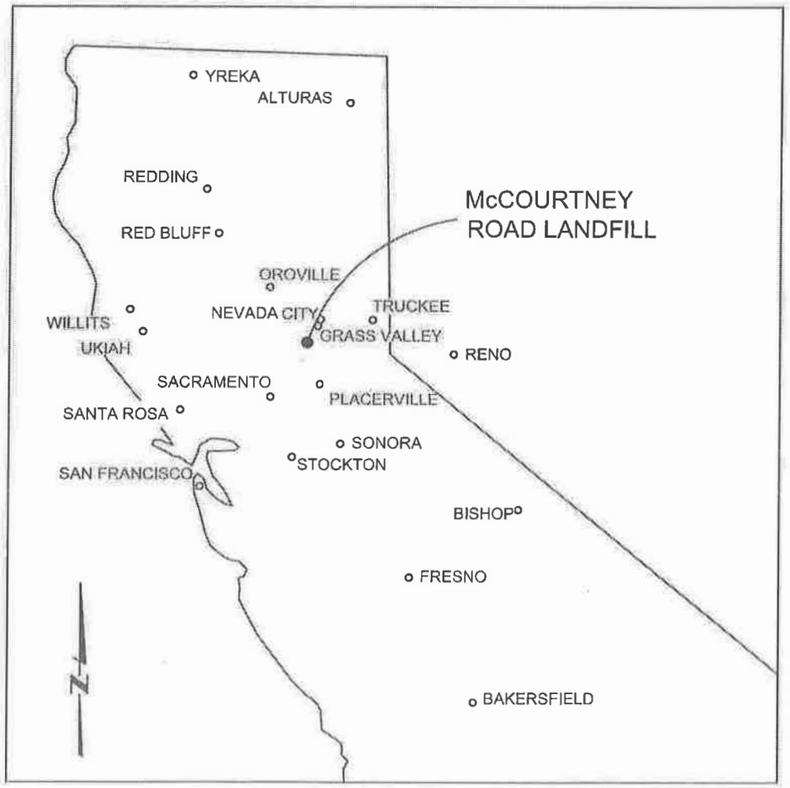
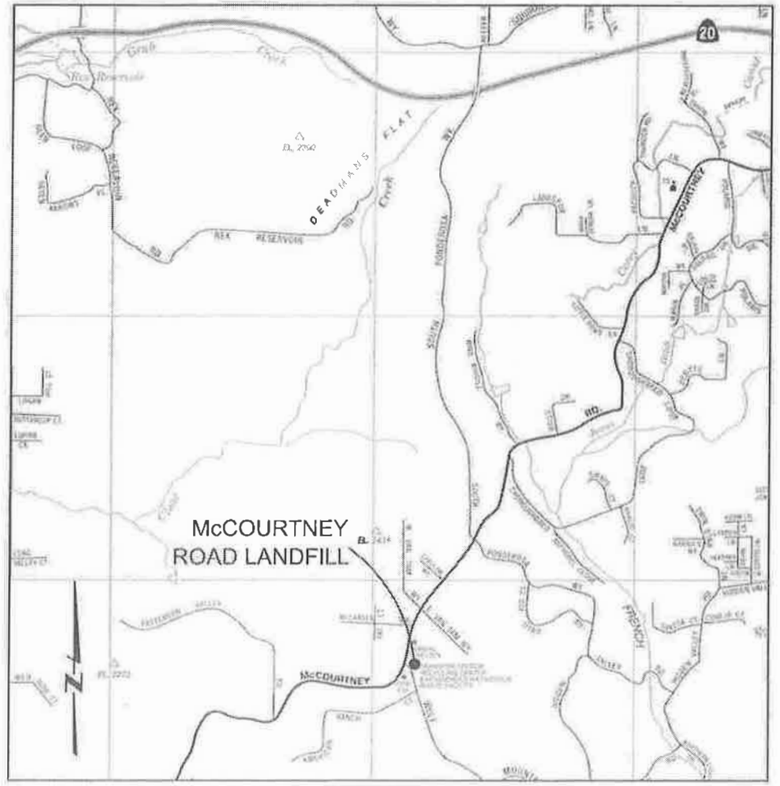
McCOURTNEY ROAD LANDFILL

2018 LANDFILL GAS EXTRACTION IMPROVEMENTS

APRIL 2018



LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

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PLANS PREPARED BY: **HOLDREGE & KULL, AN NV5 COMPANY**
792 SEARLS AVENUE
NEVADA CITY, CA 95959

JASON W. MUIR, R.C.E 60167

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/18
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED FOR: **COUNTY OF NEVADA**
950 MAIDU AVENUE
NEVADA CITY, CA 95959

ED SCOFIELD, CHAIR
NEVADA COUNTY BOARD OF SUPERVISORS

TRISHA TILLOTSON, R.C.E. 66958
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

MATERIALS AND WORKMANSHIP

1. UNLESS OTHERWISE SPECIFICALLY PROVIDED IN THESE PLANS, ALL EQUIPMENT, MATERIALS, AND OTHER ITEMS SHALL BE NEW AND IN ORIGINAL CONDITION.
2. ALL MATERIALS AND EQUIPMENT SHALL BE SUITABLE FOR THE INTENDED USE.
3. THE CONTRACTOR SHALL PROVIDE TO THE OWNER, FOR HIS APPROVAL, AT LEAST ONE WEEK PRIOR TO INSTALLATION, MODEL NUMBERS, SIZES, BRAND OF MANUFACTURE, PERFORMANCE CURVES, INSTALLATION RECOMMENDATIONS, AND/OR OTHER PERTINENT DATA AND CHARACTERISTICS ON EACH ITEM TO BE INSTALLED.
4. MATERIALS AND EQUIPMENT USED WITHOUT APPROVAL BY THE OWNER MAY BE REJECTED BY THE OWNER WHETHER INSTALLED OR NOT.
5. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS.
6. ALL MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THESE DOCUMENTS. ANY DISCREPANCIES OR CONFLICTS BETWEEN THESE DOCUMENTS AND MANUFACTURER'S RECOMMENDATIONS OR APPLICABLE CODES AND REGULATIONS SHALL BE BROUGHT TO THE OWNER'S ATTENTION AND SHALL BE RESOLVED BY THE DESIGN ENGINEER PRIOR TO CONSTRUCTION.
7. IF CONFLICT IS PRESENT BETWEEN THESE PLANS AND APPLICABLE CODES AND REGULATIONS, OR MANUFACTURER'S RECOMMENDATIONS, THE MOST STRINGENT OR RESTRICTIVE METHOD SHALL PREVAIL.

LICENSING AND EXPERIENCE REQUIREMENTS

1. THE PRIME CONTRACTOR SHALL HAVE A CLASS A OR C-57 LICENSE.
2. THE CONTRACTOR'S LICENSE MUST BE CURRENT AND IN GOOD STANDING.

DISPOSAL OF CONSTRUCTION DEBRIS

1. ALL DRILLING SPOILS AND CONSTRUCTION DEBRIS, SHALL BE DISPOSED OF AT THE ADJACENT TRANSFER STATION DURING REGULAR OPERATION HOURS.
2. THE CONTRACTOR IS RESPONSIBLE FOR PAYING THE DISPOSAL FEES.
3. ANY WASTE LEFT EXPOSED OVERNIGHT SHALL BE COVERED BY A WEIGHTED TARP.

GENERAL CONDITIONS

1. ALL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE CURRENT ISSUES OF THE FOLLOWING CODES (WHERE APPLICABLE TO THE WORK):

   CALIFORNIA BUILDING CODE (UNIFORM BUILDING CODE)
   UNIFORM FIRE CODE
   NATIONAL ELECTRICAL CODE
   TITLE 27 OF THE CALIFORNIA CODE OF REGULATIONS (CCR)

2. ALL MATERIALS, EQUIPMENT AND INSTALLATIONS SHALL BE PROVIDED AND/OR PERFORMED IN COMPLIANCE WITH APPLICABLE SECTIONS OF THE FOLLOWING STANDARDS:
3. THE GENERAL CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, UTILITIES, AND OTHER FACILITIES, UNLESS SPECIFICALLY STATED OTHERWISE IN THESE DOCUMENTS. ANY ITEMS DAMAGED OR DESTROYED BY THE CONTRACTOR OR HIS SUBCONTRACTORS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
4. THE CONTRACTOR SHALL MAINTAIN A SET OF RECORD DRAWINGS DURING THE CONSTRUCTION OF THIS PROJECT. THE DRAWINGS SHALL SHOW THE LOCATIONS, LENGTHS, AND DEPTHS OF ALL MATERIALS, EQUIPMENT AND WORK PERFORMED ON THIS PROJECT.
5. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL SUBCONTRACTORS AND INSPECTION OF THEIR WORK. THE GENERAL CONTRACTOR WILL BE HELD RESPONSIBLE AND FINANCIALLY ACCOUNTABLE FOR DEFICIENCIES IN SUBCONTRACTORS WORK.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING INSPECTIONS BY FEDERAL STATE, AND/OR LOCAL AGENCIES, WHERE REQUIRED.
7. ALL WORK SHALL BE PROVIDED COMPLETE IN PLACE, INCLUDING ALL LABOR, MATERIALS, EQUIPMENT, FEES, AND APPURTENANCES TO INSTALL THE WORK IN OPERATING CONDITION IN A WORKMAN LIKE MANNER.
8. CONTRACTOR MUST NOTIFY OWNER, ENGINEER AND CQA MONITOR AT LEAST ONE WEEK PRIOR TO MOBILIZATION.

OWNER: COUNTY OF NEVADA,
DAVID GARCIA (530) 265-7038

ENGINEER: H&K/NV5
JASON MUIR (530) 478-1305

CQA MONITOR: H&K/NV5
BRYAN BOTSFORD (530) 478-1305

SITE SAFETY

THE FOLLOWING SAFETY STANDARDS ARE MINIMUM AND DO NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO ASSURE SITE SAFETY.

1. CONTRACTOR SHALL PREPARE A SITE-SPECIFIC SAFETY PLAN DETAILING THE METHODS CONTRACTOR WILL MAINTAIN TO INSURE THE SAFETY OF EMPLOYEES FROM INJURY AND HEALTH RISK RELATED TO THE WORK, INCLUDING BUT NOT LIMITED TO MUNICIPAL REFUSE, LANDFILL GAS, EQUIPMENT OPERATION AND CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL MAINTAIN A COPY OF THE SAFETY PLAN AT THE SITE DURING THE WORK AVAILABLE TO EMPLOYEES, COUNTY PERSONNEL, CQA PERSONNEL AND AUTHORIZED VISITORS.
2. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS, INCLUDING BUT NOT LIMITED TO THE HAZWOPER AND THE HAZARD COMMUNICATIONS STANDARD. CONTRACTOR SHALL CONDUCT A SAFETY ORIENTATION PRIOR TO BEGINNING WORK, AND FOR ALL NEW EMPLOYEES, AND SHALL CONDUCT DAILY SAFETY BRIEFINGS.
3. THE SITE-SPECIFIC SAFETY PLAN SHALL CONTAIN PROVISIONS FOR MITIGATING THE POTENTIAL HEALTH EFFECTS FROM LANDFILL GAS. TYPICAL CONSITUENTS OF TRACE CONSITUENTS IN THE ON-SITE GAS WILL BE PROVIDED UPON REQUEST FROM THE CONTRACTOR.
4. NO SMOKING, OPEN FLAME, SPARKS, WELDING OR OTHER SOURCE OF COMBUSTION ARE ALLOWED WITHIN 100 FEET OF THE LANDFILL CAP. ANY TIME THE LANDFILL CAP HAS BEEN OPENED, CONTRACTOR SHALL HAVE A METER CAPABLE OF READING 0 TO 200% OF THE LOWER EXPLOSIVE LIMIT (LEL), 0 TO 20 % OXYGEN, AND SHALL HAVE AN AUDIBLE ALARM WHEN TOTAL ORGANIC COMPOUNDS AS METHANE EXCEED 25% OF THE LEL AND WHEN OXYGEN FALLS BELOW 19.5%.
5. THE CONTRACTOR SHALL MEET ALL APPLICABLE FEDERAL, STATE AND LOCAL SAFETY REQUIREMENTS, WHETHER STATED ABOVE OR NOT. IF UNSAFE CONDITIONS ARE FOUND BY THE CONTRACTOR, ALL WORK SHALL CEASE UNTIL THE SAFETY ISSUE IS RESOLVED
6. WHEN OPEN EXCAVATIONS OF ANY DEPTH ARE PRESENT, PUBLIC ACCESS TO THE SITE SHALL BE RESTRICTED BY A 3-FOOT TALL TEMPORARY SAFETY FENCE. SIGNS SHALL BE POSTED ON THE FENCE STATING "DO NOT ENTER" AND "NO SMOKING."

DESCRIPTION OF WORK

1. MOBILIZATION - CONTRACTOR SHALL PERFORM ALL PREPARATORY WORK AND OPERATIONS NECESSARY FOR PLANNING THE WORK, INCLUDING SITE SAFETY, AND FOR MOVEMENT OF PERSONNEL, EQUIPMENT, SUPPLIES AND INCIDENTALS TO THE PROJECT SITE, AND FOR ALL OTHER WORK AND OPERATIONS THAT MUST BE PERFORMED OR THAT CAUSE COSTS TO BE INCURRED PRIOR TO BEGINNING WORK ON THE VARIOUS ITEMS UNDER THIS CONTRACT.
2. PRESERVATION OF LANDFILL FINAL COVER - AT THE LOCATION OF EACH PROPOSED EXTRACTION WELL, EXCAVATE THE VEGETATIVE LAYER OF THE LANDFILL FINAL COVER TO EXPOSE THE UNDERLYING GEOSYNTHETIC CLAY LINER (GCL). THE EXCAVATION DEPTH SHALL BE APPROXIMATELY 1.5 FEET, OR UNTIL THE GCL IS EXPOSED. STOCKPILE THE TOPSOIL LAYER (0 TO 6 INCHES BELOW GROUND SURFACE [BGS]) AND VEGETATIVE LAYER (6 TO 18 INCHES BGS) SEPARATELY FOR REPLACEMENT AFTER CONSTRUCTION OF THE WELL. CUT A HOLE IN THE GCL TO ALLOW ACCESS FOR DRILLING. THE GCL HOLE DIAMETER MUST ALLOW FOR AT LEAST THREE-FOOT OVERLAP OF THE WELL BOOT AND PRESERVED GCL IN ALL DIRECTIONS. PRESERVE ALL REMAINING GCL. IF GCL IS DAMAGED DURING CONSTRUCTION, PATCH THE DAMAGE WITH NEW GCL A MINIMUM OF THREE FEET OF OVERLAP IN ALL DIRECTIONS. SMALL QUANTITIES OF SCRAP GCL MAY BE AVAILABLE FROM THE COUNTY OF NEVADA IF NEEDED. ALL TRACKS CAUSED BY DRILLING EQUIPMENT SHALL BE REPAIRED.
3. DRILLING AND WELL CONSTRUCTION - ALL DOWN-HOLE DRILLING EQUIPMENT SHALL BE DECONTAMINATED PRIOR TO ARRIVING ON-SITE. A DRILL RIG EQUIPPED WITH A SOLID-STEM AUGER OR BUCKET AUGER (24-36 INCHES IN DIAMETER) SHALL BE USED TO DRILL ONE LFG EXTRACTION WELL WITHIN LANDFILL UNIT 1 (EW-30), AND ONE LFG EXTRACTION WELL WITHIN LANDFILL UNIT 2 (EW-29). THE PROPOSED LOCATIONS OF THESE WELLS ARE DEPICTED ON FIGURE 4 OF THE PROJECT PLANS AND SPECIFICATIONS, AND THE PROPOSED DEPTHS ARE LISTED ON FIGURE 5 OF THE PROJECT PLANS AND SPECIFICATIONS.

   THE EXTRACTION WELLS SHALL BE CONSTRUCTED USING 4-INCH DIAMETER HIGH-DENSITY POLYETHYLENE (HDPE) STANDARD DIMENSION RATION (SDR) 11 WELL CASING. THE SCREENED INTERVAL SHALL BE CONSTRUCTED USING 4-INCH HDPE SDR 11 PERFORATED PIPE, WITH APPROXIMATELY 12 PERFORATIONS PER FOOT OF PIPE. THE PERFORATIONS SHALL BE ½ INCH IN DIAMETER, AND THE PERFORATION PATTERN IS DEPICTED ON FIGURE 6, DETAIL 4 OF THE PROJECT PLANS AND SPECIFICATIONS.

Proposed Extraction Well Depths and Screened Intervals

Well ID	Depth of Well Bore (feet bgs)	Depth of Bottom of Casing (feet bgs)	Screened Interval (feet bgs)	Landfill Unit	Well Located in Lined Area?	Approximate Depth of Liner (feet bgs)
EW-29	44	43	23-43	2	Yes	50
EW-30	71	70	30-70	1	No	NA

THE ANNULAR SPACE BETWEEN THE CASING AND BOREHOLE SHALL BE FILLED AS OUTLINED BELOW, FROM BOTTOM TO TOP:

A. CLEAN, WASHED, ROUNDED DRAIN ROCK NO LESS THAN ¾-INCH DIAMETER AND NO GREATER THAN 2-INCH DIAMETER SHALL BE PLACED FROM THE BOTTOM OF THE BOREHOLE TO APPROXIMATELY 16 FEET BGS WITHOUT BRIDGING.

B. A GCL "WELL WASHER" SHALL BE PLACED ABOVE THE DRAIN ROCK. THE WELL WASHER SHALL BE THE DIAMETER OF THE BOREHOLE, WITH A 4-INCH HOLE IN THE MIDDLE FOR PLACEMENT OVER THE HDPE WELL CASING.

C. A MINIMUM 3-FOOT THICK BENTONITE-CHIP SEAL SHALL BE PLACED ABOVE THE GCL WELL WASHER AND SHALL BE HYDRATED WITH WATER. BENTONITE CHIPS SHALL BE PLACED IN ONE-FOOT LIFTS AND HYDRATED WITH APPROXIMATELY 3 TO 4 GALLONS OF WATER PER 50 POUNDS OF BENTONITE.

D. A SOIL WELL PLUG SHALL BE CONSTRUCTED ABOVE THE BENTONITE SEAL USING APPROVED IMPORT OR ON-SITE SOIL TO WITHIN 4 FEET OF THE GROUND SURFACE, AND SHALL BE MOISTENED AND TAMPED IN 1-FOOT LIFTS. THE SOIL SHALL BE 3-INCH MINUS LOW PERMEABILITY CLAYEY OR SILTY SOIL MEETING A UNIFORM SOIL CLASSIFICATION SYSTEM (USCS) DESIGNATION OF CL, CH, SC, OR ML. BASED ON A 3-FOOT DIAMETER BORING, IT IS ESTIMATED THAT APPROXIMATELY 2 CUBIC YARDS OF SOIL WILL BE NEEDED FOR THE SOIL PLUG AT EW-29, AND APPROXIMATELY 5 CUBIC YARDS OF SOIL WILL BE NEEDED FOR THE SOIL PLUG AT EW-30. NEVADA COUNTY CAN PROVIDE UP TO 15 CUBIC YARDS OF ON-SITE MATERIAL, BUT THIS MATERIAL WILL NEED TO BE SCREENED TO MEET THE 3-INCH MINUS REQUIREMENT. THIS ONSITE MATERIAL IS STOCKPILED APPROXIMATE 200 FEET SOUTH OF PROPOSED EXTRACTION WELL EW-30.

E. A MINIMUM 4-FOOT THICK BENTONITE CHIP SEAL SHALL BE PLACED ABOVE THE SOIL PLUG AND SHALL BE HYDRATED WITH WATER AS DESCRIBED ABOVE IN ITEM C. THE BENTONITE CHIP SEAL SHALL EXTENDED A MINIMUM OF 3 INCHES ABOVE THE EXPOSED GCL AND SHALL EXTEND A MINIMUM OF 3 FEET FROM THE WELL CASING IN ALL DIRECTIONS AS DEPICTED IN FIGURE 5, DETAIL 2 OF THE PROJECT PLANS AND SPECIFICATIONS.

F. AN ADDITIONAL 1/4 POUND OF SODIUM BENTONITE GRANULES PER LINEAR FOOT SHALL BE PLACED BETWEEN THE CONTACT OF THE EXPOSED GCL SURROUNDING THE COMPLETED WELL AND THE PIPE BOOT.

G. A 40-MIL HDPE PIPE BOOT SHALL BE INSTALLED AS DEPICTED ON FIGURE 5 OF THE PROJECT PLANS. THE PIPE BOOT SHALL EXTEND AT LEAST 12 INCHES ABOVE THE LANDFILL SURFACE (TOP OF VEGETATIVE LAYER AFTER REPLACEMENT, INCLUDING THE MOUNDED TOP SOIL) AND A MINIMUM OF 3 FEET FROM THE WELL CASING IN ALL DIRECTIONS.

H. THE TOPSOIL AND VEGETATIVE LAYERS SHALL BE REPLACED, COMPACTED TO APPROXIMATELY 90% OF THE ASTM D1557 MAXIMUM DRY DENSITY (85% FOR TOPSOIL IN THE UPPER SIX INCHES), AND MOUNDED TO PREVENT SURFACE WATER PONDING. THE TOPSOIL MOUND SHALL BE AT LEAST ONE FOOT HIGHER AT THE WELL HEAD THAN THE SURROUNDING GRADE AND SHALL SLOPE AWAY FROM THE WELL HEAD FOR A DISTANCE OF AT LEAST FIVE FEET IN ALL DIRECTIONS. THE CONTRACTOR SHALL PROVIDE ADDITIONAL SOIL, AS NEEDED, TO FACILITATE MOUNDING.

I. DRILL CUTTINGS CONSISTING OF MUNICPAL SOLID WASTE MAY BE STOCKPILED ON THE GROUND SURFACE ADJACENT TO THE WELLS DURING DRILLING AND MAY BE TRANSPORTED TO THE ON-SITE MCCOURTNEY ROAD TRANSFER STATION (MRTS) FOR DISPOSAL. CONTRACTOR IS RESPONSIBLE FOR TRANSPORT AND DISPOSAL FEES. IF DRILL CUTTINGS ARE LEFT ADJACENT TO THE DRILL SITE OVERNIGHT, THEY SHALL BE COVERED WITH PLASTIC TARPS WEIGHTED BY SAND BAGS. EACH WELL SHALL EITHER BE COMPLETED DURING THE WORKING DAY OR COVERED WITH A 1 -INCH THICK PLYWOOD AT LEAST 18 INCHES WIDER THAN THE HOLE ON EACH SIDE AND WEIGHTED TO PREVENT REMOVAL WITHOUT USING EQUIPMENT. THE CONTRACTOR SHALL BEAR SOLE RESPONSIBILITY AND LIABILITY FOR SAFETY RELATED TO UNFINISHED HOLES AND OTHER ASPECTS OF THE WORK.

J. THE EXTRACTION WELLS SHALL BE CONSTRUCTED USING 4-INCH DIAMETER HIGH-DENSITY POLYETHYLENE (HDPE) STANDARD DIMENSION RATIO (SDR) 11 WELL CASING. THE SCREENED INTERVAL SHALL BE CONSTRUCTED USING 4-INCH HDPE SDR 11 PERFORATED PIPE, WITH APPROXIMATELY 12 PERFORATIONS PER FOOT OF PIPE. THE PERFORATIONS SHALL BE ½ INCH IN DIAMETER, AND THE PERFORATION PATTERN IS DEPICTED ON FIGURE 6, DETAIL 4 OF THE PROJECT PLANS AND SPECIFICATIONS.

4. INSTALLATION OF HDPE LATERAL PIPING - FOUR-INCH DIAMETER SDR 17 HDPE LATERAL PIPING SHALL BE TIED INTO THE EXISTING 4-INCH DIAMETER LATERALS ADJACENT TO EXISTING WELLS EW_2 AND EW-13. THE NEW LATERALS WILL BE APPROXIMATELY 50 FEET IN LENGTH AND SHALL REDUCE TO 2_INCH DIAMETER SDR 17 HDPE PIPING ADJACENT TO THE NEW EXTRACTION WELLS EW-29 AND EW-30. THE 2-INCH SDR 17 HDPE PIPING SHALL MAKE A 90 DEGREE TURN AND SHALL BE CONNECTED TO THE EXISTING 2-INCH DIAMETER KANAFLEX HOSE, WHICH SHALL BE CONNECTED TO THE NEW EXTRACTION WELL HEADS DESCRIBED BELOW. EITHER WOOD BLOCKING OR UNISTRUT STANDS SHALL BE USED AS NECESSARY TO ALLOW CONDENSATE DRAINAGE WITHIN THE LATERAL PIPING. LATERAL PIPING DETAILS ARE DEPICTED IN FIGURE 6 OF THE PROJECT PLANS AND SPECIFICATIONS.
5. INSTALLATION OF EXTRACTION WELL HEADS - NEW QED PRECISION FLOW EXTRACTION WELL HEADS SHALL BE INSTALLED ON NEW WELLS EW-29 AND EW-30. ADDITIONALLY, NEW QED PRECISION WELLHEADS SHALL BE INSTALLED ON 27 EXISTING EXTRACTION WELLS. THE FULL 4 PIECE SET OF STAINLESS STEEL ORIFICE PLATES SHALL BE INCLUDED WITH EACH EXTRACTION WELL, WITH EXTRA ORIFICES NOT INSTALLED PROVIDED TO THE COUNTY. NEW KANAFLEX HOSE SHALL BE PROVIDED FOR NEW EXTRACTION WELLS EW-29 AND EW-30. ALL KANAFLEX HOSE ON EXISTING EXTRACTION WELLS SHALL BE RE-USED. DETAILS ARE PRESENTED ON FIGURE 6 OF THE ATTACHED PLANS AND SPECIFICATIONS.
6. DEMOBILIZATION - CONTRACTOR SHALL REMOVE ALL EQUIPMENT, SUPPLIES, INCIDENTALS, WASTE AND SURPLUS MATERIALS INCLUDING BUT NOT LIMITED TO MUNICIPAL REFUSE GENERATED DURING DRILLING AND REPLACED WELLHEADS. DISTURBED LANDSCAPE SURFACES SHALL BE RAKED SMOOTH AND EROSION CONTROLS SHALL BE APPLIED AT ALL LOCATIONS OF DISTURBED FINAL COVER. CONTRACTOR SHALL PROVIDE TECHNICAL DATA FROM WELLHEAD MANUFACTURER.

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/18
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STATE OF CALIFORNIA

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CONSULTING ENGINEERS • GEOLOGISTS
An NV5 Company

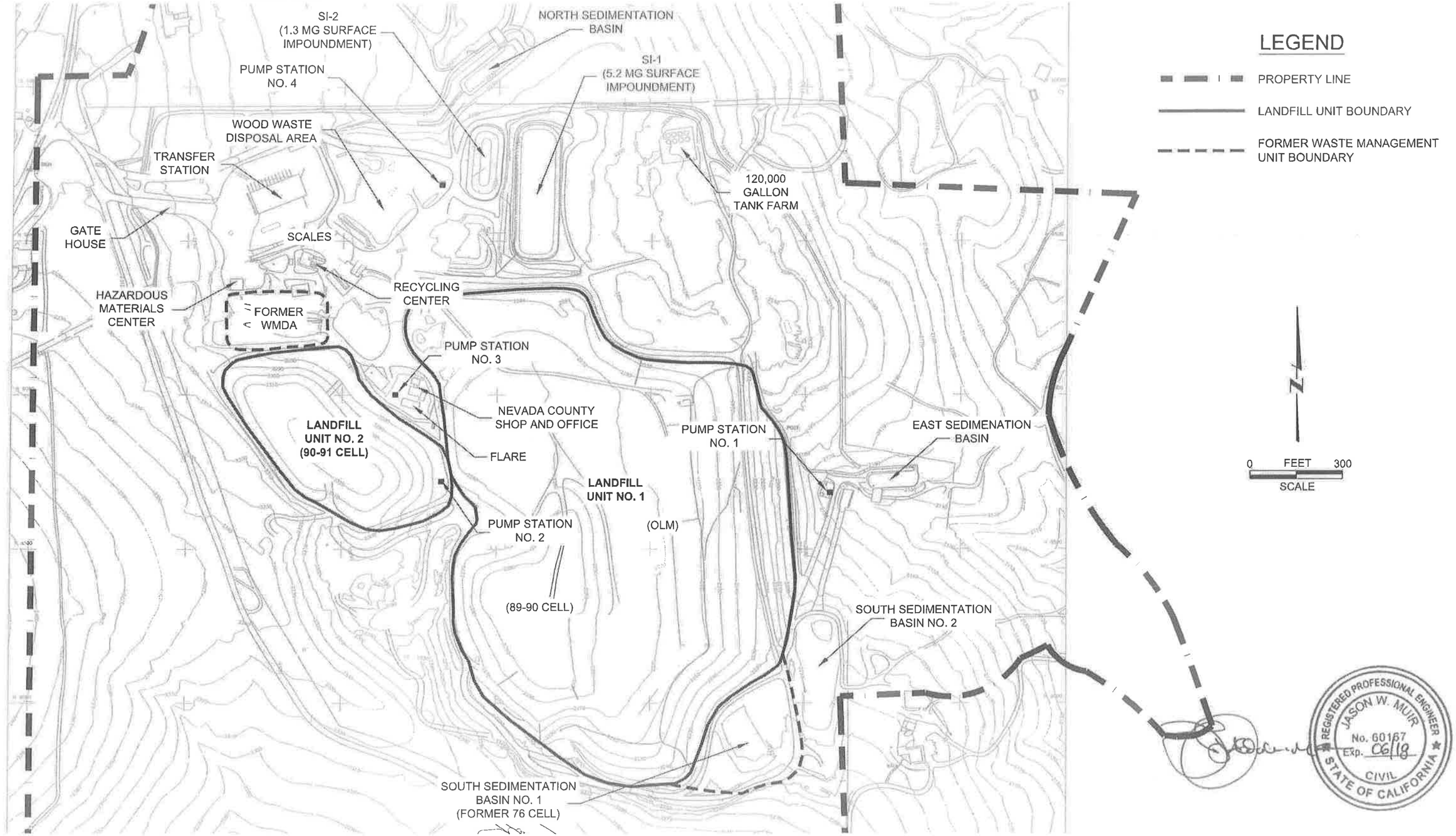
COUNTY OF NEVADA CALIFORNIA

GENERAL NOTES
FIGURE 2

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE
1	MODIFICATIONS TO EXPERIENCE	5/30/18
	REQUIREMENTS AND WELLHEAD	
	INSTALLATION	

ORDER NO.:	R5-2014-0022
DRAWN BY:	BJB
CHECKED BY:	JWM
H&K PROJECT:	4142N-03
DATE:	MARCH 2018



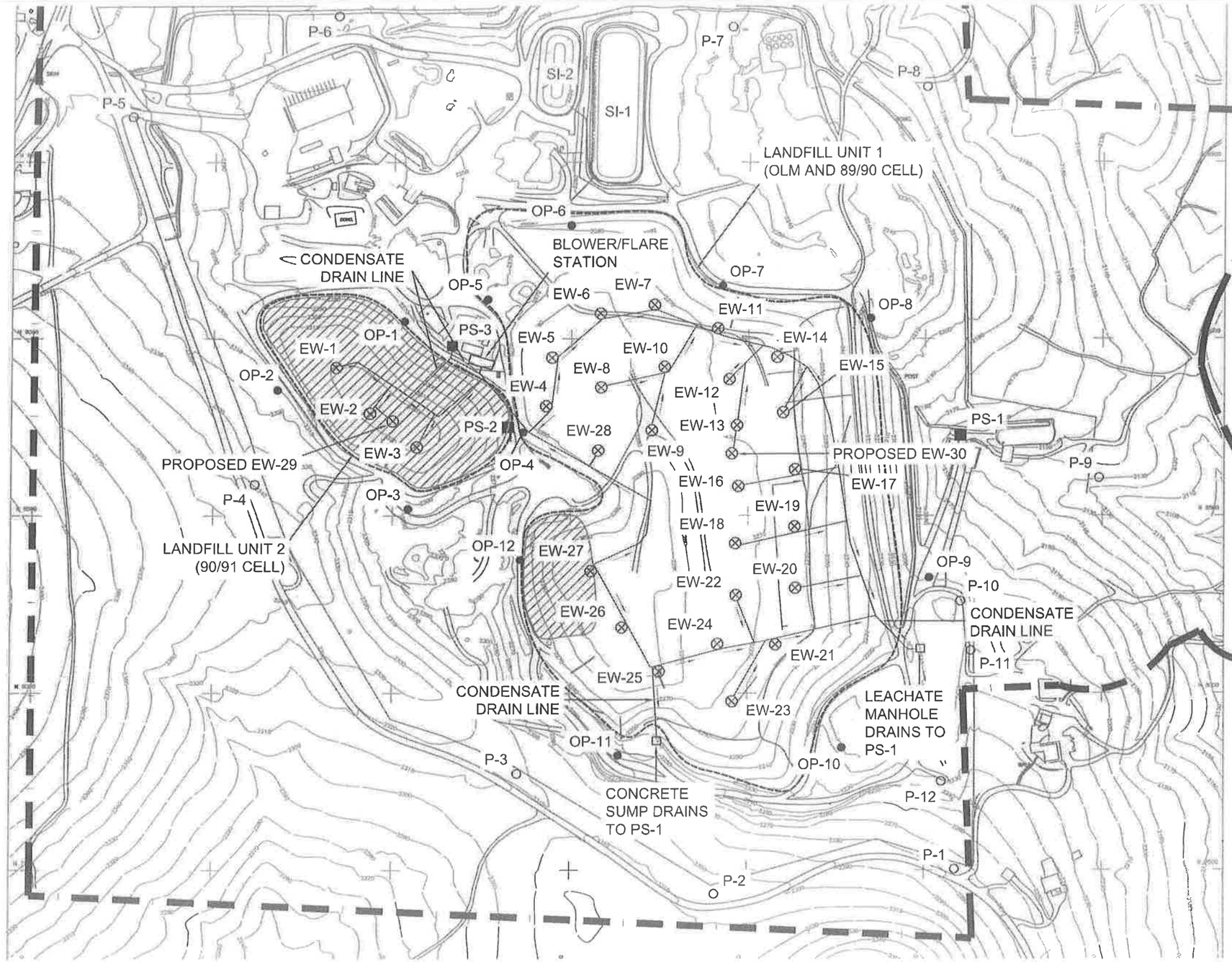
HOLDREGE & KULL
CONSULTING ENGINEERS · GEOLOGISTS
An NV5 Company

FACILITY MAP
FIGURE 3

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

ORDER NO.:	R5-2014-0022
DRAWN BY:	BJB
CHECKED BY:	JWM
H&K PROJECT:	4142N-03
DATE:	MARCH 2018



LEGEND

- EW-1 ⊗ EXTRACTION WELL
- OP-1 ● ON-SITE PERIMETER GAS PROBE
- P-1 ○ PERIMETER GAS PROBE
- □ LEACHATE SUMP/MANHOLE
- PS-1 ■ LEACHATE PUMP STATION
- LFG COLLECTION PIPES, REFERENCE 2
- PROPERTY LINE
- APPROXIMATE WASTE BOUNDARY, REFERENCE 2
- APPROXIMATE BOUNDARY OF BASE LINER (HDPE AND COMPACTED CLAY), REFERENCE 1

N

0 FEET 300
SCALE

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/18
CIVIL
STATE OF CALIFORNIA

REFERENCES

(1) RESOURCE MANAGEMENT INTERNATIONAL, INC. DRAINAGE & LEACHATE MANAGEMENT PLAN (FEB. 1990)

(2) SCS ENGINEERS, LFG COLLECTION AND CONTROL SYSTEM (APRIL 2003)

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
An NV5 Company

LFG MONITORING AND EXTRACTION POINTS

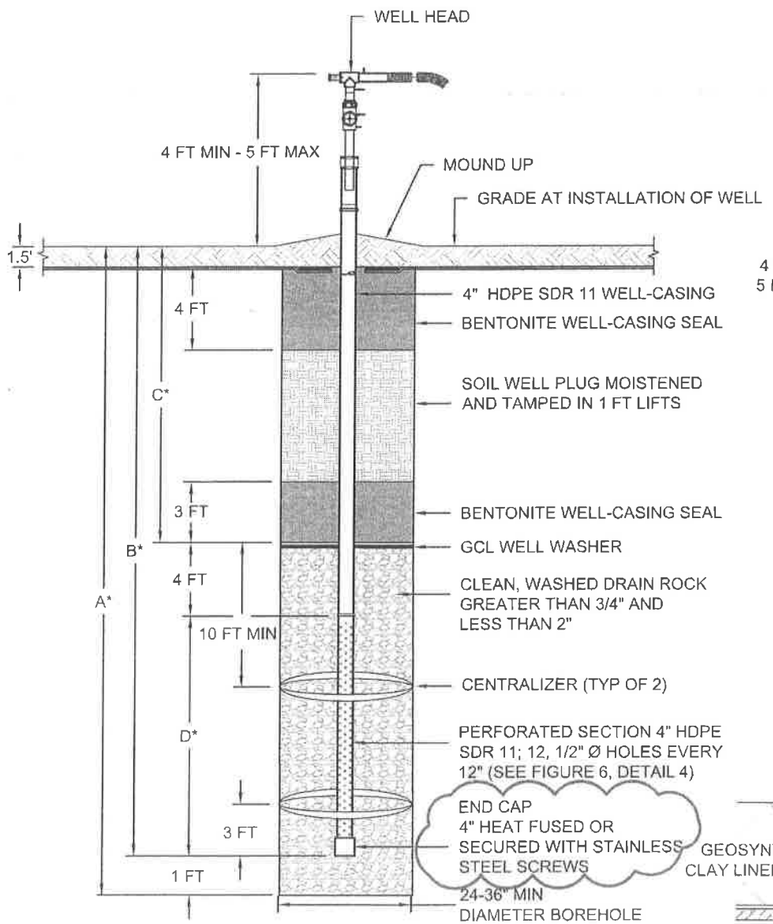
FIGURE 4

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

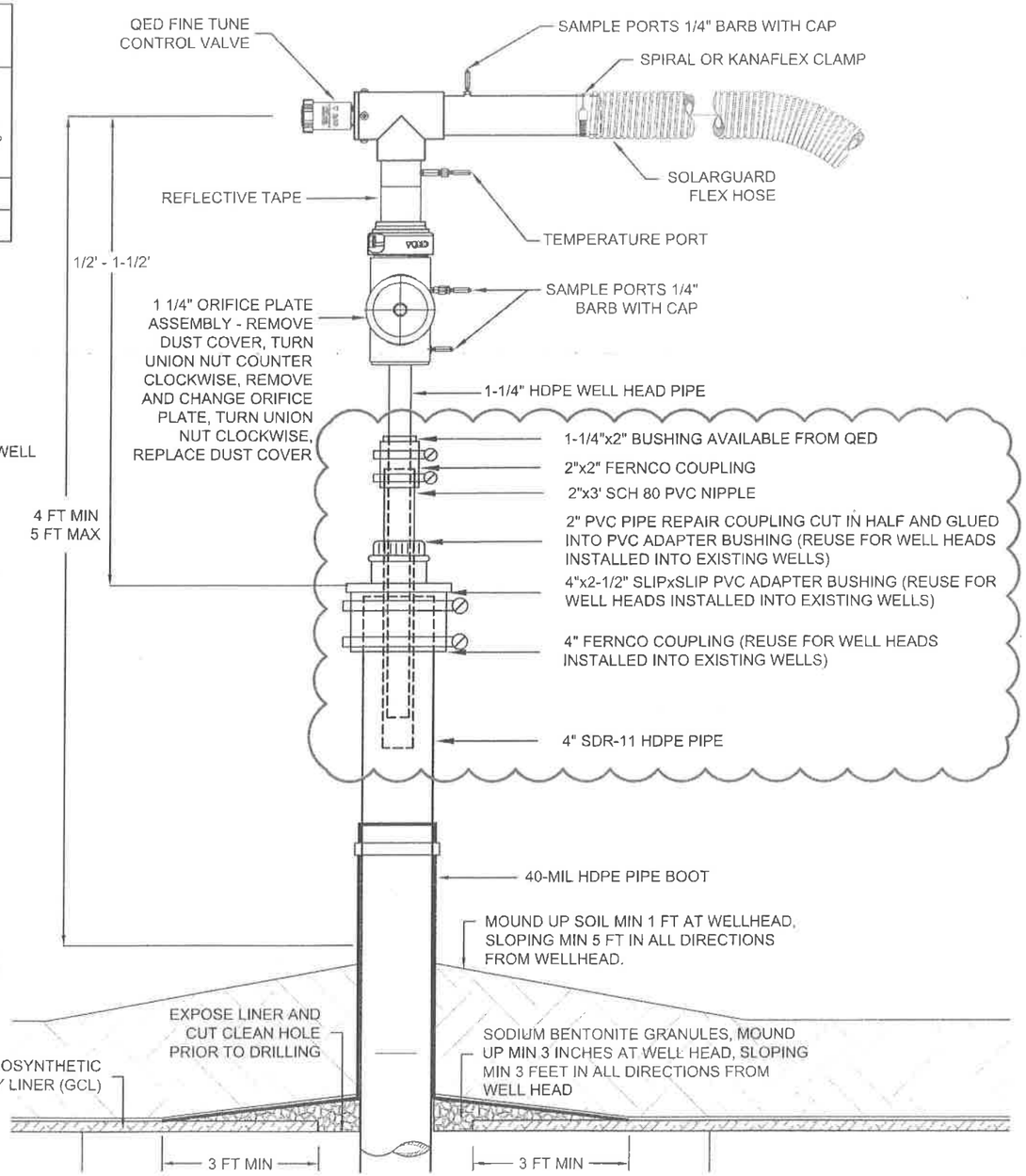
ORDER NO.:	R5-2014-0022
DRAWN BY:	BJB
CHECKED BY:	JWM
H&K PROJECT:	4142-01
DATE:	MARCH 2018

TABLE 1 - PROPOSED GAS-EXTRACTION WELL DIMENSIONS					
WELL NO.	(A) DEPTH OF WELL BORE (FEET BGS)	(B) DEPTH OF BOTTOM OF CASING (FEET BGS)	(C) DEPTH OF SEAL (FEET BGS)	(D) PERFORATION LENGTH (FEET)	WELL LOCATED IN LINED AREA?
EW-29	44	43	16	23	YES
EW-30	71	70	16	40	NO



* DEPTH VARIES, SEE TABLE 1 FOR DEPTHS

1 - LANDFILL GAS-EXTRACTION WELL
SCALE: N.T.S.



2 - WELL HEAD DETAIL
SCALE: N.T.S.

WELLHEAD INSTALLATION:

1. REFER TO QED FINE TUNE CONTROL VALVE WELLHEAD INSTALLATION AND OPERATION MANUAL. READ INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING ASSEMBLY AND INSTALLATION OF WELLHEAD ON WELL CASING.
2. WELLHEAD ASSEMBLY SHALL HAVE 1/4" SAMPLE PORTS WITH BARBED FITTINGS ON BOTH SIDES OF VALVE.
3. QED WELLHEAD ASSEMBLY, FLEX HOSE, AND ACCESSORIES AVAILABLE FROM QED ENVIRONMENTAL SYSTEMS: TOM JUDY: 530-320-3037 AND WWW.QEDENV.COM.
4. FOR FLEXIBLE CONNECTIONS FOR NEW WELLHEADS AND PIPE, USE NIPPLE AND KANAFLEX OR SPIRAL CLAMP. REUSE KANAFLEX AT EXISTING WELLS.
5. ALLOW SUFFICIENT SLACK IN FLEX HOSE FOR PIPING EXPANSION AND CONTRACTION: AN EXTRA 8 - 12" IS RECOMMENDED.
6. MINIMUM NIPPLE LENGTH IS 12" UNLESS OTHERWISE INDICATED.
7. INSTALL ORIFICE PLATE IN CONTROL VALVE. INCLUDE FULL 4 PIECE SET OF STAINLESS STEEL ORIFICE PLATES WITH EACH WELL, AND PROVIDE EXTRA ORIFICES NOT INSTALLED TO THE COUNTY.

WELL AND PIPE INSTALLATION:

1. ENSURE ALL LATERAL PIPES GRAVITY DRAIN ALL OF THE WAY TO THE CONNECTION WITH EXISTING LINE.
2. WELL SHALL BE LOGGED UNDER THE DIRECTION OF A CA PROFESSIONAL GEOLOGIST OR ENGINEER.
3. WELLHEAD CASING PENETRATION TO BE DETERMINED BASED ON FIELD CONDITIONS AND THE ENGINEER'S DIRECTION.
4. WELL BORE DEPTH SHALL BE COMPLETED BASED ON FIELD CONDITIONS.
5. SCREEN LENGTH, GRAVEL-PACK INTERVAL AND SEAL DEPTH TO BE DETERMINED IN THE FIELD BASED ON FIELD CONDITIONS.
6. PERFORATION INTERVAL SHOULD BE 1 FT ABOVE BOTTOM OF BORING AND 4 FT BELOW LOWER BENTONITE SEAL.
7. PERFORATION SECTION SHALL HAVE 12, 1/2" Ø HOLES PER FOOT.
8. BENTONITE SEAL SHALL BE HYDRATED IN ACCORDANCE WITH SECTION 2.2.8 OF THE WORK PLAN DURING INSTALLATION.
9. UPPER BENTONITE SEAL SHALL BE PLACED BETWEEN THE INTERFACE OF THE WASTE AND INTERMEDIATE COVER.
10. LATERAL PIPING MAY BE SUPPORTED BY GROUND SURFACE, BERMED EARTH, OR PIPING SUPPORTS, AS APPROVED IN THE FIELD BY THE COUNTY.

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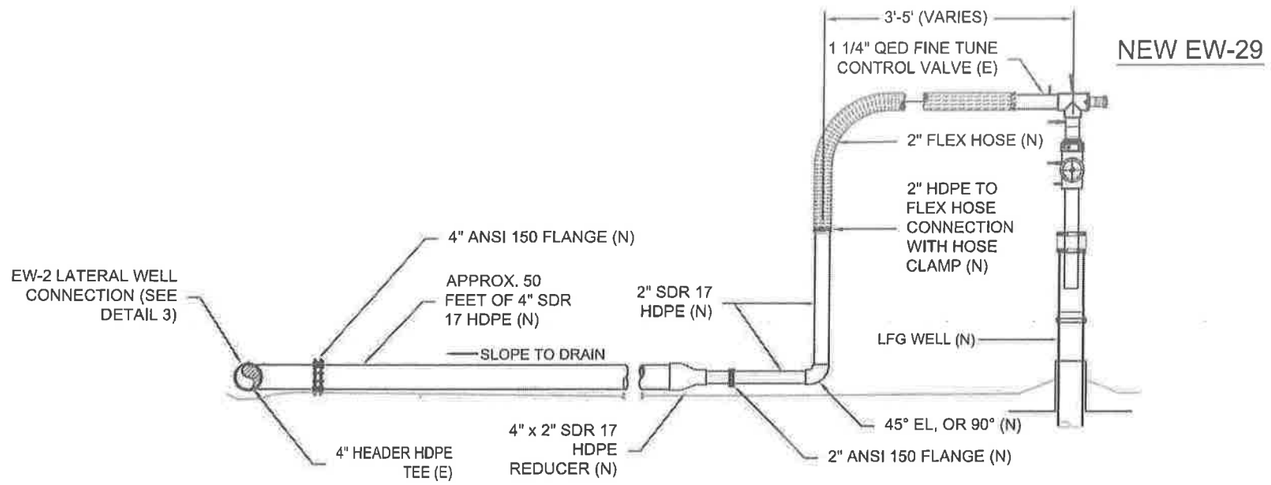
LANDFILL GAS EXTRACTION DETAIL
FIGURE 5
McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

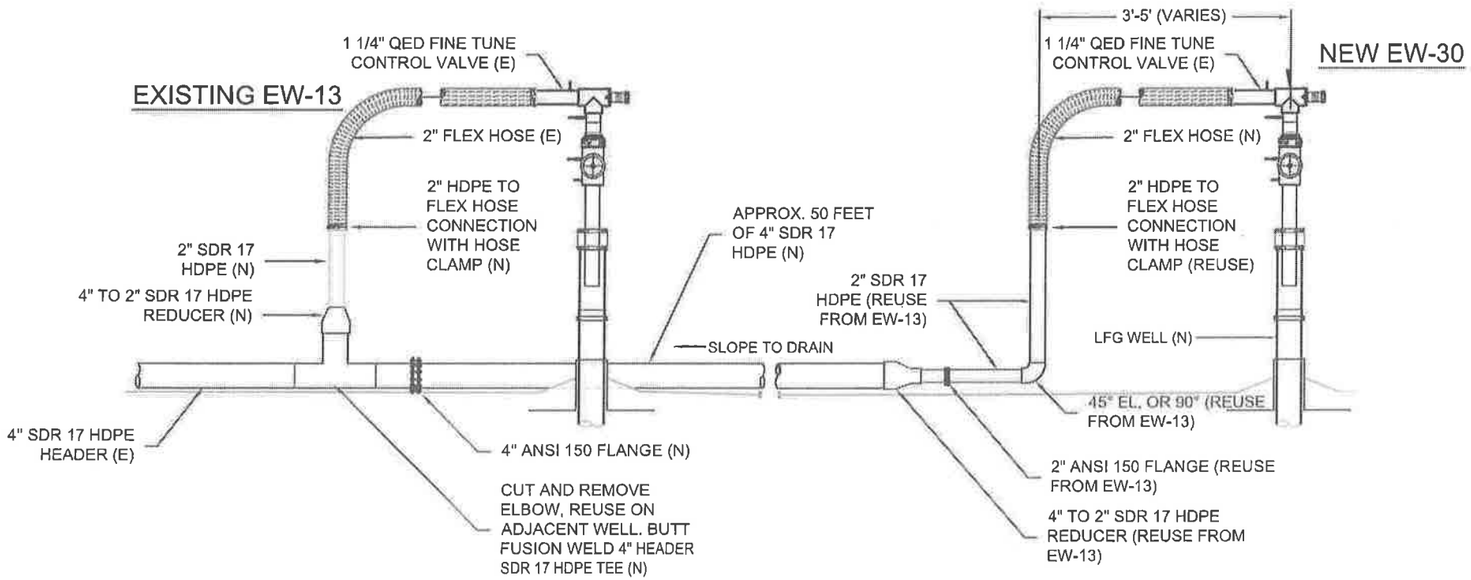
NO.	REVISIONS	DATE
1	WELL HEAD CONNECTION DETAILS ADDED	5/30/18

ORDER NO.:	R5-2014-0022
DRAWN BY:	BJB
CHECKED BY:	JWM
H&K PROJECT:	4142N-03
DATE:	MARCH 2018



1 - EW-29 WELL HEAD AND LATERAL

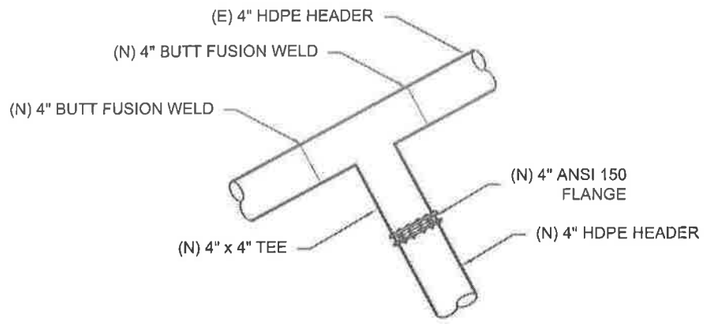
SCALE: N.T.S.



2 - EW-30 WELL HEAD AND LATERAL

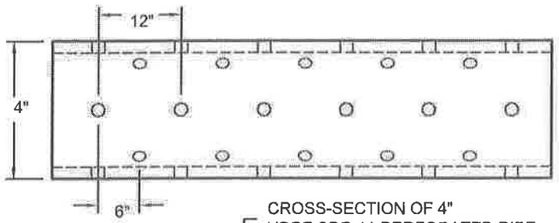
SCALE: N.T.S.

NOTE: N = NEW, E = EXISTING



3 - CONNECT 4" LATERAL TO 4" MAIN

SCALE: N.T.S.



NOTE:

PROVIDE 12, 1/2" HOLES PER 1 FOOT OF PIPE. CONTRACTOR MAY PROPOSE AN ALTERNATIVE PERFORATION PATTERN.

4 - PERFORATED PIPE FOR EXTRACTION WELL

SCALE: N.T.S.

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/18
CIVIL
STATE OF CALIFORNIA

HK HOLDREGE & KULL
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An NV5 Company

COUNTY OF NEVADA CALIFORNIA

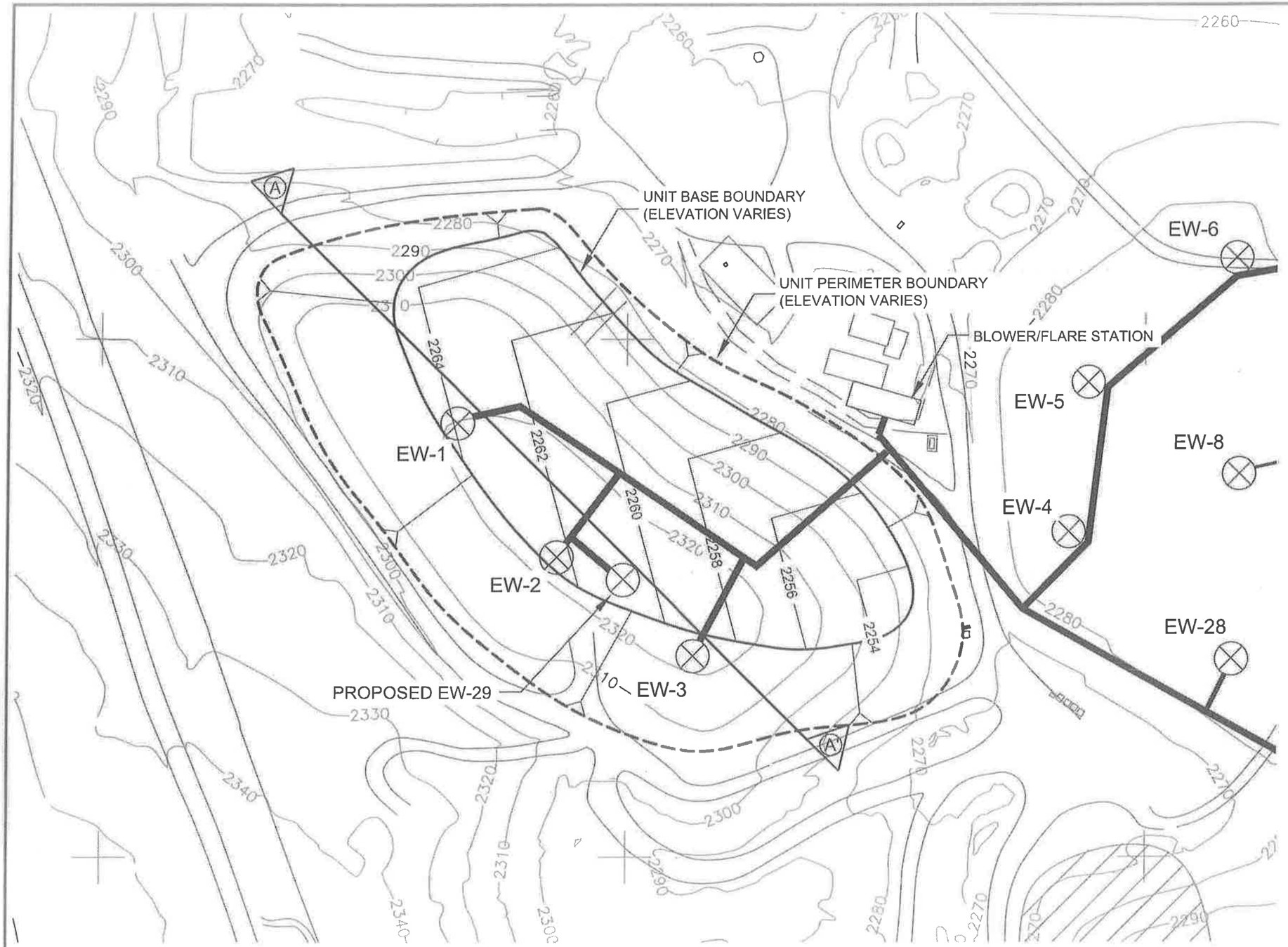
HORIZONTAL COLLECTOR DETAILS

FIGURE 6

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

ORDER NO.:	R5-2014-0022
DRAWN BY:	BJB
CHECKED BY:	JWM
H&K PROJECT:	4142N-03
DATE:	MARCH 2018



LEGEND

- 2254 — SITE TOPOGRAPHY (1995)
- 2254 — BASE LINER CONTOUR , REFERENCE 1
- HDPE PIPING, REFERENCE 2
- A — CROSS SECTION LINE
- EXTRACTION WELL

N

0 FEET 100
SCALE

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60187
Exp. 06/18
CIVIL
STATE OF CALIFORNIA

REFERENCES

(1) 1990-1991 DISPOSAL AREA MCCOURTNEY ROAD LANDFILL (EMCON ASSOCIATES, JANUARY 1991)

(2) SCS ENGINEERS, LFG COLLECTION AND CONTROL SYSTEM (APRIL 2003)

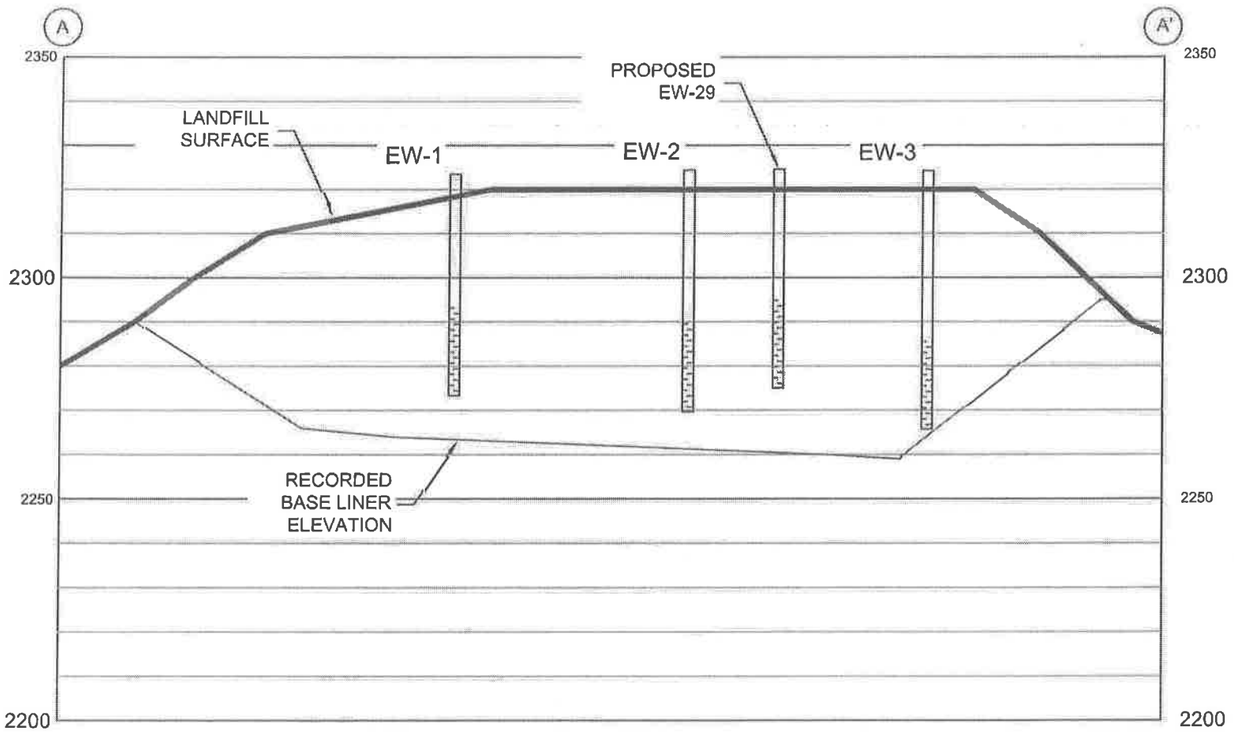
HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
An NV5 Company

LANDFILL UNIT 2 PLAN VIEW
FIGURE 7

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

ORDER NO.:	R5-2014-0022
DRAWN BY:	BOTSFORD
CHECKED BY:	MUIR
H&K PROJECT:	4142-01
DATE:	MARCH 2018



LEGEND

BASE LINER

WELL SCREENED INTERVAL

N

0 FEET 100

HORIZONTAL SCALE

SECTION A - A'

ASPECT RATIO 1:3, H:V

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/19
CIVIL
STATE OF CALIFORNIA

REFERENCES

1, 1990-1991 DISPOSAL AREA MCCOURTNEY ROAD LANDFILL
(EMCON ASSOCIATES, JANUARY 1991)

HOLDREGE & KULL
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COUNTY OF NEVADA CALIFORNIA

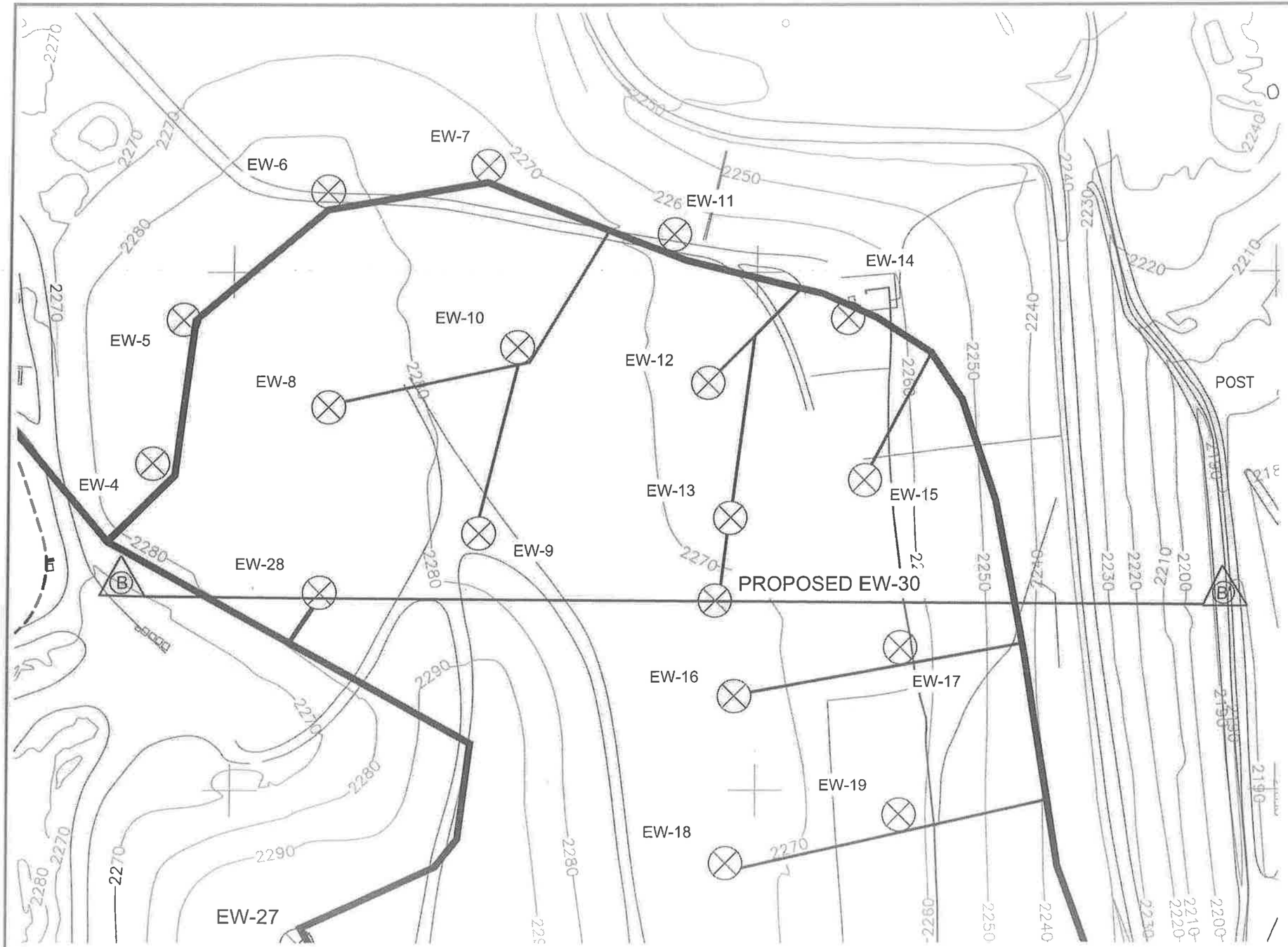
LANDFILL UNIT 2 CROSS SECTION

FIGURE 8

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

ORDER NO.:	R5-2014-0022
DRAWN BY:	BOTSFORD
CHECKED BY:	MUIR
H&K PROJECT:	4142-01
DATE:	MARCH 2018



LEGEND

- 2254 — SITE TOPOGRAPHY (1995)
- HDPE PIPING, REFERENCE 1
- B — CROSS SECTION LINE
- EXTRACTION WELL

N

0 FEET 100
SCALE

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/18
CIVIL
STATE OF CALIFORNIA

REFERENCES

(1) SCS ENGINEERS, LFG COLLECTION AND CONTROL SYSTEM (APRIL 2003)

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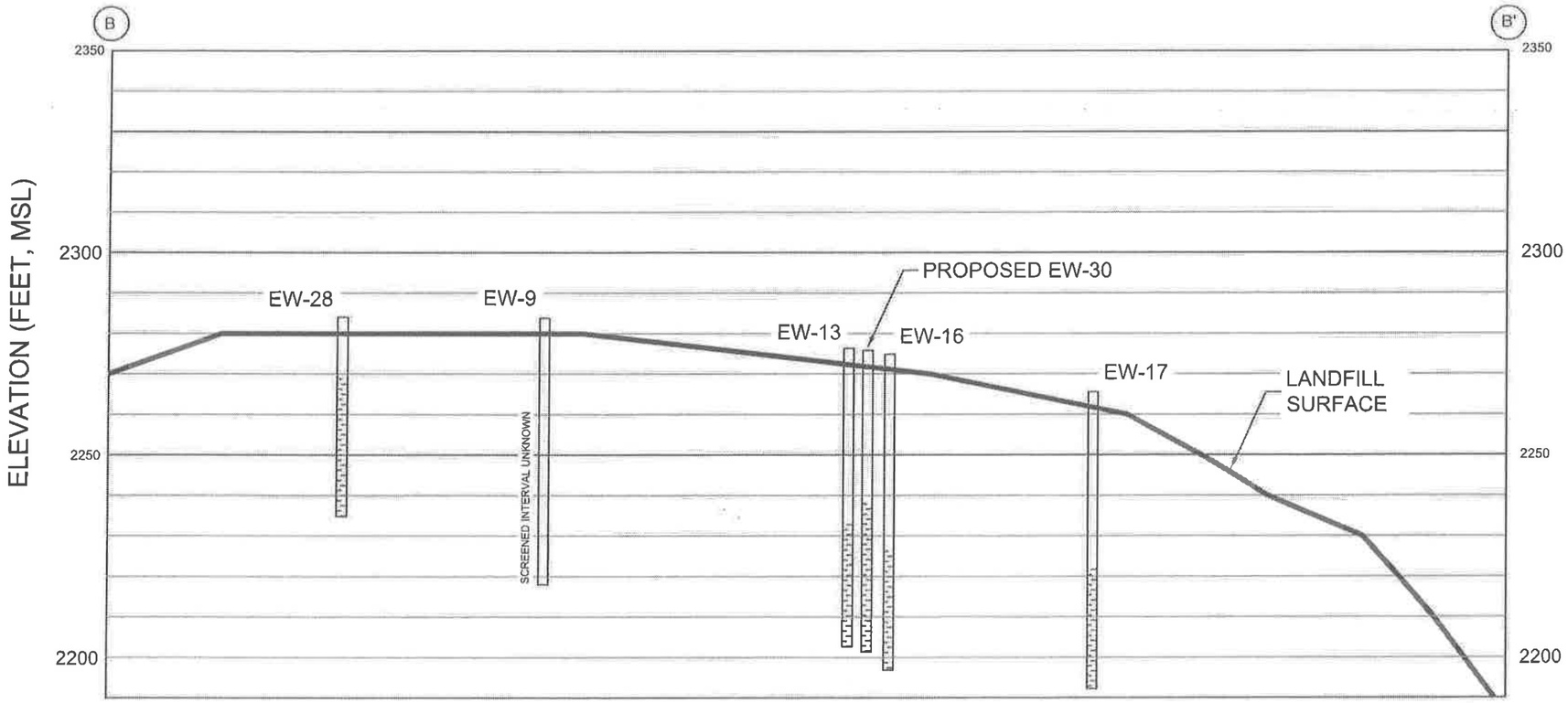
LANDFILL UNIT 1 PLAN VIEW

FIGURE 9

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

ORDER NO.:	R5-2014-0022
DRAWN BY:	BOTSFORD
CHECKED BY:	MUIR
H&K PROJECT:	4142-01
DATE:	MARCH 2018



SECTION B - B'

ASPECT RATIO 1:3, H:V

LEGEND

WELL SCREENED INTERVAL

N

0 FEET 100

HORIZONTAL SCALE

REGISTERED PROFESSIONAL ENGINEER
JASON W. MUIR
No. 60167
Exp. 06/18
CIVIL
STATE OF CALIFORNIA

REFERENCES

1. 1990-1991 DISPOSAL AREA MCCOURTNEY ROAD LANDFILL (EMCON ASSOCIATES, JANUARY 1991)

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
An NV5 Company

LANDFILL UNIT 1 CROSS SECTION

FIGURE 10

McCOURTNEY ROAD LANDFILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

ORDER NO.:	R5-2014-0022
DRAWN BY:	BOTSFORD
CHECKED BY:	MUIR
H&K PROJECT:	4142-01
DATE:	MARCH 2018