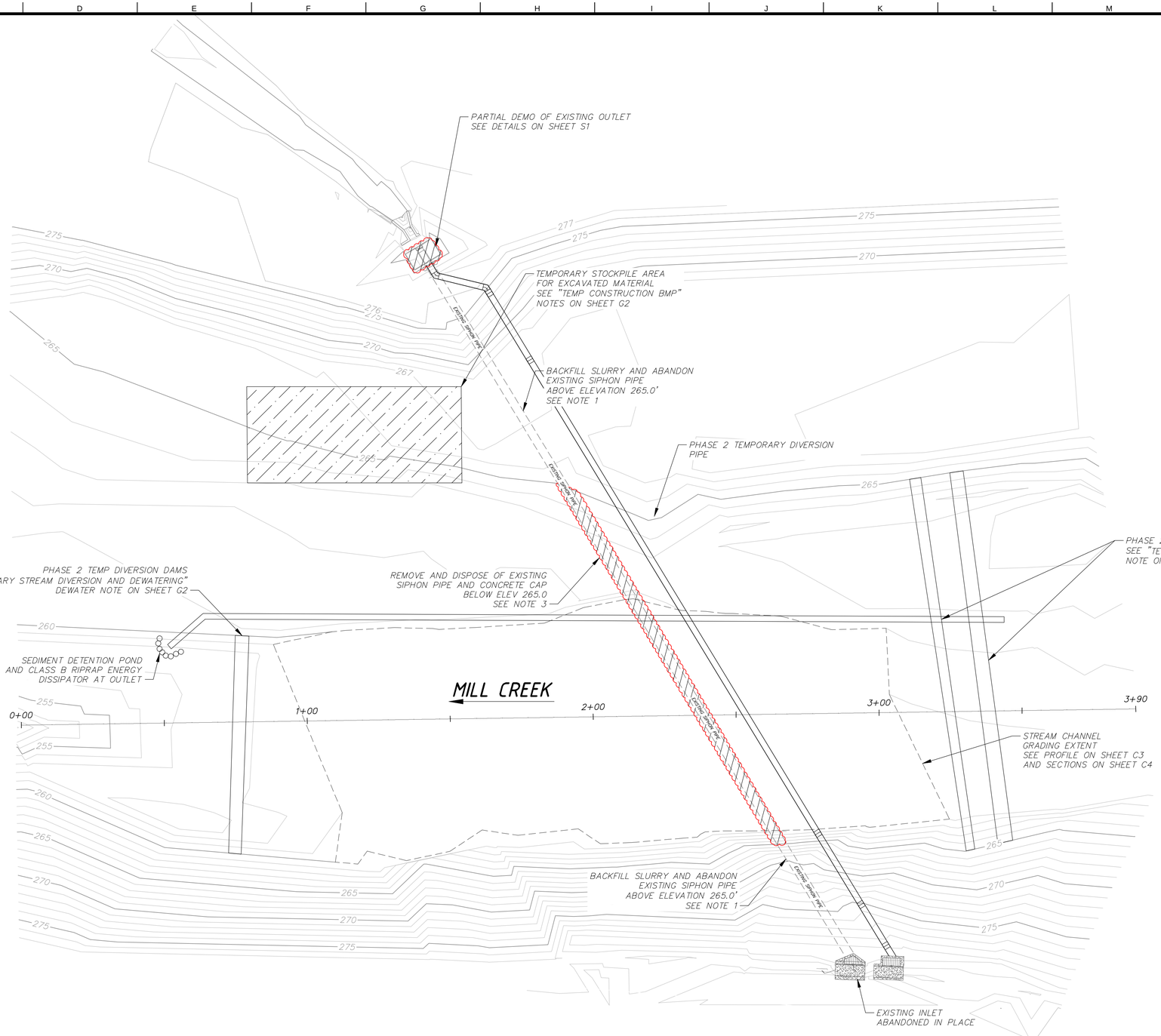
# Siphon Replacement

## SITE ACCESS AND STAGING AREA SHEET

Job Number
50655

Sheet Number
G3

Sheet 3 of 12




DEMOLITION NOTES:

1. BACKFILL SLURRY IN EXISTING PIPE WITH 2-SACK SAND CEMENT SLURRY. MINIMUM STRENGTH AT 7 DAYS AND 28 DAYS SHALL BE 100 PSI AND 300 PSI, RESPECTIVELY.
2. TO MAINTAIN THE OWNER'S DIVERSION FLOW TO THE NORTHWEST SIDE CANAL, THE EXISTING SIPHON PIPE SHALL BE DEMOLISHED AFTER THE NEW SIPHON PIPE AND CONCRETE CAP IS IN PLACE. THE TRANSITION BETWEEN OLD SIPHON PIPE AND NEW SIPHON PIPE SHALL RESULT IN NO MORE THAN 3 DAYS OF INTERRUPTION OF WATER SERVICE.
3. THE INSTALLATION OF SIPHON PIPE SHALL BE CONDUCTED IN TWO PHASES. PHASE 1 WORK SHALL INCLUDE WORK ON THE NORTHWEST SIDE FLOODPLAIN, OUTSIDE OF SUMMER STREAM CHANNEL. PHASE 2 WORK SHALL INCLUDE WORK ON THE SOUTHEAST SIDE, INCLUDING STREAM CHANNEL AND SOUTHEAST SIDE BANK SLOPE. PHASE 2 WORK REQUIRE TEMPORARY STREAM DIVERSION.
   - 3.1. CONSTRUCT TEMPORARY DIVERSION DAMS
   - 3.2. DEWATER STREAM CHANNEL AND INSTALL SUMP PUMPS TO MAINTAIN SATISFACTORY SOIL CONDITION FOR EXCAVATION
   - 3.3. INSTALL NEW SIPHON PIPE AND CAST-IN-PLACE CONCRETE CAP
   - 3.4. CONSTRUCT NEW SIPHON INLET AND OUTLET
   - 3.5. REMOVE AND DISPOSE OF EXISTING SIPHON PIPE
   - 3.6. BACKFILL AND AND GRADE STREAM CHANNEL PER PLAN SHEET C6
4. THE CONTRACTOR SHALL MAINTAIN SUITABLE WORKING AND SOIL CONDITION WITHIN THE EXCAVATION AREA. SEE NOTE 3.4 ON SHEET G2.
5. THE CONTRACTOR SHALL INSTALL SUMP PUMPS WITH INFILTRATION POND AT THE OUTLET TO ALLOW SEDIMENT AND SILT TO SETTLE OUT PRIOR TO RETURNING WATER TO STREAM. SEE NOTE 3.5 ON SHEET G2.


Client / Agency

U.S. Fish and Wildlife Service
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| File Name | SIPHON BASEMAP.dwg |
| Plotted Scale | 0 ½ 1 |

# Siphon

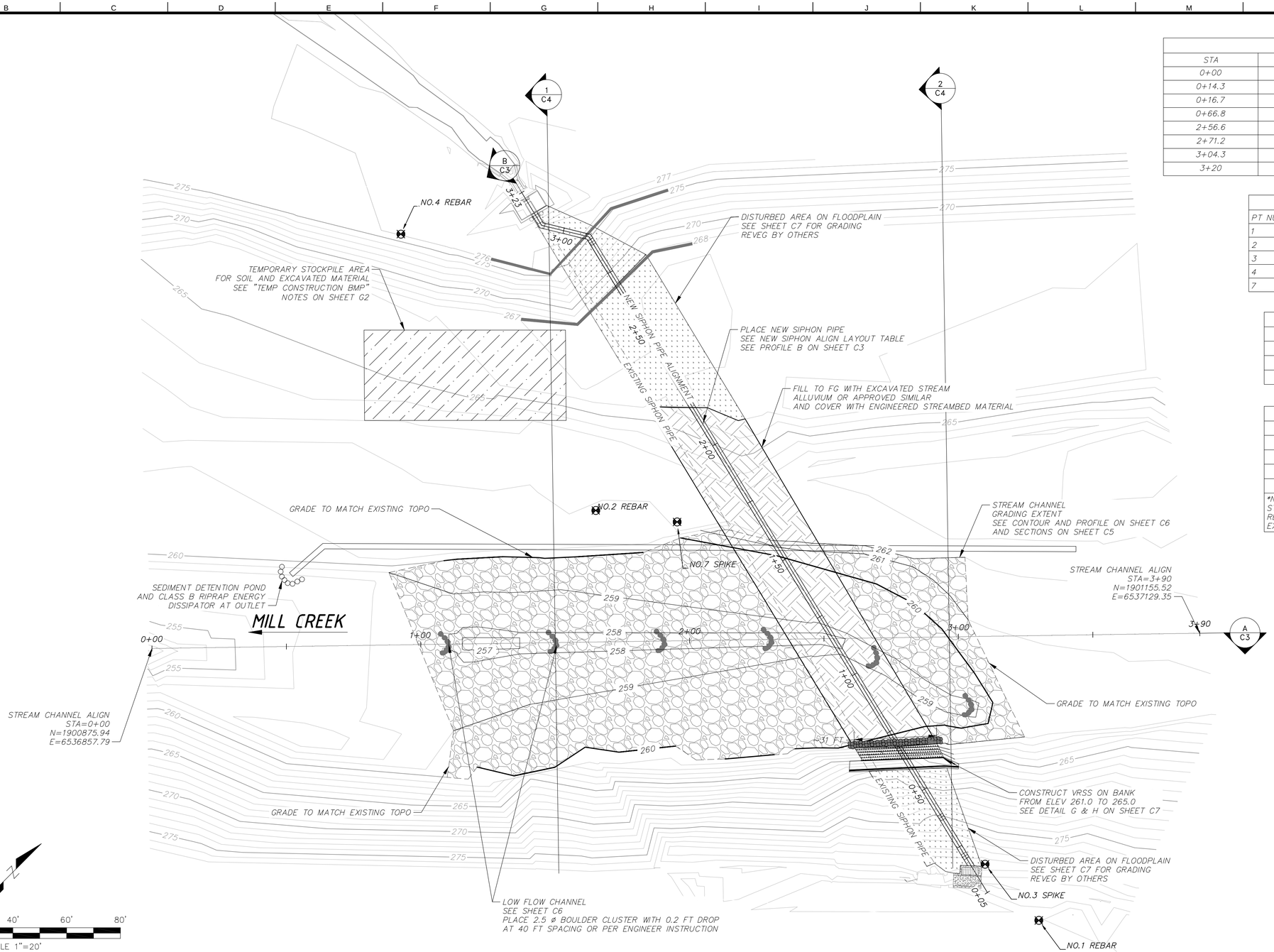
## DEMOLITION AND DEWATERING SHEET

Job Number 50655

Sheet Number

C1

Sheet 4 of 12




| NEW SIPHON ALIGNMENT LAYOUT | | | |
|---|---|---|---|
| STA | NORTHING | EASTING | INV ELEV |
| 0+00 | 1901030.29 | 6537146.54 | 276.9 |
| 0+14.3 | 1901033.68 | 6537132.67 | 276.9 |
| 0+16.7 | 1901034.26 | 6537130.28 | 276.9 |
| 0+66.8 | 1901046.12 | 6537081.64 | 248.0 |
| 2+56.6 | 1901091.07 | 6536897.29 | 247.1 |
| 2+71.2 | 1901094.53 | 6536883.08 | 255.5 |
| 3+04.3 | 1901089.31 | 6536850.38 | 274.6 |
| 3+20 | 1901093.08 | 6536835.18 | 274.6 |

| CONTROL POINTS | | | | |
|---|---|---|---|---|
| PT NUMBER | NORTHING | EASTING | ELEV | PT DESCRIPTION |
| 1 | 1901037.69 | 6537162.53 | 278.9 | NO.1 REBAR |
| 2 | 1901028.97 | 6536938.23 | 262.6 | NO.2 REBAR |
| 3 | 1901038.34 | 6537133.62 | 279.6 | NO.3 SPIKE |
| 4 | 1901050.35 | 6536814.30 | 276.5 | NO.4 REBAR |
| 7 | 1901047.34 | 6536962.61 | 262.6 | NO.7 SPIKE |

| IN STREAM GRADING CUT/FILL TABLE | |
|---|---|
| SURFACE AREA, SF | 16,400 |
| CUT, CY | 257.1 |
| FILL, CY | 270.5 |
| NET FILL, CY | 13.4 |

| ENGINEERED STREAM BED MATERIAL GRADATION* | |
|---|---|
| PERCENT FINER | PARTICLE DIAMETER, FT |
| 100% | 1.5 |
| 80% | 0.9 |
| 50% | 0.6 |
| 0% | 0.1 |

*NOTE: GRADATION IS ESTABLISHED TO MATCH EXISTING STREAM BED MATERIAL GRADATION. THE ENGINEER MAY REQUIRE IMPORT OF GRAVEL OR COBBLE TO SUPPLEMENT EXCAVATED MATERIAL.

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| Date | 02 January 2015 (16:29) |
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| File Name | SIPHON BASEMAP.dwg |
| Plotted Scale | 0 ½ 1 |

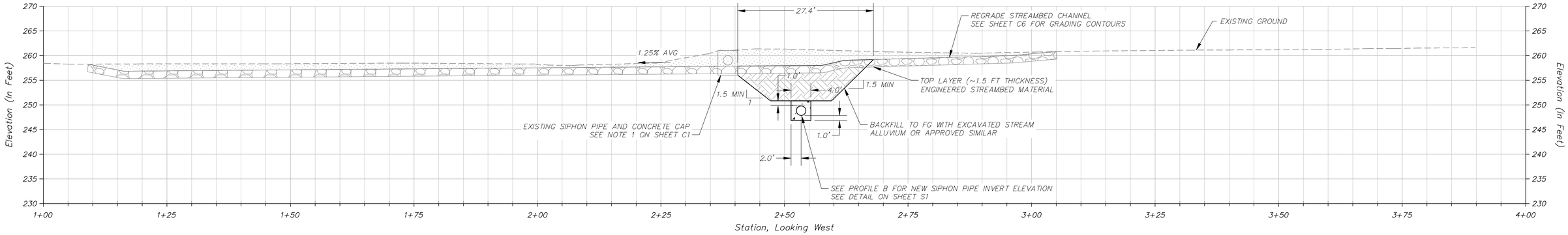
# Siphon Replacement

## PLAN SHEET

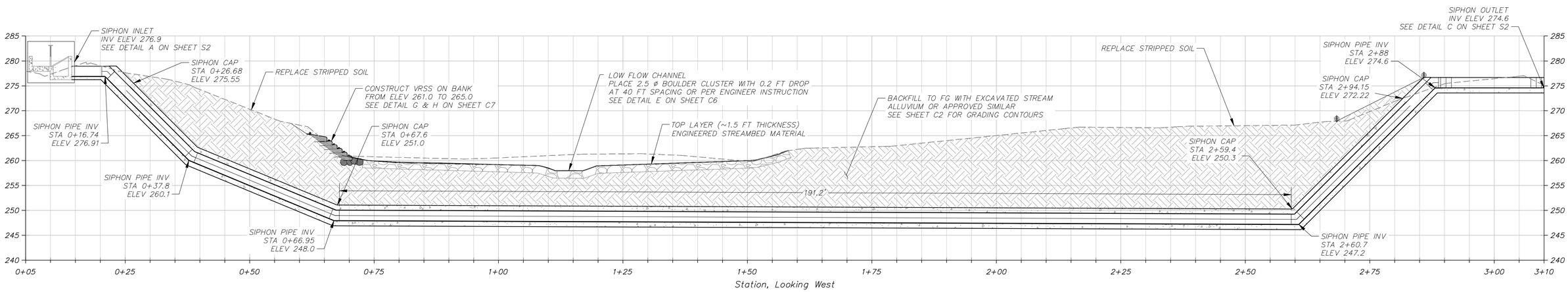
Job Number
50655

Sheet Number
C2

Sheet 5 of 12




A PROFILE - STREAM CHANNEL PROFILE (TYP)
H: 1"=10' V: 1"=10'




B PROFILE - REPLACEMENT SIPHON PROFILE
H: 1"=10' V: 1"=10'

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|---|---|
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| Plotted Scale | 0 ½ 1 |

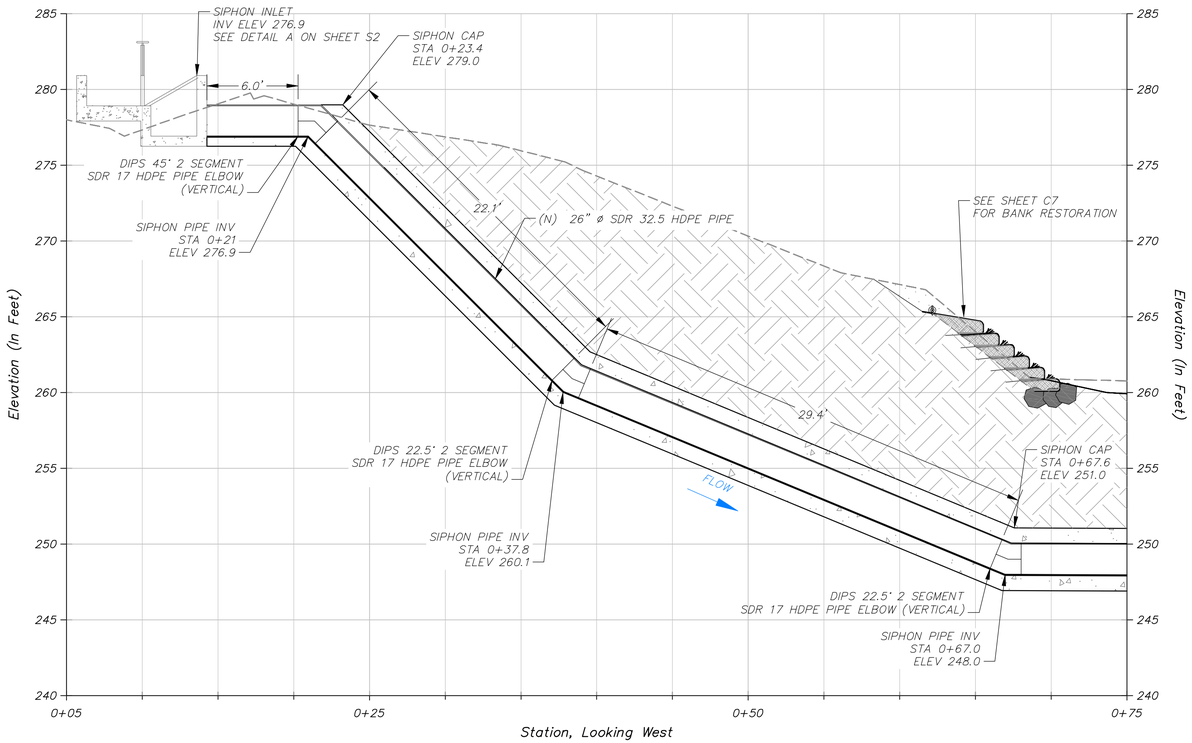
# Siphon Replacement

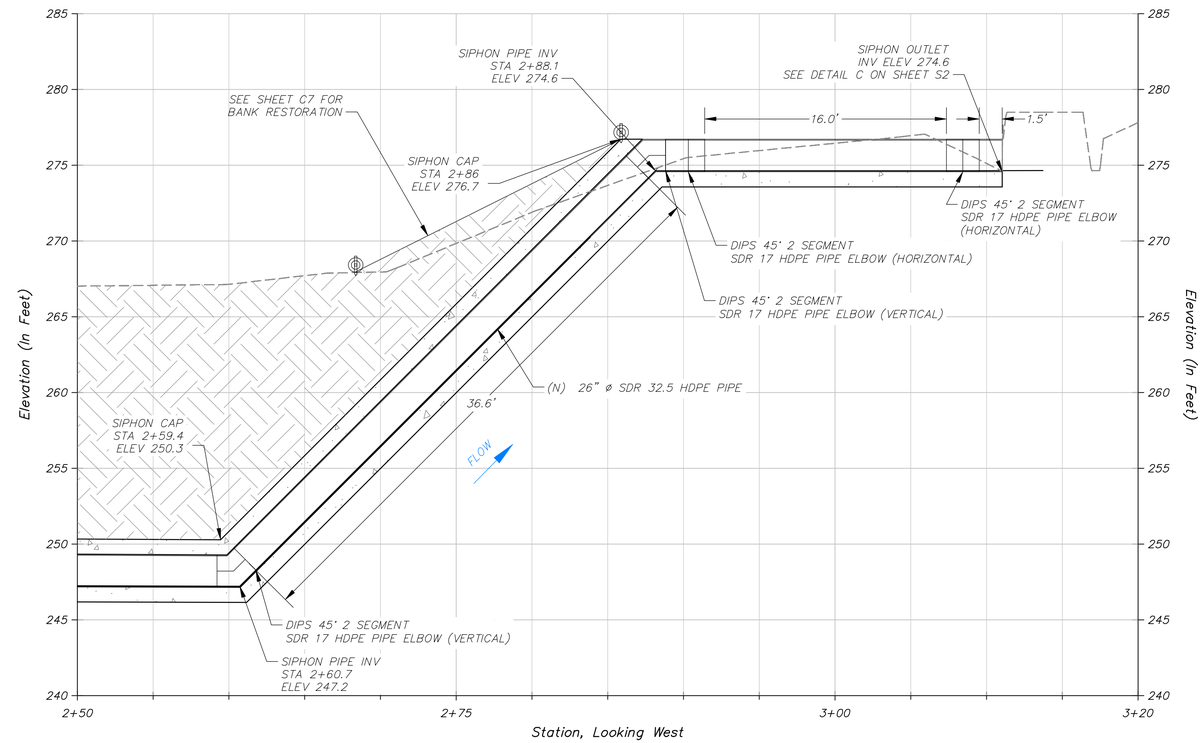
## PROFILES AND DETAILS SHEET

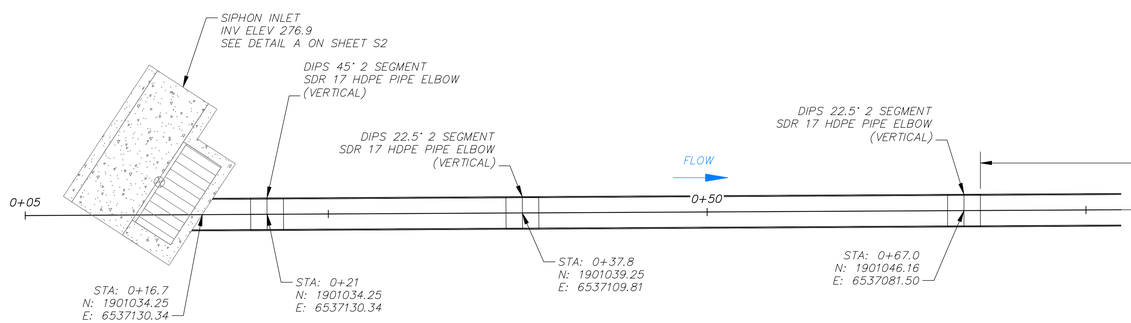
Job Number
50655

Sheet Number
C3

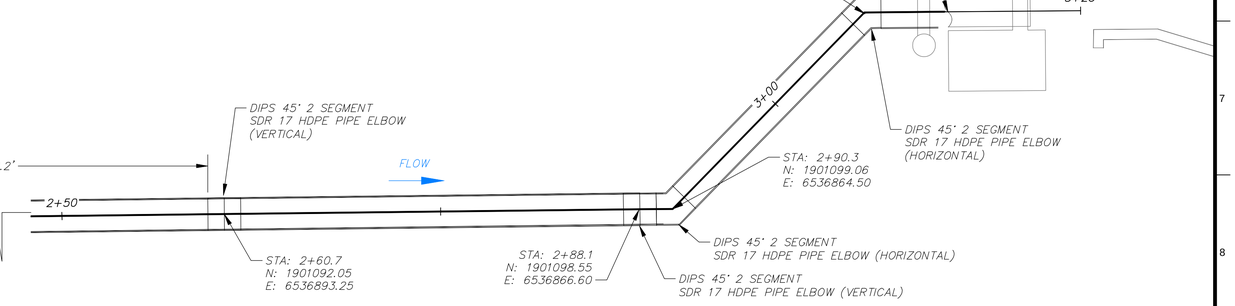
Sheet 6 of 12




C REPLACEMENT SIPHON PROFILE (INLET)
H: 1"=5' V: 1"=5'




D REPLACEMENT SIPHON PROFILE (OUTLET)
H: 1"=5' V: 1"=5'

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| Drawing Information | |
|---|---|
| Date | 02 January 2015 (16:29) |
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| File Name | SIPHON BASEMAP.dwg |
| Plotted Scale | 0 ½ 1 |

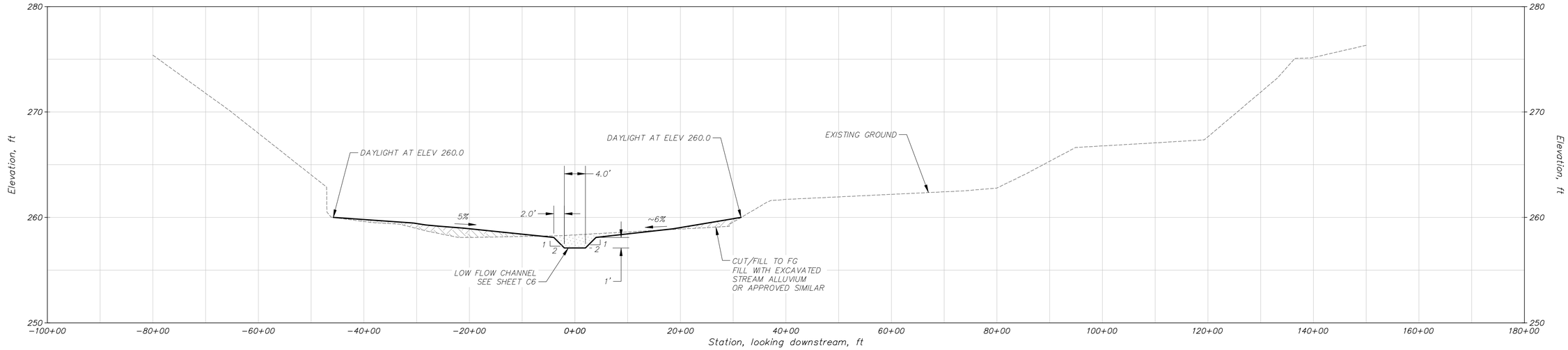
# Siphon Replacement

## PIPE ALIGNMENT DETAILS SHEET

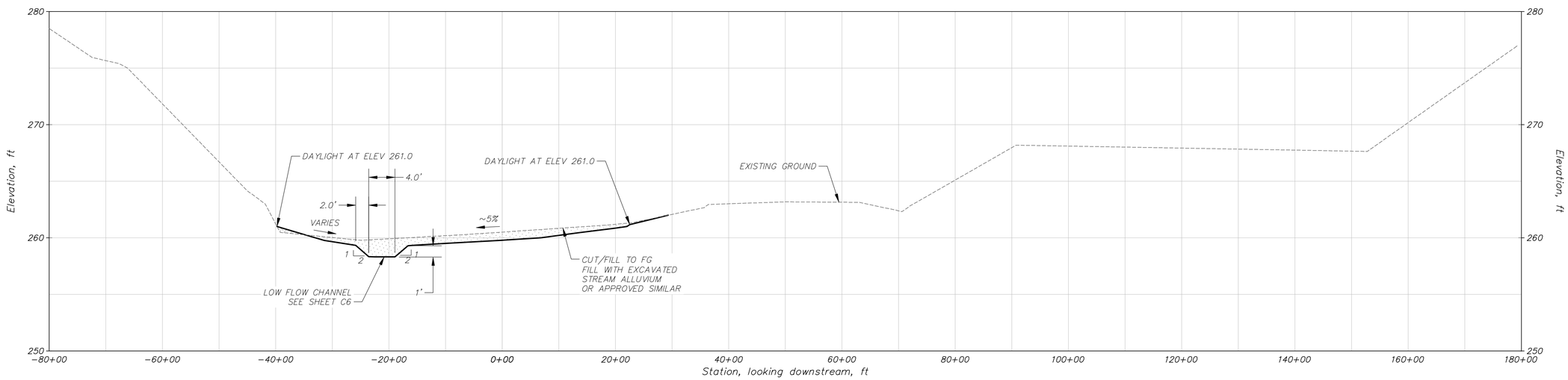
Job Number
50655

Sheet Number
C4

Sheet 7 of 12




1 SECTION - STA 1+50 (DOWNSTREAM OF SIPHON)
H: 1"=20' V: 1"=10'




2 SECTION - STA 2+90 (UPSTREAM OF SIPHON)
H: 1"=20' V: 1"=10'

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| Plotted Scale | 0 ½ 1 |

Siphon Replacement

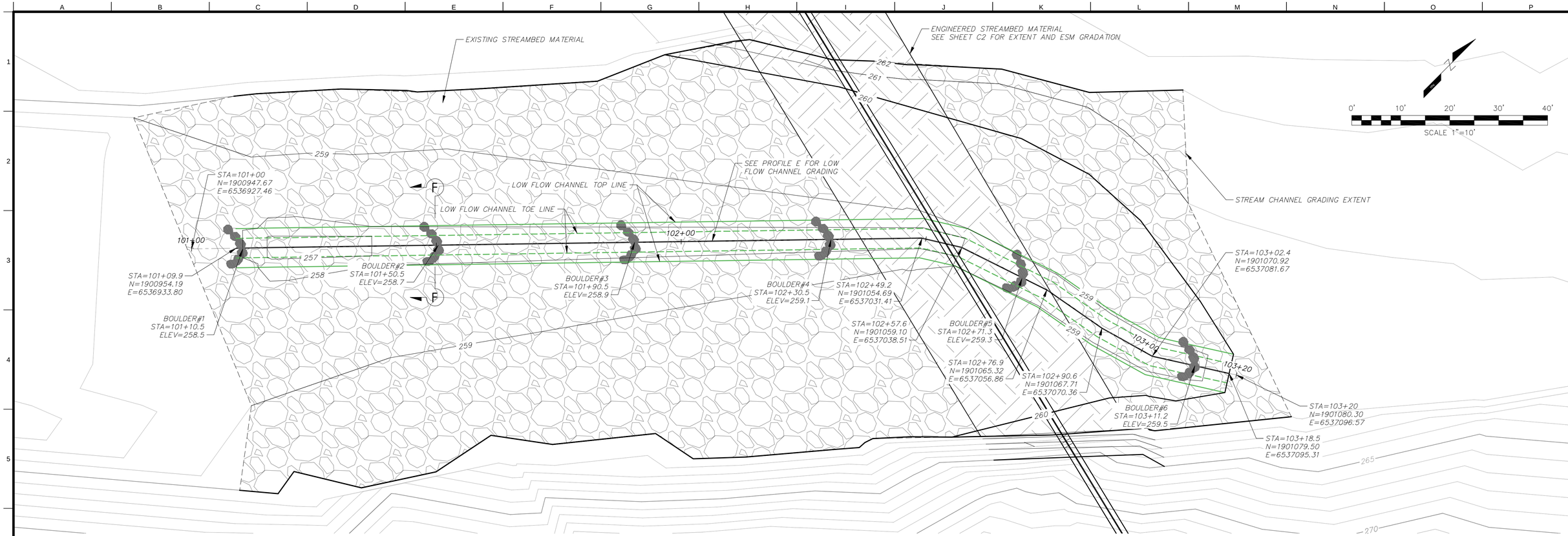
SIPHON REPLACEMENT SECTIONS SHEET

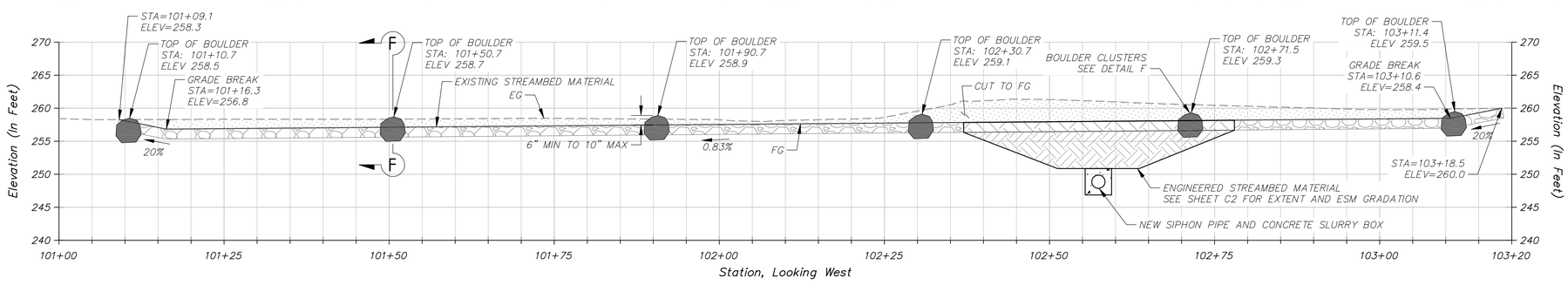
Job Number 50655

Sheet Number

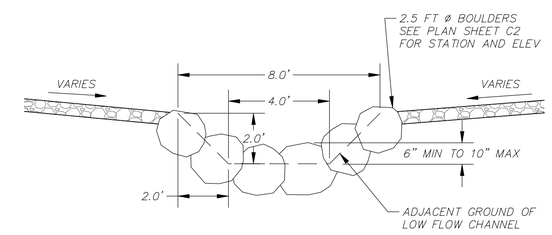
C5

Sheet 8 of 12




E PROFILE - STREAM LOW FLOW CHANNEL
H:1"=10' V:1"=10'




F DETAIL - BOULDER CLUSTER
H:1"=3' V:1"=3'

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| Plotted Scale | 0 ½ 1 |

Siphon Replacement

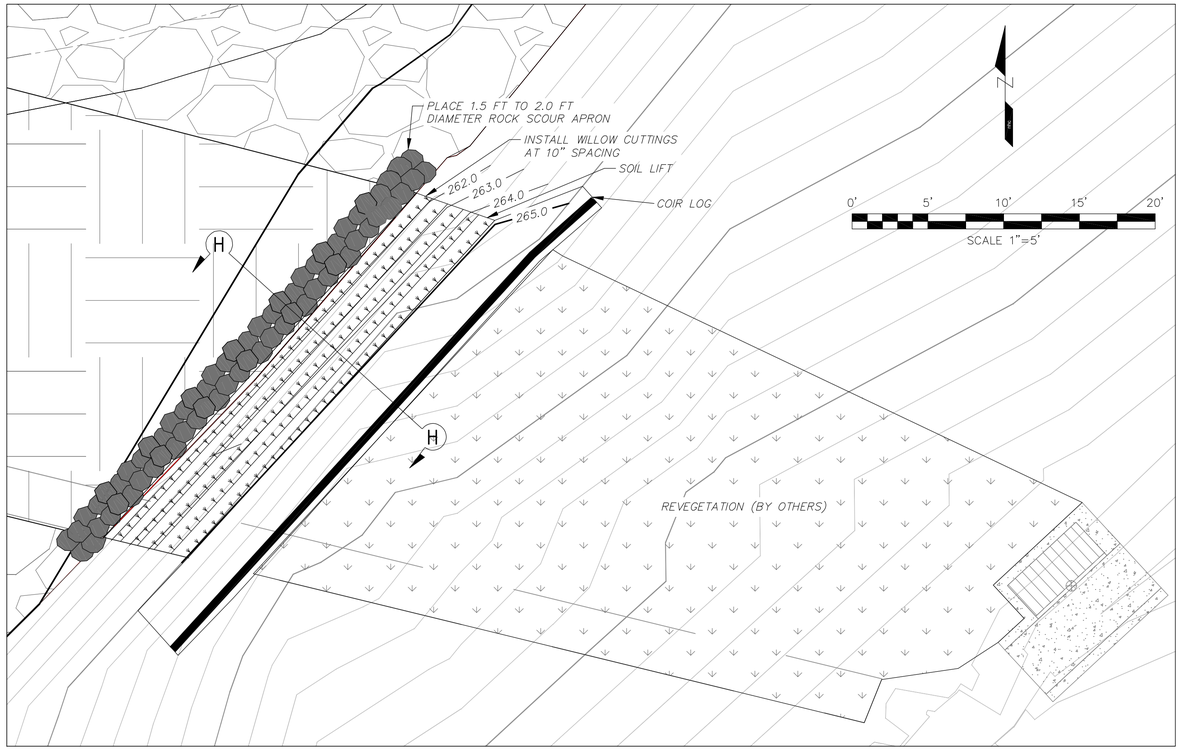
STREAM CHANNEL GRADING SHEET

Job Number
50655

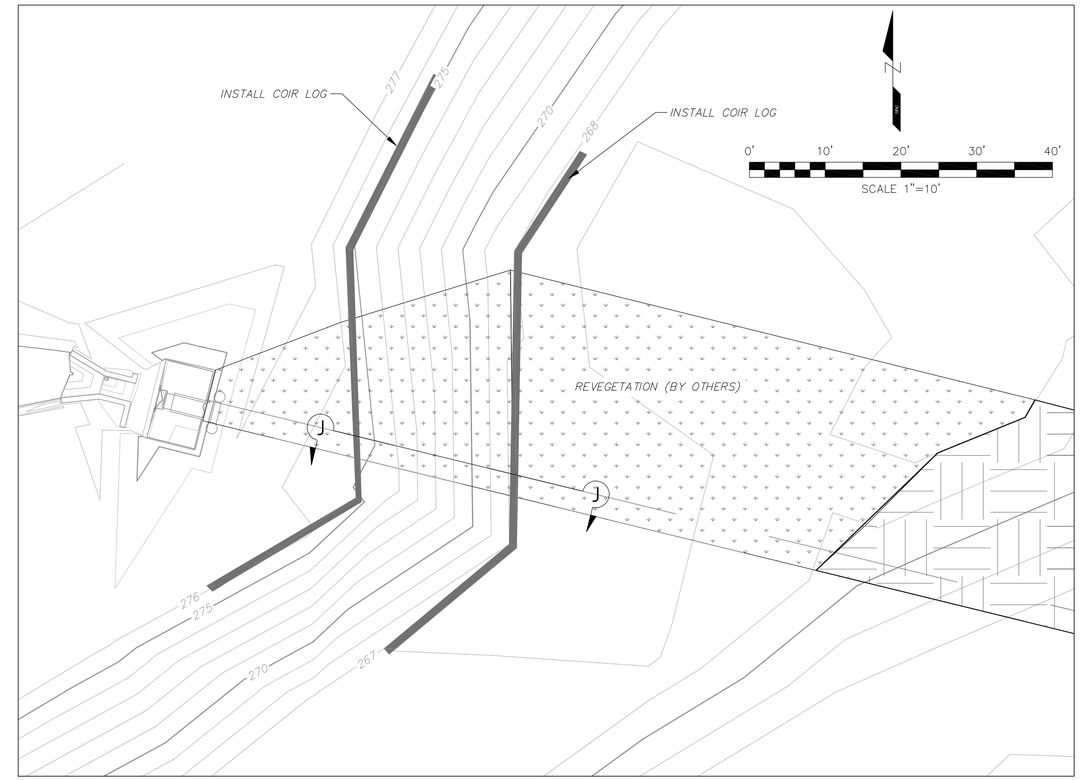
Sheet Number
C6

Sheet 9 of 12

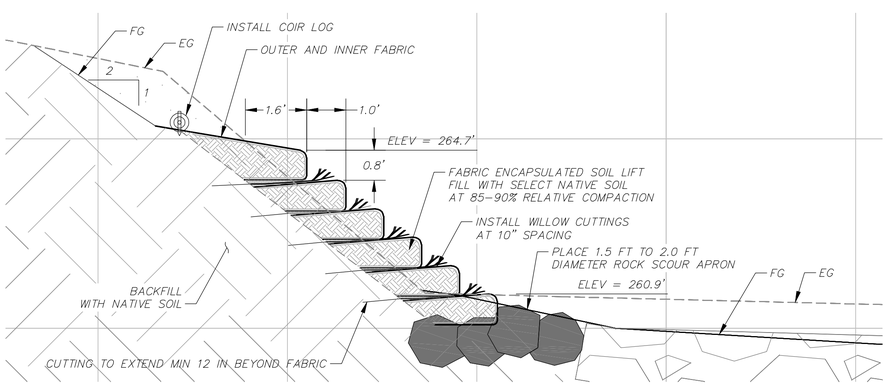
P:\50655_Mill_Creek_Fish_Passage_Phase_1\AC-50655\dwg\SIPHON BASEMAP.dwg, 1/2/2015 4:29:22 PM, DWF6 ePlot.pc3




G PLAN - LEFT BANK RESTORATION
H:1"=5' V:1"=5'



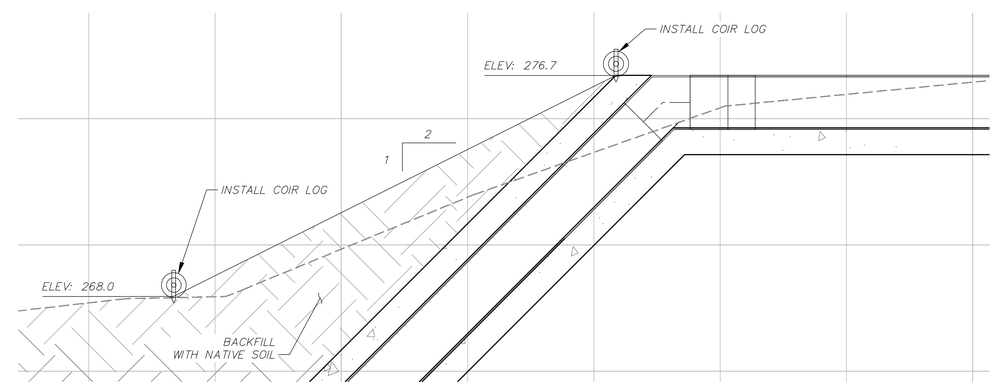

I PLAN - RIGHT BANK RESTORATION
H:1"=10' V:1"=10'




H DETAIL - VRSS FABRIC ENCAPSULATED SOIL LIFTS (ON LEFT BANK)
H:1"=2' V:1"=2'

| LEFT BANK RESTORATION MATERIALS TABLE | | |
|---|---|---|
| ITEM | UNIT | QUANTITY |
| WILLOW CUTTING (3' TO 4'LONG EACH) | EA | 180 |
| 1.5' TO 2.0' ø BOULDERS | EA | 66 |
| EXCAVATION VOLUME | CY | 13 |
| COIR LOG | LF | 40 |
| GEOTEXTILE FABRIC | SF | 900 |

| RIGHT BANK RESTORATION MATERIALS TABLE | | |
|---|---|---|
| ITEM | UNIT | QUANTITY |
| REVEGETATION AREA (BY OTHERS) | SF | 2340 |
| COIR LOG | LF | 150 |




J DETAIL - REVEGETATION ON RIGHT BANK
H:1"=3' V:1"=3'

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| Plotted Scale | 0 ½ 1 |

# Siphon Replacement

## BANK RESTORATION SHEET

Job Number 50655

Sheet Number C7

Sheet 10 of 12

GENERAL NOTES

1. REFER TO CIVIL IMPROVEMENTS PLAN SHEETS FOR INFORMATION NOT SHOWN.
2. THE NOTES PROVIDED ON THESE DRAWINGS DO NOT REPRESENT A COMPLETE DESCRIPTION OF THE WORK TO BE PERFORMED AND ARE INTENDED TO COMPLEMENT THE SPECIFICATIONS. TECHNICAL SPECIFICATIONS ASSOCIATED WITH THIS WORK ARE AS FOLLOWS:
   A. CALTRANS 2010 STANDARD SPECIFICATIONS SECTION 51-7 CONCRETE STRUCTURES, MINOR STRUCTURES
   B. CALTRANS 2010 STANDARD SPECIFICATIONS SECTION 90-2 CONCRETE, MINOR CONCRETE
   C. CALTRANS 2010 STANDARD SPECIFICATIONS SECTION 19-3.02D SLURRY CEMENT BACKFILL
   D. SPECIFICATION SECTION 331100 HDPE PIPE AND FITTINGS, PREPARED BY SAGE
2. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION MEANS AND METHODS.
3. LOCATIONS AND DIMENSIONS OF EXISTING STRUCTURES AND FEATURES ARE APPROXIMATE AND FOR GENERAL REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL CONTROLLING DIMENSIONS OF NEW AND EXISTING FEATURES PRIOR TO ORDERING OR FABRICATING MATERIAL OR CONSTRUCTING PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION OF THE FEATURE IN QUESTION.
4. PRIOR TO THE START OF CONSTRUCTION, LOCATE ALL EXISTING AND UNDERGROUND UTILITIES IN AND AROUND THE AREAS OF NEW CONSTRUCTION. VERIFY THAT THE PROPOSED CONSTRUCTION DOES NOT CONFLICT WITH EXISTING OR PROPOSED UTILITIES OR THAT APPROPRIATE MEANS ARE PROVIDED FOR REROUTING, SUPPORTING, PROTECTING, OR OTHERWISE INCORPORATING THE UTILITIES INTO THE CONSTRUCTION.
5. NOTIFY THE OWNER AND/OR ENGINEER WHERE A CONFLICT OR DISCREPANCY OCCURS BETWEEN THESE DRAWINGS AND ANY OTHER PORTION OF THE CONTRACT DOCUMENTS OR EXISTING FIELD CONDITIONS.
6. PRODUCTS REFERENCED ON THE DRAWINGS SHALL BE CONSTRUCTED, INSTALLED, AND/OR APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN RECOMMENDATIONS UNLESS OTHERWISE NOTED.
7. DO NOT SCALE DRAWINGS. CONTACT THE ENGINEER FOR ANY DIMENSIONS OR SPECIFIC DETAIL NOT SHOWN..

DESIGN BASIS AND LOADING

1. THE DESIGNS DEPICTED IN THESE DRAWINGS ARE BASED ON INFORMATION PROVIDED IN THE FOLLOWING REFERENCES:
   A. TOPOGRAPHIC BASE MAP PROVIDED BY NORTHWEST HYDRAULIC CONSULTANTS., DATED APRIL 22, 2014.
2. DESIGN IS IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
   - AWWA MANUAL M55, PE PIPE-DESIGN AND INSTALLATION, 1ST EDITION
   - ACI 318-11, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
3. DESIGN CRITERIA:
   - PIPELINE:
     MAXIMUM OPERATING PRESSURE = 12 PSI
4. GEOTECHNICAL DESIGN PARAMETERS:
   - FRICTION ANGLE: 35°
   - COHESION: 0 PSF
   - MOIST UNIT WEIGHT: 125 PCF

EXCAVATION

1. NOTIFY UNDERGROUND SERVICE ALERT (USA NORTH) TO IDENTIFY THE LOCATION OF EXISTING UTILITIES AT LEAST 48 HOURS (TWO WORKING DAYS) PRIOR TO ANY EXCAVATION WORK: (800)-227-2600 OR WWW.USANORTH.ORG.
2. STABILITY AND SHORING OF TEMPORARY CUT SLOPES AND TRENCHES SHALL CONFORM TO THE REQUIREMENTS OF CAL-OSHA.
3. EXCAVATIONS SHALL BE KEPT CLEAN AND DRY FOR THE DURATION OF THE WORK PERFORMED.

CONCRETE

1. CONCRETE STRENGTH AND MIX REQUIREMENTS:
   - MINIMUM 28-DAY COMPRESSIVE STRENGTH (f'c) = 3,000 PSI
   - MAXIMUM WATER/CEMENT RATIO = 0.45
   - MAXIMUM AGGREGATE SIZE = 1 ½"
   - CEMENT = ASTM C150 TYPE II
   - EXPOSURE CLASSES:
     FREEZING AND THAWING = F0
     SULFATE = S1
     PERMEABILITY = P0
     CORROSION = C1
2. EXPOSED CONCRETE EDGES SHALL HAVE A ¾" CHAMFER
3. REINFORCING STEEL:
   - DEFORMED REBAR = ASTM A615, GRADE 60 (fy = 60 KSI)
4. REINFORCEMENT SPACING SHOWN IS CENTER TO CENTER OF BARS
5. SECURELY POSITION REINFORCEMENT, EMBEDS, AND DOWELS PRIOR TO PLACING CONCRETE.
6. UNLESS OTHERWISE NOTED, MAINTAIN COVERAGE TO THE FACE OF REBAR AS FOLLOWS:
   - CONCRETE CAST AGAINST EARTH = 3"
   - CONCRETE EXPOSED TO EARTH OR WEATHER:
     #6 THROUGH #18 = 2"
     #5 AND SMALLER = 1 ½"
   - OTHER SURFACES = 1 ½"
6. MINIMUM LAP LENGTHS SHALL CONFORM TO TABLE 1, THIS SHEET

CEMENT SLURRY BACKFILL

1. SAND CEMENT SLURRY PER CALTRANS SECTION 19-3.02D SHALL BE USED TO BACKFILL AROUND THE PIPE AS SHOWN.
2. MINIMUM SLURRY COVER AROUND PIPE = 12" TYPICAL
3. PREVENT THE PIPE FROM FLOATING OR MOVING UNTIL INITIAL SET IS ACHIEVED BY ANCHORING THE PIPE, ADDING WEIGHT, OR PLACING SLURRY IN SMALL LIFTS. BRING UP SLURRY IN EQUAL VOLUMES ON BOTH SIDES OF THE PIPE DURING PLACEMENT.

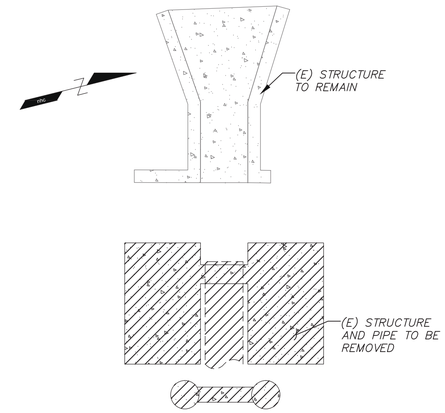
PIPELINE

1. PIPE MATERIAL = SOLID WALL HIGH DENSITY POLYETHYLENE (HDPE) SDR 32.5, MEETING OR EXCEEDING ASTM D3350 9.
2. FABRICATED PIPE FITTINGS = HDPE SDR 17 WITH MITERED ENDS TO CONFORM TO SDR 32.5
3. PIPE SEGMENTS AND FITTINGS SHALL BE BUTT FUSION WELDED.
4. INSTALL PIPE TO THE LINES AND GRADES SHOWN ON CIVIL SHEETS. COLD BEND THE PIPE WHERE NECESSARY.
   - MINIMUM BEND RADIUS = 91 FT, OR PER MANUFACTURER RECOMMENDATIONS
5. MAXIMUM DESIGN PRESSURE = 12 PSI
6. MAXIMUM PRESSURE FOR LEAK TEST PER ASTM F2164 = 18 PSI
7. MINIMUM SOIL COVER OVER CEMENT SLURRY BACKFILL = 12"

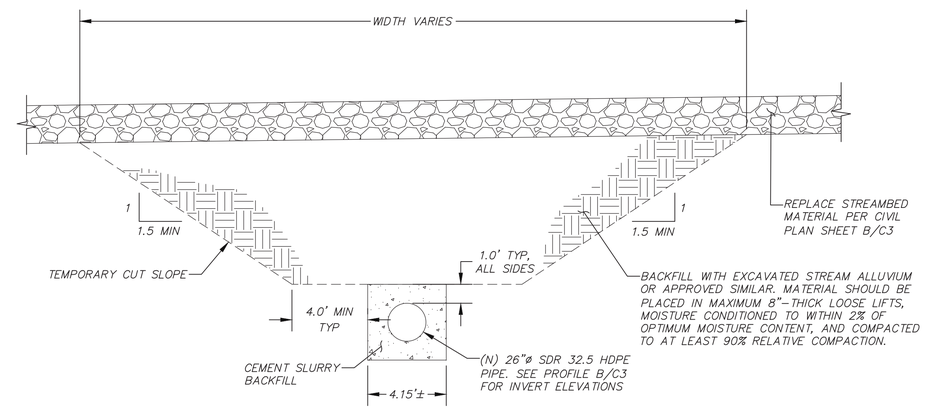
TABLE 1 – TYPICAL DEVELOPMENT/LAP LENGTHS [1]

| | f'c = 3,000 PSI | | fy = 60,000 PSI | | |
|---|---|---|---|---|---|
| | TOP BARS [2] | | OTHER BARS | | STD HOOKS |
| BAR SIZE | DEV LENGTH , Ld (IN) | CLASS B LAP SPLICE (IN) | DEV LENGTH, Ld (IN) | CLASS B LAP SPLICE (IN) | DEV LENGTH, Ldh (IN) |
| #3 | 22 | 28 | 17 | 22 | 5 |
| #4 | 29 | 38 | 22 | 29 | 7 |
| #5 | 36 | 47 | 28 | 36 | 8 |
| #6 | 43 | 56 | 33 | 43 | 9 |
| #7 | 63 | 81 | 48 | 63 | 11 |
| #8 | 72 | 93 | 55 | 72 | 12 |
| #9 | 81 | 105 | 62 | 81 | 14 |
| #10 | 91 | 118 | 70 | 91 | 16 |
| #11 | 101 | 131 | 78 | 101 | 17 |

FOOTNOTES
1. BASED ON ACI 318-11 SECTIONS 12.2.2 AND 12.5.2.
2. TOP BARS SHALL BE DEFINED AS ANY HORIZONTAL BAR PLACED SUCH THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE BAR IN ANY SINGLE POUR. HORIZONTAL WALL BARS ARE CONSIDERED TOP BARS.




EXIST. OUTLET STRUCTURE DEMO PLAN
SCALE: 1/4" = 1'




TYPICAL PIPE SECTION
SCALE: 1/4" = 1'

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REGISTERED PROFESSIONAL ENGINEER TRAVIS W. KOCH No. 75422 Exp. 12/31 CIVIL STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

| Revisions | | |
|---|---|---|
| No. | Date | Description |
| | | |

| Drawing Information | |
|---|---|
| Date | 03 December 2014 (08:40) |
| Designer | M. BOAK |
| Drafter | M. BOAK |
| Checked | T. KOCH |
| File Name | 11-018.00-STRUCT-SIPHON.dwg |
| Plotted Scale | 0 ½ 1 |

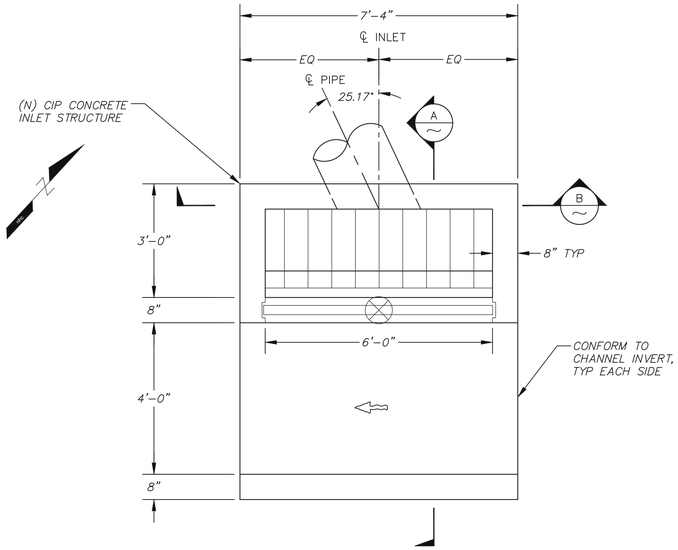
# SIPHON REPLACEMENT

## STRUCTURAL NOTES, EXISTING INLET PLAN AND SECTION

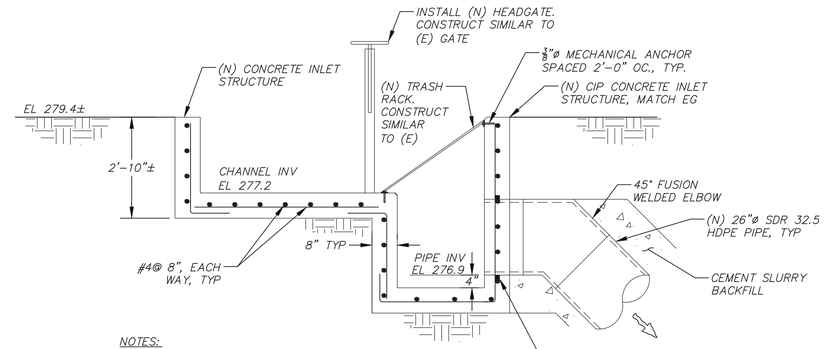
Job Number 11-018.00

Sheet Number

S1



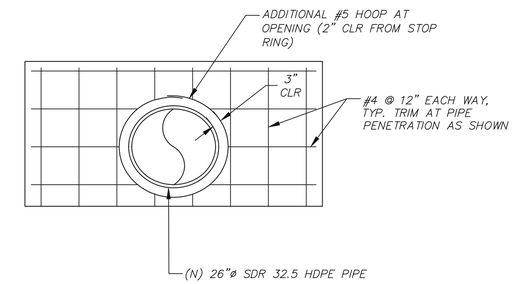

NEW INLET STRUCTURE PLAN
SCALE: 1/2" = 1'-0"



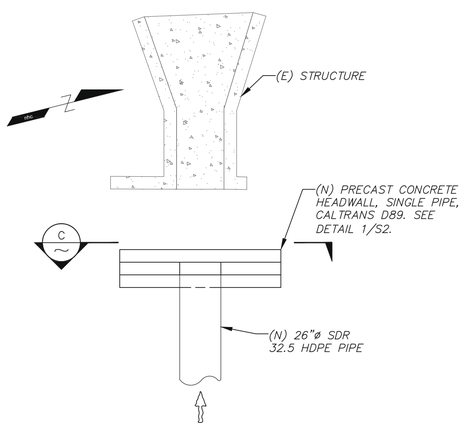

NOTES:

1. SUBGRADE TO BE OVER-EXCAVATED 6" MIN AND MOISTURE CONDITIONED TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT, AND COMPACTED TO AT LEAST 90% RC.
2. ALL (N) METAL ELEMENTS MUST BE HOT DIPPED GALVANIZED.

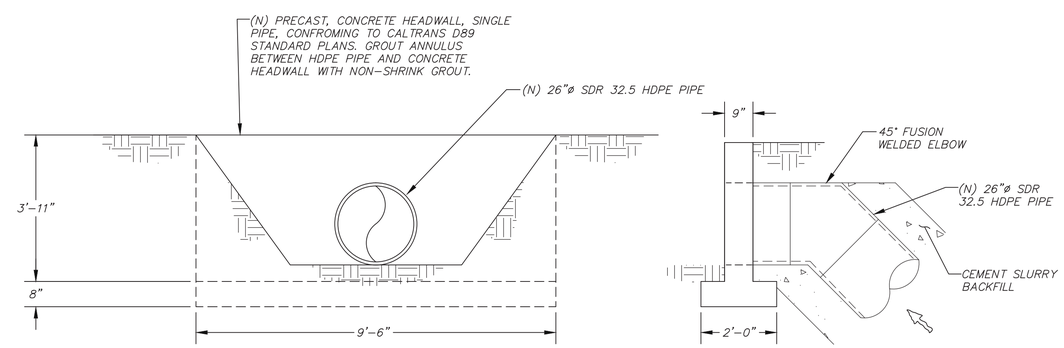
A NEW INLET STRUCTURE SECTION
SCALE: 1/2" = 1'-0"




B PIPE PENETRATION SECTION
SCALE: 1/2" = 1'-0"




NEW OUTLET STRUCTURE PLAN
SCALE: 1/4" = 1'-0"




NOTE: SUBGRADE TO BE OVER-EXCAVATED 6" MIN AND MOISTURE CONDITIONED TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT, AND COMPACTED TO AT LEAST 90% RC

C NEW OUTLET STRUCTURE
SCALE: 1/2" = 1'-0"

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| Revisions | | |
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| | | |

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| Date | 03 December 2014 (08:42) |
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| Drafter | M. BOAK |
| Checked | T. KOCH |
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# SIPHON REPLACEMENT

## STRUCTURAL SECTIONS AND DETAILS

Job Number
11-018.00

Sheet Number
S2

Sheet 12 of 12

# Appendix B

# Revised 95% Design Plan Drawings
# Ward Dam

## SHEET INDEX


| | |
|---|---|
| COVER SHEET | T1 |
| GENERAL NOTES | G1 |
| ACCESS & DEMOLITION | G2 |
| GENERAL PLAN | C1 |
| FISH LADDER PLAN | C2 |
| FISH LADDER DETAILS | C3 |
| DIVERSION INLET PLAN | C4 |
| DIVERSION INLET DETAILS | C5 |
| JUVENILE BYPASS PIPE DETAILS | C6 |
| FISH SCREEN RETROFIT PLAN | C7 |
| FISH SCREEN RETROFIT DETAILS | C8 |


## LEGEND

| | |
|---|---|
| EXISTING TREES | |
| EXISTING PAVED ROAD | |
| EXISTING GRAVEL ROAD | |
| EXISTING CONTOURS (MAJOR) | 60 |
| EXISTING CONTOURS (MINOR) | 61 |
| EXISTING FENCE | |
| EXISTING EDGE OF WATER (00/00/00) | |
| EXISTING BUILDINGS & STRUCTURES | |
| PROPOSED EARTHWORK | |
| CONSTRUCTION BASELINE | 1+00 |
| CONSTRUCTION AREA LIMITS | |
| PROPOSED CONCRETE | |
| PROPOSED NATIVE/SOIL MIX FILL | |
| PROPOSED EXCAVATED AREA | |
| PROPOSED ROCK SCOUR PROTECTION | |
| PROPOSED VRSS | |
| PROPOSED METAL GRATING | |

# U.S. Department of Interior

Fish & Wildlife Services

CONSTRUCTION PLANS FOR

# Mill Creek Fish Passage Improvement Project
# Ward Dam Fish Ladder

FEBRUARY 2015

PROJECT MANAGER

TRICIA PARKER–HAMELBERG
ANTIDROMOUS FISH RESTORATION PROGRAM, NORTHERN SACRAMENTO RIVER
U.S. FISH & WILDLIFE SERVICE, RED BLUFF OFFICE

APPROVED BY:

LOS MOLINOS MUTUAL WATER COMPANY (date)


U.S. Fish & Wildlife Service

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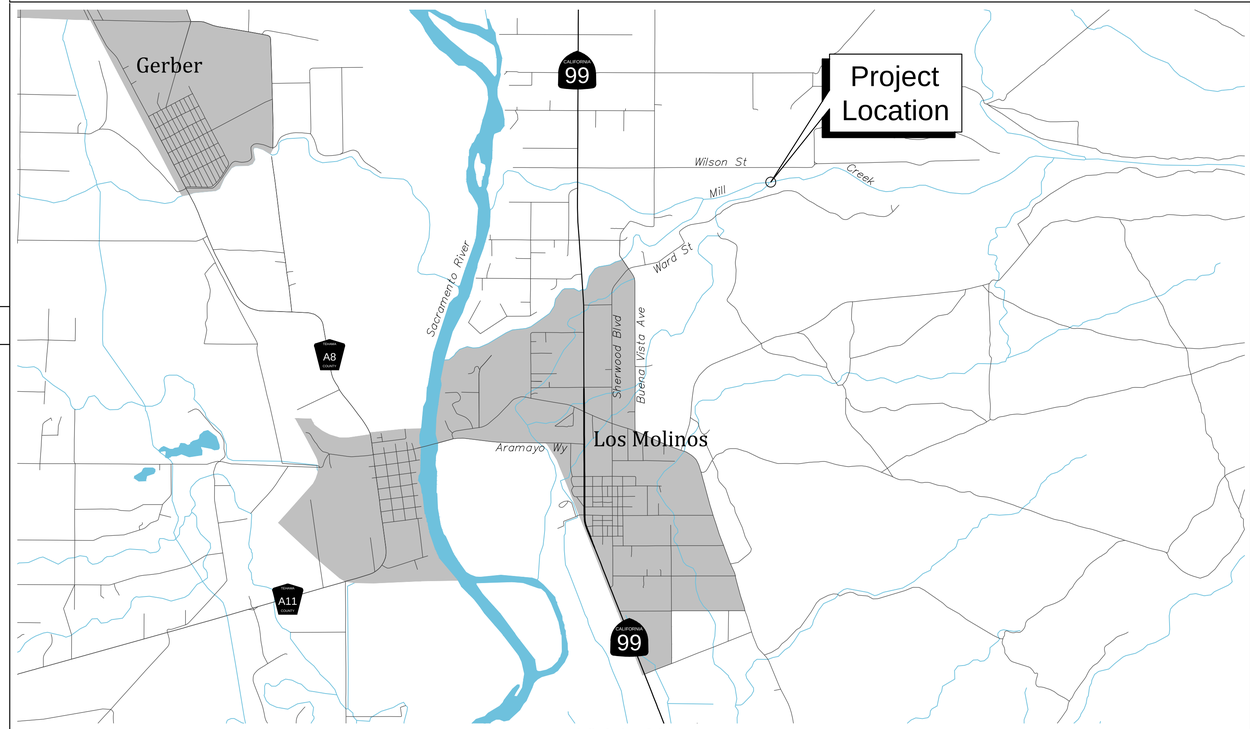
northwest hydraulic consultants




Vicinity Map

Project Location Map

| Drawing Name | | | | Date |
|---|---|---|---|---|
| WARD COVER<br>P:\50655_Mill_Creek_Fish_Passage_Phase_1\AC-50655\dwg | | | | 13 February 2015 09:59 |
| Drawing Status | Designer | Drafter | Checked | Job Number |
| 95% Submittal | tvs | tvs | bgw | 50655 |

Sheet 1 of 11

Sheet Number

T1

1. GENERAL

1.1. SUMMARY

1.1.1. THE US FISH AND WILDLIFE, HEREIN REFERRED TO AS THE PROJECT OWNER, WILL DESIGNATE A REPRESENTATIVE REFERRED TO HEREIN AS THE ENGINEER, TO OVERSEE THE CONSTRUCTION AND COORDINATE WITH LOS MOLINOS MUTUAL WATER COMPANY, CONTRACTOR AND PERMITTING AGENCIES.

1.1.2. THE WORK WILL BE PERFORMED AT WARD DAM SITE ON MILL CREEK IN TEHAMA COUNTY. THE WORK INCLUDES BUT IS NOT LIMITED TO: EXCAVATION; SPOILS DISPOSAL; SUB-BASE PREPARATION; STRUCTURAL FILL PLACEMENT; FORMING, PLACING, AND FINISHING PORTLAND CEMENT CONCRETE; FURNISHING AND INSTALLING SCOUR APRON; REVEGETATION; BYPASS PIPE AND SITE CLEANUP AND RESTORATION.

1.1.3. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS TO COMPLETE ALL WORK ON THE PLANS AND DESCRIBED IN THE SPECIFICATIONS.

1.1.4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND AVOIDING DAMAGE TO UNDERGROUND UTILITIES. THE CONTRACTOR SHALL LOCATE EXISTING UTILITIES AT LEAST 48 HOURS PRIOR TO EXCAVATION. ANY RELOCATIONS OR TEMPORARY OUTAGES SHALL BE COORDINATED WITH THE PROJECT MANAGER. IF UTILITY CONFLICTS ARE IDENTIFIED, THE CONTRACTOR SHALL HALT ALL WORK IN THE AREA AFFECTED BY THE UTILITY CONFLICT AND SHALL IMMEDIATELY NOTIFY THE PROJECT MANAGER.

1.1.5. THIS PROJECT IS SUBJECT TO REQUIREMENTS OF PERMITS ISSUED BY VARIOUS REGULATORY AGENCIES. THE CONTRACTOR IS RESPONSIBLE TO UNDERSTAND AND PERFORM ALL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE PERMITS. COPIES OF THE PERMITS HAVE BEEN PROVIDED TO THE CONTRACTOR ALONG WITH THESE PLANS AND SPECIAL PROVISIONS. PRIOR TO COMMENCING WORK THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT MANAGER TO VERIFY THE MOST RECENT COPY OF ALL APPLICABLE PERMITS ARE INCLUDED IN THE SPECIAL PROVISIONS.

1.1.6. HORIZONTAL COORDINATES AND ELEVATIONS ARE BASED ON NAD 1983 COORDINATES AND NAVD 1988 VERTICAL DATUM, RESPECTIVELY. CONTROL POINTS SET IN THE FIELD ARE SHOWN ON SHEET C1.

2. TEMPORARY STREAM DIVERSION AND DEWATERING

2.1. SUMMARY

THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO PROVIDE TEMPORARY STREAM DIVERSIONS AND ANY DEWATERING ACTIVITIES NECESSARY TO PERFORM THE WORK.

2.2. SUBMITTALS

2.2.1. CONTRACTOR SHALL PROVIDE A STREAM DIVERSION AND DEWATERING PLAN THAT DESCRIBES THE MATERIALS AND METHODS TO BE USED TO INSTALL AND MAINTAIN STREAM DIVERSIONS. THE PLAN SHALL OUTLINE THE SEQUENCE OF WORK AND THE METHODS FOR DEWATERING AND REWATERING THE CREEK.

2.2.2. THE CONTRACTOR SHALL SUBMIT PLAN AT LEAST 5 DAYS PRIOR TO COMMENCING WORK. NO WORK SHALL OCCUR UNTIL THE PLAN IS APPROVED BY THE ENGINEER.

2.3. CONDITIONS AND REQUIREMENTS

2.3.1. THE INSTREAM WORK WILL OCCUR DURING SUMMER AND EARLY FALL. THE WORK WILL BE CONSTRUCTED WHEN RIVER FLOWS AT THE SITE ARE GENERALLY LESS THAN 50 CFS. DURING CONSTRUCTION, LOS MOLINOS MUTUAL WATER COMPANY (LMMWC) CONTROLS RELEASES TO WARD DAM AT UPPER DAM. THE FLOW RELEASES ARE DIVERTED AT WARD DAM. LMMWC WILL TYPICALLY DIVERT ALL OF THE REMAINING STREAMFLOW AT WARD DAM DURING LATE SUMMER. THE CONTRACTOR WILL COORDINATE WITH LMMWC TO DETERMINE FLOWS FOR TEMPORARY DIVERSIONS AND TO MAINTAIN THE DIVERSION FLOWS AT WARD DAM. IN THE EVENT THAT THE FLOW IS FORECASTED TO RISE ABOVE THE WARD DAM DIVERSION CAPACITY DURING THE CONSTRUCTION PERIOD, THE ENGINEER MAY REQUIRE THE WORK TO BE HALTED (EXCEPT FOR THE INSTALLATION AND MAINTENANCE OF CONSTRUCTION BMPS) AND THE TEMPORARY STREAM DIVERSIONS TO BE REMOVED. IN THE EVENT THAT WORK IS RESUMED, RE-INSTALLATION OF TEMPORARY STREAM DIVERSIONS WILL BE PAID FOR AS EXTRA WORK.

2.3.2. DEWATERING OF EXCAVATIONS (SEEPAGE PUMP) MAYBE REQUIRED TO ACHIEVE WORKABLE GROUND CONDITION TO INSTALL MATERIALS CONFORMING WITH THE PLANS AND SPECIFICATIONS.

2.3.3. THE CONTRACTOR SHALL MONITOR THE TEMPORARY DIVERSION DAMS DURING THE COURSE OF THE PROJECT AND MAKE ANY REPAIRS OR REPLACEMENTS NECESSARY TO MAINTAIN THE DAMS IN FULLY FUNCTIONING CONDITION. THE ENGINEER MAY REQUIRE THAT WORK BE HALTED WHILE ANY NECESSARY REPAIRS OR REPLACEMENTS ARE MADE.

2.3.4. THE CONTRACTOR SHALL PROVIDE AT LEAST 24 HOURS ADVANCE NOTICE TO THE ENGINEER PRIOR TO REINTRODUCING RIVER FLOWS INTO ANY CONSTRUCTED CHANNEL.

2.3.5. THE LMMWC DIVERSION FLOWS AT WARD DAM MUST MAY BE INTERRUPTED FOR THREE CUMULATIVE DAYS DURING CONSTRUCTION. THE DIVERSION FLOW IS LIKELY TO BE 35 CFS, ALTHOUGH LMMWC COULD DIVERT AN ADDITIONAL 15 CFS OF STREAMFLOW AROUND THE PROJECT SITE.

2.4. PRODUCTS

2.4.1. PRELIMINARY TOP ELEVATIONS ARE SHOWN ON THE PLANS FOR REFERENCE. THE CONTRACTOR SHALL EVALUATE AND SET TOP ELEVATIONS BASED ON SPECIFIC DESIGNS TO BE IMPLEMENTED AND APPROVED BY THE ENGINEER. DAMS MAY BE DESIGNED AS SOLID BARRIERS OR WITH A GATED OPENING TO ALLOW GRADUAL REDUCTION AND INCREASE OF FLOWS.

2.4.2. DAMS SHALL BE CONSTRUCTED USING CLEAN MATERIALS THAT DO NOT POSE A RISK OF SEDIMENT DISCHARGE WHEN INSTALLED OR IF OVERTOPPED. DAMS MAY BE CONSTRUCTED ONSITE USING GRAVEL BAG AND PLASTIC SHEETING MATERIALS, OR MAY BE INSTALLED AS SOLID OR INFLATABLE IMPORTED BARRIERS SUCH AS WATER FILLED DAMS.

2.5. EXECUTION

2.5.1. TEMPORARY DIVERSION DAMS SHALL BE INSTALLED PRIOR TO PERFORMING WORK IN THE CHANNEL.

2.5.2. IF AQUATIC RELOCATION IS REQUIRED BY PROJECT PERMITS, CONTRACTOR SHALL ACCOMMODATE AQUATIC RELOCATION ACTIVITIES TO BE PERFORMED BY OTHERS AS DIRECTED BY THE ENGINEER.

2.5.3. DIVERSION DAMS MAY BE INSTALLED ON THE STREAMBED OR BY EXCAVATING BELOW STREAM GRADE AFTER AN INITIAL DIVERSION AND ISOLATION OF THE CHANNEL HAS BEEN COMPLETED.

2.5.4. DIVERSION DAMS SHALL BE COMPLETELY REMOVED AFTER COMPLETION OF CONSTRUCTION AND AREA RESTORED.

3. TEMPORARY CONSTRUCTION BMPS

3.1. SUMMARY

3.1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO DEVELOP AND MAINTAIN ADEQUATE TEMPORARY CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPS) TO PROTECT WATER QUALITY AND PREVENT EROSION, AS SPECIFIED IN PROJECT PERMITS, AND AS SHOWN ON THE PLANS.

3.2. CONDITIONS AND REQUIREMENTS

3.2.1. THE CONTRACTOR SHALL COMPLY WITH APPLICABLE PERMIT PROVISIONS IN THE REFERENCED PERMITS FOR THE PROJECT TO PROTECT WATER QUALITY AND PREVENT EROSION.

3.2.2. MATERIAL STORAGE WILL BE LIMITED TO STAGING AREAS APPROVED BY THE ENGINEER.

3.2.3. ALL CONSTRUCTION RELATED MATERIAL IMPORTED TO THE SITE SHALL BE CLEAN OR WASHED FREE OF ADHERED SOIL AND DELETERIOUS MATERIAL PRIOR TO FINAL PLACEMENT.

3.2.4. CONSTRUCTION EQUIPMENT SHALL BE INSPECTED FOR LEAKS AND STEAM CLEANED OFF-SITE PRIOR TO DEPLOYMENT. DURING CONSTRUCTION CONTRACTOR SHALL ROUTINELY INSPECT EQUIPMENT FOR LEAKS AND REMOVE ANY LEAKING EQUIPMENT FROM SERVICE UNTIL REPAIRED. CONTRACTOR SHALL MAINTAIN SPILL CLEANUP MATERIALS ONSITE AND RESPOND TO SPILLS AND LEAKS IMMEDIATELY TO CONTAIN AND REMOVE THE POLLUTANTS FROM THE SITE.

3.2.5. EXCAVATION, BACKFILL, AND PLACEMENT OF CONCRETE SHALL BE IN WORK AREAS ISOLATED FROM THE ACTIVE FLOWING CREEK.

3.3. PRODUCTS

3.3.1. CONSTRUCTION FENCING SHALL BE 48-INCH HIGH-DENSITY ORANGE POLYETHYLENE SAFETY FENCING WITH A MESH OPENING OF APPROXIMATELY 1 INCH BY 4 INCHES. FENCING SHALL BE ATTACHED TO STEEL OR WOOD POSTS INSTALLED IN THE GROUND AT LEAST 18 INCHES AND AT A MAXIMUM SPACING OF 12 FEET.

3.3.2. SILT FENCING SHALL BE INSTALLED AS SPECIFIED IN THE CALTRANS BEST MANAGEMENT PRACTICE FIELD MANUAL.

3.3.3. GRAVEL BAGS SHALL BE MADE FROM A WOVEN POLYPROPYLEN, POLYETHYLENE, OR POLYAMIDE FABRIC, OR BURLAP MATERIAL. WHEN FULL, A BAG SHOULD BE 1.5 FEET LONG BY 1 FOOT WIDE, AND 3 INCHES THICK WITH A WEIGHT OF APPROXIMATELY 35 LB. GRAVEL SHALL BE CLEAN GRANULAR MATERIAL LARGER THAN 0.25 INCHES AND SMALLER THAN 1 INCH.

3.3.4. PLASTIC SHEETING SHALL BE 6 MIL MINIMUM POLYETHYLENE OR APPROVED EQUAL.

3.4. EXECUTION

3.4.1. TEMPORARY CONSTRUCTION BMPS AS REQUIRED BY PROJECT PERMITS SHALL BE INSTALLED PRIOR TO MATERIAL DELIVERY AND CONSTRUCTION ACTIVITIES. NO SITE ACCESS FOR CONSTRUCTION OF THE WORK WILL BE PERMITTED UNTIL TEMPORARY CONSTRUCTION BMPS ARE INSTALLED AND APPROVED BY THE ENGINEER AT EACH DIVERSION SITE.

3.4.2. ADEQUATE PLASTIC SHEETING AND SILT FENCING MATERIALS SHALL BE ON HAND TO COVER CONSTRUCTION MATERIALS IN THE EVENT THAT PRECIPITATION IS FORECAST. COVERS SHALL BE 6 MIL PLASTIC SHEETING ENCIRCLED WITH PROPERLY INSTALLED SILT FENCING AND ANCHORED WITH GRAVEL BAGS. COVERS SHALL BE INSTALLED PRIOR TO PRECIPITATION. IF PRECIPITATION IS FORECAST OVERNIGHT OR OVER A WEEKEND, COVERS SHALL BE INSTALLED AT THE END OF THE WORK DAY.

3.4.3. AT THE COMPLETION OF CONSTRUCTION, TEMPORARY CONSTRUCTION BMPS SHALL BE COMPLETELY REMOVED FROM EACH DIVERSION SITE AND DISPOSED OF BY THE CONTRACTOR.

3.4.4. AREAS DISTURBED BY INSTALLATION OF TEMPORARY CONSTRUCTION BMPS, AND ANY OTHER AREAS DISTURBED BY CONSTRUCTION ACTIVITIES, SHALL BE LIGHTLY GRADED AND TREATED WITH WOOD CHIPS.

4. CLEARING AND GRUBBING

4.1. SUMMARY

4.1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO CLEAR AND GRUB TREES, PLANTS, BUSHES, WOOD, ORGANIC MATERIAL, AND OTHER MATERIALS NOT TO BE INCORPORATED IN THE WORK FROM THE AREA OF GRADING AS SHOWN ON THE PLANS.

4.2. CONDITIONS AND REQUIREMENTS

4.2.1. CLEARING AND GRUBBING OPERATIONS ARE TO BE CONDUCTED IN SENSITIVE AREAS NEAR THE CREEK AND DAMAGE TO EXISTING VEGETATION SHALL BE MINIMIZED. CLEARING AND GRUBBING OPERATIONS ARE SUBJECT TO THE REQUIREMENTS OF THE APPLICABLE PROVISIONS OF PROJECT PERMITS.

4.2.2. LOGS, BRANCHES, ROOTS, PLANTS, ORGANIC MATERIAL, REFUSE, AND OTHER MATERIAL REMOVED SHALL BE DISPOSED OF OFF THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING THE DISPOSAL SITE AND OBTAINING PERMISSION FOR DISPOSAL, FOR COMPLYING WITH APPLICABLE LAWS AND REGULATIONS FOR TRANSPORT OF MATERIALS TO BE DISPOSED, AND FOR APPROPRIATE DISPOSAL OF MATERIALS.

4.3. PRODUCTS

4.3.1. TREE WOUND PAINT SHALL BE BITUMINOUS BASED PAINT OF STANDARD MANUFACTURE SPECIFICALLY DESIGNATED FOR USE ON TREE WOUNDS AND CUTS.

4.4. EXECUTION

4.4.1. UTILITIES SHALL BE LOCATED BY UNDERGROUND SERVICE ALERT (USA) PRIOR TO COMMENCING CLEARING AND GRUBBING OPERATIONS AND UTILITIES TO REMAIN SHALL BE PROTECTED.

4.4.2. THE ENGINEER WILL MARK THE TREES TO BE REMOVED IN THE FIELD. TREES TO BE REMOVED SHALL BE FELLED AND CUT FOR TRANSPORT. STUMPS AND ROOTS SHALL BE GRUBBED IN AREAS TO BE GRADED. GRUBBING SHALL REMOVE ROOTS LARGER THAN 3 INCHES IN DIAMETER TO A DEPTH OF AT LEAST 18 INCHES BELOW THE GROUND SURFACE. DEPRESSIONS FORMED BY GRUBBING SHALL BE REGRADED AS PART OF THE WORK OR FILLED WITH NATIVE MATERIAL TO BE FLUSH WITH THE ADJACENT GROUND SURFACE.

4.4.3. TREES AND VEGETATION TO REMAIN SHALL BE PROTECTED. NO GRADING SHALL OCCUR WITHIN 5 FEET OF THE DRIPLINE OF TREES INDICATED ON THE PLANS AS PROTECTED. MINOR ADJUSTMENTS IN SLOPE STEEPNESS OR LIMITS OF EXCAVATION AND FILL MAY BE REQUIRED TO AVOID GRADING WITHIN 5 FEET OF THESE TREES. PROTECTED TREE LOCATIONS INDICATED ON SHEET C2 ARE TO BE PROTECTED, ALTHOUGH GRADING MAY OCCUR VERY CLOSE TO, OR AROUND, THE TRUNKS. EXCAVATION AND FILL IN THE VICINITY OF TREES SO INDICATED SHALL BE PERFORMED BY HAND, TO THE EXTENT NECESSARY TO AVOID DAMAGE TO THE TREES.

4.4.4. TREES LOCATED NEAR ACCESS ROUTES OR WITH BRANCHES THAT INTERFERE WITH THE WORK SHALL BE PRUNED TO PREVENT DAMAGE BY EQUIPMENT. BRANCHES SHALL BE CUT NEAR THE BOLE OF THE TREE OR ADJACENT BRANCH. CUTS SHALL BE NEATLY MADE, WITHOUT SPLINTERING OR TEARING THE BRANCH. CUTS ON BRANCHES LARGER THAN 1½ INCHES SHALL BE PAINTED WITH AN APPROVED TREE WOUND PAINT.

5. INSTREAM GRADING WORK

5.1. SUMMARY

5.1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO CONDUCT INSTREAM GRADING AND OTHER RELATED TASKS DESCRIBED IN THIS SECTION AND AS SHOWN ON THE DRAWINGS. WORK INCLUDED IN THIS SECTION INCLUDES:

5.1.1.1. FIELD LAYOUT OF STRUCTURES AND ADJUSTMENT TO FIELD CONDITIONS;

5.1.1.2. COORDINATION WITH THE OWNER OR OWNER'S REPRESENTATIVE TO MAKE FIELD ADJUSTMENTS TO THE CONFIGURATION OF IN-STREAM STRUCTURES, AS NOTED ON THE DRAWINGS;

5.1.1.3. CONSTRUCTION OF FEATURES AND STRUCTURES, INCLUDING ASSOCIATED EXCAVATION AND BACKFILL; ALSO INCLUDING COORDINATION FOR INSTALLATION OF PLANTINGS/REVEGETATION.

5.1.2. THE CONTRACTOR SHALL HAVE EXPERIENCE IN INSTREAM CONSTRUCTION AND SHALL HAVE EQUIPMENT AND TRAINED PERSONNEL APPROPRIATE TO THE WORK TO BE PERFORMED.

5.1.3. QUALITY ASSURANCE

5.1.3.1. WRITTEN GUARANTEE AGAINST DEFECTS

BEFORE FINAL ACCEPTANCE, THE CONTRACTOR SHALL PROVIDE A WRITTEN GUARANTEE AGAINST DEFECTS RESULTING FROM POOR INSTALLATION OF BIOENGINEERED STRUCTURES TO THE CONTRACTING OFFICER FOR A PERIOD OF 1 YEAR AFTER THE CONTRACTING OFFICER'S ACCEPTANCE OF THE COMPLETED INSTALLATION.

5.1.3.2. RECORD DRAWINGS

THROUGHOUT THE CONSTRUCTION PERIOD, THE CONTRACTOR SHALL KEEP WRITTEN AND PHOTOGRAPHIC NOTES RECORDING CONSTRUCTION EFFORTS AND ANY CHANGES, ADDITIONS, OR DELETIONS FROM THE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING RED-LINED RECORD ("AS-BUILT") DRAWINGS FOR USE BY OTHERS. THE RECORD DRAWINGS SHALL SHOW AS-BUILT CONDITIONS, INCLUDING INFORMATION ON THE CONSTRUCTION OF THE BIOENGINEERED STRUCTURES. THE CONTRACTOR SHALL DRAFT ALL CHANGES ON ONE SET OF FULL SIZE CONSTRUCTION DRAWINGS. AT THE CONTRACTOR'S OPTION, THE ORIGINAL CONSTRUCTION DRAWINGS CAN BE PROVIDED BY THE CONTRACTING OFFICER IN ELECTRONIC (AUTOCAD) FORMAT.

5.1.4. ENVIRONMENTAL REQUIREMENTS

SEE "TEMPORARY CONSTRUCTION BMPS" NOTES

5.2. MATERIALS

5.2.1. ROCK

ROCK FOR THE ROCK SCOUR PROTECTION SHALL MEET THE MATERIAL SPECIFICATIONS OUTLINED IN CALTRANS STANDARD SPECIFICATION 72-2 FOR ROCK SLOPE PROTECTION. THE ROCK SHALL BE SOUND, DURABLE MATERIAL FREE FROM MAJOR CRACKS OR DEFECTS. ROCK MAY BE QUARRIED FROM EXCAVATION OR FROM BLASTED ROCK. ROCK SHALL BE SUB-ANGULAR OR ANGULAR AND BLOCKY IN SHAPE, AND WITH THE MAXIMUM AXIS DIMENSION NOT MORE THAN TWO TIMES THE MINIMUM AXIS DIMENSION.

| ROCK SCOUR PROTECTION GRADATION CHART | |
|---|---|
| ROCK MASS (kg) | PERCENTAGE LARGER THAN ROCK MASS.... |
| 1 ton | 0-5 |
| ½ ton | 50-100 |
| 200 lb | 95-100 |

5.2.2. FILTER FABRIC

FILTER FABRIC SHALL MEET CLASS 8 FABRIC AS DEFINED IN CALTRANS STANDARD SPECIFICATION 72-2.

5.3. EXECUTION

5.3.1. SITE VERIFICATION OF CONDITIONS THE CONTRACTOR SHALL VERIFY SITE CONDITIONS AT THE LOCATIONS OF GRADING WORK AND IDENTIFY ANY SITE CONDITIONS THAT WOULD REQUIRE MODIFICATIONS TO THE DESIGN. THE CONTRACTOR SHALL VERIFY THAT SUITABLE WATER CONTENT, SOIL, AND OTHER ENVIRONMENTAL CONDITIONS EXIST TO CONDUCT INSTREAM GRADING WORK.

5.3.2. SCOUR APRON THE SCOUR APRON IS INTENDED TO DISSIPATE ENERGY OF THE FLOW PLUNGING OVER THE DAM CREST. SCOUR APRON ROCKS SHALL BE PLACED AND FILLED TO THE ELEVATION SHOWN ON THE SHEET C2 OR AS DIRECTED BY THE ENGINEER.

6. JUVENILE BYPASS PIPE

6.1. SUMMARY

6.1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO PLACE THE JUVENILE BYPASS PIPE. THIS WORK INCLUDES THE TRENCH, PLACEMENT, AND FILL OF THE JUVENILE BYPASS PIPE.

6.2. MATERIALS

6.2.0. THE JUVENILE BYPASS PIPE SHALL BE HIGH DENSITY POLYETHYLENE WATER TRANSMISSION AND DISTRIBUTION PIPE WITH OUTSIDE DIAMETER (O.D.) OF 20" FOLLOWING THE STEEL PIPE SIZE (IPS) CONVENTION. THE PIPE SHALL HAVE A DIMENSION RATION (DR) OF 32.5. STANDARD PIPE LENGTHS SHALL BE 45 OR 50 FOOT WITH PIPE SEGMENTS JOINED BY HEAT FUSION. THE FUSION SHALL INCLUDE THE PEELING REMOVAL OF THE INTERNAL BEAD FORMED BY THE FUSION PROCESS. ALL WELDS AND EDGES SHALL BE SMOOTH AND FREE OF BURNS OR DEFORMITIES. POLYETHYLENE PIPE AND FITTINGS SHALL BE MADE FROM VIRGIN RESINS EXHIBITING A CELL CLASSIFICATION OF PE 345444C AS DEFINED IN ASTM D3359 WITH AN ESTABLISHED HYDROSTATIC-DESIGN-BASIS TO BE PROVIDED WITH SUBMITTAL FOR WATER AT 73 DEGREES F. THE RESIN SHALL BE LISTED BY THE PPI (PLASTIC PIPE INSTITUTE) IN ITS PIPE-GRADE REGISTRY TECHNICAL REPORT (TR) 4, "LISTING OF PLASTIC PIPE COMPOUNDS."

6.2.1. THE PIPE BACKFILL IS DIVIDED INTO THREE ZONES. THE PIPE BEDDING IS DEFINED AS THE PORTION OF THE BACKFILL MATERIAL BETWEEN THE BOTTOM OF THE PIPE AND TRENCH SUBGRADE. THE PIPE ZONE BACKFILL IS DEFINED AS THAT PORTION OF THE TRENCH TO BE FILLED FROM THE PIPE BOTTOM TO 6" ABOVE THE TOP OF PIPE. THE PIPE BEDDING AND PIPE ZONE BACKFILL SHALL BE NATIVE SOILS OR IMPORT, AS REQUIRED, AND SHALL CONFORM TO CALTRANS CLASS 2 AGGREGATE BASE WITH 3/4-INCH MAXIMUM SIZE. THE TRENCH ZONE BACKFILL IS WILL FILL THE TRENCH BETWEEN THE TOP OF THE PIPE ZONE TO THE EXISTING GRADE. THE TRENCH ZONE BACKFILL WILL BE EXCAVATED FROM THE TRENCH.

6.3. EXECUTION

6.3.1. PIPE AND FITTINGS SHALL BE OF THE SIZES INDICATED. CLEAN PIPE INTERIOR OF ALL FOREIGN MATTER BEFORE INSTALLING. PIPE SHALL BE SQUARE CUT WITH FINE TOOTH SAW OR OTHER CUTTER OR KNIFE DESIGNED FOR USE WITH PLASTIC PIPE. REMOVE BURRS BY SMOOTHING EDGES WITH A KNIFE, FILE, OR SANDPAPER. INTERIOR JOINTS MUST BE SMOOTHED BY PEELING THE INTERNAL BEAD CREATED DURING THE THE FUSION PROCESS TO MATCH FACTORY INTERIOR WALL SMOOTHNESS AND REMOVE ANY AND ALL PROJECTIONS. NO GOUGES OR SCRATCHES ON THE INTERIOR OF THE PIPE WILL BE ACCEPTABLE. ANY LENGTH OF PIPE HAVING A GOUGE, SCRATCH, OR OTHER PERMANENT INDENTATION MORE THAN 10 PERCENT OF THE WALL THICKNESS IN DEPTH SHALL BE REJECTED. REPLACE ANY SECTION OF PIPE FOUND TO BE DEFECTIVE OR DAMAGED WITH NEW ACCEPTABLE PIPE. HANDLE PIPE CAREFULLY TO PREVENT GOUGING OR SCRATCHING.

7. STRUCTURAL STEEL

7.1. SUMMARY

7.1.1. STRUCTURAL STEEL WORK INCLUDES THE PRODUCTION OF THE FISH SCREEN LOUVERS, INSTALLATION OF THE FLOW ISOLATION PLATE ON THE EXISTING SCREEN, AND PRODUCTION AND INSTALLATION OF THE TRASH RACKS. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED IN THE PRODUCTION AND INSTALLATION OF THESE ITEMS.

7.1.2. SUBMITTALS:

7.1.2.1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL 14 DAYS PRIOR TO BEGINNING FABRICATION. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING:

7.1.2.1.1. SIZES SHAPES WEIGHT OF EACH PIECE AND DIMENSION OF ALL MATERIALS USED.

7.1.2.1.2. FABRICATION DETAILS.

7.1.2.1.3. DETAILS OF ALL WELDED AND BOLTED CONNECTIONS.

7.1.2.2. CERTIFICATIONS: THE CONTRACTOR SHALL SUBMIT MILL TEST REPORTS CERTIFYING THAT THE MATERIAL MEET THE REFERENCE ASTM SPECIFICATIONS:

7.1.2.2.1. STRUCTURAL SHAPES AND PLATES

7.1.2.2.2. BOLTS, NUTS, AND WASHERS

7.1.2.3. SUBMIT WELDER CERTIFICATION PAPERS FOR ALL WELDERS DOING FIELD WELDING. SUBMIT LETTER FROM MANUFACTURER STATING ALL OFFSITE FABRICATION IS DONE BY CERTIFIED INSPECTORS.

7.2. PRODUCTS

7.2.1. SHAPES AND PLATES

7.2.1.1. CHANNELS, ANGLES, AND PLATES-ASTM A36

7.2.1.2. STEEL TUBING-ASTM A500 GRADE B

7.2.1.3. PIPE: ASTM A53, GRADE B

7.2.2. CONNECTIONS

7.2.2.1. BOLTS, WASHERS, AND NUTS: UNLESS OTHERWISE NOTED ON THE PLANS: ASTM F593 AND ASTM 594

7.2.2.2. WELDING-WELDING ROD E70XX PER ANSI/AWS D1.1

7.2.2.3. ANCHOR RODS-ASTM F1553. GRADE 36

7.2.2.4. THREADED RODS- ASTM A307

7.2.3. FINISH

7.2.3.1. HOT-DIP GALVANIZING: GALVANIZE ALL STEEL UNLESS OTHERWISE NOTED ON THE PLANS. GALVANIZE IN ACCORDANCE WITH ASTM A123/123M

7.2.3.2. EPOXY IMPREGNATED PAINT OR POWDER COATING CAN BE USED EN LIEU OF HOT-DIP GALVANIZING. COLOR SHOULD BE APPROVED BY ENGINEER.

7.3. EXECUTION

7.3.1. FABRICATE ALL STRUCTURAL STEEL FABRICATIONS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AS WELL AS AISC AND AWS SPECIFICATIONS.

7.3.2. STORE MATERIALS IN A CAREFUL AND WORKMANLIKE MANNER SO THAT DAMAGE TO THE MATERIALS EITHER FROM CORROSION OR LOADS IS AVOIDED. STORE WELDING RODS IN ORIGINAL CONTAINERS OR IN ROD ROD OVENS. RODS MUST BE KEPT DRY. WET RODS ARE NOT TO BE USED.

7.3.3. ALL WELDING WHETHER IIN THE FIELD OR THE SHOP MUST BE PERFORMED BY WELDERS CERTIFIED IN THE WELDS AND POSITIONS THAT ARE REQUIRED BY THE PLANS. SPECIAL INSPECTION IS TO BE PROVIDED WHERE REQUIRED.

7.3.4. ALL BOLTS MUST BE TENSION TO THE SNUG-TIGHT CONDITION ONLY.

7.3.5. INSTALL GALVANIZED STRUCTURAL STEEL WITHOUT DAMAGE TO COATING. ANY DAMAGE TO STRUCTURAL STEEL HALL BE REPAIRD BY STRIPPING COATING AND REDIPPING PIECE.

8. TEMPORARY ACCESS

8.1. SUMMARY

8.1.1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS FOR ALL WORK REQUIRED TO DEVELOP AND MAINTAIN ADEQUATE CONSTRUCTION ACCESS TO THE WORK.

8.1.2. SUBMITTALS

8.1.2.1. CONTRACTOR SHALL SUBMIT A TEMPORARY SITE ACCESS PLAN DESCRIBING METHODS TO BE USED TO ACCESS JOB SITE. THE PLAN SHALL DESCRIBE: THE APPROACH FOR CONSTRUCTION ACCESS TO EACH DIVERSION SITE; TRAFFIC MANAGEMENT METHODS FOR DELIVERY OF MATERIALS AND TRANSFER TO STAGING AND WORK AREAS; INSTALLATION OF TEMPORARY CONSTRUCTION BMPS TO PROTECT SOILS, VEGETATION, AND WATER QUALITY DURING CONSTRUCTION; AND METHODS TO PROTECT VEGETATION AND GROUND SURFACES OUTSIDE THE AREAS OF WORK.

8.1.3. NO WORK SHALL OCCUR UNTIL THE PLAN IS APPROVED BY THE ENGINEER.

8.2. EXECUTION

8.2.1. ANY WORK REQUIRED TO MAKE ACCESS ROADS SERVICEABLE FOR CONSTRUCTION OPERATIONS SHALL BE AT THE CONTRACTOR'S EXPENSE.

8.2.2. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING FACILITIES AND ACCESS ROADS UTILIZED FOR PERFORMANCE OF THE WORK MEET PRE-CONSTRUCTION CONDITIONS.

8.2.3. ANY TEMPORARY FILL USED FOR CONSTRUCTION OF TEMPORARY ACCESS RAMPS SHALL BE PLACED ON PAVING FABRIC AS DEFINED IN CALTRANS STANDARD SPECIFICATION SECTION 88. ALL TEMPORARY FILL AND FABRIC SHALL BE OFF-HAULED AT COMPLETION OF THE PROJECT AT THE CONTRACTOR'S EXPENSE.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| Drafter | tvs |
| Checked | bgw |
| File Name | WARD BASEMAP |
| Plotted Scale | 0 1/2 1 |

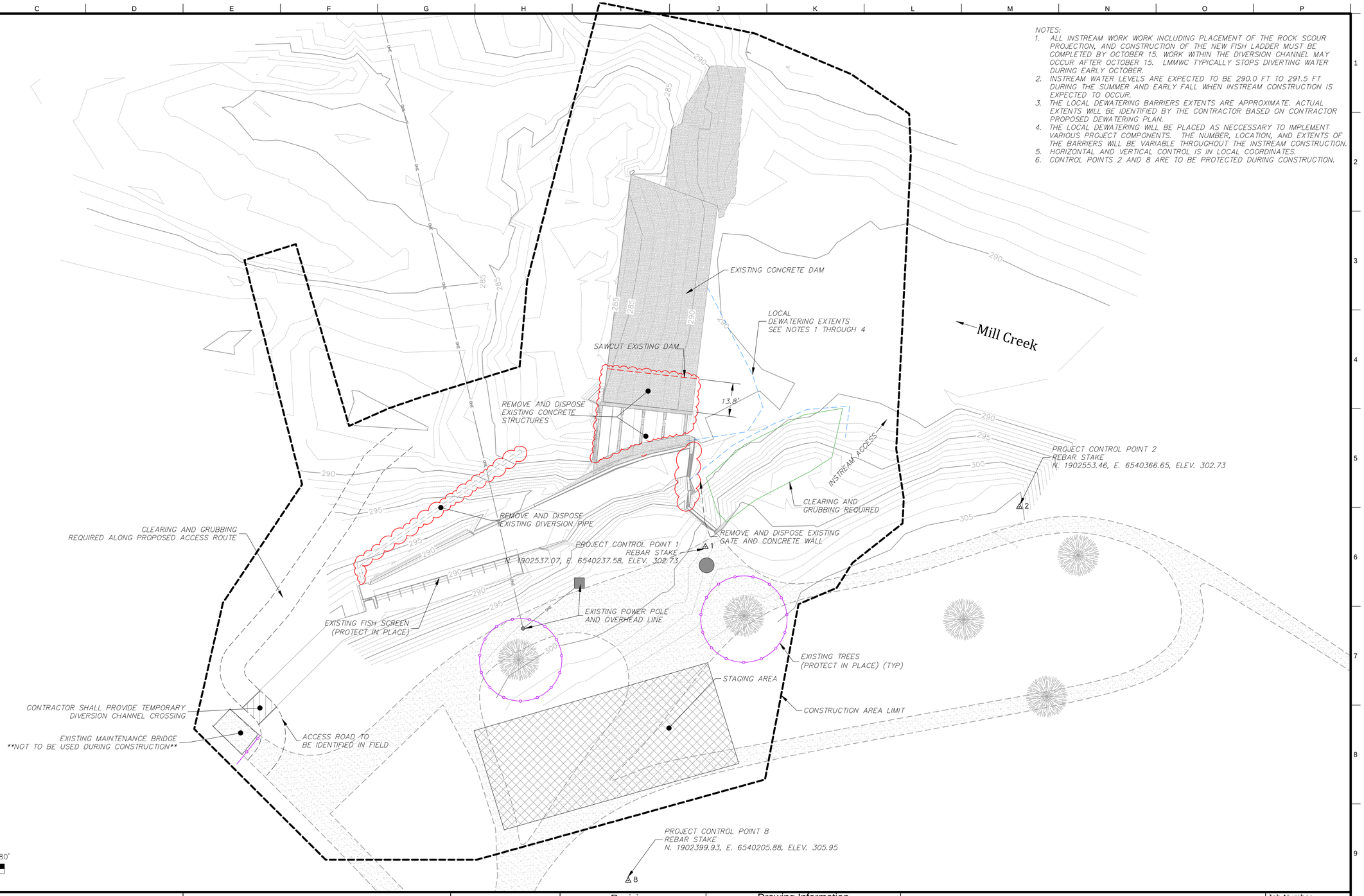
Mill Creek Fish Passage Improvement Project
Ward Dam Facilities

General Notes

Job Number 50655

Sheet Number G1

NOTES:
1. ALL INSTREAM WORK WORK INCLUDING PLACEMENT OF THE ROCK SCOUR PROJECTION, AND CONSTRUCTION OF THE NEW FISH LADDER MUST BE COMPLETED BY OCTOBER 15. WORK WITHIN THE DIVERSION CHANNEL MAY OCCUR AFTER OCTOBER 15. LMMWC TYPICALLY STOPS DIVERTING WATER DURING EARLY OCTOBER.
2. INSTREAM WATER LEVELS ARE EXPECTED TO BE 290.0 FT TO 291.5 FT DURING THE SUMMER AND EARLY FALL WHEN INSTREAM CONSTRUCTION IS EXPECTED TO OCCUR.
3. THE LOCAL DEWATERING BARRIERS EXTENTS ARE APPROXIMATE. ACTUAL EXTENTS WILL BE IDENTIFIED BY THE CONTRACTOR BASED ON CONTRACTOR PROPOSED DEWATERING PLAN.
4. THE LOCAL DEWATERING WILL BE PLACED AS NECCESSARY TO IMPLEMENT VARIOUS PROJECT COMPONENTS. THE NUMBER, LOCATION, AND EXTENTS OF THE BARRIERS WILL BE VARIABLE THROUGHOUT THE INSTREAM CONSTRUCTION.
5. HORIZONTAL AND VERTICAL CONTROL IS IN LOCAL COORDINATES.
6. CONTROL POINTS 2 AND 8 ARE TO BE PROTECTED DURING CONSTRUCTION.





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# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

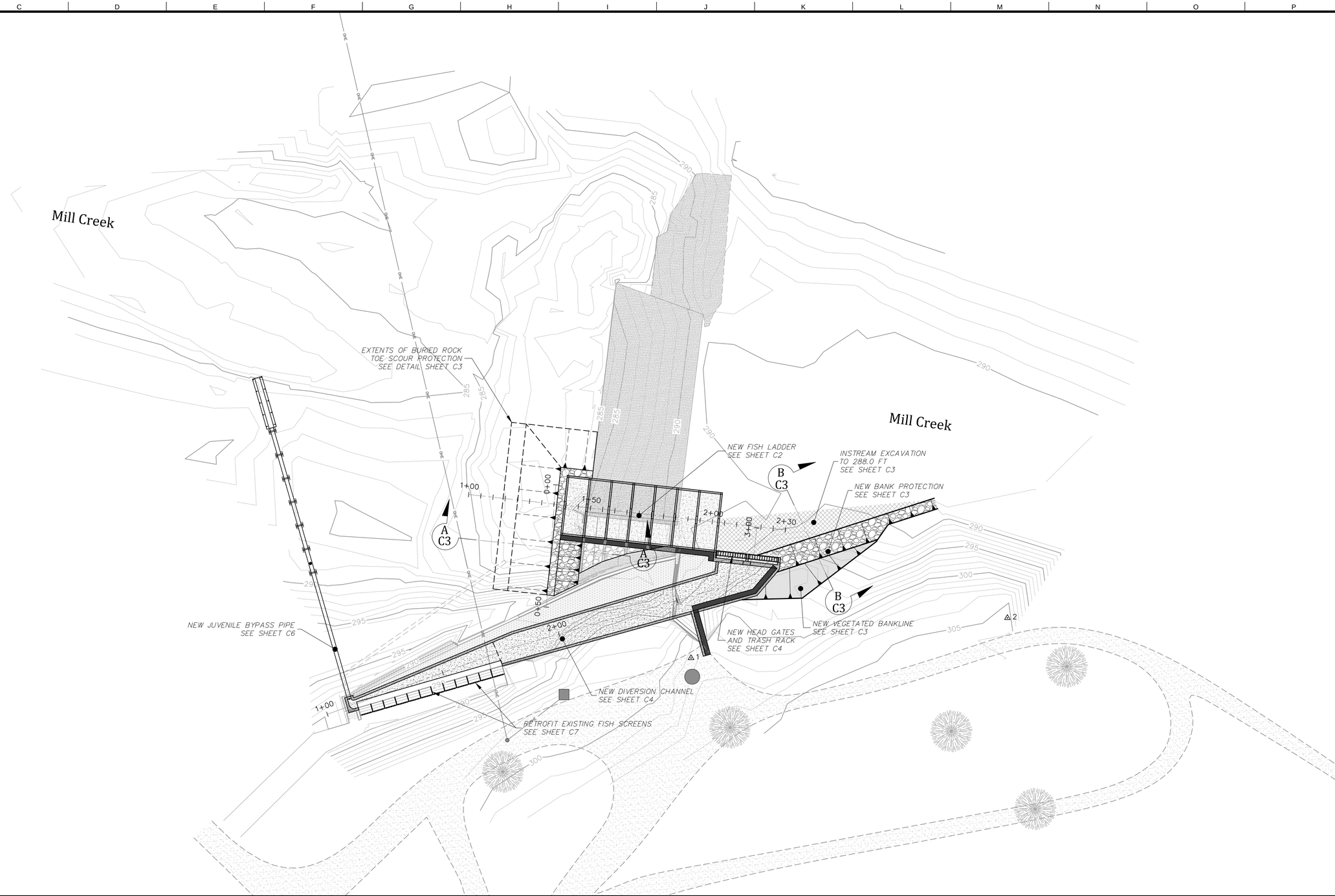
## Access & Demolition

Job Number 50655

Sheet Number

G2

Sheet 3 of 11

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# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

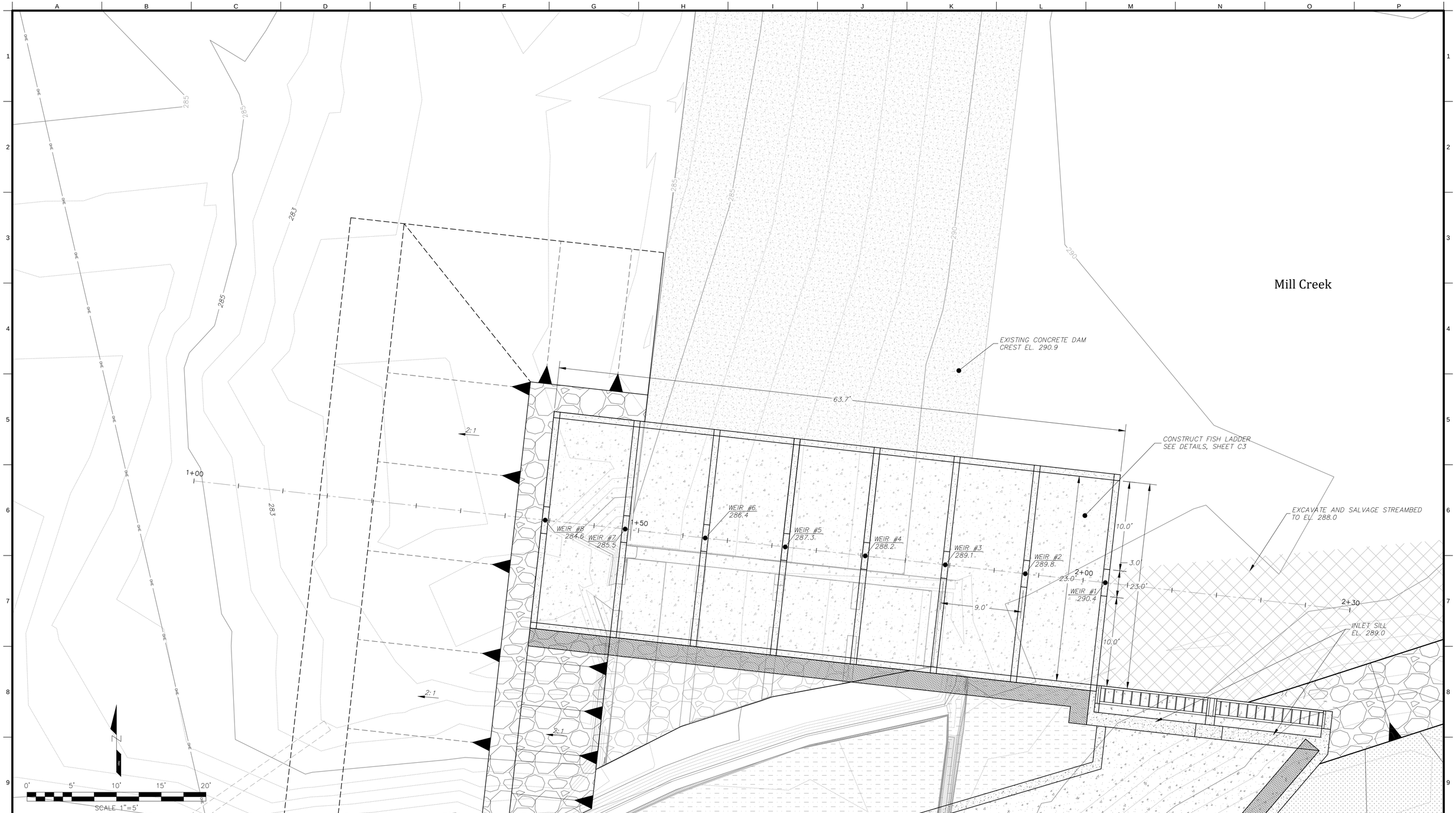
## General Plan

Job Number 50655

Sheet Number

C1

Sheet 4 of 11

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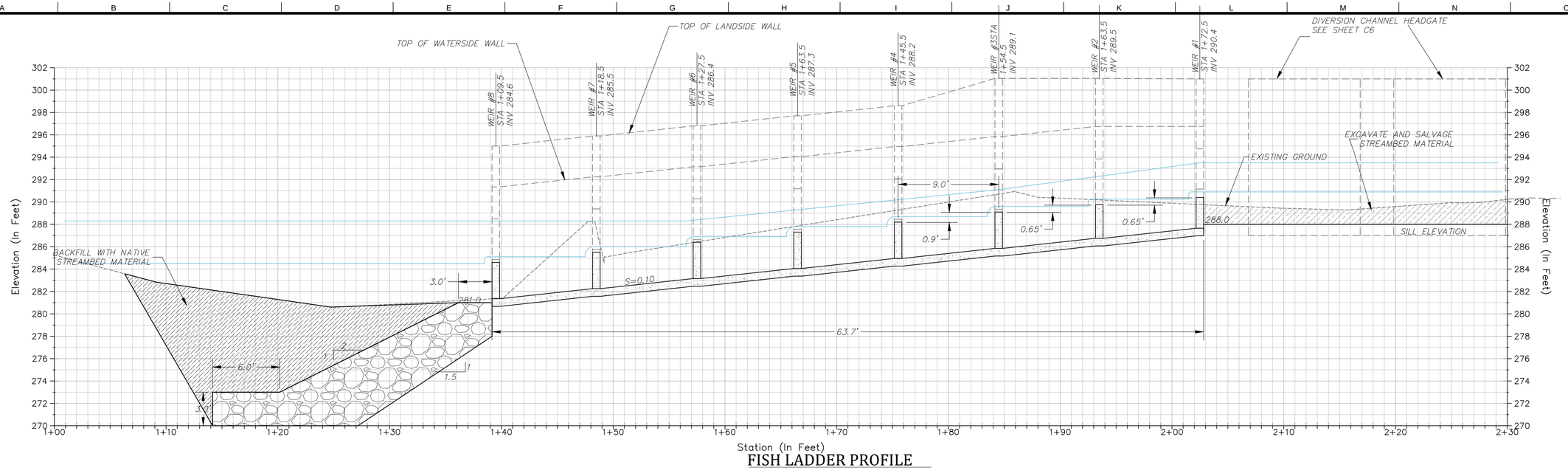
# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

## Fish Ladder Plan

Job Number
50655

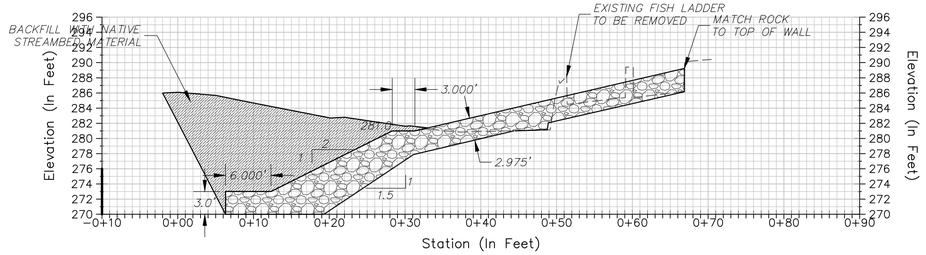
Sheet Number
C2

Sheet 5 of 11



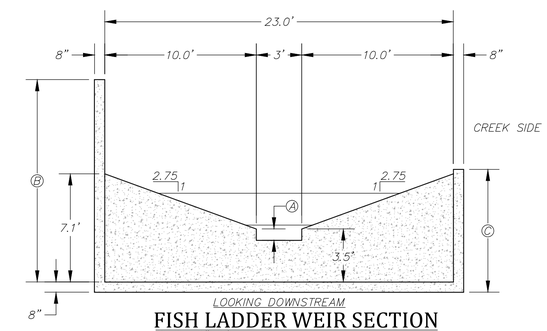

## FISH LADDER PROFILE

H: 1"=5' V: 1"=5'




## ROCK BANK PROTECTION (SECTION A-A)

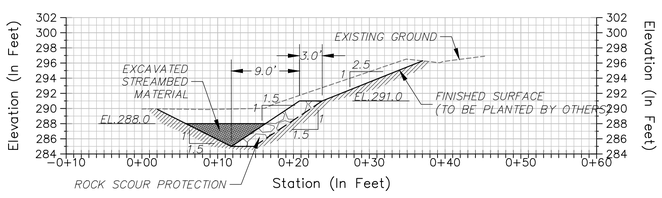
Scale: 1"=10'




## FISH LADDER WEIR SECTION

Scale: 1"=5'

| WEIR DIMENSIONS | | | |
|---|---|---|---|
| WEIR | NOTCH HEIGHT, "A" (FT) | LANDSIDE WALL HEIGHT "B" (FT) | WATERSIDE WALL HEIGHT "C" (FT) |
| 1 | 0.75 | 13.40 | 9.1 |
| 2 | 0.50 | 14.30 | 10 |
| 3 | 0.25 | 15.20 | 10 |
| 4 | 0.25 | 13.65 | 10 |
| 5 | 0.25 | 13.65 | 10 |
| 6 | 0.25 | 13.65 | 10 |
| 7 | 0.25 | 13.65 | 10 |
| 8 | 0.25 | 13.65 | 10 |




## ROCK BANK PROTECTION (SECTION B-B)

Scale: 1"=10'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# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

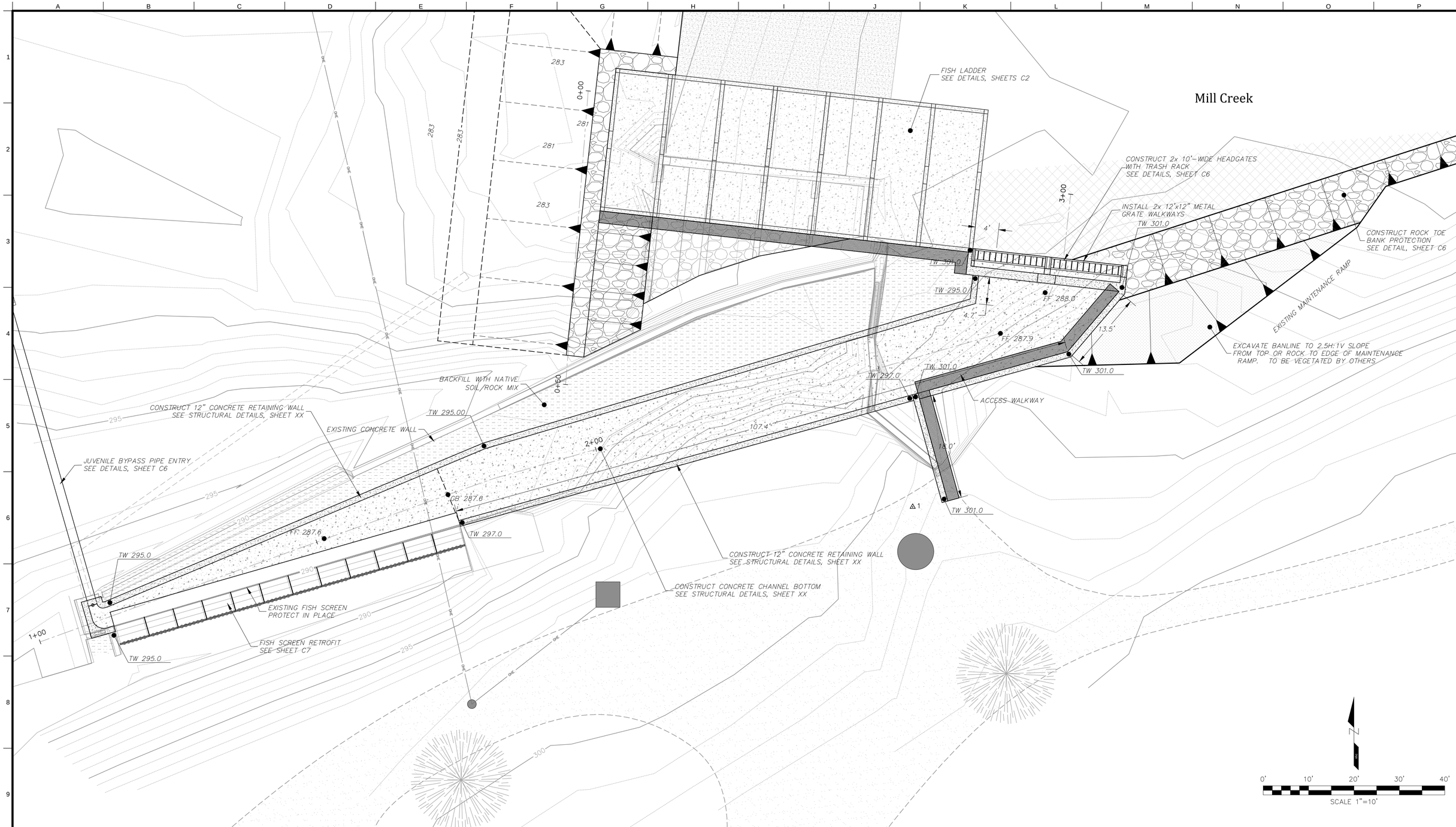
## Fish Ladder Details

Job Number 50655

Sheet Number

C3

Sheet 6 of 11

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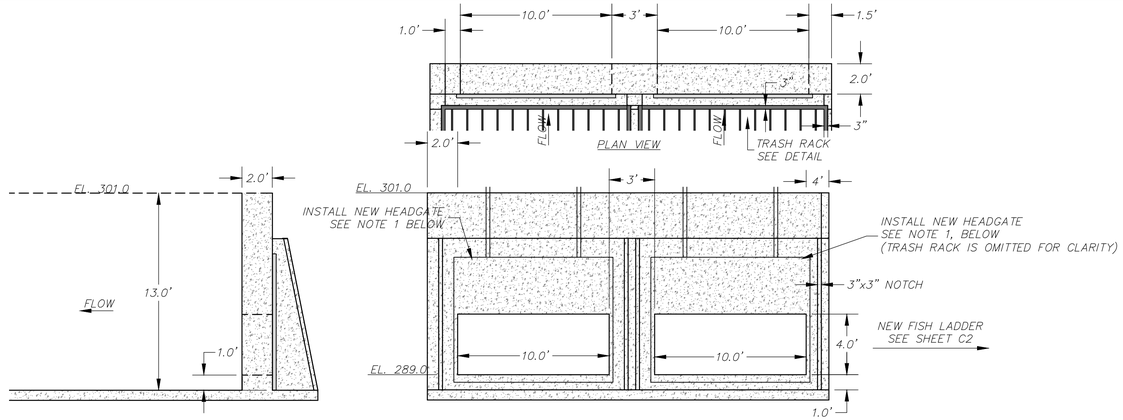
# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

## Diversion Inlet Plan

Job Number
50655

Sheet Number
C4

Sheet 7 of 11



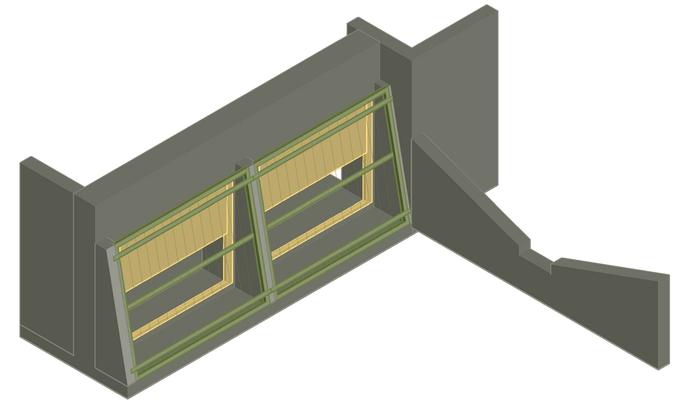

SECTION VIEW

ELEVATION VIEW

## HEADGATE

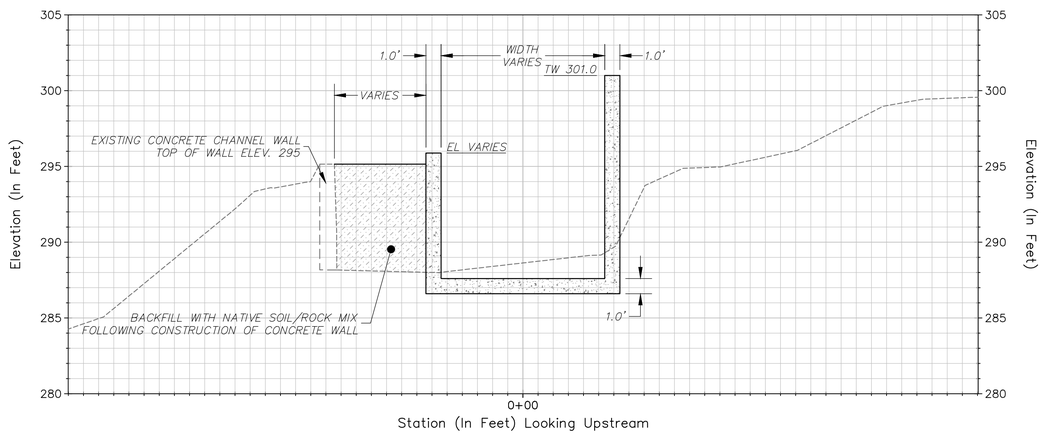
Scale: 1"=5'

NOTE:
1. INSTALL TWO 120"W X 48"H GOLDEN HARVEST GH-46 STAINLESS STEEL SLIDE GATES OR EQUIVALENT



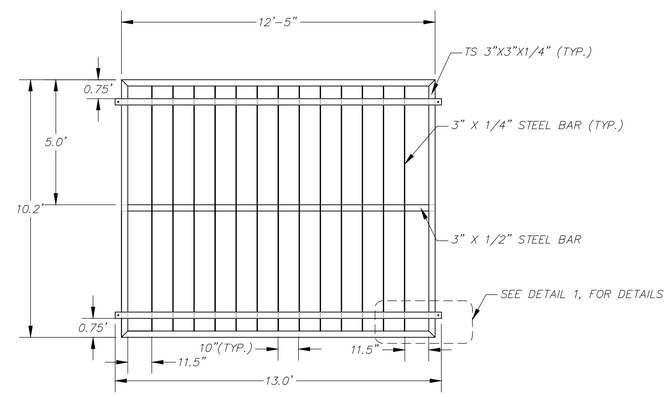
## TRASH RACK AND HEADGATE ISOMETRIC VIEW

Scale: 1"=5'



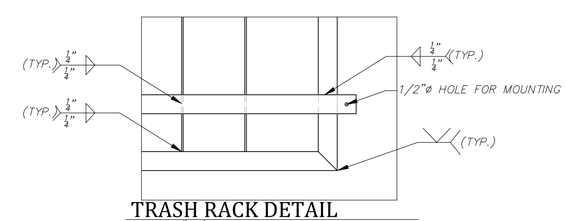

## TYPICAL CHANNEL SECTION (STA 1+74 to STA 2+84)

Scale: 1"=5'




## FRONT VIEW TRASH RACK

Scale: 1"=3'




## TRASH RACK DETAIL

Scale: 1"=1'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| File Name | WARD BASEMAP |
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# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

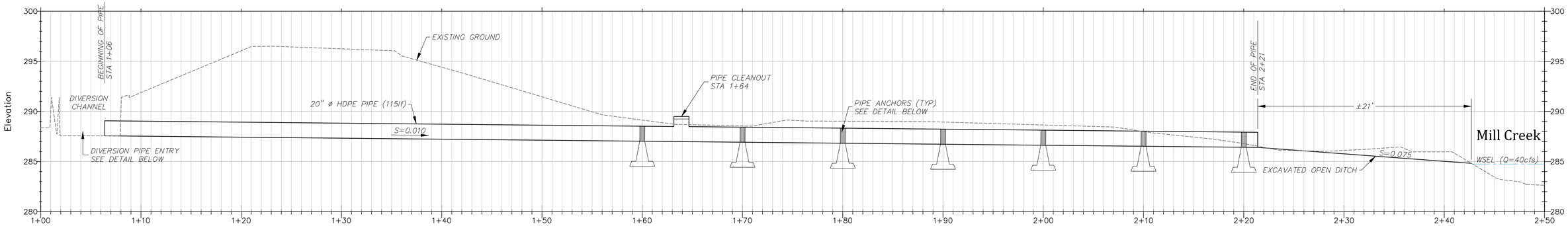
## Diversion Inlet Details

Job Number 50655

Sheet Number

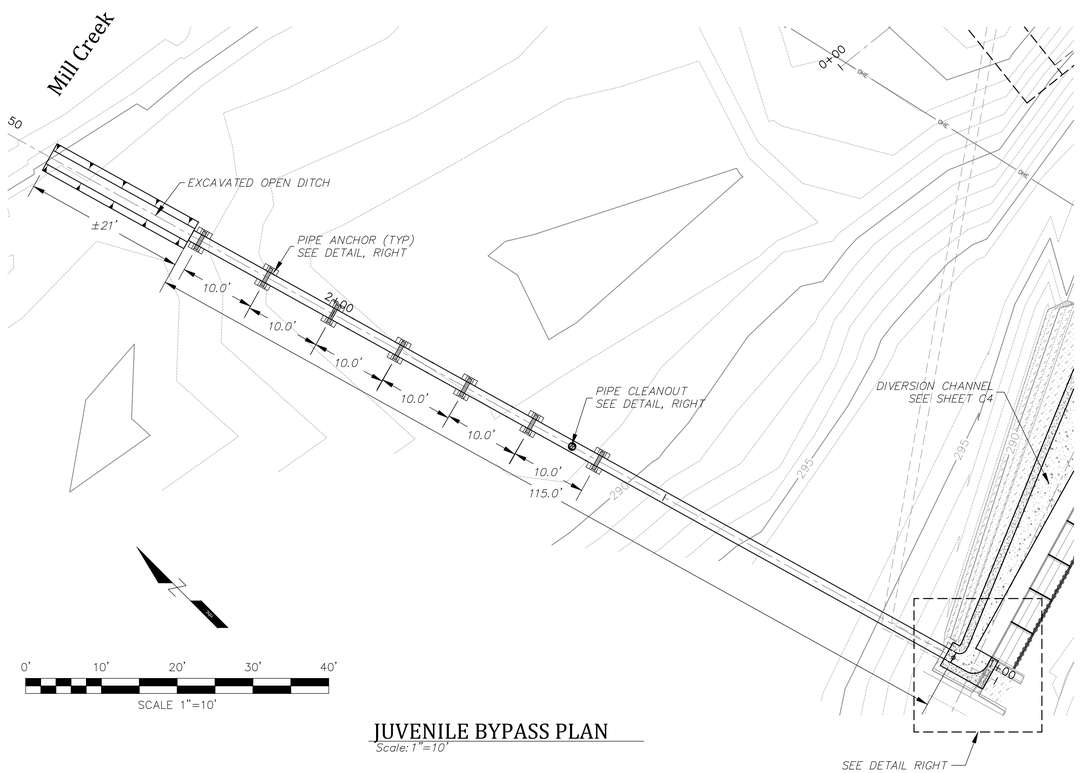
C5

Sheet 8 of 11



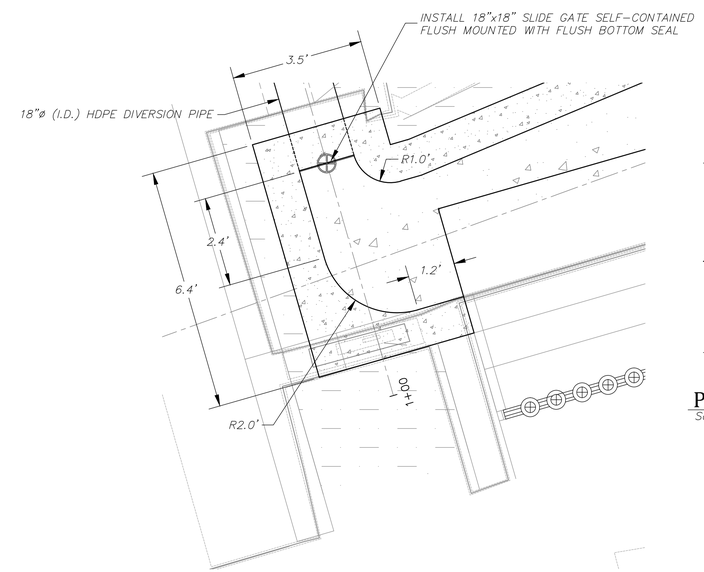

## JUVENILE BYPASS PIPE PROFILE

Scale: 1"=5'



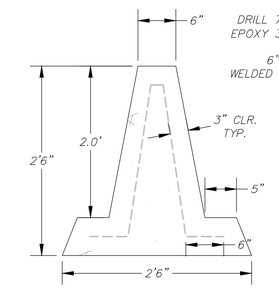

## JUVENILE BYPASS PLAN

Scale: 1"=10'



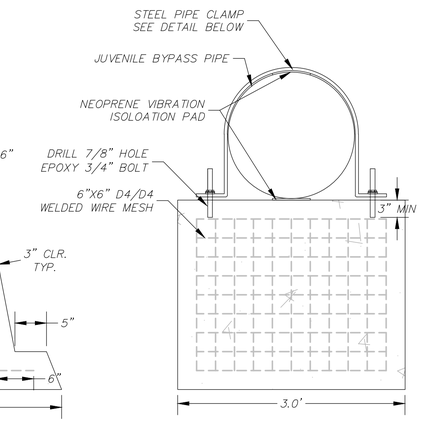

## JUVENILE BYPASS PIPE ENTRY

Scale: 1"=2'



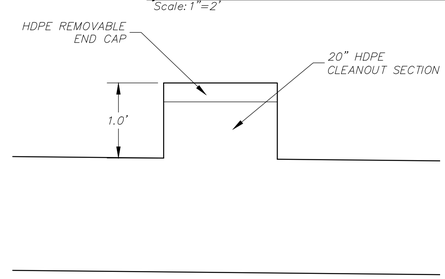

## PIPE ANCHOR-SIDE

Scale: 1"=1'



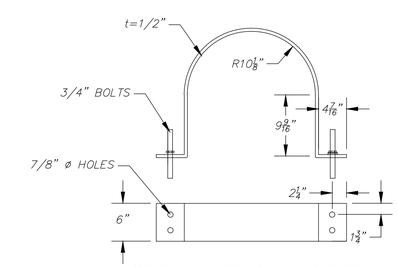

## PIPE ANCHOR-FRONT

Scale: 1"=1'




## JUVENILE BYPASS CLEANOUT

Scale: 1"=1'




## STEEL PIPE CLAMP DETAIL

Scale: 1"=1'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| Revisions | | |
|---|---|---|
| No. | Date | Description |
| | | |

| Drawing Information | |
|---|---|
| Date | 15 March 2015 (06:23) |
| Status | 95% Submittal |
| Designer | tvs |
| Drafter | tvs |
| Checked | bgw |
| File Name | WARD BASEMAP |
| Plotted Scale | 0 1/2 1 (18.23:41) |

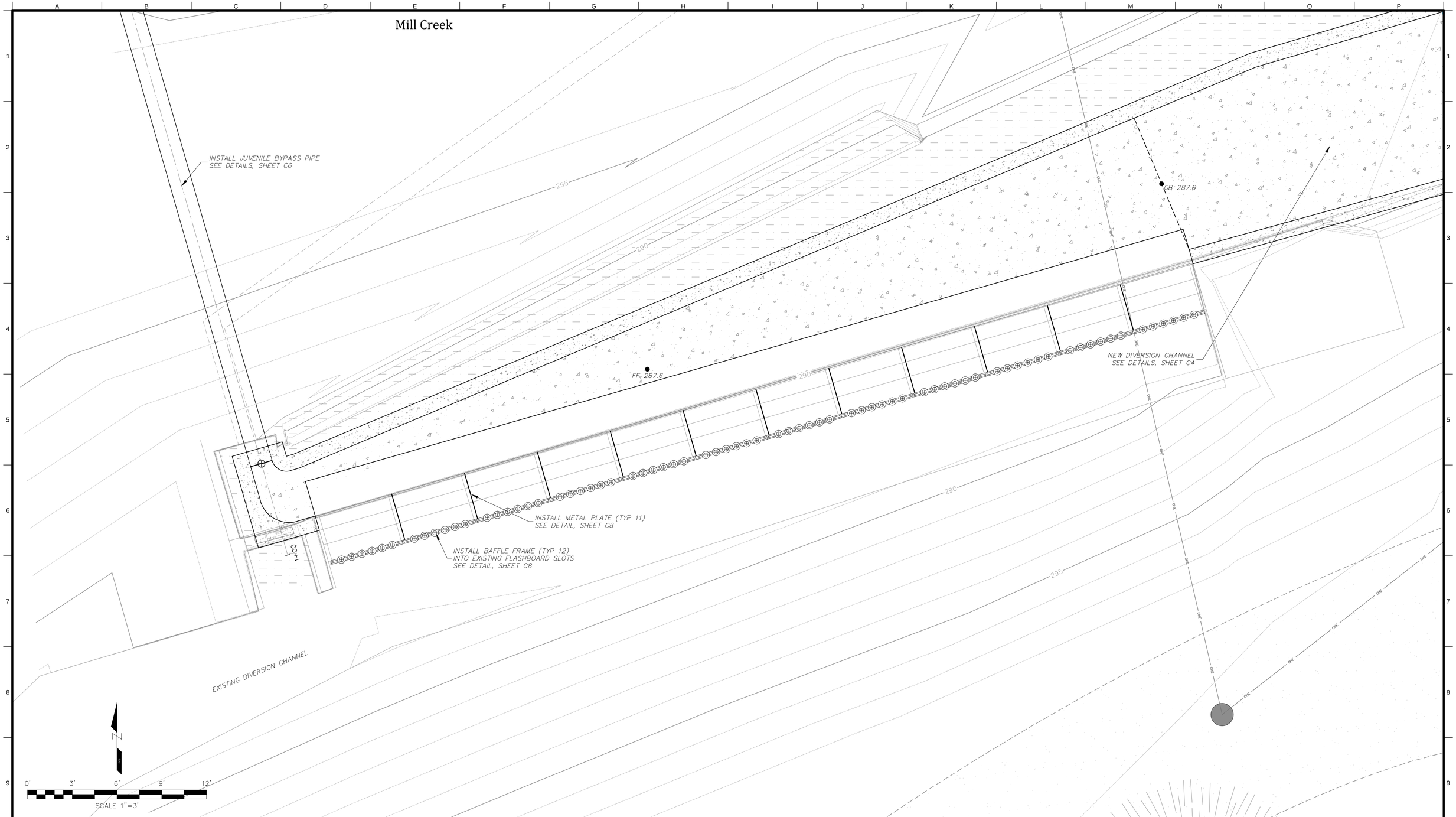
P:\50655_Mill Creek Fish Passage_Phase 1\C-\50655dwg

# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

## Juvenile Bypass Pipe Details

Job Number 50655

Sheet Number C6

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|---|---|---|
| No. | Date | Description |
| | | |

| Drawing Information | |
|---|---|
| Date | 15 March 2015 (06:23) |
| Status | 95% Submittal |
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| Drafter | tvs |
| Checked | bgw |
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| Plotted Scale | 0 1/2 1 (18:23:43) |

P:\50655_Mill Creek Fish Passage_Bridge_DWG\50655dwg

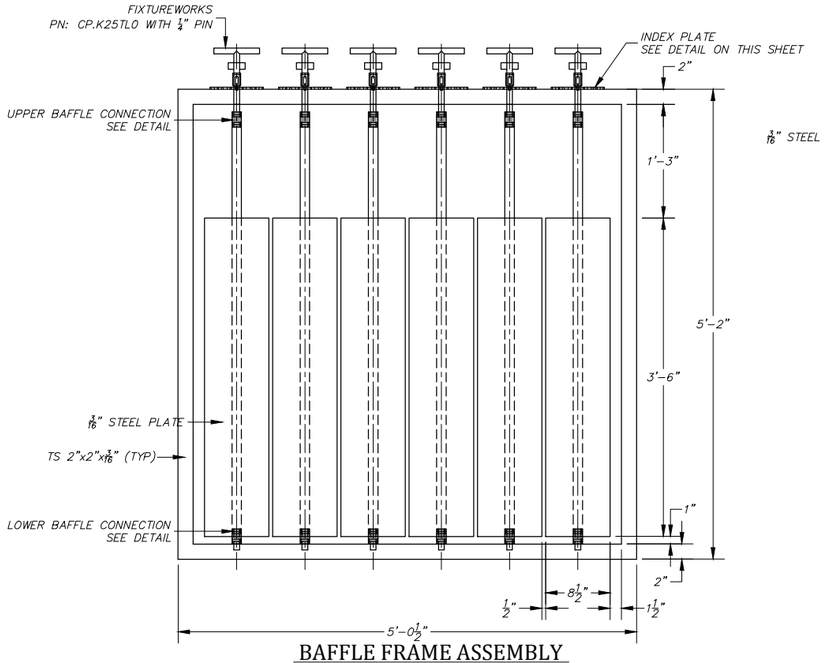
# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

## Fish Screen Retrofit Plan

Job Number
50655

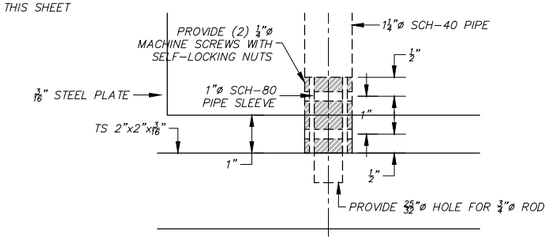
Sheet Number
C7

Sheet 10 of 11



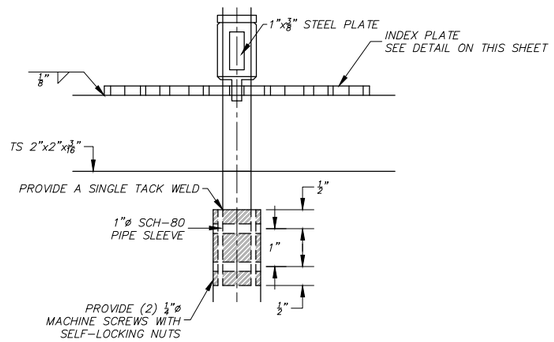

## BAFFLE FRAME ASSEMBLY

Not to Scale



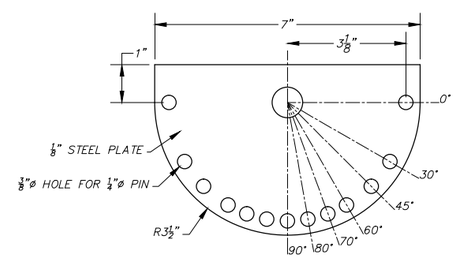

## BOTTOM BAFFLE CONNECTION

Scale: 1"=6"



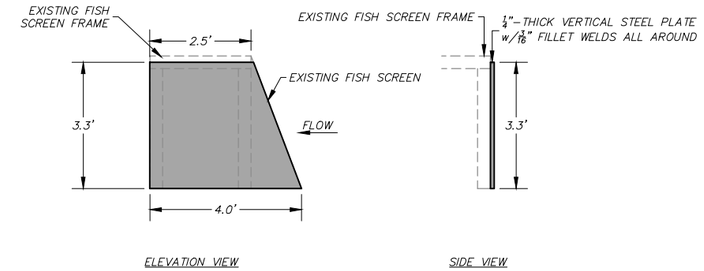

## UPPER BAFFLE CONNECTION

Scale: 1"=6"




## INDEX PLATE

Scale: 1"=6"




## FISH SCREEN RETROFIT STEEL PLATE

Scale: 1"=6"

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|---|---|---|
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| | | |

| Drawing Information | |
|---|---|
| Date | 15 March 2015 (06:23) |
| Status | 95% Submittal |
| Designer | tvs |
| Drafter | tvs |
| Checked | bgw |
| File Name | WARD BASEMAP |
| Plotted Scale | 0 1/2 1 (@ 23.43) |

# Mill Creek Fish Passage Improvement Project
## Ward Dam Facilities

## Fish Screen Details

Job Number 50655

Sheet Number

C8

Sheet 11 of 11

# Appendix C

# 30% Design Plan Drawings
# Upper Dam

## SHEET INDEX


| | |
|---|---|
| COVER SHEET | T1 |
| ACCESS SHEET | G1 |
| DEMOLITION SHEET | G2 |
| GENERAL PLAN SHEET | C1 |


## GENERAL NOTES

ADD NOTES HERE

## LEGEND

| | |
|---|---|
| EXISTING TREES | |
| EXISTING PAVED ROAD | |
| EXISTING GRAVEL ROAD | |
| EXISTING CONTOURS (MAJOR) | 60 |
| EXISTING CONTOURS (MINOR) | 61 |
| EXISTING FENCE | |
| EXISTING EDGE OF WATER (00/00/00) | |
| EXISTING BUILDINGS & STRUCTURES | |
| PROPOSED EARTHWORK | |
| CONSTRUCTION BASELINE | 1+00 |
| PRESERVATION FENCE | |
| PRESERVATION FENCE WITH SILT BARRIER | |
| HORIZONTAL AND VERTICAL CONTROL POINT | |
| HORIZONTAL CONTROL POINT | |
| VERTICAL CONTROL POINT | |

# U.S. Department of Interior

Fish & Wildlife Services

CONSTRUCTION PLANS FOR

# Mill Creek Fish Passage Improvement Project
# Upper Dam Fish Ladder

APRIL 2015

## PROJECT MANAGER

xxxxxxxxxxxxx
xxxxxxxxxxxxx
xxxxxxxxxxxxx
xxxxxxxxxxxxx

APPROVED BY:

xxxxxxxxxxxx, title (date)

xxxxxxxxxxxx, title (date)

xxxxxxxxxxxx, title (date)


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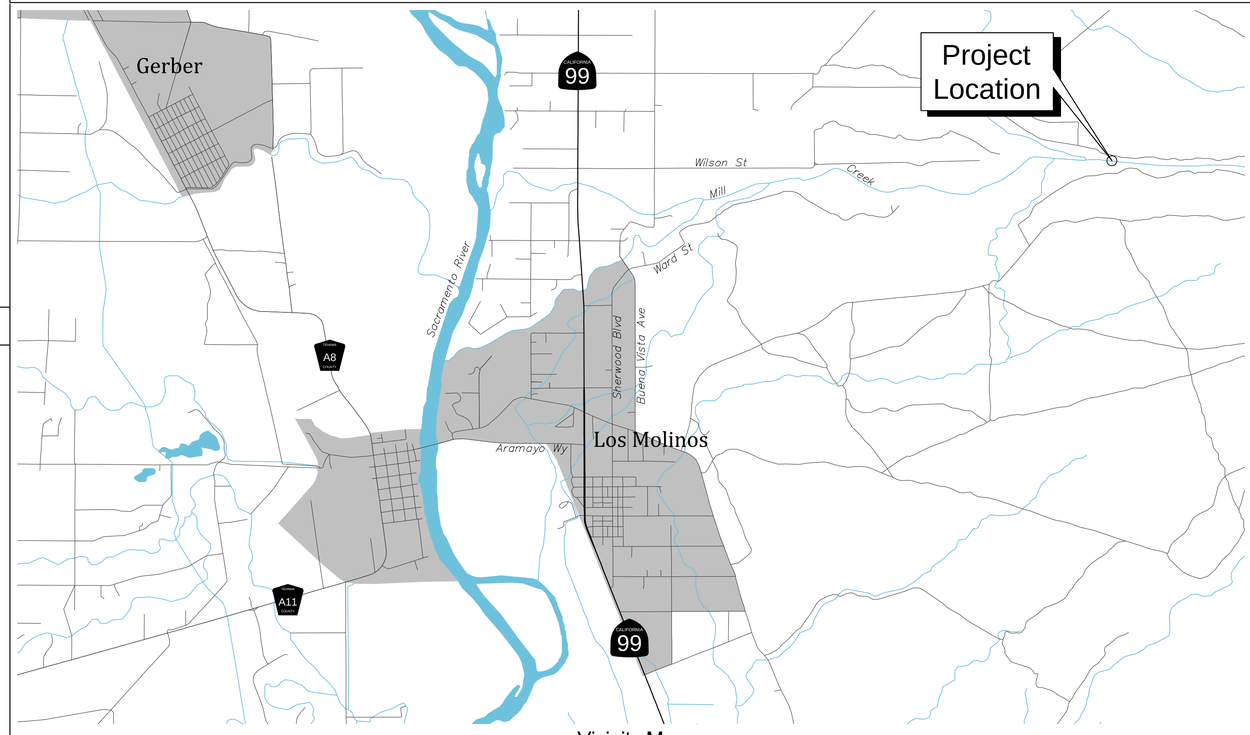
CALIFORNIA REGISTERED
PROFESSIONAL ENGINEER NO. #74371
northwest hydraulic consultants




Vicinity Map

Project Location Map

| Drawing Name | | | | Date |
|---|---|---|---|---|
| UPPER DAM COVER 30 | | | | 8 April 2015 10:33 |
| P:\50655 Mill Creek Fish Passage Phase 1\AC-50655\dwg | | | | |
| Drawing Status | Designer | Drafter | Checked | Job Number |
| 30% Submittal | tvs | tvs | bgw | 50655 |

Sheet 1 of 4

Sheet Number

T1

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|---|---|---|
| No. | Date | Description |
| | | |

| Drawing Information | |
|---|---|
| Date | 8 April 2015 (10:33) |
| Status | 30% Submittal |
| Designer | bgw/tvs |
| Drafter | tvs |
| Checked | bgw |
| File Name | UPPER DAM COVER 30 |
| Plotted Scale | 0 1/2 1 (10:33:17) |

P:\50655 Mill Creek Fish Passage Project\50655\dwg

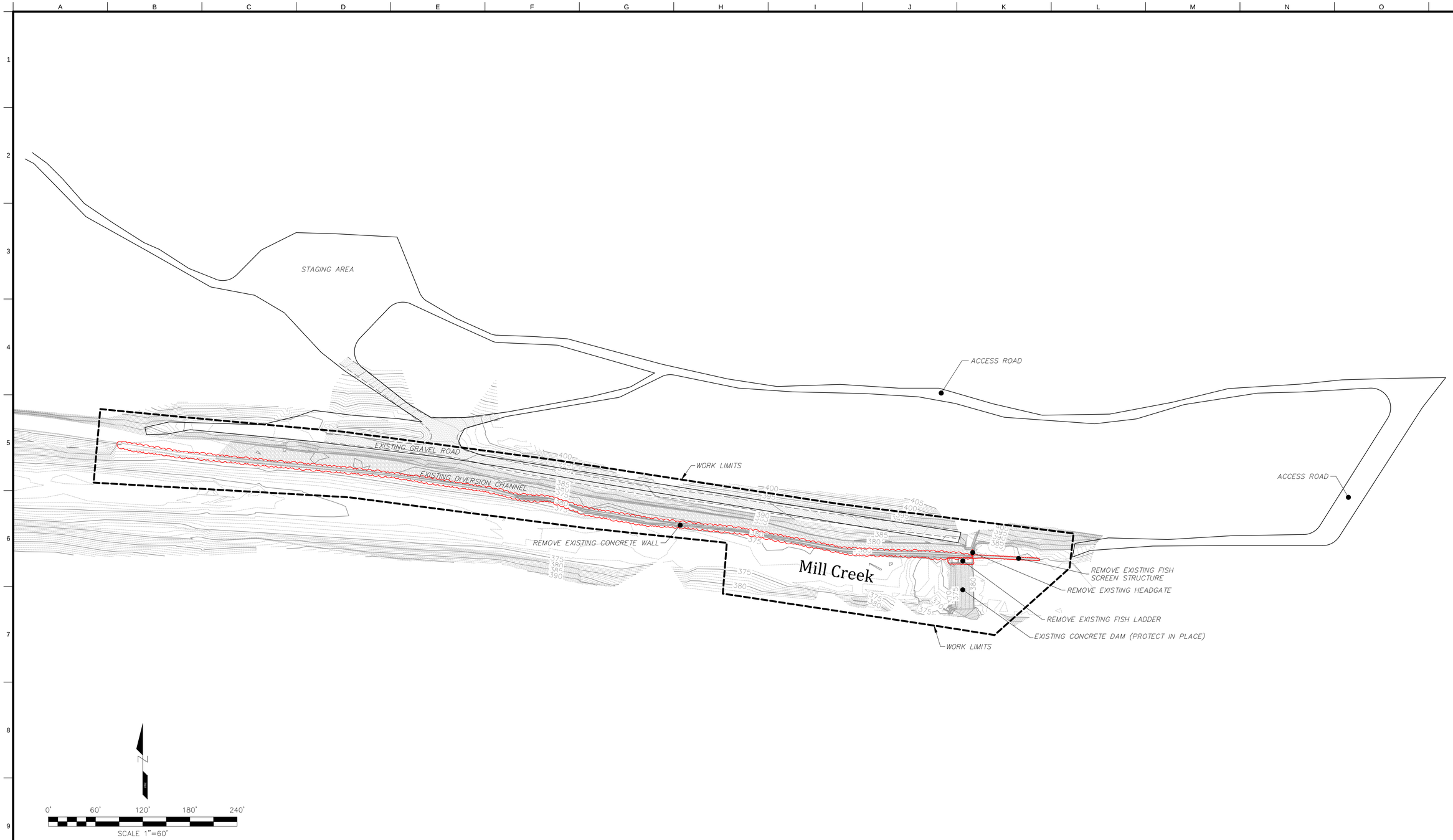
# Mill Creek Fish Passage Improvement Project
## Upper Dam Fish Ladder

## Access Sheet

Job Number
50655

Sheet Number
G1

Sheet 2 of 4

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| No. | Date | Description |
| | | |

| Drawing Information | |
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| Date | 8 April 2015 (10:33) |
| Status | 30% Submittal |
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| Drafter | tvs |
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| File Name | UPPER DAM COVER 30 |
| Plotted Scale | 0 1/2 1 (10:20:17) |

P:\50655_Mill_Creek_Fish_Passage_Phase_1\50655\dwg

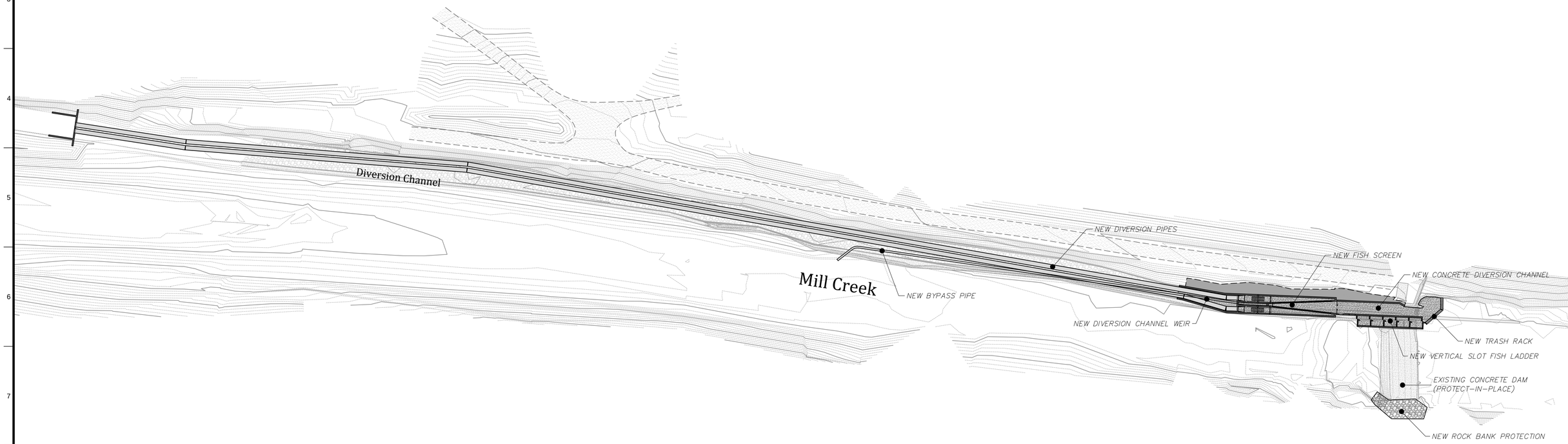
# Mill Creek Fish Passage Improvement Project
## Upper Dam Fish Ladder

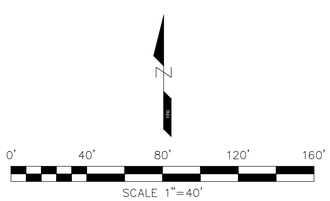
## Demolition Sheet

Job Number
50655

Sheet Number
G2

Sheet 3 of 4

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|---|---|---|
| No. | Date | Description |
| | | |

| Drawing Information | |
|---|---|
| Date | 8 April 2015 (10:26) |
| Status | 30% Submittal |
| Designer | bgw/tvs |
| Drafter | tvs |
| Checked | bgw |
| File Name | UPPER DAM 30 |
| Plotted Scale | 0 1/2 1 (10:28:55) |

P:\50655 Mill Creek Fish Passage Phase 1\40-\50655dwg

# Mill Creek Fish Passage Improvement Project
## Upper Dam Fish Ladder

## General Plan Sheet

Job Number
50655

Sheet Number
C1

Sheet 4 of 4

# Appendix D

# Vascular Plant Species Observed Within or Near Project Site

Appendix D-Table 2. Vascular Plant Species Identified during the 2014 Field Survey on May 16-18 and July 18, 2014; Mill Creek Fish Passage Improvement Project; Tehama County, CA

| | | | | | | |
|---|---|---|---|---|---|---|
| *Achyrachaena* | *mollis* | | | N | Blow-wives | Asteraceae |
| *Acmispon* | *brachycarpus* | | | N | Foothill Lotus | Fabaceae |
| *Acmispon* | *americanus* | var. | *americanus* | N | Spanish Lotus | Fabaceae |
| *Acmispon* | *wrangelianus* | | | N | Wrangel Lotus | Fabaceae |
| *Agoseris* | *heterophylla* | | | N | Annual Agoseris | Asteraceae |
| *Agrostis* | *stolonifera* | | | I | Creeping Bentgrass | Poaceae |
| *Aira* | *caryophyllea* | | | I | Silver European Hairgrass | Poaceae |
| *Alisma* | *triviale* | | | N | Water Plantain | Alismataceae |
| *Allium* | *amplectens* | | | N | Clasping Onion | Alliaceae |
| *Alnus* | *rhombifolia* | | | N | White Alder | Betulaceae |
| *Amaranthus* | *albus* | | | I | Tumbleweed | Amaranthaceae |
| *Ambrosia* | *psilostachya* | | | N | Western Ragweed | Asteraceae |
| *Amsinckia* | *intermedia* | | | N | Common Fiddleneck | Boraginaceae |
| *Amsinckia* | *menziesii* | | | N | Menzies' Fiddleneck | Boraginaceae |
| *Anagallis* | *arvensis* | | | I | Scarlet Pimpernel | Myrsinaceae |
| *Andropogon* | *glomeratus* | var. | *scabriglumis* | N | Southwestern Bushy Bluestem | Poaceae |
| *Apocynum* | *cannabinum* | | | N | Indian Hemp | Apocynaceae |
| *Aristida* | *oligantha* | | | N | Oldfield Three-awn | Poaceae |
| *Aristolochia* | *californica* | | | N | California Pipevine | Aristolochiaceae |
| *Artemisia* | *douglasiana* | | | N | Mugwort | Asteraceae |
| *Astragalus* | *gambelianus* | | | N | Gambel's Milk-vetch | Fabaceae |
| *Athysanus* | *pusillus* | | | N | Petty Athysanus | Brassicaceae |
| *Avena* | *barbata* | | | I | Slender Wild Oat | Poaceae |
| *Avena* | *fatua* | | | I | Wild Oat | Poaceae |
| *Baccharis* | *salicifolia* | | | N | Mule's-fat | Asteraceae |
| *Bidens* | *frondosa* | | | N | Sticktight | Asteraceae |
| *Blennosperma* | *nanum* | var. | *nanum* | N | Yellow Carpet | Asteraceae |
| *Brachypodium* | *distachyon* | | | I | False Brome | Poaceae |
| *Brickellia* | *californica* | | | N | California Brickellbush | Asteraceae |
| *Briza* | *minor* | | | I | Lesser Quaking-grass | Poaceae |
| *Brodiaea* | *californica* | | | N | California Brodiaea | Themidaceae |
| *Brodiaea* | *coronaria* | | | N | Harvest Brodiaea | Themidaceae |
| *Brodiaea* | *elegans* | ssp. | *elegans* | N | Elegant Brodiaea | Themidaceae |
| *Brodiaea* | *minor* | | | N | Purdy's Brodiaea | Themidaceae |
| *Bromus* | *diandrus* | | | I | Ripgut Brome | Poaceae |
| *Bromus* | *hordeaceus* | | | I | Soft Chess | Poaceae |
| *Bromus* | *madritensis* | ssp. | *madritensis* | I | Foxtail Chess | Poaceae |
| *Bromus* | *madritensis* | ssp. | *rubens* | I | Red Brome | Poaceae |
| *Bromus* | *tectorum* | | | I | Cheat Grass, Downy Brome | Poaceae |
| *Calandrinia* | *ciliata* | | | N | Redmaids | Montiaceae |
| *Calochortus* | *luteus* | | | N | Yellow Mariposa Lily | Liliaceae |
| *Calycadenia* | *fremontii* | | | N | Fremont's Calycadenia | Asteraceae |
| *Calycadenia* | *truncata* | | | N | Rosinweed | Asteraceae |
| *Calycanthus* | *occidentalis* | | | N | Western Spicebush | Calycanthaceae |
| *Capsella* | *bursa-pastoris* | | | I | Shepherds's-purse | Brassicaceae |
| *Cardamine* | *oligosperma* | | | N | Western Bittercress | Brassicaceae |
| *Carex* | *barbarae* | | | N | Santa Barbara Sedge | Cyperaceae |
| *Carex* | *nudata* | | | N | Torrent Sedge | Cyperaceae |
| *Castilleja* | *attenuata* | | | N | Valley Tassel | Orobanchaceae |
| *Ceanothus* | *cuneatus* | var. | *cuneatus* | N | Buckbrush | Rhamnaceae |
| *Centaurea* | *melitensis* | | | I | Tocalote | Asteraceae |
| *Centaurea* | *solstitialis* | | | I | Yellow Starthistle | Asteraceae |
| *Centromadia* | *fitchii* | | | N | Fitch's Spikeweed | Asteraceae |
| *Cephalanthus* | *occidentalis* | | | N | California Button Willow | Rubiaceae |
| *Cerastium* | *glomeratum* | | | I | Sticky Mouse-eared Chickweed | Caryophyllaceae |
| *Chamaesyce* | *ocellata* | ssp. | *ocellata* | N | Valley Spurge | Euphorbiaceae |
| *Chamaesyce* | *serpyllifolia* | ssp. | *serpyllifolia* | N | Thyme-leaved Spurge | Euphorbiaceae |
| *Chenopodium* | *album* | | | I | Lamb's Quarters | Chenopodiaceae |
| *Chlorogalum* | *angustifolium* | | | N | Narrow-leaved Soap-plant | Agavaceae |
| *Chorizanthe* | *polygonoides* | var. | *polygonoides* | N | Knotweed Spineflower | Polygonaceae |
| *Cichorium* | *intybus* | | | I | Chicory | Asteraceae |
| *Clarkia* | *purpurea* | ssp. | *quadrivulnera* | N | Purple Clarkia | Onagraceae |
| *Claytonia* | *parviflora* | ssp. | *parviflora* | N | Small-flowered Minor's Lettuce | Montiaceae |
| *Clematis* | *ligusticifolia* | | | N | Virgin's-bower | Ranunculaceae |
| *Collinsia* | *sparsiflora* | | | N | Collinsia | Plantaginaceae |
| *Convolvulus* | *arvensis* | | | I | Bindweed | Convolvulaceae |
| *Cortaderia* | *selloana* | | | I | Pampass Grass | Poaceae |
| *Crassula* | *aquatica* | | | N | Water Pygmyweed | Crassulaceae |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Crassula* | *connata* | | | N | Pygmyweed | Crassulaceae |
| *Croton* | *setigerus* | | | N | Turkey-mullein | Euphorbiaceae |
| *Cryptantha* | *flaccida* | | | N | Weaked-stemmed Cryptantha | Boraginaceae |
| *Cynodon* | *dactylon* | | | I | Bermuda Grass | Poaceae |
| *Cynosurus* | *echinatus* | | | I | Hedgehog Dogtail | Poaceae |
| *Cyperus* | *eragrostis* | | | N | Tall Cyperus | Cyperaceae |
| *Daucus* | *pusillus* | | | N | Rattlesnake-weed | Apiaceae |
| *Deschampia* | *elongata* | | | N | Slender Hairgrass | Poaceae |
| *Deschampsia* | *danthonioides* | | | N | Annual Hairgrass | Poaceae |
| *Dodecatheon* | *clevelandii* | ssp. | *patulum* | N | Lowland Shootingstar | Primulaceae |
| *Draba* | *verna* | | | N | Spring Whitlow Grass | Brassicaceae |
| *Dysphania* | *ambrosioides* | | | I | Mexican Tea | Chenopodiaceae |
| *Echinochloa* | *crus-galli* | | | I | Barnyard Grass | Poaceae |
| *Eleocharis* | *macrostachya* | | | N | Pale Spike-rush | Cyperaceae |
| *Eleocharis* | *quinqueflora* | | | N | Few-flowered Spike-rush | Cyperaceae |
| *Eleusine* | *indica* | | | I | Goosegrass | Poaceae |
| *Elodea* | *canadensis* | | | N | Canadian Waterweed | Hydrocharitaceae |
| *Elymus* | *glaucus* | ssp. | *glaucus* | N | Blue Wild-rye | Poaceae |
| *Elymus* | *triticoides* | | | N | Alkali Ryegrass | Poaceae |
| *Elymus* | *caput-medusae* | | | I | Medusa-head | Poaceae |
| *Epilobium* | *ciliatum* | | | N | Willowherb | Onagraceae |
| *Epilobium* | *brachycarpum* | | | N | Tall Annual Willowherb | Onagraceae |
| *Epilobium* | *densiflorum* | | | N | Dense-flowered Spike-primrose | Onagraceae |
| *Epilobium* | *torreyi* | | | N | Torrey's Spike-primrose | Onagraceae |
| *Equisetum* | *laevigatum* | | | N | Smooth Scouring  Rush | Equisetaceae |
| *Erigeron* | *canadensis* | | | N | Canadian Horseweed | Asteraceae |
| *Eriogonum* | *nudum* | | | N | Buckwheat | Polygonaceae |
| *Eriogonum* | *vimineum* | | | N | Wicker Buckwheat | Polygonaceae |
| *Eriophyllum* | *lanatum* | var. | *grandiflora* | N | Large-flowered Wooly Sunflower | Asteraceae |
| *Erodium* | *botrys* | | | I | Long-beaked Stork's-bill | Geraniaceae |
| *Erodium* | *cicutarium* | | | I | Red-stemmed Filaree | Geraniaceae |
| *Erodium* | *moschatum* | | | I | White-stemmed Filaree | Geraniaceae |
| *Eryngium* | *castrense* | | | N | Coyote Thistle | Apiaceae |
| *Eschscholzia* | *californica* | ssp. | *californica* | N | California Poppy | Papaveraceae |
| *Eschscholzia* | *lobbii* | | | N | Frying Pans | Papaveraceae |
| *Eucalyptis* | | | | I | Eucalyptis | Myrtaceae |
| *Euthamia* | *occidentalis* | | | N | Western Goldenrod | Asteraceae |
| *Festuca* | *arundinacea* | | | I | Tall Fescue | Poaceae |
| *Festuca* | *perennis* | | | I | Annual Ryegrass | Poaceae |
| *Festuca* | *pratensis* | | | I | Meadow Fescue | Poaceae |
| *Festuca* | *bromoides* | | | I | Brome Fescue | Poaceae |
| *Festuca* | *microstachys* | | | N | Small Fescue | Poaceae |
| *Festuca* | *myuros* | | | I | Rattail Sixweeks Grass | Poaceae |
| *Ficus* | *carica* | | | I | Edible Fig | Moraceae |
| *Frangula* | *californica* | ssp. | *tomentella* | N | Hoary Coffeeberry | Rhamnaceae |
| *Fraxinus* | *latifolia* | | | N | Oregon Ash | Oleaceae |
| *Galium* | *aparine* | | | N | Cleavers | Rubiaceae |
| *Galium* | *parisiense* | | | I | Wall Bedstraw | Rubiaceae |
| *Gastridium* | *phleoides* | | | I | Nitgrass | Poaceae |
| *Geranium* | *molle* | | | I | Dove's-foot Geranium | Geraniaceae |
| *Glyceria* | *declinata* | | | I | Low Mannagrass | Poaceae |
| *Gnaphalium* | *palustre* | | | N | Western Cudweed | Asteraceae |
| *Grindelia* | *sp.* | | | N | Gumweed | Asteraceae |
| *Hirschfeldia* | *incana* | | | I | Mediterranean Hoary-mustard | Brassicaceae |
| *Hordeum* | *marinum* | ssp. | *gussoneanum* | I | Mediterranean Barley | Poaceae |
| *Hordeum* | *murinum* | ssp. | *leporinum* | I | Hare Wall Barley | Poaceae |
| *Hypericum* | *perforatum* | | | I | Klamathweed | Hypericaceae |
| *Hypochaeris* | *glabra* | | | I | Smooth Cat's-ear | Asteraceae |
| *Juncus* | *balticus* | ssp. | *ater* | N | Baltic Rush | Juncaceae |
| *Juncus* | *bufonius* | var. | *bufonius* | N | Common Toad Rush | Juncaceae |
| *Juncus* | *effusus* | ssp. | *pacificus* | N | Pacific Rush | Juncaceae |
| *Juncus* | *acuminatus* | | | N | Sharp-fruited Rush | Juncaceae |
| *Keckiella* | *sp.* | | | N | Keckiella | Plantaginaceae |
| *Koeleria* | *gerardii* | | | I | Bristly Koeler's-Grass | Poaceae |
| *Lactuca* | *serriola* | | | I | Prickly Lettuce | Asteraceae |
| *Lagophylla* | *glandulosa* | | | N | Glandular Hareleaf | Asteraceae |
| *Lagophylla* | *sp.* | | | N | Hareleaf | Asteraceae |
| *Lamium* | *amplexicaule* | | | I | Giraffehead | Lamiaceae |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Lasthenia* | *californica* | | | N | California Goldfields | Asteraceae |
| *Lasthenia* | *fremontii* | | | N | Fremont's Goldfields | Asteraceae |
| *Lasthenia* | *platycarpha* | | | N | Alkali Goldfields | Asteraceae |
| *Lathyrus* | *tingitanus* | | | I | Tangier Pea | Fabaceae |
| *Layia* | *fremontii* | | | N | Fremont's Tidytips | Asteraceae |
| *Leersia* | *oryzoides* | | | N | Rice Cutgrass | Poaceae |
| *Leontodon* | *saxatillis* | | | I | Long-beaked Hawkbit | Asteraceae |
| *Lepidium* | *nitidum* | | | N | Shiny Pepper-grass | Brassicaceae |
| *Lepidium* | *strictum* | | | N | Upright Pepper-grass | Brassicaceae |
| *Lessingia* | *nana* | | | N | Dwarf Lessingia | Asteraceae |
| *Lessingia* | *virgata* | | | N | Wand Lessingia | Asteraceae |
| *Logfia* | *gallica* | | | N | Narrow-leaved Filago | Asteraceae |
| *Lomatium* | *caruifolium* | var. | *denticulatum* | N | Foothill Lomatium | Apiaceae |
| *Lomatium* | *utriculatum* | | | N | Bladder Lomatium | Apiaceae |
| *Lotus* | *corniculatus* | | | I | Bird's-foot Trefoil | Fabaceae |
| *Lupinus* | *bicolor* | | | N | Bicolored Lupine | Fabaceae |
| *Lupinus* | *nanus* | | | N | Valley Sky Lupine | Fabaceae |
| *Lythrum* | *hyssopifolium* | | | I | Hyssop Loosestrife | Lythraceae |
| *Marrubium* | *vulgare* | | | I | Horehound | Lamiaceae |
| *Matricaria* | *discoidea* | | | I | Common Pineapple-weed | Asteraceae |
| *Medicago* | *lupinlina* | | | I | Black Medick | Fabaceae |
| *Medicago* | *polymorpha* | | | I | California or Common Bur-clover | Fabaceae |
| *Melica* | *californica* | | | N | California Melic | Poaceae |
| *Melilotus* | *albus* | | | I | White Sweet-clover | Fabaceae |
| *Melilotus* | *sp.* | | | | Sweet-clover | Fabaceae |
| *Mentha* | *arvensis* | | | I | Mint | Lamiaceae |
| *Micropus* | *californicus* | var. | *californicus* | N | Slender Cottonweed | Asteraceae |
| *Microseris* | *acuminata* | | | N | Sierra Foothill Microseris | Asteraceae |
| *Microseris* | *douglasii* | ssp. | *douglassi* | N | Douglas' Microseris | Asteraceae |
| *Microsteris* | *gracilis* | | | N | Slender Phlox | Polemoniaceae |
| *Mimulus* | *gutattus* | | | N | Seep Monkey-flower | Phrymaceae |
| *Minuartia* | *californica/cismontana* | | | | Sandwort (dried) | Caryophyllaceae |
| *Mollugo* | *verticillata* | | | I | Indian Chickweed | Molluginaceae |
| *Montia* | *fontana* | | | N | Water Montia | Montiaceae |
| *Morus* | *alba* | | | I | White Mulberry | Moraceae |
| *Muhlenbergia* | *rigens* | | | N | Deergrass | Poaceae |
| *Myosurus* | *minimus* | | | N | Common Mousetail | Ranunculaceae |
| *Navarretia* | *leucocephala* | ssp. | *leucocephala* | N | White-flowered Navarretia | Polemoniaceae |
| *Navarretia* | *pubescens* | | | N | Downy Navarretia | Polemoniaceae |
| *Navarretia* | *tagetina* | | | N | Marigold Navarretia | Polemoniaceae |
| *Nemophila* | *pedunculata* | | | N | Meadow Nemophila | Boraginaceae |
| *Odontostomum* | *hartwegii* | | | N | Hartweg's Odontostomum | Tecophilaeceae |
| *Panicum* | *sp.* | | | I | Panicgrass | Poaceae |
| *Paspalum* | *distichum* | | | N | Knotgrass | Poaceae |
| *Pentagramma* | *triangularis* | ssp. | *triangularis* | N | Gold-backed Fern | |
| *Persicaria* | *maculosa* | | | I | Lady's Thumb | Polygonaceae |
| *Petrorhagia* | *dubia* | | | I | Grass Pink | Caryophyllaceae |
| *Phacelia* | *cicutariua* | var. | *cicutaria* | N | Caterpillar Phacelia | Boraginaceae |
| *Phacelia* | *egena* | | | N | Rock Phacelia | Boraginaceae |
| *Pilularia* | *americana* | | | N | American Pillwort | Marsileaceae |
| *Pinus* | *sabiniana* | | | N | Gray Pine | Pinaceae |
| *Plagiobothrys* | *austiniae* | | | N | Austin's Popcorn-flower | Boraginaceae |
| *Plagiobothrys* | *canescens* | | | N | Valley Popcorn-flower | Boraginaceae |
| *Plagiobothrys* | *fulvus* | var. | *campestris* | N | Fulvous Popcorn-flower | Boraginaceae |
| *Plagiobothrys* | *nothofulvus* | | | N | Common Popcorn-flower | Boraginaceae |
| *Plagiobothrys* | *stipitatus* | var. | *micranthus* | N | Small-flowered Popcorn-flower | Boraginaceae |
| *Plagiobothrys* | *scriptus* | | | N | Scribe's Popcorn-flower | Boraginaceae |
| *Plagiobothrys* | *greenei* | | | N | Greene's Popcorn-flower | |
| *Plantago* | *crononopus* | | | I | Cut-leaved Plantain | Plantaginaceae |
| *Plantago* | *erecta* | | | N | Erect Plantain | Plantaginaceae |
| *Plantago* | *lanceolata* | | | I | English Plantain | Plantaginaceae |
| *Plantago* | *elongata* | | | N | Elongate Plantain | Plantaginaceae |
| *Platanus* | *racemosa* | | | N | Western Sycamore | Platanaceae |
| *Poa* | *annua* | | | I | Annual Bluegrass | Poaceae |
| *Poa* | *pratensis* | ssp. | *pratensis* | I | Kentucky Bluegrass | Poaceae |
| *Poa* | *secunda* | ssp. | *secunda* | N | One-sided Bluegrass | Poaceae |
| *Poa* | *bulbosa* | ssp. | *vivipara* | I | Bulbous Bluegrass | Poaceae |
| *Pogogyne* | *floribunda* | | | N | Profuse-flowered Pogogyne | Lamiaceae |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Polygonum* | *aviculare* | ssp. | *depressum* | I | Common Knotweed | Polygonaceae |
| *Polygonum* | *californicum* | | | N | California Knotweed | Polygonaceae |
| *Polypogon* | *interruptus* | | | I | Ditch Beard Grass | Poaceae |
| *Polypogon* | *maritimus* | | | I | Mediterranean Beardgrass | Poaceae |
| *Polypogon* | *monspeliensis* | | | I | Annual Beard Grass | Poaceae |
| *Populus* | *fremontii* | ssp. | *fremontii* | N | Fremont's Cottonwood | Salicaceae |
| *Potamogeton* | *sp.* | | | N | Pondweed | Potamogetonaceae |
| *Psilocarphus* | *brevissimus* | var. | *brevissimus* | N | Dwarf Wooly Marbles | Asteraceae |
| *Psilocarphus* | *oregonus* | | | N | Oregon Woolly-marbles | Asteraceae |
| *Pterostegia* | *drymariodes* | | | N | Pterostegia | Polygonaceae |
| *Quercus* | *douglasii* | | | N | Blue Oak | Fagaceae |
| *Quercus* | *lobata* | | | N | Valley Oak | Fagaceae |
| *Quercus* | *wislizenii* | var. | *wislizeni* | N | Interior Live Oak | Fagaceae |
| *Ranunculus* | *aquatilis* | var. | *aquatilis* | N | Broad-leaved Water Buttercup | Ranunculaceae |
| *Ranunculus* | *sceleratus* | var. | *sceleratus* | N | Cursed Buttercup | Ranunculaceae |
| *Rhus* | *aromatica* | | | N | Skunkbrush | Anacardiaceae |
| *Rosa* | *californica* | | | N | California Rose | Rosaceae |
| *Rubus* | *armeniacus* | | | I | Himalayan Blackberry | Rosaceae |
| *Rubus* | *ursinus* | | | N | California Blackberry | Rosaceae |
| *Rumex* | *conglomeratus* | | | I | Green Dock | Polygonaceae |
| *Rumex* | *crispus* | | | I | Curly Dock | Polygonaceae |
| *Salix* | *babylonica* | | | I | Weeping Willow | Salicaceae |
| *Salix* | *exigua* | | | N | Sandbar Willow | Salicaceae |
| *Salix* | *laevigata* | | | N | Red Willow | Salicaceae |
| *Salix* | *lasiolepis* | | | N | Arroyo Willow | Salicaceae |
| *Salix* | *melanopsis* | | | N | Dusky Willow | Salicaceae |
| *Sanicula* | *bipinnatifida* | | | N | Purple Sanicle | Apiaceae |
| *Schoenoplectus* | *acutus* | var. | *occidentalis* | N | Hard-stemmed Tule | Cyperaceae |
| *Scleranthus* | *annuus* | ssp. | *annuus* | I | Knawel | Caryophyllaceae |
| *Scribneria* | *bolanderi* | | | N | Scribner's Grass | Poaceae |
| *Sedella* | *pumila* | | | N | Dwarf Stonecrop | Crassulaceae |
| *Selaginella* | *hansenii* | | | N | Hansen's Spike-moss | Selaginellaceae |
| *Senecio* | *vulgaris* | | | I | Old Man in the Spring | Asteraceae |
| *Setaria* | *sp.* | | | I | Bristlegrass | Poaceae |
| *Sheradia* | *arevensis* | | | I | Field Madder | Rubiaceae |
| *Silene* | *gallica* | | | I | Windmill-pink | Caryophyllaceae |
| *Sonchus* | *asper* | ssp. | *asper* | I | Prickly Sow Thistle | Asteraceae |
| *Sorghum* | *halepense* | | | I | Johnsongrass | Poaceae |
| *Spergularia* | *rubra* | | | I | Ruby Sandspurry | Caryophyllaceae |
| *Stachys* | *sp.* | | | N | Hedge-nettle | Lamiaceae |
| *Stellaria* | *media* | | | I | Common Chickweed | Caryophyllaceae |
| *Stephanomeria* | *sp.* | | | N | Stephanomeria | Asteraceae |
| *Stipa* | *pulchra* | | | N | Purple Needlegrass | Poaceae |
| *Symphyotrichum* | *subulatum* | var. | | N | Annual Salt Marsh Aster | Asteraceae |
| *Taraxacum* | *officinale* | | | I | Common Dandelion | Asteraceae |
| *Thysanocarpus* | *curvipes* | var. | *elegans* | N | Elegant Fringepod | Brassicaceae |
| *Torilis* | *arvensis* | | | I | Tall Sock-Destroyer | Apiaceae |
| *Torilis* | *nodosa* | | | I | Knotted Hedge Parsley | Apiaceae |
| *Toxicodendron* | *diversilobum* | | | N | Western Poison-oak | Anacardiaceae |
| *Tribulus* | *terrestris* | | | I | Punctureivine | Zygophyllaceae |
| *Trichostema* | *lanceolatum* | | | N | Vinegar-weed | Lamiaceae |
| *Trifolium* | *albopurpureum* | | | N | Indian Clover | Fabaceae |
| *Trifolium* | *depauperatum* | | *?* | N | Cowbag Clover | Fabaceae |
| *Trifolium* | *dubium* | | | I | Little Hop Clover | Fabaceae |
| *Trifolium* | *fragiferum* | | | I | Strawberry Clover | Fabaceae |
| *Trifolium* | *glomeratum* | | | I | Sessile-headed Clover | Fabaceae |
| *Trifolium* | *hirtum* | | | I | Rose Clover | Fabaceae |
| *Trifolium* | *hybridum* | | | I | Alsike Clover | Fabaceae |
| *Trifolium* | *microcephalum* | | | N | Small-headed Clover | Fabaceae |
| *Trifolium* | *repens* | | | I | White Clover | Fabaceae |
| *Trifolium* | *subterraneum* | | | I | Subterranean Clover | Fabaceae |
| *Trifolium* | *variegatum* | | | N | White-tipped Clover | Fabaceae |
| *Triphysaria* | *eriantha* | ssp. | *eriantha* | N | Johnnytuck | Orobanchaceae |
| *Uropappus* | *lindleyi* | | | N | Silverpuffs | Asteraceae |
| *Verbascum* | *blattaria* | | | I | Moth Mullein | Scrophulariaceae |
| *Verbascum* | *thapsis* | | | I | Woolly Mullein | Scrophulariaceae |
| *Veronica* | *peregrina* | ssp. | *xalapensis* | N | Purslane Speedwell | Plantaginaceae |
| *Vicia* | *villosa* | ssp. | *varia* | I | Winter Vetch | Fabaceae |

Appendix D-Table 2. Vascular Plant Species Identified during the 2014 Field Survey; Mill Creek Fish-Passage Improvement Project; Tehama County, CA

| | | | | | | |
|---|---|---|---|---|---|---|
| *Vitis* | *californica* | | | N | California Wild Grape | Vitaceae |
| *Woodwardia* | *fimbriata* | | | N | Giant Chain Fern | Blechnaceae |
| *Xanthium* | *strumarium* | | | N | Cocklebur | Asteraceae |
| *Zeltnera* | sp. | | | N | Canchalagua | Gentianaceae |
| | | | | | | |

# Appendix E

# Potentially Occurring Special-Status Vascular Plant Species Within or Near the Project Site

Special-status Plant Species with Potential to Occur at the Mill Creek Fish Passage Restoration Project, Tehama County, California
(Source: Dittes and Guardino Consulting, 2014)

| ***Scientific Name*** **Common Name** | **CNPS Rank** | **Geographic Range** | **Elevation (meters)** | **Habitat/Plant Community Associations** | **Flowering Period** |
|---|---|---|---|---|---|
| *Astragulus pauperculus* **Depauperate Milk-vetch** | 4.3 | California endemic: Butte, Placer, Shasta, Tehama and Yuba counties | 60 to 1215 | Vernally mesic, volcanic; Chaparral, Cismontane Woodland and Valley and Foothill Grasslands | March - June |
| *California macrophylla* **Round-leaved Filaree** | 1B.1 | California endemic: Alameda, Butte*, Contra Costa, Colusa, Fresno, Glenn, Kern, King, Lake, Lassen, Los Angeles, Merced, Monterey, Napa, Riverside, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, San Mateo, Solano, Sonoma, Stanislaus, Tehama, Tulare, Ventura and Yolo counties | 15 to 1200 | Clay; Cismontane Woodland and Valley and Foothill Grasslands | March - May |
| *Chamaecyce ocellata* ssp. *rattanii* | 1B.2 | California endemic: Glenn and Tehama counties | 85 to 800 | Chaparral and Valley and Foothill Grasslands (sandy or rocky) | May - October |
| **Stony Creek Spurge** *Crypthantha crinata* **Silky Cryptantha** | 1B.2 | California endemic: Shasta and Tehama counties | 61 to 1215 | Gravelly streambeds; Cismontane Woodland, Lower Montane Coniferous Forest, Riparian Forest, Riparian Woodland, and Valley and Foothill Grasslands | April - May |
| Downingia pusilla **Dwarf downingia** | 2B.2 | Amador, Fresno, Merced, Napa, Placer, Sacramento, San Joaquin, Solano, Sonoma, Stanislaus, Tehama and Yuba counties; South America | 1 to 445 | Valley and Foothill Grasslands (mesic) and Vernal Pools | March - May |
| *Fritillaria pluriflora* **Adobe Lily** | 1B.2 | California endemic: Butte, Colusa, Glenn, Lake, Napa, Solano, Tehama and Yolo counties | 60 to 705 | Often adobe; Chaparral, Cismontane Woodland and Valley and Foothill Grasslands | February - April |
| *Hesperevax caulescens* ***Hogwallow Starfish*** | 4.2 | California endemic: Alameda, Amador, Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Merced, Monterey, Napa*, Sacramento, San Diego*, San Joaquin, San Luis Obispo, Stanislaus, Sutter, Tehama and Yolo counties | 0 to 505 | Valley and Foothill Grasslands (mesic, clay) and Vernal Pools (shallow) | March - June |

| ***Scientific Name*** **Common Name** | **CNPS Rank** | **Geographic Range** | **Elevation (meters)** | **Habitat/Plant Community Associations** | **Flowering Period** |
|---|---|---|---|---|---|
| *Juncus leiospermus* var. *ahartii* **Ahart's Dwarf Rush** | 1B.2 | California endemic: Butte, Calaveras, Placer, Sacramento, Tehama and Yuba counties | 30 to 229 | Vernally mesic; Chaparral, Cismontane Woodland, Meadows and Seeps, Valley and Foothill Grasslands and Vernal Pools | March - May |
| *Juncus leiospermus* var. *leiospermus* **Red Bluff Dwarf Rush** | 1B.1 | California endemic: Butte, Placer, Shasta and Tehama counties | 35 to 1250 | Valley and Foothill Grasslands (mesic) | March - June |
| *Limnanthes floccosa* ssp. *floccosa* **Wooly Meadowfoam** | 4.2 | Butte, Lake, Lassen, Napa, Shasta, Siskiyou, Tehama and Trinity counties; Oregon | 60 to 1335 | Vernally mesic; Chaparral, Cismontane Woodland, Valley and Foothill Grasslands and Vernal Pools | March - June |
| *Mimulus glaucescens* **Shield-bracted Monkeyflower** | 4.3 | California endemic: Butte, Colusa, Lake, Nevada, Shasta and Tehama counties | 60 to 1240 | Serpentinite seeps, sometimes streambanks; Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest and Valley and Foothill Grasslands | February - September |
| *Navarretia heterandra* **Tehama Navarretia** | 4.3 | Butte, Colusa, Lake, Napa, Shasta, Tehama, Trinity and Yuba counties; Oregon | 30 to 1010 | Valley and Foothill Grasslands (mesic), Vernal Pools | April - June |
| *Paronychia ahartii* **Ahart's paronychia** | 1B.1 | California endemic: Butte, Shasta and Tehama counties | 30 to 510 | Cismontane Woodland, Valley and Foothill Grasslands and Vernal Pools | February - June |
| *Polygonum bidwelliae* ***Bidwell's knotweed*** | 4.3 | California endemic: Butte, Shasta and Tehama counties | 60 to 1200 | Chaparral, Cismontane Woodland and Valley and Foothill Grasslands | April - July |
| *Sagittaria sanfordii* **Sanfords Arrowhead** | 1B.2 | California endemic: Butte, Del Norte, Eldorado, Fresno, Mariposa, Merced, Orange*, Placer, Sacramento, San Bernardino, San Joaquin, Shasta, Solano, Tehama, Ventura* and Yuba counties. | 0 to 650 | Marshes and Swamps (assorted shallow freshwater) | May - November |

California Native Plant Society (CNPS) California Rare Plant Ranks (CRPR): CRPR 1B = Plants Rare, Threatened, or Endangered in CA and elsewhere: CRPR 2B = Plants Rare, Threatened or Endangered in CA but more common elsewhere: CRPR 3 = Plants about which more information is needed – a review list: CRPR 4 = Plants of limited distribution in CA

Threat ranks: 0.1 = seriously threatened in CA.; 0.2 = Fairly threatened in CA.; 0.3 = not very threatened in CA. : (*) = May be extirpated from County

# Appendix F

# Faunal Species Observed Within or Near the Project Site

# APPENDIX F
## Faunal Species Observed Within or Near the Project Site
### Mill Creek Fish Passage Restoration Project

| COMMON NAME | SCIENTIFIC NAME | LISTING STATUS | |
|---|---|---|---|
| | | Federal | State |
| **AMPHIBIANS & REPTILES** | | | |
| Bullfrog* | *Rana catesbeinana* | | |
| Foothill Yellow-legged Frog | *Rana boylii* | | CSC |
| Gopher Snake | *Pituophis melanoleucus* | | |
| Garter Snake | *Thamnophis sp.* | | |
| Pacific Chorus Frog | *Pseudacris regilla* | | |
| Western Fence Lizard | *Sceloporus occidentalis* | | |
| Western Pond Turtle | *Emys marmorata* | | CSC |
| **BIRDS** | | | |
| Acorn Woodpecker | *Melanerpes formicivorus* | | |
| American Bald Eagle | *Haliaeetus leucocephalus* | D | E / FP |
| American Crow | *Corvus brachyrhynchos* | | |
| American Goldfinch | *Xanthocephalus xanthocephalus* | | |
| American Kestrel | *Falco sparverius* | | |
| American Peregrine Falcon | *Falco peregrinus* | D | D / FP |
| American Robin | *Turdus migratorius* | | |
| American White Pelican | *Pelecanus erythrorhynchos* | | CSC |
| Ash–throated Flycatcher | *Myiarchus cinerascens* | | |
| Belted Kingfisher | *Ceryle alcyon* | | |
| Bewick's Wren | *Thryomanes bewickii* | | |
| Black Phoebe | *Sayornis nigricans* | | |
| Blue Grosbeak | *Passerina caerulea* | | |
| Brewer’s Blackbird | *Euphagus cyanocephalus* | | |
| Brown-headed Cowbird | *Molothrus ater* | | |
| Bullock's Oriole | *Icterus bullockii* | | |
| Bushtit | *Psaltriparus minimus* | | |
| California Horned Lark | *Eremophila alpestris actia* | | |
| California Quail | *Callipepla californica* | | |
| California Towhee | *Pipilo crissalis* | | |
| Canada Goose | *Branta canadensis* | | |
| Cedar Waxwing | *Bombycilla cedrorum* | | |
| Chipping Sparrow | *Spizella passerina* | | |
| Cliff Swallow | *Hirundo pyrrhonota* | | |
| Common Merganser | *Mergus merganser* | | |
| Common Raven | *Corvus corax* | | |
| Cooper’s Hawk | *Accipiter cooperii* | | |
| Dark-eyed Junco | *Junco hyemalis* | | |
| Eurasian Collared-Dove* | *Streptopelia decaocto* | | |
| European Starling* | *Sturnus vulgaris* | | |
| Fox Sparrow | *Passerella iliaca* | | |
| Golden Eagle | *Aquila chrysaetos* | | CSC / FP |
| Great Blue Heron | *Ardea herodias* | | |

# APPENDIX F
## Faunal Species Observed Within or Near the Project Site
### Mill Creek Fish Passage Restoration Project

| COMMON NAME | SCIENTIFIC NAME | LISTING STATUS | |
|---|---|---|---|
| | | Federal | State |
| Great Egret | *Casmerodius albus* | | |
| Green Heron | *Butorides striatus* | | |
| Hermit Warbler | *Setophaga occidentalis* | | |
| Hooded Merganser | *Lophodytes cucullatus* | | |
| House Finch | *Carpodacus mexicanus* | | |
| House Sparrow* | *Passer domesticus* | | |
| House Wren | *Troglodytes aedon* | | |
| Hummingbird | *Unknown species* | | |
| Killdeer | *Charadrius vociferous* | | |
| Lark Sparrow | *Chondestes grammacus* | | |
| Lesser Goldfinch | *Spinus psaltria* | | |
| Lewis's Woodpecker | *Melanerpes lewis* | | |
| Loggerhead Shrike | *Lanius ludovicianus* | | CSC |
| Little Willow Flycatcher | *Empidonax traillii brewsteri* | | E |
| Mallard | *Anas platyrhynchos* | | |
| Mourning Dove | *Zenaida macroura* | | |
| Northern Flicker | *Calaptes auratus* | | |
| Northern Harrier | *Circus cyaneus* | | CSC |
| Northern Mockingbird | *Mimus polyglottos* | | |
| Nuttall's Woodpecker | *Picoides nuttallii* | | |
| Oak Titmouse | *Parus inornatus* | | |
| Osprey | *Pandion haliaetus* | | |
| Phainopepla | *Phainopepla nitens* | | |
| Red-shouldered Hawk | *Buteo lineatus* | | |
| Red-tailed Hawk | *Buteo jamaicensis* | | |
| Red-winged Blackbird | *Agelaius phoenniceus* | | |
| Ruby-crowned Kinglet | *Regulus calendula* | | |
| Rufous Hummingbird | *Selasphorus rufus* | | |
| Savannah Sparrow | *Passerculus sandwichensis* | | |
| Say's Phoebe | *Sayornis saya* | | |
| Sharp-shinned Hawk | *Accipiter striatus* | | |
| Song Sparrow | *Melospiza melodia* | | |
| Spotted Sandpiper | *Actitus macularia* | | |
| Spotted Towhee | *Pipilo maculatus* | | |
| Swainson's Hawk | *Buteo swainsoni* | | T |
| Swallow | *Unknown species* | | |
| Tree Swallow | *Tachycineta bicolor* | | |
| Tricolored Blackbird | *Agelaius tricolor* | | E |
| Tundra Swan | *Cygnus columbianus* | | |
| Turkey Vulture | *Cathartes aura* | | |
| Western Bluebird | *Sialia mexicana* | | |
| Western Kingbird | *Tyrannus vericalus* | | |
| Western Meadowlark | *Sturnella neglecta* | | |

# APPENDIX F
## Faunal Species Observed Within or Near the Project Site
### Mill Creek Fish Passage Restoration Project

| COMMON NAME | SCIENTIFIC NAME | LISTING STATUS | |
|---|---|---|---|
| | | Federal | State |
| Western Scrub-Jay | *Aphelocoma californica* | | |
| Western Tanager | *Piranga ludoviciana* | | |
| Western Wood-Pewee | *Contopus sordidulus* | | |
| White-breasted Nuthatch | *Sitta carolinensis* | | |
| White-crowned Sparrow | *Zonotrichia leucophyrus* | | |
| Wild Turkey* | *Meleagris gallopavo* | | |
| Wilson's Warbler | *Wilsonia pusilla* | | |
| Wood Duck | *Aix sponsa* | | |
| Yellow-breasted Chat | *Icteria virens* | | CSC |
| Yellow-rumped Warbler | *Dendroica coronata* | | |
| **FISH** | | | |
| Bass* | *Micropterus sp.* | | |
| Chinook Salmon (fall-run) | *Oncorhynchus tshawytscha* | SC | |
| Green Sunfish* | *Lepomis cyanellus* | | |
| Mosquitofish* | *Gambusia affinis* | | |
| Sacramento Pike Minnow | *Ptychocheilus grandis* | | |
| Rainbow Trout (Steelhead) | *Oncorhynchus mykiss* | T | |
| Sacramento Sucker | *Catostomus occidentalis* | | |
| **INVERTEBRATES** | | | |
| Crayfish | *Unknown species* | | |
| Vernal Pool Fairy Shrimp | *Branchinecta lynchi* | T | |
| **MAMMALS** | | | |
| American Beaver | *Castor canadensis* | | |
| Big Brown Bat | *Eptesicus fuscus* | | |
| Black-tailed Jackrabbit | *Lepus californicus* | | |
| Brazilian Free-tailed Bat | *Tadarida brasiliensis* | | |
| California Myotis | *Myotis californicus* | | |
| Canyon Bat | *Parastrellus hesperus* | | |
| Coyote | *Canis latrans* | | |
| Hoary Bat | *Lasiurus cinereus* | | |
| Little Brown Myotis | *Myotis lucifugus* | | |
| Long-eared Myotis | *Myotis evotis* | | |
| Long-legged Myotis | *Myotis volans* | | |
| Mule Deer (Black-tailed Deer) (tracks) | *Odocoileus hemionus columbianus* | | |
| Pallid Bat | *Antrozous pallidus* | | CSC |
| Raccoon (tracks) | *Procyon lotor* | | |
| Silver-haired Bat | *Lasionycteris noctivagans* | | |
| Small-footed Myotis | *Myotis ciliolabrum* | | |
| Striped Skunk (tracks) | *Mephitis mephitis* | | |
| Townsend's Big-eared Bat | *Corynorhinus townsendii* | | C / CSC |

# APPENDIX F
## Faunal Species Observed Within or Near the Project Site
### Mill Creek Fish Passage Restoration Project

| COMMON NAME | SCIENTIFIC NAME | LISTING STATUS | |
|---|---|---|---|
| | | Federal | State |
| Western Gray Squirrel | *Sciurus griseus* | | |
| Western Red Bat | *Lasiurus blossevillii* | | CSC |
| Yuma Myotis | *Myotis yumanensis* | | |

**LEGEND:**

**E** = Endangered
**T** = Threatened
**C** = Candidate for listing as Endangered or Threatened
**P** = Proposed for listing as Endangered or Threatened
**CSC** = California Species of Special Concern
**FP** = California Fully Protected
**SC** = NMFS Species of Concern
**D** = Delisted
**PD** = Proposed for Delisting
***** = Non-native Species

# Appendix G

# Potentially Occurring Special-Status Faunal Species Within or Near the Project Site

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| **AMPHIBIANS & REPTILES** | | | | |
| Western Pond Turtle (*Emys marmorata)* | --- | CSC | In or near aquatic habitats in slow moving water. Often associated with basking substrate (e.g. logs, large rocks, etc.) Use adjacent uplands to nest and overwinter. | Observed during site surveys. Known to occur north of project site within the Dye Creek Preserve. |
| Foothill Yellow-legged Frog *(Rana boylii)* | --- | CSC | In or near rocky streams in a variety of habitats. Rarely encountered far from permanent water. | Observed during site surveys. Known to occur north of project site within the Dye Creek Preserve. |
| California Red-legged Frog *(Rana draytonii)* | T | CSC | Slow moving or pooled aquatic habitats with overhanging vegetation. | Not likely to occur within the study area due to the fact that the study area is well outside the current known range of the species and the marginal breeding habitat within the project site. Not observed during site surveys; however protocol surveys were not conducted. |
| Western Spadefoot *(Spea hammondii)* | --- | CSC | Shallow grasslands and occasionally valley foothill hardwood woodlands. Shallow temporary pools for breeding. | Potential breeding habitat present within the project site. Not observed during site surveys. |
| **BIRDS** | | | | |
| Tricolored Blackbird *(Agelaius tricolor)* | --- | E | Breeds in tall emergent vegetation with access to open water. Forages in grassland, agricultural lands. | Observed flying through the study area during site surveys. Not likely to nest due to a lack of suitable nesting habitat. May forage within the project area if nesting habitat is present in the general area. Known to occur north of project site within the Dye Creek Preserve. |
| Grasshopper Sparrow *(Ammodramus savannarum)* | --- | CSC | Uses short- to mid-height moderately open grasslands with scattered shrubs and tall forbs. Ground nesting in depressions near the base of overhanging grass or forb clumps. | Potential nesting and foraging habitat present within the project site. Not observed during site surveys. Known to occur north of project site within the Dye Creek Preserve. |

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| Golden Eagle *(Aquila chrysaetos)* | --- | FP | Uses rolling foothills and mountain terrain, wide arid plateaus, some deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Generally inhabit areas with open country. | Not likely to nest due to a lack of suitable nesting habitat. Potential foraging habitat present within the project site. Observed during site surveys. Known to nest north of project site within the Dye Creek Preserve. |
| Short-eared Owl *(Asio flammeus)* | --- | CSC | Uses open areas with few trees including grasslands, prairies, dunes, meadows, irrigated areas and emergent wetlands. Nests in open country supporting rodents and herbaceous cover sufficient to conceal ground nests. | Not likely to nest within the study area due to the fact that the study area is well outside the current known range of nesting for the species. Potential winter foraging habitat may be present within the project site. Not observed during site surveys. |
| Long-eared Owl *(Asio otus)* | --- | CSC | Riparian, live oak or conifer thickets with small, dense canopy trees used for roosting and nesting. Generally forages in open areas. | Potential nesting and foraging habitat present within the project site. Not observed during site surveys. |
| Burrowing Owl *(Athene cunicularia)* | --- | CSC | Uses open grasslands, deserts or scrublands. Nest in small mammal burrows, pipes, culverts or nesting boxes. Species is gregarious. | Potential nesting and foraging habitat present within the project site. No individuals observed during site surveys. Known to occur north of project site within the Dye Creek Preserve. |
| Swainson's Hawk (*Buteo swainsoni)* | --- | T | Open desert, grassland or cropland containing scattered large trees, small groves or riparian woodlands. Nests in scattered trees, small groves, sparsely vegetated flatlands or in riparian woodlands. | Potential nesting and foraging habitat present within the project site. Observed flying at high elevations during site surveys. Known to occur north of project site within the Dye Creek Preserve. |
| Northern Harrier *(Circus cyaneus)* | --- | CSC | Nest and forage in a variety of open habitats such as grasslands, rangelands, agricultural lands, meadow and emergent wetland that provide adequate vegetative cover, prey, and scattered hunting, plucking, and lookout perches such as shrubs or fence posts. Nests on the ground, mostly within patches of dense, often tall, vegetation in undisturbed areas. | Potential nesting and foraging habitat present within the project site. Observed during site surveys. Known to occur north of project site within the Dye Creek Preserve. |

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)* | T | E | Dense deciduous riparian cover, esp. willow with low level understory foliage, near slow moving water with high humidity, utilizes riparian forests and adjacent orchards for foraging. Requires large $\geq$ 7 acre habitat patch sizes for nesting. | Not likely to nest within project site, due to lack of minimum nesting habitat acreage requirements. May forage within the project area if nesting within the general area. |
| White-tailed Kite *(Elanus caeruleus)* | --- | FP | Nests in dense tree stands near open foraging areas. Forages in open grassland and agricultural areas. | Potential nesting and foraging habitat present within the project site. Not observed during site surveys. Known to nest north of project site within the Dye Creek Preserve. |
| Little Willow Flycatcher *(Empidonax traillii brewsteri)* | --- | E | Nests in upper elevation riparian and wet meadow habitats. | Observed during site surveys. Not likely to nest due to low project site elevation. Likely to forage within the project area during spring and fall migration. |
| American Peregrine Falcon (*Falco peregrinus anatum*) | D | D / FP | Riparian areas, coastal and inland wetlands are important habitats. Breeds mostly in woodland, forest and coastal habitats on cliff ledges, occasionally in snag cavities and in other used raptor nests. | Nesting habitat present in the vicinity of project site on the high voltage power lines. Known to forage within the project area. Known to nest north of project site within the Dye Creek Preserve. Observed during site surveys. |
| American Bald Eagle *(Haliaeetus leucocephalus)* | D | E / FP | Nests in large trees with open branchwork, usually near permanent water including rivers, streams and lakes / reservoirs. Forages over large bodies of water with abundant fish. | Potential nesting habitat present within the project site, however there is a low likelihood that nesting will occur without established nests being present. Observed foraging during site surveys. Known to occur north of project site within the Dye Creek Preserve. |
| Yellow-breasted Chat *(Icteria virens)* | --- | CSC | Nests in dense shrubs along streams and rivers. | Observed during site surveys. Known to nest north of project site within the Dye Creek Preserve. Likely to nest and forage within the project area. |

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| Loggerhead Shrike *(Lanius ludovicianus)* | --- | CSC | Prefers open habitats with scattered trees, shrubs, posts, fences and other perches. Found primarily in valley-foothill and desert habitats. | Observed during site surveys. Known to nest north of project site within the Dye Creek Preserve. Likely to nest and forage within the project area. |
| American White Pelican *(Pelecanus erythrorhynchos)* | | CSC | Rests in day and roosts at night along edge of water, on beaches, sandbars, or old driftwood, but never in trees. Nests at large freshwater and salt water lakes, usually on small islands or remote dikes. | Not likely to nest due to a lack of suitable nesting habitat. May forage within the project area. Observed during site surveys. |
| Bank Swallow *(Riparia riparia)* | --- | T | Nests in excavated burrows in fine-textured vertical stream banks. | Not likely to nest due to a lack of suitable nesting habitat. May forage within the project area if nesting habitat is present in the general area. Not observed during site surveys. |
| Yellow Warbler *(Setophaga petechia)* | --- | CSC | Nests in riparian habitats and open conifer forests. | May nest in riparian habitats within the project site. Likely to forage within the project site during spring and fall migration if nesting does not occur locally. Known to occur north of project site within the Dye Creek Preserve. Not observed during site surveys. |
| Least Bell's Vireo *(Vireo bellii pusillus)* | E | E | Lowland riparian areas. Nests in willows, mulefat, wildrose, etc. | Not likely to occur within the study area due to the fact that the study area is well outside the current known range of the species. |
| **FISH** | | | | |
| Green Sturgeon (Southern DPS) (*Acipenser medirostris*) | T | CSC | Requires cool fresh water for spawning in large cobble. Spawning takes place in deep, fast water. | Not likely to occur due to a lack of preferred habitat. Not known to occur within the Mill Creek drainage. |

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| River Lamprey *(Lampetra ayresii)* | | CSC | Adults spawn in gravelly riffles in river tributary streams. Ammocoetes (young) use silty backwaters and eddies. | Not well studied in Mill Creek. Recent studies of lamprey in Mill Creek have not distinguished between lamprey species. Current identification is insufficient in determining presence. May be present within ammocoete stage and may spawn within study area. |
| Hardhead *(Mylopharodon conocephalus)* | --- | CSC | Low- to mid-elevation streams in the Sacramento and San Joaquin drainage. Also present in the Russian River. Clear, deep pools with sand, gravel, and boulder substrate. Slow water velocity. Not found where exotic centrarchids predominate. | Known to occur within Mill Creek from confluence with Sacramento River to Upper Dam. |
| Central Valley Steelhead *(Oncorhynchus mykiss)* | T | --- | Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries. | Rainbow trout / steelhead observed during site surveys. Adults and juveniles are known to occur within Mill Creek from confluence with Sacramento River to above Upper Dam. |
| Central Valley Fall- / Late Fall-run Chinook Salmon *(Oncorhynchus tshawytscha)* | SC | CSC | Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries. | Adults and juveniles known to occur within Mill Creek from confluence with Sacramento River to Upper Dam. Observed during site surveys. |
| Central Valley Spring-run Chinook Salmon *(Oncorhynchus tshawytscha)* | T | T | Spawns in the late summer / early fall in cool, clear water with clean spawning gravel in the Sacramento River and some tributaries. | Adults and juveniles known to occur within Mill Creek from confluence with Sacramento River to Upper Dam. |
| Sacramento River Winter-run Chinook Salmon *(Oncorhynchus tshawytscha)* | E | E | Spawns in the summer in cool, clear water with clean spawning gravel, almost exclusively in the mainstem of the Sacramento River. | Juveniles known to use Mill Creek habitat from the confluence with Sacramento River to Sherwood Bridge for non-natal rearing and could use habitat up to the Ward Dam. Ward Dam is likely the upstream limit for non-natal rearing (M. Johnson pers. comm 2014) |

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| **INVERTEBRATES** | | | | |
| Conservancy Fairy Shrimp | E | --- | Vernal pool and vernal pool-like habitats. | Potential habitat present within the project site. Not observed during site surveys. |
| Vernal Pool Fairy Shrimp *(Branchinecta lynchi)* | T | --- | Vernal pool and vernal pool-like habitats. | Potential habitat present within the project site. Observed during site surveys. |
| Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus)* | T | --- | Elderberry shrubs with stems 1 inch or greater in diameter. | Potential habitat present within the project site. No exit holes observed during site surveys. |
| Vernal Pool Tadpole Shrimp *(Lepidurus packardi)* | E | --- | Vernal pool and ephemeral wetland habitats. | Potential habitat present within the project site. Not observed during site surveys. |
| **MAMMALS** | | | | |
| Pallid Bat *(Antrozous pallidus)* | --- | CSC | Uses a wide variety of habitats including grassland, shrubland, woodland and forest. Roosts in caves, mines, crevices, hollow trees and buildings. | Detected during acoustical surveys. Potential roosting habitat present within the project site. Known to occur north of project site within the Dye Creek Preserve. |
| Ringtail *(Bassariscus astutus)* | --- | FP | Riparian habitats and forest and shrub habitats near rocky areas or riparian areas from low to middle elevations. | Potential denning, nesting and foraging habitat present within the project site. Not observed during site surveys. |
| Townsend's Big-eared Bat *(Corynorhinus townsendii)* | --- | C / CSC | Roosts in caves, mines, tunnels and buildings. Very sensitive to human disturbance; however, in some instances it can become habituated to reoccurring and predictable human activity. | Detected during acoustical surveys. No roosting habitat present within the project site. Known to occur north of project site within the Dye Creek Preserve. |

# APPENDIX G
## Potentially-occurring Special-status Species
### Mill Creek Fish Passage Restoration Project
### (Source: Tehama Environmental Solutions Inc., 2015)

| SPECIES | LISTING STATUS | | TYPICAL HABITAT | POTENTIAL FOR OCCURRENCE |
|---|---|---|---|---|
| Common Name (*Scientific Name*) | Federal | State | | |
| Spotted Bat *(Euderma maculatum)* | --- | CSC | Prefers to roost in rock crevices on cliffs but also roosts in caves and buildings. Forages over water in a variety of habitats. | No roosting habitat present within the project site. May forage within the project area if roosting habitat is present in the general area. Known to occur north of project site within the Dye Creek Preserve. Not detected during acoustical surveys. |
| Western Mastiff Bat *(Eumops perotis)* | --- | CSC | Roosts in rock crevices on cliffs, high buildings, trees and tunnels. Occurs in open arid to semi-arid habitats with abundant roost sites. | No roosting habitat present within the project site. May forage within the project area if roosting habitat is present within the general area. Not detected during acoustical surveys. Known to occur north of project site within the Dye Creek Preserve. |
| Western Red Bat (*Lasiurus blossevillii*) | --- | CSC | Roosts primarily in trees, less often in shrubs. Roost sites often are in edge habitats adjacent to streams, fields, or urban areas. Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging. | Detected during acoustical surveys. Known to occur north of project site within the Dye Creek Preserve. |

**LEGEND:**

**E** = Endangered
**T** = Threatened
**C** = Candidate for listing as Endangered or Threatened
**P** = Proposed for listing as Endangered or Threatened
**CSC** = California Species of Special Concern
**FP** = California Fully Protected
**SC** = NMFS Species of Concern
**D** = Delisted
**PD** = Proposed for Delisting
**1A** = Plants presumed to be extinct in California
**1B** = Plants rare, threatened or endangered in California and elsewhere
**2** = Plants rare, threatened or endangered in California but more common elsewhere
**3** = Plants about which we need more information, a review list
**4** = Plants of limited distribution, a watch list

# Appendix H

# List of Mitigation Measures Table

| Appendix H. List of Mitigation Measures | |
|---|---|
| **Measure Number** | **Mitigation Measure** |
| **AIR-1** | A Fugitive Dust Permit will be obtained from the Tehama County Air Pollution Control District (TCAPCD) for each of the three project sites. |
| **AIR-2** | All construction equipment will be maintained in proper tune according to manufacturer's specifications.<br><br>To the extent feasible, the use of diesel construction equipment meeting the California Air Resources Board's (CARB) 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.<br><br>If required by the TCAPCD, verify that owners or operators of vehicles are registered with the California Air Resources Board Diesel Off-Road On-Line Reporting System (DOORS) program: (www.arb.ca.gov/msprog/ordiesel/ordiesel.htm). The DOORS program assists fleet owners in reporting their off-road diesel vehicle inventories to reduce vehicle emissions, as required by the In-Use Off-Road Diesel Regulation.<br><br>If required by the TCAPCD, verify that owners or operators of portable engines and certain other types of equipment are registered under the California Air Resources Board's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts: (www.arb.ca.gov/portable/portable.htm). |
| **VEGETATION-1** | Disturbance to existing vegetation will be avoided or minimized to the extent possible. |
| **VEGETATION-2** | Disturbance to riparian vegetation will be avoided or minimized to the extent possible. |
| **VEGETATION-3** | All heavy equipment shall be thoroughly cleaned prior to mobilization onsite to remove any soil, weed seeds and plant parts in order to reduce the importation and spread of invasive exotic plant species. |
| **VEGETATION-4** | Only certified weed-free straw shall be used for erosion control or other purposes to reduce the importation and spread of invasive exotic plant species. |
| **VEGETATION-5** | A revegetation plan will be prepared to replace impacted riparian wetlands and riparian habitat by a measure of quantity and quality equal to, or exceeding impacts of the project using appropriate native riparian trees and shrubs. |
| **VEGETATION-6** | Areas with woody vegetation that have been disturbed will be revegetated in accordance with the revegetation plan. |
| **VEGETATION-7 (Upper Dam Site Only)** | (Upper Dam Site Only) Vehicle traffic at the Upper Dam project site will be limited to the existing disturbed road prism. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. If truck passing areas are necessary, they will be established in areas away from populations of Tehama navarretia and wooly meadowfoam and away from aquatic sites. Truck passing areas will be clearly mapped in the field with high visibility fencing or flagging and all construction personnel will be made aware of the sensitive resources and avoidance measures. |

| Appendix H. List of Mitigation Measures | |
|---|---|
| **Measure Number** | **Mitigation Measure** |
| **VEGETATION-8** | No smoking will be allowed on the construction site or within the Action Area, for fire prevention purposes. |
| **WILDLIFE-1** | Prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs or western pond turtles are present. If any individuals of these species are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures. Herpetological exclusion fencing shall be erected around the perimeter of the instream work area prior to construction initiation. Fencing shall remain until work in aquatic habitats is complete. |
| **WILDLIFE-2** | A qualified biologist experienced in the identification of amphibian species (particularly Rana species) will conduct survey(s) for California red-legged frogs at a frequency / rate deemed acceptable by the California Department of Fish and Wildlife to determine if this species is present within any of the disturbance areas. If any California red-legged frogs are found to be present, all potentially disturbing construction activities will be suspended until appropriate protective measures can be developed in consultation with the USFWS ESA staff. |
| **WILDLIFE-3** | Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between August 31 and January 1 (outside of the nesting season for avian species).<br><br>If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the nesting season for non-raptor avian species (March 1 through July 31), a nesting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active avian nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with California Department of Fish and Wildlife (CDFW) and / or the U.S. Fish and Wildlife Service (USFWS), can establish an appropriate protective buffer area to minimize impacts to the nesting birds. No construction activities shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.<br><br>If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the raptor nesting season January 1 through August 31, a raptor nesting survey of the construction area and a 0.25 mile buffer (as access allows) shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with CDFW and / or USFWS can establish an appropriate protective buffer area to minimize impacts to the nesting raptors. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active. |

| Appendix H. List of Mitigation Measures | |
|---|---|
| **Measure Number** | **Mitigation Measure** |
| **WILDLIFE-4** | Prior to any construction work, a survey shall be conducted by a qualified biologist to ensure that pallid bats are not roosting within the areas to be disturbed.<br><br>If pallid bats are found to be roosting within the area to be disturbed, construction activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to pallid bats. |
| **WILDLIFE-5** | Prior to construction, a qualified biologist will inspect the area to be disturbed to determine if potential ringtail denning is occurring.<br><br>If potential ringtail denning is found to be occurring, construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to ringtail. |
| **WILDLIFE-6** | Prior to construction, all elderberry shrubs within 150 feet of any project activity will be clearly flagged, marked and maintained throughout construction in order to avoid impacts to the valley elderberry longhorn beetle. All elderberry shrubs within 100 feet of project activity will be marked with high-visibility orange fencing. |
| **WILDLIFE-7 (Upper Dam Site Only)** | At the Upper Dam site, project activities shall avoid impacts to vernal pools and other potential large branchiopod (fairy shrimp, tadpole shrimp) habitats to the extent possible.<br><br>High-visibility fencing shall be installed in areas where equipment will be working near any potential large branchiopod habitat that are not to be disturbed.<br><br>No road grading or road improvements shall be allowed in or near potential large branchiopod habitat.<br><br>Dust control water applications will not be applied to potential large branchiopod habitats.<br><br>All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitat and required to inspect their vehicles prior to entry and exit of these habitats, to prevent accidental discharge.<br><br>All vehicular traffic will be restricted to the designated work boundaries. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. The work boundaries will be flagged or fenced and identified on construction drawings to limit equipment and personnel to the minimum area necessary to perform the project work and minimize impacts to potential large branchiopod habitats. |
| **WILDLIFE-8** | A qualified biologist (biological monitor) shall regularly inspect construction-related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor should have the authority to stop all activities that may result in such disturbance until appropriate corrective measures have been completed. The biologist will also be required to report any unauthorized take to CDFW, USFWS and / or NMFS immediately. |

| Appendix H. List of Mitigation Measures | |
|---|---|
| **Measure Number** | **Mitigation Measure** |
| **WILDLIFE-9** | A construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those species listed in the environmental documents. |
| **WILDLIFE-10** | An Endangered Species Act Section 7 consultation will occur with the USFWS for each of the three project sites for impacts to yellow-billed cuckoo, valley elderberry longhorn beetle, vernal pool fairy shrimp and / or vernal pool tadpole shrimp. All protective measures imposed by USFWS through the consultation will be adhered to. |
| **WILDLIFE-11** | Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in a chemical solution(s). |
| **WETLAND-1** | Project activities will avoid impacts to wetlands and other aquatic habitats to the extent possible. |
| **WETLAND-2** | High-visibility fencing will be installed in areas where equipment will be working near any wetlands or other aquatic habitats that are not to be disturbed |
| **WETLAND-3** | Construction crews will be informed about the importance of avoiding sensitive areas, including wetlands. |
| **WETLAND-4** | A Clean Water Act Section 404 Permit will be obtained from the U.S. Army Corps of Engineers and a Clean Water Act Section 401 Certification will be obtained from the Regional Water Quality Control Board (RWQCB) for each of the three project sites. |
| **WETLAND-5** | A California Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement will be obtained from CDFW for the Exposed Siphon site, if deemed applicable. It is anticipated that a 1600 Agreement will not be required for the Ward Dam or the Upper Dam sites. |
| **FISH-1** | Instream construction work shall be conducted between July 15 and October 14 to minimize impacts to anadromous fish by working when water temperatures are warmer and anadromous fish are less likely to be present. Work within the channel and banks, outside of this instream work window must be isolated from flowing water and fish passage will be accommodated through the project site after October 14 . |
| **FISH-2** | All construction debris already on site and generated as a result of construction activity (concrete, metal, etc.) from the fish passage improvement-related construction activities will be removed from the active stream channel post-construction. |

| Appendix H. List of Mitigation Measures | |
|---|---|
| **Measure Number** | **Mitigation Measure** |
| **FISH-3** | Prior to construction, exclusionary fish netting shall be installed upstream and downstream of the construction area. USFWS, in coordination and consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue and location of exclusionary netting is most appropriate. Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment. |
| **FISH-4** | An Endangered Species Act Section 7 consultation and a Magnuson Stevens Act Essential Fish Habitat consultation will occur with NMFS for each of the three project sites for impacts to Central Valley steelhead, Central Valley spring-run salmon, winter-run salmon and /or fall- late fall-run salmon. |
| **FISH-5** | All dewatering and rewatering activities will be conducted slowly, in order to minimize disturbance to fish. |
| **FISH-6** | All pumps used during dewatering or other construction activities will be screened to meet CDFW and NMFS criteria. |
| **FISH-7** | Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in a chemical solution(s). |
| **CULTURAL-1** | In the event subsurface cultural remains over 45 years of age are encountered during ground-disturbing activities, all work will cease at the general area of discovery and the U.S. Fish and Wildlife Service regional archaeologist, or other lead agency archaeologist, will be notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following Native American Graves Protection and Repatriation Act procedures). |
| **SOIL / GEO-1** | After ground-disturbing activities are complete, all disturbed areas (outside of the active stream channel and the ditch bottom) shall be seeded with native plant species and mulched as described in the revegetation plan. |
| **SOIL / GEO-2** | Construction of all project actions shall comply with RWQCB Basin Plan Objectives. Standard Best Management Practices (BMPs) will be incorporated into the project designs. |
| **SOIL / GEO-3** | If the total disturbance area is greater than one acre for any of the three project sites, a Notice of Intent will be submitted to the State Water Resources Control Board to obtain coverage under the National Pollution Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activity. |

| Appendix H. List of Mitigation Measures | |
|---|---|
| **Measure Number** | **Mitigation Measure** |
| **HAZ-1** | A designated concrete washout area will be located at least 100 feet from any high water mark within adjacent waterways and will be developed and used following the U.S. EPA Stormwater BMP for a Concrete Washout. |
| **WATER-1** | All construction shall be conducted in the summer / early fall during the low flow period. Any work within the channel and banks, outside of this instream work window must be isolated from flowing water and dewatering will be required. |
| **WATER-2** | BMP's will be developed and implemented to ensure that wet concrete does not enter Mill Creek during construction. |
| **WATER-3** | Monitoring of water turbidity and settleable materials shall be conducted in accordance with the Clean Water Act Section 401 Certification through consultation with the Central Valley Regional Water Quality Control Board. |
| **WATER-4** | All equipment and machinery that contains fuel, oil or other petroleum products used during construction related activities shall be checked for petroleum leaks immediately prior to being mobilized to the project site and again each day prior to use. |
| **WATER-5** | All equipment refueling and / or maintenance shall take place within a secondary containment structure and a minimum of 100 feet away from Mill Creek or other aquatic sites. |
| **WATER-6** | An emergency spill kit and absorbent oil booms will be onsite during construction activities. |
| **WATER-7** | All equipment operations within the channel and banks of Mill Creek will be required to use readily biodegradable hydraulic oil. |
| **WATER-8** | A dewatering permit will be obtained from RWQCB for each project site, if deemed necessary, based on the dewatering methods used. |
| **NOISE-1** | Construction work (including arrival and departure of trucks hauling materials) will generally be conducted from 7:00 am to 7:00 pm Monday through Friday. Weekend work will only be allowed, if necessary to complete the projects within the established environmental time frames. |

# Appendix I

# CEQA Environmental Checklist Form

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- ☐ Aesthetics
- ☐ Agriculture and Forestry Resources
- ☑ Air Quality / Greenhouse Gas Emissions
- ☑ Biological Resources
- ☐ Cultural Resources
- ☑ Geology /Soils
- ☐ Land Use / Planning
- ☑ Hazards & Hazardous Materials
- ☑ Hydrology / Water Quality
- ☐ Population / Housing
- ☐ Mineral Resources
- ☑ Noise
- ☐ Transportation/Traffic
- ☐ Public Services
- ☐ Recreation
- ☐ Utilities / Service Systems
- ☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☑ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Signature Date

# Environmental Checklist Form

| I. AESTHETICS (See EA/IS Section 3.1)<br>- Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☐ | ☑ |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | ☑ |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings? | ☐ | ☐ | ☐ | ☑ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☐ | ☑ |

II. AGRICULTURE RESOURCES (See EA/IS Section 3.2)

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

| | | | | |
|---|---|---|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non- agricultural use? | ☐ | ☐ | ☐ | ☑ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☑ |
| c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use? | ☐ | ☐ | ☐ | ☑ |

III. AIR QUALITY / GREEN HOUSE GAS (See EA/IS Section 3.3)

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

| | | | | |
|---|---|---|---|---|
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☐ | ☑ |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? | ☐ | ☐ | ☑ | ☐ |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | ☐ | ☑ | ☐ | ☐ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☑ | ☐ |
| e) Create objectionable odors affecting a substantial number of people? | ☐ | ☐ | ☐ | ☑ |
| f) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☑ | ☐ |
| g) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☐ | ☑ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| IV. BIOLOGICAL RESOURCES (See EA/IS Section 3.4) | | | | |
| - Would the project: | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | ☐ | ☑ | ☐ | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? | ☐ | ☑ | ☐ | ☐ |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal,filling, hydrological interruption, or other means? | ☐ | ☑ | ☐ | ☐ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☐ | ☑ | ☐ |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | ☑ |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ☑ |
| V. CULTURAL RESOURCES (See EA/IS Section 3.5) | | | | |
| - Would the project: | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5? | ☐ | ☐ | ☑ | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5? | ☐ | ☑ | ☐ | ☐ |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☑ | ☐ |
| d) Disturb any human remains, including those interred outside of formal cemeteries? | ☐ | ☐ | ☑ | ☐ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| VI. GEOLOGY AND SOILS (See EA/IS Section 3.8) | | | | |
| - Would the project: | | | | |
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ☐ | ☐ | ☐ | ☑ |
| ii) Strong seismic ground shaking? | ☐ | ☐ | ☐ | ☑ |
| iii) Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☐ | ☑ |
| iv) Landslides? | ☐ | ☐ | ☐ | ☑ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☑ | ☐ | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☐ | ☑ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | ☐ | ☐ | ☐ | ☑ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☐ | ☑ |
| VII. HAZARDS AND HAZARDOUS MATERIALS (See EA/IS Section 3.9) | | | | |
| - Would the project: | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☑ | ☐ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☑ | ☐ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☐ | ☐ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☐ | ☑ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ☑ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ☑ |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | ☑ |
| h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | ☐ | ☐ | ☐ | ☑ |
| **VIII. HYDROLOGY AND WATER QUALITY** (See EA/IS Section 3.10) | | | | |
| - Would the project: | | | | |
| a) Violate any water quality standards or waste discharge requirements? | ☐ | ☑ | ☐ | ☐ |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | ☐ | ☐ | ☐ | ☑ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | ☐ | ☐ | ☐ | ☐ |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | ☐ | ☐ | ☑ | ☐ |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | ☐ | ☐ | ☐ | ☑ |
| f) Otherwise substantially degrade water quality? | ☐ | ☑ | ☐ | ☐ |
| g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | ☐ | ☐ | ☐ | ☑ |
| h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows? | ☐ | ☐ | ☑ | ☐ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☑ |
| j) Inundation by seiche, tsunami, or mudflow? | ☐ | ☐ | ☐ | ☑ |
| IX. LAND USE AND PLANNING (See EA/IS Section 3.11) | | | | |
| - Would the project: | | | | |
| a) Physically divide an established community? | ☐ | ☐ | ☐ | ☑ |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☐ | ☑ |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan? | ☐ | ☐ | ☐ | ☑ |
| X. MINERAL RESOURCES (See EA/IS Section 3.8) | | | | |
| - Would the project: | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ☑ |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☐ | ☑ |
| XI. NOISE (See EA/IS Section 3.12) | | | | |
| - Would the project result in: | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☑ | ☐ | ☐ |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☐ | ☐ | ☑ |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☐ | ☑ |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☑ | ☐ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☑ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☑ |
| XII. POPULATION AND HOUSING (See EA/IS Section 3.13) | | | | |
| - Would the project: | | | | |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ☐ | ☐ | ☐ | ☑ |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☑ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☑ |
| XIII. PUBLIC SERVICES (See EA/IS Section 3.14) | | | | |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| Fire protection? | ☐ | ☐ | ☐ | ☑ |
| Police protection? | ☐ | ☐ | ☐ | ☑ |
| Schools? | ☐ | ☐ | ☐ | ☑ |
| Parks? | ☐ | ☐ | ☐ | ☑ |
| Other public facilities? | ☐ | ☐ | ☐ | ☑ |
| XIV. RECREATION (See EA/IS Section 3.15) | | | | |
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ☑ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ☑ |
| **XV. TRANSPORTATION/TRAFFIC** (See EA/IS Section 3.16) | | | | |
| - Would the project: | | | | |
| a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)? | ☐ | ☐ | ☑ | ☐ |
| b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways? | ☐ | ☐ | ☐ | ☑ |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | ☐ | ☐ | ☐ | ☑ |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☐ | ☑ |
| e) Result in inadequate emergency access? | ☐ | ☐ | ☐ | ☑ |
| f) Result in inadequate parking capacity? | ☐ | ☐ | ☐ | ☑ |
| g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)? | ☐ | ☐ | ☐ | ☑ |
| **XVI. UTILITIES AND SERVICE SYSTEMS** (See EA/IS Section 3.14) | | | | |
| - Would the project: | | | | |
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | ☐ | ☐ | ☐ | ☑ |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☑ |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☑ |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | ☐ | ☐ | ☐ | ☑ |

# Environmental Checklist Form

| | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☐ | ☑ |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | ☐ | ☐ | ☐ | ☑ |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | ☐ | ☐ | ☐ | ☑ |
| XVII. MANDATORY FINDINGS OF SIGNIFICANCE | | | | |
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☑ | ☐ | ☐ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☐ | ☐ | ☑ |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☑ | ☐ | ☐ |