SHOP DRAWING AND SAMPLE TRANSMITTAL/REVIEW FORM

Contractor: ARB Inc. 26000 Commercentre Drive Lake Forrest, CA 92630 Phone: (949) 598-9242 Fax: (949) 587-5786	Subcontractor: Phone: Fax:
Engineer: HDR Engineering, Inc. 2030 10th. Street Los Osos, CA 93402 Phone: (805) 534-1341 Fax: (805) 534-1493	Supplier: Phone:

Los Osos Wastewater Collection Areas A & D	ARB Submittal No: 30.0		Date Submitted: Tuesday, October 02, 2012
CPM Activity No.	Specification Package Section: 02140-1		Drawing / Detail

Number Of Copies	Type	Product Description / Manufacturer	Contractor Remarks	Review Action
5	Paper	Dewatering Plan		
1	PDF	Dewatering Plan		
		Related Submittal(s)		

By this submittal, I hereby represent that I have determined and verified all field measurements, construction criteria, material, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable shop drawings and other requirements of the contract documents, except for the deviations listed: (If none, state none)	Deviations: **None** Authorized Signature:

FOR REVIEW USE ONLY

REVIEW COMMENTS:

SIGNATURE DATE

Two Copies Returned To Contractor On (Date): **By:**

Review Action Explanation:	1. Approved	2. Approved as Noted	3. Approved as Noted/Confirm
	4. Approved as Noted/Resubmit	5. Not Approved	6. Comments Attached
	7. Receipt Acknowledged		

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
CIVIL ENGINEERING
STRUCTURAL ENGINEERING
CONSTRUCTION ENGINEERING

LOS OSOS WASTEWATER COLLECTION SYSTEM
LOS OSOS, CA

EXCAVATION DEWATERING PLAN DESIGN CALCULATIONS

ARB, INC.
26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630

The dewatering plan for the above mentioned project is based on the design assumptions from the 'Dewatering Plan' designed by CDM Smith, March 2012. Soils are assumed to be a mix of alluvium and sand deposits. An estimated range of hydraulic conductivity of 10 to 50 gpd/ft^2 and an aquifer thickness of 60 feet have been assumed. Pump rates and estimated duration of the initial draw-down are based upon the worst-case scenario: Ground water at existing grade, with a 20 foot deep excavation, resulting in a desired draw-down of 22 feet.

REGISTERED PROFESSIONAL ENGINEER
ADRIANUS J. VERMEULEN
No. 69082
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

DATE: 09/28/2012
BY: B.R.L.
BY DIRECTION OF: A.J.V.
SHEET NO: 1 of 18
JOB NO.: 13315-1

1325 COLLEGE AVE. • SANTA ROSA, CA 95404 • (707) 528-4503 FAX (707) 528-4505

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CONSTRUCTION ENGINEERING

DEWATERING DESIGN NARRATIVE

Work areas shall be dewatered 1,000 feet at a time. Groundwater observation wells shall be provided at 500ft intervals within the areas of active dewatering.

Area D2 shall be dewatered through the use of sumps and pumps as only nuisance water is expected to be encountered. Groundwater shall be pumped into a baffled sedimentation tank; tested and treated as required by the project specifications and in accordance with the SWPPP BMP's and thereafter trucked to the Fairchild Detention Basin.

Area D3 shall be dewatered through the use of 30 foot deep well points which shall be spaced at 50, 75 or 100 feet, as the contractor deems best suited to each area. Each well point shall consist of a 24 inch diameter well, an 8 inch casing, 15 feet of well screen, filter pack and a submersible pump. Pumps shall discharge into a 6 inch diameter header pipe, which shall outlet into a baffled sedimentation tank. Groundwater shall be tested and treated as required by the project specifications and in accordance with the SWPPP BMP's and pumped into the Fairchild Detention Basin.

Areas D1, A1, A2, A3 and A4 shall be dewatered through the use of 30 foot deep well points which shall be spaced at 50, 75 or 100 feet, as the contractor deems best suited to each area. Each well point shall consist of a 24 inch diameter well, an 8 inch casing, 15 feet of well screen, filter pack and a submersible pump. Pumps shall discharge into a 6 inch diameter header pipe, which shall outlet into a baffled sedimentation tank which shall then outlet into the proposed 16 inch force main running along Los Osos Valley Road where it shall be gravity fed into the Mid-Town Retention Site.

Settlement monitoring points shall be established on or near existing improvements within the dewatering system's radius of influence. These points shall be monitored daily during the initial draw-down, and weekly once the steady state has been achieved. Pumps shall run continuously for 14 days, or until desired draw-down is observed in observation wells. If desired draw-down is not observed within 14 days, additional wells shall be added.

DATE: 09/28/2012
BY: B.R.L.
BY DIRECTION OF: A.J.V.
SHEET NO: 2 of 18
JOB NO.: 13315-1

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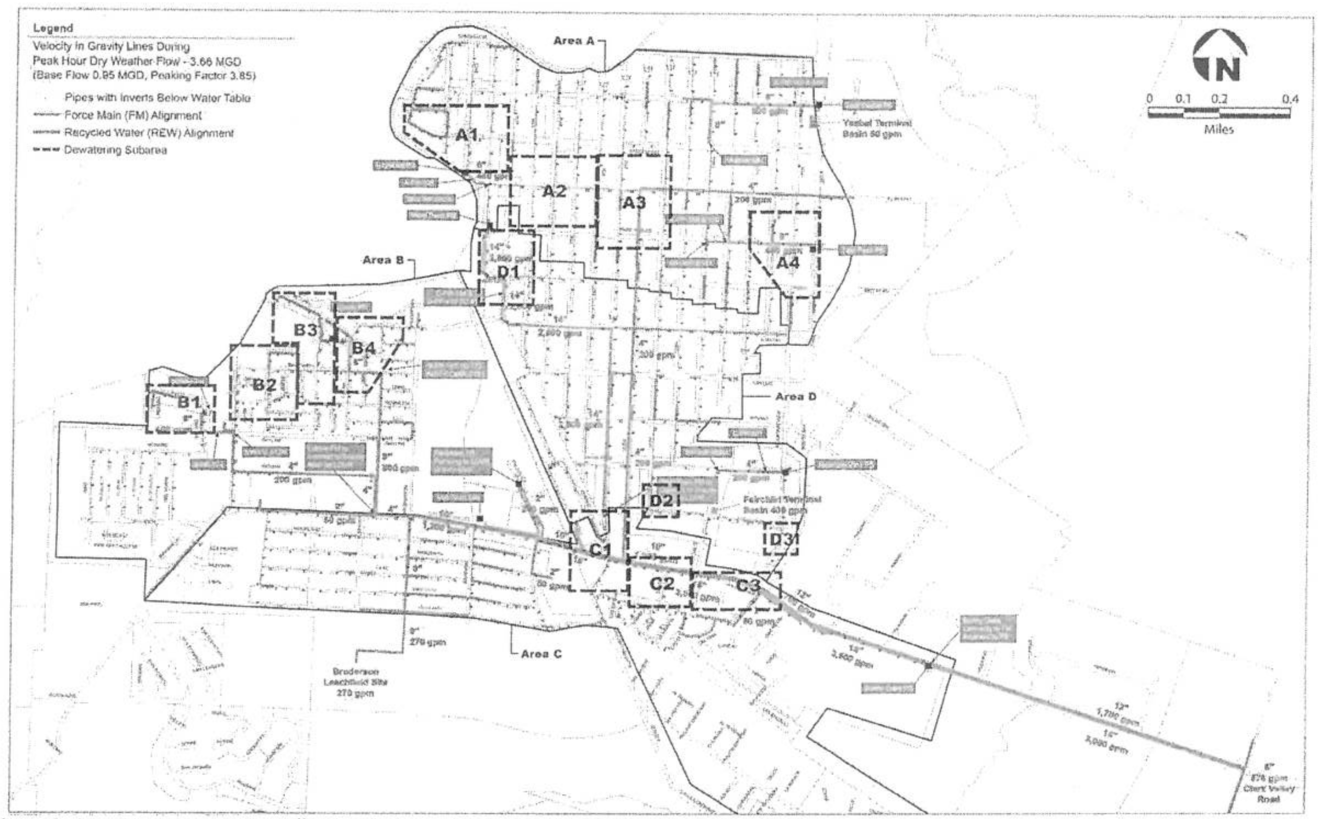


Figure 2. Los Osos Wastewater Collection System – Sewer Areas with Shallow Groundwater

J.M. TURNER ENGINEERING. INC.
CONSULTING ENGINEERS
(707) 528-4503 FAX (707) 528-4505

ARB Inc.
Los Osos
Waste Water Collection
Dewatering Plan

Dewatering Plan for Case '50ft spacing'

Soil and groundwater qualities were taken from "Appendix D Dewatering Plan", performed by CDM Smith, Dated March 2012

Soils Based on Above Report: Soils: SW, SM. A hydraulic conductivity range of 10ft/day to 50ft/day has been used to determine expected pumping rates.

30' Dewatering Wells

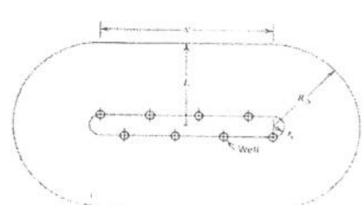
Permeability Based on Design Soil Parameters:	10	to	50 ft/day
	35.30	to	176.50 (μ/sec)

Range of Permeability of Natural Soils				
Description		Permeability (μ/sec)		
Openwork Gravel	(GP)	10000		higher
Uniform Gravel	(GP)	2000	to	10000
Well Graded Gravel	(GW)	500	to	3000
Uniform Sand	(SP)	50	to	2000
Well Graded Sand	**(SW)**	**10**	**to**	**1000**
Silty Sand	**(SM)**	**10**	**to**	**50**
Clayey Sand	(SC)	1	to	10
Silt	(ML)	0.5	to	1
Clay	(CL)	0.1	to	0.0001

Conversion Factors for Units of Permeability		
UNIT	Multiply by to Convert to μ/sec	Multiply μ/sec by to get unit
cm x 10^{-4} per sec	1	1
Gallons Per Day Per Square Foot	0.46948357	2.13
Feet Per Minute	5081	0.000197
Feet Per Day	**3.53**	**0.283286**
Inches Per Year	0.0008058	1241
Meters Per Day	11.57	0.08643
Feet Per Year	0.00967118	103.4

Estimated depth of aquifer 60 ft

RADIUS OF INFLUENCE R_0



Approximate analysis of long narrow systems

30 ft deep well:

Ground Level	100 elev
Water surface level	100 elev
Dewater elevation	78 elev
Pump Intake elevation	70 elev
h_w =	38 ft

Expect that permeability K can range
from 35.30 (μ/sec)

75.19 gal/day/ft^2

to 176.50 (μ/sec)

375.95 gal/day/ft^2

$$Q = \frac{\pi K (H^2 - h^2)}{\ln R_0/r_s} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Steady State:

Total wells = 21

approximate

R_0 = $3(H-h)K^{.5}$ = 392 FT

H = 60 FT

h = 38 FT

K = 35.30 (μ/sec)

Approximate R_0 = $3(H-h)K^{.5}$ = 877 FT

H = 60 FT

h = 38 FT

K = 176.50 (μ/sec)

$Q = \pi K(H^2-h_w^2)/\ln R_o/r_s+2(X*K(H^2-h_w^2)/2L$

$Q = K(H^2-h_w^2)/458 \ln R_o/r_w$

Equivalent radius (R_s) = 17.8 ft

X = 1000 ft

r_s = 1 ft

based on a system of wells with the same enclosed area: sqrt(a*b/pi)

Estimate Q	
K =	**75.189 gal/day/ft^2**
H =	60 ft
h_w =	38 ft
R_0 =	392 ft
r_s =	1 ft
$\ln R_0/r_s$ =	5.97
Q =	498684 gpd
	20,779 gph
	346 gpm
Q =	16 gpm per well

Estimate Q	
K =	**375.945 gal/day/ft^2**
H =	60 ft
h_w =	38 ft
R_0 =	877 ft
r_s =	1 ft
$\ln R_0/r_s$ =	6.78
Q =	1300170 gpd
	54,174 gph
	903 gpm
Q =	43 gpm per well

Initial Drawdown:

Approximate draw-down time based on field data:

Uniform to Well Graded Gravel:	2 - 3 days
Uniform to Well Graded Sand:	4 - 6 days
Silty and Clayey Sand:	7 - 12 days
Silt and Clay:	more than 12 days

Estimated permeability =	375.9 gal/day/ft^2
Q (steady state) =	43 gpm per well
Estimated draw-down time =	11 days
Estimated rate of draw-down =	2.0 ft per log cycle
Pumping coefficient =	1.5
Qi =	64 gpm per well
Initial Flow rate =	92,869 gpd per well
Steady State Flow rate =	61,913 gpd per well

Summary:

Estimated Flows	Quantity (gal)	Time (days)	Q (gpd)
Initial Drawdown	1,021,562	11	92,869
Steady State	61,913	1	61,913

Pump Requirements	Q (gpd)	Qty Pumps	Capacity (gpm)
Initial Drawdown	92,869	21	64
Steady State	61,913	21	43

Sedimentation and Turbidity Control:

Pump to Retention

Length L =	50	ft
Width W =	8	ft
Depth D =	8	ft
Volume	3200	cf
Volume	23936	gal
Surface area A_s	400	sf

Particle Size (mm)	Particle Description	Settling Velocity V_s (fps)
0.5	coarse sand	0.19
0.2	medium sand	0.067
0.1	fine sand	0.023
0.05	coarse silt	0.0062
0.02	medium silt	0.00096
0.01	fine silt	0.00024
0.005	clay	0.00006

Summary from below calculations.

Sedimentation	Detention Time (hr)	Velocity V_s (ft/sec)	solids (cf/day)	Overflow Rate (gpd/sf)
Initial Drawdown	6.19	0.000428	0.62	232
Steady State	9.28	0.000287	0.41	155

Note-Discharge with a turbidity in excess of 50 NTUs or 110% of the ambient stream turbidity, which ever is less is prohibited. A turbidity test will be required if a visual test does not confirm this.

Initial Drawdown 4 days

Estimated Flows	Quantity (gal)	Time (days)	Q (gpd)
Initial Drawdown	1,021,562	11	92,869

Detention time = volume of tank/flow per unit time = **6.186 Hr**

Volume = 3200 cf
Q = 92,869 gpd

Velocity V_s = 1.2 Q/A_s = **0.000428 ft/sec** **sufficient time to settle particles**

A_s = 400 sf
Q = 92,869 gpd

Estimated solids =suspended solids/unit volume x Q = **0.62 cf/day**

Q = 92,869 gpd
suspended solids 5 ppm

Overflow rate =Q/LW = **232 gpd/sf**

Q = 92,869 gpd
L = 50
W = 8

Steady State

Estimated Flows	Quantity (gal)	Time (days)	Q (gpd)
Steady State	61,913	1	61,913
Total Initial Steady State	61,913	1	61,913

Detention time = volume of tank/flow per unit time = **9.28 Hr**

Volume = 3200 cf
Q = 61,913 gpd

Velocity V_s = 1.2 Q/A_s = **0.000287 ft/sec** **sufficient time to settle particles**

A_s = 400 sf
Q = 61,913 gpd

Estimated solids =suspended solids/unit volume x Q = **0.41 cf/day**

Q = 61,913 gpd
suspended solids 5 ppm

Overflow rate =Q/LW = **154.8 gpd/sf**

Q = 61,913 gpd
L = 50 ft
W = 8 ft

J.M. TURNER ENGINEERING, INC.
1325 COLLEGE AVENUE
SANTA ROSA, CA 95404
PH#: (707) 528-4503
FAX#: (707) 528-4505

SUBJECT: ARB, Inc. SHEET NO.: ____ OF ____
Los Osos Wastewater Collection System BY: B.L. DATE: ____
Dewatering Well Calculations CHKD BY: ____ DATE: ____

Check Screen Diameter:

Pump Capacity (gpm):	$Q := 123$	(from well calculations, spaced at 100ft)
Minimum Well Diameter (in):	$d := 6$	(per table 18.1 Powers 1992)
Well Screen Diameter (in):	$D := 8$	$D \geq d$ OK

Check Screen Length:

Well Screen Length (ft):	$L := 15$	
Flow per lineal foot of screen (gpm/ft):	$q := \frac{Q}{L}$	$q = 8.2$

Check Screen Entrance Velocity (Slotted PVC Screen):

Well Screen Diameter (in):	$D = 8$	
Well Screen Slot Size (in):	$S := 0.030$	
Area of Opening (in^2/ft):	$A_o := 25.9$	(per table 18.2 Powers 1992)
Screen Entrance Velocity (fpm):	$v_s := 19.2 \cdot \frac{q}{A_o}$	$v_s = 6$
Recommended Velocity (fpm):	$V_s := 6$	(per table 18.3 Powers 1992)
	$V_s = 6$ > $v_s = 6$	OK

Check Gravel Filter Pack (Powers 1992):

Soil Properties (based upon grain distribution graph from the Geotechnical Report, by Fugro West, Inc. March 4, 2004):

90% Passing Size (mm):	$D_{90a} := 0.30$	(US STD Sieve #48)
60% Passing Size (mm):	$D_{60a} := 0.25$	(US STD Sieve #60)
50% Passing Size (mm):	$D_{50a} := 0.21$	(US STD Sieve #65)
10% Passing Size (mm):	$D_{10a} := 0.08$	(US STD Sieve #200)
Gradation:	$C_u := \frac{D_{60a}}{D_{10a}}$	$C_u = 3.1$

Filter Pack Properties:

Filter factor for uniform soils:	$F := 8$	(per figure 18.14 Powers 1992)	
Allowable Filter 50% Passing (mm):	$D_{50f} := F \cdot D_{50a}$	$D_{50f} = 1.68$	(US STD Sieve #12)
Filter 90% Passing Size (mm):	$D_{90f} := F \cdot D_{90a}$	$D_{90f} = 2.4$	(US STD Sieve #8)
Filter 60% Passing Size (mm):	$D_{60f} := F \cdot D_{60a}$	$D_{60f} = 2$	(US STD Sieve #10)
Filter 10% Passing Size (mm):	$D_{10f} := F \cdot D_{10a}$	$D_{10f} = 0.64$	(US STD Sieve #30)

CALPORTLAND
CONSTRUCTION

CONSTRUCTION • READY MIX CONCRETE • ASPHALTIC CONCRETE • AGGREGATES • TRANSPORTATION

Telephone: (805) 345-3400
Fax: (805) 345-3577
P.O. Box 1280, Santa Maria, CA 93456

September 20, 2012

ARB, Inc.
Los Osos Wastewater Collection A&D
County of San Luis Obispo, CA

MANUFACTURER'S CERTIFICATION
GAREY AGGREGATE PLANT
1/4" x #8 BACKFILL AGGREGATE

The Garey 1/4" x #8 Backfill Aggregate supplied by CalPortland Construction is produced at the Garey, California Plant, SMARA No. 91-42-0014. The typical physical properties of the aggregate are summarized below and represent material that was sampled during routine quality control testing.

Gradation:	Cumulative Percent Passing
	Garey
Sieve Size	1/4" x #8 Backfill
1/2" (12.5 mm)	100
3/8" (9.50 mm)	99
1/4" (6.30 mm)	98
#4 (4.75 mm)	64
#8 (2.36 mm)	3
#16 (1.18 mm)	1

Specific Gravity, Bulk SSD	2.54
Cleanness Value, CT 227	60
Durability Index, CT 229	50
Voids (Rodded), C 29	39

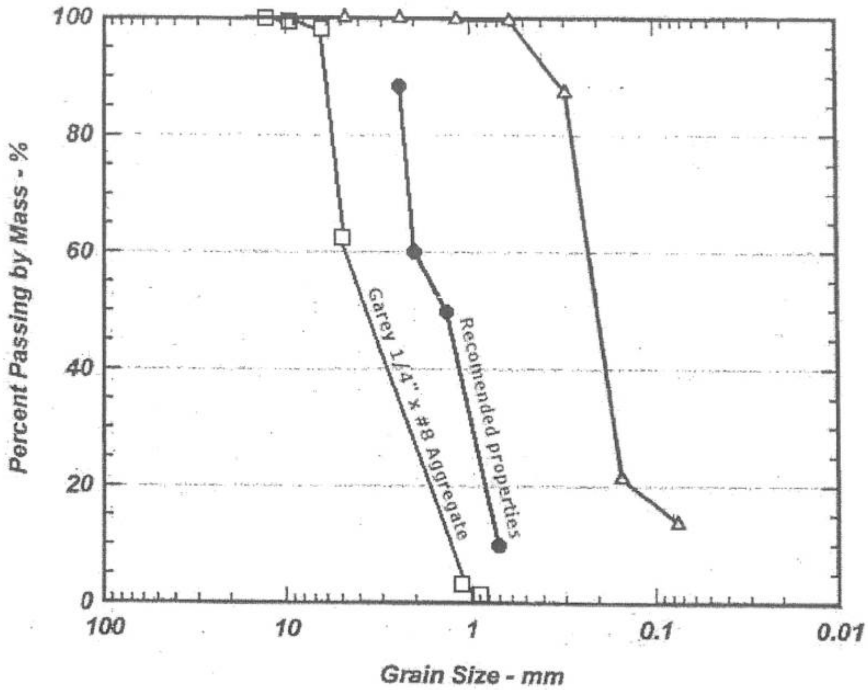
CALPORTLAND CONSTRUCTION

Patrick W. Imhoff

Patrick W. Imhoff, P.E.
Technical Service Manager

CALPORTLAND IS AN EQUAL OPPORTUNITY EMPLOYER

Mechanical Sieve Analysis Results



GRAVEL		SAND			SILT or CLAY
coarse	fine	coarse	medium	fine	

Symbol	Sample	Depth (ft)	Description and Classification	C_c	C_u
▲	1-4	18.5	Silty SAND (SM)	—	—

Project: Los Osos Wastewater Project
Performed by: Gregg Fiegel, Ph.D., P.E.
Test Method: ASTM D422

GRAIN SIZE

CFS Geotechnical Consultants	~~MECHANICAL SIEVE ANALYSIS~~ RESULTS	Los Osos Wastewater Project Los Osos, California Project No. 991001
		Figure B-2a

ARB, INC.

26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630

LOS OSOS WASTE WATER COLLECTION SYSTEM DEWATERING PLAN LOS OSOS, CA

TYPICAL DEWATERING PLAN FOR AREAS "A" & "D"

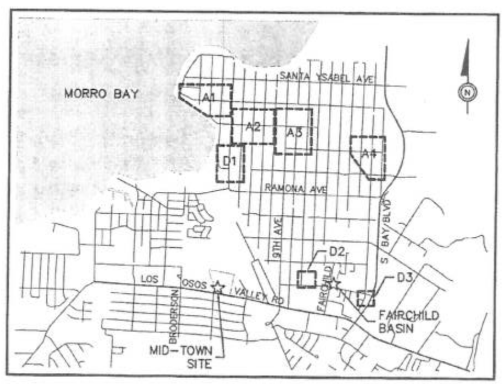
GENERAL NOTES:

1. DUE TO NATURAL VARIATIONS IN SOIL STRATA PUMPING RATES MAY VARY FROM THOSE SHOWN ON THIS PLAN. THIS PLAN SHALL BE MODIFIED AS REQUIRED TO MAINTAIN THE SPECIFIED DEWATERED ELEVATION TO ALLOW CONSTRUCTION TO PROCEED ON DRY, STABLE SUBGRADES. IF CONDITIONS ARE ENCOUNTERED SUCH THAT THE PUMPING RATES ARE MORE THAN TWICE THOSE SHOWN ON THIS PLAN OUR OFFICE SHALL BE NOTIFIED IMMEDIATELY.
2. DURING THE DEWATERING PROCESS THE CONTRACTOR SHALL DESIGNATE A COMPETENT PERSON AT THE SITE WHERE THIS PLAN IS IN USE TO BE RESPONSIBLE FOR ENSURING THAT THE INTENT OF THIS PLAN IS MAINTAINED AT ALL TIMES.
3. DESIGN BASED ON TECHNICAL MEMORANDUM "APPENDIX D" DEWATERING PLAN BY CDM SMITH, DATED MARCH 2012.
4. VERIFY LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND/OR PIPES PRIOR TO COMMENCING WELL PLACEMENT TO AVOID POTENTIAL CONFLICTS.
5. SUMPS AND DRAINAGE DITCHES SHALL NOT BE PERMITTED IF THEY RESULT IN BOILS, LOSS OF FINES, OR SLOPE INSTABILITY. WELLS SHALL BE MONITORED AND MODIFIED IF NECESSARY TO PREVENT THE CONTINUOUS PUMPING OF FINES.
6. SEE SHEET 2 FOR ESTIMATED FLOWS, AND PUMP REQUIREMENTS.
7. AFTER INITIAL DRAW-DOWN, PUMP SIZE AND/OR NUMBER OF ACTIVE WELLS MAY BE MODIFIED SO LONG AS MINIMUM DEWATER DEPTH IS MAINTAINED AS SHOWN ON PLAN.
8. PROVIDE OBSERVATION WELLS AT 500 FT.

WELL ABANDONMENT SEQUENCE:

1. REMOVE PUMP AND ASSOCIATED PIPING AND CABLE, ETC.
2. REMOVE WELL CASING.
3. REMOVE THE TOP FIVE FEET OF GRAVEL PACK AND REPLACE WITH NATIVE FILL OR CLASS II AGGREGATE BASE.

INDEX:



VICINITY MAP

DEWATERING NOTES:

1. PLACE WELLS WITH OFFSETS AS SHOWN ON PLAN.
2. WELL SPACING SHALL BE AS SHOWN ON PLAN.
3. PROVIDE, TAKE MEASUREMENTS, AND MAINTAIN OBSERVATION WELLS. ACTIVE WELLS MAY DOUBLE AS OBSERVATION WELLS.
4. PUMPS SHALL BE POWERED WITH 3-PHASE POWER WHERE POSSIBLE.
5. PROVIDE BACKUP GENERATORS, AUTO ALARMS AND DIALERS TO LIMIT INTERRUPTIONS IN DEWATERING.

GROUNDWATER DISPOSAL:

1. DISCHARGE PUMPS INTO AN 6 INCH PVC HEADER WHICH SHALL OUTLET INTO A BAFFLED BAKER TANK.
2. PERFORM WATER QUALITY ANALYSES AS REQUIRED BY PROJECT SPECIFICATIONS.
3. TREAT WATER AS REQUIRED BY PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH THE SWPPP BMP'S PRIOR TO DISPOSAL.
4. PRIORITIZE USE OF WATER FOR CONSTRUCTION PURPOSES. DISPOSE OF REMAINING WATERS AS FOLLOWS:

4.1. WATER PUMPED FROM AREA D2 SHALL BE LOADED ONTO TRUCKS AND DUMPED INTO THE FAIRCHILD DETENTION BASIN.

4.2. WATER FROM AREA D3 SHALL BE PIPED TO THE FAIRCHILD DETENTION BASIN.

4.3. WATER PUMPED FROM AREAS D1, A2, A3, A1, AND A4 SHALL BE PIPED TO THE MID-TOWN RETENTION SITE.

REGISTERED PROFESSIONAL ENGINEER
ADRIANUS J. VERMEULEN
No. 69062
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

REVISIONS	BY

WASTE WATER COLLECTION SYSTEM
DEWATERING PLAN
LOS OSOS, CA
COVER PAGE

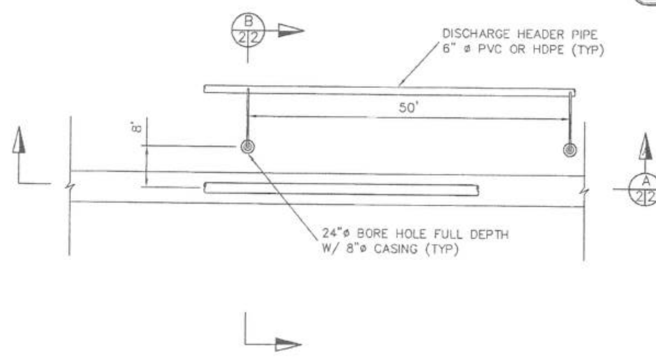
ARB INC.
26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1325 COLLEGE AVE. SANTA ROSA, CA 95404
(707) 528-4503 FAX (707) 528-4505

SCALE: N.T.S.
DATE: 09/28/12
DRAWN BY: B.R.L.
CHECKED BY: A.J.V.
DRAWING NO: 13315-1/ S1
SHEET: 1 OF 5

WASTE WATER COLLECTION SYSTEM
LOS OSOS, CA
DEWATERING PLAN

WELL AT 50FT



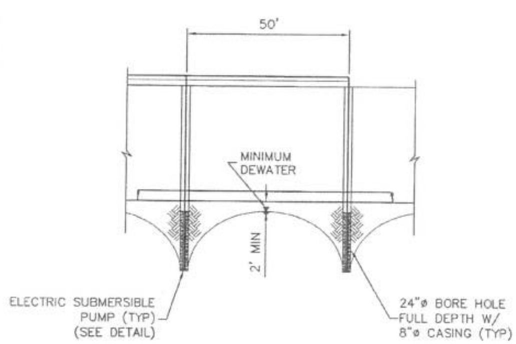
PLAN VIEW

DEWATERING PLAN – WELLS AT 50FT

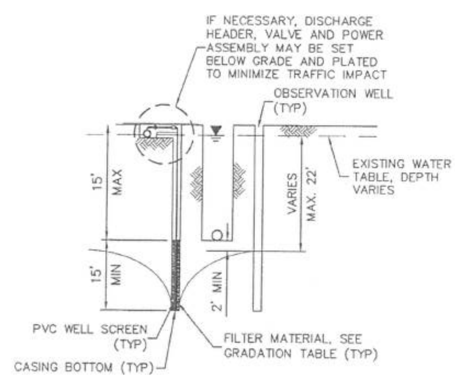
ESTIMATED PUMP REQUIREMENTS (PER PUMP)	QUANTITY (GPD)	NUMBER OF PUMPS (PER 1,000 FT)	CAPACITY (GPM)
INITIAL DRAWDOWN	92,869	21	64
STEADY STATE	61,913	21	43

30' WELL

ESTIMATED FLOW (PER PUMP)	QUANTITY (GAL)	TIME (DAYS)	Q (GPD)	Q (CFS)
INITIAL DRAWDOWN	1,021,562	11	92,869	0.14
STEADY STATE	61,913	1	61,913	0.10



SECTION A 2|2



SECTION B 2|2

0 10' 20' 40'
SCALE: 1" = 20'-0"

REVISIONS	BY

WASTE WATER COLLECTION SYSTEM
DEWATERING PLAN
LOS OSOS, CA
DEWATERING WELLS AT 50 FEET

ARB INC.
26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630

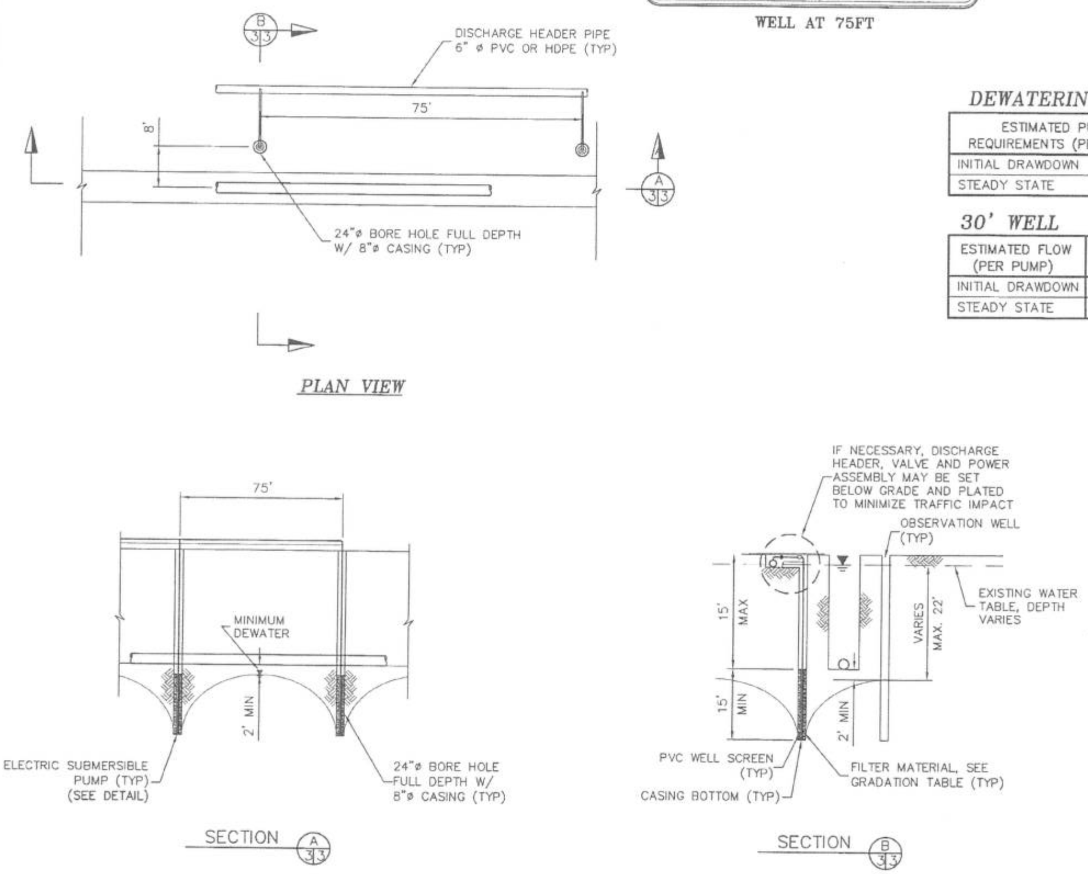
J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1335 N. DUTTON AVE., SANTA ROSA, CA 95401
(707) 528-4503 FAX (707) 528-4505

SCALE: 1"=20'
DATE: 09/28/12
DRAWN BY: B.R.L.
CHECKED BY: A.J.V.
DRAWING NO: 13315-1/ S2
SHEET: 2 OF 5

P:\13000 Series\13300 Series\13315-1\Drawings\S2.dwg, 10/1/2012 11:08:31 AM

WASTE WATER COLLECTION SYSTEM
LOS OSOS, CA
DEWATERING PLAN

WELL AT 75FT



DEWATERING PLAN – WELLS AT 75FT

ESTIMATED PUMP REQUIREMENTS (PER PUMP)	QUANTITY (GPD)	NUMBER OF PUMPS (PER 1,000 FT)	CAPACITY (GPM)
INITIAL DRAWDOWN	130,017	15	90
STEADY STATE	86,678	15	60

30' WELL

ESTIMATED FLOW (PER PUMP)	QUANTITY (GAL)	TIME (DAYS)	Q (GPD)	Q (CFS)
INITIAL DRAWDOWN	1,430,186	11	130,017	0.20
STEADY STATE	86,678	1	86,678	0.13

REGISTERED PROFESSIONAL ENGINEER
ARIANUS J. VERMEULEN
No 69082
Exp 6/30/14
CIVIL
STATE OF CALIFORNIA

0 10' 20' 40'
SCALE: 1" = 20'-0"

REVISIONS | BY

WASTE WATER COLLECTION SYSTEM
DEWATERING PLAN
LOS OSOS, CA
DEWATERING WELLS AT 75 FEET

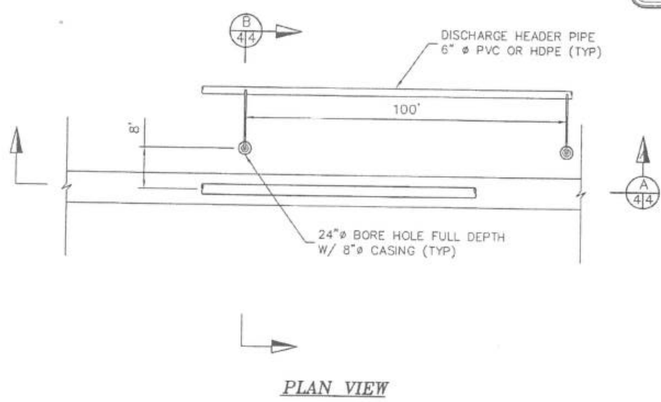
ARB INC.
26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1335 N. DUTTON AVE, SANTA ROSA, CA 95401
(707) 528-4503 FAX (707) 528-4505

SCALE: 1"=20'
DATE: 09/28/12
DRAWN BY: B.R.L.
CHECKED BY: A.J.V.
DRAWING NO: 13315-1/ S3
SHEET: 3 OF 5

WASTE WATER COLLECTION SYSTEM
LOS OSOS, CA
DEWATERING PLAN

WELL AT 100FT

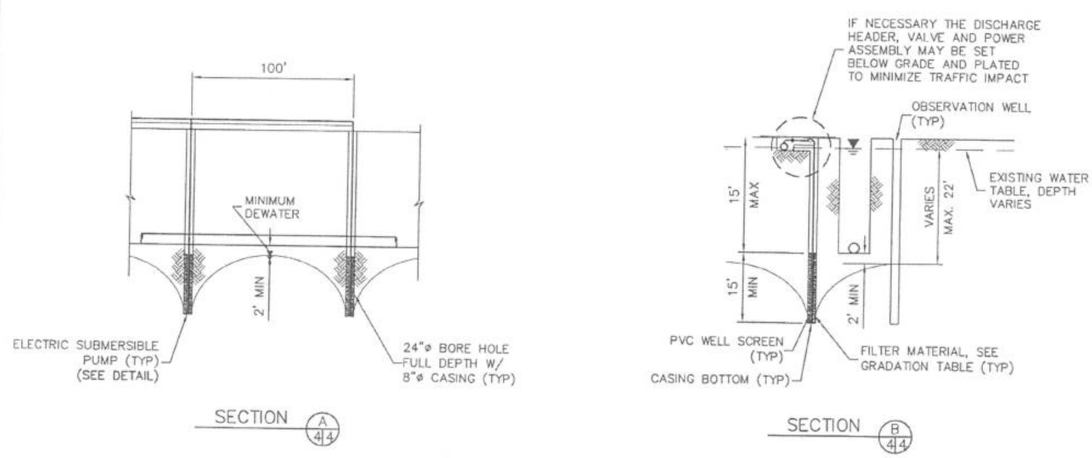


DEWATERING PLAN – WELLS AT 100FT

ESTIMATED PUMP REQUIREMENTS (PER PUMP)	QUANTITY (GPD)	NUMBER OF PUMPS (PER 1,000 FT)	CAPACITY (GPM)
INITIAL DRAWDOWN	177,296	11	123
STEADY STATE	118,197	11	82

30' WELL

ESTIMATED FLOW (PER PUMP)	QUANTITY (GAL)	TIME (DAYS)	Q (GPD)	Q (CFS)
INITIAL DRAWDOWN	1,950,254	11	177,296	0.27
STEADY STATE	118,197	1	118,197	0.18



SCALE: 1" = 20'-0"

REVISIONS | BY

WASTE WATER COLLECTION SYSTEM
DEWATERING PLAN
LOS OSOS, CA
DEWATERING WELLS AT 100 FEET

ARB INC.
26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1335 N. DUTTON AVE., SANTA ROSA, CA 95401
(707) 528-4503 FAX (707) 528-4505

SCALE: 1"=20'
DATE: 09/28/12
DRAWN BY: B.R.L.
CHECKED BY: A.J.V.
DRAWING NO: 13315-1/ S4
SHEET: 4 OF 5

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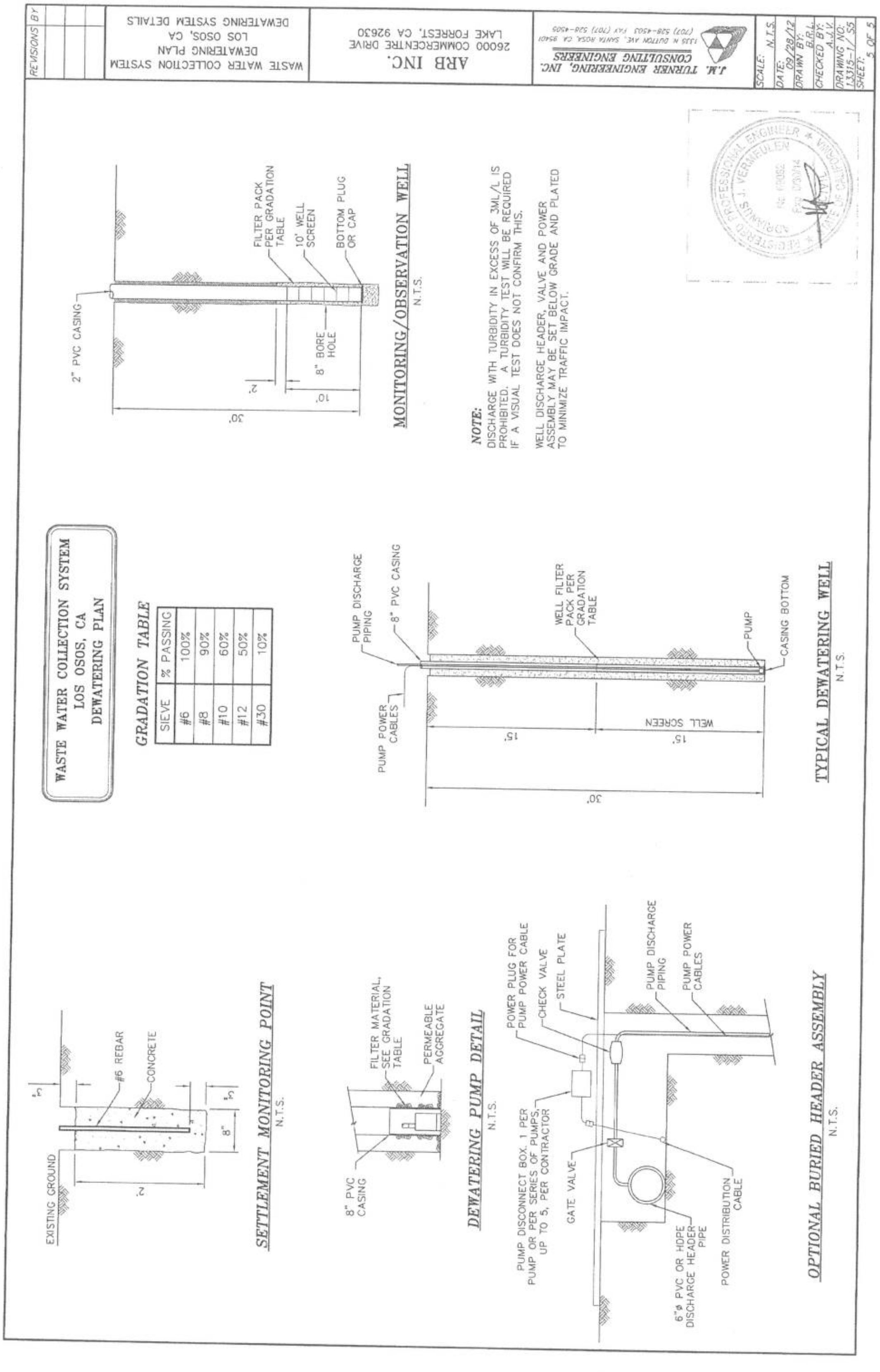

WASTE WATER COLLECTION SYSTEM
LOS OSOS, CA
DEWATERING PLAN
EXISTING GROUND
3"
2'
#6 REBAR
CONCRETE
8"
3"
SETTLEMENT MONITORING POINT
N.T.S.
GRADATION TABLE
SIEVE | % PASSING
#6 | 100%
#8 | 90%
#10 | 60%
#12 | 50%
#30 | 10%
2" PVC CASING
30'
2'
10'
8" BORE HOLE
FILTER PACK PER GRADATION TABLE
10' WELL SCREEN
BOTTOM PLUG OR CAP
MONITORING/OBSERVATION WELL
N.T.S.
8" PVC CASING
FILTER MATERIAL, SEE GRADATION TABLE
PERMEABLE AGGREGATE
DEWATERING PUMP DETAIL
N.T.S.
PUMP POWER CABLES
PUMP DISCHARGE PIPING
8" PVC CASING
30'
15'
15'
WELL SCREEN
WELL FILTER PACK PER GRADATION TABLE
PUMP
CASING BOTTOM
TYPICAL DEWATERING WELL
N.T.S.
NOTE:
DISCHARGE WITH TURBIDITY IN EXCESS OF 3ML/L IS PROHIBITED. A TURBIDITY TEST WILL BE REQUIRED IF A VISUAL TEST DOES NOT CONFIRM THIS.
WELL DISCHARGE HEADER, VALVE AND POWER ASSEMBLY MAY BE SET BELOW GRADE AND PLATED TO MINIMIZE TRAFFIC IMPACT.
PUMP DISCONNECT BOX. 1 PER PUMP OR PER SERIES OF PUMPS, UP TO 5, PER CONTRACTOR
POWER PLUG FOR PUMP POWER CABLE
CHECK VALVE
STEEL PLATE
GATE VALVE
PUMP DISCHARGE PIPING
PUMP POWER CABLES
6"ø PVC OR HDPE DISCHARGE HEADER PIPE
POWER DISTRIBUTION CABLE
OPTIONAL BURIED HEADER ASSEMBLY
N.T.S.
REVISIONS | BY
WASTE WATER COLLECTION SYSTEM
DEWATERING PLAN
LOS OSOS, CA
DEWATERING SYSTEM DETAILS
ARB INC.
26000 COMMERCENTRE DRIVE
LAKE FORREST, CA 92630
J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
SCALE: N.T.S.
DATE: 09/28/12
DRAWN BY: B.R.L.
CHECKED BY: A.J.V.
DRAWING NO: 13315-1/ S5
SHEET: 5 OF 5