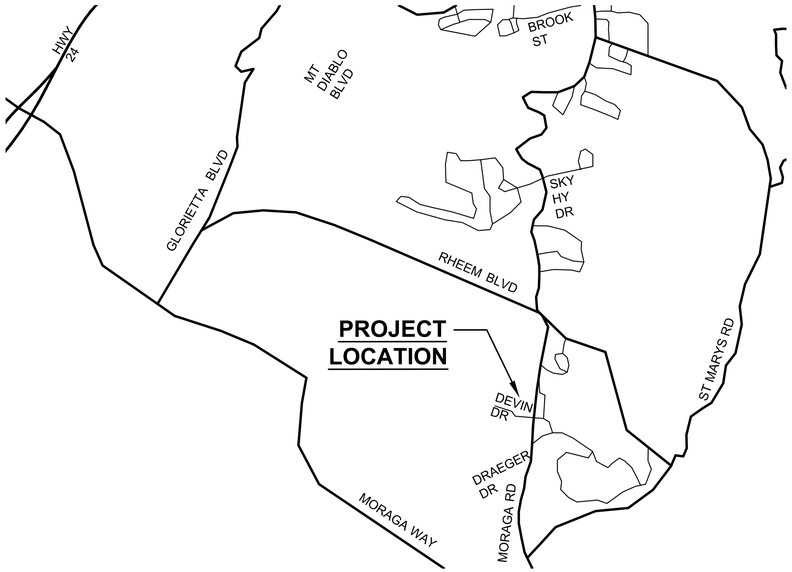
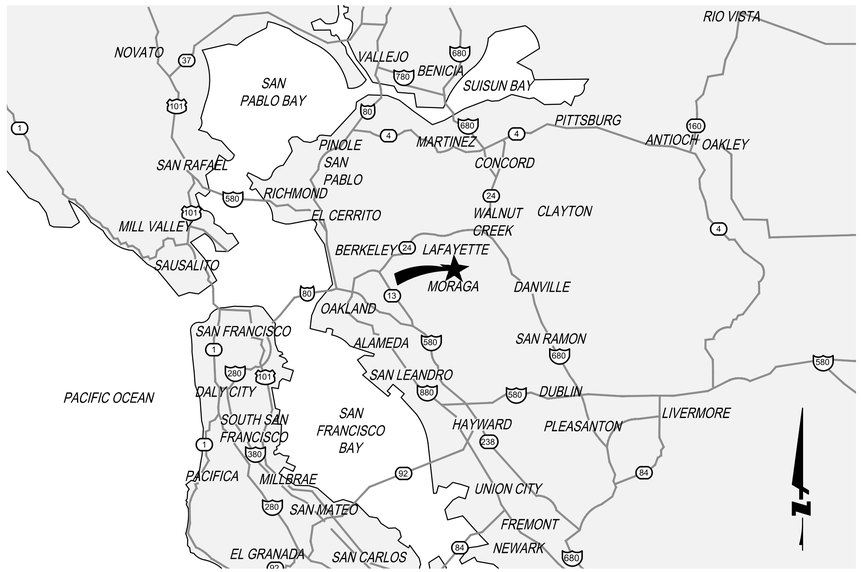
TOWN OF MORAGA

LAGUNA CREEK RESTORATION AND FLOOD PROTECTION PROJECT

CIP NUMBER 16-201



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

SHEET INDEX

SHT NO	SHT REF	DESCRIPTION
1	TS-01	TITLE SHEET
2	GN-01	GENERAL NOTES
3	KM-01	KEY MAP
4	EX-01	EXISTING CONDITIONS PLAN
5	DE-01	DEMOLITION PLAN
6	IM-01	IMPROVEMENT PLAN
7	GR-01	GRADING & UTILITY PLAN
8	GR-02	ENLARGED GRADING PLAN
9	XS-01	CROSS SECTIONS
10	CD-01	CONSTRUCTION DETAILS
11	CD-02	CONSTRUCTION DETAILS
12	EC-01	EROSION CONTROL
13	LI-01	RESTORATION PLANTING LEGEND & NOTES
14	LI-02	RESTORATION PLANTING PLAN
15	LI-03	PAVILION PLANTING PLAN
16	LI-04	TRAIL LAYOUT
17	LI-05	LANDSCAPE DETAILS
18	S-01	BRIDGE PLAN
19	S-02	BRIDGE SECTION
20	S-03	FOOTING DETAIL
21	S-04	BRIDGE SECTION
22	S-05	BRIDGE SECTION
23	S-06	BRIDGE SECTION
24	S-07	BRIDGE SECTION
25	S-08	BRIDGE SPECIFICATIONS
26	S-09	BRIDGE SPECIFICATIONS
27	S-10	SAMPLE DETAILS & IMAGES
28	S-11	SAMPLE DETAILS & IMAGES

PROJECT CONTACTS

CIVIL ENGINEER

BKF ENGINEERS
DAYNE JOHNSON
1646 N. CALIFORNIA BLVD, SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200

LANDSCAPE

RESTORATION DESIGN GROUP
ANNEKE SWINEHART
2332 FIFTH ST,
BERKELEY, CA 94710
(510) 644-2798

STRUCTURAL

CONTECH
ALEX KEENAN
9025 CENTER POINTE DR.
WEST CHESTER, OH 45069
(800) 333-8112

Know what's below. Call before you dig.

REVISIONS

NO.	DESCRIPTION	DATE	BY	APPVD
1				
2				
3				
4				

REGISTERED PROFESSIONAL ENGINEER
DAYNE B. JOHNSON
No. C 061408
CIVIL
STATE OF CALIFORNIA

65% REVIEW

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
TITLE SHEET

CITY OF MORAGA
CALIFORNIA

DATE	SCALE
09-15-21	AS SHOWN

BKF JOB NO. 201226

SHEET NO. 1 OF 28

FILE NO. TS.01

65% CONSTRUCTION DOCUMENTS

© BKF Engineers

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGING REQUIRED INSPECTIONS BY THE CITY ENGINEER OR HER AUTHORIZED REPRESENTATIVES. BKF ENGINEERS IS NOT RESPONSIBLE FOR DELAY OF WORK CLAIM DUE TO THE CONTRACTOR'S FAILURE TO ARRANGE FOR CITY INSPECTION IN ADVANCE.

2. WORK SHALL NOT BE PERFORMED DURING HOURS OTHER THAN THE NORMAL WORKING HOURS OF THE CITY INSPECTION AND MAINTENANCE PERSONNEL WITHOUT THE APPROVAL OF THE CITY ENGINEER AND WITHOUT FIRST OBTAINING ANY APPLICABLE PERMITS FOR AFTER HOURS WORK FROM THE CITY ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR PAYING ANY ADDITIONAL FEES REQUIRED BY THE CITY FOR PERFORMING WORK BEYOND THE NORMAL WORKING HOURS. CONTRACTOR SHALL CONFORM TO THE REQUIREMENT OF THE CITY NOISE ORDINANCE.

3. REVISIONS TO THESE PLANS MUST BE REVIEWED AND APPROVED IN WRITING BY THE ENGINEER, WHO WILL OBTAIN APPROVAL FROM THE CITY ENGINEER PRIOR TO CONSTRUCTION OF AFFECTED ITEMS. REVISIONS SHALL BE ACCURATELY SHOWN ON REVISED PLANS, WHICH SHALL BE REVIEWED AND APPROVED BY THE ENGINEER AND CITY ENGINEER PRIOR TO INSTALLATION OF THE IMPROVEMENTS.

4. CONTRACTOR SHALL REPLACE OR REPAIR, AT HIS OWN EXPENSE, DAMAGED, REMOVED OR OTHERWISE DISTURBED EXISTING UTILITIES, IMPROVEMENTS OR FEATURES OF WHATEVER NATURE, TO ITS ORIGINAL CONDITION.

5. REPLACE STREET MONUMENTS AND OTHER PERMANENT MONUMENTS DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION BEFORE ACCEPTANCE OF THE IMPROVEMENTS BY THE CITY ENGINEER.

6. IF TEMPORARY LANE CLOSURES ARE REQUIRED FOR CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL PREPARE A TRAFFIC CONTROL PLAN AND OBTAIN APPROVAL FROM THE CITY ENGINEER BEFORE COMMENCING WORK. THE CONTRACTOR SHALL ALSO PROVIDE FLAG MEN, CONES OR BARRICADES, AS NECESSARY TO CONTROL TRAFFIC AND PREVENT HAZARDOUS CONDITIONS, PER CALTRANS STANDARDS AND THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

7. EXISTING PEDESTRIAN WALKWAYS, BIKE PATHS AND ADA ACCESS PATHWAYS SHALL BE MAINTAINED DURING CONSTRUCTION TO THE SATISFACTION OF THE CITY ENGINEER AND INSPECTOR.

8. EXCAVATIONS SHALL BE ADEQUATELY SHORED, BRACED AND SHEATHED SO THAT THE EARTH WILL NOT SLIDE OR SETTLE AND SO THAT ALL EXISTING IMPROVEMENTS OF ANY KIND WILL BE FULLY PROTECTED FROM DAMAGE. DAMAGE RESULTING FROM A LACK OF ADEQUATE SHORING, BRACING AND SHEATHING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND HE SHALL COMPLETE NECESSARY REPAIRS OR RECONSTRUCTION AT HIS OWN EXPENSE. WHERE THE EXCAVATION IS FIVE FEET (5') OR MORE IN DEPTH, THE CONTRACTOR SHALL PROVIDE SHEATHING, SHORING AND BRACING IN CONFORMANCE WITH THE APPLICABLE CONSTRUCTION SAFETY ORDERS OF THE DIVISION OF INDUSTRIAL SAFETY OF THE STATE OF CALIFORNIA. THE CONTRACTOR SHALL COMPLY WITH OSHA REQUIREMENTS.

9. DURING CONSTRUCTION, THE CITY STREETS SHALL BE CLEANED AS OFTEN AS REQUIRED TO REMOVE ACCUMULATION OF MUD AND DEBRIS RESULTING FROM CONSTRUCTION ACTIVITIES.

10. SHOULD IT APPEAR THAT THE WORK TO BE DONE OR ANY MATTER RELATIVE THERETO IS NOT SUFFICIENTLY DETAILED OR SPECIFIED IN THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER, BKF ENGINEERS, BEFORE PROCEEDING WITH THE WORK IN QUESTION.

11. THE CONTRACTOR IS RESPONSIBLE FOR MATCHING EXISTING GRADE, LANDSCAPING AND OTHER IMPROVEMENTS WITH A SMOOTH TRANSITION IN TO AVOID ABRUPT OR APPARENT CHANGES IN GRADES OR CROSS SLOPES, LOW SPOTS OR HAZARDOUS CONDITIONS.

12. CONTRACTOR SHALL POST 24-HOUR EMERGENCY TELEPHONE NUMBERS FOR PUBLIC WORKS, POLICE DEPARTMENT AND FIRE DEPARTMENT ON SITE PRIOR TO START OF CONSTRUCTION.

13. THE CONTRACTOR IS RESPONSIBLE FOR THE CARE AND PROTECTION OF ADJOINING PREMISES, TREES, LANDSCAPING, UTILITIES, SIDEWALKS AND STREETS FROM DAMAGE BY HIS OPERATIONS. CONTRACTOR SHALL REPAIR, REPLACE OR CLEAN ANY PART OF THE ABOVE MENTIONED TO THE SATISFACTION OF THE OWNER, AT NO ADDITIONAL COST TO THE OWNER, AT HIS OR HER EXPENSE.

14. CONSTRUCTION MATERIALS, EQUIPMENT AND VEHICLES SHALL BE PROPERLY MAINTAINED AND MANAGED AT THE CONSTRUCTION SITE THROUGHOUT THE DURATION OF THE PROJECT IN ACCORDANCE WITH ANY APPLICABLE REQUIREMENTS.

15. CONTRACTOR TO OBTAIN REQUIRED PERMITS FOR HAUL ROUTES PRIOR TO DEMOLITION AND CONSTRUCTION.

16. CONSTRUCTION STAKING FOR CURB, GUTTER, SIDEWALK, UTILITIES, AND GRADING, ETC. SHALL BE DONE BY A CIVIL ENGINEER OR LAND SURVEYOR REGISTERED IN THE STATE OF CALIFORNIA.

17. IMPLEMENT CONSTRUCTION DUST CONTROL MEASURES TO REDUCE PARTICULATE GENERATION TO A LESS THAN SIGNIFICANT LEVEL. PROVIDE DUST CONTROL IN CONFORMANCE WITH BAY AREA AIR QUALITY MANAGEMENT DISTRICT MINIMUM REQUIREMENTS. IMPLEMENT THE FOLLOWING CONSTRUCTION PRACTICES EXCEPT WHEN IT IS RAINING:

    A. WATER ACTIVE EXTERIOR SOIL AREAS AT LEAST TWICE A DAY.

    B. COVER TRUCKS HAULING SOIL, SAND AND OTHER LOOSE MATERIAL OR PROVIDE 2 FEET OF FREEBOARD.

    C. PAVE, APPLY WATER THREE TIMES DAILY OR APPLY NON-TOXIC SOIL STABILIZER ON UNPAVED ACCESS ROADS, PARKING AREAS, AND STAGING AREAS.

    D. SWEEP PAVED ACCESS ROADS, PARKING AREAS, AND STAGING AREAS DAILY.

    E. APPLY HYDROSEED OR NON-TOXIC SOIL STABILIZER TO INACTIVE CONSTRUCTION AREAS.

    F. ENCLOSE, COVER, WATER TWICE DAILY OR APPLY NON-TOXIC SOIL STABILIZER TO EXPOSED SOIL STOCKPILES.

    G. INSTALL SANDBAGS AND OTHER EROSION CONTROL MEASURES TO PREVENT SILT RUNOFF TO PUBLIC ROADWAYS.

    H. REPLANT VEGETATION IN DISTURBED AREAS AS QUICKLY AS POSSIBLE.

23. A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS EXPECTED TO BE REQUIRED FOR THE PROJECT. THE CONTRACTOR SHALL DEVELOP THE SWPPP AND COMPLY WITH THE REQUIREMENTS CONTAINED IN THE PROJECT SWPPP DURING CONSTRUCTION ACTIVITIES. CONTRACTOR TO UPDATE REPORT, AND ACTIVITIES AND INFORMATION AS REQUIRED OF THE CONTRACTOR AND QSP BY THE REGIONAL WATER QUALITY CONTROL BOARD ON THE PROJECT SMARTS WEBSITE THROUGHOUT CONSTRUCTION ACTIVITIES.

II. EXISTING CONDITIONS

1. BASED ON A TOPOGRAPHIC SURVEY OF AN UNSTABLE CHANNEL REACH, GRADES ENCOUNTERED ON-SITE MAY VARY FROM THOSE SHOWN. CONTRACTOR SHALL REVIEW THE PLANS AND SPECIFICATIONS AND CONDUCT INVESTIGATIONS AS REQUIRED TO VERIFY EXISTING CONDITIONS AT THE PROJECT SITE PRIOR TO START OF WORK.

2. INFORMATION REGARDING EXISTING SUBSURFACE IMPROVEMENTS AND UTILITIES SHOWN ON THESE PLANS WAS TAKEN FROM RECORD DATA KNOWN TO THE ENGINEER AND IS NOT MEANT TO BE A FULL CATALOG OF EXISTING CONDITIONS. CONTRACTOR SHALL CONDUCT FIELD INVESTIGATIONS AS REQUIRED TO VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING SUBSURFACE IMPROVEMENTS AND UTILITIES, WHETHER SHOWN ON THESE PLANS OR NOT, PRIOR TO THE COMMENCEMENT OF WORK. CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY UPON DISCOVERY OF DISCREPANCIES BETWEEN EXISTING CONDITIONS IN THE FIELD AND INFORMATION SHOWN ON THESE PLANS.

3. ELEVATIONS AND LOCATIONS OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO START OF CONSTRUCTION AFFECTING SAID LINES.

4. ITEMS DEMOLISHED ARE TO BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE LAWFULLY DISPOSED OF OFF-SITE AND IN CONFORMANCE WITH ANY CITY REQUIREMENTS.

5. CONTRACTOR TO COORDINATE ABANDONMENT, REMOVAL, RELOCATION, AND/OR ADJUSTMENT TO GRADE OF EXISTING DRY UTILITIES WITH UTILITY OWNER.

6. IF UNDERGROUND UTILITY FACILITIES (W, SD, SS, IRRIG, ETC) ARE DISCOVERED BUT NOT SHOWN ON THESE PLANS, NOTIFY THE OWNER'S REPRESENTATIVE OR ENGINEER BEFORE REMOVAL OF SAID MATERIAL.

7. CONDITIONS ENCOUNTERED ON SITE MAY VARY FROM THOSE SHOWN. REVIEW CONSTRUCTION DOCUMENTS AND CONDUCT INVESTIGATIONS TO UNDERSTAND AND VERIFY EXISTING CONDITIONS AT THE SITE.

III. UTILITIES

1. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY, ENGINEER, AND UTILITY OWNER IF EXISTING WATER, SEWER, GAS MAINS, OR SERVICES ARE DISTURBED OR DAMAGED.

2. CONTRACTOR SHALL PROTECT UTILITIES FROM DAMAGE DURING THE COURSE OF CONSTRUCTION.

3. EXISTING PG&E, AT&T, CABLE, AND FIBER OPTIC MANHOLES/VAULTS ENCOUNTERED DURING CONSTRUCTION SHALL BE ADJUSTED TO GRADE BY THE UTILITY PROVIDER. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE APPROPRIATE UTILITY PROVIDER. OTHER UTILITY BOXES SHALL BE ADJUSTED TO FINISH GRADE BY THE CONTRACTOR.

4. STORM DRAIN UTILITY INSTALLATION AND MATERIALS SHALL CONFORM TO TOWN OF MORAGA STANDARD DETAILS AND SPECIFICATIONS, LATEST EDITION, UNLESS NOTED OTHERWISE.

5. HDPE PIPE DERIVES THEIR STRENGTH FROM THE COMPACTED BEDDING MATERIAL BELOW AND BESIDE THE PIPE HAUNCHES. CAREFULLY PLACE AND COMPACT PIPE BEDDING AND BACKFILL MATERIAL, AND ALSO THE INSERTION AND REMOVAL OF SHEET PILING ADJACENT TO IT. USE CAUTION WHEN OPERATING EQUIPMENT ON SUBGRADE NEAR PIPE INSTALLATIONS.

IV. EARTHWORK AND GRADING

1. THE CONTRACTOR SHALL STRIP THE ENTIRE AREA OF ALL VEGETATION PRIOR TO PERFORMING ANY GRADING OPERATION IN THAT AREA. STRIPPED MATERIALS SHALL BE STOCKPILED FOR PLACEMENT AS TOPSOIL AFTER GRADING OPERATION IS COMPLETE. STRIPPING SHALL BE DETERMINED IN THE FIELD BY THE GEOTECHNICAL ENGINEER. PLACE TOPSOIL IN ACCORDANCE WITH LANDSCAPE PLANS AND SPECIFICATIONS. FINISH GRADE SHALL INCLUDE PLACEMENT OF TOPSOIL AND SHALL CONFORM TO THE DESIGN GRADES SHOWN ON THE DRAWINGS. ANY AREA TO RECEIVE FILL SHALL BE SCARIFIED AT LEAST 6-INCHES AND COMPACTED TO THE SPECIFIED RELATIVE COMPACTION.

2. CONTRACTOR SHALL DEWATER AREAS COVERED WITH STANDING WATER PRIOR TO PLACING FILL OR GRADING. CONTRACTOR SHALL MAINTAIN WORK IN PROGRESS FREE OF STANDING WATER. WATER SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

3. CONTRACTOR SHALL CLEAR DEBRIS FROM AREAS OF EARTHWORK AND GRADING PRIOR TO PLACING FILL OR STARTING GRADING OPERATIONS. DO NOT CLEAR AREAS OUTSIDE LIMIT OF WORK.

4. GRADING ACTIVITIES SHALL COMPLY WITH WITH THE GEOTECHNICAL REPORT PREPARED BY XXX

5. COMPACT FILL PER RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT. COMPACT FILL IN LANDSCAPE AREAS IN ACCORDANCE WITH THE LANDSCAPE PLANS AND SPECIFICATIONS. DO NOT PLACE, SPREAD OR ROLL FILL MATERIAL DURING UNFAVORABLE WEATHER CONDITIONS. GEOTECHNICAL ENGINEER WILL BE ON SITE AND WILL PERFORM COMPACTION TESTS PERIODICALLY DURING CONSTRUCTION. CONTRACTOR SHALL RECOMPACT AREAS OF FILL NOT MEETING COMPACTION REQUIREMENTS AS DIRECTED BY THE GEOTECHNICAL ENGINEER.

6. COMPACTION BY FLOODING, PONDING OR JETTING WILL NOT BE PERMITTED.

7. FOR BIDDING PURPOSES CONTRACTOR SHALL MAKE HIS OWN DETERMINATION OF EARTHWORK AND MATERIAL QUANTITIES.

8. REFER TO LANDSCAPE PLANS FOR DEPTH OF SOIL AMENDMENTS AND FINE GRADING IN LANDSCAPE AREAS.

9. PERFORM WORK IN ACCORDANCE WITH THE REQUIREMENTS AND RECOMMENDATIONS CONTAINED IN PROJECT GEOTECHNICAL REPORT PREPARED BY xxx.

10. THE GEOTECHNICAL ENGINEER SHALL BE NOTIFIED AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF GRADING OPERATIONS. THE GEOTECHNICAL ENGINEER SHALL ALSO BE SCHEULED AT LEAST TWO (2) WORKING DAYS PRIOR TO EARTHWORK AND COMPACT DURING CONSTRUCTION. (CORNERSTONE EARTH GROUP DISPATCH: 408-769-8384).

11. A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL BE ONSITE DURING GRADING OPERATIONS AND SHALL PERFORM SUCH TESTING AS DEEMED NECESSARY. THE REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL OBSERVE THE GRADING OPERATIONS FOR CONDITIONS THAT SHOULD BE CORRECTED, AND IDENTIFY THOSE CONDITIONS WITH RECOMMENDED CORRECTIVE MEASURES TO THE CONTRACTOR AND OWNER.

12. THE CONTRACTOR SHALL PERFORM THE FOLLOWING BEST MANAGEMENT PRACTICES:

    A. ALL EXPOSED SURFACES (E.G., PARKING AREAS, STAGING AREAS, SOIL PILES, GRADED AREAS AND UNPAVED ACCESS ROADS) SHALL BE WATERED TWO TIMES PER DAY.

    B. ALL HAUL TRUCKS TRANSPORTING SOIL, SAND OR OTHER LOOSE MATERIAL OFF-SITE SHALL BE COVERED.

    C. ALL VISIBLE MUD OR DIRT TRACK-OUT ONTO ADJACENT PUBLIC ROADS SHALL BE REMOVED USING WET POWER VACUUM STREET SWEEPERS AT LEAST ONCE PER DAY. THE USE OF DRY POWER SWEEPING IS PROHIBITED.

    D. ALL VEHICLE SPEEDS ON UNPAVED ROADS SHALL BE LIMITED TO 15 MPH.

    E. ALL ROADWAYS, DRIVEWAYS AND SIDEWALKS TO BE PAVED SHALL BE COMPLETED AS SOON AS POSSIBLE. BUILDING PADS SHALL BE LAID AS SOON AS POSSIBLE AFTER GRADING UNLESS SEEDING OR SOIL BINDERS ARE USED.

    F. IDLING TIMES SHALL BE MINIMIZED EITHER BY SHUTTING EQUIPMENT OFF WHEN NOT IN USE OR REDUCING THE MAXIMUM IDLING TIME TO FIVE MINUTES (AS REQUIRED BY THE CALIFORNIA AIRBORNE TOXICS CONTROL MEASURE TITLE 13, SECTION 2485, OF CALIFORNIA CODE OF REGULATIONS [CCR]). CLEAR SIGNAGE SHALL BE PROVIDED FOR CONSTRUCTION WORKERS AT ALL ACCESS POINTS.

    G. ALL CONSTRUCTION EQUIPMENT SHALL BE MAINTAINED AND PROPERLY TUNED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. ALL EQUIPMENT SHALL BE CHECKED BY A CERTIFIED MECHANIC AND DETERMINED TO BE RUNNING IN PROPER CONDITION PRIOR TO OPERATION.

    H. POST A PUBLICLY VISIBLE SIGN WITH THE TELEPHONE NUMBER AND PERSON TO CONTACT AT THE LEAD AGENCY REGARDING DUST COMPLAINTS. THIS PERSON SHALL RESPOND AND TAKE CORRECTIVE ACTION WITHIN 48 HOURS. THE AIR DISTRICT'S PHONE NUMBER SHALL ALSO BE VISIBLE TO ENSURE COMPLIANCE WITH APPLICABLE REGULATIONS.

V. RECORD DRAWINGS

1. KEEP ACCURATE RECORD DRAWINGS SHOW THE FINAL LOCATION, ELEVATION, AND DESCRIPTION OF WORK.

2. PROVIDE THE LOCATION AND ELEVATION OF THE EXISTING IMPROVEMENTS ENCOUNTERED. CERTIFY THE "RED-LINED" AS-BUILT PLANS FOR THE PROJECT ON A SET OF CONSTRUCTION PLAN REPRODUCIBLE, AND DELIVER THE DRAWINGS TO THE ENGINEER.

VII. STATEMENT OF RESPONSIBILITY

1. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD BOTH DESIGN PROFESSIONAL AND THE TOWN OF MORAGA HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF EITHER THE DESIGN PROFESSIONAL OR THE TOWN OF MORAGA, RESPECTIVELY.

VIII. UNAUTHORIZED CHANGES AND USES

1. THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

VIIII. DRAWING LANGUAGE

1. NOTES AND CALLOUTS ON DRAWINGS MAY USE IMPERATIVE LANGUAGE REQUIREMENTS EXPRESSED IMPERATIVELY ARE TO BE PERFORMED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.

NOISE

1. THE FOLLOWING NOISE REDUCTION MEASURES SHALL BE INCORPORATED INTO CONSTRUCTION PLANS AND CONTRACTOR SPECIFICATIONS TO REDUCE THE IMPACT OF TEMPORARY CONTRUCTION-RELATED NOISE ON NEARBY PROPERTIES:

    A. COMPLY WITH MANUFACTURER'S MUFFLER REQUIREMENTS ON ALL CONSTRUCTION EQUIPMENT ENGINES.

    B. TURN OFF CONSTRUCTION EQUIPMENT WHEN NOT IN USE, WHERE APPLICABLE.

    C. LOCATE STATIONARY EQUIPMENT AS FAR AS PRACTICAL FROM RECEIVING PROPERTIES.

    D. USE TEMPORARY SOUND BARRIERS OR SOUND CURTAINS AROUND LOUD STATIONARY EQUIPMENT IF THE OTHER NOISE REDUCTION METHODS ARE NOT EFFECTIVE OR POSSIBLE.

    E. SHROUD OR SHIELD IMPACT TOOLS AND USE ELECTRIC-POWERED RATHER THAN DIESEL-POWERED CONSTRUCTION EQUIPMENT.

WORK HOURS

1. NO WORK SHALL COMMENCE ON THE JOB SITE PRIOR TO 7:00 A.M. NOR CONTINUE LATER THAN 6:00 P.M., MONDAY THROUGH FRIDAY, NOR SHALL ANY WORK BE PERMITTED ON SATURDAY OR SUNDAY OR ANY HOLIDAY UNLESS PRIOR APPROVAL IS GRANTED BY THE CITY. AT THE DISCRETION OF THE CITY, THE GENERAL CONTRACTOR MAY BE REQUIRED TO ERECT A SIGN AT A PROMINENT LOCATION ON THE CONSTRUCTION SITE TO ADVISE SUBCONTRACTOR AND MATERIAL SUPPLIERS OF THE WORKING HOURS.

SITE RESTORATION

1. EXISTING LANDSCAPE WITHIN THE AREA OF WORK SHALL BE CAREFULLY REMOVED AND REPLACED WITH MINIMAL DAMAGE.

2. THE CONTRACTOR SHALL RETURN THE PRIVATE YARDS, SIDEWALKS, PLANTERS, IRRIGATION SYSTEMS, AND ANY OTHER FACILITIES, PUBLIC OR PRIVATE, DISTURBED BY THE WORK TO THE SAME OR BETTER CONDITION THAT EXISTED PRIOR TO COMMENCEMENT OF THE WORK. THE CONTRACTOR SHALL MAKE A REASONABLE EFFORT TO RESTORE EACH PRIVATE YARD DISTURBED BY THE WORK WITHIN ONE WEEK AFTER THE WORK IS COMPLETED ON THE SAME YARD EXCEPT WHERE THE CITY'S INSPECTOR AGREES THAT FOR CONSTRUCTION REASONS, THE 1 WEEK REQUIREMENT MAY BE EXTENDED.

DISTURBANCE COORDINATOR

1. THE CONTRACTOR SHALL DESIGNATE A "DISTURBANCE COORDINATOR" WHO WILL BE RESPONSIBLE FOR RESPONDING TO ANY LOCAL COMPLAINTS REGARDING CONSTRUCTION NOISE. THE COORDINATOR (WHO MAY BE AN EMPLOYEE OF THE GENERAL CONTRACTOR) WILL DETERMINE THE CAUSE OF THE COMPLAINT AND WILL REQUIRE THAT REASONABLE MEASURES WARRANTED TO CORRECT THE PROBLEM BE IMPLEMENTED. A TELEPHONE NUMBER OF THE NOISE DISTURBANCE COORDINATOR SHALL BE CONSPICUOUSLY POSTED AT THE CONSTRUCTION SITE FENCE AND ON THE NOTIFICATION SENT TO NEIGHBORS ADJACENT TO THE SITE.

NOTICE OF CONSTRUCTION

1. THE CONTRACTOR SHALL NOTIFY NEIGHBORS WITHIN 300' OF THE PROJECT SITE OF THE CONSTRUCTION SCHEDULE IN WRITING, PRIOR TO CONSTRUCTION. A COPY OF THE NOTICE AND THE MAILING LIST SHALL BE SUBMITTED PRIOR TO ISSUANCE OF BUILDING PERMITS.

DISCOVERY OF CONTAMINATED SOILS

1. IF CONTAMINATED SOILS ARE DISCOVERED, THE APPLICANT WILL ENSURE THE CONTRACTOR EMPLOYS ENGINEERING CONTROLS AND BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE HUMAN EXPOSURE TO POTENTIAL CONTAMINANTS. ENGINEERING CONTROLS AND CONSTRUCTION BMPS WILL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

    A. CONTRACTOR EMPLOYEES WORKING ON-SITE WILL BE CERTIFIED IN OSHA'S 40-HOUR HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (HAZWOPER) TRAINING.

    B. CONTRACTOR WILL STOCKPILE SOIL DURING CONSTRUCTION ACTIVITIES TO ALLOW FOR PROPER CHARACTERIZATION AND EVALUATION OF DISPOSAL OPTIONS.

    C. CONTRACTOR WILL MONITOR AREA AROUND CONSTRUCTION SITE FOR FUGITIVE VAPOR EMISSIONS WITH APPROPRIATE FIELD SCREENING INSTRUMENTATION.

    D. CONTRACTOR WILL WATER/MIST SOIL AS IT IS BEING EXCAVATED AND LOADED ONTO TRANSPORTATION TRUCKS.

    E. CONTRACTOR WILL PLACE ANY STOCKPILED SOIL IN AREAS SHIELDED FROM PREVAILING WINDS.

    F. CONTRACTOR WILL COVER THE BOTTOM OF EXCAVATED AREAS WITH SHEETING WHEN WORK IS NOT BEING PERFORMED.

DISCOVERY OF ARCHAEOLOGICAL RESOURCES

1. IF PREHISTORIC OR HISTORIC-PERIOD CULTURAL MATERIALS ARE UNEARTHED DURING GROUND-DISTURBING ACTIVITIES, IT IS RECOMMENDED THAT ALL WORK WITHIN 100' OF THE FIND BE HALTED UNTIL A QUALIFIED ARCHAEOLOGIST AND NATIVE AMERICAN REPRESENTATIVE CAN ASSESS THE SIGNIFICANCE OF THE FIND. PREHISTORIC MATERIALS MIGHT INCLUDE OBSIDIAN AND CHERT FLAKED-STONE TOOLS (E.G., PROJECTILE POINTS, KNIVES, SCRAPERS) OR TOOL-MAKING DEBRIS; CULTURALLY DARKENED SOIL ("MIDDEN") CONTAINING HEAT-AFFECTED ROCKS AND ARTIFACTS; STONE MILLING EQUIPMENT (E.G., MORTARS, PESTLES, HANDSTONES, OR MILLING SLABS); AND BATTERED-STONE TOOLS, SUCH AS HAMMERSTONES AND PITTED STONES. HISTORIC-PERIOD MATERIALS MIGHT INCLUDE STONE, CONCRETE, OR ADOBE FOOTINGS AND WALLS; FILLED WELLS OR PRIVIES; AND DEPOSITS OF METAL, GLASS, AND/ OR CERAMIC REFUSE. IF THE FIND IS DETERMINED TO BE POTENTIALLY SIGNIFICANT, THE ARCHAEOLOGIST, IN CONSULTATION WITH THE NATIVE AMERICAN REPRESENTATIVE, WILL DEVELOP A TREATMENT PLAN THAT COULD INCLUDE SITE AVOIDANCE, CAPPING, OR DATA RECOVERY.

DISCOVERY OF HUMAN REMAINS

1. IN THE EVENT OF THE DISCOVERY OF HUMAN REMAINS DURING CONSTRUCTION OR DEMOLITION, THERE SHALL BE NO FURTHER EXCAVATION OR DISTURBANCE OF THE SITE WITHIN A 50' RADIUS OF THE LOCATION OF SUCH DISCOVERY, OR ANY NEARBY AREA REASONABLY SUSPECTED TO OVERLIE ADJACENT REMAINS. THE CONTRA COSTA COUNTY CORONER SHALL BE NOTIFIED AND SHALL MAKE A DETERMINATION AS TO WHETHER THE REMAINS ARE NATIVE AMERICAN. IF THE CORONER DETERMINES THAT THE REMAINS ARE NOT SUBJECT TO HIS/HER AUTHORITY, HE/ SHE SHALL NOTIFY THE NATIVE AMERICAN HERITAGE COMMISSION, WHICH SHALL ATTEMPT TO IDENTIFY DESCENDANTS OF THE DECEASED NATIVE AMERICAN. IF NO SATISFACTORY AGREEMENT CAN BE REACHED AS TO THE DISPOSITION OF THE REMAINS PURSUANT TO THIS STATE LAW, THEN THE LANDOWNER SHALL REINTER THE HUMAN REMAINS AND ITEMS ASSOCIATED WITH NATIVE AMERICAN BURIALS ON THE PROPERTY IN A LOCATION NOT SUBJECT TO FURTHER SUBSURFACE DISTURBANCE. A FINAL REPORT SHALL BE SUBMITTED TO THE CITY'S COMMUNITY DEVELOPMENT DIRECTOR PRIOR TO RELEASE OF A CERTIFICATE OF OCCUPANCY. THIS REPORT SHALL CONTAIN A DESCRIPTION OF THE MITIGATION PROGRAMS AND ITS RESULTS, INCLUDING A DESCRIPTION OF THE MONITORING AND TESTING RESOURCES ANALYSIS METHODOLOGY AND CONCLUSIONS, AND A DESCRIPTION OF THE DISPOSITION/ CURATION OF THE RESOURCES. THE REPORT SHALL VERIFY COMPLETION OF THE MITIGATION PROGRAM TO THE SATISFACTION OF THE CITY'S COMMUNITY DEVELOPMENT DIRECTOR.

PRECONSTRUCTION NESTING BIRD SURVEY

1. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR THE RETENTION OF A QUALIFIED BIOLOGIST TO CONDUCT A PRECONSTRUCTION BIRD NESTING SURVEY TO ENSURE PROJECT COMPLIANCE WITH THE MIGRATORY BIRD TREATY ACT AND ENVIRONMENTAL PERMIT CONDITIONS. BIRD NESTING SURVEYS SHALL BE CONDUCTED WITHIN 14 DAYS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITY TO LOCATE ANY ACTIVE BIRD NESTS, INCLUDING PASSERINE NESTS WITHIN 250 FEET OF THE PROJECT SITE AND ANY ACTIVE RAPTOR NESTS WITHIN 500 FEET OF THE PROJECT SITE. IF ACTIVE BIRD NESTS ARE FOUND THE BIOLOGIST SHALL DETERMINE APPROPRIATE BUFFER ZONES TO PROTECT EACH NEST FROM CONSTRUCTION ACTIVITY. THE BIOLOGIST SHALL MONITOR EACH NEST AT REGULAR INTERVALS FOR THE DURATION OF WORK. THE BUFFER ZONE WILL REMAIN IN PLACE UNTIL THE BIOLOGIST DETERMINES THE NEST IS NO LONGER ACTIVE OR THE NESTING SEASON ENDS. IF CONSTRUCTION CEASES FOR TWO DAYS OR MORE AND THEN RESUMES DURING THE NESTING SEASON, AN ADDITIONAL SURVEY WILL BE NECESSARY TO AVOID IMPACTS ON ACTIVE BIRD NESTS THAT MAY BE PRESENT.

DISCOVERY OF PALENTOLOGICAL RESOURCES

1. IN THE EVENT THAT A FOSSIL IS DISCOVERED DURING CONSTRUCTION OF THE PROJECT, EXCAVATIONS WITHIN 50' OF THE FIND SHALL BE TEMPORARILY HALTED OR DELAYED UNTIL THE DISCOVERY IS EXAMINED BY A QUALIFIED PALEONTOLOGIST, IN ACCORDANCE WITH SOCIETY OF VERTEBRATE PALEONTOLOGY STANDARDS. THE CITY SHALL INCLUDE A STANDARD INADVERTENT DISCOVERY CLAUSE IN EVERY CONSTRUCTION CONTRACT TO INFORM CONTRACTORS OF THIS. REQUIREMENT. IF THE FIND IS DETERMINED TO BE SIGNIFICANT AND IF AVOIDANCE IS NOT FEASIBLE, THE PALEONTOLOGIST SHALL DESIGN AND CARRY OUT A DATA RECOVERY PLAN CONSISTENT WITH THE SOCIETY OF VERTEBRATE PALEONTOLOGY STANDARDS.

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APPV'D

REGISTERED PROFESSIONAL ENGINEER — DAINE B. JOHNSON — No. C 081408 — CIVIL — STATE OF CALIFORNIA — 65% FOR REVIEW ONLY

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED:
APPROVED: DJ

LAGUNA CREEK RESTORATION
GENERAL NOTES

CITY OF MORAGA CALIFORNIA

DATE: 09-15-21
SCALE: AS SHOWN
BKF JOB NO: 201226
SHEET NO: 2 OF 28
FILE NO: GN.01

65% CONSTRUCTION DOCUMENTS

KEY MAP

SCALE 1"=60'

HORIZONTAL CONTROL LEGEND:

PROPERTY LINE

MON FOUND MONUMENT

BASIS OF BEARINGS:

THE BEARINGS USED ON THIS SURVEY ARE BASED ON THE CONTRA COSTA COUNTY CONTROL PROJECT, GPS1659, NAD83, CALIFORNIA COORDINATE SYSTEM ZONE 3.

BENCHMARK:

CONTROL POINT DE8505 STAMPED NO.56 2000, CONTRA COSTA COUNTY CONTROL PROJECT, GPS1659, TAKEN AS 613.6 FEET, NAVD 88 DATUM.

N

0 60 120

GRAPHIC SCALE: 1"=60'

NO.	DESCRIPTION	BY	DATE	APPV'D
1				
2				
3				
4				

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. 61408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

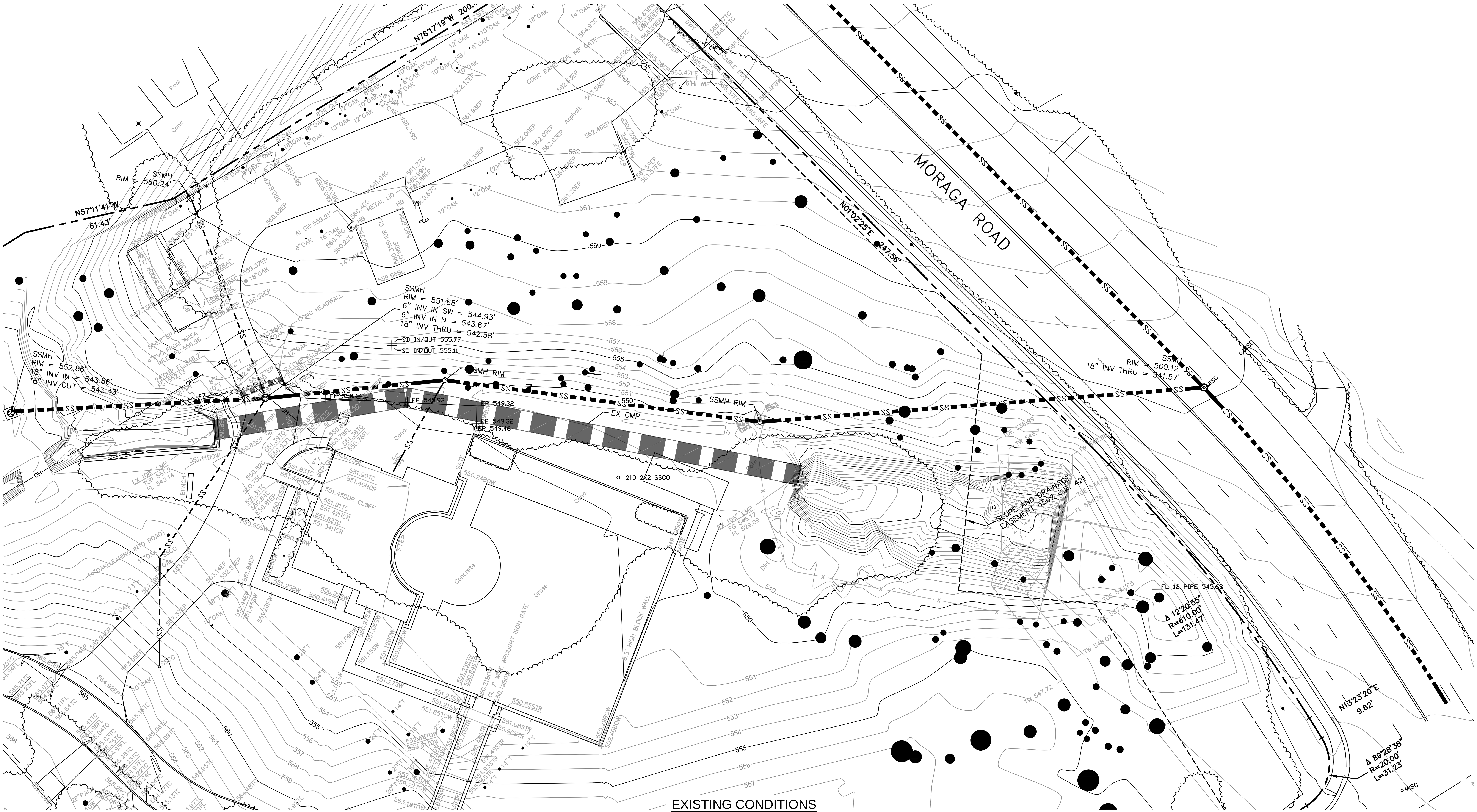
DESIGNED: BKF WC
DRAWN: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
KEY MAP AND HORIZONTAL CONTROL

CITY OF MORAGA
CALIFORNIA

DATE 09-15-21
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 3 OF 28
FILE NO. KM-01

65% CONSTRUCTION DOCUMENTS



EXISTING CONDITIONS

SCALE 1"=20'

LEGEND:

- CENTER LINE
- SUBJECT PROPERTY LINE
- EASEMENT LINE
- FENCE LINE
- OVERHEAD LINE
- SANITARY SEWER LINE
- EXISTING TREE (SIZE VARIES)
- ELECTROLIER
- GUY WIRE
- SANITARY SEWER MANHOLE
- POWER OR JOINT POLE
- SIGN
- STORM DRAIN MANHOLE
- STREET LIGHT
- VALVE

LEGEND:

AB	ASPHALT BERM	EP	EDGE OF PAVEMENT	HI	HIGH	SW OR S/W	SIDEWALK
AC	ASPHALT CONCRETE	EUC	EUCALYPTUS TREE	JP	JOINT POLE	T	TREE
AD	AREA DRAIN	FE	FENCE	MH	MANHOLE	TC	TOP OF CURB
AI	AREA INLET	EX	EXISTING	O.R.	OFFICIAL RECORDS	TYP	TYPICAL
BL OR BLDG	BUILDING	FL	FLOWLINE	RIM:	RIM ELEVATION	TOW	TOP OF WALL
BOW	BOTTOM OF WALL	FOD	FULL OF DEBRIS	RUDR	ROLL-UP DOOR	UB	UTILITY BOX
BW	BACK OF WALK	G OR GND	GROUND	SD	STORM DRAIN	UTIL	UTILITY
CLF	CHAIN LINK FENCE	GA	GATE	SDCO	STORM DRAIN CLEANOUT	WDF	WOOD FENCE
COL	COLUMN	GP	GUARD POST	SDMH	STORM DRAIN MANHOLE	WIF	WROUGHT IRON FENCE
C OR CONC	CONCRETE	GR:	GRATE ELEVATION	SS	SANITARY SEWER	WM	WATER METER
DI	DROP INLET	HB	HOSE BIB	SSCO	SANITARY SEWER CLEANOUT	WV	WATER VALVE
DR	DOOR	HCR	HANDICAP RAMP	SSMH	SANITARY SEWER MANHOLE		
EB	ELECTRIC BOX						

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPV'D
4				
3				
2				
1				

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. C 061408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW ONLY

1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

BKF

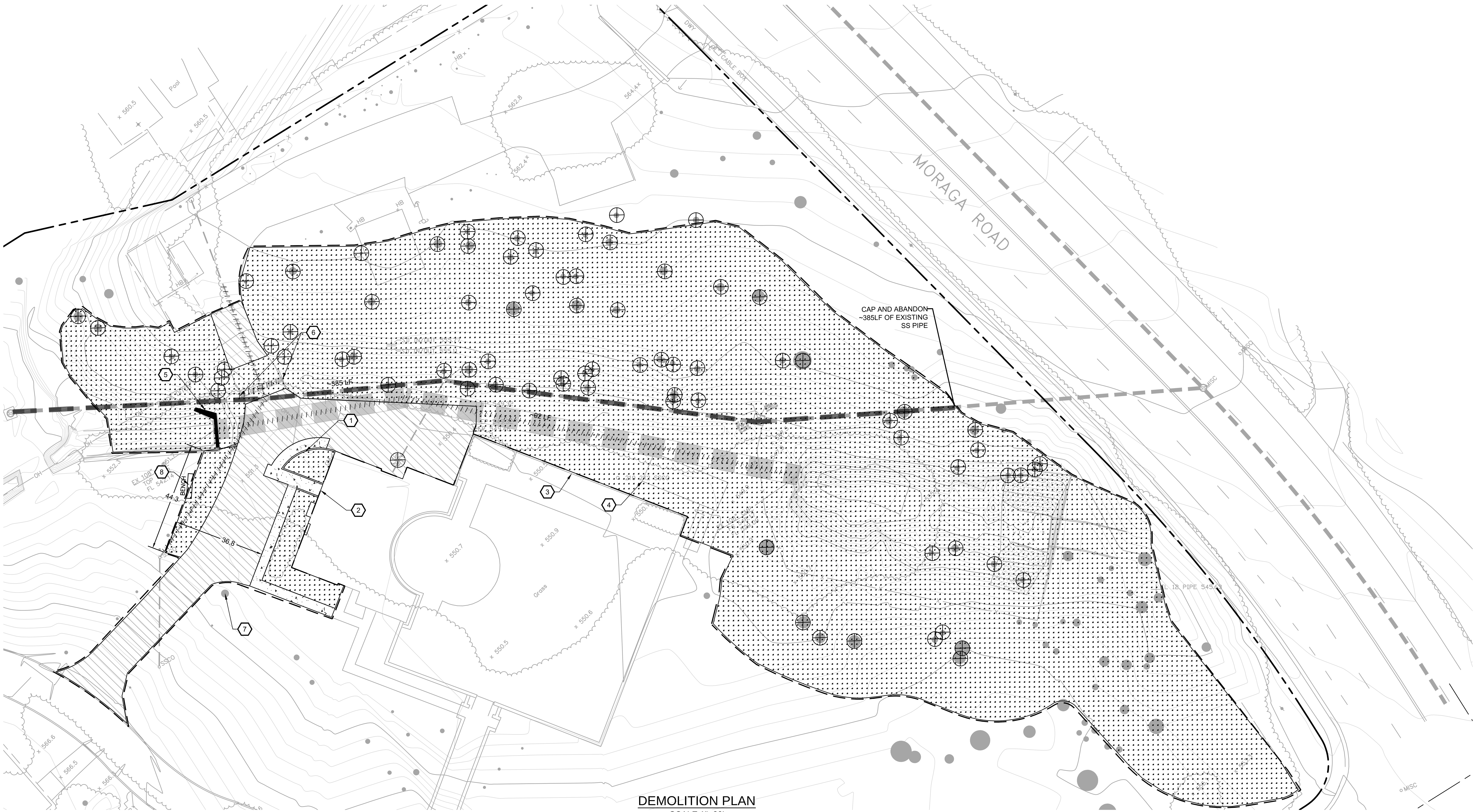
DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
EXISTING CONDITIONS

CITY OF MORAGA
CALIFORNIA

DATE 09-15-21
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 4 OF 28
FILE NO. EX-01

65% CONSTRUCTION DOCUMENTS



DEMOLITION PLAN

SCALE 1"=20'

LEGEND:

- PROPERTY LINE
- EASEMENT
- REMOVE TREE
- REMOVE EXISTING PIPE
- ABANDON EXISTING PIPE
- LIMIT OF WORK
- REMOVE AC
- CLEAR AND GRUB
- REMOVE CONCRETE

KEY NOTES:

1. REMOVE CURB
2. REMOVE RAMP
3. PROTECT EXISTING WALL
4. STORAGE SHED TO BE RELOCATED
5. REMOVE EXISTING WING WALL SEGMENT
6. REMOVE EXISTING HEADWALLS
7. PROTECT EXISTING TREE
8. SALVAGE BENCH SEE IM-01 FOR RELOCATION
9. SALVAGE BENCH SEE IM-01 FOR RELOCATION

NOTES:

1. SEE SHEET EX-01 FOR EXISTING CONDITIONS LEGEND.

0 20 40
GRAPHIC SCALE: 1"=20'

REVISIONS				
NO.	DESCRIPTION	BY	DATE	APPV'D
1				
2				
3				
4				

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. C 61408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW

1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

BKF

DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

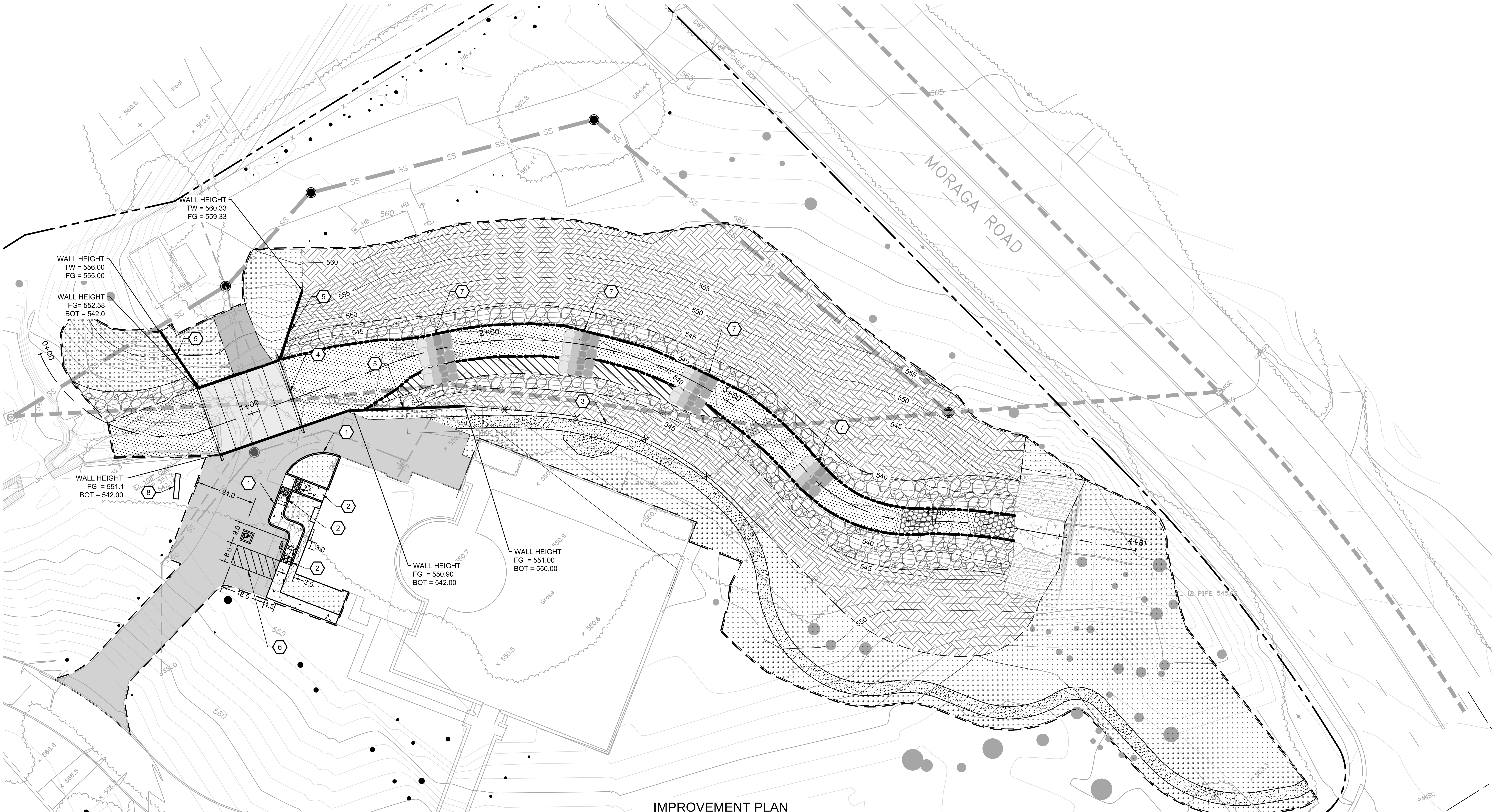
LAGUNA CREEK RESTORATION
DEMOLITION PLAN

CITY OF MORAGA
CALIFORNIA

DATE: 09-15-21
SCALE: AS SHOWN
BKF JOB NO. 201226
SHEET NO. 5 OF 28
FILE NO. DE-01

65% CONSTRUCTION DOCUMENTS

© BKF Engineers



IMPROVEMENT PLAN

SCALE 1"=20'

LEGEND:

- PROPERTY LINE
- EASEMENT
- TOE OF BANK
- LANDSCAPE/ROCK LIMIT
- LIMIT OF WORK
- AC PAVEMENT — SEE DETAIL 10, CD-02
- DECOMPOSED GRANITE TRAIL
- LANDSCAPE AREA — SEE LANDSCAPE PLANS
- LANDSCAPE RESTORATION AREA WITH REINFORCED FABRIC — SEE LANDSCAPE PLANS & SPECS
- CONCRETE SIDEWALK — SEE DETAIL 9, SHEET CD-02
- ROCK/BOULDERS - BANK STABILIZATION — SEE SHEET CD-01
- 12" MIN ENGINEERED STREAMBED MATERIAL (ESM) — SEE SHEET CD-01
- ROCK/BOULDERS - PLUNGE POOLS — SEE SHEET CD-01
- FLOODPLANE/POINTBAR AREA- SOIL GRAVEL MIX W/ BURIED ROCK — SEE DETAIL 2 SHEET CD-01
- DETECTABLE WARNING SURFACE — SEE DETAIL 6 SHEET CD-02

NOTES:

1. SEE SHEET EX-01 FOR EXISTING CONDITIONS LEGEND.

KEY NOTES:

1. STANDARD CURB — SEE DETAIL 6, CD-02
2. CURB RAMP — SEE DETAIL 7, CD-02
3. GUARD RAILING — SEE LANDSCAPE PLANS SHEET LI-04
4. CONSPAN BRIDGE — SEE BRIDE PLAN SHEETS 17-27
5. BRIDGE WINGWALL, TYP — SEE BRIDE PLAN SHEETS 17-27
6. VAN ACCESSIBLE STALL — SEE DETAIL 1, CD-02
7. DROP STRUCTURE — SEE SHEET CD-01
8. RELOCATE BENCH — SEE DE-01 FOR ORIGINAL LOCATION

0 20 40
GRAPHIC SCALE: 1"=20'

NO.	DESCRIPTION	DATE	BY	APPV'D
	REVISIONS			

REGISTERED PROFESSIONAL ENGINEER — DANE B. JOHNSON — No. C81408 — CIVIL — STATE OF CALIFORNIA — 65% FOR REVIEW

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

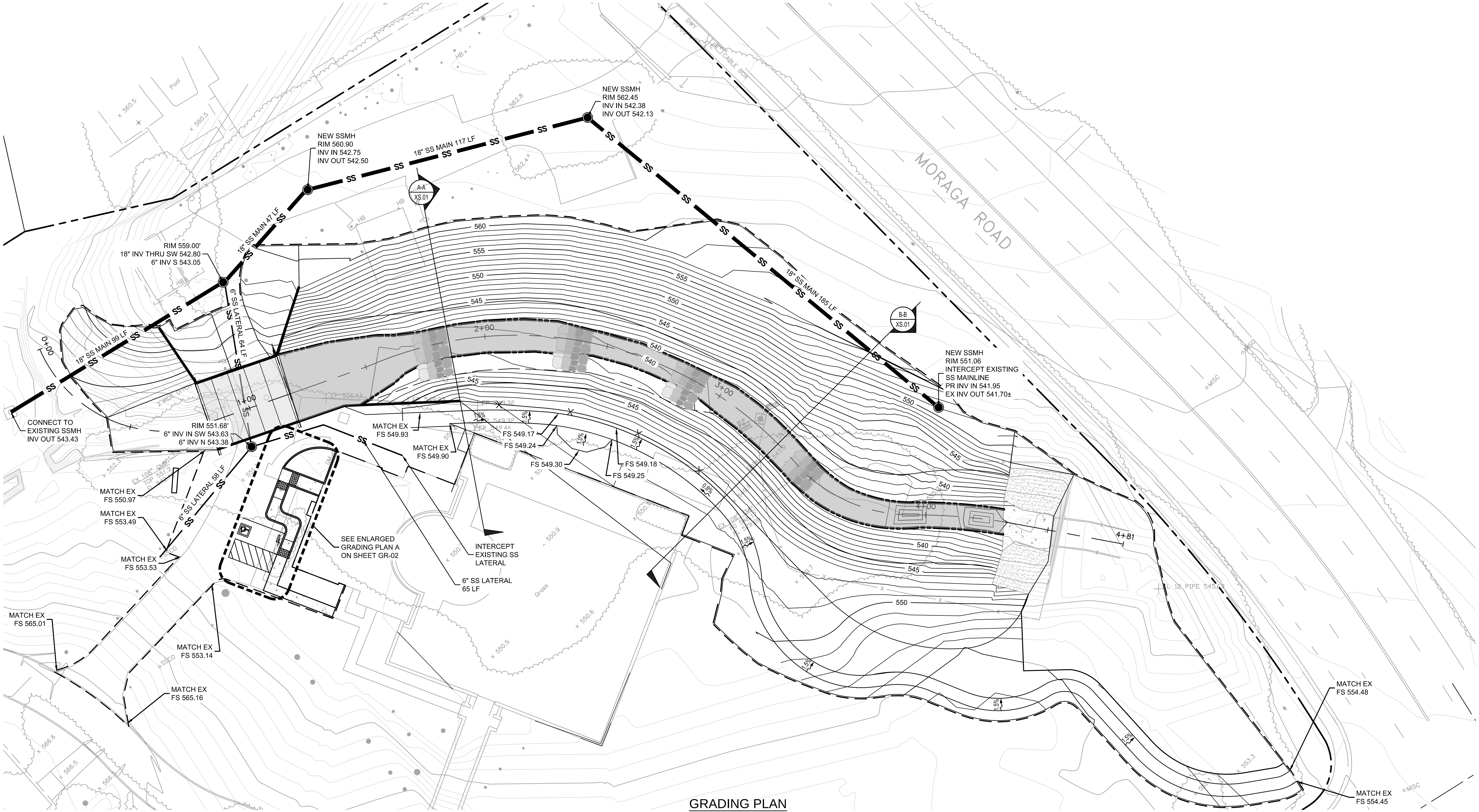
DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
IMPROVEMENT PLAN

CITY OF MORAGA CALIFORNIA

DATE: 09-15-21
SCALE: AS SHOWN
BKF JOB NO. 201226
SHEET NO. 6 OF 28
FILE NO. IM-01

65% CONSTRUCTION DOCUMENTS



GRADING PLAN

SCALE 1"=20'

LEGEND:

PROPERTY LINE	
EASEMENT	
TOE OF BANK	
FLOOD BENCH	
SS	18" SANITARY SEWER MAINLINE
SS	6" SANITARY SEWER LATERAL
●	SANITARY SEWER MANHOLE
▨	CHANNEL BOTTOM

NOTES:

1. SEE SHEET EX-01 FOR EXISTING CONDITIONS LEGEND.

0 20 40
GRAPHIC SCALE: 1"=20'

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPV'D
1				
2				
3				
4				

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. C 061408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW ONLY

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

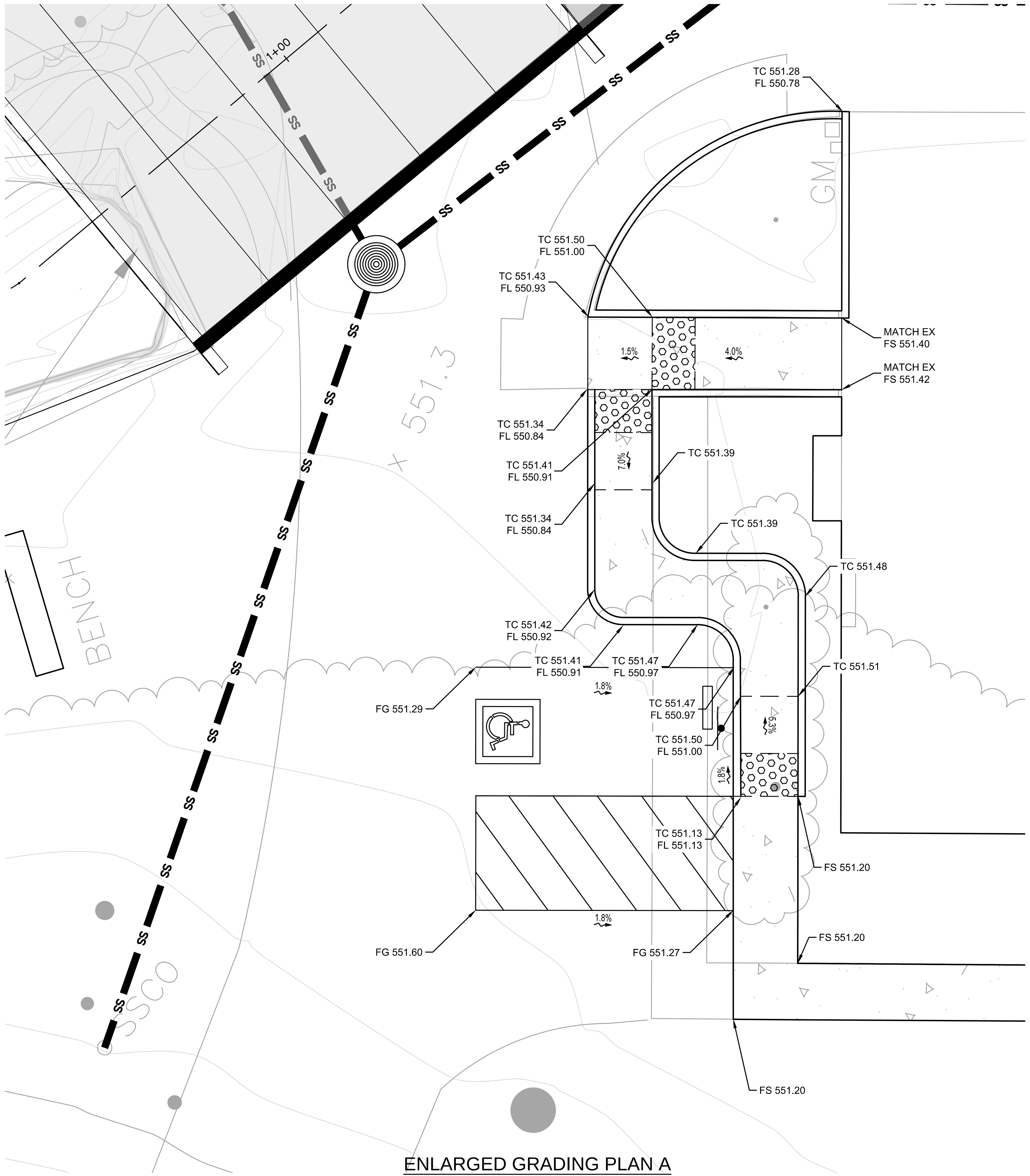
DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
GRADING AND UTILITY PLAN

CITY OF MORAGA CALIFORNIA

DATE 09-15-21
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 7 OF 28
FILE NO. GR-01

65% CONSTRUCTION DOCUMENTS



ENLARGED GRADING PLAN A

SCALE 1"=5'

LEGEND:

— — — —	PROPERTY LINE
- - - - - - -	EASEMENT
▬▬▬▬	TOE OF BANK
— — — —	FLOOD BENCH
▬ SS ▬	18" SANITARY SEWER MAINLINE
— SS —	6" SANITARY SEWER LATERAL
●	SANITARY SEWER MANHOLE
▨	CHANNEL BOTTOM

NOTES:

1. SEE SHEET EX-01 FOR EXISTING CONDITIONS LEGEND.

0 5 10

GRAPHIC SCALE: 1"=5'

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPV'D
1				
2				
3				
4				

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. C 061408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW ONLY

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

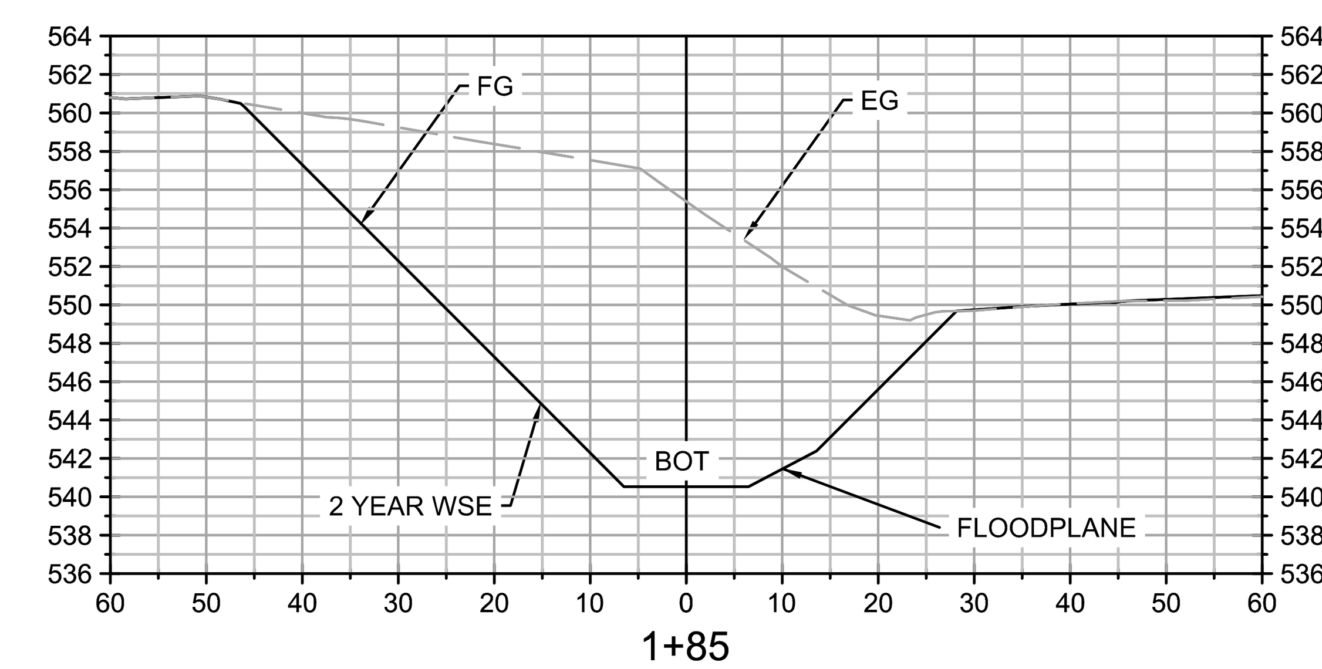
DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION ENLARGED GRADING PLAN

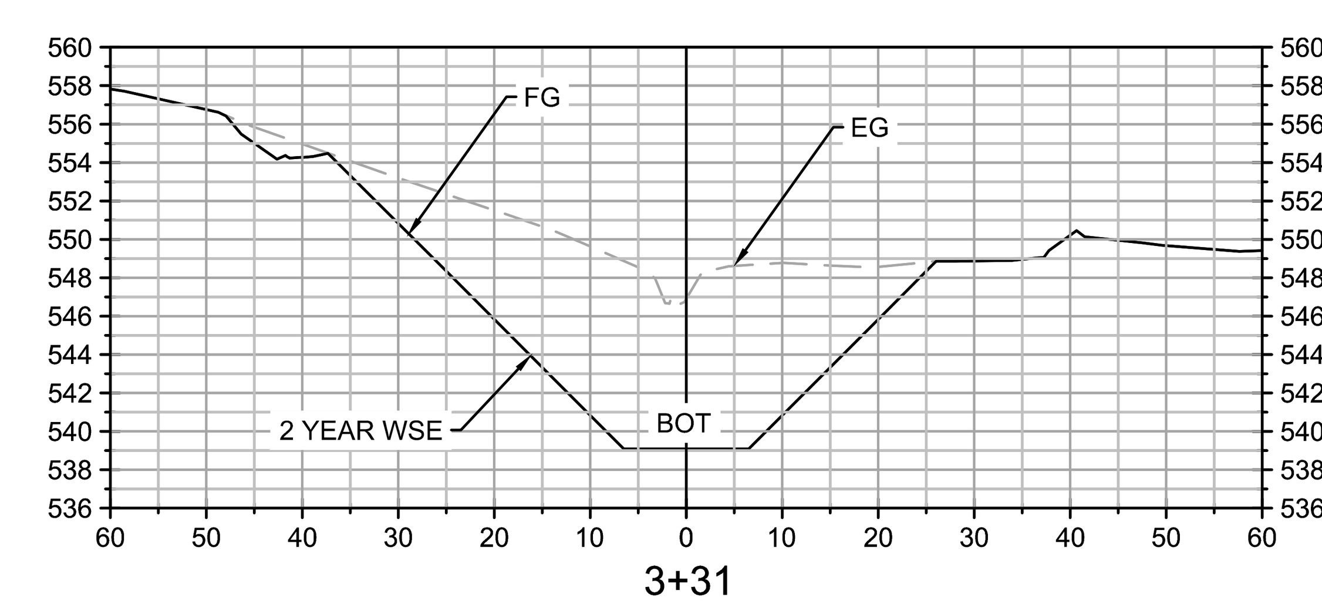
CITY OF MORAGA CALIFORNIA

DATE 09-15-21
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 8 OF 28
FILE NO. GR-02

65% CONSTRUCTION DOCUMENTS



CROSS SECTION STA 1+85 A-A GR-01



CROSS SECTION STA 3+31 B-B GR-01

NO.	DESCRIPTION	BY	DATE	APPV'D
	REVISIONS			

FOR 65% REVIEW

REGISTERED PROFESSIONAL ENGINEER DAINE B. JOHNSON No. C 61408 CIVIL STATE OF CALIFORNIA

1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

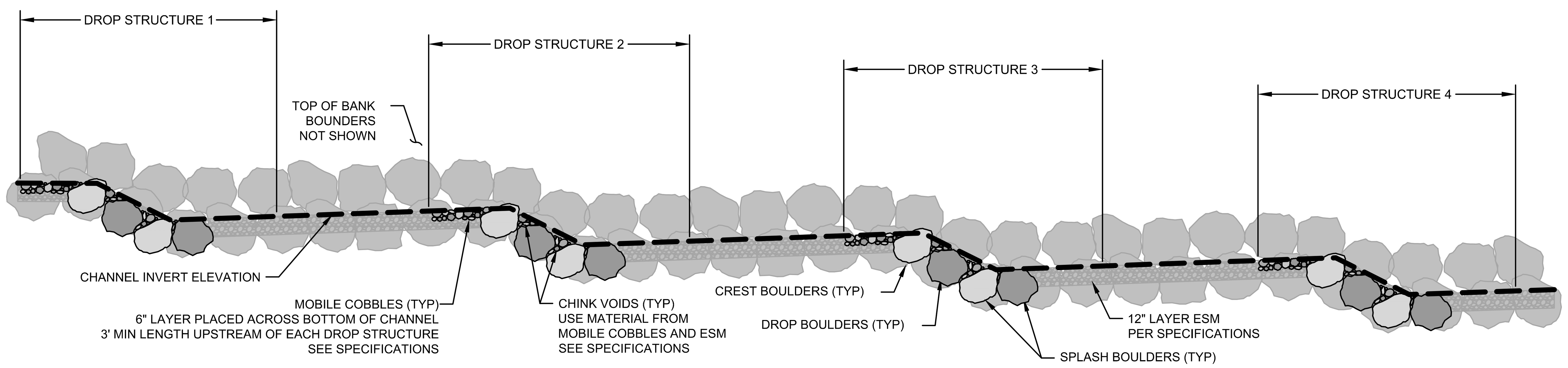
DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
CROSS SECTIONS

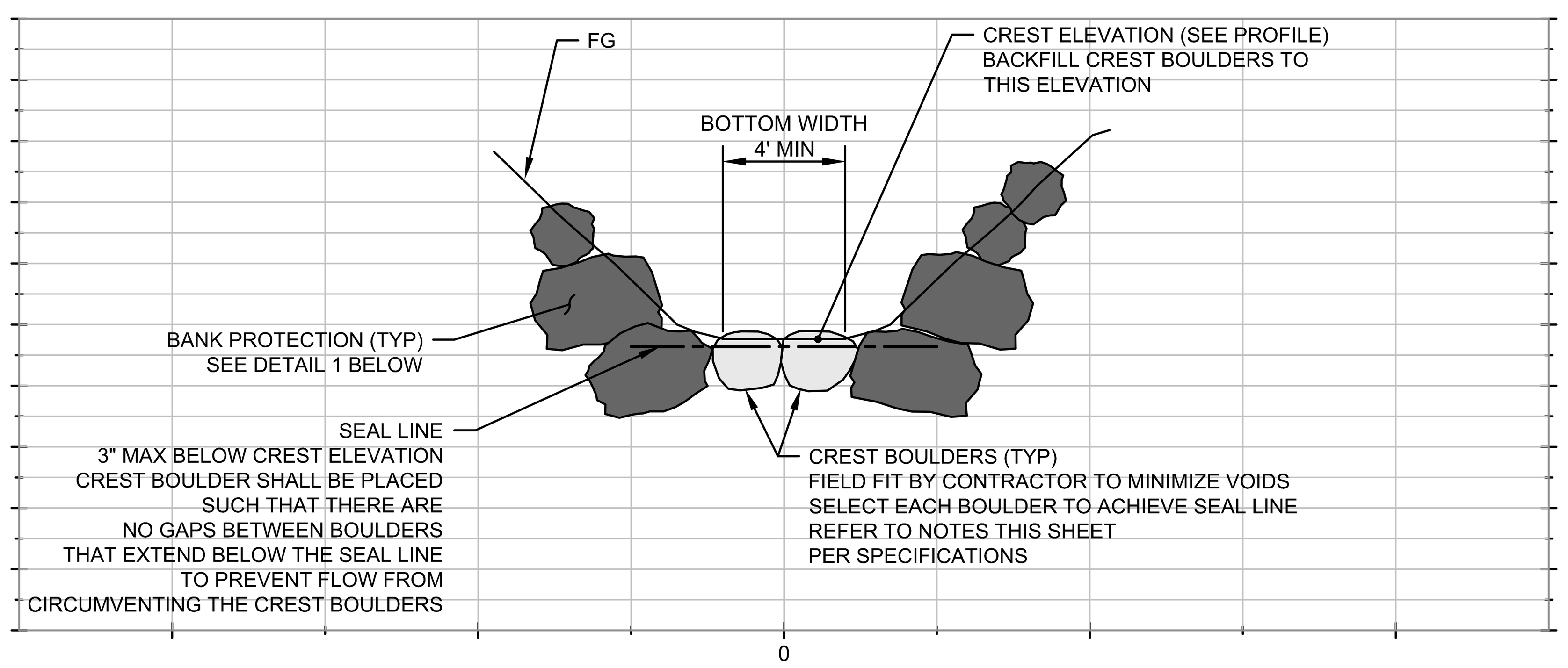
CITY OF MORAGA
CALIFORNIA

DATE: 09-15-21
SCALE: AS SHOWN
BKF JOB NO. 201226
SHEET NO. 9 OF 28
FILE NO. XS-01

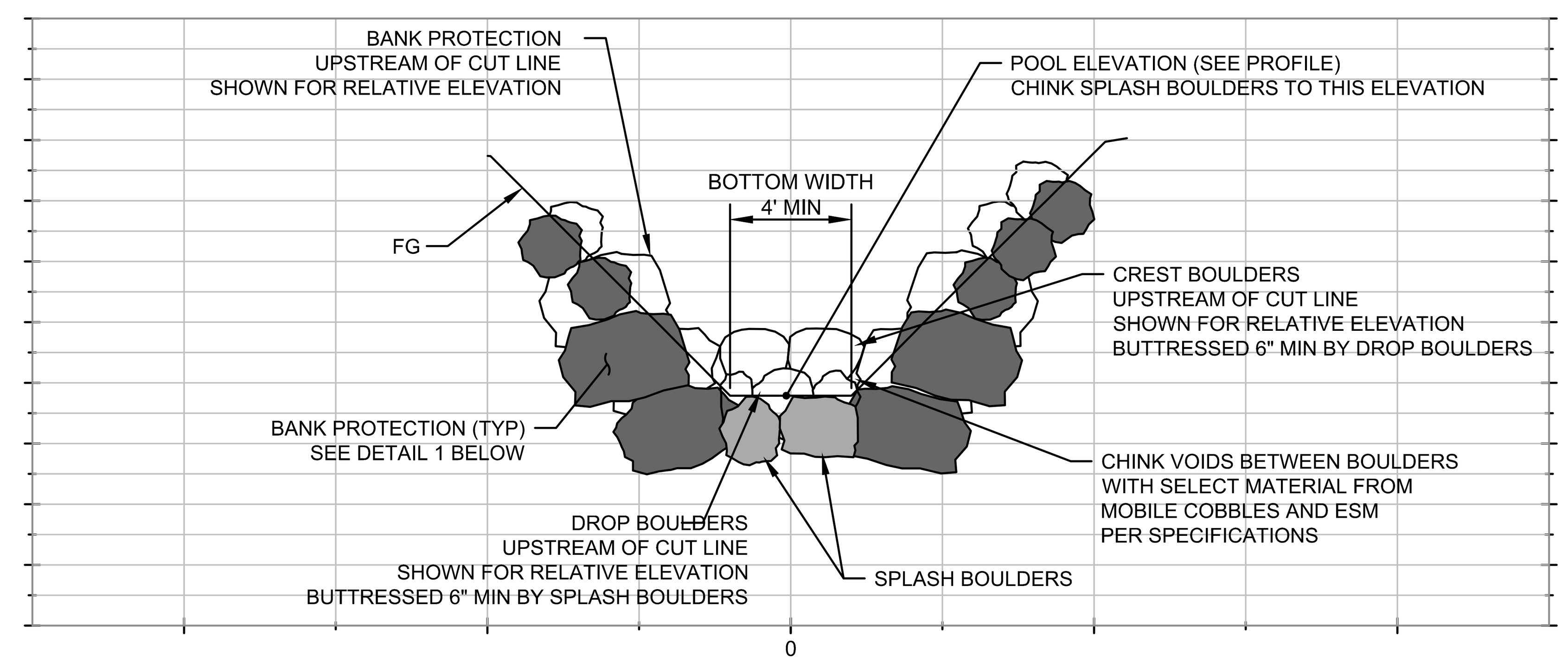
65% CONSTRUCTION DOCUMENTS



CREEK PROFILE SECTION



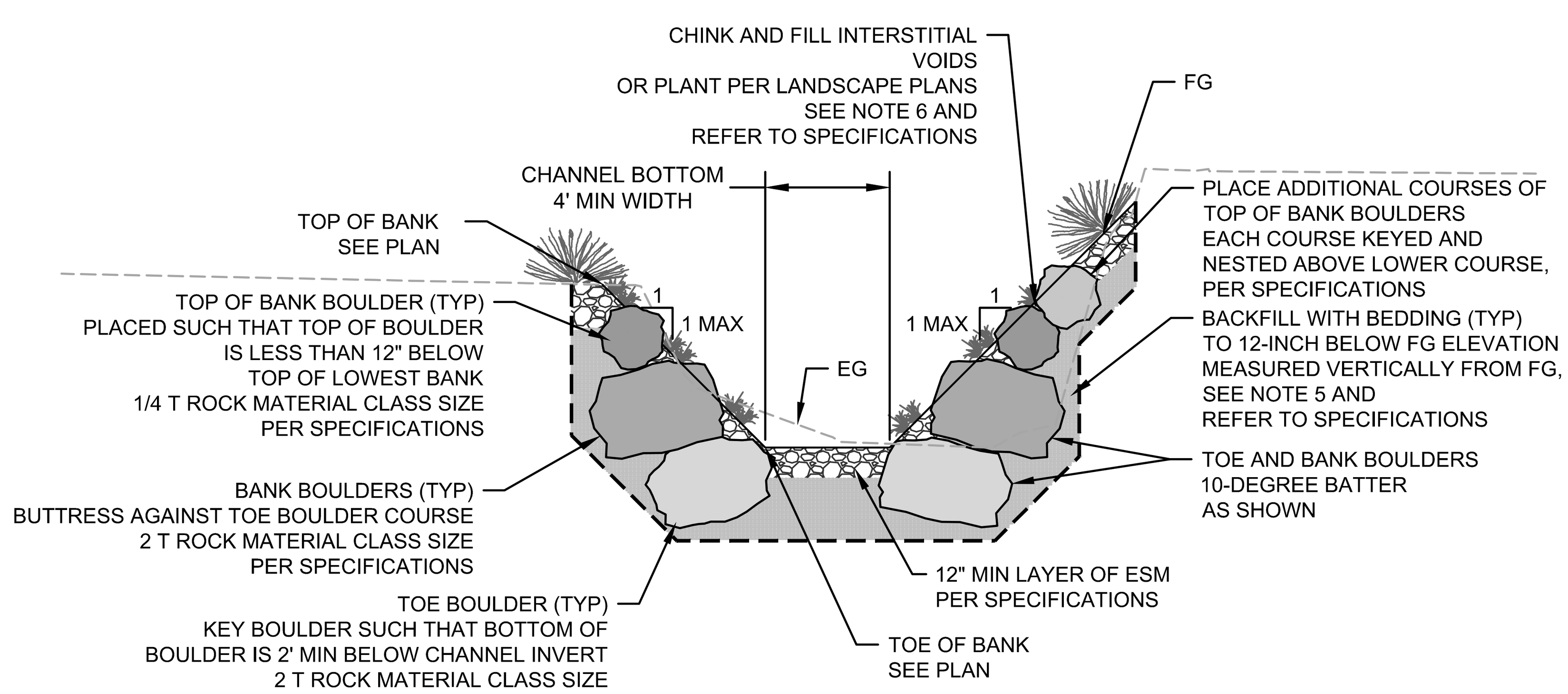
CREST BOULDER TYPICAL SECTION



SPLASH BOULDER TYPICAL SECTION

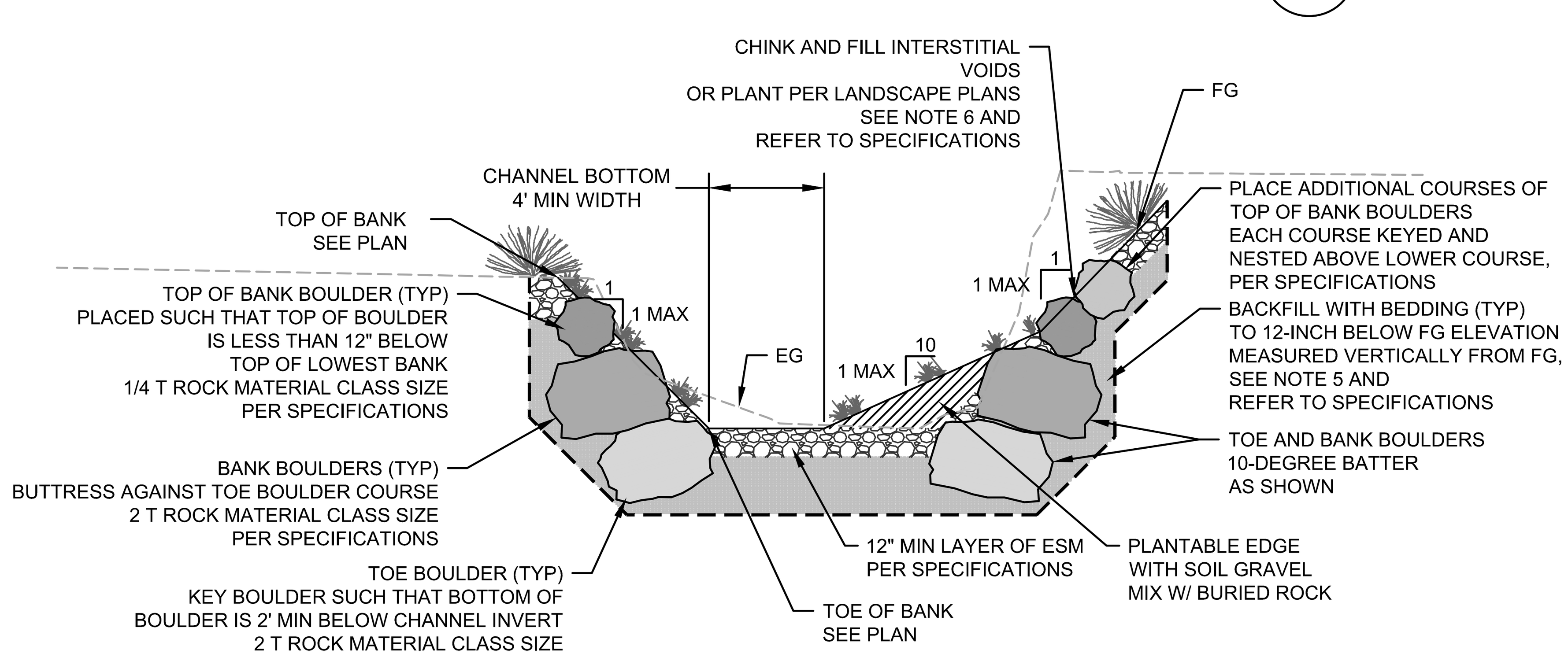
NOTES

1. CONSTRUCTION OF DROP STRUCTURES REQUIRES A SKILLED EQUIPMENT OPERATOR AND AN ATTENTION TO DETAIL.
2. ELEVATION OF PLACED BOULDERS SHOULD BE REGULARLY CHECKED, AND BOULDER POSITION SHOULD BE ADJUSTED TO ACHIEVE THE DESIGN ELEVATION.
3. THE LEAST DIMENSION OF AN INDIVIDUAL BOULDER SHOULD NOT BE LESS THAN ONE-THIRD THE GREATEST DIMENSION.
4. BOULDERS USED IN DROP STRUCTURES SHALL BE FRESH, UNIFORMLY SOUND, DURABLE AND FREE FROM CRACKS, SEAMS, AND OTHER DEFECTS THAT INCREASES ITS DETERIORATION.
5. ALL BOULDERS USED IN STRUCTURES IN THE CHANNEL SHOULD BE INDIVIDUALLY PLACED BY HAND AND/OR MACHINE AND SECURED IN DESIRED POSITION BY MACHINE TAMPING OF BOULDER AND SURROUNDING SUPPORT MATERIAL.
6. BOULDERS FORMING THE DROP STRUCTURES SHOULD BE INDIVIDUALLY SELECTED BASED ON BEST FIT, AND PLACED TIGHTLY TOGETHER TO MINIMIZE GAPS, PREVENT OVERLAPPING SEAMS BETWEEN COURSES. EACH BOULDER SHOULD HAVE A MINIMUM OF THREE CONTACT POINTS WITH ADJACENT BOULDERS.
7. BACKFILL BOULDERS USED IN DROP STRUCTURES AFTER PLACEMENT TO 12-INCH BELOW CHANNEL INVERT ELEVATION MEASURED VERTICALLY FROM THE CHANNEL INVERT ELEVATION, AND PER THE SPECIFICATIONS.
9. SPLASH BOULDERS SHALL BE PLACED SUCH THAT TOP OF BOULDER IS FLUSH WITH POOL ELEVATION SHOWN IN PROFILE. CHINK SPLASH BOULDERS TO CHANNEL INVERT ELEVATION PER SPECIFICATIONS.
10. DROP BOULDERS SHALL BE FIRMLY BUTTRESSED 6" MIN BY SPLASH BOULDERS. CHINK DROP BOULDERS TO CHANNEL INVERT ELEVATION PER SPECIFICATIONS.
11. CREST BOULDERS SHALL BE PLACED SUCH THAT TOP OF BOULDER IS 3" ABOVE THE CREST ELEVATION, AND SEAL LINE IS LESS THAN 3" BELOW THE CREST ELEVATION. CREST BOULDERS SHALL FIRMLY TOUCH ADJACENT TOE PROTECTION BOULDERS AND SHALL BE FIRMLY BUTTRESSED 6" MIN BY DROP BOULDERS. CHINK CREST BOULDERS TO CREST ELEVATION PER SPECIFICATIONS
12. MOBILE COBBLES SHALL BE PLACED IN A 6-INCH LAYER UPSTREAM OF THE CREST BOULDERS AND UNDERLAIN WITH A 6-INCH LAYER OF ESM, PER THE SPECIFICATIONS.
13. FILL ALL VOIDS BETWEEN BOULDERS USED IN DROP STRUCTURES WITH SELECT ROCKS FROM THE MOBILE COBBLES MATERIAL. FILL REMAINING VOIDS WITH SMALLER MATERIAL FROM THE ESM TO MINIMIZE PERMEABILITY. REFER TO SPECIFICATIONS.
14. AFTER COMPLETION OF EACH DROP STRUCTURE FILL MATERIAL SHOULD BE TAMPED FURTHER INTO PLACED AND MATERIAL SPREAD INTO ANY VOIDS THAT APPEAR. REPEAT THIS PROCESS UNTIL ALL VOIDS ARE FILLED.
15. REFER TO GRADING AND PROFILE SHEETS FOR PROPOSED ALIGNMENT AND ELEVATIONS.



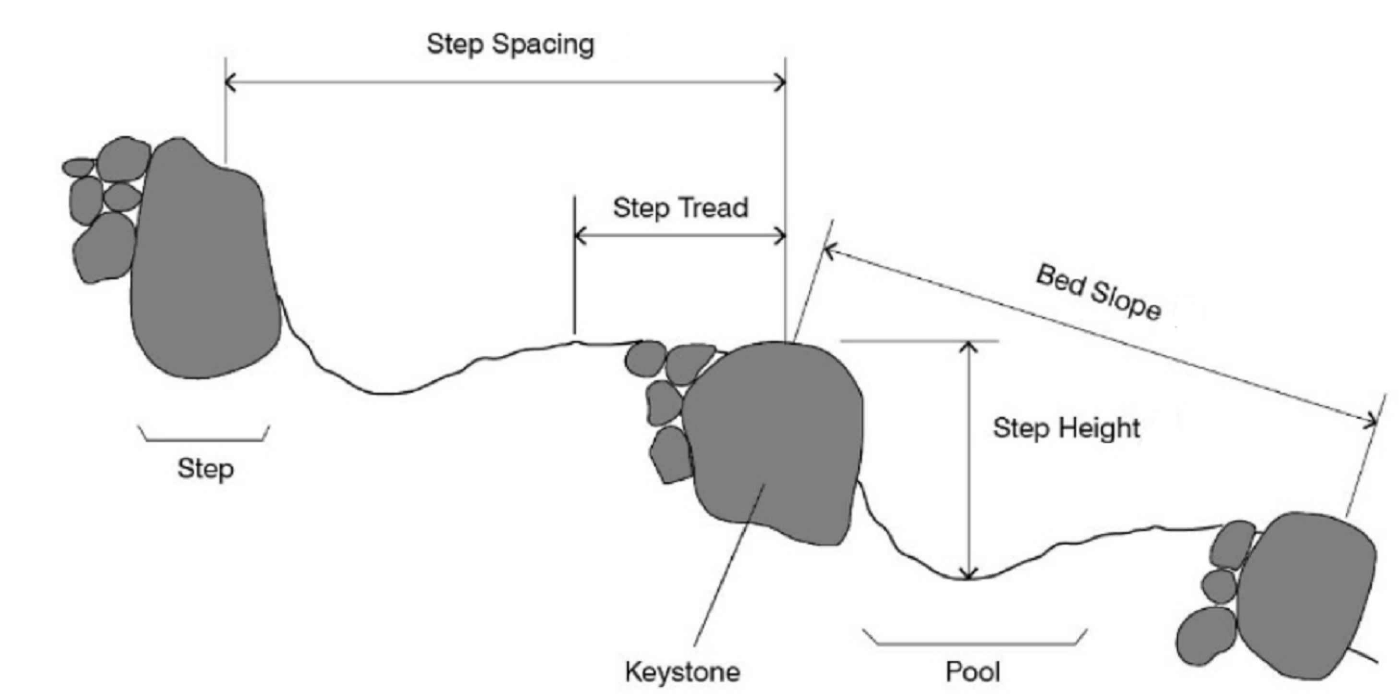
VEGETATED BOULDER BANK PROTECTION

1
-



VEGETATED BOULDER BANK PROTECTION AT FLOOD PLANE

2
-



DETAIL 1: PLUNGE POOL PROFILE

IMAGE 1 - CREEK BED ROCK PROTECTION

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPV'D
4				
3				
2				
1				

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. C 061408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW ONLY

1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION CONSTRUCTION DETAILS

CITY OF MORAGA CALIFORNIA

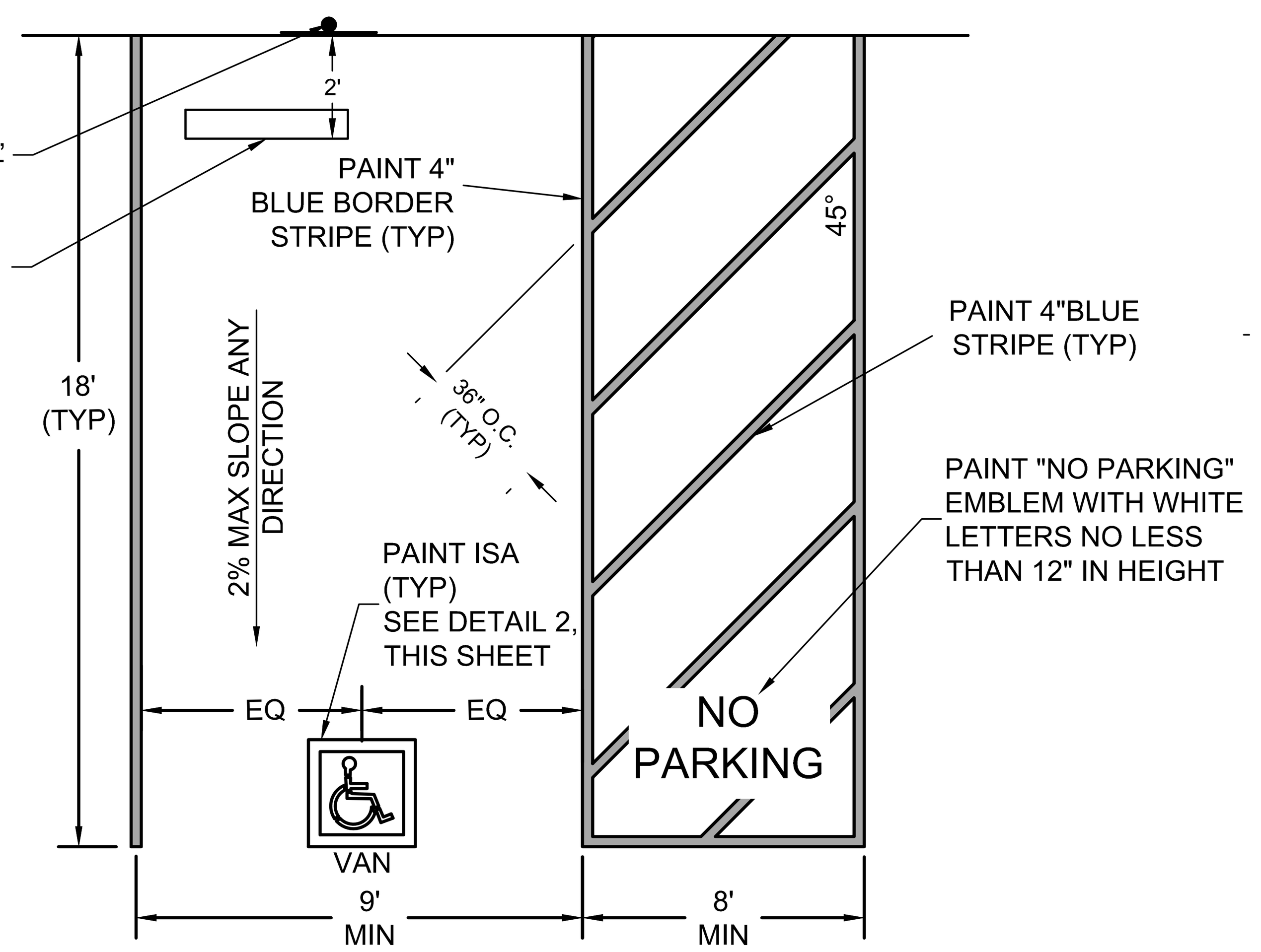
DATE	SCALE
09-15-21	AS SHOWN

BKF JOB NO. 201226

SHEET NO. 10 OF 28

FILE NO. CD-01

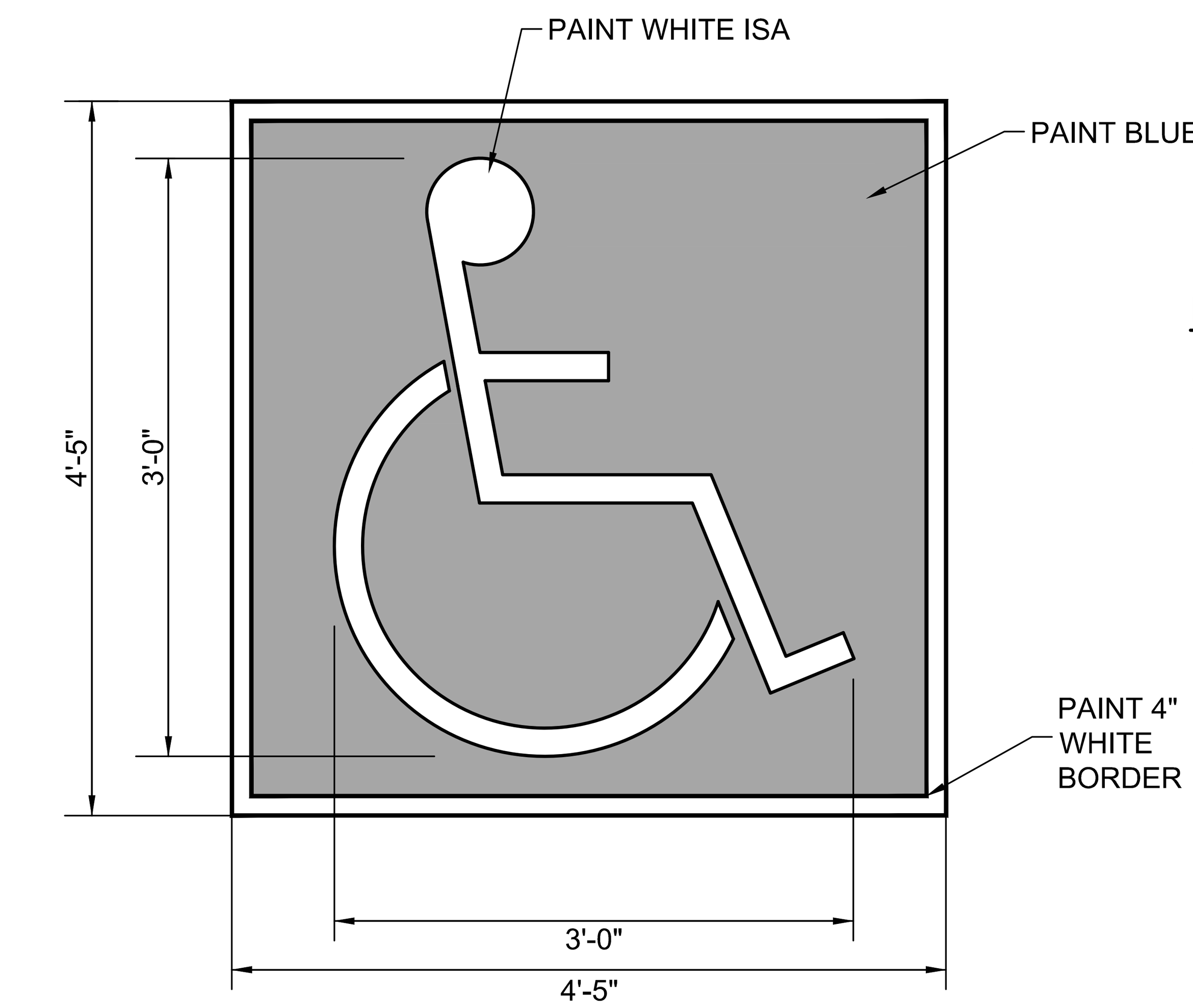
65% CONSTRUCTION DOCUMENTS



NOTES:

1. SURFACE OF THE PARKING SPACE(S) AND ACCESS AISLE(S) DOES NOT EXCEED 1:50 (2.0%) IN ANY DIRECTION
2. CURB RAMP REQUIRED WHEN WALK IS AT DIFFERENT LEVEL THAN PARKING ELEVATION. SEE HORIZONTAL LAYOUT PLAN FOR PROPOSE CURB RAMP LOCATIONS.
3. DETECTABLE WARNINGS AND OTHER CHANGES IN LEVEL NOT PERMITTED WITHIN ACCESS AISLE.

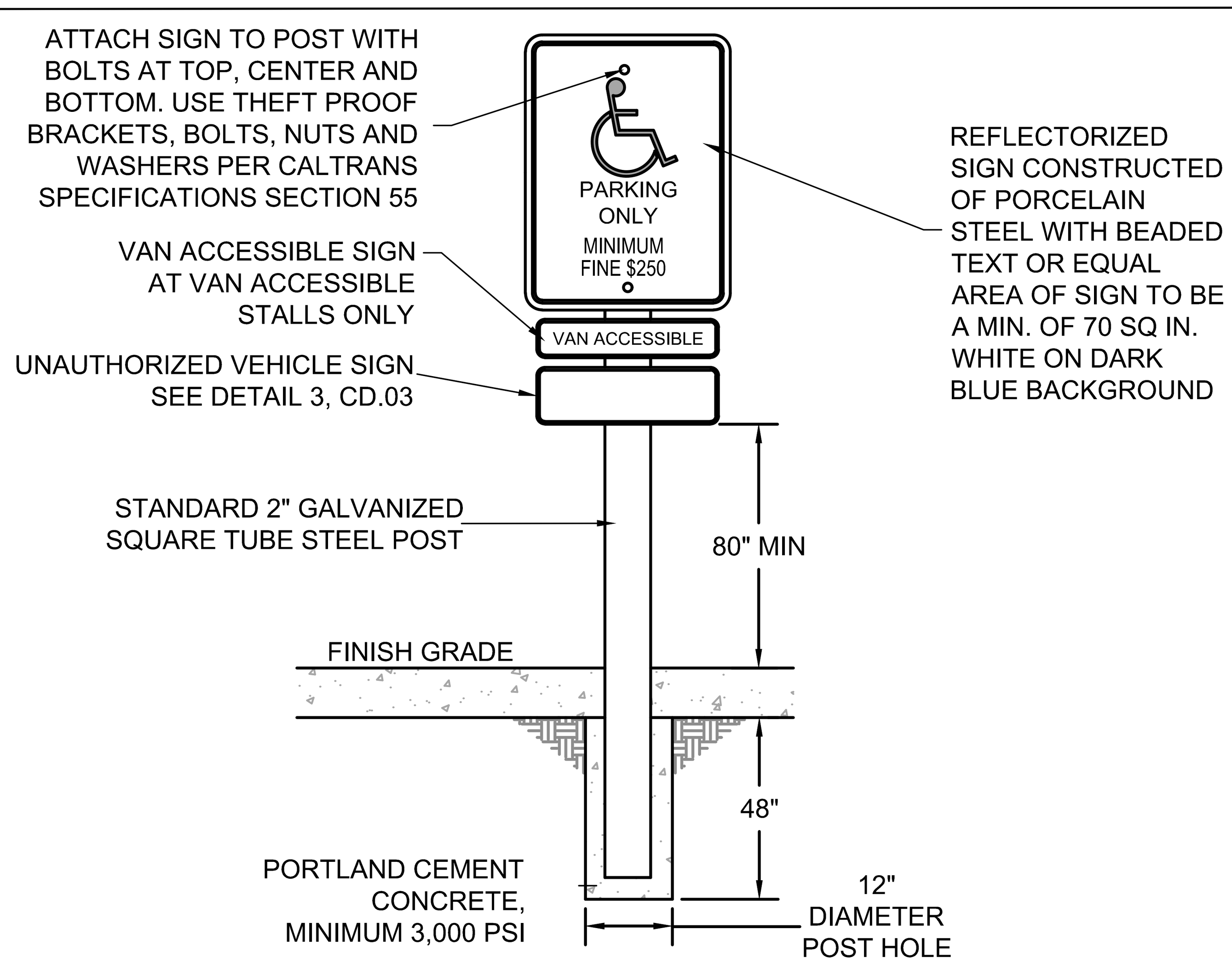
VAN ACCESSIBLE PARKING STALL AND UNLOADING ZONE
NOT TO SCALE
1



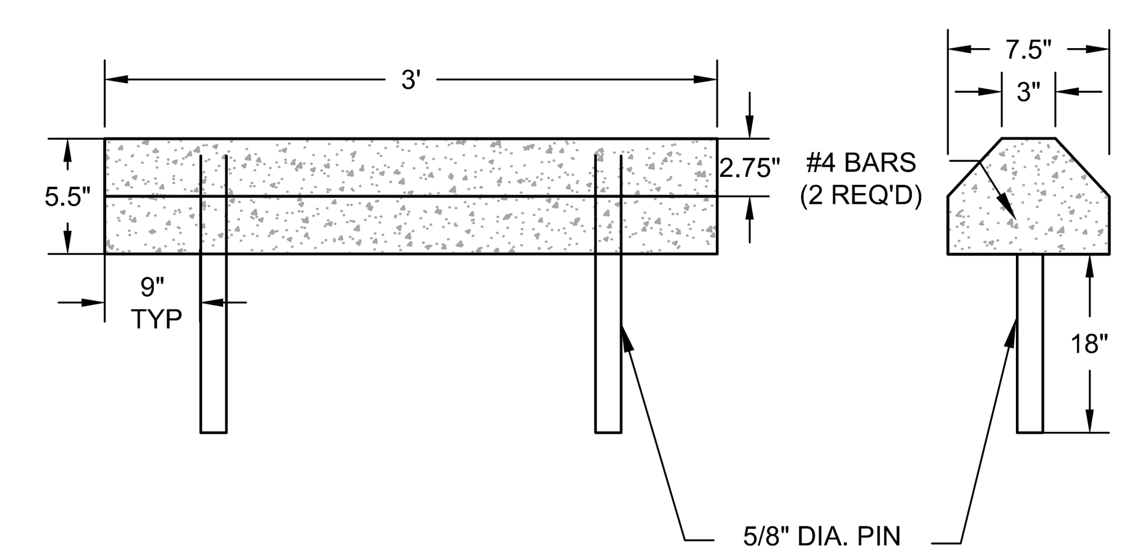
NOTE:

1. PER CALTRANS STANDARD PLAN A24C.
2. ALIGN SYMBOL AND BACKGROUND WITH BACK OF PARKING SPACE.

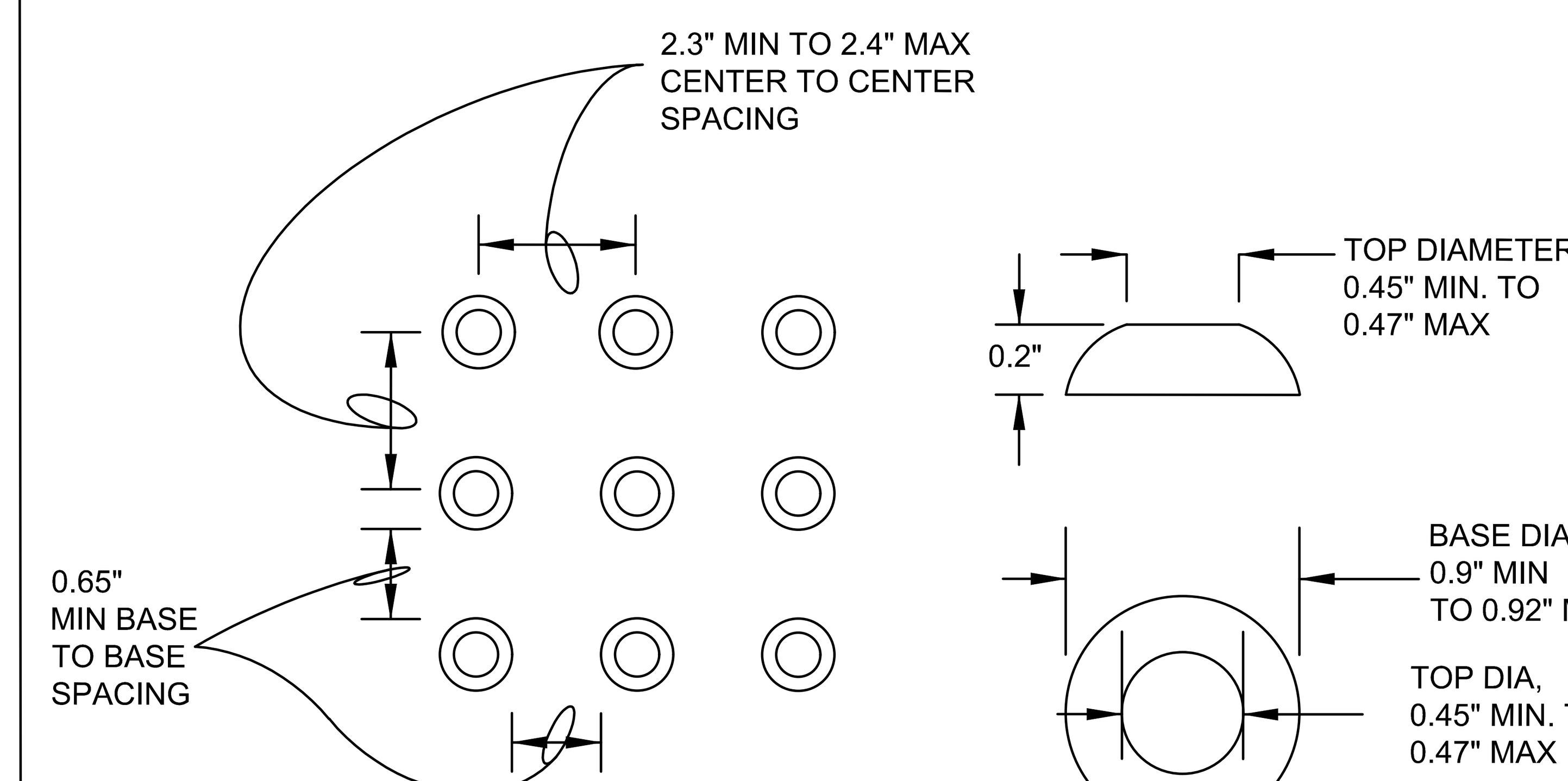
INTERNATIONAL SYMBOL OF ACCESSIBILITY
NOT TO SCALE
2



ACCESSIBLE PARKING SIGN
NOT TO SCALE
3



WHEEL STOP
NOT TO SCALE
4



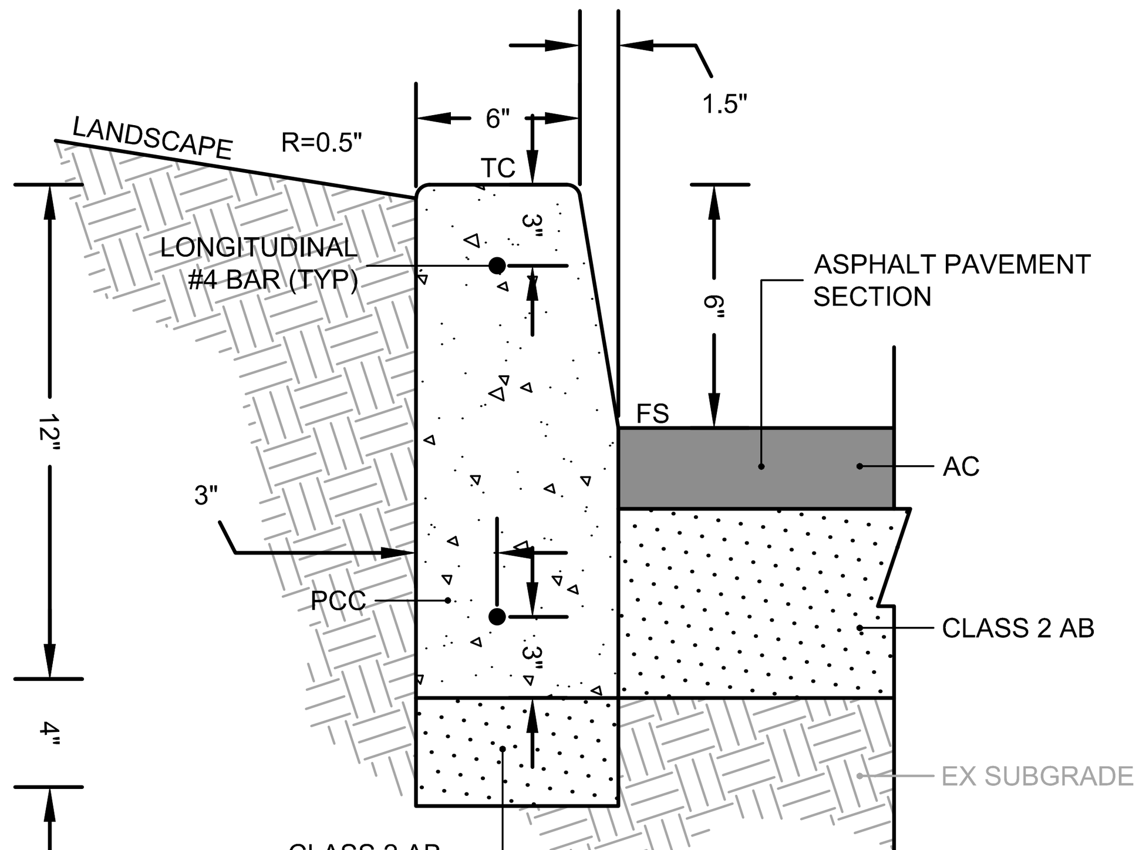
RAISED TRUNCATED DOME PATTERN (IN-LINE)

RAISED TRUNCATED DOME

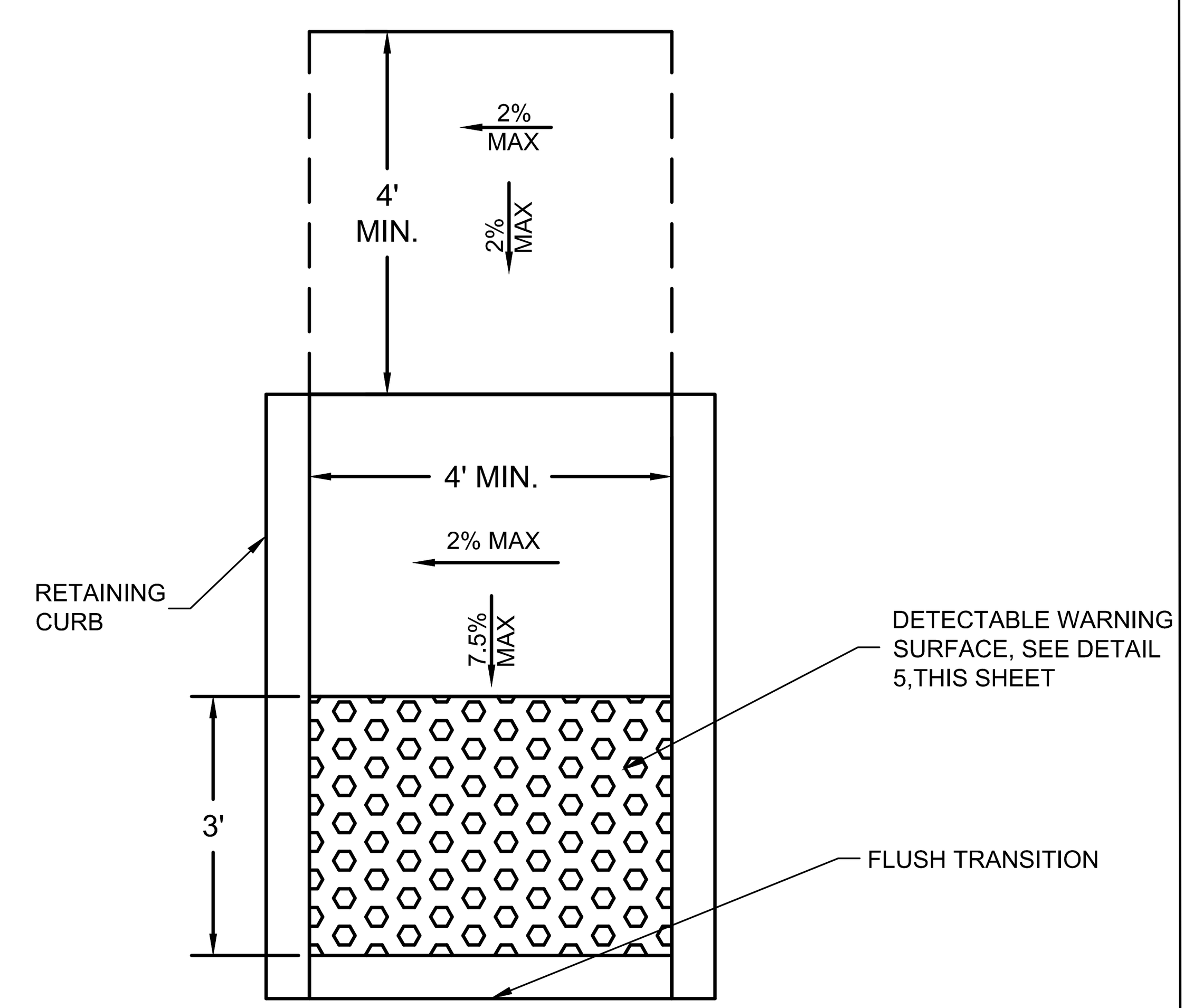
NOTES:

1. DETECTABLE WARNING SURFACE SHALL BE RECESSED AND CAST IN CONCRETE
2. DETECTABLE WARNING SURFACE SHALL BE INSTALLED AT BOTTOM OF THE RAMP. SEE THE LAYOUT PLANS FOR THE SPECIFIC LOCATIONS TO INSTALL THE WARNING SURFACES.
3. DETECTABLE WARNING DEVICES TO BE COLOR YELLOW CONFORMING TO FEDERAL COLOR NO. 33538.
4. DETECTABLE WARNING SURFACE SHALL PROVIDE AT MINIMUM A 70% CONTRAST WITH ADJACENT SURFACE PER CBC-11B-705.1.1.3.2

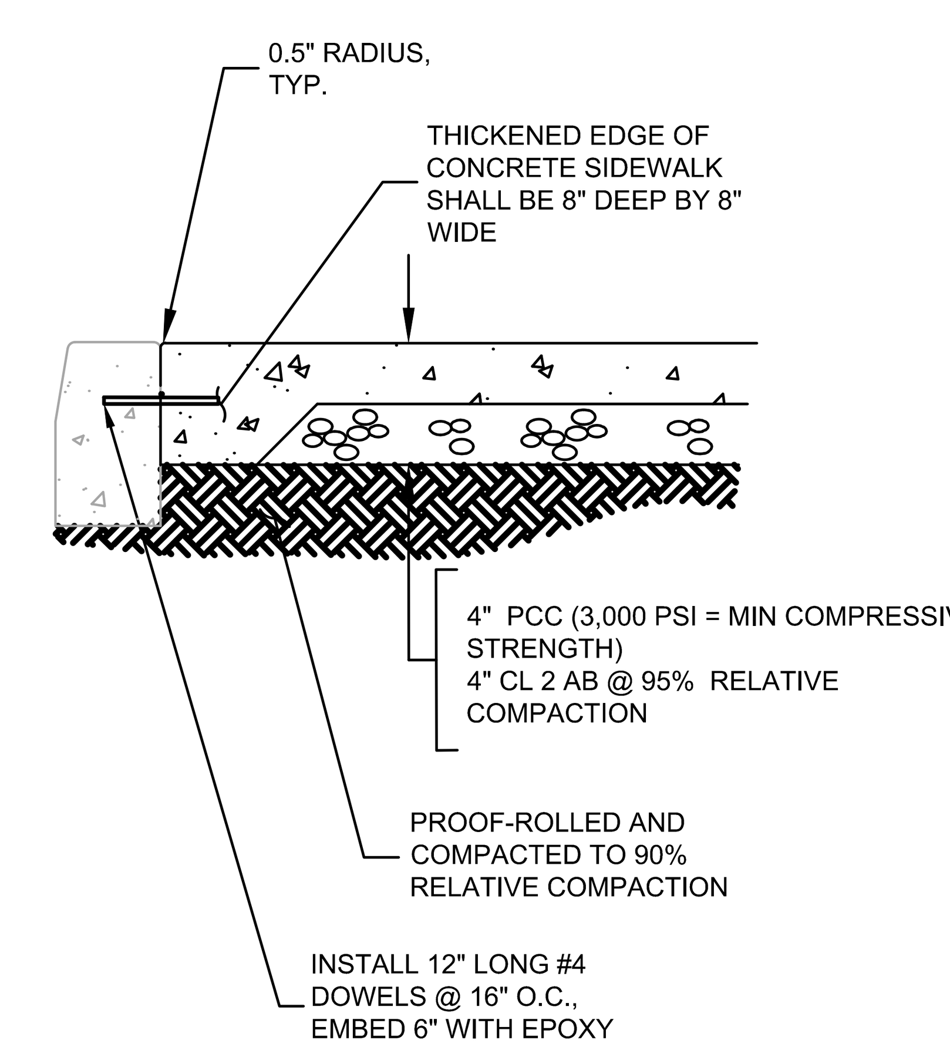
DETECTABLE WARNING SURFACE
NOT TO SCALE
5



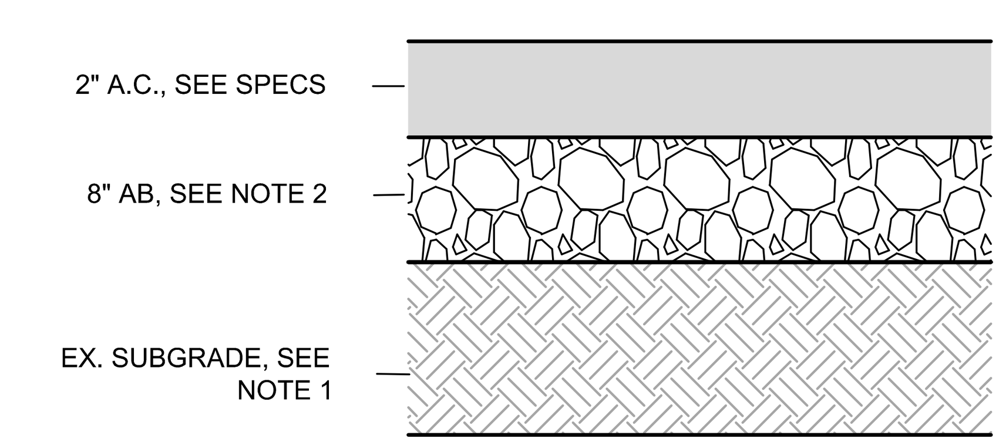
STANDARD CURB
NOT TO SCALE
6



CURB RAMP (CASE F)
NOT TO SCALE
7



STANDARD SIDEWALK
NOT TO SCALE
9



NOTES:

1. PRIOR TO PLACEMENT OF AGGREGATE BASE, SCARIFY THE EX. SUBGRADE TO A MINIMUM DEPTH OF 12-INCHES, MOISTURE-CONDITION TO NEAR-OPTIMUM MOISTURE CONTENT AND RECOMPACT TO A MINIMUM OF 95% RELATIVE COMPACTION (R.C.)
2. AGGREGATE BASE SHALL BE PLACED IN ONLY 5-INCH MAXIMUM LIFTS AND COMPACTED TO 95% R.C.

AC PAVEMENT SECTION
NOT TO SCALE
10

NO.	DESCRIPTION	BY	DATE	APPV'D
4				
3				
2				
1				

REVISIONS

REGISTERED PROFESSIONAL ENGINEER DAINE B. JOHNSON No. C 061408 CIVIL STATE OF CALIFORNIA
65% FOR REVIEW ONLY

1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION CONSTRUCTION DETAILS

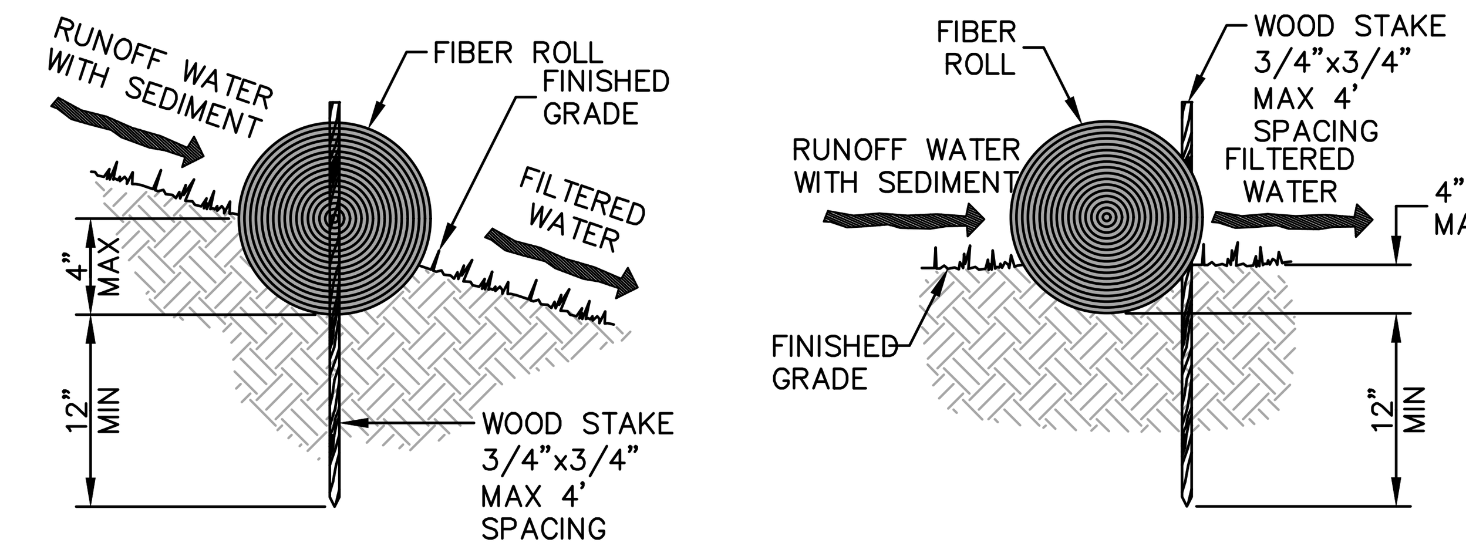
CITY OF MORAGA CALIFORNIA

DATE 09-15-21
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 11 OF 28
FILE NO. CD-02

65% CONSTRUCTION DOCUMENTS

SUPPLEMENTAL EROSION CONTROL NOTES:

1. THIS PLAN MAY NOT COVER ALL THE SITUATIONS THAT ARISE DURING CONSTRUCTION DUE TO UNANTICIPATED FIELD CONDITIONS. IN GENERAL, THE CONTRACTOR IS RESPONSIBLE FOR KEEPING SEDIMENT STORM RUN-OFF FROM LEAVING THE SITE. FIBER ROLLS AND SAND BAGS SHALL BE USED BY THE CONTRACTOR ON AN AS NEEDED BASIS TO INHIBIT SILT FROM LEAVING THE SITE AND ENTERING THE STORM DRAIN SYSTEM. ALL EXISTING, TEMPORARY, OR PERMANENT CATCH BASINS SHALL USE ONE OF THE SEDIMENT BARRIERS SHOWN.
2. AS THE OWNER'S REPRESENTATIVE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGES TO PUBLICLY AND/OR PRIVATELY OWNED AND MAINTAINED ROADS CAUSED BY THE CONTRACTOR'S GRADING ACTIVITIES, AND SHALL BE RESPONSIBLE FOR THE CLEANUP OF ANY MATERIAL SPILLED ON ANY PUBLIC ROAD ON THE HAUL ROUTE. ADJACENT PUBLIC ROADS SHALL BE CLEANED AT THE END OF EACH WORKING DAY. EROSION CONTROL MEASURES ARE REQUIRED DURING THE WET SEASON, STARTING OCTOBER 1 OF EACH YEAR. EROSION CONTROL FACILITIES SHALL BE MAINTAINED DAILY UNTIL APRIL 15.
3. THE NAME OF THE PERSON RESPONSIBLE FOR THE DAILY MAINTENANCE OF THESE FACILITIES SHALL BE ON RECORD WITH THE CITY OF FOSTER CITY DEPARTMENT OF PUBLIC WORKS ALONG WITH A PHONE NUMBER WHERE THEY CAN BE REACHED 24 HOURS A DAY. THESE FACILITIES SHALL CONTROL AND CONTAIN EROSION-CAUSED SILT DEPOSITS AND PROVIDE FOR THE SAFE DISCHARGE OF SILT-FREE STORM WATER INTO EXISTING AND PROPOSED STORM DRAIN FACILITIES. DESIGN OF THESE FACILITIES MUST BE APPROVED AND UPDATED EACH YEAR PRIOR TO SEPTEMBER 30 BY THE ENGINEER.
4. AS THE OWNER'S REPRESENTATIVE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL SUB-CONTRACTORS, AND SUPPLIERS ARE AWARE OF ALL STORM WATER QUALITY MEASURES & IMPLEMENT SUCH MEASURES. FAILURE TO COMPLY WITH THE APPROVED CONSTRUCTION WILL RESULT IN THE ISSUANCE OF CORRECTION NOTICES, CITATIONS AND/OR A PROJECT STOP ORDER.
5. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE OPERABLE YEAR-ROUND OR UNTIL DISTURBED AREAS ARE STABILIZED.
6. DURING THE RAINY SEASON, ALL PAVED AREAS ARE TO BE KEPT CLEAR OF EARTH MATERIAL AND DEBRIS. THE SITE IS TO BE MAINTAINED SO AS TO MINIMIZE SEDIMENT RUNOFF TO ANY STORM DRAIN SYSTEM.
7. AS THE OWNER'S REPRESENTATIVE, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSPECT ALL EROSION CONTROL FACILITIES AND REPAIR ANY DAMAGED FACILITIES BY THE END OF THE WORK DAY DURING THE RAINY SEASON.
8. BORROW AND TEMPORARY STOCKPILES SHALL BE PROTECTED WITH APPROPRIATE EROSION CONTROL MEASURES (TARPS, FIBER ROLLS, SILT FENCES ETC.) TO ENSURE SILT DOES NOT LEAVE THE SITE OR ENTER THE STORM DRAIN SYSTEM. REFER TO EROSION CONTROL AND SEDIMENT CONTROL FIELD MANUAL, 3RD EDITION, PREPARED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN FRANCISCO BAY REGION.
9. ALL DIRT PILES AND HAUL TRUCKS SHALL BE COVERED.
10. DURING PERIODS WHEN STORMS ARE FORECAST -
    - a. EXCAVATED SOILS SHOULD NOT BE PLACED IN STREETS OR ON PAVED AREAS.
    - b. ANY EXCAVATED SOILS SHOULD BE REMOVED FROM THE SITE BY THE END OF THE DAY.
    - c. WHERE STOCKPILING IS NECESSARY, USE A TARPAULIN OR SURROUND THE STOCKPILED MATERIAL WITH STRAW BALES, FIBER ROLL, OR OTHER RUNOFF CONTROLS.
    - d. USE INLET CONTROLS (E.G. FILTER MAT) FOR STORM DRAINS ADJACENT TO THE STOCKPILED SOIL.
    - e. THOROUGHLY SWEEP ALL PAVED AREAS EXPOSED TO SOIL EXCAVATION AND PLACEMENT.
11. DURING PERIODS WHEN STORMS ARE NOT FORECAST -
    - a. PREVENT STOCKPILED MATERIAL FROM ENTERING THE STORM DRAIN SYSTEM
    - b. THOROUGHLY REMOVE LOOSE SOIL VIA SWEEPING FOLLOWING REMOVAL OF DIRT.
12. THE LOCATIONS OF THE TEMPORARY CONCRETE WASHOUT FACILITY AND TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT CAN BE DECIDED BY THE CONTRACTOR UPON APPROVAL BY THE CITY.



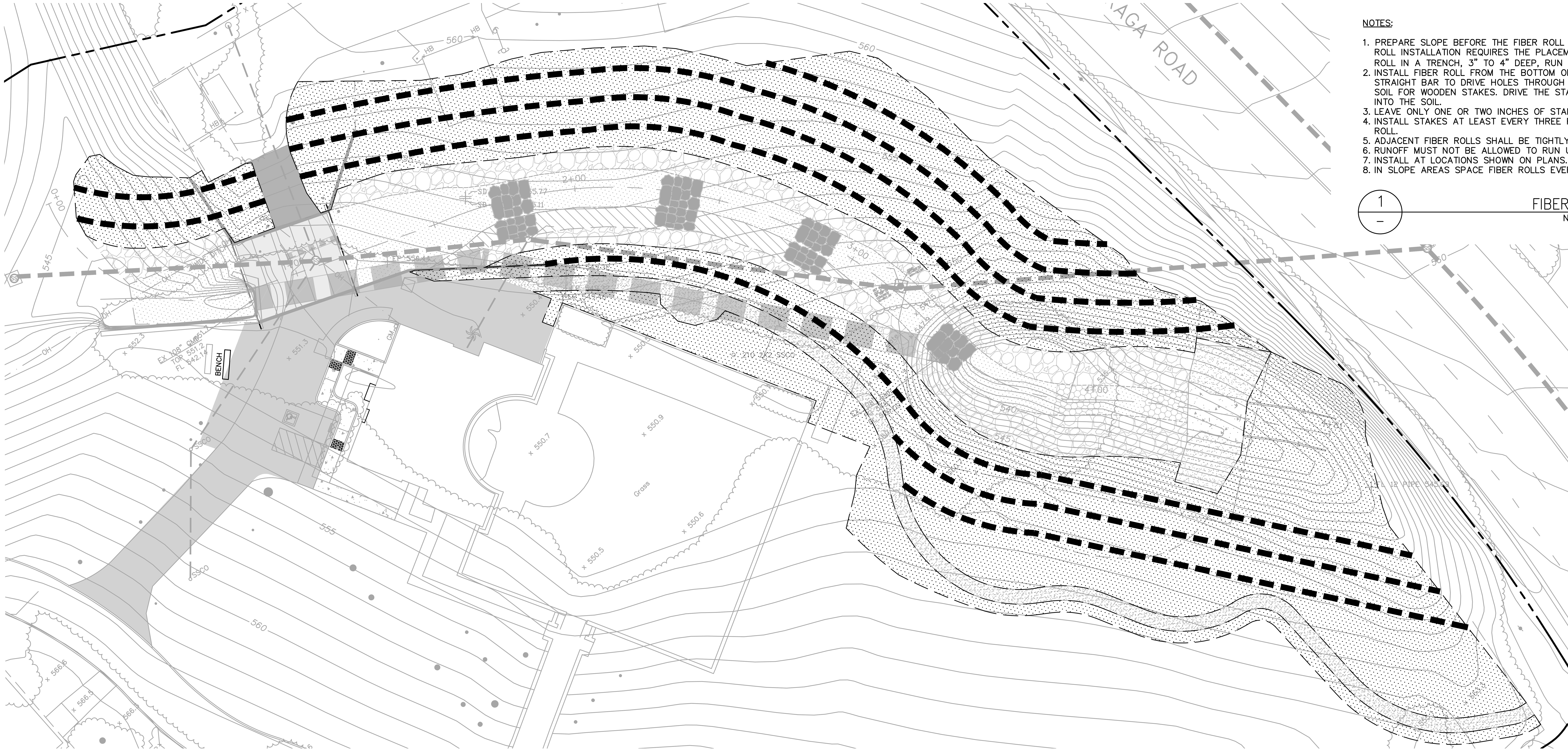
ENTRENCHMENT DETAIL IN SLOPE AREA

ENTRENCHMENT DETAIL IN FLAT AREA

NOTES:

1. PREPARE SLOPE BEFORE THE FIBER ROLL PROCEDURE IS STARTED. FIBER ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3" TO 4" DEEP, RUN PARALLEL TO THE CONTOUR.
2. INSTALL FIBER ROLL FROM THE BOTTOM OF THE SLOPE AND WORK UP. USE A STRAIGHT BAR TO DRIVE HOLES THROUGH THE FIBER ROLL AND INTO THE SOIL FOR WOODEN STAKES. DRIVE THE STAKE THROUGH THE PREPARED HOLE INTO THE SOIL.
3. LEAVE ONLY ONE OR TWO INCHES OF STAKE EXPOSED ABOVE FIBER ROLL.
4. INSTALL STAKES AT LEAST EVERY THREE FEET APART THROUGH THE FIBER ROLL.
5. ADJACENT FIBER ROLLS SHALL BE TIGHTLY ABUT.
6. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND FIBER ROLL.
7. INSTALL AT LOCATIONS SHOWN ON PLANS.
8. IN SLOPE AREAS SPACE FIBER ROLLS EVERY 10 VERTICAL FEET ON SLOPE.

1 / – FIBER ROLL
NTS



KEY MAP
SCALE 1"=20'

LEGEND:

- FIBER ROLLS SEE DETAIL 1, THIS SHEET
- HYDROSEED SEE SPECIFICATIONS
- HYDROSEED BOUNDARY

EROSION CONTROL NOTES:

1. IF DISCREPANCIES OCCUR BETWEEN THESE NOTES, MATERIAL REFERENCED HEREIN OR THE MANUFACTURER'S RECOMMENDATIONS, THEN THE MOST PROTECTIVE SHALL APPLY.
2. PRESERVATION OF EXISTING VEGETATION SHALL OCCUR TO THE MAXIMUM EXTENT PRACTICABLE.
3. THE OWNER IS RESPONSIBLE FOR PREVENTING STORM WATER POLLUTION GENERATED FROM THE CONSTRUCTION SITE YEAR ROUND. THE OWNER MUST IMPLEMENT AN EFFECTIVE COMBINATION OF EROSION PREVENTION AND SEDIMENT CONTROL ON ALL DISTURBED AREAS DURING THE RAINY SEASON (OCTOBER 15 - APRIL 15).
4. EROSION PREVENTION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED BY THE OWNER BEFORE FORECASTED STORM EVENTS AND AFTER ACTUAL STORM EVENTS TO ENSURE MEASURES ARE FUNCTIONING PROPERLY. STORM EVENTS PRODUCE AT LEAST 1 INCH OF PRECIPITATION IN A 24 HOUR PERIOD. EROSION PREVENTION AND SEDIMENT CONTROL MEASURES THAT HAVE FAILED OR ARE NO LONGER EFFECTIVE SHALL BE PROMPTLY REPLACED. EROSION PREVENTION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED.
5. CHANGES TO THE EROSION PREVENTION AND SEDIMENT CONTROL PLAN MAY BE MADE TO RESPOND TO FIELD CONDITIONS. CHANGES SHALL BE NOTED ON THE PLAN WHEN MADE.
6. DISCHARGES OF POTENTIAL POLLUTANTS FROM CONSTRUCTION SITES SHALL BE PREVENTED USING SOURCE CONTROLS TO THE MAXIMUM EXTENT PRACTICABLE. POTENTIAL POLLUTANTS INCLUDE BUT ARE NOT LIMITED TO: SEDIMENT, TRASH, NUTRIENTS, PATHOGENS, PETROLEUM HYDROCARBONS, METALS, CONCRETE, CEMENT,ASPHALT, LIME, PAINT, STAINS, GLUES, WOOD PRODUCTS, PESTICIDES, HERBICIDES, CHEMICALS, HAZARDOUS WASTE, SANITARY WASTE, VEHICLE OR EQUIPMENT WASH WATER AND CHLORINATED WATER.
7. ENTRANCE(S) TO THE CONSTRUCTION SITE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF POTENTIAL POLLUTANTS OFFSITE. POTENTIAL POLLUTANTS DEPOSITED ON PAVED AREAS WITHIN THE CITY RIGHT-OF-WAY, SUCH AS ROADWAYS AND SIDEWALKS, SHALL BE PROPERLY DISPOSED OF AT THE END OF EACH WORKING DAY OR MORE FREQUENTLY AS NECESSARY.
8. SOIL AND MATERIAL STOCKPILES SHALL BE PROPERLY PROTECTED TO MINIMIZE SEDIMENT AND POLLUTANT TRANSPORT FROM THE CONSTRUCTION SITE.
9. SOLID WASTE, SUCH AS TRASH, DISCARDED BUILDING MATERIALS AND DEBRIS, SHALL BE PLACED IN DESIGNATED COLLECTION AREAS OR CONTAINERS. THE CONSTRUCTION SITE SHALL BE CLEARED OF SOLID WASTE DAILY, OR AS NECESSARY, AND REGULAR REMOVAL AND PROPER DISPOSAL SHALL BE ARRANGED.
10. A CONCRETE WASHOUT AREA, SUCH AS A TEMPORARY PIT, SHALL BE DESIGNATED TO CLEAN CONCRETE TRUCKS AND TOOLS. AT NO TIME SHALL CONCRETE PRODUCTS AND WASTE BE ALLOWED TO ENTER WATERWAYS SUCH AS CREEKS OR STORM DRAINS.
11. PROPER APPLICATION, CLEANING AND STORAGE OF POTENTIALLY HAZARDOUS MATERIALS, SUCH AS PAINTS AND CHEMICALS, SHALL BE CONDUCTED TO PREVENT THE DISCHARGE OF POLLUTANTS.
12. WHEN UTILIZED, TEMPORARY RESTROOMS AND SANITARY FACILITIES SHALL BE LOCATED AND MAINTAINED TO PREVENT THE DISCHARGE OF POLLUTANTS.
13. APPROPRIATE VEHICLE STORAGE, FUELING, MAINTENANCE AND CLEANING AREAS SHALL BE DESIGNATED AND MAINTAINED TO PREVENT DISCHARGE OF POLLUTANTS.

N

0 20 40
GRAPHIC SCALE: 1"=20'

NO.	DESCRIPTION	BY	DATE	APPV'D
4				
3				
2				
1				

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
DAINE B. JOHNSON
No. C 061408
CIVIL
STATE OF CALIFORNIA
65% FOR REVIEW ONLY

BKF
1646 N. CALIFORNIA BLVD.
SUITE 400
WALNUT CREEK, CA 94596
(925) 940-2200
www.bkf.com

DRAWN: BKF WC
DESIGNED: BKF WC
CHECKED: DJ
APPROVED:

LAGUNA CREEK RESTORATION
EROSION CONTROL

CITY OF MORAGA
CALIFORNIA

DATE	SCALE
09-15-21	AS SHOWN

BKF JOB NO. 201226

SHEET NO. 12 OF 28

FILE NO. EC-01

65% CONSTRUCTION DOCUMENTS

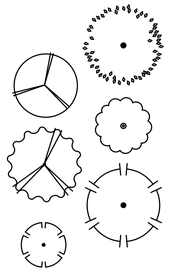
RESTORATION REVEGETATION NOTES

1. RESTORATION GRADE NATIVE PLANTS SHALL BE SOURCED WITHIN 20 MILES OF THE PROJECT SITE. CULTIVARS OF NATIVE SPECIES WILL NOT BE ACCEPTED. COUNTY OF ORIGIN FOR EACH PLANT SHALL BE NOTED IN SUBMITTAL.
2. CONTRACTOR SHALL PROVIDE PLANTS IN CONTAINER SIZES NOTED IN LEGEND. IN SOME CIRCUMSTANCES CONTAINER SIZES MAY BE SUBSTITUTED WITH O.R. APPROVAL. THE FOLLOWING ARE PLANT QUANTITY RATIOS FOR PLANT CONTAINER SIZE SUBSTITUTIONS. CONTRACTOR TO PROVIDE A SUBMITTAL FOR ALL PROPOSED SUBSTITUTIONS. SEE SPECIFICATIONS.
   - 15 GALLON POT = NO SUBSTITUTIONS
   - 5 GALLON POT TO 4-GAL TREEPOT = 1:1.2
   - 1 GALLON POT TO D-40 = 1:1.2
   - 1 GALLON POT TO 4" POT = 1:1.4
   - 1 GALLON POT TO D-16 = 1:2
4. PLANTS SHALL BE UNEVENLY SPACED, UNLESS DIRECTED OTHERWISE BY O.R. IN THE FIELD.
5. PLANT SUBSTITUTIONS MUST BE APPROVED BY O.R. PRIOR TO PURCHASE AND DELIVERY.
6. FINAL LAYOUT OF CONTAINER PLANTS TO BE APPROVED BY O.R. IN THE FIELD. CONTRACTOR TO PROVIDE MEANS OF MARKING PLANT LOCATIONS.
7. SEED AND MULCH AREAS SHOWN ON PLANS. MULCH CONTAINER PLANTS AND UPLAND PATCHES PER DETAILS.
8. SEED AND MULCH PRIOR TO OCTOBER 15TH.
9. SEE SPECIFICATIONS FOR SEED MIXES AND ADDITIONAL REQUIREMENTS.
10. PROVIDE TOUCH-UP SEEDING TO ALL AREAS DISTURBED AFTER ORIGINAL SEEDING.

REVEGETATION LEGEND

- PROPERTY BOUNDARY
- EDGE OF CHANNEL
- LIMIT OF GRADING
- MAJOR CONTOUR
- MINOR CONTOUR
- 10' SANITARY SEWER OFFSET

1 / LI-05 RESTORATION TREE PLANTING SCHEDULE



SCIENTIFIC NAME	COMMON NAME	SIZE	TOTAL QTY
ACER NEGUNDO	BOX ELDER	15G	15
AESCULUS CALIFORNICA	BUCKEYE	15G	9
CERCIS OCCIDENTALIS	WESTERN REDBUD	15G	8
JUGLANS HINDSII	BLACK WALNUT	15G	10
QUERCUS AGRIFOLIA	LIVE OAK	15G	18
SAMBUCUS NIGRA V. CAERULEA	BLUE ELDERBERRY	15G	10

7 / LI-05 PATCH PLANTING

U4 UPLAND PATCH 4,160 SF

Achillea millefolium | Yarrow
Epilobium canum | California Fuchsia
Frangula californica | Coffeeberry
Iris douglasiana | Douglas Iris

B2 BLACKBERRY PATCH 475 SF

Baccharis pilularis | Coyote Bush
Corylus cornuta ssp. californica | California Hazelnut
Rubus ursinus | California Blackberry
Symphoricarpos albus | Common Snowberry

R1 RIPARIAN PATCH 580 SF

Carex praegracilis | Clustered Field Sedge
Juncus effusus | Soft Rush
Juncus patens | Common Rush
Physocarpus capitatus | Pacific Ninebark
Scrophularia californica | Bee Plant
Stachys bullata | California Hedgenettle

4 / LI-05 LIVE STAKING

LC3 WILLOW / COTTONWOOD LIVE CUTTINGS PLANTED IN RIPRAP 4' O.C 2,260 SF / 160 LIVE CUTTINGS

SEEDING AND MULCH

UPLAND SEED MIX DISTURBED AREAS 18,471 SF
Bromus carinatus | California Brome
Elymus glaucus | Blue Wildrye
Eschscholzia californica | California Poppy
Festuca microstachys | Three Weeks Festuca
Hordeum brachyantheruum | Meadow Barley
Lupinus bicolor | Miniature Lupine
Trifolium wildenovii | Tomcat Clover

SITE MULCH 8,475 SF

NOTE: THERE ARE 229 RIPARIAN TREES SHOWN ON PLAN (15G + LIVE CUTTINGS). PLAN ASSUMES 39 RIPARIAN TREE SPECIES REMOVED AND REPLACED AT A MINIMUM OF 3:1 RATIO (PER LSA RIPARIAN TREE SURVEY FROM 4/21/2021).

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
4				
3				
2				
1				

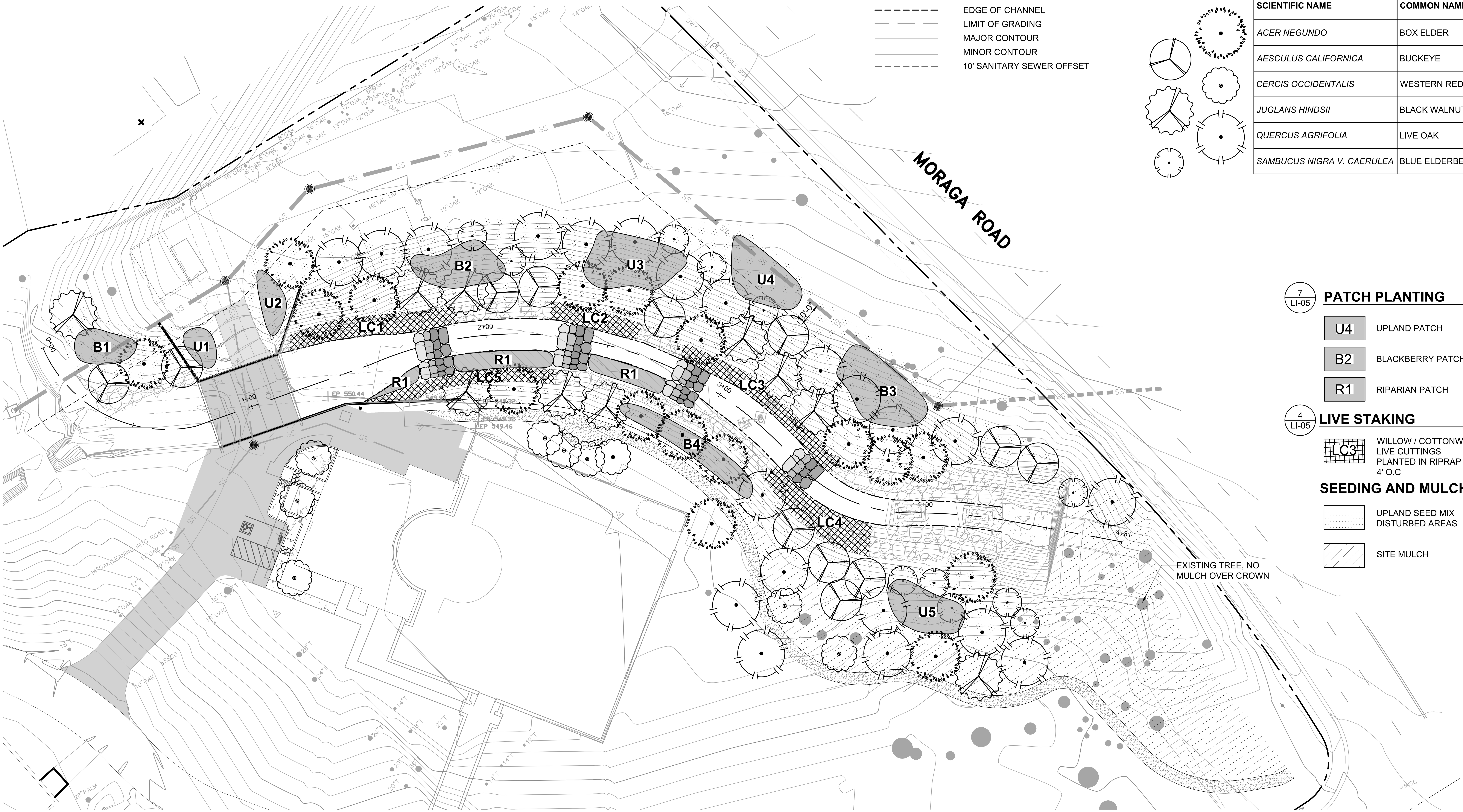
Restoration Design Group, Inc.
2332 Fifth Street, Suite C
Berkeley, CA 94710
T. 510.644.2700 F. 510.644.2799
www.restorationdesigngroup.com

DESIGNED RDG | AS NQ
DRAWN RDG | AS ES
CHECKED ES
APPROVED

LAGUNA CREEK RESTORATION
REVEGETATION NOTES AND SCHEDULE
65% DESIGN

CITY OF MORAGA CALIFORNIA

DATE 09/15/2021 SCALE AS SHOWN
BKF JOB NO: 201226
SHEET NO: 13 OF 28
FILE NO: LI-01



REVEGETATION LEGEND

- PROPERTY BOUNDARY
- EDGE OF CHANNEL
- LIMIT OF GRADING
- MAJOR CONTOUR
- MINOR CONTOUR
- 10' SANITARY SEWER OFFSET

RESTORATION TREES

1 / LI-05

SCIENTIFIC NAME	COMMON NAME
ACER NEGUNDO	BOX ELDER
AESCULUS CALIFORNICA	BUCKEYE
CERCIS OCCIDENTALIS	WESTERN REDBUD
JUGLANS HINDSII	BLACK WALNUT
QUERCUS AGRIFOLIA	LIVE OAK
SAMBUCUS NIGRA V. CAERULEA	BLUE ELDERBERRY

PATCH PLANTING

7 / LI-05

- U4 — UPLAND PATCH
- B2 — BLACKBERRY PATCH
- R1 — RIPARIAN PATCH

LIVE STAKING

4 / LI-05

- LC3 — WILLOW / COTTONWOOD LIVE CUTTINGS PLANTED IN RIPRAP 4' O.C

SEEDING AND MULCH

- UPLAND SEED MIX DISTURBED AREAS
- SITE MULCH

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPV'D
1				
2				
3				
4				

Restoration Design Group, Inc.
2332 Fifth Street, Suite C
Berkeley, CA 94710
T 510.644.2798 F 510.644.2799
www.restorationdesigngroup.com

RDG

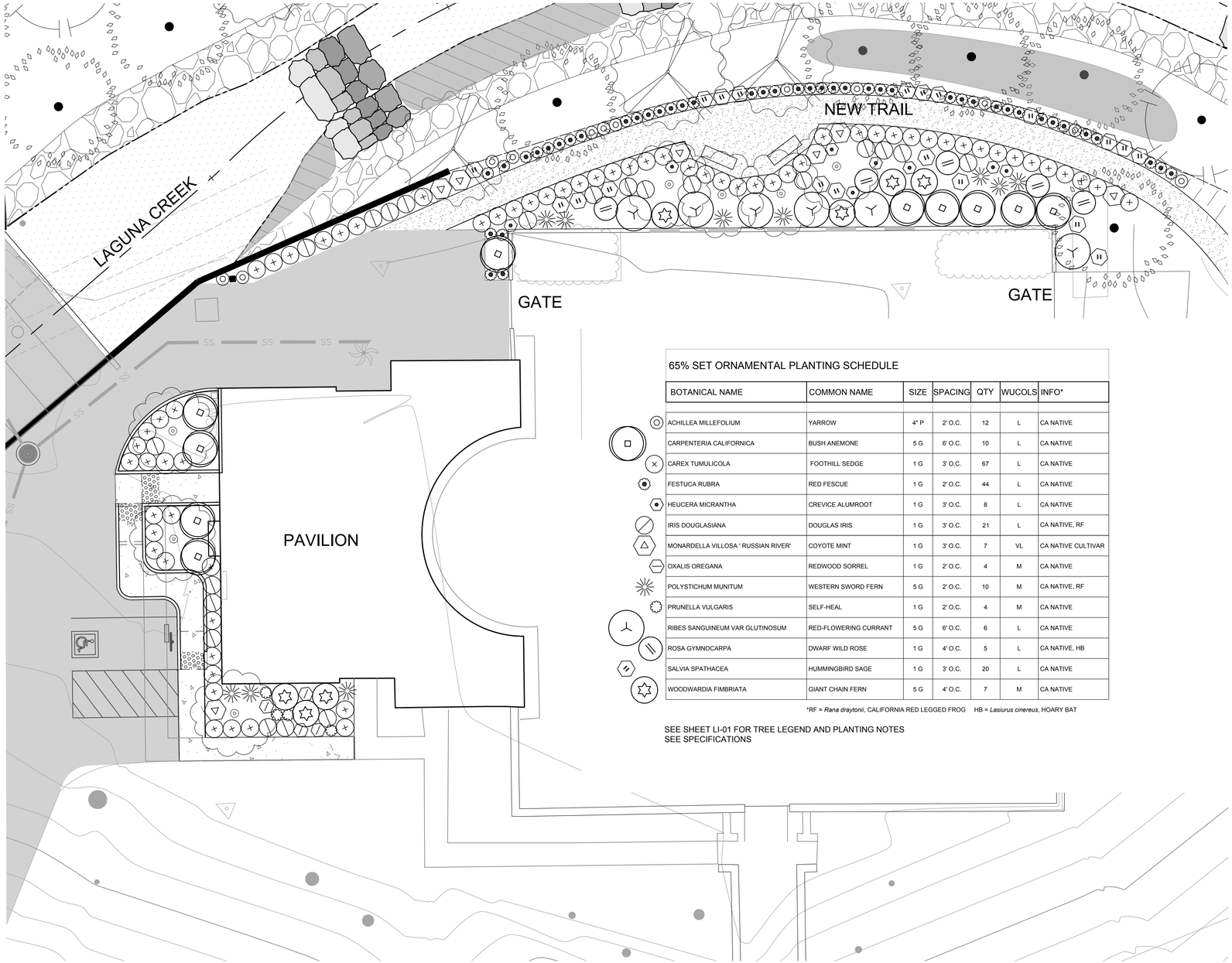
DESIGNED: RDG | AS ES
DRAWN: RDG | AS NQ
CHECKED: ES
APPROVED:

LAGUNA CREEK RESTORATION
REVEGETATION PLAN
65% DESIGN

CITY OF MORAGA, CALIFORNIA

DATE: 09/15/2021
SCALE: AS SHOWN
BKF JOB NO.: 201226
SHEET NO.: 14 OF 28
FILE NO.: LI-02

30% CONSTRUCTION DOCUMENTS 05/06/2021



65% SET ORNAMENTAL PLANTING SCHEDULE

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY	WUCOLS	INFO*
ACHILLEA MILLEFOLIUM	YARROW	4" P	2' O.C.	12	L	CA NATIVE
CARPENTERIA CALIFORNICA	BUSH ANEMONE	5 G	6' O.C.	10	L	CA NATIVE
CAREX TUMULICOLA	FOOTHILL SEDGE	1 G	3' O.C.	67	L	CA NATIVE
FESTUCA RUBRA	RED FESCUE	1 G	2' O.C.	44	L	CA NATIVE
HEUCERA MICRANTHA	CREVICE ALUMROOT	1 G	3' O.C.	8	L	CA NATIVE
IRIS DOUGLASIANA	DOUGLAS IRIS	1 G	3' O.C.	21	L	CA NATIVE, RF
MONARDELLA VILLOSA ' RUSSIAN RIVER'	COYOTE MINT	1 G	3' O.C.	7	VL	CA NATIVE CULTIVAR
OXALIS OREGANA	REDWOOD SORREL	1 G	2' O.C.	4	M	CA NATIVE
POLYSTICHUM MUNITUM	WESTERN SWORD FERN	5 G	2' O.C.	10	M	CA NATIVE, RF
PRUNELLA VULGARIS	SELF-HEAL	1 G	2' O.C.	4	M	CA NATIVE
RIBES SANGUINEUM VAR GLUTINOSUM	RED-FLOWERING CURRANT	5 G	6' O.C.	6	L	CA NATIVE
ROSA GYMNOCARPA	DWARF WILD ROSE	1 G	4' O.C.	5	L	CA NATIVE, HB
SALVIA SPATHACEA	HUMMINGBIRD SAGE	1 G	3' O.C.	20	L	CA NATIVE
WOODWARDIA FIMBRIATA	GIANT CHAIN FERN	5 G	4' O.C.	7	M	CA NATIVE

*RF = *Rana draytonii*, CALIFORNIA RED LEGGED FROG HB = *Lasiurus cinereus*, HOARY BAT

SEE SHEET LI-01 FOR TREE LEGEND AND PLANTING NOTES
SEE SPECIFICATIONS

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 5 ft.

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
4				
3				
2				
1				

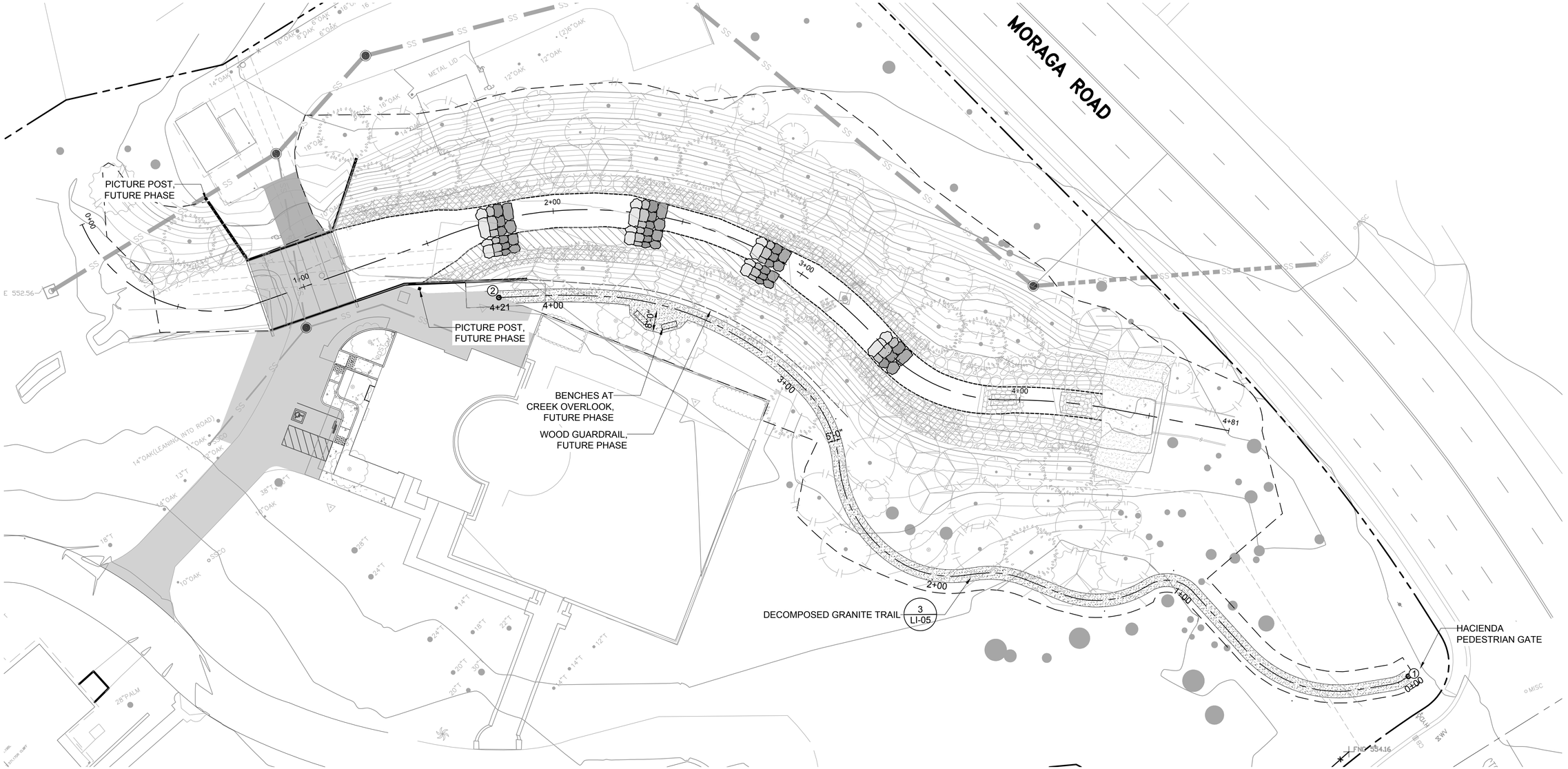
Restoration Design Group, Inc.
2332 Fifth Street, Suite C
Berkeley, CA 94710
T. 510.644.2700 F. 510.644.2799
www.restorationdesigngroup.com

DESIGNED RDG | AS KB
DRAWN RDG | AS ES KB
CHECKED ES
APPROVED

LAGUNA CREEK RESTORATION
PAVILION PLANTING
65% DESIGN

CITY OF MORAGA, CALIFORNIA

DATE 09/15/2021
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 15 OF 28
FILE NO. LI-03



LAYOUT NOTES

1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS ON THE SITE AND NOTIFY O.R. OF ALL DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING MINOR SITE ADJUSTMENTS TO TRAIL ALIGNMENT AT NO COST TO THE OWNER.
2. DIMENSIONS AS SHOWN ARE TO BE VERIFIED WITH THE O.R. PRIOR TO INSTALLING THE IMPROVEMENTS. IF MINOR FIELD ADJUSTMENTS ARE REQUIRED, THEY SHALL BE COMPLETED BY THE CONTRACTOR AT NO COST TO THE OWNER.
3. TRAIL ALIGNMENT SHALL BE STAKED IN THE FIELD FOR REVIEW AND APPROVAL BY O.R. PRIOR TO INSTALLATION.

LEGEND

- PROPERTY BOUNDARY
- EDGE OF CHANNEL
- LIMIT OF GRADING
- MAJOR CONTOUR
- MINOR CONTOUR

TRAIL ALIGNMENT POINT LAYOUT TABLE

Point Table			
Point #	Northing	Easting	Description
1	2136437.91	6092379.94	ENTRANCE AT HACIENDA PEDESTRIAN GATE
2	2136788.04	6092239.30	TRAIL AT PAVILLION

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
1				
2				
3				
4				

Restoration Design Group, Inc.
2332 Fifth Street, Suite C
Berkeley, CA 94710
T. 510.644.2700 F. 510.644.2799
www.restorationdesigngroup.com

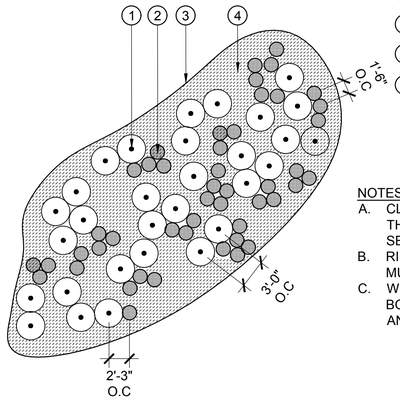
RDG

DESIGNED: RDG | AS NQ
DRAWN: RDG | AS ES
CHECKED: ES
APPROVED:

LAGUNA CREEK RESTORATION
TRAIL ALIGNMENT
65% DESIGN

CITY OF MORAGA — CALIFORNIA

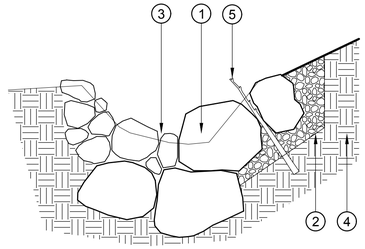
DATE 09/15/2021 | SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 16 OF 28
FILE NO. LI-04



1. LARGE RESTORATION CONTAINER (2 / LI-05)
2. SMALL RESTORATION CONTAINER
3. PATCH BOUNDARY EDGE
4. MULCH

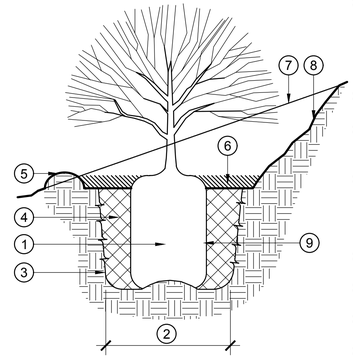
NOTES:
A. CLUSTER PLANTS TOGETHER THROUGHOUT PATCH, DO NOT SPACE OUT. SEE SPACING RULES ON DRAWING DETAIL. .
B. RIPARIAN PATCH TYPE SHALL NOT RECEIVE MULCH.
C. WHEN 15G TREES OCCUR WITHIN PATCH BOUNDARIES, ALLOW 3'-0" BETWEEN TREE AND ANY PATCH PLANTING CONTAINERS

7 PATCH LAYOUT TYPICAL
SCALE: NTS



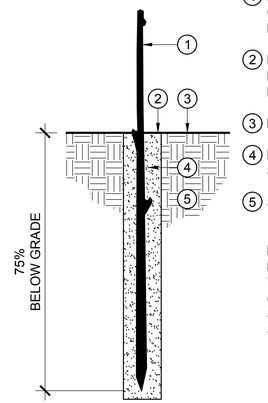
1. BANK PROTECTION, SEE CIVIL PLANS
2. BACKING, SEE CIVIL PLANS
3. CHANNEL, SEE CIVIL PLANS
4. SUBGRADE
5. LIVE CUTTING, ENSURE 6" MIN. EMBEDMENT INTO SUBGRADE (5 / LI-05)

4 JOINT PLANTING
SCALE: NTS



1. TREE OR SHRUB ROOTBALL (1 GALLON OR LARGER). SET CROWN 1-2" ABOVE FINISHED GRADE
2. PIT DIAMETER, TWO TIMES THE ROOTBALL DIAMETER. EXCAVATE PIT 2" SHALLOWER THAN CONTAINER, DEEPER BEYOND ROOTBALL. PLACE ROOTBALL ON CENTER MOUND AS SHOWN.
3. EDGE OF PIT, FRACTURE & SCARIFY.
4. PLANTING AREA SOIL MIX, BACKFILLED. HAND COMPACT IN 6" LIFTS
5. WATERING BASIN LIP, 4" HEIGHT. DOWN SLOPE EDGE ONLY IN SLOPED CONDITION; COMPLETE PERIMETER IN LEVEL CONDITION
6. MULCH
7. ORIGINAL GRADE, SLOPED CONDITION
8. FINISHED GRADE, SLOPED CONDITION
9. ROOT GUARD, NOT SHOWN, SEE SPECS

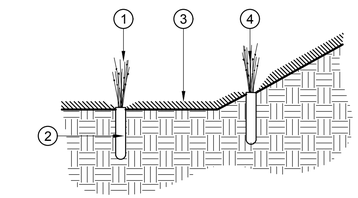
1 PLANT - TREE OR SHRUB
SCALE: NTS



1. LIVE CUTTING, WILLOW OR COTTONWOOD POLE, 42" LONG - SEE PLANS, DETAILS AND SPECIFICATIONS
2. DRILL PILOT HOLE 1" DIAMETER LARGER THAN LIVE CUTTING DIAMETER
3. FINISH GRADE
4. NATIVE SOIL, VOID OF AIR POCKETS, SEE SPECIFICATIONS
5. SUBGRADE

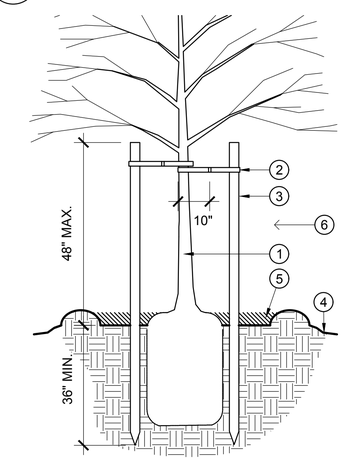
NOTE: SET ALL LIVE CUTTINGS PERPENDICULAR TO SLOPE. INSTALL WITH IRREGULAR SPACING (NATURALISTIC) PER O.R. DIRECTION. SEE PLANS FOR APPROXIMATE SPACING.

5 LIVE CUTTING
SCALE: NTS



1. PLANT GROWN IN RESTORATION CONTAINER (SMALLER THAN 1 GALLON)
2. PLANTING PIT AND PLANTING AREA SOIL MIX, EQUAL DIAMETER TO CONTAINER. USE DIBBLE OR HAND SPADE. SET CROWN ABOVE FINISH GRADE. PINCH SOIL MIX TIGHT AGAINST ROOTS.
3. MULCH / SEEDING, SEE PLANS AND SPECIFICATIONS. KEEP MULCH CLEAR OF CROWN.
4. SLOPED CONDITION - SET PLANT PLUMB

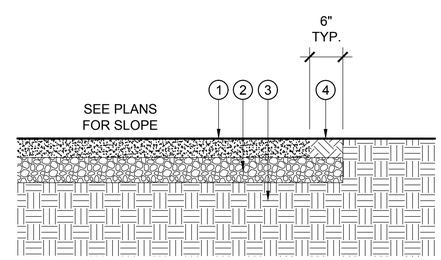
2 PLANT - SMALL
SCALE: NTS



1. 15 GALLON CONTAINER TREE
2. ARBORTIE TREE TIES (2), W/ 10" WIDE LOOPS AROUND TRUNK. SECURE ARBORTIES 4" MIN FROM TOP OF STAKES. DIRECTION AND APPROVAL OF INSTALLATION BY O.R.
3. TREE STAKES, SET VERTICAL OUTSIDE ROOTBALL. KEEP TOP OF STAKES 6" MIN CLEAR OF LIMBS. SET IN LINE WITH CREEK FLOW DIRECTION.
4. FINISH GRADE
5. MULCH
6. CREEK FLOW DIRECTION

6 TREE STAKING
SCALE: NTS

1. DECOMPOSED GRANITE (DG) PAVING, 3" DEPTH.
2. BASE COURSE, 4" DEPTH, EXTEND BEYOND EDGE AS SHOWN.
3. SUBGRADE, SHAPE TO DRAIN PER PLANS.
4. EARTHEN SHOULDER, OVER BASE COURSE. COMPACT TO 90%.



3 DG TRAIL
SCALE: NTS

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPVD
4				
3				
2				
1				

Restoration Design Group, Inc.
2332 Fifth Street, Suite C
Berkeley, CA 94710
T. 510.644.2700 F. 510.644.2799
www.restorationdesigngroup.com

CHECKED ES
APPROVED

DRAWN RDG | AS NQ
DESIGNED RDG | AS ES

RDG

LAGUNA CREEK RESTORATION
LANDSCAPE DETAILS
65% DESIGN
CALIFORNIA
CITY OF MORAGA

DATE 09/15/2021
SCALE AS SHOWN
BKF JOB NO. 201226
SHEET NO. 17 OF 28
FILE NO. LI-05

30% CONSTRUCTION DOCUMENTS 04/28/2021

NOTES

GENERAL NOTES:

1. THIS BRIDGE HAS BEEN DESIGNED FOR GENERAL SITE CONDITIONS. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR THE STRUCTURE'S SUITABILITY TO THE EXISTING SITE CONDITIONS AND FOR THE HYDRAULIC EVALUATION -- INCLUDING SCOUR AND CONFIRMATION OF SOIL CONDITIONS.

2. PRIOR TO CONSTRUCTION, CONTRACTOR MUST VERIFY ALL ELEVATIONS SHOWN THROUGH THE ENGINEER.

3. ONLY CONTECH ENGINEERED SOLUTIONS LLC, THE CON/SPAN® APPROVED PRECASTER IN CALIFORNIA MAY PROVIDE THE STRUCTURE DESIGNED IN ACCORDANCE WITH THESE PLANS.

4. THE USE OF ANOTHER PRECAST STRUCTURE WITH THE DESIGN ASSUMPTIONS USED FOR THE CON/SPAN® STRUCTURE MAY LEAD TO SERIOUS DESIGN ERRORS. USE OF ANY OTHER PRECAST STRUCTURE WITH THIS DESIGN AND DRAWINGS VOIDS ANY CERTIFICATION OF THIS DESIGN AND WARRANTY. REP ASSUMES NO LIABILITY FOR DESIGN OF ANY ALTERNATE OR SIMILAR TYPE STRUCTURES.

5. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF CALIFORNIA , EMPLOYED BY THE PRECAST CONCRETE BRIDGE SUPPLIER, ARE SUBMITTED TO THE ENGINEER 2 WEEKS PRIOR TO THE BID DATE FOR REVIEW AND APPROVAL.

6. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT THE ALTERNATE DESIGN DOES NOT REDUCE THE HYDRAULIC OPENING OF THE STRUCTURE AS SHOWN ON THE DRAWINGS. AT A MINIMUM THE ALTERNATE STRUCTURE MUST PROVIDE THE SAME OR LARGER SPAN AND RISE AS THE STRUCTURE SHOWN ON THE DRAWINGS.

7. THE PRECAST ARCH SUPPLIER MUST ATTEND THE PRE-BID MEETING, IF ONE IS HELD.

8. SUPPLIER OF PROPOSED ALTERNATES TO A CON/SPAN® BRIDGE SYSTEM MUST SUBMIT AT LEAST TWO (2) INDEPENDENTLY VERIFIED FULL SCALE LOAD TESTS THAT CONFIRM THE PROPOSED DESIGN METHODOLOGY OF THE THREE SIDED/ARCH STRUCTURE(S). THE PROPOSED ALTERNATE, UPON SATISFACTORY CONFIRMATION OF DESIGN METHODOLOGY, MAY BE CONSIDERED AN ACCEPTABLE ALTERNATE.

9. PROPOSED ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT THE PRECAST CONCRETE BRIDGE STRUCTURES ARE PROVIDED BY A SUPPLIER THAT HAS A MINIMUM OF TWO (2) REGISTERED PROFESSIONAL ENGINEERS ON STAFF THAT ARE DEDICATED TO THE DESIGN OF THESE TYPES OF STRUCTURES. SUPPLIER MUST PROVIDE THESE NAMES, P.E. LICENSE NUMBERS AND DATES OF HIRE AT TIME OF ALTERNATE SUBMITTAL.

DESIGN DATA

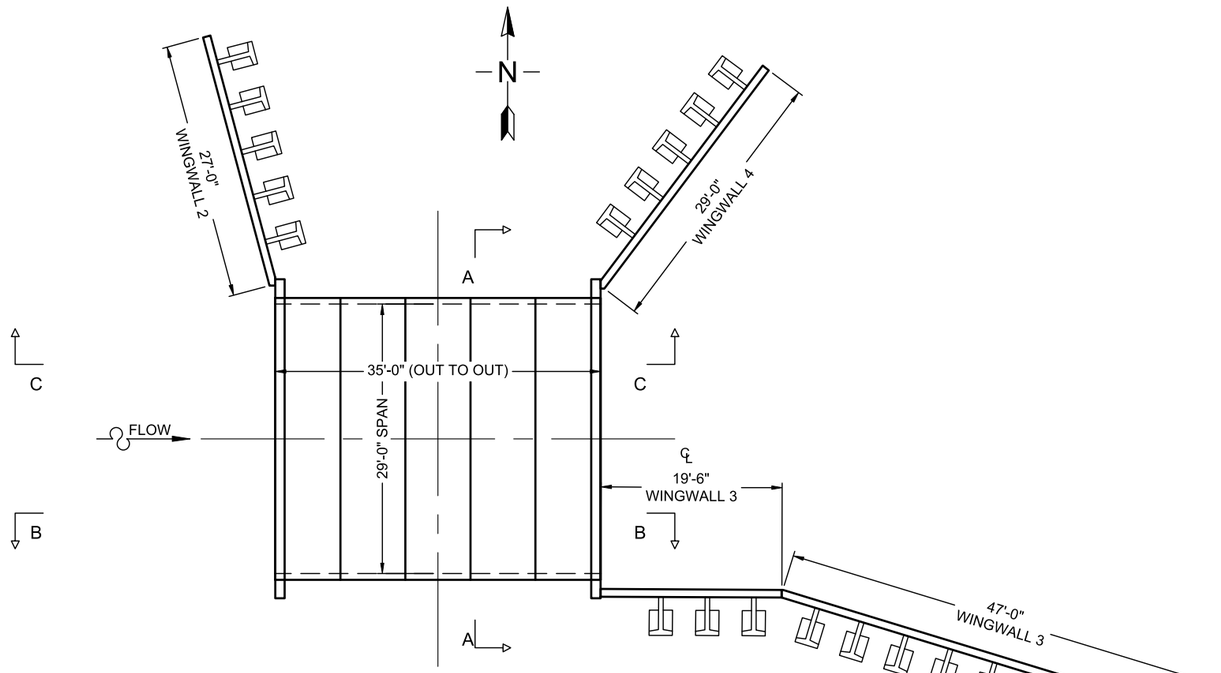
DESIGN LOADING:
- BRIDGE UNITS: HL-93
- HEADWALLS: EARTH PRESSURE ONLY
- WINGWALLS: EARTH PRESSURE ONLY

DESIGN FILL HEIGHT: 1'-0" TO 4'-0"
FROM TOP OF CROWN TO TOP OF PAVEMENT.
DESIGN METHOD: LOAD RESISTANCE FACTOR DESIGN PER AASHTO LRFD SPECIFICATION
ASSUMED NOMINAL BEARING RESISTANCE: 0 PSF
ASSUMED FACTORED BEARING RESISTANCE: 0 PSF

*AT THE TIME OF DESIGN, A GEOTECHNICAL REPORT FOR THE PROJECT SITE WAS NOT AVAILABLE. IT IS THE PROJECT ENGINEER'S, OWNER'S AND/OR THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE ACTUAL SITE CONDITIONS AT THE TIME OF CONSTRUCTION ARE CONSISTENT WITH THE ASSUMED ALLOWABLE SOIL BEARING PRESSURE WITH A GEOTECHNICAL INVESTIGATION FROM A QUALIFIED GEOTECHNICAL ENGINEER.

MATERIALS

PRECAST UNITS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CON/SPAN® SPECIFICATIONS. CONCRETE FOR FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. REINFORCING STEEL FOR FOOTINGS SHALL CONFORM TO ASTM A615 OR A996-GRADE 60.



BRIDGE PLAN

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

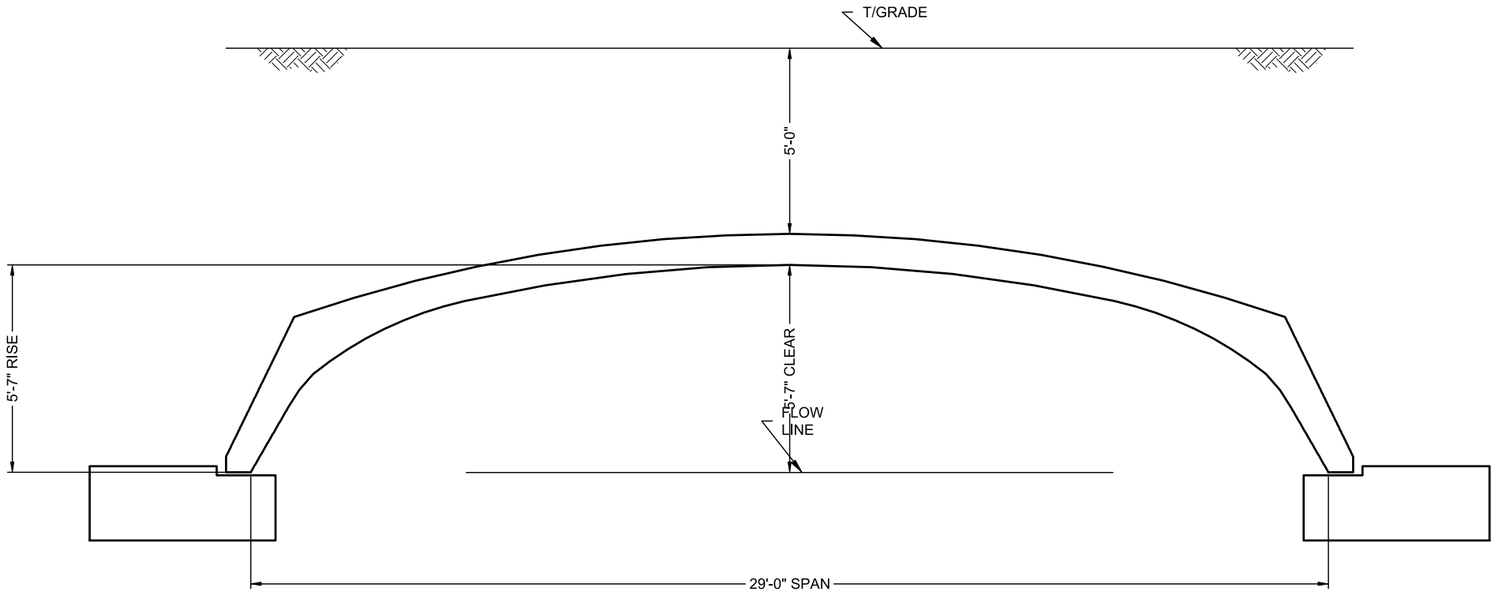
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 18 OF 28		



CROSS SECTION A-A

Approximate Area: 128 sq. ft. used, 128 sq. ft. total

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

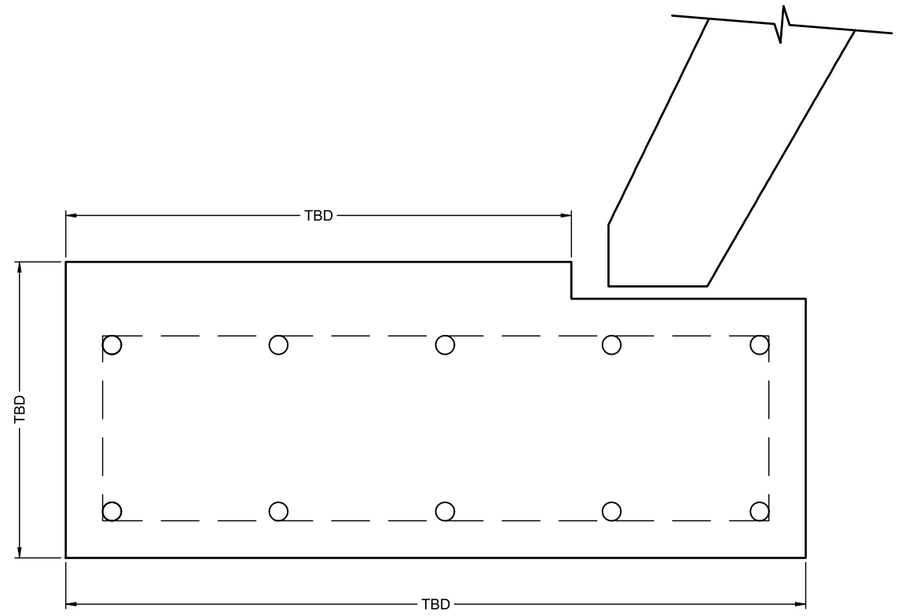
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 19 OF 28		



TYPICAL FOOTING DETAIL

NOTES
- FOOTING DIMENSIONS AND DETAILS SHOWN ARE CONCEPTUAL ONLY
- FINAL DIMENSIONS & DETAILS TO BE FURNISHED BY THE PROJECT ENGINEERS
- FOUNDATION REINFORCING TO BE DETERMINED

MARK	DATE	REVISION DESCRIPTION	BY
---		----	----
---		----	----
---		----	----
---		----	----
---		----	----
---		----	----

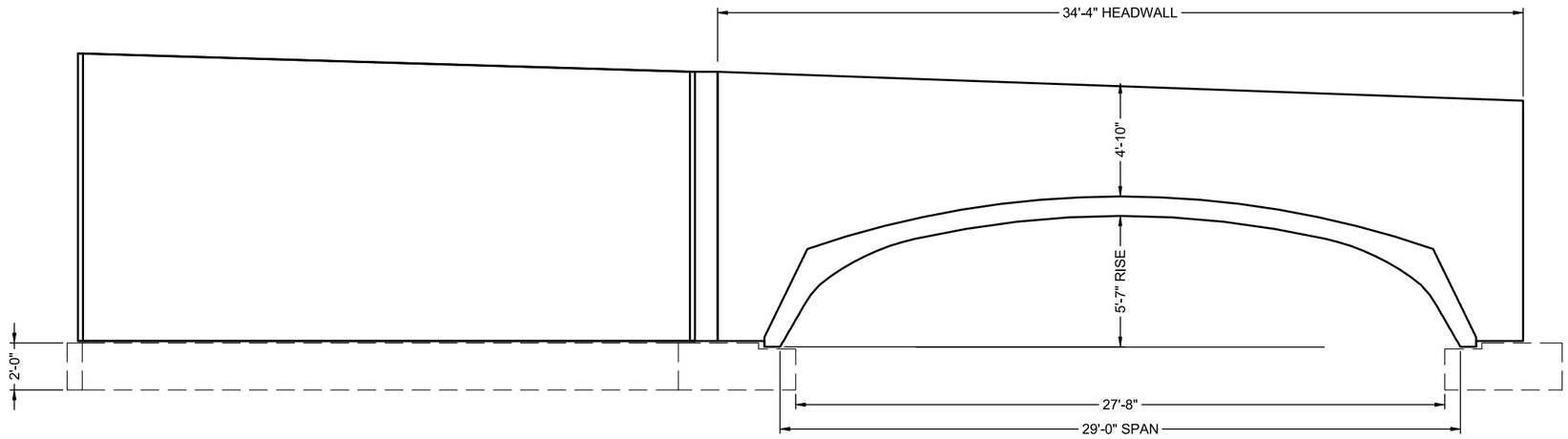
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL
DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 20 OF 28		



OUTLET END ELEVATION

MARK	DATE	REVISION DESCRIPTION	BY
---		----	----
---		----	----
---		----	----
---		----	----
---		----	----

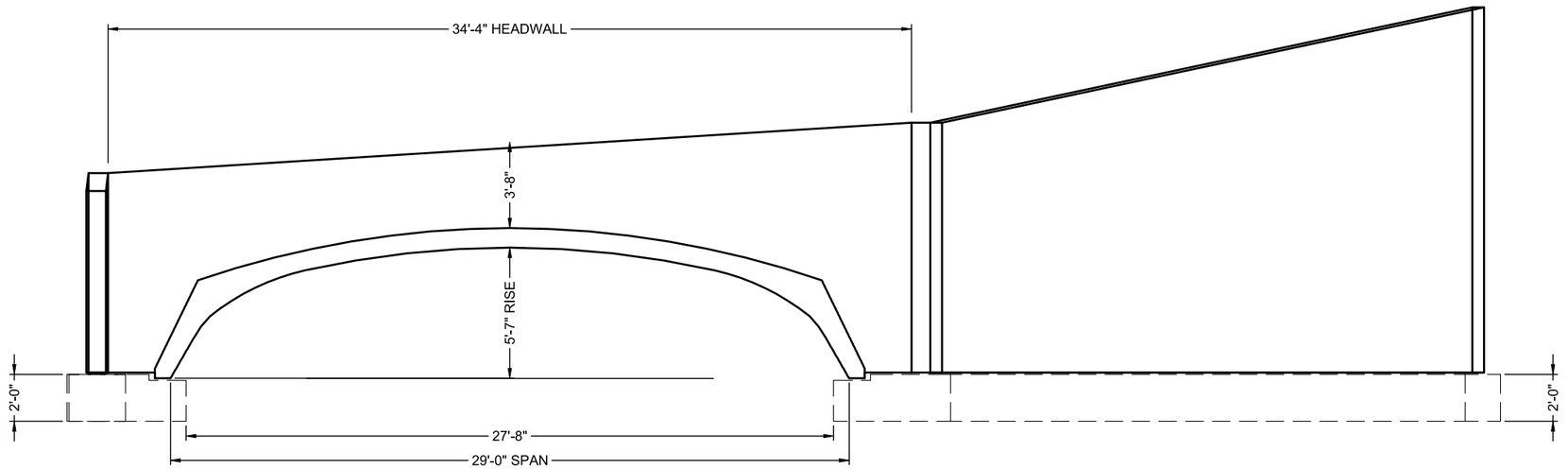
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL
DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 21 OF 28		



INLET END ELEVATION

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

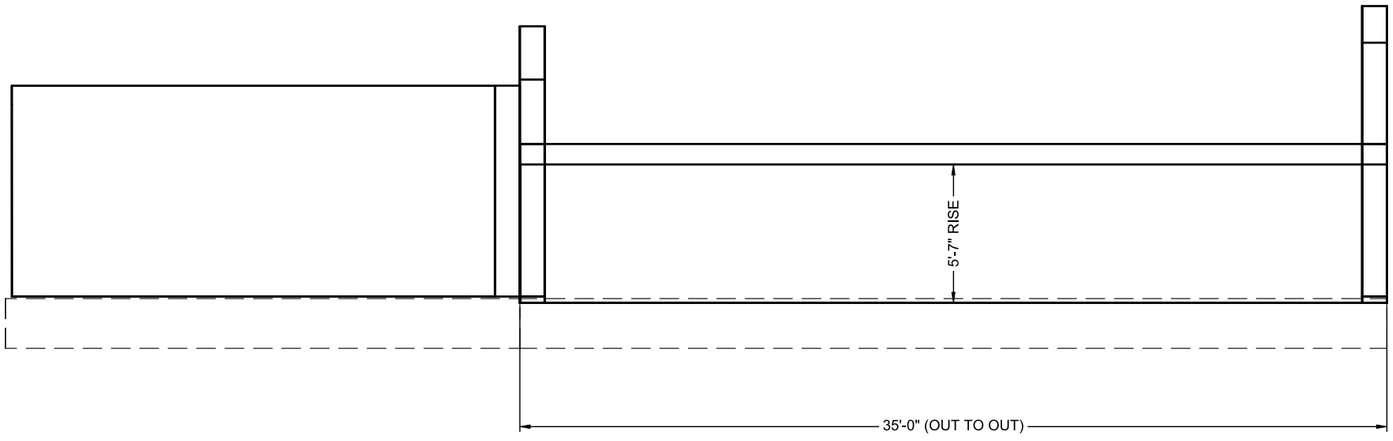
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL
DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 22	OF	28



PROFILE SECTION B-B

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

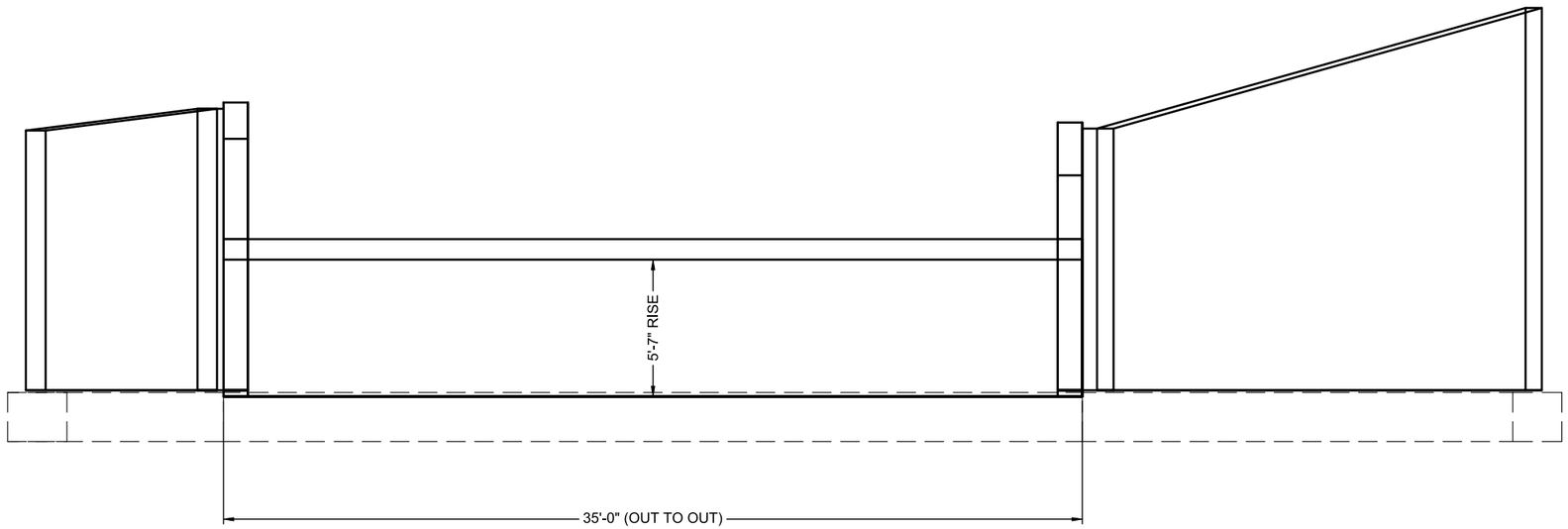
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 23 OF 28		



PROFILE SECTION C-C

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL
DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 24 OF 28		

LFD new

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® O-SERIES BRIDGE SYSTEMS

1. DESCRIPTION
   1.1. TYPE - THIS WORK SHALL CONSIST OF FURNISHING AND CONSTRUCTING A CON/SPAN® O-SERIES BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN AND DIMENSIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER. IN SITUATIONS WHERE TWO OR MORE SPECIFICATIONS APPLY TO THIS WORK, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN.
   1.2. DESIGNATION - PRECAST REINFORCED CONCRETE CON/SPAN® O-SERIES BRIDGE UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY SPAN AND RISE. PRECAST REINFORCED CONCRETE WINGWALLS AND HEADWALLS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT, AND DEFLECTION ANGLE. PRECAST REINFORCED CONCRETE EXPRESS™ FOUNDATION UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT AND WIDTH.

2. DESIGN
   2.1. SPECIFICATIONS - THE PRECAST ELEMENTS ARE DESIGNED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 17TH EDITION, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002. A MINIMUM OF ONE FOOT OF COVER ABOVE THE CROWN OF THE BRIDGE UNITS IS REQUIRED IN THE INSTALLED CONDITION. (UNLESS NOTED OTHERWISE ON THE SHOP DRAWINGS AND DESIGNED ACCORDINGLY.)

3. MATERIALS
   3.1. CONCRETE - THE CONCRETE FOR THE PRECAST ELEMENTS SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO FREEZE-THAW CONDITIONS, COMPOSED OF PORTLAND CEMENT, FINE AND COARSE AGGREGATES, ADMIXTURES AND WATER. AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 ± 2 PERCENT AIR. THE AIR- ENTRAINING ADMIXTURE SHALL CONFORM TO AASHT0 M154. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE AS SHOWN ON THE SHOP DRAWINGS.
      3.1.1. PORTLAND CEMENT - SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT.
      3.1.2. COARSE AGGREGATE - SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1 INCH. AGGREGATE SHALL MEET REQUIREMENTS FOR ASTM C33.
      3.1.3. WATER REDUCING ADMIXTURE - THE MANUFACTURER MAY SUBMIT, FOR APPROVAL BY THE ENGINEER, A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CONCRETE.
      3.1.4. CALCIUM CHLORIDE - THE ADDITION TO THE MIX OF CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.
      3.1.5. MIXTURE - THE AGGREGATES, CEMENT AND WATER SHALL BE PROPORTIONED AND MIXED IN A BATCH MIXER TO PRODUCE A HOMOGENEOUS CONCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS SPECIFICATION. THE PROPORTION OF PORTLAND CEMENT IN THE MIXTURE SHALL NOT BE LESS THAN 564 POUNDS (6 SACKS) PER CUBIC YARD OF CONCRETE.
   3.2. STEEL REINFORCEMENT
      3.2.1. THE MINIMUM STEEL YIELD STRENGTH SHALL BE 60,000 PSI, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS.
      3.2.2. ALL REINFORCING STEEL FOR THE PRECAST ELEMENTS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE DETAILED SHOP DRAWINGS SUBMITTED BY THE MANUFACTURER.
      3.2.3. REINFORCEMENT SHALL CONSIST OF WELDED WIRE REINFORCING CONFORMING TO ASTM SPECIFICATION A 1064, OR DEFORMED BILLET STEEL BARS CONFORMING TO ASTM SPECIFICATION A 615, GRADE 60. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY CONSIST OF WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS.
   3.3. STEEL HARDWARE
      3.3.1. BOLTS AND THREADED RODS FOR WINGWALL CONNECTIONS SHALL CONFORM TO ASTM A 307. NUTS SHALL CONFORM TO AASHTO M292 (ASTM A194) GRADE 2H. ALL BOLTS, THREADED RODS AND NUTS USED IN WINGWALL CONNECTIONS SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.
      3.3.2. STRUCTURAL STEEL FOR WINGWALL CONNECTION PLATES AND PLATE WASHERS SHALL CONFORM TO AASHTO M 270 (ASTM A 709) GRADE 36 AND SHALL BE HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).
      3.3.3. INSERTS FOR WINGWALLS SHALL BE 1" DIAMETER TWO-BOLT PRESET WINGWALL ANCHORS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700 AND SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.
      3.3.4. FERRULE LOOP INSERTS SHALL BE F-64 FERRULE LOOP INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700.
      3.3.5. HOOK BOLTS USED IN ATTACHED HEADWALL CONNECTIONS SHALL BE ASTM A307.
      3.3.6. INSERTS FOR DETACHED HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL, EXPANDED COIL INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700. COIL RODS AND NUTS USED IN HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL. WASHERS USED IN HEADWALL CONNECTIONS SHALL BE EITHER AISI TYPE 304 STAINLESS STEEL PLATE WASHERS OR AASHTO M270 (ASTM A709) GRADE 36 PLATE WASHERS HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).
      3.3.7. MECHANICAL SPLICES OF REINFORCING BARS SHALL BE MADE USING THE DOWEL BAR SPLICER SYSTEM AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700, AND SHALL CONSIST OF THE DOWEL BAR SPLICER (DB-SAE) AND DOWEL-IN (DI).

4. MANUFACTURE OF PRECAST ELEMENTS - SUBJECT TO THE PROVISIONS OF SECTION 5, BELOW, THE PRECAST ELEMENT DIMENSION AND REINFORCEMENT DETAILS SHALL BE AS PRESCRIBED IN THE PLAN AND SHOP DRAWINGS PROVIDED BY THE MANUFACTURER.
   4.1. FORMS - THE FORMS USED IN MANUFACTURE SHALL BE SUFFICIENTLY RIGID AND ACCURATE TO MAINTAIN THE REQUIRED PRECAST ELEMENT DIMENSIONS WITHIN THE PERMISSIBLE VARIATIONS GIVEN IN SECTION 5 OF THESE SPECIFICATIONS. ALL CASTING SURFACES SHALL BE OF A SMOOTH MATERIAL.
   4.2. PLACEMENT OF REINFORCEMENT
      4.2.1. PLACEMENT OF REINFORCEMENT IN PRECAST BRIDGE UNITS - THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MINIMUM. THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1½" MINIMUM, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING SINGLE OR MULTIPLE LAYERS OF WELDED WIRE FABRIC (NOT TO EXCEED 3 LAYERS), SUPPLEMENTED WITH A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WHEN NECESSARY. WELDED WIRE FABRIC SHALL BE COMPOSED OF CIRCUMFERENTIAL AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE BRIDGE UNIT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW. THE ENDS OF THE LONGITUDINAL DISTRIBUTION REINFORCEMENT SHALL BE NOT MORE THAN 3" AND NOT LESS THAN 1½" FROM THE ENDS OF THE BRIDGE UNIT.
      4.2.2. BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.
      4.2.3. PLACEMENT OF REINFORCEMENT FOR PRECAST WINGWALLS AND HEADWALLS - THE COVER OF CONCRETE OVER THE LONGITUDINAL AND TRANSVERSE REINFORCEMENT SHALL BE 2" MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 1½" NOR MORE THAN 3". REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC, OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.
      4.2.4. PLACEMENT OF REINFORCEMENT FOR PRECAST FOUNDATION UNITS - THE COVER OF CONCRETE OVER THE BOTTOM REINFORCEMENT SHALL BE 3 INCHES MINIMUM. THE COVER OF CONCRETE FOR ALL OTHER REINFORCEMENT SHALL BE 2 INCHES MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 3 INCHES. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC OR A SINGLE LAYER OF DEFOREMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.
   4.3. LAPS, WELDS, SPACING
      4.3.1. LAPS, WELDS, AND SPACING FOR PRECAST BRIDGE UNITS - TENSION SPLICES IN THE CIRCUMFERENTIAL REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. THE OVERLAP OF WELDED WIRE FABRIC SHALL BE MEASURED BETWEEN THE OUTER-MOST LONGITUDINAL WIRES OF EACH FABRIC SHEET. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1 FOR SPLICES OTHER THAN TENSION SPLICES, THE OVERLAP SHALL BE A MINIMUM OF 1'-0" FOR WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS. THE SPACING CENTER TO CENTER OF THE CIRCUMFERENTIAL WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL DISTRIBUTION STEEL FOR EITHER LINE OF REINFORCING IN THE TOP SLAB SHALL BE NOT MORE THAN 1'-4".
      4.3.2. LAPS, WELDS, AND SPACING FOR PRECAST WINGWALLS, HEADWALLS AND FOUNDATIONS - SPLICES IN THE REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1. THE SPACING CENTER-TO-CENTER OF THE WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 8".
   4.4. CURING - THE PRECAST CONCRETE ELEMENTS SHALL BE CURED FOR A SUFFICIENT LENGTH OF TIME SO THAT THE CONCRETE WILL DEVELOP THE SPECIFIED COMPRESSIVE STRENGTH IN 28 DAYS OR LESS. ANY ONE OF THE FOLLOWING METHODS OF CURING OR COMBINATIONS THERE OF SHALL BE USED:
      4.4.1. STEAM CURING - THE PRECAST ELEMENTS MAY BE LOW-PRESSURE STEAM CURED BY A SYSTEM THAT WILL MAINTAIN A MOIST ATMOSPHERE.
      4.4.2. WATER CURING - THE PRECAST ELEMENTS MAY BE WATER CURED BY ANY METHOD THAT WILL KEEP THE SECTIONS MOIST.
      4.4.3. MEMBRANE CURING - A SEALING MEMBRANE CONFORMING TO THE REQUIREMENTS OF ASTM SPECIFICATION C309 MAY BE APPLIED AND SHALL BE LEFT INTACT UNTIL THE REQUIRED CONCRETE COMPRESSIVE STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF APPLICATION SHALL BE WITHIN +/- 10 DEGREES F OF THE ATMOSPHERIC TEMPERATURE. ALL SURFACES SHALL BE KEPT MOIST PRIOR TO THE APPLICATION OF THE COMPOUNDS AND SHALL BE DAMP WHEN THE COMPOUND IS APPLIED.
   4.5. STORAGE, HANDLING & DELIVERY
      4.5.1. STORAGE - PRECAST CONCRETE BRIDGE ELEMENTS SHALL BE LIFTED AND STORED IN "AS-CAST" POSITION. PRECAST CONCRETE HEADWALL AND WINGWALL UNITS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION. THE PRECAST ELEMENTS SHALL BE STORED IN SUCH A MANNER TO PREVENT CRACKING OR DAMAGE. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. THE UNITS SHALL NOT BE MOVED UNTIL THE CONCRETE COMPRESSIVE STRENGTH HAS REACHED A MINIMUM OF 2500 PSI, AND THEY SHALL NOT BE STORED IN AN UPRIGHT POSITION.
      4.5.2. HANDLING - HANDLING DEVICES SHALL BE PERMITTED IN EACH PRECAST ELEMENT FOR THE PURPOSE OF HANDLING AND SETTING. SPREADER BEAMS MAY BE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE BRIDGE ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES.
      4.5.3. DELIVERY - PRECAST CONCRETE ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH, OR AS DIRECTED BY THE DESIGN ENGINEER. PRECAST CONCRETE ELEMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT THE SITE UNTIL INSTALLED. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE.
   4.6. QUALITY ASSURANCE - THE PRECASTER SHALL DEMONSTRATE ADHERENCE TO THE STANDARDS SET FORTH IN THE NPCA QUALITY CONTROL MANUAL. THE PRECASTER SHALL MEET EITHER SECTION 4.6.1 OR 4.6.2
      4.6.1. CERTIFICATION - THE PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED BY THIS SPECIFICATION.
      4.6.2. QUALIFICATIONS, TESTING AND INSPECTION
         4.6.2.1. THE PRECASTER SHALL HAVE BEEN IN THE BUSINESS OF PRODUCING PRECAST CONCRETE PRODUCTS SIMILAR TO THOSE SPECIFIED FOR A MINIMUM OF THREE YEARS. HE SHALL MAINTAIN A PERMANENT QUALITY CONTROL DEPARTMENT OR RETAIN AN INDEPENDENT TESTING AGENCY ON A CONTINUING BASIS. THE AGENCY SHALL ISSUE A REPORT, CERTIFIED BY A LICENSED ENGINEER, DETAILING THE ABILITY OF THE PRECASTER TO PRODUCE QUALITY PRODUCTS CONSISTENT WITH INDUSTRY STANDARDS.
         4.6.2.2. THE PRECASTER SHALL SHOW THAT THE FOLLOWING TESTS ARE PERFORMED IN ACCORDANCE WITH THE ASTM STANDARDS INDICATED, TESTS SHALL BE PERFORMED AS INDICATED IN SECTION 6 OF THESE SPECIFICATIONS.
            4.6.2.2.1. AIR CONTENT: C231 OR C173
            4.6.2.2.2. COMPRESSIVE STRENGTH: C31,C39,C497
         4.6.2.3. THE PRECASTER SHALL PROVIDE DOCUMENTATION DEMONSTRATING COMPLIANCE WITH THIS SECTION TO CONTECH® ENGINEERED SOLUTIONS AT REGULAR INTERVALS OR UPON REQUEST.
         4.6.2.4. THE OWNER MAY PLACE AN INSPECTOR IN THE PLANT WHEN THE PRODUCTS COVERED BY THIS SPECIFICATION ARE BEING MANUFACTURED.
      4.6.3. DOCUMENTATION - THE PRECASTER SHALL SUBMIT PRECAST PRODUCTION REPORTS TO CONTECH® ENGINEERED SOLUTIONS AS REQUIRED.

5. PERMISSIBLE VARIATIONS
   5.1. BRIDGE UNITS
      5.1.1. INTERNAL DIMENSIONS - THE INTERNAL DIMENSION SHALL VARY NOT MORE THAN 1% FROM THE DESIGN DIMENSIONS NOR MORE THAN 1½" WHICHEVER IS LESS.
      5.1.2. SLAB AND WALL THICKNESS - THE SLAB AND WALL THICKNESS SHALL NOT BE LESS THAN THAT SHOWN IN THE DESIGN BY MORE THAN ¼". A THICKNESS MORE THAN THAT REQUIRED IN THE DESIGN SHALL NOT BE CAUSE FOR REJECTION.
      5.1.3. LENGTH OF OPPOSITE SURFACES - VARIATIONS IN LAYING LENGTHS OF TWO OPPOSITE SURFACES OF THE BRIDGE UNIT SHALL NOT BE MORE THAN ½" IN ANY SECTION, EXCEPT WHERE BEVELED ENDS FOR LAYING OF CURVES ARE SPECIFIED BY THE PURCHASER.
      5.1.4. LENGTH OF SECTION - THE UNDERRUN IN LENGTH OF A SECTION SHALL NOT BE MORE THAN ½" IN ANY BRIDGE UNIT.
      5.1.5. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½" FOR THE OUTSIDE CIRCUMFERENTIAL STEEL OR BE LESS THAN 1" FOR THE INSIDE CIRCUMFERENTIAL STEEL AS MEASURED TO THE EXTERNAL OR INTERNAL SURFACE OF THE BRIDGE. THESE TOLERANCES OR COVER REQUIREMENTS DO NOT APPLY TO MATING SURFACES OF THE JOINTS.
      5.1.6. AREA OF REINFORCEMENT - THE AREAS OF STEEL REINFORCEMENT SHALL BE THE DESIGN STEEL AREAS AS SHOWN IN THE MANUFACTURER'S SHOP DRAWINGS. STEEL AREAS GREATER THAN THOSE REQUIRED SHALL NOT BE CAUSE FOR REJECTION. THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCEMENT SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCEMENT.
   5.2. WINGWALLS & HEADWALLS
      5.2.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.2.2. LENGTH/HEIGHT OF WALL SECTIONS - THE LENGTH AND HEIGHT OF THE WALL SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.2.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½".
      5.2.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.
   5.3. FOUNDATION UNITS
      5.3.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.3.2. LENGTH/ HEIGHT/WIDTH OF FOUNDATION SECTIONS - THE LENGTH, HEIGHT AND WIDTH OF THE FOUNDATION UNITS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.3.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½".
      5.3.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.

6. TESTING/ INSPECTION
   6.1. TESTING
      6.1.1. TYPE OF TEST SPECIMEN - CONCRETE COMPRESSIVE STRENGTH SHALL BE DETERMINED FROM COMPRESSION TESTS MADE ON CYLINDERS OR CORES. FOR CYLINDER TESTING, A MINIMUM OF 4 CYLINDERS SHALL BE TAKEN FOR EACH BRIDGE ELEMENT. EACH ELEMENT SHALL BE CONSIDERED SEPARATELY FOR THE PURPOSE OF TESTING AND ACCEPTANCE.
      6.1.2. COMPRESSION TESTING - CYLINDERS SHALL BE MADE AND TESTED AS PRESCRIBED BY THE ASTM C39 SPECIFICATION. CYLINDERS SHALL BE CURED IN THE SAME ENVIRONMENT AS THE BRIDGE ELEMENTS. CORES SHALL BE OBTAINED AND TESTED FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE PROVISIONS OF THE ASTM C42 SPECIFICATION.
      6.1.3. ACCEPTABILITY OF CYLINDER TESTS - WHEN THE AVERAGE COMPRESSIVE STRENGTH OF ALL CYLINDERS TESTED IS EQUAL TO OR GREATER THAN THE DESIGN COMPRESSIVE STRENGTH, AND NOT MORE THAN 10% OF THE CYLINDERS TESTED HAVE A COMPRESSIVE STRENGTH LESS THAN THE DESIGN CONCRETE STRENGTH, AND NO CYLINDER TESTED HAS A COMPRESSIVE STRENGTH LESS THAN 80% OF THE DESIGN COMPRESSIVE STRENGTH, THEN THE ELEMENT SHALL BE ACCEPTED. WHEN THE COMPRESSIVE STRENGTH OF THE CYLINDERS TESTED DOES NOT CONFORM TO THESE ACCEPTANCE CRITERIA, THE ACCEPTABILITY OF THE ELEMENT MAY BE DETERMINED AS DESCRIBED IN SECTION 6.1.4, BELOW.
      6.1.4. ACCEPTABILITY OF CORE TESTS - THE COMPRESSIVE STRENGTH OF THE CONCRETE IN A BRIDGE ELEMENT IS ACCEPTABLE WHEN THE AVERAGE CORE TEST STRENGTH IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH. WHEN THE COMPRESSIVE STRENGTH OF A CORE TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN MAY BE RE-CORED. WHEN THE COMPRESSIVE STRENGTH OF THE RE-CORE IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, THE COMPRESSIVE STRENGTH OF THE CONCRETE IN THAT BRIDGE ELEMENT IS ACCEPTABLE.
         6.1.4.1. WHEN THE COMPRESSIVE STRENGTH OF ANY RECORE IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN SHALL BE REJECTED.
         6.1.4.2. PLUGGING CORE HOLES - THE CORE HOLES SHALL BE PLUGGED AND SEALED BY THE MANUFACTURER IN A MANNER SUCH THAT THE ELEMENTS WILL MEET ALL OF THE TEST REQUIREMENTS OF THIS SPECIFICATION. PRECAST ELEMENTS SO SEALED SHALL BE CONSIDERED SATISFACTORY FOR USE.
         6.1.4.3. TEST EQUIPMENT - EVERY MANUFACTURER FURNISHING PRECAST ELEMENTS UNDER THIS SPECIFICATION SHALL FURNISH ALL FACILITIES AND PERSONNEL NECESSARY TO CARRY OUT THE TEST REQUIRED.
   6.2. INSPECTION - THE QUALITY OF MATERIALS, THE PROCESS OF MANUFACTURE, AND THE FINISHED PRECAST ELEMENTS SHALL BE SUBJECT TO INSPECTION BY THE PURCHASER.

7. JOINTS
   THE BRIDGE UNITS SHALL BE PRODUCED WITH FLAT BUTT ENDS. THE ENDS OF THE BRIDGE UNITS SHALL BE SUCH THAT WHEN THE SECTIONS ARE LAID TOGETHER THEY WILL MAKE A CONTINUOUS LINE WITH A SMOOTH INTERIOR FREE OF APPRECIABLE IRREGULARITIES, ALL COMPATIBLE WITH THE PERMISSIBLE VARIATIONS IN SECTION 5, ABOVE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED ¾".

8. WORKMANSHIP/ FINISH
   THE BRIDGE UNITS, WINGWALLS, HEADWALLS AND FOUNDATION UNITS SHALL BE SUBSTANTIALLY FREE OF FRACTURES. THE ENDS OF THE BRIDGE UNITS SHALL BE NORMAL TO THE WALLS AND CENTERLINE OF THE BRIDGE SECTION, WITHIN THE LIMITS OF THE VARIATIONS GIVEN IN SECTION 5, ABOVE, EXCEPT WHERE BEVELED ENDS ARE SPECIFIED. THE FACES OF THE WINGWALLS AND HEADWALLS SHALL BE PARALLEL TO EACH OTHER, WITHIN THE LIMITS OF VARIATIONS GIVEN IN SECTION 5, ABOVE. THE SURFACE OF THE PRECAST ELEMENTS SHALL BE A SMOOTH STEEL FORM OR TROWELED SURFACE. TRAPPED AIR POCKETS CAUSING SURFACE DEFECTS SHALL BE CONSIDERED AS PART OF A SMOOTH, STEEL FORM FINISH.

9. REPAIRS
   PRECAST ELEMENTS MAY BE REPAIRED, IF NECESSARY, BECAUSE OF IMPERFECTIONS IN MANUFACTURE OR HANDLING DAMAGE AND WILL BE ACCEPTABLE IF, IN THE OPINION OF THE PURCHASER, THE REPAIRS ARE SOUND, PROPERLY FINISHED AND CURED, AND THE REPAIRED SECTION CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION.

10. REJECTION
    THE PRECAST ELEMENTS SHALL BE SUBJECT TO REJECTION ON ACCOUNT OF ANY OF THE SPECIFICATION REQUIREMENTS. INDIVIDUAL PRECAST ELEMENTS MAY BE REJECTED BECAUSE OF ANY OF THE FOLLOWING:
    10.1. FRACTURES OR CRACKS PASSING THROUGH THE WALL, EXCEPT FOR A SINGLE END CRACK THAT DOES NOT EXCEED ONE HALF THE THICKNESS OF THE WALL.
    10.2. DEFECTS THAT INDICATE PROPORTIONING, MIXING, AND MOLDING NOT IN COMPLIANCE WITH SECTION 4 OF THESE SPECIFICATIONS.
    10.3. HONEYCOMBED OR OPEN TEXTURE.
    10.4. DAMAGED ENDS, WHERE SUCH DAMAGE WOULD PREVENT MAKING A SATISFACTORY JOINT.

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL
DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 25	OF 28	

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® O-SERIES BRIDGE SYSTEMS (CONT'D)

11. MARKING
EACH BRIDGE UNIT SHALL BE CLEARLY MARKED BY WATERPROOF PAINT. THE FOLLOWING SHALL BE SHOWN ON THE INSIDE OF THE VERTICAL LEG OF THE BRIDGE SECTION:
BRIDGE SPAN x BRIDGE RISE
DATE OF MANUFACTURE
NAME OR TRADEMARK OF THE MANUFACTURER

12. INSTALLATION PREPARATION
TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE BRIDGE SYSTEM, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR BRIDGE UNITS, HEADWALL, AND WINGWALL ELEMENTS. EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS.

12.1. FOOTINGS
DO NOT OVER EXCAVATE FOUNDATIONS UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.

THE SITE SOILS ENGINEER SHALL CERTIFY THAT THE BEARING CAPACITY MEETS OR EXCEEDS THE FOOTING DESIGN REQUIREMENTS, PRIOR TO THE CONTRACTOR POURING OF THE FOOTINGS.

THE BRIDGE UNITS AND WINGWALLS SHALL BE INSTALLED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE FOOTINGS. THE SIZE AND ELEVATION OF THE FOOTINGS SHALL BE AS DESIGNED BY THE ENGINEER. A KEYWAY SHALL BE FORMED IN THE TOP SURFACE OF THE BRIDGE FOOTING AS SPECIFIED ON THE PLANS. NO KEYWAY IS REQUIRED IN THE WINGWALL FOOTINGS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

THE FOOTINGS SHALL BE GIVEN A SMOOTH FLOAT FINISH AND SHALL REACH A COMPRESSIVE STRENGTH OF 2,000 PSI BEFORE PLACEMENT OF THE BRIDGE AND WINGWALL ELEMENTS. BACKFILLING SHALL NOT BEGIN UNTIL THE FOOTING HAS REACHED THE FULL DESIGN COMPRESSIVE STRENGTH.

THE FOOTING SURFACE SHALL BE CONSTRUCTED IN ACCORDANCE WITH GRADES SHOWN ON THE PLANS. WHEN TESTED WITH A 10'-0" STRAIGHT EDGE, THE SURFACE SHALL NOT VARY MORE THAN ½" IN 10'-0".

IF A PRECAST CONCRETE FOOTING IS USED, THE CONTRACTOR SHALL PREPARE A 4" THICK BASE LAYER OF COMPACTED GRANULAR MATERIAL THE FULL WIDTH OF THE FOOTING PRIOR TO PLACING THE PRECAST FOOTING.

THE FOUNDATIONS FOR PRECAST CONCRETE BRIDGE ELEMENTS AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE USED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF THE FOUNDATIONS PER THE PLANS AND SPECIFICATIONS.

13. INSTALLATION

13.1. GENERAL - THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS EXPLAINED IN THE PUBLICATION CON/SPAN BRIDGE SYSTEMS INSTALLATION HANDBOOK.

13.1.1. LIFTING - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT A CRANE OF THE CORRECT LIFTING CAPACITY IS AVAILABLE TO HANDLE THE PRECAST CONCRETE UNITS. THIS CAN BE ACCOMPLISHED BY USING THE WEIGHTS GIVEN FOR THE PRECAST CONCRETE COMPONENTS AND BY DETERMINING THE LIFTING REACH FOR EACH CRANE UNIT. SITE CONDITIONS MUST BE CHECKED WELL IN ADVANCE OF SHIPPING TO ENSURE PROPER CRANE LOCATION AND TO AVOID ANY LIFTING RESTRICTIONS. THE LIFT ANCHORS OR HOLES PROVIDED IN EACH UNIT ARE THE ONLY MEANS TO BE USED TO LIFT THE ELEMENTS. THE PRECAST CONCRETE ELEMENTS MUST NOT BE SUPPORTED OR RAISED BY OTHER MEANS THAN THOSE GIVEN IN THE MANUALS AND DRAWINGS WITHOUT WRITTEN APPROVAL FROM CONTECH® ENGINEERED SOLUTIONS.

13.1.2. CONSTRUCTION EQUIPMENT WEIGHT RESTRICTIONS - IN NO CASE SHALL EQUIPMENT OPERATING IN EXCESS OF THE DESIGN LOAD (HS20 OR HS25) BE PERMITTED OVER THE BRIDGE UNITS UNLESS APPROVED BY CONTECH® ENGINEERED SOLUTIONS.

13.1.2.1. IN THE IMMEDIATE AREA OF THE BRIDGE UNITS, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:

- NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE BRIDGE UNIT.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 4" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 10 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 1'-0" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN COVER, OR 2'-0" MINIMUM, OVER THE CROWN OF THE PRECAST CONCRETE BRIDGE, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE BRIDGE.

13.2. LEVELING PAD/SHIMS - THE BRIDGE UNITS AND WINGWALLS SHALL BE SET ON HARDBOARD SHIMS CONFORMING TO ASTM D1037 OR PLASTIC SHIMS (DAYTON SUPERIOR P-80, P-81 OR APPROVED EQUAL) MEASURING 5" x 5", MINIMUM, UNLESS SHOWN OTHERWISE ON THE PLANS. A MINIMUM GAP OF ½" SHALL BE PROVIDED BETWEEN THE FOOTING AND THE BOTTOM OF THE BRIDGE'S VERTICAL LEGS OR THE BOTTOM OF THE WINGWALL. ALSO, A SUPPLY OF ¼", ½" AND ¾" THICK HARDBOARD OR PLASTIC SHIMS FOR VARIOUS SHIMMING PURPOSES SHALL BE ON SITE.

13.3. PLACEMENT OF BRIDGE UNITS - THE BRIDGE UNITS SHALL BE PLACED AS SHOWN ON THE ENGINEER'S PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED ¾".

13.4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE STRUCTURE SPAN DURING ALL PHASES OF INSTALLATION. DUE TO THE ARCH SHAPE, BRIDGE ELEMENTS WILL TEND TO SPREAD UNDER SELF-WEIGHT. IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. GENERALLY, HORIZONTAL CABLE TIES OR TIE RODS ARE SHIPPED IN THE LARGER BRIDGE ELEMENTS TO ASSIST IN PREVENTING THIS SPREADING. CABLE TIES/TIE RODS SHALL NOT BE REMOVED UNTILL BRIDGE UNITS ARE GROUTED AND GROUT HAS CURED. IT IS RECOMMENDED THAT TEMPORARY HARDWOOD BLOCKS BE USED IN CONJUNCTION WITH THE CABLE TIES/TIE RODS TO MAINTAIN SPAN. IF, HOWEVER, DUE TO SITE RESTRICTIONS, THESE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO PLACEMENT OF THE BRIDGE ELEMANTS, THE CONTRACTOR MUST NOTIFY CONTECH (MANUFACTURER) AND REQUEST A SUGGESTED INSTALLATION PROCEDURE.

IN ADDITION, IF THE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO SETTING ARCH UNITS, THE FOLLOWING QUALITY CONTROL PROCEDURE MUST BE FOLLOWED:
1) FIND "MEASURED SPAN" UPON ARCH UNIT'S DELIVERY TO SITE, PRIOR TO LIFTING FROM TRUCK AND REMOVING CABLE TIES/TIE RODS. "MEASURED SPAN" SHALL BE THE AVERAGE OF (3) SPAN MEASUREMENTS ALONG THE LAY LENGTH OF THE ARCH UNIT.
2) AFTER SETTING OF BRIDGE UNIT ON THE FOUNDATION, VERIFY THE SPAN. THIS "INSTALLED SPAN MEASUREMENT" SHALL NOT EXCEED THE MAXIMUM OF:
A) THE NOMINAL SPAN +½" OR
B) THE "MEASURED SPAN"
IF THE "INSTALLED SPAN MEASUREMENT" EXCEEDS THIS AMOUNT, THE ARCH UNIT SHALL BE LIFTED AND RE-SET UNTIL THE "INSTALLED SPAN MEASUREMENT" MEETS THE LIMITS.

13.5. PLACEMENT OF WINGWALLS, HEADWALLS AND FOUNDATION UNITS - THE WINGWALLS, HEADWALLS AND FOUNDATIONS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE.

13.6. WATERPROOFING/JOINT PROTECTION AND SUBSURFACE DRAINAGE

13.6.1. EXTERNAL PROTECTION OF JOINTS - THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A ⅛" x 1⅜" PREFORMED BITUMINOUS JOINT SEALANT AND A MINIMUM OF A 9" WIDE JOINT WRAP. THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE JOINT MATERIAL. A PRIMER COMPATIBLE WITH THE JOINT WRAP TO BE USED SHALL BE APPLIED FOR A MINIMUM WIDTH OF 9" ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE CS212 BY CONCRETE SEALANTS INC., EZ-WRAP RUBBER BY PRESS-SEAL GASKET CORPORATION, SEAL WRAP BY MAR MAC MANUFACTURING CO. INC. OR APPROVED EQUAL. THE JOINT SHALL BE COVERED CONTINUOUSLY FROM THE BOTTOM OF ONE BRIDGE SECTION LEG, ACROSS THE TOP OF THE BRIDGE AND TO THE OPPOSITE BRIDGE SECTION LEG. ANY LAPS THAT RESULT IN THE JOINT WRAP SHALL BE A MINIMUM OF 6" LONG WITH THE OVERLAP RUNNING DOWNHILL.

13.6.2. IN ADDITION TO THE JOINTS BETWEEN BRIDGE UNITS, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE HEADWALL SHALL ALSO BE SEALED AS DESCRIBED ABOVE. IF PRECAST WINGWALLS ARE USED, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE WINGWALL SHALL BE SEALED WITH A 2'-0" STRIP OF FILTER FABRIC. ALSO, IF LIFT HOLES ARE FORMED IN THE BRIDGE UNITS, THEY SHALL BE PRIMED AND COVERED WITH A 9" x 9" SQUARE OF JOINT WRAP.

13.6.3. DURING THE BACKFILLING OPERATION, CARE SHALL BE TAKEN TO KEEP THE JOINT WRAP IN ITS PROPER LOCATION OVER THE JOINT.

13.6.4. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE ENGINEER.

13.7. GROUTING

13.7.1. GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS. FILL THE BRIDGE-FOUNDATION KEYWAY WITH CEMENT GROUT (PORTLAND CEMENT AND WATER OR CEMENT MORTAR COMPOSED OF PORTLAND CEMENT, SAND AND WATER) WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI. VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS COMPLETELY FILLED. IF BRIDGE ELEMENTS HAVE BEEN SET WITH TEMPORARY TIES (CABLES, BARS, ETC.) GROUT MUST ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI BEFORE TIES MAY BE REMOVED.

13.7.2. ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF ¼".

13.7.3. LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT.

13.7.4. AFTER GROUT HAS REACHED ITS DESIGN STRENGTH THE TEMPORARY HARDWOOD WEDGES SHALL BE REMOVED AND THEIR HOLES FILLED WITH GROUT.

13.8. BACKFILL

13.8.1. DO NOT PERFORM BACKFILLING DURING WET OR FREEZING WEATHER.

13.8.2. NO BACKFILL SHALL BE PLACED AGAINST ANY STRUCTURAL ELEMENTS UNTIL THEY HAVE BEEN APPROVED BY THE ENGINEER.

13.8.3. BACKFILL SHALL BE CONSIDERED AS ALL REPLACED EXCAVATION AND NEW EMBANKMENT ADJACENT TO THE PRECAST CONCRETE ELEMENTS. THE PROJECT CONSTRUCTION AND MATERIAL SPECIFICATIONS, WHICH INCLUDE THE SPECIFICATIONS FOR EXCAVATION FOR STRUCTURES AND ROADWAY EXCAVATION AND EMBANKMENT CONSTRUCTION, SHALL APPLY EXCEPT AS MODIFIED IN THIS SECTION.

13.8.4. BACKFILL ZONES:

- IN-SITU SOIL
- ZONE A: CONSTRUCTED EMBANKMENT OR OVERFILL.
- ZONE B: FILL THAT IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE BRIDGE INSTALLATION.
- ZONE C: ROAD STRUCTURE.

13.8.5. REQUIRED BACKFILL PROPERTIES

13.8.5.1. IN-SITU SOIL - NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE BRIDGE UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR MINIMUM LATERAL DIMENSION OF ONE BRIDGE SPAN OUTSIDE OF THE BRIDGE FOOTING.

13.8.5.2. ZONE A - ZONE A REQUIRES FILL MATERIAL WITH SPECIFICATIONS AND COMPACTING PROCEDURES EQUAL TO THAT FOR NORMAL ROAD EMBANKMENTS.

13.8.5.3. ZONE B - GENERALLY, SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3" IN DIAMETER SEE CHARTS FOR DETAILED DESCRIPTIONS OF ACCEPTABLE SOILS.

13.8.5.4. ZONE C - ZONE C IS THE ROAD SECTION OF GRAVEL, ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.

13.8.5.5. GEOTECHNICAL ENGINEER SHALL REVIEW GRADATIONS OF ALL INTERFACING MATERIALS AND, IF NECESSARY, RECOMMEND GEOTEXTILE FILTER FABRIC (PROVIDED BY CONTRACTOR)

13.8.6. PLACING AND COMPACTING BACKFILL
DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" FROM THE BRIDGE LEG.

THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE BRIDGE MUST NOT EXCEED 2'-0".

THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE BRIDGE FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING 8" PER LAYER.

THE BACKFILL OF ZONE B SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR, AS REQUIRED BY AASHTO T-99.

SOIL WITHIN 1'-0" OF CONCRETE SURFACES SHALL BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHALL NOT BE STARTED OR STOPPED WITHIN ZONE B AND THE VIBRATION FREQUENCY SHOULD BE AT LEAST 30 REVOLUTIONS PER SECOND.

THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS SHALL SATISFY THE CRITERIA FOR THE BRIDGE BACKFILL, ZONE B.

BACKFILL AGAINST A WATERPROOFED SURFACE SHALL BE PLACED CAREFULLY TO AVOID DAMAGE TO THE WATERPROOFING MATERIAL.

13.8.7. BRIDGE UNITS
FOR FILL HEIGHTS OVER 12 FEET (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE), NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® ENGINEERED SOLUTIONS.

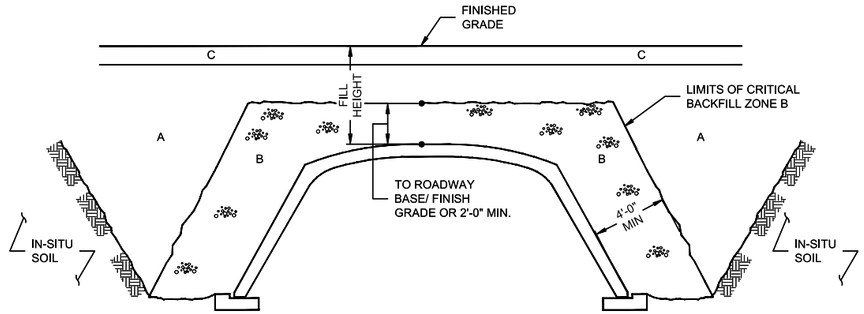
13.8.8. WINGWALLS
BACKFILL IN FRONT OF WINGWALLS SHALL BE CARRIED TO GROUND LINES SHOWN IN THE PLANS.

13.8.9. MONITORING
THE CONTRACTOR SHALL CHECK SETTLEMENTS AND HORIZONTAL DISPLACEMENT OF FOUNDATION TO ENSURE THAT THEY ARE WITHIN THE ALLOWABLE LIMIT PROVIDED BY THE ENGINEER. THESE MEASUREMENTS SHOULD GIVE AN INDICATION OF THE SETTLEMENTS AND DEFORMATIONS ALONG THE LENGTH OF THE FOUNDATIONS.

THE FIRST MEASUREMENT SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST BRIDGE SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC. FURTHER MEASUREMENTS MAY BE MADE ACCORDING TO LOCAL CONDITIONS.

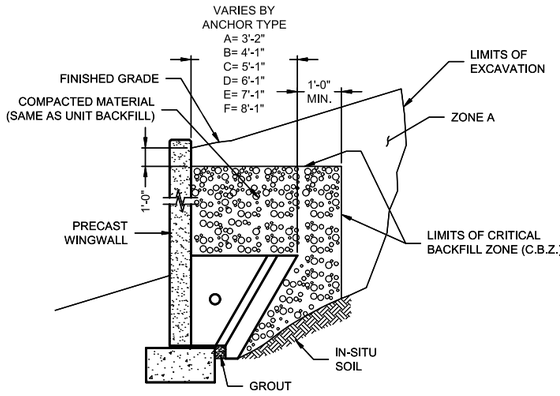
ACCEPTABLE SOILS FOR USE IN ZONE B BACKFILL

TYPICAL USCS MATERIALS	AASHTO GROUP	AASHTO SUBGROUP	PERCENT PASSING US SIEVE NO.			CHARACTER OF FRACTION PASSING NO. 40 SIEVE		SOIL DESRIPTION
			#10	#40	#200	LIQUID LIMIT	PLASTICITY INDEX	
GW, GP, SP	A1	A-1a	50 MAX	30 MAX	15 MAX		6 MAX	LARGELY GRAVEL BUT CAN INCLUDE SAND AND FINES
GM, SW, SP, SM		A-1b		50 MAX	25 MAX		6 MAX	GRAVELLY SAND OR GRADED SAND, MAY INCLUDE FINES
GM, SM, ML, SP, GP	A2	A-2-4			35 MAX	40 MAX	10 MAX	SANDS, GRAVELS WITH LOW-PLASTICITY SILT FINES
SC, GC, GM		A-2-5			35 MAX	41 MIN	10 MAX	SANDS, GRAVELS WITH PLASTIC SILT FINES
SP, SM, SW	A3			51 MIN	10 MAX		NON-PLASTIC	FINE SANDS
ML, SM, SC	A4				36 MIN	40 MAX	10 MAX	LOW-COMPRESSIBILTY SILTS

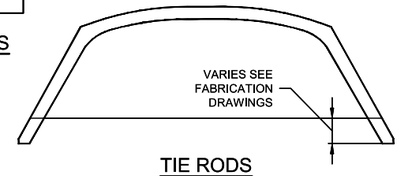


SPAN	FILL HEIGHT	ACCEPTABLE MATERIAL INSIDE ZONE B
≤ 24'-0"	≥ 12'-0"	A1, A3
≤ 24'-0"	< 12'-0"	A1, A2, A3, A4
> 24'-0"	ALL	A1, A3

BACKFILL REQUIREMENTS



WALL BACKFILL REQUIREMENTS



TIE RODS

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

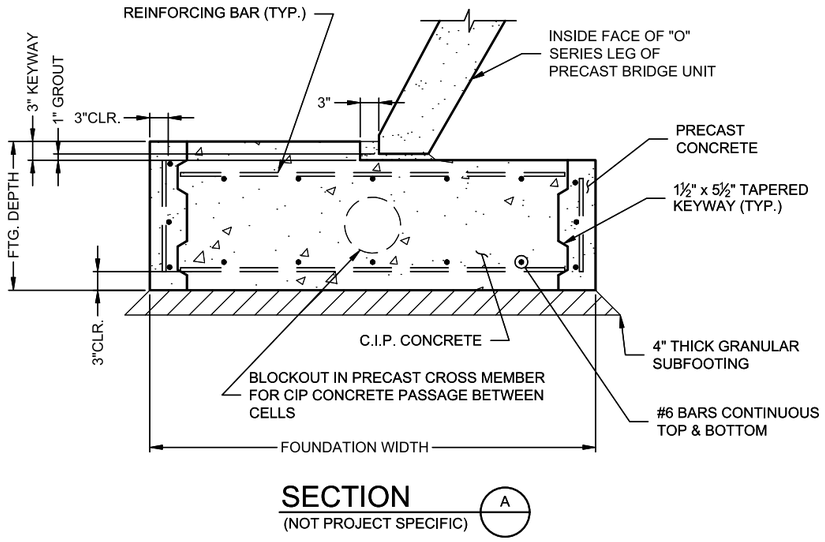
CONTECH STRUCTURAL PLATE

PROPOSAL DRAWING

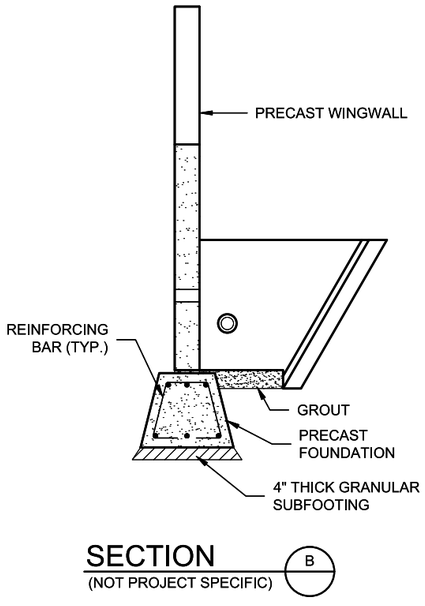
Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 26 OF 28		

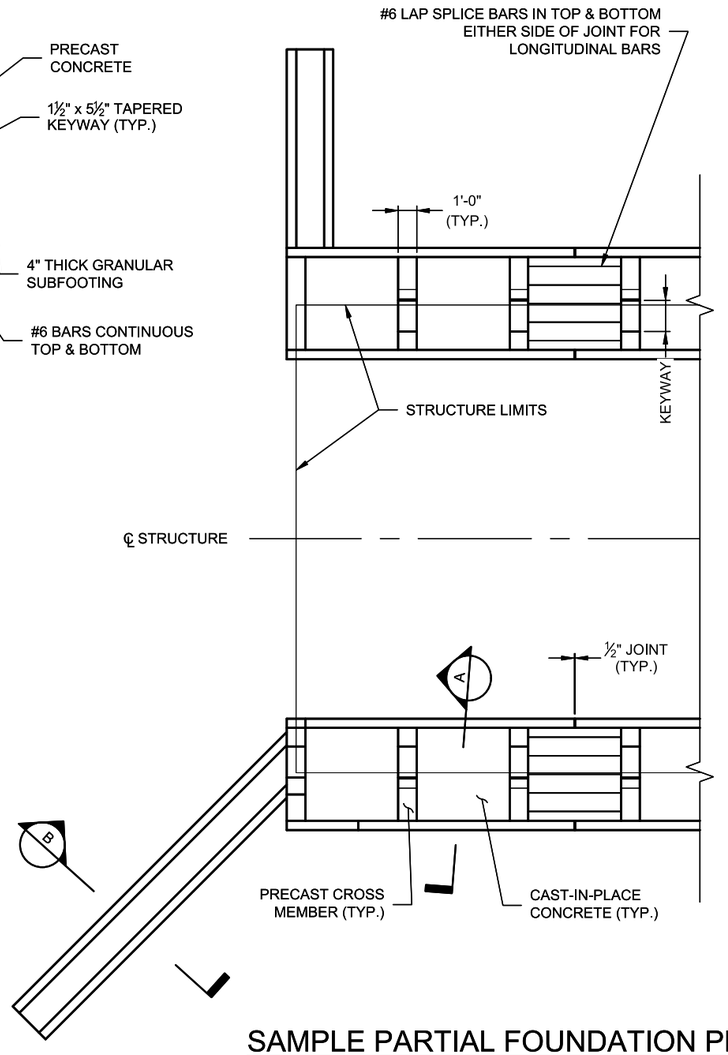
SAMPLE DRAWING ONLY



SECTION A
(NOT PROJECT SPECIFIC)



SECTION B
(NOT PROJECT SPECIFIC)



SAMPLE PARTIAL FOUNDATION PLAN
(NOT PROJECT SPECIFIC)

EXPRESS FOUNDATIONS

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 27	OF	28

SAMPLE DRAWING ONLY

ARMORFLEX FULL INVERT

N.T.S.

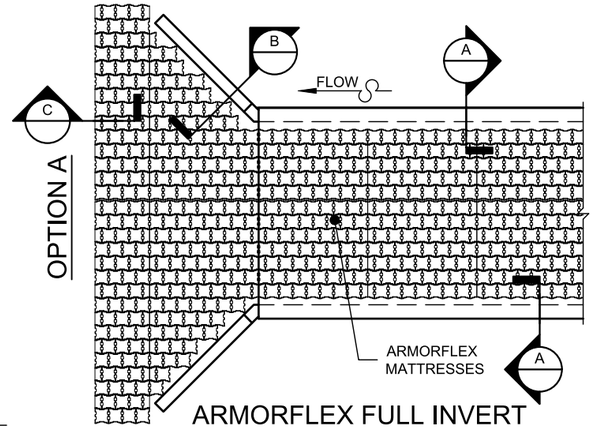
ARMORFLEX PARTIAL INVERT

N.T.S.

A-JACKS PARTIAL INVERT

N.T.S.

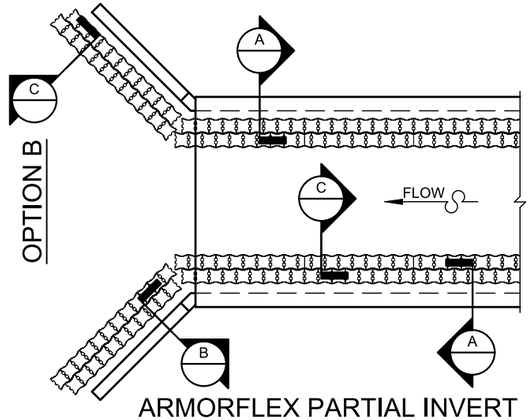
OPTION A



ARMORFLEX FULL INVERT
PARTIAL LAYOUT PLAN

N.T.S.

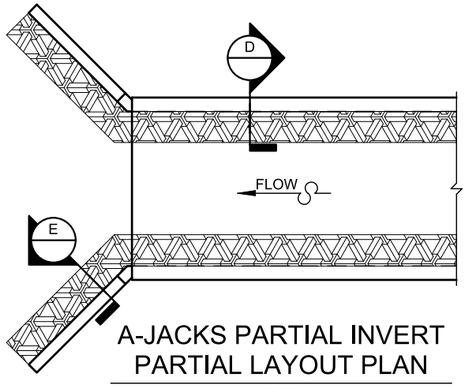
OPTION B



ARMORFLEX PARTIAL INVERT
PARTIAL LAYOUT PLAN

N.T.S.

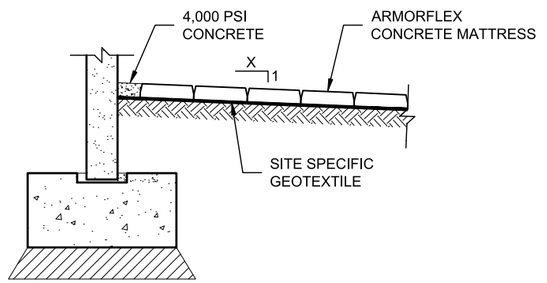
OPTION C



A-JACKS PARTIAL INVERT
PARTIAL LAYOUT PLAN

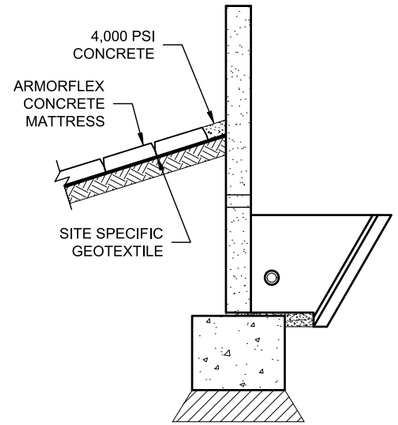
N.T.S.

CONSIDER A COMPLETE SYSTEM WITH ARMORTEC REVETMENT



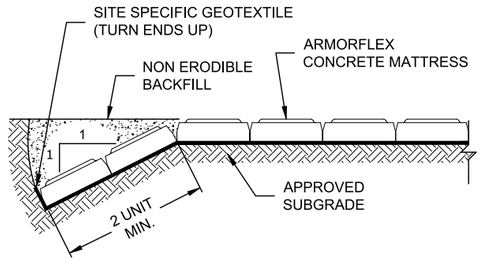
ARMORFLEX STRUCTURE TERMINATION A

N.T.S.



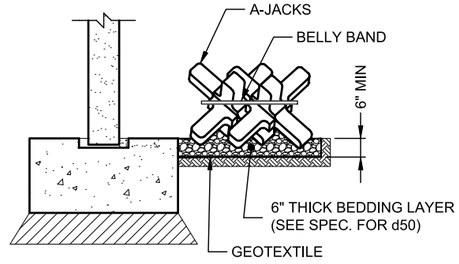
ARMORFLEX WINGWALL
TERMINATION B

N.T.S.



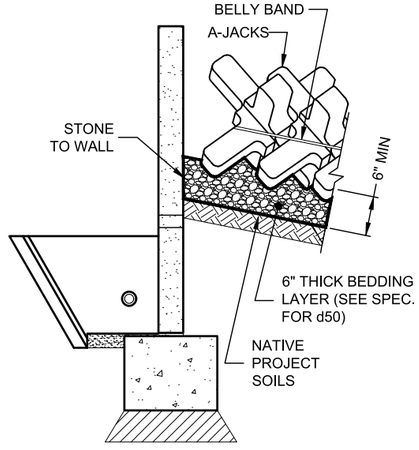
STANDARD TERMINATION C

N.T.S.



A-JACKS STRUCTURE
TERMINATION D

N.T.S.



A-JACKS WINGWALL
TERMINATION E

N.T.S.

MARK	DATE	REVISION DESCRIPTION	BY
---		---	---
---		---	---
---		---	---
---		---	---
---		---	---

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH STRUCTURAL PLATE

PROPOSAL DRAWING

Project Title Line 1
Project Title Line 2
Project Title Line 3

PROJECT No.:	SEQ. No.:	DATE:
XXXXXX	001	09/15/2021
DESIGNED:		DRAWN: N/A
CHECKED: XXX		APPROVED: XXX
SHEET NO.: 28	OF 28	