Any other measures that will facilitate positive surface drainage should be employed. Maintenance personal should be informed of the need to preserve proper drainage.

LANDSCAPING

All slopes should be planted as soon as possible. It is important to avoid repeated wetting and drying of the slope surface, which may cause the soil to crack and/or loosen. The landscaping process should aid in abating erosion. In addition, efforts should be made to effectively control burrowing rodents. If slopes are not landscaped prior to experiencing a drying season, the condition of their surface should be re-evaluated prior to landscaping.

Raised planter boxes adjacent to building foundations should either be avoided or appropriately sealed so that the irrigation water does not impact the foundations. Sealing may be accomplished by constructing the raised planters with a solid base and side-wall weep holes (exiting on side away from the building), or by providing a cutoff wall adjacent to the foundations. Cutoff walls should be at least 6 inches thick and extend at least 30 inches below the grade.

Control of irrigation water is a necessary part of site maintenance. Soggy ground, near-surface, perched water or seeps may result if irrigation water is excessively or improperly applied. All irrigation systems should be adjusted to provide the minimum water needed to sustain landscaping. Adjustments should be made for changes in the climate. Irrigation should stop when sufficient water is provided by precipitation. Broken, leaking, or plugged sprinklers or irrigation lines should be repaired immediately. Frequent inspections of the irrigation systems should be performed. Maintenance personal should be informed of the need to properly irrigate the properties.

SERVICES DURING CONSTRUCTION

Grading, foundation, retaining wall or other plans should be forwarded to our office for review as they are developed. We may offer additional discussion and/or design criteria as warranted.

Placement of all fill and backfill should be monitored by representatives of this office. This includes our observation of prepared bottoms prior to filling.

Foundation excavations should be observed by representatives of this office to see if the recommended penetration of proper supporting strata has been achieved. Such observations should be made prior to placing concrete, steel or forms. This office should be notified at least 24 hours prior to placing concrete.

111 STATEMENT

Based upon tests conducted as outlined in this and applicable referenced reports, and if constructed in accordance with our recommendations and properly maintained, it is the opinion of the

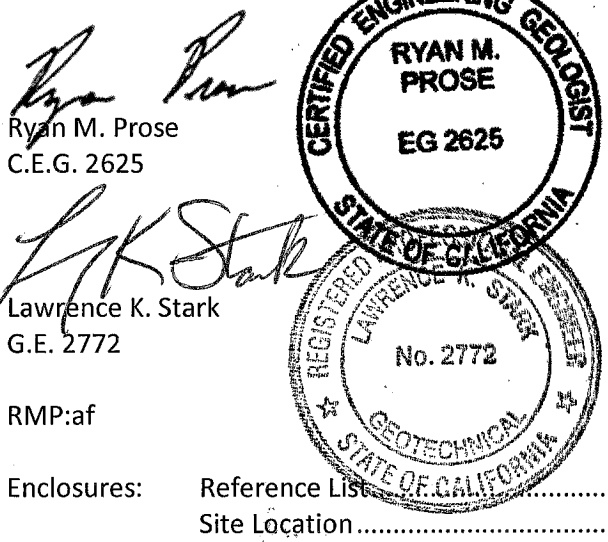
undersigned, a duly registered professional engineer and engineering geologist, that (1) the proposed grading and proposed structure(s) will be safe against hazard from landslide, settlement or slippage, and that (2) the proposed building or proposed grading construction will have no adverse effect on the geologic stability of property outside the building site. The nature and extent of tests conducted for purposes of this declaration are, in the opinion of the undersigned, in conformance with generally accepted practices in this area. Test findings and statements of professional opinion do not constitute a guarantee or warranty, express or implied.

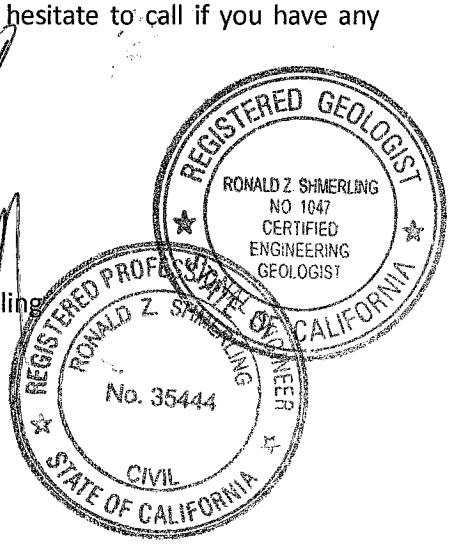
CLOSURE

This geotechnical report has been prepared in accordance with generally accepted engineering practices at this time and location. No other warranties, either express or implied, are made as to the professional advice provided under the terms of our agreement and included in this report.

Thank you for this opportunity to be of service. Please do not hesitate to call if you have any questions regarding this report.

Respectfully submitted,
GEOLABS-WESTLAKE VILLAGE





Ryan M. Prose
C.E.G. 2625

Ronald Z. Shmerling
C.E.G. 1047
R.C.E. 35444

Lawrence K. Stark
G.E. 2772

RMP:af

Enclosures:

Reference List	R1- R2
Site Location	Plate 1.1
Geologic Maps	Plates 1.2 – 1.3
Removal Map	Plate 1.4
Geologic Cross-Sections	Plates 2.1 – 2.7
Geotechnical Cross-Sections	Plates 2.2E – 2.4E
Excavation Logs	Appendix A (pgs. A1-A58)
Laboratory Summary and Testing	Appendix B (pgs. B1-B-6b)
Slope Stability Calculations	Appendix C (pgs. C1-C158)
Typical Grading Details	Appendix D (pgs. D1-D6)

XC: (2) Addressee

REFERENCE LIST:

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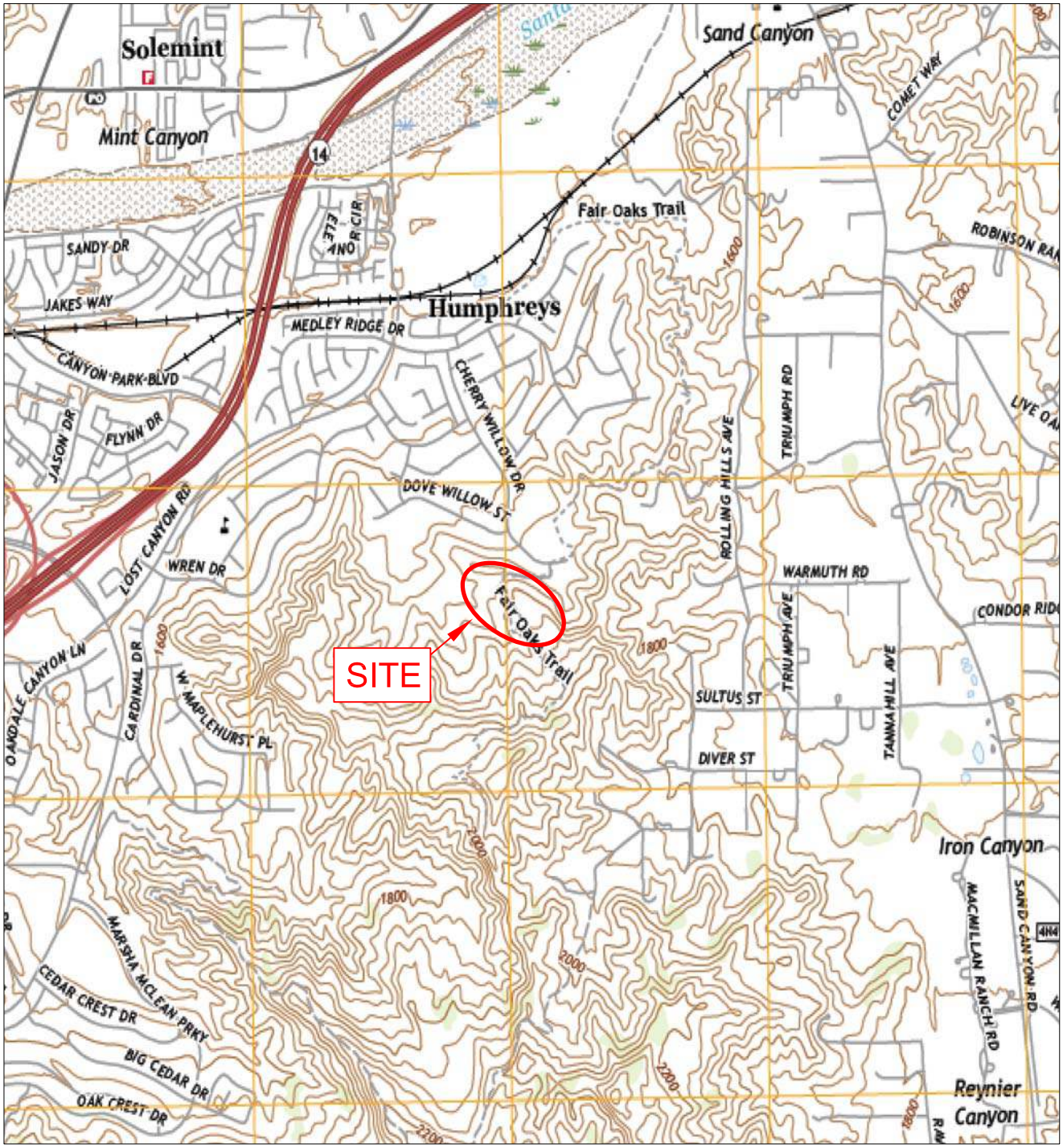
SITE LOCATION MAP

Phase 2B Recycled Water Tanks at Cherry Willow
Lot 940, Tract 52833
Santa Clarita Area, California



0 1 2 3 THOUSAND FEET

405

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE	9/23/2020	BY	RMP
SCALE	1:24,000	W.O.	8485

Base Map: USGS US Topo 7.5-minute map for Mint Canyon, CA 2018

PLATE 1.1

GEOLOGIC MAP

Proposed Phase 2B Recycled Water Tanks
at Cherry Willow
Lot 940, Tract 52833
Santa Clarita Area, California

EXPLANATION

afe ENGINEERED FILL
Qc COLLUVIAL DEPOSITS (/ denotes unit as buried)
Qls LANDSLIDE DEBRIS (/ denotes unit as buried)
Tt TOWSLEY FORMATION (/ denotes unit as buried)
Tc CASTAIC FORMATION (/ denotes unit as buried)
Tmc MINT CANYON FORMATION (/ denotes unit as buried)

GEOLOGIC CONTACT (dotted where buried)

FAULT (DOTTED WHERE BURIED)

APPROXIMATE LIMITS OF REMEDIAL GRADING (see Removal Map, Plate 1.4, for depths)

STRIKE AND DIP OF BEDDING

STRIKE AND DIP OF APPROXIMATE BEDDING

STRIKE AND DIP OF FRACTURE/JOINT

STRIKE AND DIP OF FAULT/SHEAR

AS-BUILT KEYWAY

AS-BUILT BACKDRAIN OR SUBDRAIN WITH OUTLET

RESTRICTED USE AREA

R3 — R3' CROSS SECTION

P38 / WB5 24" DIAMETER BORING BY GWV

T3 (0+00 — 1+00) BACKHOE TRENCH BY GWV

N

PLAN
0 10 20 30
1"=20'

P:\8485 Fair\Oaks\Phase 3B East Side 52833\Water Tank 2020\Geologic\Maps.dwg (Layout: Plate 1.2)

Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING
DATE 9/23/2020 BY RMP
SCALE 1"=20' W.O. 8485

PLATE 1.2

DIGALERT
DIAL TOLL FREE 811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT(USA) OF SOUTHERN CALIFORNIA

NO.	DESCRIPTION	APP.	DATE
	REVISIONS		

PLANS PREPARED BY:
Kennedy/Jenks Consultants
Engineers & Scientists
2775 N. VENTURA ROAD, #100
OXNARD, CA. 93036
(805) 973-5700
406

CHECKED BY:
BRENT PAYNE, PRINCIPAL ENGINEER DATE
RECOMMENDED BY:
KEITH ABERCROMBIE, CHIEF OPERATING OFFICER DATE
APPROVED BY: SANTA CLARITA VALLEY WATER AGENCY
BRIAN J. FOLSOM, CHIEF ENGINEER DATE

SANTA CLARITA VALLEY WATER AGENCY
ENGINEERING SERVICES SECTION
26521 SUMMIT CIRCLE
SANTA CLARITA, CA. 91350
(661) 259-2737

LOT 940, TRACT NO. 52833
PHASE 2B RECYCLED WATER TANKS AT CHERRY WILLOW
SANTA CLARITA, CALIFORNIA
UNINCORPORATED COUNTY OF LOS ANGELES

SITE LAYOUT AND GRADING OPTION B.1
AASHTO SU-30 FROM ACCESS ROAD

DATE: 08-31-2020
SCALE:
PROJECT NO. 1844207*00
DRAWN BY: KENNEDY JENKS
CHECKED BY: CONSULTANT ENGINEER
SHEET: C-1 OPTB.1

GEOLOGIC MAP

Proposed Phase 2B Recycled Water Tanks at Cherry Willow
Lot 940, Tract 52833
Santa Clarita Area, California

EXPLANATION

afu UNDOCUMENTED ARTIFICIAL FILL (dozer road fill)
afe ENGINEERED FILL
Qal ALLUVIAL DEPOSITS (/ denotes unit as buried)
Qc COLLUVIAL DEPOSITS (/ denotes unit as buried)
Qls LANDSLIDE DEBRIS (/ denotes unit as buried)
Tt TOWSLEY FORMATION (/ denotes unit as buried)
Tc CASTAIC FORMATION (/ denotes unit as buried)
Tmc MINT CANYON FORMATION (/ denotes unit as buried)

GEOLOGIC CONTACT (dotted where buried)

FAULT (DOTTED WHERE BURIED)

APPROXIMATE LIMITS OF REMEDIAL GRADING (see Removal Map, Plate 1.4, for depths)

STRIKE AND DIP OF BEDDING

STRIKE AND DIP OF APPROXIMATE BEDDING

STRIKE AND DIP OF FRACTURE/JOINT

STRIKE AND DIP OF FAULT/SHEAR

AS-BUILT KEYWAY

AS-BUILT BACKDRAIN OR SUBDRAIN WITH OUTLET

RESTRICTED USE AREA

WT15 WT15' CROSS SECTION

P38 / WB5 — 24" DIAMETER BORING BY GWV

BA-2(Fugro) — BUCKET-AUGER BORING BY FUGRO

B6(LCA) — 20" DIAMETER BUCKET-AUGER BORING BY LeROY CRANDALL AND ASSOCIATES

T3 (0+00 to 1+00) — BACKHOE TRENCH BY GWV

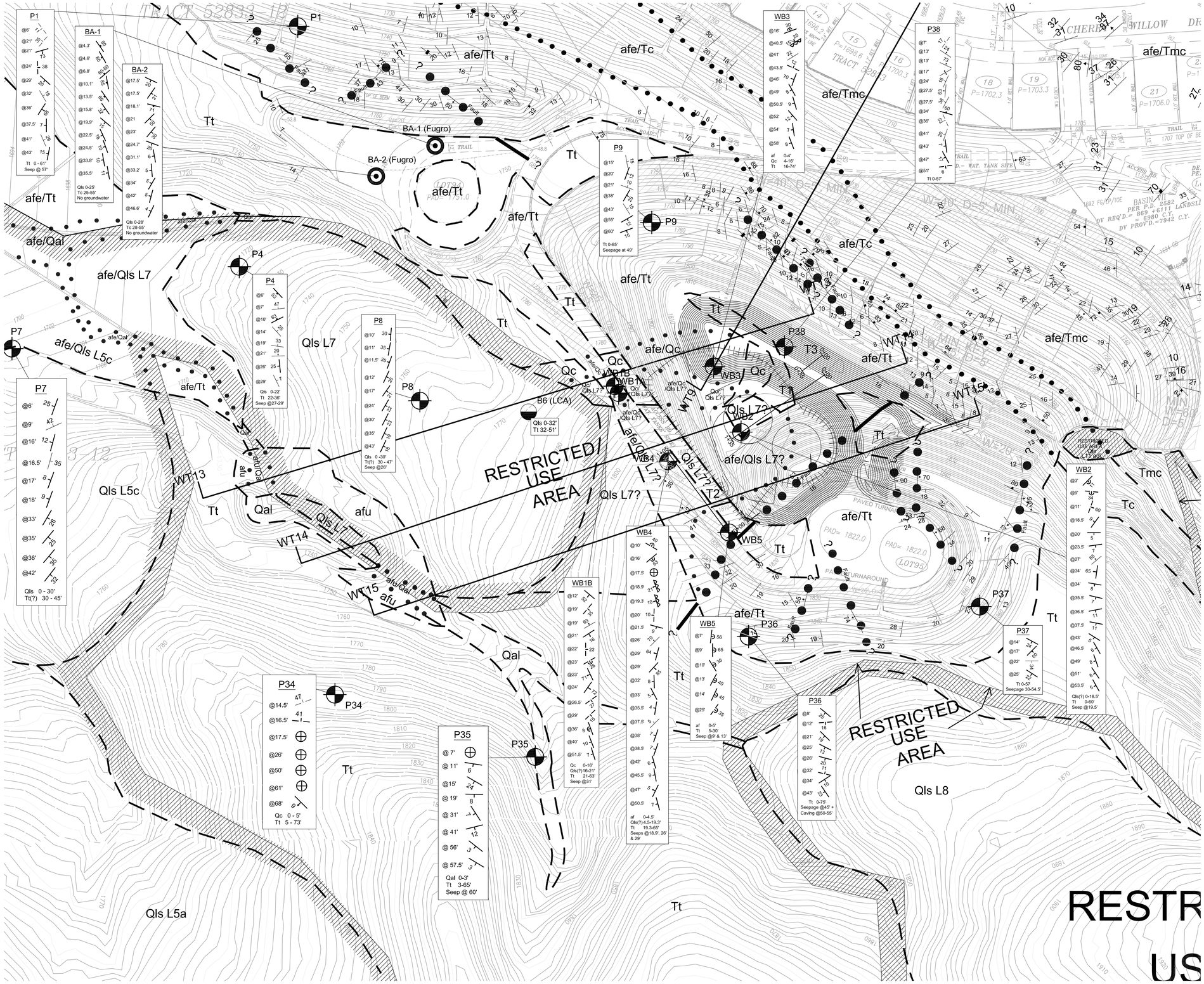


PLATE 1.3

P:\5485 FinClubs\Phase 3B East Side 52833\Water Tank 2020\Geologic\Map\reg (Layout Plate 1.3)

REMOVAL MAP

Proposed Phase 2B Recycled Water Tanks
at Cherry Willow
Lot 940, Tract 52833
Santa Clarita Area, California

APPROXIMATE LOCATION OF EXISTING BACKDRAIN. SEE REPORT TEXT FOR RECOMMENDATIONS REGARDING PORTIONS REMOVED BY GRADING.

R1 R2 R3 R3'

afe/Tt
afe/Qc
afe/Qc /Qls L7?
afe/Qls L7?
Qc
Qc/ Qls L7?
Qls L7?
Tt
Qls L7

TOP TOE 1:1 3:4 2:1 12.5%

PAVED TURNAROUND

ACCESS RD. TANKS' SITE)

20 10 0 20
1"=20'

EXPLANATION

afe ENGINEERED FILL
Qc COLLUVIAL DEPOSITS (/ denotes unit as buried)
Qls LANDSLIDE DEBRIS (/ denotes unit as buried)
Tt TOWSLEY FORMATION (/ denotes unit as buried)

GEOLOGIC CONTACT (dotted where buried)

R3 R3' CROSS SECTION

408

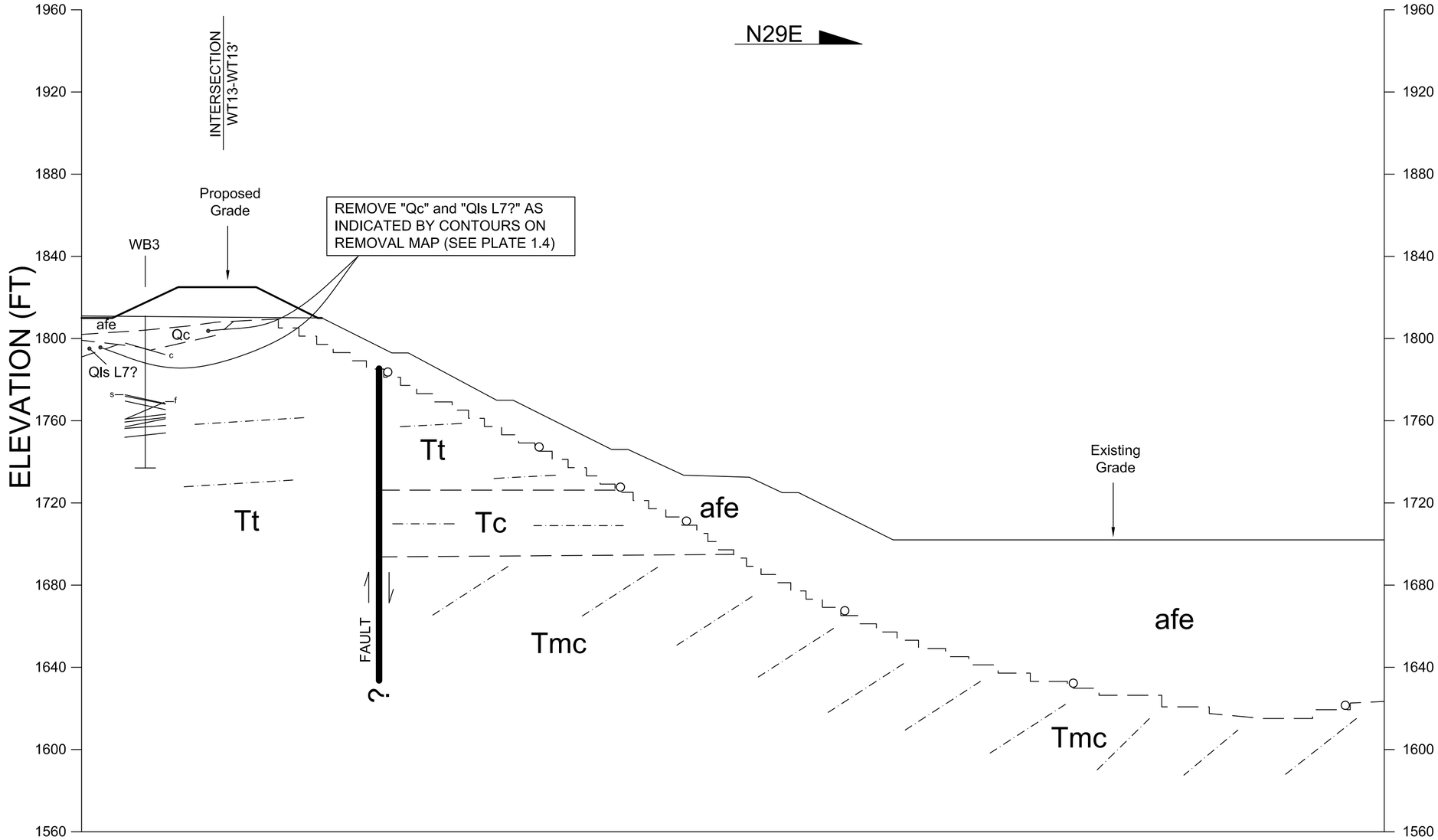
Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY RMP
SCALE 1"=20' W.O. 8485

PLATE 1.4

P:\8485 FairOaks\Phase 3B East Side 52833\Water Tank 2020\GeologicMap.dwg (Layout: Plate 1.4)

WT9

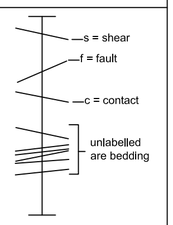


N29E

WT9

1960
1920
1880
1840
1800
1760
1720
1680
1640
1600
1560

BORING
APPARENT DIP
SYMBOL KEY



Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

GEOLOGIC
CROSS SECTION
WT9-WT9'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY SR
SCALE 1" = 40' W.O. 8485

P:\8485 FairOaks\Phase 3B East Side 52833\Water Tank 2020\Cross Sections.dwg | WT9

PLATE 2.1

WT13

WT13'

N73E

ELEVATION (FT)

2000
1960
1920
1880
1840
1800
1760
1720
1680
1640
1600

P8
(Proj. 50' SW
along avg. strike)

Existing
Grade

B6 (LCA)

INTERSECTION
WT9-WT9'

WB3
(Proj. 25' NW
along avg. strike)

WB1B
(Proj. 15' NW
along avg. strike)

Proposed
Grade

P38
(Proj. 30' N
along avg. strike)

afe
Qc
Q
afu
Qal
Qls L7
Qls L7?
Tt

BORING
APPARENT DIP
SYMBOL KEY

s = shear
f = fault
c = contact
unlabelled
are bedding

Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

GEOLOGIC
CROSS SECTION
WT13-WT13'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY RMP
SCALE 1" = 40' W.O. 8485

410

PLATE 2.2

WT14

WT14'

N72E

ELEVATION (FT)

2000
1960
1920
1880
1840
1800
1760
1720
1680
1640
1600

P8
(Proj. 200' SW
along avg. strike)

WB4
(Proj. 20' N
along avg strike)

WB2
(Proj. 15' NW
along avg. strike)

Proposed
Water Tank

P38
(Proj. 65' S
along avg strike)

Proposed
Grade

Existing
Grade

afu

Qal

Qls L7

Qls L7?

afe

Tt

REMOVE BASE OF POSTULATED LANDSLIDE MATERIAL AS INDICATED BY BOLD DASHED LINE

BORING
APPARENT DIP
SYMBOL KEY

s = shear
f = fault
c = contact
unlabelled
are bedding

Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

GEOLOGIC
CROSS SECTION
WT14-WT14'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY RMP
SCALE 1" = 40' W.O. 8485

411

PLATE 2.3

WT15

WT15'

N72E

ELEVATION (FT)

2000
1960
1920
1880
1840
1800
1760
1720
1680
1640
1600

WB4
(Proj. 65' S
along avg strike)

Proposed
Water Tank
(Projected)

Proposed
Grade

Existing
Grade

afe

afe

afe

Qls L7?

Qls L7

afu

Qal

Tt

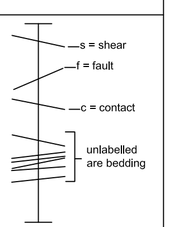
Tt

FAULT

?

REMOVE BASE OF POSTULATED
LANDSLIDE MATERIAL AS INDICATED
BY BOLD DASHED LINE

BORING
APPARENT DIP
SYMBOL KEY



Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

GEOLOGIC
CROSS SECTION
WT15-WT15'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY RMP
SCALE 1" = 40' W.O. 8485

412

PLATE 2.4

R1

R1'

N55E

ELEVATION (FT)

1920
1900
1880
1860
1840
1820
1800
1780
1760
1740
1720
1700

INTERSECTION
R3-R3'

CRITICAL FAILURE SURFACE
TEMPORARY FS = 1.41
C = 200 psf; PHI = 30 deg

Existing
Grade

Proposed
Grade

WB3

REPLACE BACKDRAIN
AS DISCUSSED IN TEXT

afe

Qc

c

afe

Qls L7?

f

s

Tt

Tt

REMOVE POSTULATED LANDSLIDE
MATERIAL AND COLLUVIUM AS
INDICATED BY BOLD DASHED LINE

BORING
APPARENT DIP
SYMBOL KEY

s = shear
f = fault
c = contact
unlabelled
are bedding

Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

P:\8485 FairOaks\Phase 3B East Side 52833\Water Tank 2020\Cross Sections.dwg | R1

GEOLOGIC
CROSS SECTION
R1-R1'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY SR
SCALE 1" = 20' W.O. 8485

PLATE 2.5

R2

R2'

N56E

INTERSECTION R3-R3'

ELEVATION (FT)

1920
1900
1880
1860
1840
1820
1800
1780
1760
1740
1720
1700

Proposed Water Tank

WB2

P38 (Proj. 45' S along avg strike)

Proposed Grade

REPLACE BACKDRAIN AS DISCUSSED IN TEXT

Existing Grade

WB4

afe

Qls L7?

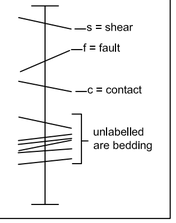
Tt

s

f

REMOVE POSTULATED LANDSLIDE MATERIAL AS INDICATED BY BOLD DASHED LINE

BORING APPARENT DIP SYMBOL KEY



Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

GEOLOGIC CROSS SECTION R2-R2'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY SR
SCALE 1" = 20' W.O. 8485

P:\8485 FairOaks\Phase 3B East Side 52833\Water Tank 2020\Cross Sections.dwg | R2

PLATE 2.6

R3

R3'

N7W

INTERSECTION R1-R1'

Bend in Section

INTERSECTION R2-R2'

N73W

ELEVATION (FT)

1920
1900
1880
1860
1840
1820
1800
1780
1760
1740
1720
1700

WB3
(Proj. 60' S
along avg. strike)

CRITICAL FAILURE SURFACE
TEMPORARY FS = 1.51

C=240; PHI=32

C=150; PHI=35

WB2
(Proj. 20' NE
along avg strike)

Proposed
Water Tanks

Existing
Grade

Proposed
Grade

afe

Qc

Qls L7?

Tt

c

f

s

FAULT

REMOVE POSTULATED LANDSLIDE MATERIAL AND COLLUVIUM AS INDICATED BY BOLD DASHED LINE

OVEREXCAVATE WATER TANK A MINIMUM OF 7 FEET BELOW AND OUTSIDE TANK FOOTPRINT

BORING
APPARENT DIP
SYMBOL KEY

s = shear
f = fault
c = contact
unlabelled are bedding

○ Approximate location of as-built subdrain or backdrain

Approximate orientation of geologic bedding

P:\8485 FairOaks\Phase 3B East Side 52833\Water Tank 2020\Cross Sections.dwg | R3

GEOLOGIC
CROSS SECTION
R3-R3'-R3"

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 09/23/2020 BY SR
SCALE 1" = 20' W.O. 8485

415

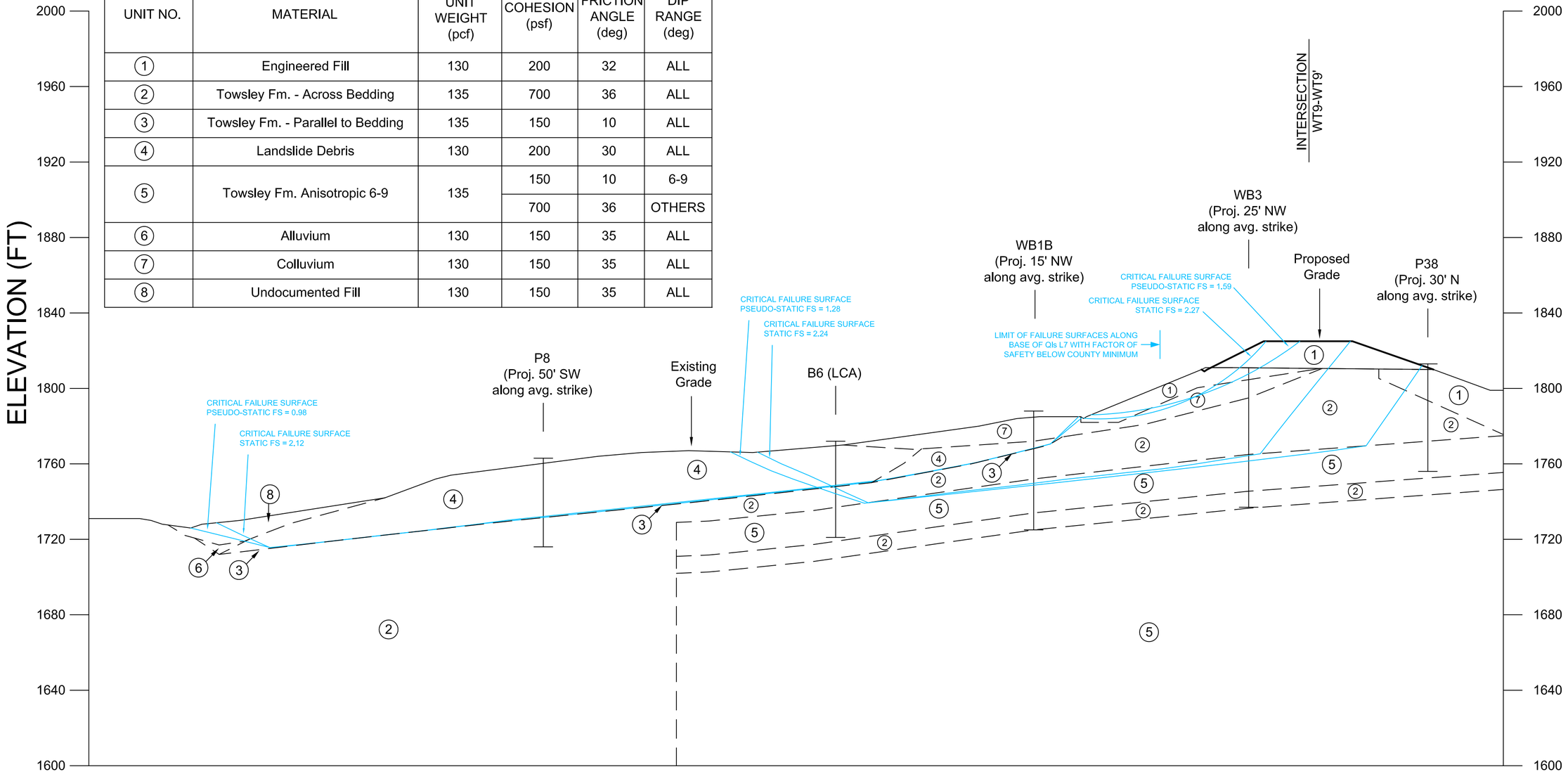
PLATE 2.7

WT13

WT13'

N73E

UNIT NO.	MATERIAL	UNIT WEIGHT (pcf)	COHESION (psf)	FRICTION ANGLE (deg)	DIP RANGE (deg)
1	Engineered Fill	130	200	32	ALL
2	Towsley Fm. - Across Bedding	135	700	36	ALL
3	Towsley Fm. - Parallel to Bedding	135	150	10	ALL
4	Landslide Debris	130	200	30	ALL
5	Towsley Fm. Anisotropic 6-9	135	150	10	6-9
			700	36	OTHERS
6	Alluvium	130	150	35	ALL
7	Colluvium	130	150	35	ALL
8	Undocumented Fill	130	150	35	ALL



GEOTECHNICAL CROSS SECTION WT13-WT13'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

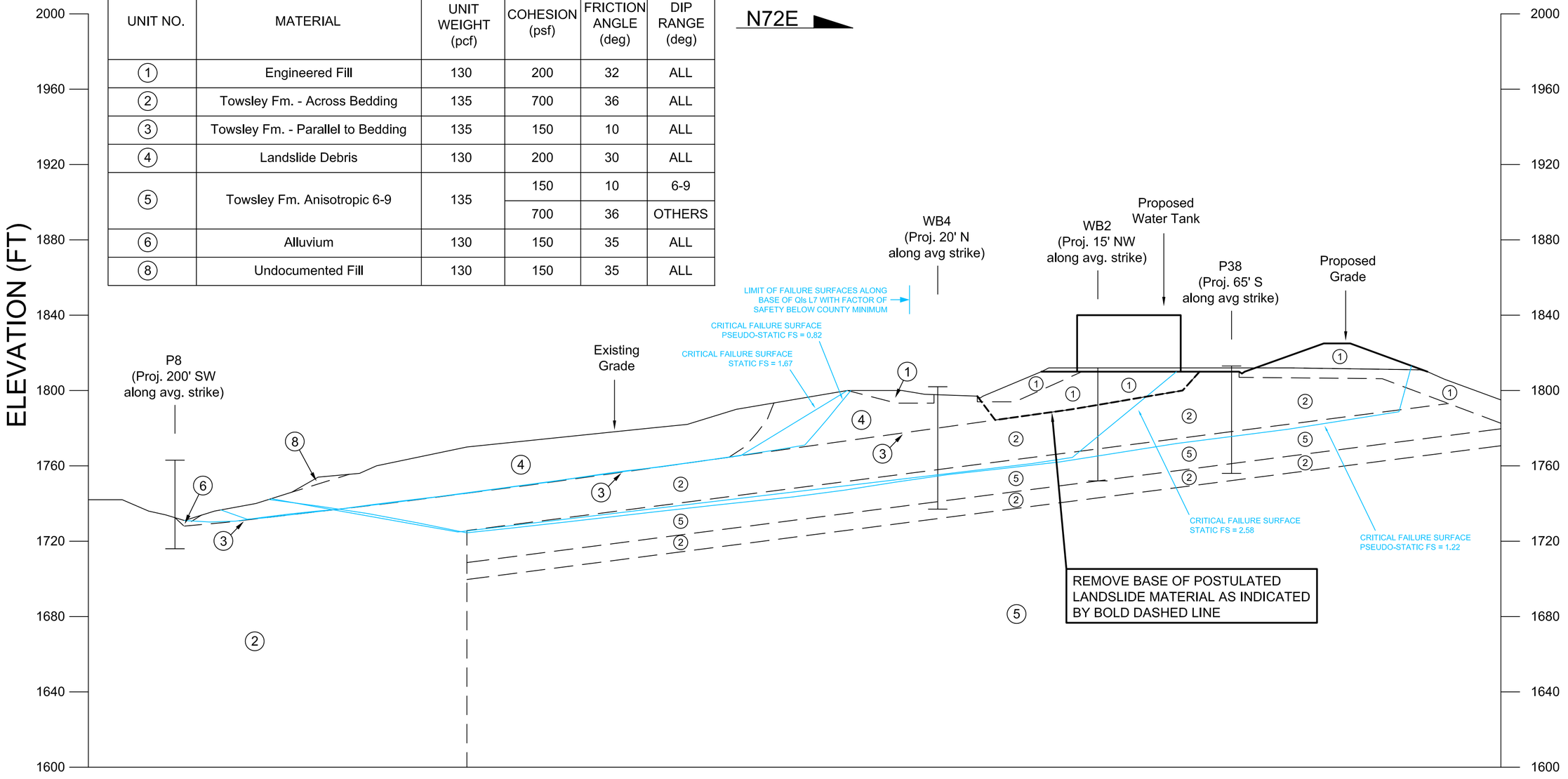
DATE 9/23/2020 BY RMP
SCALE 1" = 40' W.O. 8485

PLATE 2.2E

WT14

WT14'

UNIT NO.	MATERIAL	UNIT WEIGHT (pcf)	COHESION (psf)	FRICTION ANGLE (deg)	DIP RANGE (deg)
1	Engineered Fill	130	200	32	ALL
2	Towsley Fm. - Across Bedding	135	700	36	ALL
3	Towsley Fm. - Parallel to Bedding	135	150	10	ALL
4	Landslide Debris	130	200	30	ALL
5	Towsley Fm. Anisotropic 6-9	135	150	10	6-9
			700	36	OTHERS
6	Alluvium	130	150	35	ALL
8	Undocumented Fill	130	150	35	ALL



GEOTECHNICAL
CROSS SECTION
WT14-WT14'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY RMP
SCALE 1" = 40' W.O. 8485

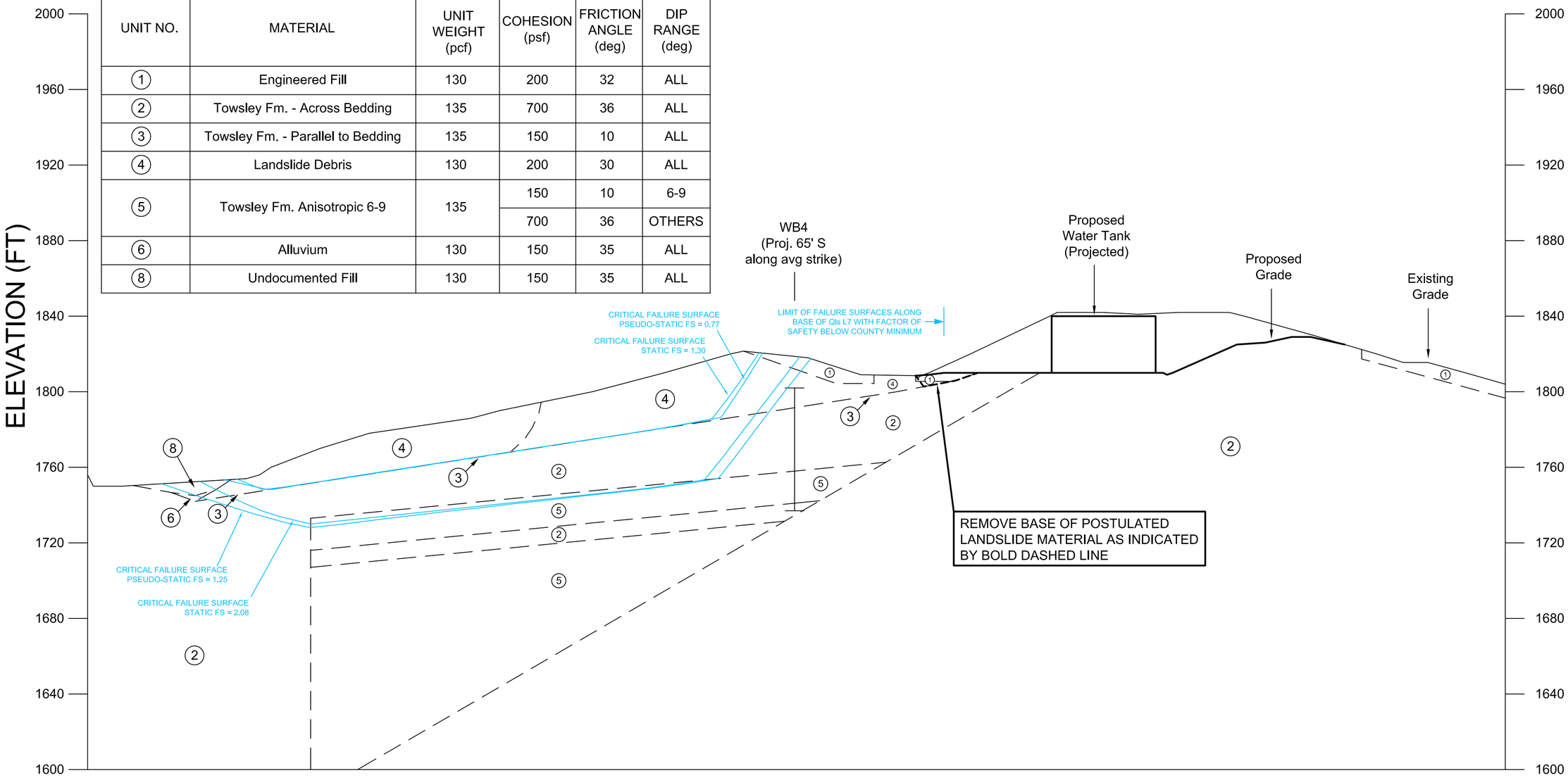
PLATE 2.3E

WT15

WT15'

N72E

UNIT NO.	MATERIAL	UNIT WEIGHT (pcf)	COHESION (psf)	FRICTION ANGLE (deg)	DIP RANGE (deg)
1	Engineered Fill	130	200	32	ALL
2	Towsley Fm. - Across Bedding	135	700	36	ALL
3	Towsley Fm. - Parallel to Bedding	135	150	10	ALL
4	Landslide Debris	130	200	30	ALL
5	Towsley Fm. Anisotropic 6-9	135	150	10	6-9
			700	36	OTHERS
6	Alluvium	130	150	35	ALL
8	Undocumented Fill	130	150	35	ALL



418

GEOTECHNICAL
CROSS SECTION
WT15-WT15'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY RMP
SCALE 1" = 40' W.O. 8485

PLATE 2.4E

APPENDIX A
Excavation Logs

October 30, 2020
W.O. 8485

Boring Logs by GWV

BORING	DATE EXCAVATED	GROUND SURFACE ELEVATION (feet above mean sea level)	TOTAL DEPTH (feet)
WB1A	6/15/2020	1788	18.5
WB1B	6/15/2020	1788	63
WB2	6/16/2020	1812.5	60
WB3	6/17/2020	1811	74
WB4	6/18/2020	1802	65
WB5	6/19/2020	1814	30
P1	10/26/1998	1768	68
P4	10/28/1998	1710	36
P7	11/30/1998	1705	45
P8	12/1/1998	1766	47
P9	12/8/1998	1860	65
P34	5/12/1999	1790	73
P35	5/14/1999	1789	65
P36	5/18/1999	1855	75
P37	5/18/1999	1865	57
P38	5/20/1999	1806	57

CLIENT:	SCVWA	PROJECT: Recycled water tank	W.O.: 8485
LOCATION:	Lot 95	ELEVATION: 1788 ± 0.5 feet	DATE: 6/15/20
RIG TYPE:	24" LoDril	HAMMER WEIGHTS: Kelly Bar	DROP: ~12"

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						0 - 3.5' - Artificial Fill: Yellowish brown silty fine to coarse SAND with 10-25% gravel and cobbles, moist.	
5	10	C		8.9	107.4	3.5 - 10' - Colluvium: Brown to dark brown silty SAND with clay and gravel, highly weathered, pores up to ⅛" in diameter below 4 feet, vertical irregular fractures infilled with dark brown soil, increase in pores and vertical root casts in infill. 7' - Discontinuous blocks of yellowish brown gravelly SANDSTONE and orange silty fine SANDSTONE bounded by soil infilled fractures.	
10						10' - Very dark brown clayey gravel with SAND on north, adjacent to 10 - 18.5' - Landslide Debris (?): mottled light gray and orangish brown slightly silty fine SANDSTONE on south. 10' - SAMPLE: interlaminated brown SILTSTONE and gray fine SANDSTONE, sparse orange oxidation along sandy lamimantions. 12' - Very dark brown gravel with cobbles, silty sand matrix.	
15							@15' - Fracture (N40W/75 SW) exit
20						Total Depth = 18.5' - Refusal on boulder No groundwater No caving	

ADDITIONAL COMMENTS:
@17-18.5': switch to core barrel

CLIENT: SCVWA						PROJECT: Recycled water tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1788 ± 0.5 feet	DATE: 6/15/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						0-4' - Artificial Fill: Yellowish brown silty fine to coarse SAND with 10-25% gravel and up to 6" cobbles, moist.	
						4-16' - Colluvium: Brown clayey fine to coarse SAND with 10-25% gravel and cobbles, medium dense, moist, massive, structureless, pinhole to ¼" pores and subvertical root casts common.	
5							
						8' - Block of yellowish brown silty fine SANDSTONE in west wall of borehole, massive, weathers orange.	
10							
						11.5' - Another block of sandstone truncated by contact to structureless dark brown clayey SAND with gravel.	
15							
						16-21' - Landslide Debris (?): Pale brown gravelly SANDSTONE with silt, 20-30% clasts, massive, friable.	@16' C (N50W/52 SW)
						19' - Approximate bedding on discontinuous orange weathered zone in pale brown silty fine to medium SANDSTONE, black mineral laminations common but offset up to 2 inches by numerous randomly oriented faults, upper contact of this bed offset 14" by normal fault.	@19' Approx. B (N40E/35 SE)
20	12	C		8.1	120.4	20' - SAMPLE: Yellowish brown silty fine to medium SANDSTONE.	@19' F (N60E/63 NW)

ADDITIONAL COMMENTS:

CLIENT:	SCVWA	PROJECT: Recycled water tank	W.O.: 8485
LOCATION:	Lot 95	ELEVATION: 1788 ± 0.5 feet	DATE: 6/15/20
RIG TYPE:	24" LoDril	HAMMER WEIGHTS: Kelly Bar	DROP: ~12"

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
20							
							@21' S
			X			21' - Landslide Plane (?): ⅛" thick brown clay, soft, plastic, carbonate staining	(N57E/16 SE)
						and nodules common along clay bed.	
						21'-63' - Towsley Formation:	@22' - Approx. B
						21'-36' Interbedded SANDSTONE and SILTSTONE: sandstone pale brown, silty,	(N/22 E)
						fine-grained, dark mineral laminations offset up to 2" by numerous randomly	@23' Approx. C
						oriented faults; siltstone gray and massive with randomly oriented	(N60E/26 SE)
						discountinuous weak surfaces (likely from same type of minor	@23' F
						faulting as in the sandstones).	(N25W/71 SW)
25						23' - Sharp scoured contact at base of sandstone, ⅛" thick rusty red	@24' F
						oxidation staining on contact surface.	(N35E/72 SE)
						23' - Contact offset 5" in normal direction by fault.	
						24' - 8" thick SANDTONE bed, truncated and thinned by fault with 8" normal	@26.5' Approx. B
						offset.	(N55E/27 SE)
						26.5' - Approximate bedding on dark mineral laminations in 6" thick	
						SANDSTONE bed, lenticular, discontinuous, very moist, light gray.	
						29' - Approximate bedding on base of 1-3" thick orange SANDSTONE bed,	@29' Approx. B
						offset several times by small faults.	(N46E/15 SE)
30	15	C		19.3	110.4	30' - SAMPLE: Gray sandy SILTSTONE, weathered olive brown in matrix, or	
						orange along pervasive fractures, slightly plastic, moist.	
						31' - Sidewall weeping water along fractures and shattered	
						cemented nodule on North wall.	
35							
						36-63' - Unoxidized SILTSTONE, dark gray, very hard, massive, indurated.	@36' C
							(N20W/8 SW)
40	20	C		16.4	112.7	40' - SAMPLE: Olive gray and dark gray SILTSTONE with sparse light gray fine	@40 B
						sand laminations, coarse sand sized shell (gastropod?) fragments and	(N21W/10 SW)
						lenticular compacted burrows infilled with sand, indurated.	
						40' - Bedding on ½-1" thick band of cemented siltstone, cementation	
						laterally discontinuous.	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled water tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1788 ± 0.5 feet	DATE: 6/15/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
45							
50	28	C		12.5	111.9	50' SAMPLE: Gray fine sandy SILTSTONE, massive, indurated.	
						51.5' - Bedding on 1" thick band of siltstone with light gray sandy laminations.	@51.5' B (N17W/7 SW)
						54' - Lighter gray very silty fine SANDSTONE.	
55							
60	28	C		10.0	103.6	60' - SAMPLE: Thoroughly mottled gray and light gray very sandy SILTSTONE, to silty fine SANDSTONE, massive.	
						60.5-61' - Cemented zone, hard drilling	
						62' - Sparse rounded gravel in light gray SANDSTONE.	

ADDITIONAL COMMENTS: Total Depth = 63'
Seep @ 31'
No caving

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1812.5 ± 0.5 feet	DATE: 6/16/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0			X			0-18.5' - Landslide Debris (?):	
			X			0-2.5' - Brown to yellowish brown silty to clayey fine to coarse SANDSTONE	
			X			with 10-20% gravel and cobbles, massive, highly weathered, rootlets common,	
			X			some loosely infilled rodent burrows.	
						2.5-5' - Interbedded pale brown to yellowish brown silty fine to medium	
						SANDSTONE, orange oxidation stains, semi friable; and brown to tan SILTSTONE,	
						massive; beds less than 1 foot thick, continuity disrupted by rodent burrows.	
						3' - Slightly scoured contact at base of sandstone.	@3' C
						4' - Contacts broken and difficult to follow, abundant subvertical fractures	(N45E/11 SE)
						lined with carbonate and rootlets.	
5						5-15' - Gray SILTSTONE, abundant orange oxidation staining and subvertical	
						carbonate and root-lined fractures, massive, rock appears shattered, firm.	
							@9' Approx. C
						9' - Approximate contact on top of 10" thick sandstone interbed, pale brown,	(N85W/34 SW)
						silty, fine to medium-grained, oxidized contacts, tiger strip oxidation near base	
10						offset up to 1 inch by numerous randomly oriented faults, upper contact	
						disrupted by fault at 11'.	@11' Approx. F
	10	C		22.7	105.2	11' - SAMPLE: interbedded tan clayey SILTSTONE, plastic; and yellowish brown	(N20E/60 SE)
						to orangish brown silty fine to medium SANDSTONE.	
15						15-18.5' - Gray SILTSTONE, less weathered, less shattered, stiff, still has	
						pervasive orange oxidation staining along fractures and burrows.	
						18.5-60' - Towsley Formation:	
						18.5-40' - Interbedded SILTSTONE and SANDSTONE: siltstone is gray to olive	@18.5' B
20						brown with orange oxidation stains, massive, hard; sandstone yellowish brown,	(N36E/9 NW)
						silty, fine to medium grained.	
						18.5' - First continuous bedding of boring on 1" thick band of clay and silt	
						laminations (slide plane?)	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1812.5 ±0.5 feet	DATE: 6/16/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
20	11	C		21.2	105.1	19.5-20.5' - Slow seeps from multiple less than 1" thick fine sandstone interbeds.	@20'B
						20' - SAMPLE: Gray clayey SILTSTONE with fine sand, slightly plastic, pervasive orange weathering.	(N90E/5 S)
						23.5' - Bedding on 2" thick band of olive brown siltstone with haloed white sand stringers over 1" thick unoxidized massive blue siltstone bed.	@23.5' B (N82E/7 SE)
25							
						27' - Fault offsets siltstone beds, 4" normal sense of motion.	@27' F (N50E/65 NW) exit
30	15	C		18.3	107.0	30' - SAMPLE: unoxidized dark blue gray SILTSTONE, hard, massive, indurated.	
							@34' F (N8E/65 W)
						34' - Fault offsets 4" thick yellowish brown silty fine sandstone bed; 6" normal sense of motion.	@34' Approx. B (N80W/8 SW)
35							
						35.5' - Bedding on orange rind at top of 12" thick sandstone bed.	@35.5' B (N77W/7 SW)
						36.5' - Bedding on 1" thick sandstone.	@36.5' B (N79E/11 SE)
						37.5' - Bedding at top of 10" thick sandstone.	@37.5' B (N79W/11 SW)
40	26	C		17.6	108.9	40-60' - Unoxidized SILTSTONE with sandstone interbeds, very hard.	
						40' - SAMPLE: Unoxidized dark blue gray SILTSTONE, indurated, massive, ⅛" thick steep gypsum-lined fracture in shoe.	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1812.5 ±0.5 feet	DATE: 6/16/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						43' - 3" thick sandstone over 1" siltstone over 1" sandstone.	@43' B (N58W/5 SW)
						44-46.5' - Thinly interbedded siltstone and sandstone, beds less than 5" thick.	@44' B (N30W/6 SW)
45							
						49' - ½" thick band of fine sand laminations.	@49' B (N19W/8 SW)
50	27	C		15.5	111.3	50' SAMPLE: Dark blue gray SILTSTONE with fine sand, massive, indurated.	
						51' - ½" thick Siltstone interbed near base of sandstone section from 50-51.	@51' B (N34W/8 SW)
						53.5' - 1" thick band of sandy laminations.	@53.5' B (N29W/5SW)
55			X				
60	31	C		15.5	106.1	60' SAMPLE: same as 50'	
						Total Depth = 60'	
						Seep @ 19.5'	
						No caving	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1811 ± 0.5 feet	DATE: 6/17/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						0-4' - Artificial Fill: Distinct lifts of yellowish brown and dark brown silty fine to coarse SAND with gravel and cobbles, dense, dry in upper 2.5', 3-6" thick lifts except upper 1.5 feet which is all uniform.	
						4-16' - Colluvium: Uniform dark brown silty to clayey SAND with 10-20% gravel and cobbles, loose, dry, abundant rootlets.	
5						6' - More clay, stiff, moist, some pinhole pores and 1/16" root casts, some roothairs, very weak clay films, crude subangular blocky ped structure.	
10	11	C		5.4	102.9	10' SAMPLE: Brown to dark brown silty SAND. 12' - Very little clay, more friable, color lightens to brown. 13.5' - More clasts 20-30%, random pockets of yellowish brown silty SAND with gravel and cobbles, and dark brown completely weathered silty SAND with gravel, one void infilled with loose sand grains.	
15						16-74' - Towsley Formation: 16-40.5' - Light gray SILTSTONE, rock is shattered with pervasive orange red and black oxidation stains on fracture surfaces and extending out into rock mass, massive, very stiff; upper contact sharp and irregular, moderately to highly weathered.	@16' C (N70E/30 NW)
20	6	C		14.5	108.8	20' SAMPLE: Light gray to olive brown fine sandy SILTSTONE, highly weathered, moist.	

ADDITIONAL COMMENTS:

CLIENT:	SCVWA	PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION:	Lot 95	ELEVATION: 1811 ± 0.5 feet	DATE: 6/17/20
RIG TYPE:	24" LoDril	HAMMER WEIGHTS: Kelly Bar	DROP: ~12"

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
20							
						24' - Two subrounded quartzite cobbles floating in siltstone (dropstone?)	
25							
						28' - Cobble sized nodule of well cemented material.	
						29.5-30' - Sandier	
30	18	C		14.0	112.9	30' SAMPLE: same as 20', massive, moderately weathered.	
35						35' - Fewer fractures, rock slightly to moderately weathered.	
40	27	C		20.0	105.9	40' SAMPLE: Very dark gray SILTSTONE, massive, indurated, fresh except along fractures which are stained with orange oxidation; interbedded with yellowish brown silty fine SANDSTONE.	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1811 ± 0.5 feet	DATE: 6/17/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40						40.5-46' - Interbedded SILTSTONE and SANDSTONE; siltstone gray and	
			X			massive, hard; sandstone silty and fine to medium grained, yellowish brown.	@40.5' S
						40.5' - Shear paper thin and parallel to underlying bedding, shear	(N57E/25 NW)
						encountered at top of 1-2" thick band of laminated siltstone, slickensided.	slicks (N74W/15)
						41' - Bedding on 4" sandstone.	@41' B
							(N58E/22NW)
						43' - Sharp, scoured, wavy, oxidized contact along base of 4-8" thick	
						sandstone.	
						43.5' - ¼" thick dark brown claystone bed, cornflaky, bed disrupted by inch	@43.5' Approx. B
						scale fault and partially scoured out by overlying sandstone.	(N65W/12 NE)
45						44-45' - Discontinuous lenses of sandstone.	
						46-65.5 - Unoxidized SILTSTONE, very hard, massive, indurated with SANDSTONE	@46' F
						interbeds.	(N20E/70 NW)
						46' - Fault offsets 3" thick SANDSTONE; 4" normal sense of motion.	
						49' - 1" thick sandstone bed	@49' B
							(N29W/8 SW)
50	26	C		17.6	110.3	50' SAMPLE: dark gray SILTSTONE with fine sand, indurated, massive,	
						fresh, hard.	
						50.5' - ½" clayey SILTSTONE in 12" thick laminated sandstone.	@50.5' B
							(N16W/9 SW)
						52' - 2" thick band of sandy laminations.	@52' B
							(N41W/12 SW)
						54' - 1" thick band of sandy laminations.	@54' B
							(N8W/7 SW)
55							
						58' - 1" thick band of sandy laminations over sharp contact to ¼" thick	@58' B
						dark gray fissile clay over silstone.	(N21W/8 SW)
60	31	C		15.5	108.7	60' SAMPLE: dark gray sandy SILTSTONE, massive, fresh.	

ADDITIONAL COMMENTS:

CLIENT: SCVWA	PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95	ELEVATION: 1811 ± 0.5 feet	DATE: 6/17/20
RIG TYPE: 24" LoDril	HAMMER WEIGHTS: Kelly Bar	DROP: ~12"

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
60							
						63' - Cemented band with rounded fine gravel, hard drilling to 64'.	
65						65.5-74' - Grades to light gray very silty fine SANDSTONE, massive, 5% rounded fine gravel, sparse cobble sized cemented nodules.	
70						71-72' - Rock cemented, hard drilling.	
						74' - Rock cemented, hard drilling.	
75						Total Depth = 74' No groundwater No caving	
80							

ADDITIONAL COMMENTS:
@65' began stemming

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1802 ± 1 feet	DATE: 6/18/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						0' - Artificial Fill: Yellowish brown silty fine to coarse SAND with 20% gravel and cobbles, dense, moist to very moist.	
						4.5-19.3' - Landslide Debris (?):	
5						4.5-13' - Yellowish brown conglomerate with silty sand matrix, medium dense, very moist, moderately to highly weathered, easy to excavate, massive, clay rinds on clasts.	
						6' - Discontinuous lens of gray SILTSTONE, subhorizontal orientation, highly weathered, pervasive orange oxidation mottles, firm, plastic, moist, up to 4" thick; below this depth there are random frequent cobbled-sized pockets of brown silty sand with gravel, contacts with surrounding conglomerate are diffuse, no clay rinds on clasts in brown pockets.	
10	9	C		8.0	--	10' - Vague abrupt contact to discontinuous zone in west quadrant with orange oxidation bands.	@10' Approx. C (N60W/40 NE)
						13-16' - Brown silty SAND with gravel and cobbles, medium dense, massive, structureless, moist, base of unit is ¼"-1" thick gouge zone along contact at 16' that appears to be ground up grains of adjacent materials.	
15							@16' C (N50E/63 SE) exit @17.5' Approx. B horizontal
						16-19.3' - Silty fine to medium SANDSTONE: Yellow with orange oxidation common along discontinuous bedding, bedding truncated by contact at 16' and by internal channels within sandstone, material harder and less weathered than above contact at 16', micaceous.	@18.9' S (N20W/21 SW)
						17.5' - 4" thick clayey SILTSTONE, tan vague contacts, subhorizontal orientation.	
						18.9' - SHEAR: brown clay, ½-1" thick, highly plastic, polished and cornflaky, bends and merges with shear at 19.3; weak seep in sandstone six	@19.3' S (N16W/10SW)
20	12	C		18.2	109.8	inches above and between shears.	
						19.3-65' - Towsley Formation:	
						19.3' - Landslide plane: ¼" thick dark brown clay with entrained sand grains, soft, plastic, rock below shear is noticably harder.	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1802 ± 1 feet	DATE: 6/18/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
20						19.4-38.5' - SILTSTONE with frequent SANDSTONE interbeds: siltstone is gray with orange oxidation mottles and bands, hard, massive to laminated and moist; sandstone is silty and fine grained, massive, semifriable, and yellowish brown.	@20' Approx. B (N2E/10 NW)
						20' - SAMPLE: gray SILTSTONE with fine sand.	@21.5' B
						20' - Bedding on 2" thick band of laminated brown clayey siltstone.	(N75W/9 SW)
						21.5' - Two 1" thick beds of orange and tan oxidized fine sandstone.	
25							
						26' - FAULT: 2" wide band of orange oxidation within siltstone, offsets a purplish bed 4" with normal sense of motion.	@26' F (N45E/70 NW)
						29' - FAULT: 5" normal offset of 3" thick orange sandstone interbed, weak seep from sandstone, grades laterally to light gray.	@29' F (N15E/64 NW)
30	15	C		24.1	99.9	30' - SAMPLE: gray clayey SILTSTONE over very moist gray fine SANDSTONE.	@29' F (N42E/85 SE)
						32' - Bedding on base of 12" thick unoxidized sandstone interbed.	@32' B (N2W/8 W)
						33' - Bedding on top of 4" thick unoxidized sandstone bed.	@33' B (N28W/5 SW)
35							
						35.5' - Bedding on 1" thick band of laminated siltstone near base of 12" thick oxidized orangish brown sandstone.	@35.5' B (N9E/4 W)
						37.5' - Bedding on 1" thick band of unoxidized sandstone in center of 14" thick oxidized sandstone.	@37.5 B (N45E/6 NW)
						38' - Bedding on dark mineral lamination near bottom of oxidized sandstone.	@38' B (N19E/7 NW)
						38.5' - Bedding on 1" thick siltstone band in 6" thick unoxidized sandstone.	
						38.5-65' - Unoxidized.	@38.5' B (N19E/7 NW)
40	17	C		16.6	112.3	40' SAMPLE: dark gray silty very fine SANDSTONE and very sandy SILTSTONE.	
						40-50' - gastropod shell fragments	

ADDITIONAL COMMENTS:

CLIENT: SCVWA						PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95						ELEVATION: 1802 ± 1 feet	DATE: 6/18/20
RIG TYPE: 24" LoDril						HAMMER WEIGHTS: Kelly Bar	DROP: ~12"
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						42' - Bedding on 1" sandstone bed.	@42' B (N16W/6 SW)
						43' - 4" SANDSTONE bed.	
45							
						45.5' - 1" SANDSTONE bed over ¼" dark gray fissile claystone.	@45.5' B (N10W/9 W)
			X			47' - 1" thick to paper thin CLAYSTONE, dark gray, sheared, highly plastic, cemented tabular nodules common, bag sample obtained; overlying 6" thick sandstone is wet.	@47' S (N26E/5 NW)
50		C		13.8	110.9	50' - SAMPLE: bluish gray silty fine SANDSTONE over fine sandy SILTSTONE.	@50.5' B (N15W/7 W)
						50.5' - Bedding on ¼" thick cemented band in sandstone from 50-51.	
55							
						57' - 6" thick band of white sandstone laminations truncated by channel margin (?).	
60	25	C		14.8	112.1	60' - SAMPLE: bluish gray silty very fine SANDSTONE.	
						61-65' - Gray to light gray silty very fine SANDSTONE with <5% subrounded to rounded 4" cobbles.	

ADDITIONAL COMMENTS:
@50' harder drilling

TD = 65'
Seep @ 19, 29, 47
No caving

CLIENT: SCVWA	PROJECT: Recycled Water Tank	W.O.: 8485
LOCATION: Lot 95	ELEVATION: 1814 ± 1 feet	DATE: 6/19/20
RIG TYPE: 24" LoDril	HAMMER WEIGHTS: Kelly Bar	DROP: ~12"

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						0' - Artificial Fill: Tan fine sandy SILT, stiff, moist.	
						1' - Six inch layers of yellowish brown silty SAND with 15% gravels and cobbles, dense, moist.	
5						5-30' - Towsley Formation:	
						5-14' - SANDSTONE with SILTSTONE interbed; sandstone beds are yellowish brown and pale brown with orange oxidation bands and splotches, medium dense, semifriable, very moist to wet, contacts between units are sharp and slightly scoured, some are oxidized, moderately weathered.	@7' C (N7E/56 E) @9' C (N/65 E) @10' C (N32W/35 NE) @13' C (N28E/40 SE) @14' C (N25E/45 SE)
10	10	C		29.2	99.3	5' - Orange oxidation bands truncated by lower contact and offset up to 2" by numerous randomly oriented faults.	
						7' - Base of orange banded SANDSTONE exits borehole; some cobble sized mud clasts .	
						9' - Contact to gravelly SANDSTONE, 20% clasts, weak seep in lower 3 inches.	
15						10' - SILTSTONE interbed; brown to light gray, clayey, plastic, moist, pervasive orange oxidation mottles.	
						10' SAMPLE: Olive brown SILTSTONE in upper rings over yellow brown SANDSTONE in tip, sandstone very moist.	
						13' - Sharp contact to gravelly SANDSTONE 20-30% clasts, wet, strong seep	
20	14	C		17.9	112.2	causing sands to run and saturating material caked to borehole wall by auger, drill cake sloughing off during downhole log.	
						14-18' - SILTSTONE: Gray, massive, indurated, pervasive orange oxidation mottles, slightly scoured and dark reddish brown oxidized upper contact, moist, slightly weathered.	
25						18-30' - Unoxidized SILTSTONE with SANDSTONE interbed; dark gray, massive, indurated, hard, sparse gastropod shell fragments, fresh.	@25' Approx. C (N35E/35 SE)
						20' - SAMPLE:Dark gray SILTSTONE with lighter sandy laminations.	
						25' - Silty fine to medium SANDSTONE interbed: two feet thick, light gray, massive, friable, moist to very moist, dense.	
30	18	C		20.5	107.6	30' - SAMPLE: dark gray SILTSTONE, massive, indurated, sparse gastropod shell fragments (coarse sand sized).	
35						TD = 30'	
						Seep at 9' and 13'	
						No caving	
40							
45							

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 & 3	ELEVATION: 1768' ±	DATE: 10/26/98
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS: See below	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0								
							Towsley Formation: Light brownish gray to tan gravelly fine to coarse grained SANDSTONE, poorly sorted, scattered subangular to subrounded pebbles of predominantly coarse grained granitics, uncemented and friable, poorly indurated, damp and dense, massive indistinct bedding.	
2.5								
5								@6' BN37W/ 11SW Approx.
7.5							@8' - Grades into light gray coarse to very coarse grained SANDSTONE, uncemented and friable, with abundant scattered gravel.	
10	3	X		4.7	117.5			
12.5								
15							Occasional scattered pebbles and cobbles of granite, K-feldspar granite, subangular up to 8" diameter, massive, indistinct bedding, localized channelization.	
17.5								
20	5	X	X	4.8	116.5		Graded bedding-fining upward sequences ranging from very coarse to very fine grained SAND, 1" thick sequences, offset against massive gravelly SANDSTONE by steep south dipping fault, fault exits hole at 25', 1cm thick, FeO stained, no clay.	@21' BN40E/ 35NW Approx. @21' Fault - N74E/73SE
22.5								

ADDITIONAL COMMENTS: 0 - 25', 4000 lbs. Blows per 12"
25 - 48', 2800 lbs.
48 - 65', 1600 lbs.
65'±, 800 lbs.

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 & 3	ELEVATION: 1768′ ±	DATE: 10/26/98
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5								
								@24′ BN1W/38NE Approx.
25							@25 - 29′, Grayish brown sandy gravelly CONGLOMERATE, massive, uncemented and friable, damp and dense.	
27.5								
								@29′ Channel - N48W/20SW
30							@29 - 32′, Well bedded medium grained SANDSTONE, underlain by grayish green clayey SILTSTONE, 1cm thick, damp and stiff.	
			X	small	bag			@32′ BN30W/ 18NE
32.5							@32′ - 1′, Light grayish brown silty gravelly SANDSTONE, poorly sorted, poor to no cementation, moist and dense.	
35								
								@36′ Fault - N33E/68SE
							@36′ - Fault offsets yellowish tan gravelly SANDSTONE and well sorted medium grained SANDSTONE, near horizontal very fine bedding within well sorted SANDSTONE, underlain by 1" thick SILTSTONE, grading into yellowish gray fine grained SANDSTONE below 38′.	@37.5′ BDueN/7W
37.5								
40	20	X	X	16.3	114.4			@41′ BN23W/ 29NE on sheared clay
			X	small	bag		@41′ - Sheared CLAY bed, 1-2cm thick, well polished upper surface.	
							@41 - 42′, Yellowish tan very fine to fine grained SANDSTONE, well bedded, uncemented, moist and dense.	
42.5							@42 - 43′, Sheared clayey SILTSTONE, fractured, sheared on upper surface, decreasing clay content to 43′.	@43′ BN11E/ 15NW on clayey SILT
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 & 3	ELEVATION: 1768' ±	DATE: 10/26/98
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
47.5								
	21	X		19.9	110.0			
50								
52.5							Seepage starting at 53'. Light yellowish tan to yellowish gray very fine to fine grained SANDSTONE with sparse granules and subangular gravel, poor to no cementation, very moist and dense, occasional FeO staining.	
55			X	small	bag			
							Dark gray (unoxidized) sandy SILTSTONE interbedded with grayish brown very fine to fine grained SANDSTONE, uncemented and friable, beds 1-3' thick, siltstone is slightly indurated, strong seepage from sandstones below 53'.	
	21	X		17.9	112.0			
57.5								
60			X				Total Depth - 68' Caving of Sandstones below 56' No downhole logging below 50' ±	
62.5								
65							On 10/27/98: Total Depth - 61' Groundwater at 57'	
67.5								
	23	X		18.9	111.6			
70								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 & 3	ELEVATION: 1710′ ±	DATE: 10/28/98
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS: See Below	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0							Landslide Debris: Mottled gray and light brown sandy SILTSTONE, strongly weathered and fractured, roots and roothairs to 5′, abundant gypsum and carbonates along fractures.	
2.5								
5								@6′ FN43W/ 53SW
7.5								@7′ BN83E/ 47NW
10	2	X		25.2	99.0		Mottled olive gray and rusty orange sandy SILTSTONE, abundant gypsum, sparse white carbonates, disaggregated and weathered, sparse fractures open to 1mm or less, damp and very firm. Weathered and localized shearing.	@10′ FN63E/ 63NW
12.5								
15							Mottled olive gray and rusty orange sandy SILTSTONE to very silty very fine grained SAND, abundant gypsum filled joints, up to 1/4" thick.	@14′ BN42W/ 25NE
17.5								
20	5	X		19.0	111.2		Gravel stringer, abundant gypsum. Bedding obscured by pervasive sinuous jointing with FeO weathering gypsum infills. Increasingly competent with depth below 25′. Slide Plane: Dark olive gray sheared CLAY, underlies 3" thick orange medium grained SANDSTONE, friable, 3-5 mm thick, gradationl change to dark gray unoxidized SILTSTONE from 25-30′, increasingly competent and indurated.	@19′, BN82W/ 33NE @21′, Slide Plane N88E/20NW
22.5								

ADDITIONAL COMMENTS: 0 - 25′, 4000 lbs. Blows per 12"
25 - 48′, 2800 lbs.
48 - 65′, 1600 lbs.
65′+, 800 lbs.

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 & 3	ELEVATION: 1710′ ±	DATE: 10/28/98
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5							@22′± - Towsley Formation: Dark gray unoxidized sandy SILTSTONE and minor interbedded yellowish brown fine grained SANDSTONE, uncemented and friable, very moist and dense, minor shearing within unoxidized slightly clayey SILTSTONE.	
25								@26′, BN6W/25SW
27.5							@27-29.5′, Yellowish brown fine grained SANDSTONE underlain and overlain by unoxidized sandy SILTSTONE. Seepage 27′-29′ from SANDSTONE.	
							@29-36′, Dark gray massive SILTSTONE, unoxidized, indurated, slightly moist and stiff, very competent.	@29′, BN26W/7NE on bottom of SANDSTONE
30	13	X		18.3	113.1			
32.5								
							Total Depth - 36′	
35							Seepage 27′ - 29′	
	19	X		18.9	113.1		No caving	
37.5								
40								
42.5								
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 and 3	ELEVATION: 1705′	DATE: 11/30/98
RIG TYPE: Bucket Auger	HAMMER WEIGHTS: See below	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0							Colluvium: 0-6′, Tan medium to coarse grained SAND with abundant rounded granitic pebbles and cobbles.	
5							Landslide Debris (?): 6-17′, 2-3" thick interbeds of oxidized fine SANDSTONE and reduced SILTSTONE.	@6′ Contact N20E/25W
10								@9′ Bedding N65E/42NW
15	3	X		17.8	109.8			@16′ Bedding N15E/12W
							17-18′, Light brown silty SANDSTONE.	@16.5′ Contact N15E/35E
20							18-32′, Tan to light brown sandy SILTSTONE with occasional thin beds of reduced SILTSTONE.	@17′ Bedding N20E/8W
25	3	X					25-27′, Zones of reduced slightly clayey SILTSTONE.	@18′ Contact N20E/9W
30							@30′ - Towsley Formation (?): Becoming unoxidized below 30′ ±	
							32-33′, Dark gray to black clayey SILTSTONE with thin interbeds of fine SANDSTONE.	
	8	X					@33′- 2" of dark gray to black CLAY with sheared waxy texture.	@33′ Bedding N30E/28E
35							33-42′, Dark gray sandy SILTSTONE, moist and very firm to hard.	@35′ Bedding N40E/25SE
40								@36′ Bedding N40E/35SE
							@42′-2" of gray black CLAY, sheared very waxy texture.	@42′ N38E/32SE
							42-45′, Dark gray sandy SILTSTONE, moist and very firm.	
45	14	X						

ADDITIONAL COMMENTS:

Total Depth - 45′
No groundwater
No caving

0 - 25′, 4000 lbs.
25 - 48′, 2800 lbs.
48 - 65′, 1600 lbs.
65′+, 800 lbs.

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 and 3	ELEVATION: 1766'	DATE: 12/1/98
RIG TYPE: Bucket Auger	HAMMER WEIGHTS: See Below	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0							Colluvium: 0-10', Brown to light brown clayey SILT with trace of sand, moist, dense, firm, abundant granitic rounded pebbles and cobbles.	
2.5								
5								
7.5								
10							Landslide Debris: 10-12', Tan sandy SILTSTONE with trace of clay, moist, weakly friable, sparse granitic subround pebbles and cobbles.	@10' bedding N5E/30W
							@12-17', Interbedded tan and gray SILTSTONE with trace of clay, moist, dense, firm.	@11' bedding N10E/35W
12.5								@11.5' bedding N20E/35W
15	2	X						@12' bedding N25E/20SE
17.5							@17-25', Tan sandy SILTSTONE, slightly friable, moist, dense, slightly firm.	@17' bedding N35E/21SE
20								
22.5								

ADDITIONAL COMMENTS: 0 - 24', 4000 lbs.
24 - 47', 2800 lbs.

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 and 3	ELEVATION: 1766′	DATE: 12/1/98
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5								
								@24′ bedding N30E/22SE
25	1	X					@25′ - Irregular contact with above. @25-30′, Tan clayey SILTSTONE, moist, dense, firm, with frequent ripup clasts 6" diameter gray SILTSTONE. @26′ - Weeping water.	
27.5								
30							@30′ - Landslide Plane(?) at oxidized-unoxidized contact. @30-43′, Dark gray to bluish gray SILTSTONE, moist, dense, very firm to hard.	@30′ bedding N27E/23SE
32.5								
35	7	X		21.5	107.9			@35′ bedding N25E/19SE
37.5								
40								
42.5								
							@43-47′, Dark gray to bluish gray SILTSTONE, dense, very hard.	@43′ bedding N25E/18SE
45								

ADDITIONAL COMMENTS: Total Depth - 47′
No caving
Standing water at 45′ on 12/3/98

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 and 3	ELEVATION: 1860' ±	DATE: 12/8/98
RIG TYPE: Bucket Auger	HAMMER WEIGHTS: See Below	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0								
							Colluvium: 0-1', Dark brown sandy SILT, sparse granitic rounded pebbles, damp to dry. Towsley Formation: 1-10', Brown fine to medium grained silty SAND, moist, friable, abundant granitic rounded pebbles and cobbles.	
2.5								
5								
7.5								
10							@10-21', Brown to tan fine to medium grained SANDSTONE, moist, very friable, abundant granitic rounded pebbles, cobbles, and boulders, poorly indurated.	
12.5								
15	2	X		3.1	116.8			@15' bedding N10W/15E
17.5								
20								@20' bedding N20E/12E
							@21-38', Brown and tan interbedded SILTSTONE, moist, dense, sparse granitic rounded pebbles.	@21' bedding N70W/10NE
22.5								

ADDITIONAL COMMENTS: 0 - 24', 4000 lbs.
24 - 47', 2800 lbs.
47 - 72', 1600 lbs.
72 - 98', 800 lbs.

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 and 3	ELEVATION: 1860' ±	DATE: 12/8/98
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5								
25	3	X		19.0	106.3		Light gray fine to medium grained silty clayey SANDSTONE, moist and dense.	
27.5								
30								
32.5								
35	2	X		12.5	112.5			
37.5							@38-43', Brownish to grayish clayey SILTSTONE, moist, dense, irregular, discontinuous zones of slightly waxy clayey SILTSTONE.	@38' contact N30E/25SE
40								
42.5							@43-55', Tan to brown SANDSTONE, moist, very friable, abundant granitic founded pebbles, cobbles, and boulders.	@43' contact N32W/15NE
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phases 2 and 3	ELEVATION: 1860' ±	DATE: 12/8/98
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
42.5								
45	6	X		15.7	113.0		Light gray silty SANDSTONE with minor clay, slightly moist and dense.	
47.5								
							@49' - Weeping water.	
50								
52.5								
55							@55-58', Dark gray to blue slightly sandy SILTSTONE, moist, very dense, very firm.	@55' contact N60E/12S
57.5							@58-65', Dark gray to blue SILTSTONE with trace of clay, moist, very dense, very firm to hard.	
60	20	X		17.2	112.1			@60' bedding N70E/15S
62.5							Total Depth - 65' Frequent caving 0-38' and 43-55' Weeping water at 49'	
65								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1790′	DATE: 5/12/99
RIG TYPE: 24" Bucket	HAMMER WEIGHTS: See below	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0							Slopewash/Colluvium: Mottled tan to medium gray brown very fine grained silty SAND, rootlets, frequent angular fragments of gray siltstone up to 4" diameter, porous to 1/16 diameter, krotovina, dry to damp, medium dense.	
2.5								
5							Weathered Towsley Formation: Mottled medium brown to light gray BRECCIA, angular siltstone and sandstone fragments in a matrix of medium brown fine grained silty sand, abundant pinpoint gypsum crystals, becoming less weathered with depth, moist, dense.	
7.5								
10							@11′ - No distinct contact.	
12.5								
15							@14.5′ - Attitude of imbrication of angular fragments.	@14.5′ BN70E/ 47NW Approx.
17.5							@16.5′ - Irregular contact/transition to Towsley Formation: @17.5′ - Near horizontal bed of tan to rust brown medium to fine grained SANDSTONE, continuous around hole, scoured, fractured. Interbedded medium brown to light gray fine to coarse grained SANDSTONE and sandy SILTSTONE, rythmically bedded, horizontal finer grained units have fractures normal to the bedding, beds are typically 1-6" thick, finer grained beds have abundant pinpoint gypsum crystals and carbonate flecks, coarse grained beds have abundant mica flakes.	@16.5′ BN85W/ 41NE Approx. @17.5′ Horizont. Bedding
20								
22.5								

ADDITIONAL COMMENTS: Blows per 6"
0 - 25′, 4000 lbs.
25 - 48′, 2800 lbs.

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1790'	DATE: 5/12/99
RIG TYPE: 24" Bucket	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5							@24' - Normal to bedding fractures infilled by gypsum.	
25							Light tan to light gray fine to medium grained SANDSTONE, continuous around hole, horizontal bedding, friable, micaceous.	@26' Horizont. Bedding
27.5							Light gray to medium brown fine grained silty SANDSTONE, abundant closely spaced fractures infilled with gypsum and normal to bedding, moist, dense, well sorted.	
30								
32.5								
35							Reddish brown to medium gray clayey SILTSTONE, continuous around hole.	
37.5							Becoming predominantly dark gray.	
40								
42.5							Grading into dark gray fine grained silty SANDSTONE, very tight, moist.	
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1790′	DATE: 5/12/99
RIG TYPE: 24" Bucket	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
42.5								
45								
47.5							Transitions to tan to rust fine grained silty SANDSTONE, slightly friable, micaceous, numerous gypsum filled fractures, possibly soft sediment deformation, dense, moist.	
50							Well cemented fossiliforous zone, gastropods, gray, roughly horizontal, discontinuous around hole. @50′ - Becomes gray fine to medium grained very silty SANDSTONE, massive.	@50′ Approx. Horizont. Bedding
52.5								
55								
57.5								
60							Medium gray pockets of silty CLAY to clayey SILTSTONE, 1-6" thick, moist, dense.	
62.5							Flat lying bed, continuous around hole, gradation from fine to medium grained SANDSTONE to very fine grained sity SANDSTONE, occasional gastropods.	@61′ Horizont. Bedding
65								

ADDITIONAL COMMENTS:

SUBSURFACE DATA

LOG OF BORING P34 (Pg 4 of 4)

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1790'	DATE: 5/12/99
RIG TYPE: 24" Bucket	HAMMER WEIGHTS:	DROP: 12"

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
65								
67.5							3/4" thick dark to medium gray CLAY bed, highly sheared, unidirectional slickensides.	@68' N45W/9SW Shear
70								
72.5							Medium gray silty CLAY to clayey SILTSTONE, moist, stiff.	
75								
77.5							Total Depth - 73' No groundwater No caving	
80								
82.5								
85								
85.5								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1789'	DATE: 5/14/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
						<u>Alluvium:</u> Abundant quartz, feldspar and K-spar, plagioclast rich granite cobbles and boulders (up to 2' diameter), subrounded to subangular, in a matrix of medium to light brown clayey silty SAND, porous with pinholes up to 1cm, dry, rootlets, becoming compact with depth.	
						<u>Towsley Formation:</u> Interbedded mottled brown and gray fine grained SANDSTONE and clayey SILTSTONE fragments, moist, compact, dense, horizontal bedding.	
						3" bed of light gray fine grained SANDSTONE, with pyrite and mica flakes, some thin rust brown stringers.	@7' Horizont.
						Gypsum stringers, interbedded orangish brown sandy SILTSTONE to very fine grained silty SANDSTONE and gray clayey SILTSTONE, continuous around hole, competent, sparse gypsum filled fractures, beds typically 2-12" thick, firm.	@11' BN81W/6SW
						@12' - 2" bed of light to rust brown silty SANDSTONE, well sorted, flat lying, compact.	
						@12-13.5', Gray clayey SILTSTONE, well sorted, moist, firm, some small angular Cm scale fragments of light to medium brown sandstone.	@15' BN60W/ 24SW
						@13.5' - 1" bed of medium brown fine grained SANDSTONE with gypsum, increasingly more gray SILTSTONE with depth, irregular contact gypsum.	
						@15' - Bedding on 1" thick layer of tan very fine grained sandstone.	
						@16' - Massive gray SILTSTONE, moist, firm, competent.	
						@19-19.5', Tan and rusty orange fine grained silty SANDSTONE, moist, uncemented, continuous around hole.	@19' BN89W/8SW
						@19.5' - Massive gray SILTSTONE to clayey SILTSTONE, gradational contacts, moist, firm, unoxidized, micaceous, abundant broken shells, mostly Cm scale bivalves and gastropods.	

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1789'	DATE: 5/14/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5								
25							@25' - Abundant broken shells. @26' - Sparse fractures with minor seepage.	
27.5								
30							Bedding on contact between dark gray clayey SILTSTONE and light gray sandy SILTSTONE.	@31' BN33W/7SW
32.5							Two isolated rip-up clasts of cemented gray siltstone, subrounded pebble size.	
35								
37.5								
40							Distinct zone of cemented SILTSTONE rip-up clasts, massive up to 55', light gray fine grained SANDSTONE, continuous around hole, uncemented, underlain by dark gray clayey SILTSTONE.	@41' BN76E/ 12SE
42.5								
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1789′	DATE: 5/14/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
42.5								
45								
47.5								
50								
52.5								
55							Grades into gray SILTSTONE. Below 56.5′ small shears along base of sandstone, multiple glossy shears on 4" thick gray sandstone at 57.5′. Discontinuous light gray sheared and fractured sandy SILTSTONE, 4" thick, on west sidewall. Below 58′, massive gray sandy SILTSTONE, micaceous, competent, minor seepage from tight fractures. @60′ - Increasing seepage.	@56′ BN52W/3SW @57.5′ BN59W/3SW
57.5								
60								
62.5							Total Depth - 65′ No caving Groundwater at 60′	
65								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1855′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
						0 <u>Colluvium:</u> Light gray to grayish brown silty SAND with sparse gravel, poorly sorted, abundant burrows infilled with soil.	
						2.5 <u>Weathered Towsley Formation:</u> Light gray to white fine to medium grained SANDSTONE, uncemented, friable.	
						5	
						7.5	@8′ BN50W/ 25SW
						10	
						12.5 Light gray gravelly SANDSTONE, poorly sorted, no cementation, friable, dry and dense.	@12′ BN86E/ 16SE Approx.
						Grades into sandy CONGLOMERATE, pebble to gravel size subangular to subrounded clasts, matrix supported by poorly sorted sand, friable, poorly bedded.	
						15	
						17.5	
						20	
						@21′ - Grades into light brownish gray poorly sorted SANDSTONE.	@21′ BN46W/ 19SW
						22.5	

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1855′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5								
25							Interbedded poorly sorted SANDSTONE and gravelly SANDSTONE, scattered pebbles, uncemented and friable, occasional channelization, minor ash content, tuffaceous, gritty texture.	@25′ BN63W/ 13SW
								@26′ BN75W/ 20SW
27.5								
30								
32.5							Light gray fine grained gravelly SANDSTONE, uncemented and friable, damp and dense.	@32′ BN77W/ 11NE
								Approx.
35							Light gray fine to medium grained SANDSTONE, friable, damp and dense.	@34′ BN57E/ 10SE
37.5								
40								
42.5								
								@43′ BN34W/ 23SW
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1855′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
42.5								
45							@45′ - Seepage.	
47.5							Light gray poorly sorted SANDSTONE, friable and uncemented, minor sloughing due to seepage.	
50							@50′ - Increasing seepage, caving within friable sandstone to 55′.	
52.5							Gray interbedded sandy SILTSTONE and fine grained SANDSTONE, unoxidized.	
55							Localized sloughing of sandstones due to seepage, generally competent and dense.	
57.5								
60								
62.5								
65								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1855′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
65							Interbedded gray fine grained silty SANDSTONE and SILTSTONE, unoxidized, moist and stiff, dense.	
67.5								
70							@71′ - Cemented bed of gray SILTSTONE.	
72.5								
75							Total Depth - 75′ Seepage at 45′+ Caving 50′-55′ due to seepage from friable sandstones.	
77.5								
80								
82.5								
85								
85.5								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1865′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
						0 <u>Colluvium:</u> Medium to dark brown clayey silty SAND with abundant angular to subangular granitic pebbles (up to 6" diameter), matrix supported, compact, dry, rootlets, pinholes in upper 2′.	
						2.5 <u>Weathered Towsley Formation:</u> Light to medium brown fine to medium grained SANDSTONE and sandy SILTSTONE with abundant weathered granitic pebble fragments, disturbed, abundant krotovina, sparse rootlets, no distinct bedding, some pebble clasts are decomposed and granular, becoming more competent with depth, uncemented, damp and medium dense.	
						5 7.5 10 <u>Towsley Formation:</u> Crudely interbedded light to medium brown medium to coarse grained pebbly/cobbly SANDSTONE, cobbles up to 9" diameter and gray sandy clayey SILTSTONE with occasional rust orange stringers, abundant scours and channeling with mostly irregular contacts, moist, friable, some cobbles are decomposed, pebbles and cobbles are angular to subrounded and are randomly disturbed. @14′ - 2′ thick bed of gradational medium grained SANDSTONE. 12.5	@14′ BN62W/ 24SW
						15 17.5 20	@17′ BN45E/ 60SE
						@22′ - Bedding dipping to south. 22.5	@22′ BdueE/34S

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1865′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
22.5								
25								@25′ BN57W/ 22SW
27.5								
30							Caving and seepage within friable sandstones below 30′; downholed only to 27′ ±.	
32.5							Interbedded light gray sandy SILTSTONE and fine grained silty SANDSTONE, sands commonly seeping and sloughing, moist and dense, stiff, uncemented.	
35								
37.5								
40								
42.5								
45								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1865′	DATE: 5/18/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
42.5								
45								
47.5								
50								
52.5							Massive gray sandy SILTSTONE and clayey SILTSTONE with gradational contacts, moist, firm, well sorted, competent, unoxidized.	
55								
57.5							@57′ - Hard cemented bed.	
60								
62.5							Total Depth - 57′ Seepage at 30′ to 54.5′ Caving between 30′ - 57′ within sandstones Hole filled to 37′ overnight	
65								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1806' ±	DATE: 5/20/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
0								
							<u>Colluvium:</u> Dark brown silty SAND with gravel, occasional pebbles, minor clay, sparse carbonate veinlets, damp and medium dense, abundant soil filled burrows.	
2.5								
5								
							<u>Towsley Formation:</u> Tan fine grained silty SANDSTONE, friable, uncemented, irregular scoured contact with underlying medium to very coarse grained SANDSTONE at 7'.	@7' BN36E/ 17NW Approx.
7.5								
10								
							Irregular, scoured contact with underlying gravelly SANDSTONE, friable, uncemented, dry and dense.	
12.5								
							Light brown very fine grained clayey silty SANDSTONE, slightly scoured upper contact, interbedded/juxtaposed with medium to coarse sandstone by numerous faults.	@13' Fault N56W/ 24NE @15' Fault N65W/ 73NE @17' Fault N60E/ Vert.
15								
17.5								
20							Light gray fine to very coarse grained gravelly SANDSTONE, poorly sorted, massively bedded, uncemented and slightly friable, damp and dense.	
22.5								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1806' ±	DATE: 5/20/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
20								
							Steep fault juxtaposes gravelly SANDSTONE over gray and mottled rusty orange sandy SILTSTONE, fault enters hole on east side, bedding within siltstone dips shallowly to NW, abundant FeO staining.	
22.5								
								@24' BN24E/ 18NW
25								
27.5							Fault exits hole on west side, mottled light brownish gray sandy SILTSTONE to slightly clayey SILTSTONE below 27.5', moderately fractured with occasional gypsum, abundant FeO staining, crude fissility, damp and stiff.	@27.5' FN5E/63NW Fault exits hole
30								@30' BN28E/ 38NW
32.5								
35							Predominantly sandy SILTSTONE, micaceous, massively bedded, bedding also locally indiscernible due to fracturing.	@34' FN74W/ 60NE Fracture
								@36' BN24W/ 53SW Approx.
37.5								
40							Abundant gypsum.	
								@41' BN19E/ 20NW
42.5								

ADDITIONAL COMMENTS:

CLIENT: Pardee	PROJECT: Fair Oaks Ranch	W.O. : 8485
LOCATION: Phase 2	ELEVATION: 1806' ±	DATE: 5/20/99
RIG TYPE: 24" Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	C	DESCRIPTION	ATTITUDES
42.5							Grades into unoxidized gray SILTSTONE, competent, massively bedded, localized crude fissility, damp and stiff.	@43' BN7W/7SW
45								
47.5							4" thick light gray fine grained silty SANDSTONE interbed, slight cementation, damp and dense.	@47' BN29W/ 17SW
50								
52.5							Dark gray SILTSTONE, massive, unoxidized, occasional gypsum, damp and very stiff, sparse light gray silty sandstone interbeds.	@51' BN82E/6SE Approx.
55								
57.5							Total Depth - 57' No groundwater No caving	
60								
62.5								
65								

ADDITIONAL COMMENTS:

KEY TO ABBREVIATIONS USED ON BORING LOGS

N	U	B	M	DD	DESCRIPTION	ATTITUDES
					N = BLOW COUNT	B = BEDDING
					U = UNDISTURBED SAMPLE	C = CONTACT
					B = BULK SAMPLE	S = SHEAR
					M = MOISTURE CONTENT	F = FAULT
					DD = DRY DENSITY	J = JOINT
					C = MODIFIED CALIFORNIA SAMPLER	
					S = STANDARD PENETRATION TEST SAMPLER	
					X = INDICATES DEPTH OF BULK SAMPLE	

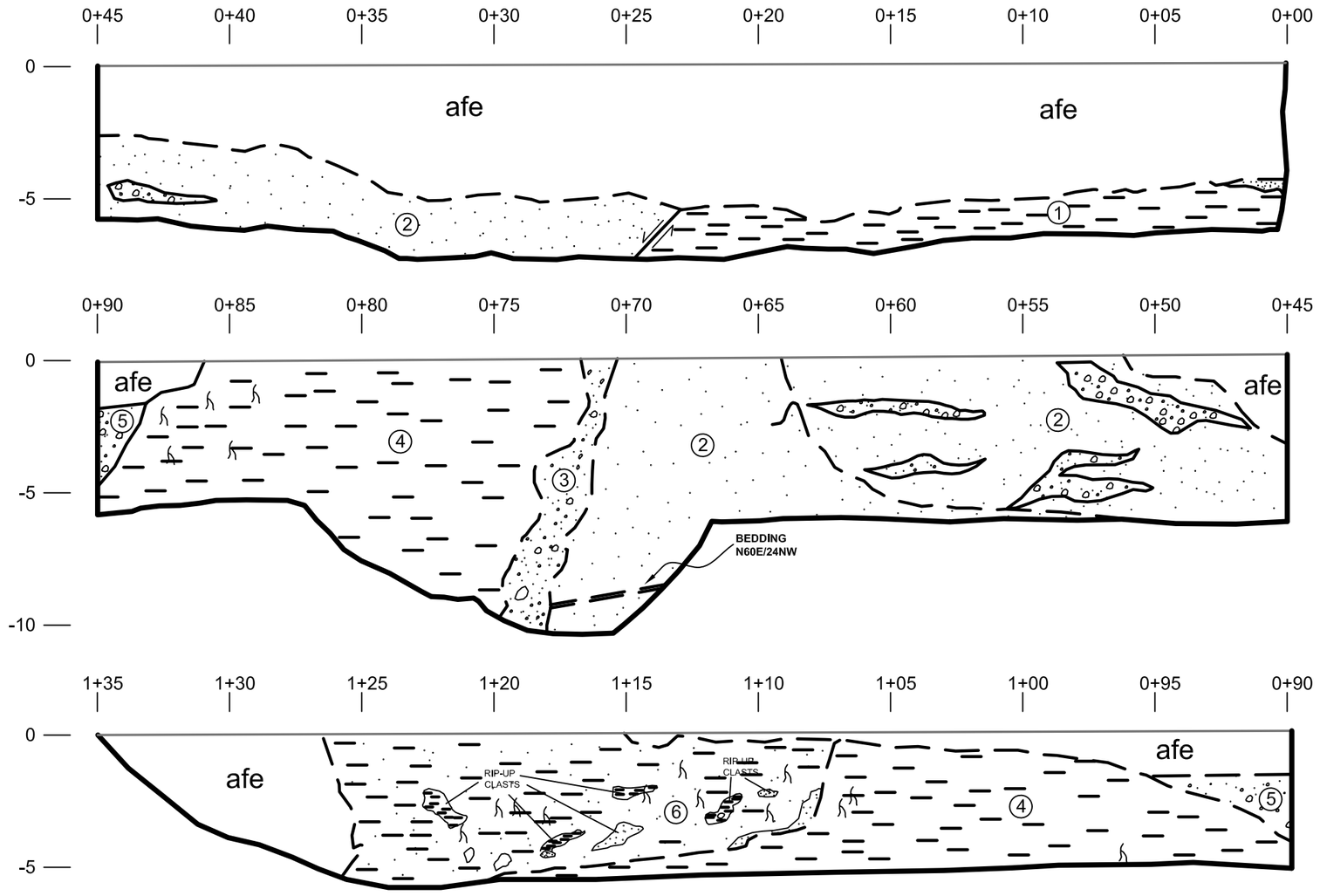
ADDITIONAL COMMENTS:

Trench Logs by GWV

TRENCH	DATE EXCAVATED	GROUND SURFACE ELEVATION (feet above mean sea level)	TOTAL LENGTH (feet)
T1	7/7/2020	1812	135
T2	7/7/2020	1814 to 1802	105
T3	7/7/2020	1812	35

LOG OF TRENCH T1

S65W



EXPLANATION

Roots

Cobble

Geologic Conact

Fault

Lithologic Units

Engineered Fill (afe):
Pale brown to buff silty fine to coarse SAND with gravel and cobbles, moist, massive, well graded. Gravel and cobbles are made of volcanics, gneiss, anorthosite, granite, and are subrounded to rounded. Angular medium and coarse sand grains of white feldspar are abundant. Sporadic roots up to ¼" and rootlets infilled with carbonates.

Landslide? (Qls L7?):
3. Brown clayey medium to coarse SAND with gravel and few cobbles, dense, moist, well graded, massive. Gravel and cobbles are rounded to subrounded, less weathered and more yellowish brown with depth.

4. SILTSTONE Gray SILT and clayey SILT, moist, dense to loose, massive. Highly fractured with hematite staining along fractures. Material becomes porous, less dense and coarser, to the south.

5. CONGLOMERATE Pale brown to buff silty fine to coarse SAND with gravel and cobbles, moist, massive, well graded. Gravel and cobbles are subrounded to rounded.

6. Brown silty sand matrix with gravel and cobbles, loose; many pieces up to small boulder size of cream colored sandstone similar to 2 and gray siltstone similar to 4.

Towsley Formation (Tt):
1. SILTSTONE Gray SILT and fine SAND with clay, dense moist and massive. Ped development in silty portions highly angular and variable in size. Surface of peds discolored by hematite staining.

2. SANDSTONE Pale gray to cream silty fine to coarse SAND, medium dense to loose, moist, channelized. Coarser material is cream colored, generally and contains some rounded gravel and cobbles, is friable. Finer grained portions have hematite staining. Around station 64 there is a paleosol development characterized by concentration of silt and brown colorization.

5 2.5 0 5

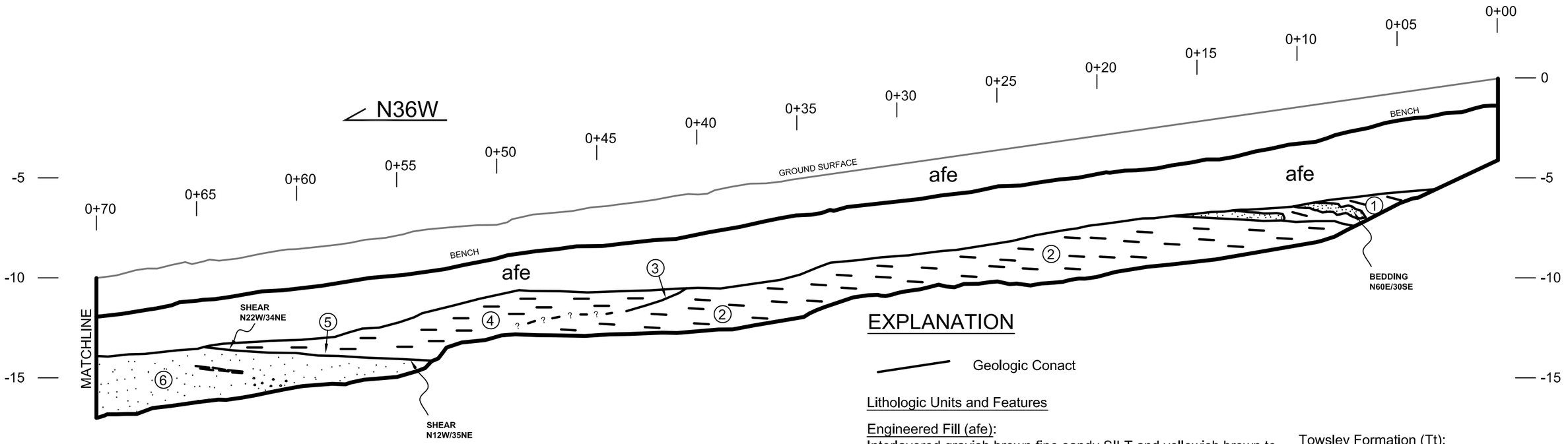
1"=5'

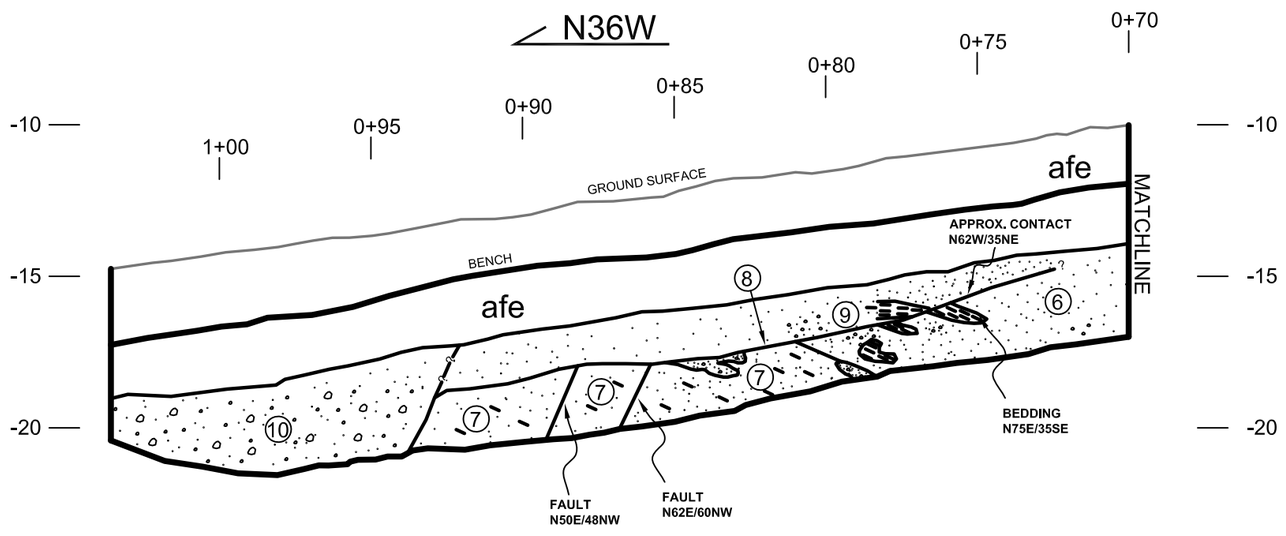
Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 07/07/2020 BY AL

SCALE 1" = 5' W.O. 8485

PLATE T1





EXPLANATION

Geologic Conact

Lithologic Units and Features

Engineered Fill (afe):
Interlayered grayish brown fine sandy SILT and yellowish brown to pale brown silty SAND with gravel and cobbles, dense, moist.

Landslide? (Qls L7?):
3. CONTACT: two to three inch thick band of ground up silt, slightly plastic, stiff.

4. SILTSTONE: grayish brown, firm to stiff, moist, slightly plastic, massive, mottled with orange oxidation stains, contains entrained sands and gravels as random pockets and individual grains, several random rounded cemented nodules up to five inches in diameter.

5. SHEAR: up to half inch thick clay seam, dark brown, soft, highly plastic, locally cornflaky and polished, separates Units 4 and 6.

8. CONTACT: sharp contact along upper surface of Units 6 and 7 separating them from Unit 9; contact steepens near Station 0+95 where it separates Unit 7 from Unit 10; beds and channels within Units 6 and 7 are truncated or offset on the order of two feet across the contact.

9. SANDSTONE: orangish brown, pale brown, and brown, fine to coarse grained, silty, medium dense, massive, pockets of material within unit 9 appear to be offset, deformed, and more weathered remnants of individual beds from unit 6.

10. CONGLOMERATE: yellowish brown, orangish brown, and brown, silty sand matrix, clasts up to twelve inches in maximum dimension, medium dense, moist, moderately to highly weathered, easy to excavate, massive.

Towsley Formation (Tt):
1. SILTSTONE: grayish brown, sandy, micaceous, stiff, moist, massive, orange oxidation stains common along fractures; interbedded with SANDSTONE: pale brown, gravelly, friable, massive, sparse blue siltstone ripups, streaks of greenish yellow and orange weathering, scoured and oxidized lower contacts.

2. SILTSTONE: grayish brown, hard, moist, massive, blocky, orange oxidation stains common along fractures.

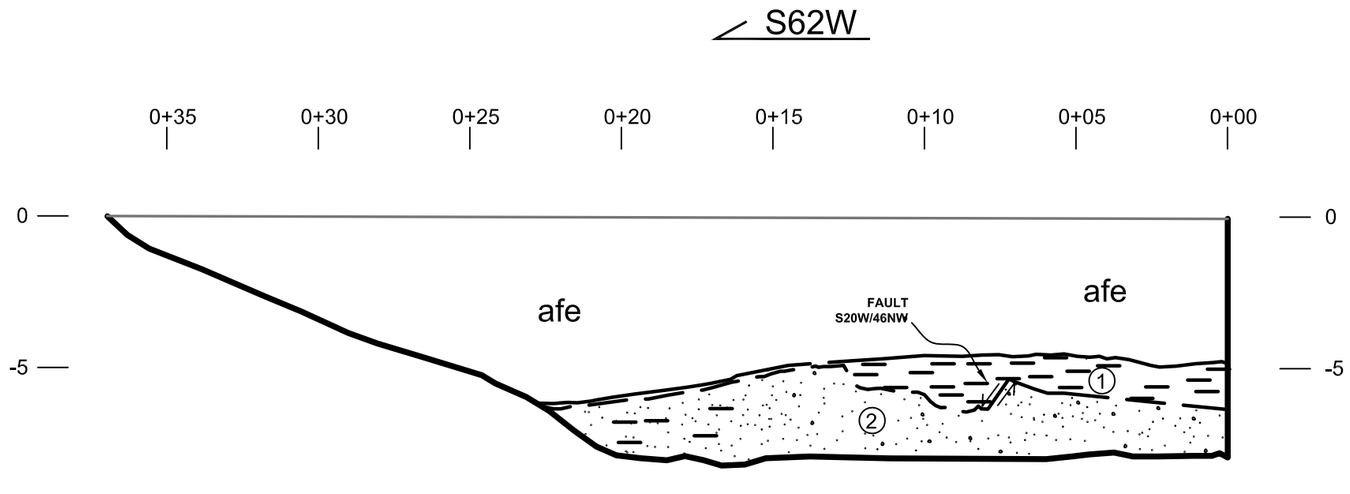
6. SANDSTONE: pale brown, fine to medium grained, massive, dense, moist, orange weathering stains pervasive to banded along vague bedding near Station 0+75, numerous randomly oriented faults with offsets of up to one inch, sparse gravelly pockets and mud ripups.

7. SANDSTONE: light gray to olive brown, fine to medium grained, silty, massive, dense, moist, numerous randomly oriented faults with offsets of up to one inch, sparse cleaner pale brown fine to coarse sand channels with gravel and reddish orange oxidized contacts. Two more planar faults with larger offsets identified as a half inch thick purple weathered zone along the fault trace; offset and sense of motion undetermined.

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 07/07/2020 BY RMP
SCALE 1" = 5' W.O. 8485

PLATE T2
A48



LOG OF TRENCH T3

EXPLANATION

Geologic Conact

Fault

Lithologic Units

Engineered Fill (afe):
Pale brown to buff silty fine to coarse SAND with gravel and cobbles, moist, massive, well graded. Gravel and cobbles are made of volcanics, gniesses, anorthosite, granite and are subrounded to rounded. Angular medium and coarse sand grains of white feldspar is abundant. Sporadic roots up to ¼" and rootlet infilled with carbonates.

Towsley Formation (Tt):
1. SILTSTONE Gray SILT and fine SAND with clay, dense moist and massive. Ped development in silty portions highly angular and variable in size. Surface of peds discolored by hematite staining.

2. SANDSTONE Pale gray to cream silty fine to coarse SAND, medium dense to loose, moist, channelized. Coarser material is cream colored, generally and contains some rounded gravel and cobbles, is friable. Finer grained portions have hematite staining.

5 2.5 0 5

1"=5'

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 07/07/2020 BY AL
SCALE 1" = 5' W.O. 8485

PLATE T3

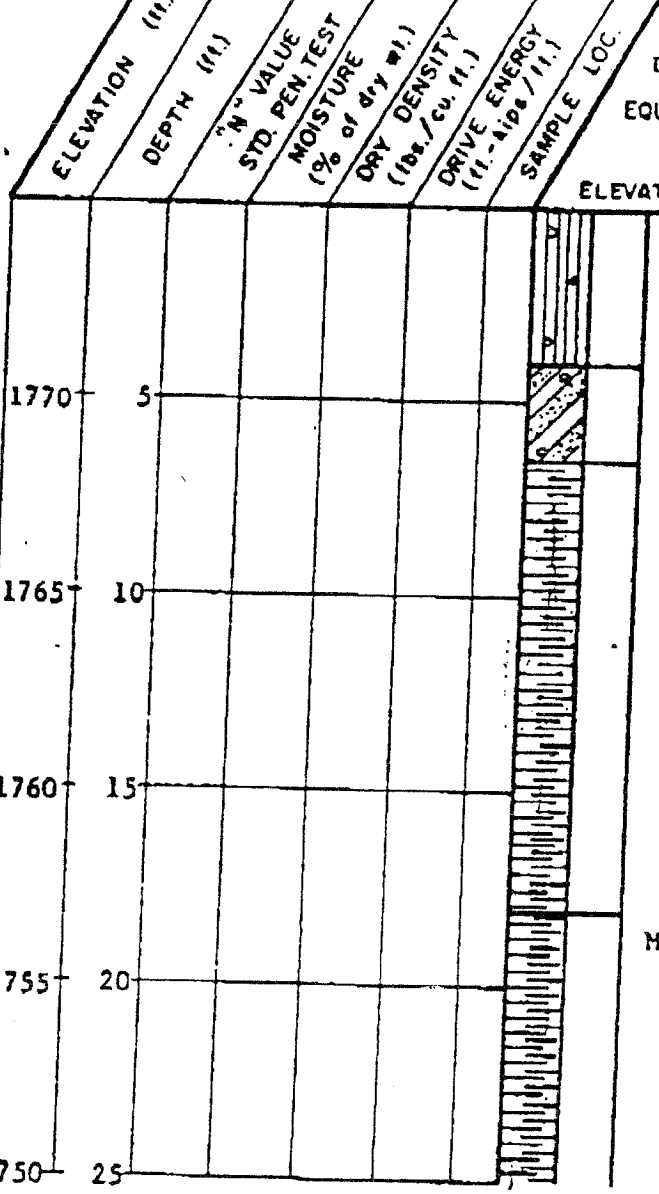
Boring Logs by LeRoy Crandall & Assoc.

BORING	DATE EXCAVATED	GROUND SURFACE ELEVATION (feet above mean sea level)	TOTAL DEPTH (feet)
B6	6/17/1980	1775	50

BORING 6AB

DATE DRILLED: June 17, 1980

EQUIPMENT USED: 20"-Diameter Bucket



CLAYEY SILT - SOIL ZONE - few gravel, some sand, dark brown

CLAYEY SAND - fine. About 30% gravel and cobbles, light brown

SANDSTONE - MIDDLE TOWSLEY FORMATION - LAND-SLIDE MATERIAL - fine to medium, some silt very moist, light brown

Fractures, Silty layers

MUDSTONE - MIDDLE TOWSLEY FORMATION - LAND-SLIDE MATERIAL - weathered, moist, grey and brown

Sandy interbeds

Seeps

(CONTINUED ON FOLLOWING PLATE)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

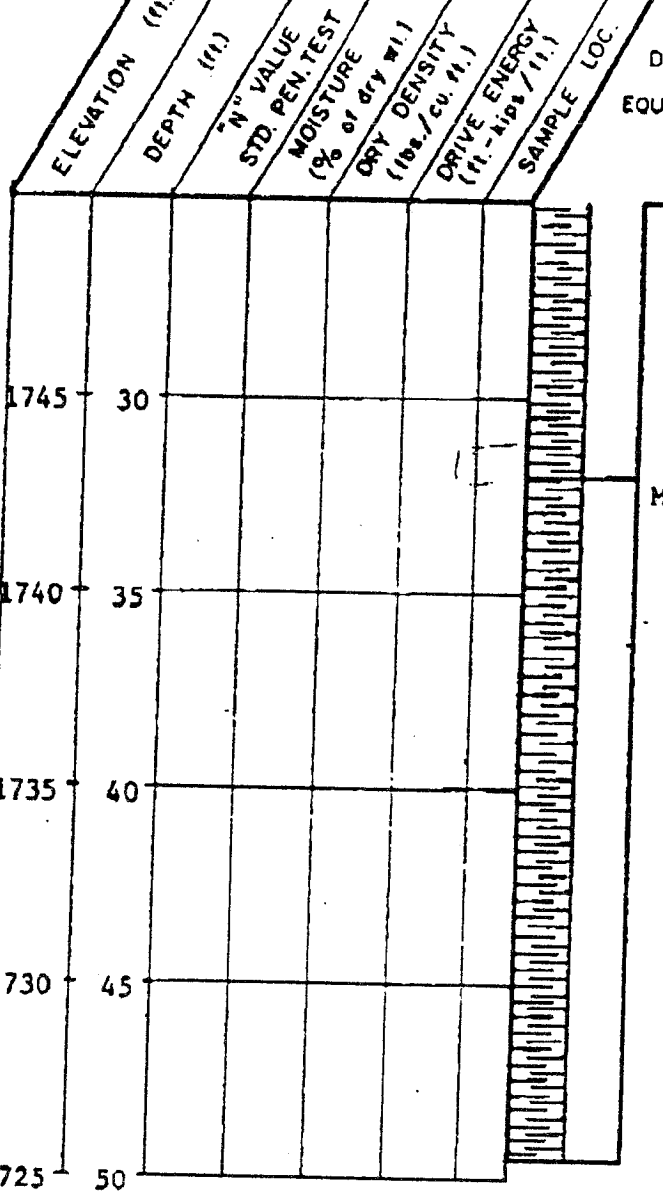
LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 6AB (CONTINUE

DATE DRILLED: June 17, 1980

EQUIPMENT USED: 20"-Diameter Bucket



Seeps

Seeps

Seeps
Possible slip surface

MUDSTONE - MIDDLE TOWSLEY FORMATION - massive, moist, bluish-grey

Sandy thin interbeds

NOTE: Total depth Piezometer A - 50.4 feet.
Total depth Piezometer B - 31.4 feet.

Depth to top of Bentonite Clay Seal - 32 feet.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

Boring Logs by Fugro

BORING	DATE EXCAVATED	GROUND SURFACE ELEVATION (feet above mean sea level)	TOTAL DEPTH (feet)
BA-1	5/21/2018	1752	55
BA-2	5/22/2018	1752	55

LOCATION: N 34.40227 W 118.43668

SURFACE EL: Approx. 1752 ft +/- (rel. NAVD88 datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
		B			**LANDSLIDE DEPOSITS (Qls)** Clayey SILTSTONE to CLAYSTONE: moderately weathered, soft, greenish brown with orange oxide staining, moist, trace gypsum nodules up to 1/5"							
1750	2											
1748	4											
		S1		(7)	- 4.33': Joint, N35W/80 NE, smooth - 4.58': Joint, N30W/85 SW, planar, smooth, rootlets	129	110	17				
1746	6	S2		54/6"	present along joint face - greenish gray, fresh - slightly weathered							
1744	8				- 6.75': Joint, N50E/ from 60-80 NW, from planar to wavy, gypsum infill up to 1/8" thick							
1742	10	S3		(4)	- slight increase in plasticity and fissility, gypsum present in spoils from 10-15 ft bgs - 10.08': Joint, N10W/85 SW, <1mm, clay in-fill	128	105	22		51	28	
1740	12											
1738	14				- 13.5': Joint, N35W/65 SW, clay in-fill, ~1/32"							
		S4		(4)	- slightly weathered	130	105	24				
1736	16	S5		30	- 15.75': Bedding, N35W/32 SW, 1/4" orange oxide contact layer 15.75': clay bed, dark gray, slightly weathered, very soft, laminated							
1734	18				- 18.6'-19.0': clay bed with interbedded orange, fine sandy siltstones up to 2" thick							
1732	20	S6		(10)	- 19.75': Bedding, N50W/15SW with laminated fine sands - CLAYSTONE, slightly weathered, soft, dark gray to gray, laminated, with 1/4" widely spaced laminated layers of silty fine sand, med gray, moist	131	112	17		46	24	
1730	22											
1728	24				- 22.5': Bedding, N25W/16 SW							
		S7		(9)	- 24.33': Becomes predominantly fine sandy claystone, gray to dark gray, slightly weathered, laminated - 24.5': clay bed, N20W/10SW, base is wavy with up to 1/2" at relief	129	104	24		83	54	
1726	26				**CASTAIC FORMATION (Tc)**							
1724	28				SEDIMENTARY ROCK (CLAYEY SILTSTONE to CLAYSTONE): slightly weathered to fresh,							
1722	30	S8		(20)	moderately soft, modurately indurated, dark gray to gray, thickly bedded, very slightly fractured [Lean to Fat CLAY, hard]				98	53	31	u 23
1720	32				- 32.25'-35.5': with laminated to thinly bedded fine sand, light gray							
1718	34				33.75': Bedding, N10W/10 SW, sand lamination							
		S9		(18)	- increase in frequency of silty fine sand layers	138	118	17				
1716	36				35.5' Bedding, N10W/11SW, clay bed, dark gray to brown, 1/2" thick							
1714	38											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 55.0 ft
DEPTH TO WATER: Not Encountered
BACKFILLED WITH: Sand/Cement Slurry
DRILLING DATE: May 21, 2018

DRILLING METHOD: 24-inch-dia. Bucket Auger
HAMMER TYPE: Kelly Bar
KELLY BAR WEIGHTS: 0-26ft: 3,390 lbs
26-52ft: 2,230 lbs
DRILLED BY: Tri-Valley Drilling
LOGGED BY: J Goodman
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. BA-1

Cherry Willow Tank
Santa Clarita, California

473

PLATE A-1a

LOCATION: N 34.40227 W 118.43668

SURFACE EL: Approx. 1752 ft +/- (rel. NAVD88 datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
		S10		(23)		139	120	16				
1710	42											
					Silty SANDSTONE: fresh, soft, gray, moist, trace gravel to 4", upper contact is subhorizontal and wavy with up to 2" of relief/amplitude							
1708	44											
		S11		(20/8")								
1706	46											
1704	48											
					downhole logged to 49'							
1702	50	S12		(29)	Sandy SILTSTONE: fresh, soft, gray, moist	135	119	13				
1700	52											
1698	54											
					Boring Completed to 55 ft bgs.							
1696	56											
1694	58											
1692	60											
1690	62											
1688	64											
1686	66											
1684	68											
1682	70											
1680	72											
1678	74											
1676	76											
1674	78											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 55.0 ft
DEPTH TO WATER: Not Encountered
BACKFILLED WITH: Sand/Cement Slurry
DRILLING DATE: May 21, 2018

DRILLING METHOD: 24-inch-dia. Bucket Auger
HAMMER TYPE: Kelly Bar
KELLY BAR WEIGHTS: 0-26ft: 3,390 lbs
26-52ft: 2,230 lbs
DRILLED BY: Tri-Valley Drilling
LOGGED BY: J Goodman
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. BA-1

Cherry Willow Tank
Santa Clarita, California
474

PLATE A-1b

LOCATION: N 34.40218 W 118.43689

SURFACE EL: Approx. 1752 ft +/- (rel. NAVD88 datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
		B			**COLLUVIUM (Qc)** Silty SAND (SM): dense, light brown and reddish brown, dry, medium to coarse sand, with trace fine to coarse gravel and cobbles to 8", gravel to cobble sized clasts, poorly stratified, locally channelized							
1750	2				- moist							
1748	4	S1		(10)	- cobbles absent below 5 ft bgs	137	129	6				
1746	6				Well-graded SAND (SW): dense, light brown, moist, micaceous, trace fine gravel, subangular to subrounded							
1744	8											
1742	10	S2		(5)		132	122	9				
		S3		39								
1740	12				- 11.17'-14.33': moderately spaced silty fine sand layers, from 1/2" to 2" thick, wavy, subhorizontal							
1738	14											
1736	16	S4		(8)		140	127	10				
					Silty SAND (SM): reddish brown, moist, fine to medium micaceous sand, weakly cemented, laminated, upper contact is wavy, subhorizontal							
1734	18				- 17.5': Bedding, from N65W/20SW to N35E/21SE, plastic clay, greenish gray, very moist, from 1/4" to 1/2", wavy							
1732	20	S5		(3)		124	113	10				
		S6		25	- 18.08'-20.67': Joint, N76W/71SW, FR, from 1/16" to 1/8", infilled with dark gray silt, joint set, very closely spaced							
1730	22				Poorly graded SAND (SP): orangish brown, interval of thinly bedded to laminated fine sand, basal contact is subhorizontal and wavy, black and at a high angle to basal contact, Bedding N45E/50SE							
1728	24											
1726	26	S7		(4)	**LANDSLIDE DEPOSITS (Qls)** Lean CLAY (CL): very soft, light gray to reddish orange,	132	113	17		47	26	
1724	28				23.0'-24.0', N40E/30SE, closely spaced Fat CLAY layers from 1" to 2" thick, varies from wavy to planar - N70W/26SW,1/4" thick clay layer							
1722	30	S8		(21)	fine SAND (SP), Silty fine SAND (SM), and Elastic SILT (MH), trace gravel, orange, light gray and dark gray, crude layering, basal contact is wavy with up to 3" of relief/amplitude, subhorizontal	137	115	19		55	31	
1720	32				**CASTAIC FORMATION (Tc)**							
1718	34				Fine SEDIMENTARY ROCK (CLAYEY SILTSTONE to CLAYSTONE): moderately to slightly weathered, soft, dark gray, laminated, with fine sand laminae, upper contact is wavy and subhorizontal, with							
1716	36	S9		(20)	interebedded silty fine sandstone [Lean to Fat CLAY, hard]							u 24
					- 31.08': Bedding, N10W/06SW, base of 2" thick laminated silty fine sandstone interval							
1714	38				- 33.17', Bedding, N05W/05SW, 1/8" thick clay layer - 34': Bedding, N30E/05NW, slightly weathered to fresh							

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 55.0 ft
DEPTH TO WATER: Not Encountered
BACKFILLED WITH: Sand/Cement Slurry
DRILLING DATE: May 22, 2018

DRILLING METHOD: 24-inch-dia. Bucket Auger
HAMMER TYPE: Kelly Bar
KELLY BAR WEIGHTS: 0-26ft: 3,390 lbs
26-52ft: 2,230 lbs
DRILLED BY: Tri-Valley Drilling
LOGGED BY: J Goodman
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. BA-2

Cherry Willow Tank
Santa Clarita, California

475

PLATE A-2a

LOCATION: N 34.40218 W 118.43689

SURFACE EL: Approx. 1752 ft +/- (rel. NAVD88 datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
		S10		(27)		132	112	18				
1710	42				- 42': Bedding, N15E/05NW, base of laminated fine sandstone							
1708	44											
		S11		(24)								
1706	46				- 46.5': Bedding, N25E/04NW, 1/4" thick clay layer							
1704	48											
1702	50	S12		(19)								
1700	52											
1698	54											
1696	56				- Boring Completed to 55 ft bgs.							
1694	58											
1692	60											
1690	62											
1688	64											
1686	66											
1684	68											
1682	70											
1680	72											
1678	74											
1676	76											
1674	78											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 55.0 ft
DEPTH TO WATER: Not Encountered
BACKFILLED WITH: Sand/Cement Slurry
DRILLING DATE: May 22, 2018

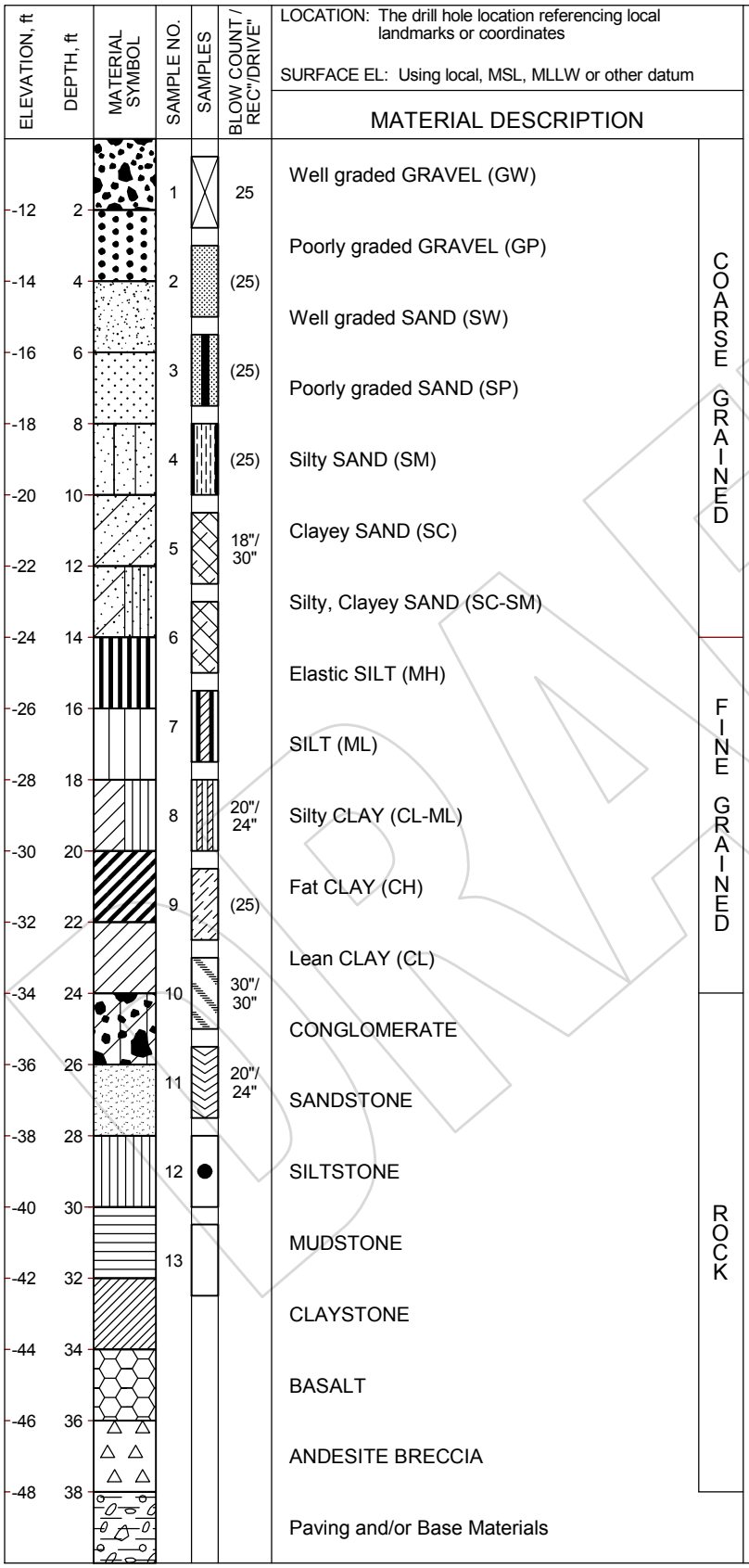
DRILLING METHOD: 24-inch-dia. Bucket Auger
HAMMER TYPE: Kelly Bar
KELLY BAR WEIGHTS: 0-26ft: 3,390 lbs
26-52ft: 2,230 lbs
DRILLED BY: Tri-Valley Drilling
LOGGED BY: J Goodman
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. BA-2

Cherry Willow Tank
Santa Clarita, California

476

PLATE A-2b



General Notes

Soil Texture Symbol

Sloped line in symbol column indicates transitional boundary

Samplers and sampler dimensions (unless otherwise noted in report text) are as follows:

Symbol for:

1	SPT Sampler, driven 1-3/8" ID, 2" OD
2	CA Liner Sampler, driven 2-3/8" ID, 3" OD
3	CA Liner Sampler, disturbed 2-3/8" ID, 3" OD
4	Thin-walled Tube, pushed 2-7/8" ID, 3" OD
5	Bulk Bag Sample (from cuttings)
6	CA Liner Sampler, Bagged
7	Hand Auger Sample
8	CME Core Sample
9	Pitcher Sample
10	Lexan Sample
11	Vibracore Sample
12	No Sample Recovered
13	Sonic Soil Core Sample

Sampler Driving Resistance

Number of blows with 140 lb. hammer, falling 30" to drive sampler 1 ft. after seating sampler 6"; for example,

Blows/ft	Description
25	25 blows drove sampler 12" after initial 6" of seating
86/11"	After driving sampler the initial 6" of seating, 36 blows drove sampler through the second 6" interval, and 50 blows drove the sampler 5" into the third interval
50/6"	50 blows drove sampler 6" after initial 6" of seating
Ref/3"	50 blows drove sampler 3" during initial 6" seating interval

Blow counts for California Liner Sampler shown in ( )

Length of sample symbol approximates recovery length

Classification of Soils per ASTM D2487 or D2488

Geologic Formation noted in bold font at the top of interpreted interval

Strength Legend

Q = Unconfined Compression
u = Unconsolidated Undrained Triaxial
t = Torvane
p = Pocket Penetrometer
m = Miniature Vane

Water Level Symbols

- Initial or perched water level
- Final ground water level
- Seepages encountered

Rock Quality Designation (RQD) is the sum of recovered core pieces greater than 4 inches divided by the length of the cored interval.

KEY TO TERMS & SYMBOLS USED ON LOGS

PLATE A-3

APPENDIX B
Laboratory Summary and Tests

October 30, 2020
W.O. 8485

LABORATORY TESTING

Undisturbed and bulk samples of soil and rock materials encountered at the site were collected during the course of our field work. Selected laboratory tests completed on the retrieved samples are described below.

MOISTURE-DENSITY

The field moisture content and dry unit weight were determined for each undisturbed sample. Dry unit weight is expressed in pounds per cubic foot and the moisture content represents a percentage of the dry unit weight. These results are presented on the boring logs.

SHEAR TEST

Shear tests were performed in a Direct Shear Machine of the strain control type commensurate with ASTM D3080. The rate of deformation is approximately 0.01 inches per minute for tests to determine peak and ultimate strength values. Multi-cycle testing evaluate residual strength were sheared at reduced rates of deformation of 0.0025 inches per minute. Shearing occurred under a variety of confining loads in order to determine the Coulomb shear strength parameters. The test was performed on undisturbed and remolded (@ field dry density) samples in an artificially saturated condition.

Stress-strain curves are presented in each shear test diagram. It should be noted that for the case of undisturbed single-cycle shear tests the value at the end of the stress-strain curve were selected.

COMPACTION AND EXPANSION TESTS

To determine the compaction characteristics of the onsite materials, compaction tests are performed in accordance with ASTM D 1557. The maximum dry density is reported in pounds per cubic foot and the optimum moisture content as a percentage of the maximum dry density. Expansion index tests were performed in accordance with ASTM D4829. The results of these tests are included in Laboratory Test Summary table in this appendix.

ATTERBERG LIMITS AND PARTICLE SIZE ANALYSES

The distribution of various particle sizes in selected representative samples was determined using both mechanical sieves and hydrometer tests. The percentage and distribution of particles larger than a #200 sieve (0.075 mm) are determined using mechanical processes per ASTM D6913. Particle distributions for fine-grained soils are determined using sedimentation (hydrometer) methods per ASTM D7928. The particle distribution is presented as the relative percentages of sand, silt and clay particles in each sample tested.

A cohesive plastic soil may go through four consistency states as the moisture content of the soil is increased. These states are the solid state, the semisolid state, the plastic state, and the liquid state. The

limits between these consistency states are the Shrinkage limit, Plastic limit, and the Liquid Limit (respectively). These limits are often referred to as the Atterberg limits. The Plasticity Index is defined as the numeric value of the Liquid limit minus the numeric value of the Plastic limit (see Plate AL). The Liquid Limit, Plasticity Limit, and Plasticity Index for selected cohesive soil samples were determined in the laboratory. The Standard Test Method ASTM D4318 was utilized. These parameters are used in the classification of cohesive soils.

CORROSIVITY

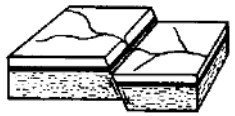
For structural elements, a site is considered to be corrosive if one or more of the following conditions exist for the representative soil samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less (Caltrans, 2015; GMED, 2013). For structural elements, the minimum resistivity of soil and/or water indicates the relative quantity of soluble salts present in the soil or water. In general, a minimum resistivity value for soil and/or water less than 1000 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion.

At the completion of rough grading for the tank pads, samples of soil were provided to consulting corrosion engineers, Schiff Associates for testing. Resistivity results indicate resistivity of saturated samples of ranging from 580 to 1700 ohm-cm. Soluble sulfate test results yielded concentrations of 0.01 to 0.45 percent by mass. This level of soluble sulfate is in the S0 to S2 exposure class per Table 19.3.1.1 of ACI 318-14. Chlorides were ranged from ND (not detected) to 50 ppm. The pH was determined to be approximately in the range of 7.6 to 8.2.

Laboratory Test Summary

Depth	Geology	Sample Description	ST	w	DD	S	Max	Opt	EI	LL	PI	% Gravel	% Sand	%Fines
Excavation: T1 (TD= 10 ft, No GW)														
5	Landslide Debris		(B)						79					
Excavation: WB1A (TD= 30 ft, No GW)														
10	Landslide Debris	clayey SILT	(U)	8.9	107.4	43								
Excavation: WB1B (TD= 63 ft, No GW)														
20	Landslide Debris	silty SAND	(U)	8.1	120.4	56								
30	Alluvium	clayey SILT	(U)	19.3	110.4	100								
40	Alluvium	lean CLAY	(U)	16.4	112.7	91								
50	Alluvium	lean CLAY	(U)	12.5	111.9	68								
60	Alluvium	lean CLAY	(U)	10	103.6	44								
Excavation: WB2 (TD= 60 ft, No GW)														
10	Landslide Debris	clayey SILT	(U)	22.7	105.2	100								
20	Alluvium	lean CLAY	(U)	21.2	105.1	96								
30	Alluvium	lean CLAY	(U)	18.3	107	87								
40	Alluvium	lean CLAY	(U)	17.6	108.9	88								
50	Alluvium	lean CLAY	(U)	15.5	111.3	83								
60	Alluvium	lean CLAY	(U)	15.5	106.1	72								
Excavation: WB3 (TD= 74 ft, No GW)														
10	Colluvium	silty SAND	(U)	5.4	102.9	23								
20	Alluvium	clayey SILT	(U)	14.5	108.8	72								
30	Alluvium	clayey SILT	(U)	14	112.9	78								
40	Alluvium	clayey SILT	(U)	20	105.9	92								
50	Alluvium	lean CLAY	(U)	17.6	110.3	91								
60	Alluvium	lean CLAY	(U)	15.5	108.7	77								

For abbreviation explanation see Legend on Page 2 of 2

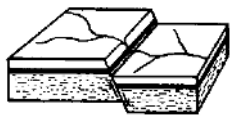


Depth	Geology	Sample Description	ST	w	DD	S	Max	Opt	EI	LL	PI	% Gravel	% Sand	%Fines	W.O. 8485.103.094
Excavation: WB4 (TD= 65 ft, No GW)															
10	Landslide Debris	silty SAND	(U)	8											
19.3	Towsley Formation	Claystone	(B)							62	44		13	87	
20	Alluvium	lean CLAY	(U)	18.2	109.8	93									
30	Alluvium	lean CLAY	(U)	24.1	99.9	96									
40	Alluvium	lean CLAY	(U)	16.6	112.3	91									
47	Towsley Formation	Claystone	(B)							86	66		4	96	
50	Alluvium	lean CLAY	(U)	13.8	110.9	73									
60	Alluvium	lean CLAY	(U)	14.8	112.1	81									
Excavation: WB5 (TD= 30 ft, No GW)															
10	Alluvium	clayey SILT	(U)	29.2	99.3	100									
20	Alluvium	lean CLAY	(U)	17.9	112.2	98									
30	Alluvium	lean CLAY	(U)	20.5	107.6	99									

LEGEND

Depth = Sample Depth (ft) below ground surface
ST = Sample Type*
w = Initial Moisture Content (%)
DD = Initial Dry Unit Weight (pcf)
Max = Maximum Dry Unit Weight (pcf)
Opt = Optimum Moisture Content (%)
EI = Expansion Index
S = Degree of Saturation (%)
LL = Liquid Limit
PI = Plasticity Index
e = Void Ratio
n = Porosity (%)
WD = Initial Wet Unit Weight (pcf)
SD = Saturated Unit Weight (pcf)
BD = Bouyant (Submerged) Unit Weight (pcf) - Assuming water unit weight of 62.4 pcf
Consol = Consolidation Test Diagram (Plate No.)
Shear = Shear Test Diagram (Plate No.)

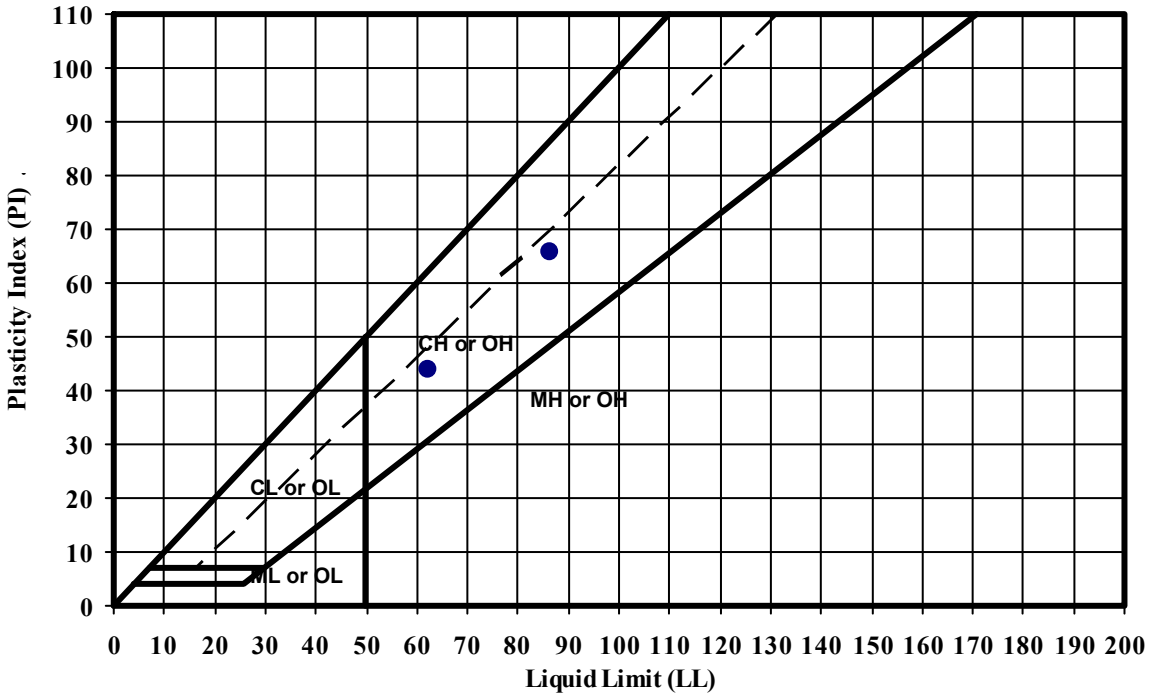
*** Sample Types: (U) = relatively Undisturbed; (S) = SPT; (B) = Bulk; (N) = Nuclear; (SC) = Sand Cone**



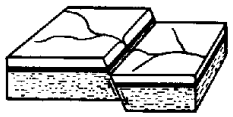
ATTERBERG LIMITS

PLASTICITY CHART

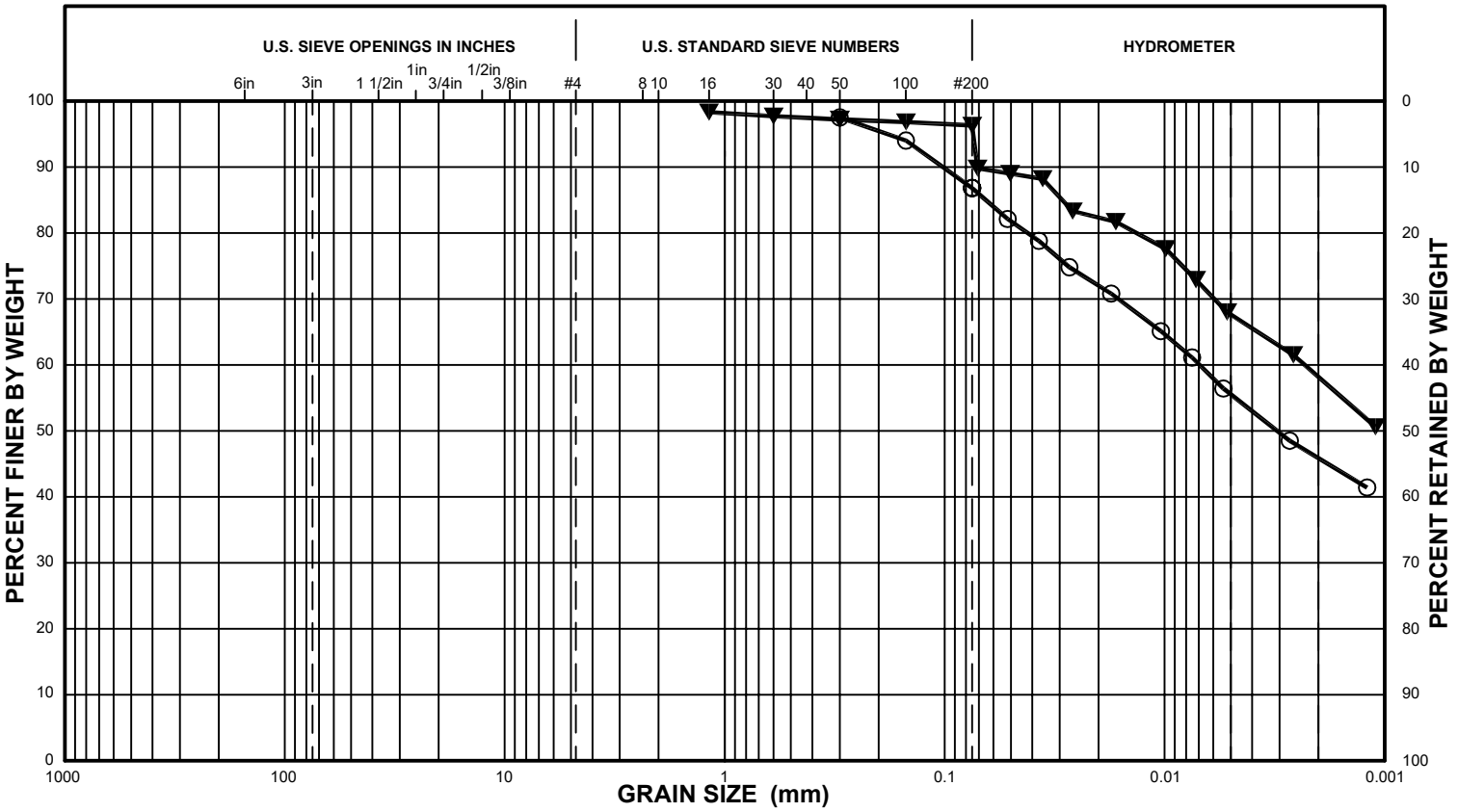
ASTM D 4318



Excavation	Depth (ft)	Geology	Soil Description	LL	PI	% Clay (0.002mm)	Fines Class	w	w/LL
WB4	19.3	Tt	Claystone	62	44	46	CH		
WB4	47	Tt	Claystone	86	66	58	CH		



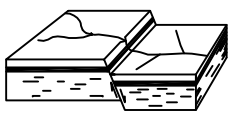
PARTICLE SIZE ANALYSIS



COBBLES & BOULDERS	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

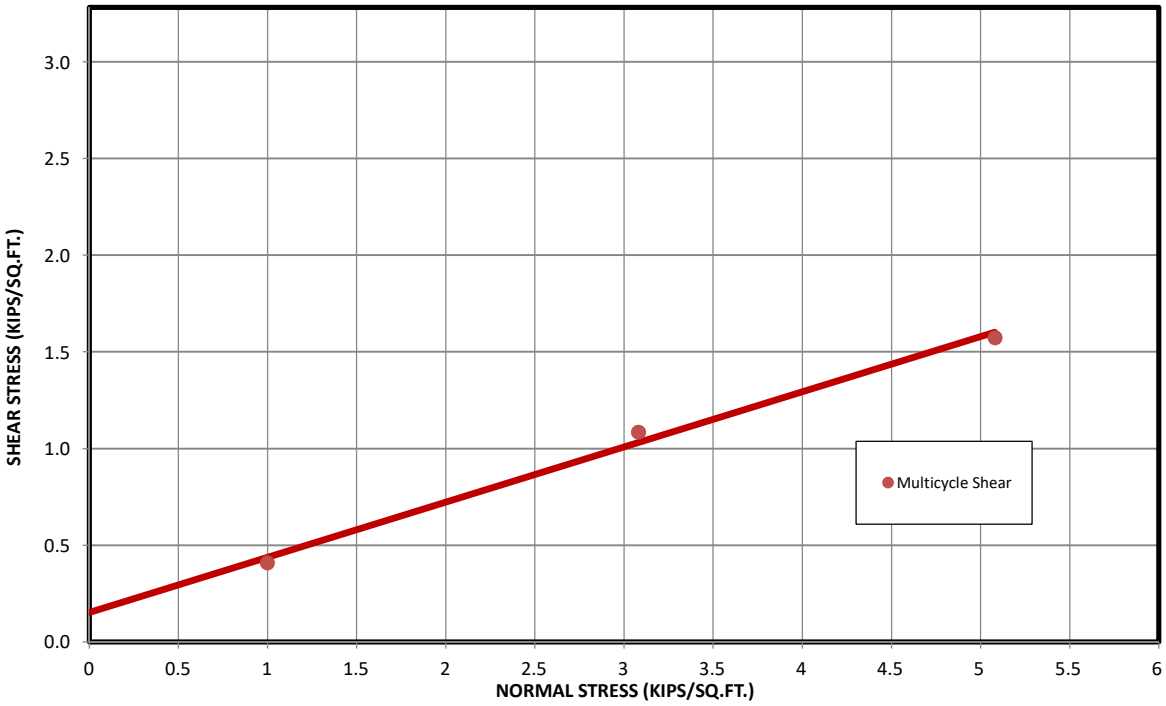
	SAMPLE	DESCRIPTION	%GRAVEL	%SAND	%FINES	D60	D30	D10	Cu	Cc	LL	PI
○	WB4 @ 19.3'	Fat Clay with Sand (CH)	---	13	87	0.007	---	---	---	---	62	44
▼	WB4 @ 47'	Fat Clay with Sand (CH)	---	4	96	0.002	---	---	---	---	86	66

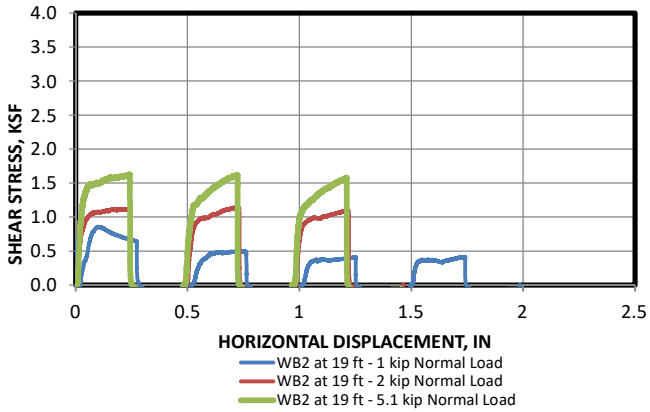
8485.103.094



DIRECT SHEAR TEST RESULTS

Remolded to Field Density





Displacement at 0.0025 inches per minute

TEST DATA:	#1	#2	#3
NORM. PRES. (KSF)	1.0	3.0	5.0
SHEAR STRESS (KSF):	0.410	1.086	1.573
H.DISPL. (IN)	0.25	0.147	0.187
PEAK			
SHEAR STRESS (KSF):			
H.DISPL. (IN)			

PROJECT:	SCVW Recycled Water Tanks
W.O:	8485.103.095
EXCAVATION:	WB2
DEPTH:	19 ft

Multi-cycle Residual

COHESION (KSF):	0.150
PHI (DEG):	16

INITIAL DRY DENSITY (PCF):	105
INITIAL MOISTURE (% OF DD):	29.0
EST.VOID RATIO, e (preshear):	0.59

TEST FILES:

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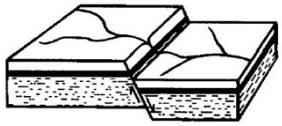
S:\GEOTEST\shears\9481.001\TEST282.DAT
S:\GEOTEST\shears\9481.001\TEST283.DAT



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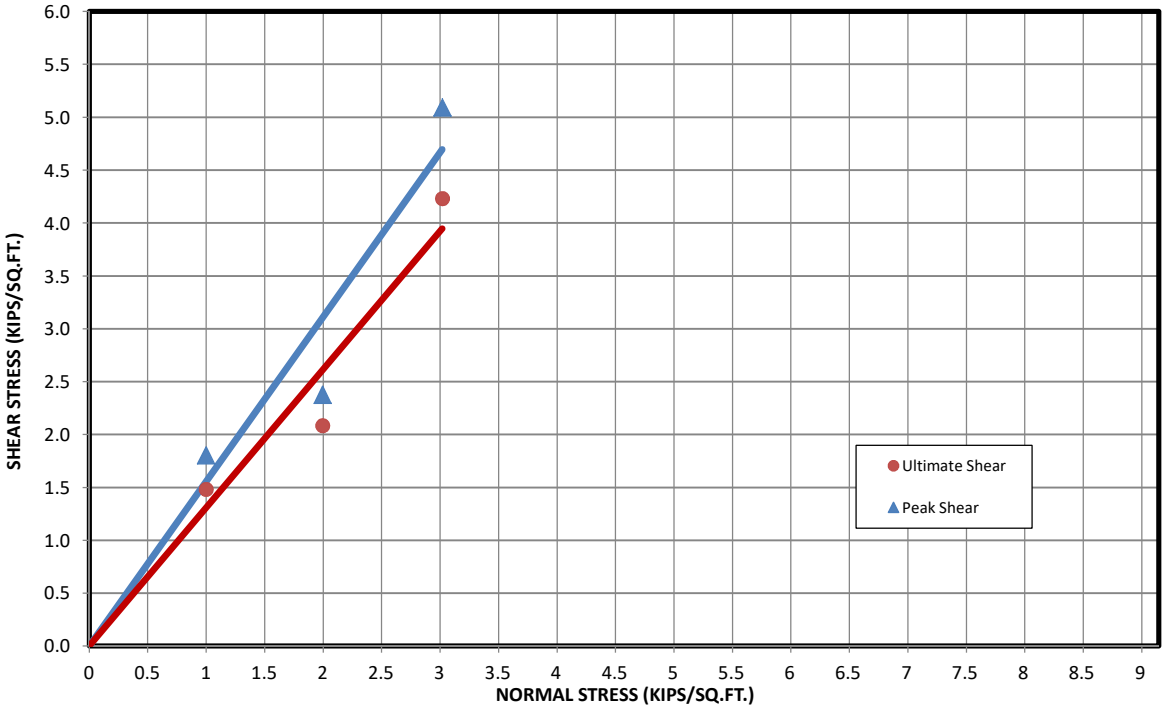
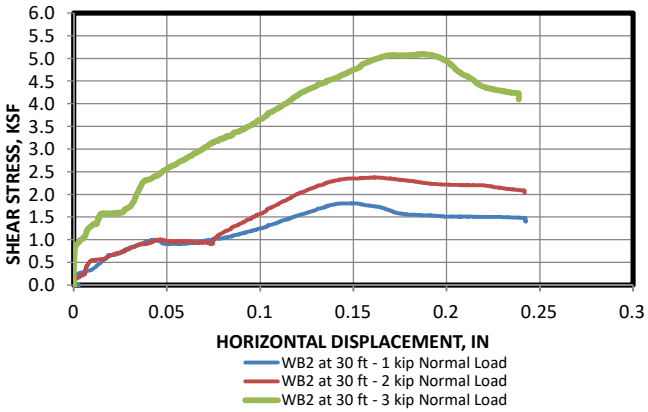
DIRECT SHEAR TEST RESULTS

Undisturbed Sample





TEST DATA:	#1	#2	#3
NORM. PRES. (KSF)	1.0	2.0	3.0
ULTIMATE			
SHEAR STRESS (KSF):	1.482	2.084	4.232
H.DISPL. (IN)	0.24	0.242	0.239
PEAK			
SHEAR STRESS (KSF):	1.804	2.376	5.093
H.DISPL. (IN)	0.15	0.16	0.19

PROJECT:	SCVW Recycled Water Tanks
W.O:	8485.103.095
EXCAVATION:	WB2
DEPTH:	30 ft

	ULTIMATE		PEAK
COHESION (KSF):	0.000		0.000
PHI (DEG):	53		57

INITIAL DRY DENSITY (PCF):	107
INITIAL MOISTURE (% OF DD):	25.5
EST.VOID RATIO, e (preshear):	0.56

TEST FILES:

S:\GEOTEST\shears\8485.103.094\TEST324.DAT
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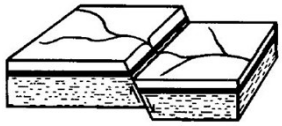

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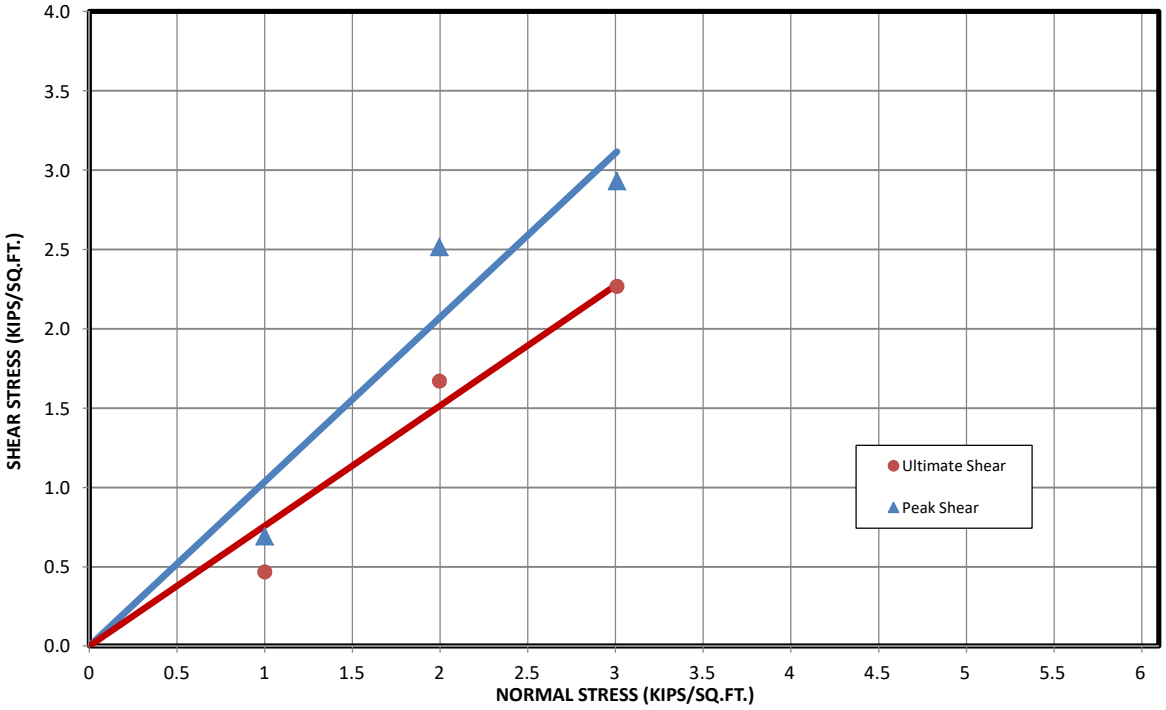
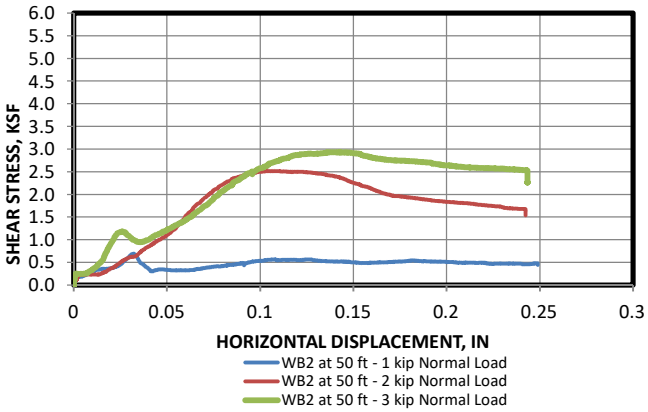
DIRECT SHEAR TEST RESULTS

Undisturbed Sample





TEST DATA:	#1	#2	#3
NORM. PRES. (KSF)	1.0	2.0	3.0
ULTIMATE			
SHEAR STRESS (KSF):	0.468	1.671	2.269
H.DISPL. (IN)	0.25	0.242	0.243
PEAK			
SHEAR STRESS (KSF):	0.692	2.516	2.932
H.DISPL. (IN)	0.03	0.10	0.14

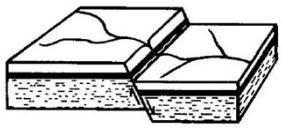
PROJECT:	SCVW Recycled Water Tanks
W.O:	8485.103.095
EXCAVATION:	WB2
DEPTH:	50 ft

	ULTIMATE		PEAK
COHESION (KSF):	0.000		0.000
PHI (DEG):	37		46

INITIAL DRY DENSITY (PCF):	111.5
INITIAL MOISTURE (% OF DD):	25.5
EST.VOID RATIO, e (preshear):	0.50

TEST FILES:

S:\GEOTEST\shears\8485.103.094\TEST327.DAT
S:\GEOTEST\shears\8485.103.094\TEST328.DAT
S:\GEOTEST\shears\8485.103.094\TEST329.DAT



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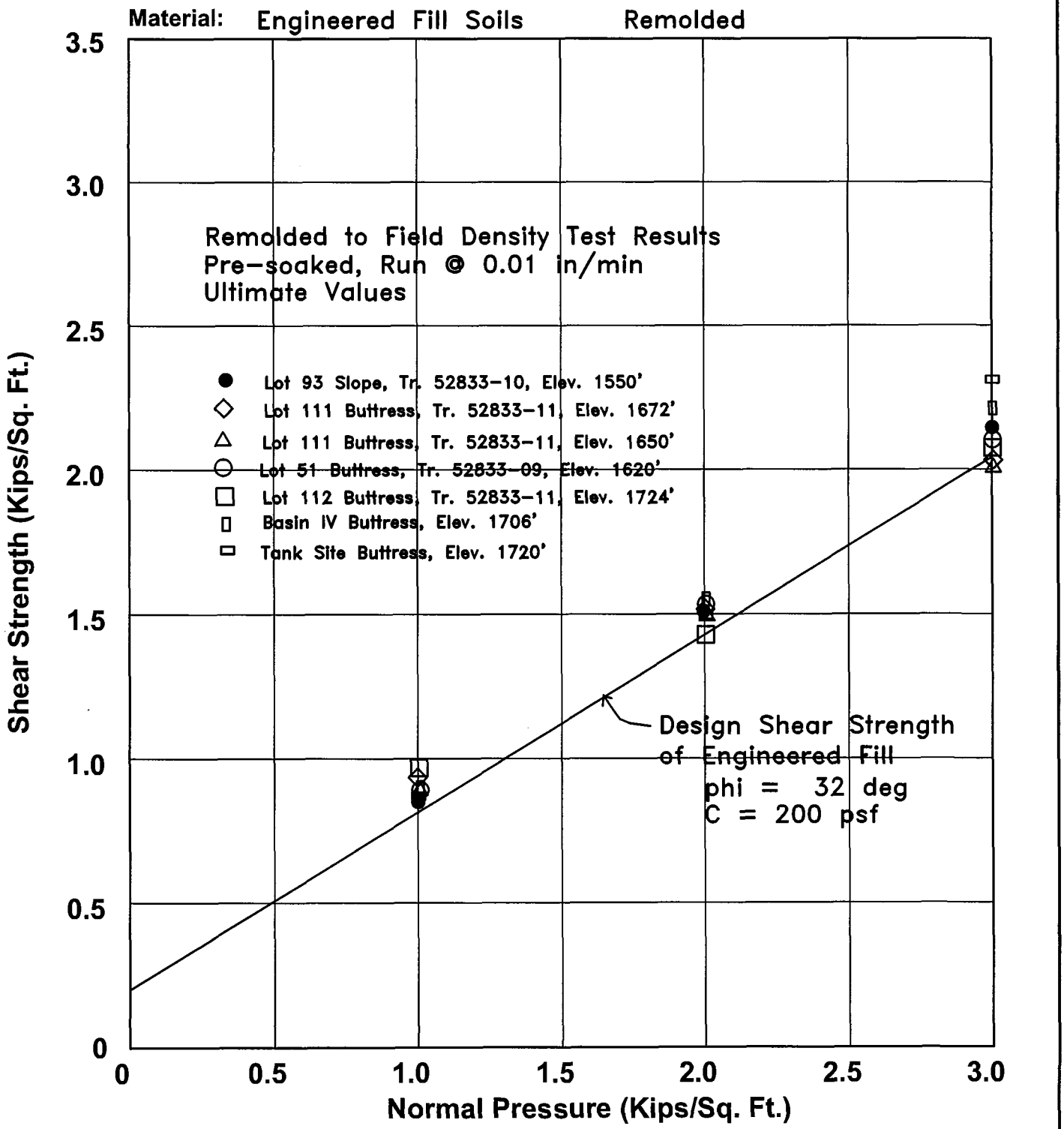
SHEAR TEST DIAGRAM



Project Fair Oaks Ranch, Ph.3B
Excavation Misc.
Depth Misc.

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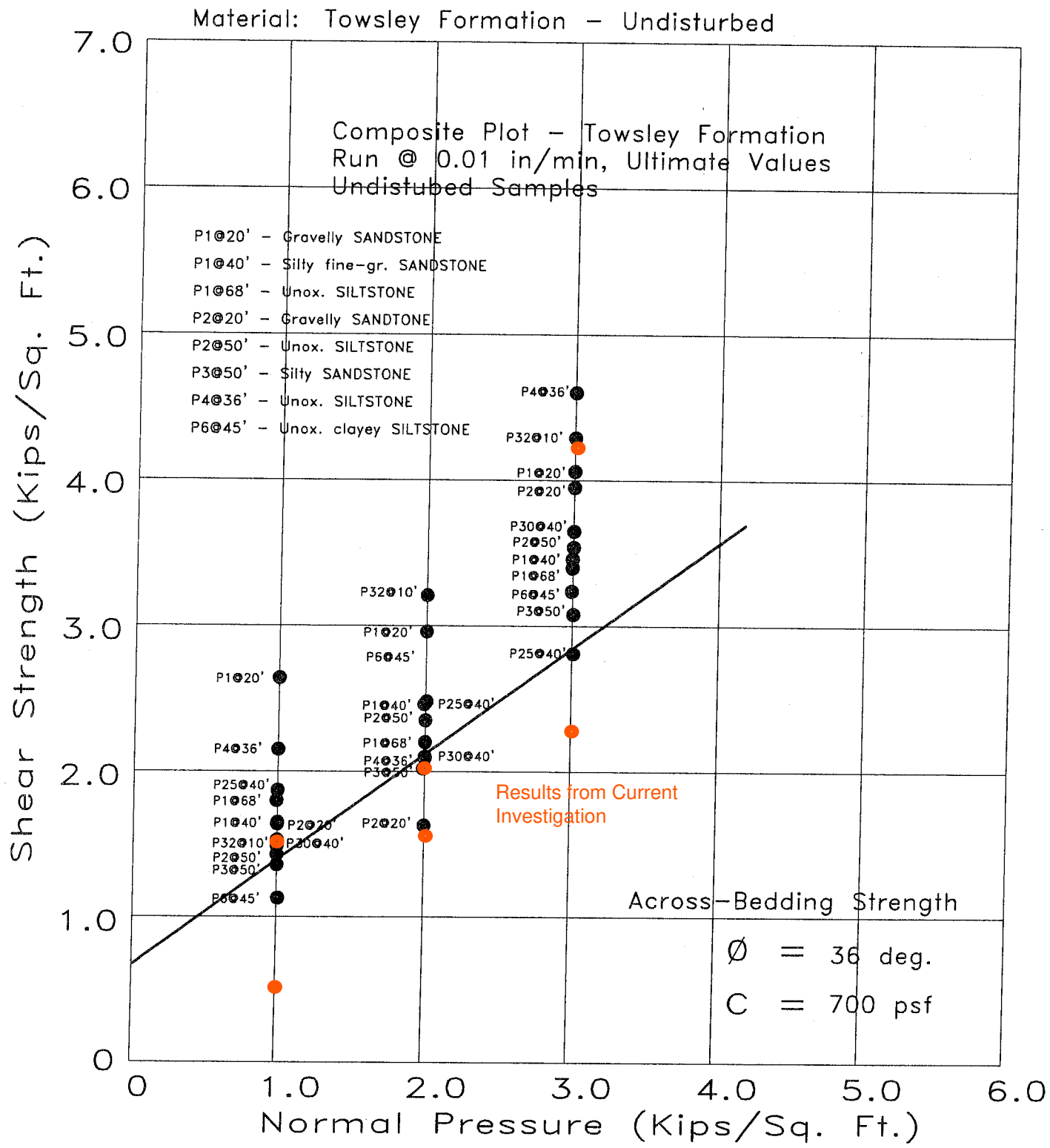
BY DS
DATE W.O. 8485.300

PLATE S1

SHEAR TEST DIAGRAM



Project Tr. 52833, Ph.3B
Excavation Misc.
Depth Misc.

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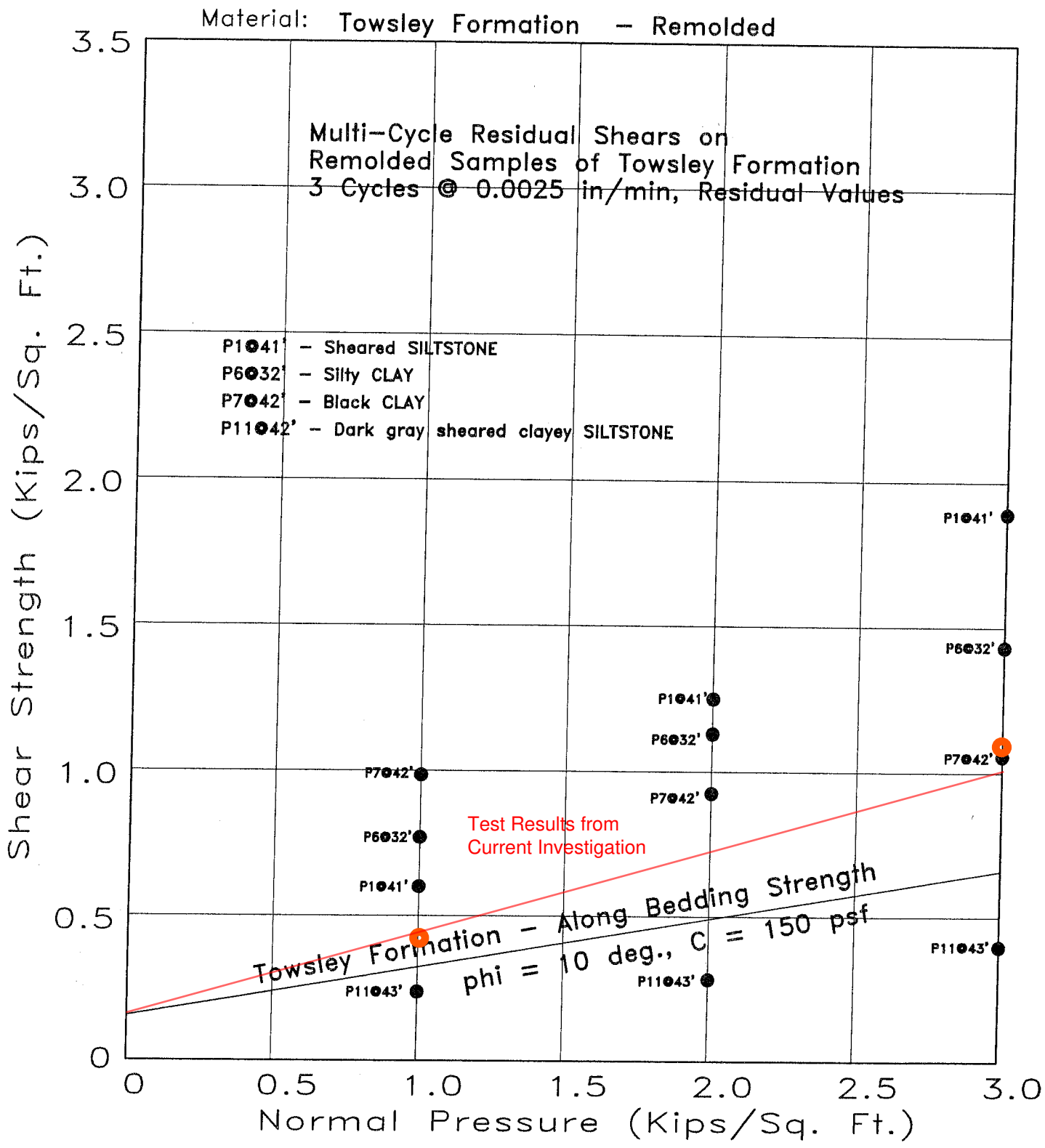
DATE _____ BY DS
SCALE _____ W.O. 8485-52833E

PLATE S.2

SCV Water

SHEAR TEST DIAGRAM

W.O. 8485



Project Tr. 52833, Ph.3B
Excavation Misc.
Depth Misc.

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PLATE S.5

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Table 1 - Laboratory Tests on Soil Samples

Geolabs
Fair Oaks
Your #8485.300, MJS&A #06-0435LAB
15-Mar-06

Sample ID			Water Tank @ ~~1917~~ 1817	Water Tank @ ~~1853~~ 1753	Lot 14, Tr 12
Resistivity		**Units**			
as-received		ohm-cm	25,000	6,300	3,800
saturated		ohm-cm	580	790	1,700
pH			8.2	7.6	8.1
Electrical Conductivity		mS/cm	0.71	1.66	0.22
Chemical Analyses					
Cations					
calcium	Ca^{2+}	mg/kg	32	1,379	24
magnesium	Mg^{2+}	mg/kg	ND	352	7
sodium	Na^{1+}	mg/kg	662	ND	176
Anions					
carbonate	CO_3^{2-}	mg/kg	56	ND	23
bicarbonate	HCO_3^{1-}	mg/kg	345	98	320
chloride	Cl^{1-}	mg/kg	50	20	ND
sulfate	SO_4^{2-}	mg/kg	1,032	4,566	166
Other Tests					
ammonium	NH_4^{1+}	mg/kg	na	na	na
nitrate	NO_3^{1-}	mg/kg	na	na	na
sulfide	S^{2-}	qual	na	na	na
Redox		mV	na	na	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

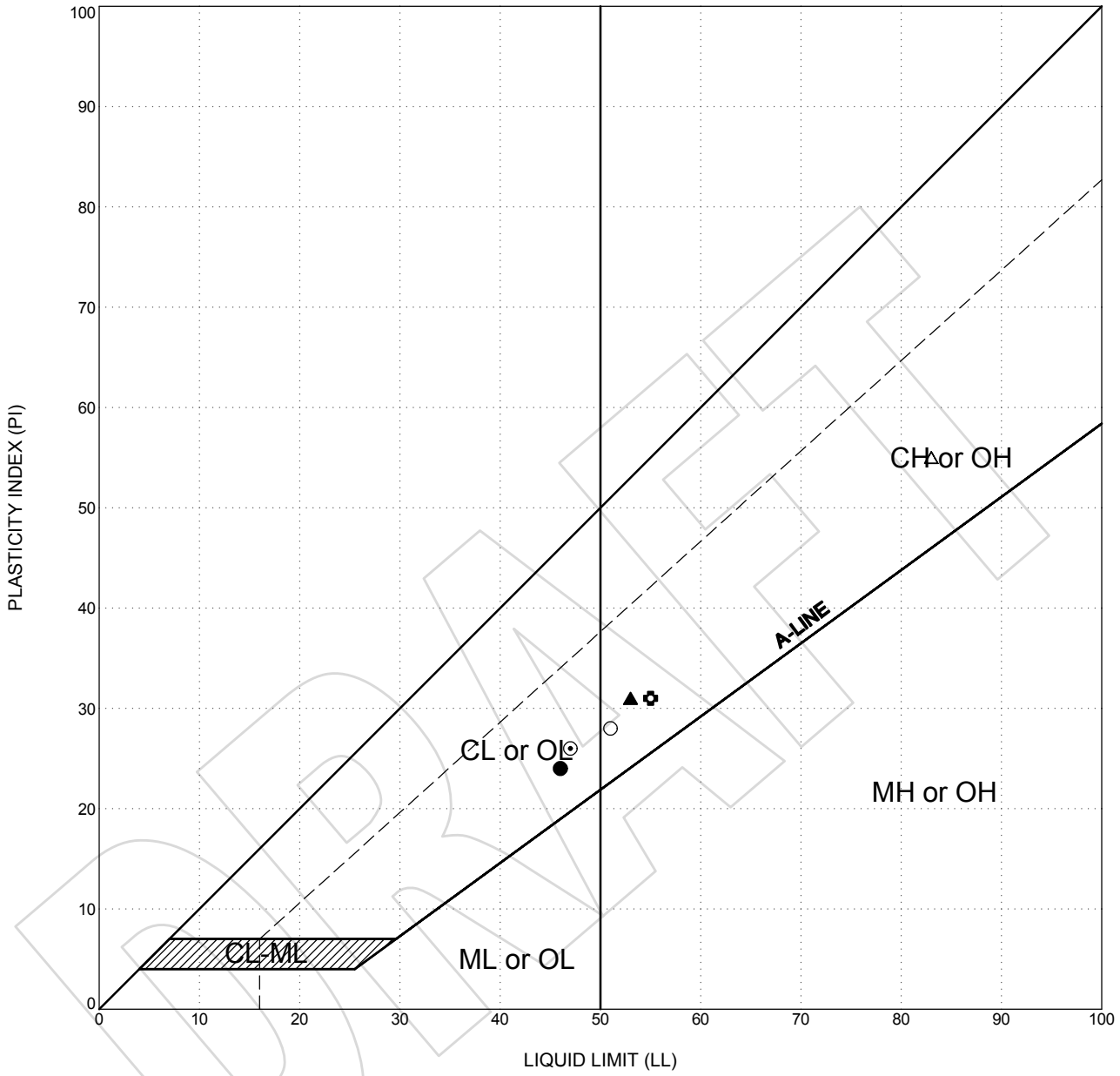
Fugro Labwork

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC %	FINES %	ATTERBERG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	Specific Gravity
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_U (Cell Prs.) ksf	R	pH	Cl	So_4 (ppm)				
BA-1	0.0		CLAYSTONE													832	7.60	31	6230.0		75.0		
BA-1	5.0		CLAYSTONE	129	110	17																	
BA-1	10.0		CLAYSTONE	128	105	22		51	28														
BA-1	15.0		CLAYSTONE	130	105	24																	
BA-1	20.0		CLAYSTONE	131	112	17		46	24			3.3	34										
BA-1	24.7		CLAYSTONE					83	55														
BA-1	25.0		CLAYSTONE	129	104	24																	
BA-1	30.0		CLAYSTONE				98	53	31						22.7(3.8)								
BA-1	35.0		CLAYSTONE	138	118	17																	
BA-1	40.0		CLAYSTONE	139	120	16																	
BA-1	50.0		Sandy SILTSTONE	135	119	13																	
BA-2	5.0		Silty SAND (SM)	137	129	6																	
BA-2	10.0		Well-graded SAND (SW)	132	122	9																	
BA-2	15.0		Well-graded SAND (SW)	140	127	10																	
BA-2	20.0		Silty SAND (SM)	124	113	10																	
BA-2	25.0		Lean CLAY (CL)	132	113	17		47	26			1.9	50										
BA-2	30.0		CLAYSTONE	137	115	19		55	31														
BA-2	35.0		CLAYSTONE												23.7(4.5)								
BA-2	40.0		CLAYSTONE	132	112	18																	

SUMMARY OF LABORATORY TEST RESULTS

Cherry Willow Tank
Santa Clarita, California

PLATE B-1



LEGEND	location	depth, ft	CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS LIQUID LIMIT(LL)	PLASTIC LIMIT(PL)	PLASTICITY INDEX (PI)
○	BA-1	10.0	CLAYSTONE	51	23	28
●	BA-1	20.0	CLAYSTONE	46	22	24
△	BA-1	24.7	CLAYSTONE	83	28	55
▲	BA-1	30.0	CLAYSTONE	53	22	31
⊙	BA-2	25.0	Lean CLAY (CL)	47	21	26
✿	BA-2	30.0	CLAYSTONE	55	24	31

PLASTICITY CHART
Cherry Willow Tank
Santa Clarita, California

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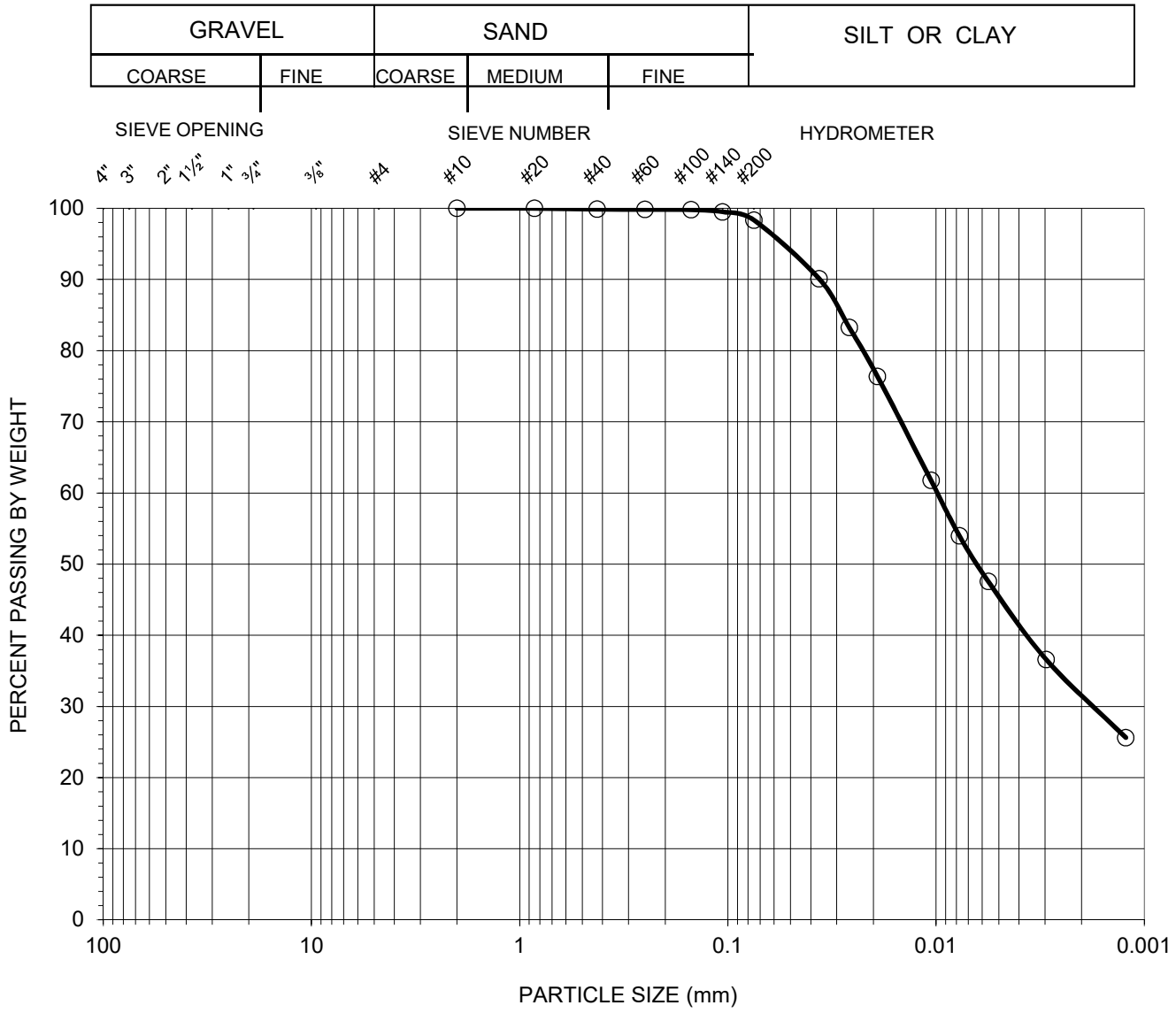
GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913 & D 7928

Client Name:	Fugro Consultants, Inc.	Tested by:	NG	Date:	06/20/18
Project Name:	Cherry Willow Tank	Computed by:	JP	Date:	06/20/18
Project Number:	04.61180021	Checked by:	AP	Date:	06/20/18



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	BA-1	S7	30	0	2	98	53:22:31	CH

PLATE B-3

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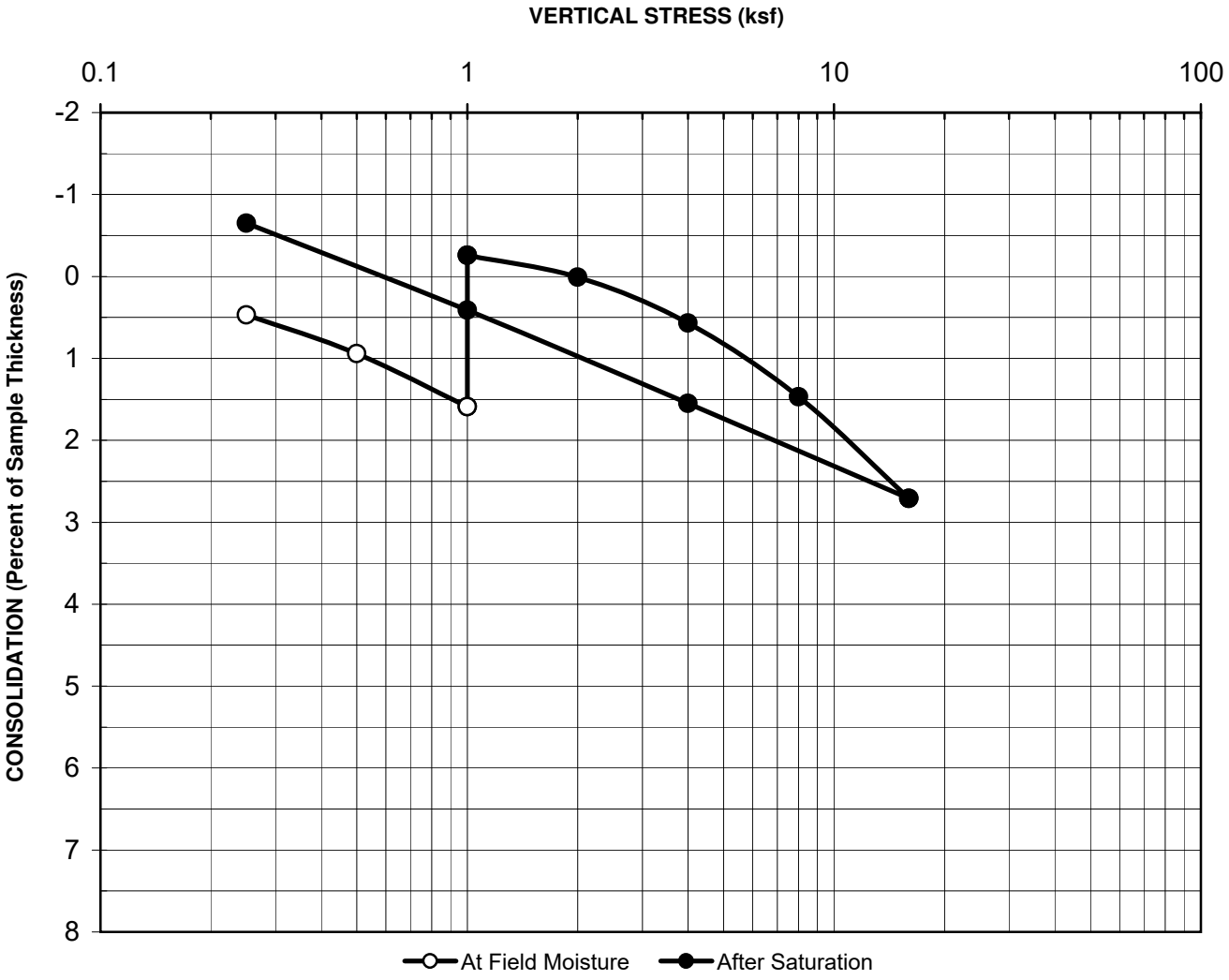

Boring No. :	BA-1	Initial Dry Unit Weight (pcf):	102.2
Sample No.:	S3	Initial Moisture Content (%):	22.1
Depth (feet):	10	Final Moisture Content (%):	27.4
Sample Type:	Mod Cal	Assumed Specific Gravity:	2.7
Soil Description:	Fat Clay	Initial Void Ratio:	0.65
Remarks:	Swell= 1.85% upon inundation		

CONSOLIDATION CURVE
ASTM D 2435

Project Name:	Cherry Willow Tank
Project No.:	04.61180021
Date:	6/20/2018
AP No:	18-0622 **Figure No:** 1

PLATE B-4

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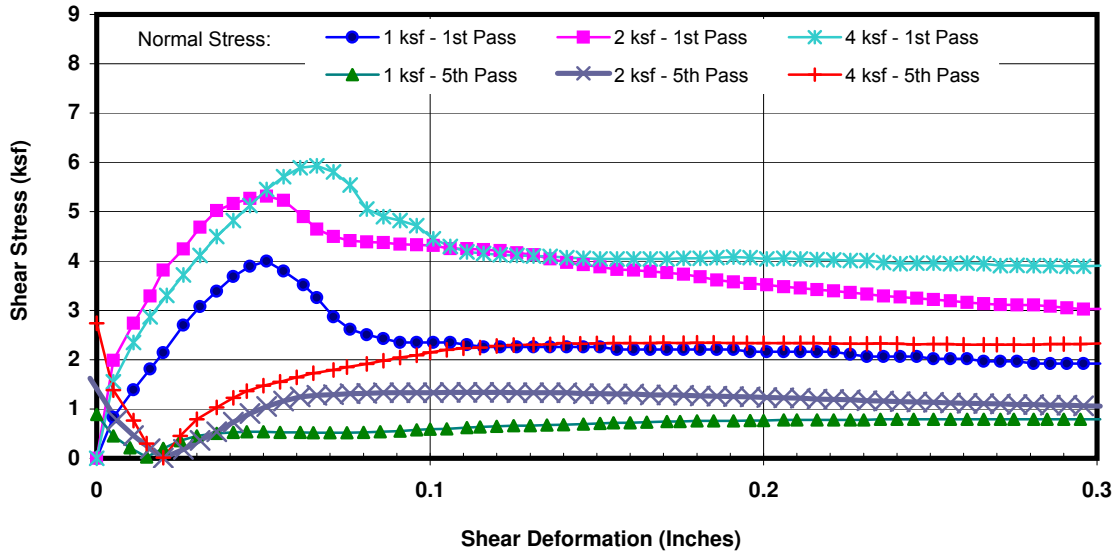
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	Cherry Willow Tank		**Tested By:**	LS	**Date:** 06/12/18
Project No.:	04.61180021		**Computed By:**	JP	**Date:** 06/14/18
Boring No.:	BA-1		**Checked by:**	AP	**Date:** 06/14/18
Sample No.:	S5	**Depth (ft):** 20			
Sample Type:	Mod. Cal.				
Soil Description:	Claystone				
Test Condition:	Inundated	**Shear Type:** 5-Pass Residual			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear (1st Pass) (ksf)	Residual Shear (5th Pass) (ksf)
128.9	109.9	17.2	19.9	87	101	1	3.997	0.516
						2	5.317	1.000
						4	5.928	2.000



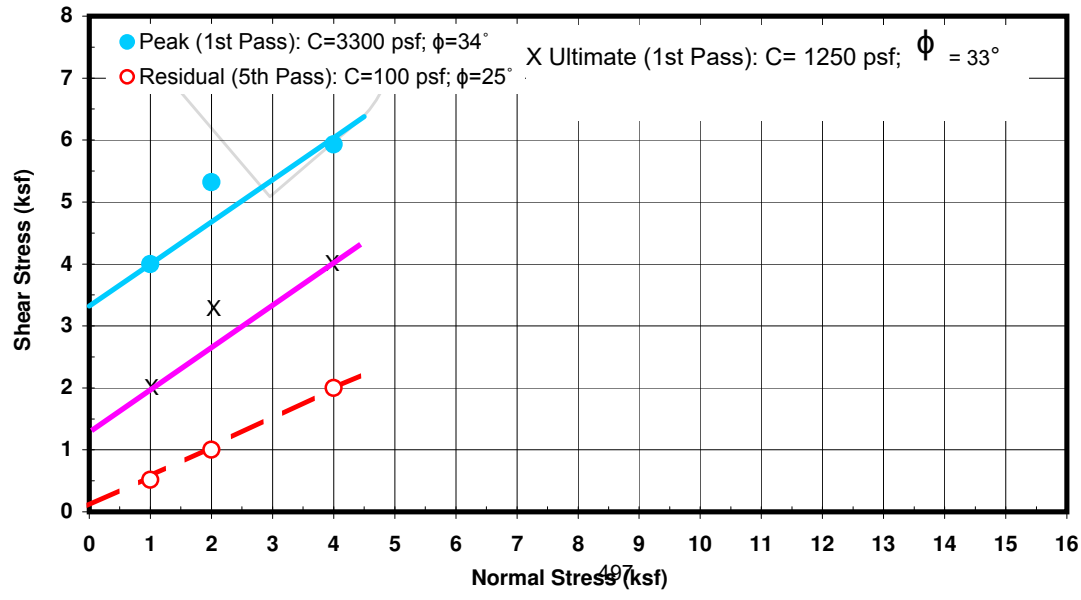


PLATE 5a

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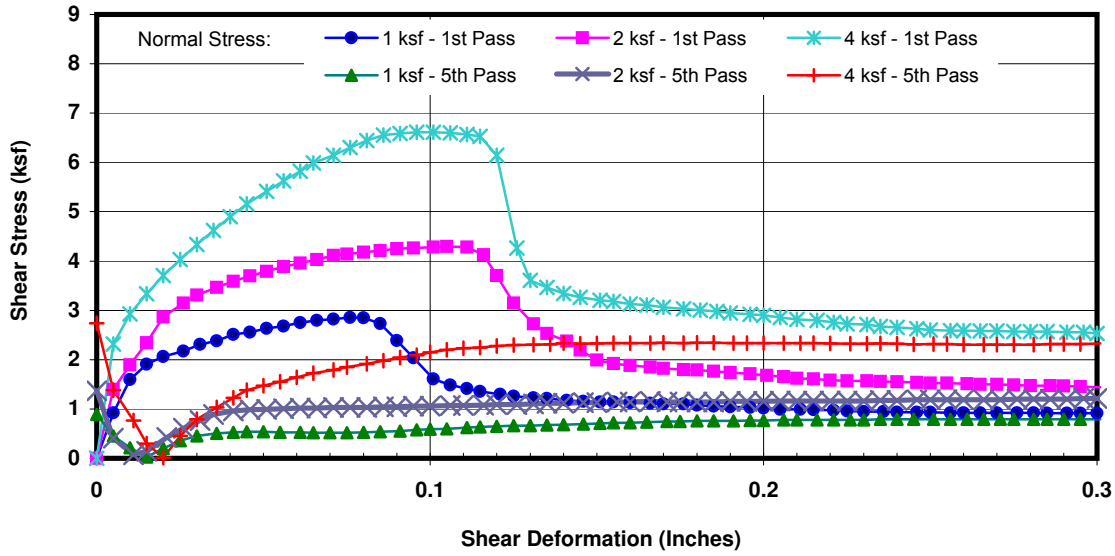
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	Cherry Willow Tank		**Tested By:**	LS	**Date:** 06/13/18
Project No.:	04.61180021		**Computed By:**	JP	**Date:** 06/14/18
Boring No.:	BA-2		**Checked by:**	AP	**Date:** 06/14/18
Sample No.:	S7	**Depth (ft):** 25			
Sample Type:	Mod. Cal.				
Soil Description:	Claystone				
Test Condition:	Inundated	**Shear Type:** 5-Pass Residual			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear (1st Pass) (ksf)	Residual Shear (5th Pass) (ksf)
130.8	111.4	17.4	18.9	91	100	1	2.858	0.792
						2	4.296	1.212
						4	6.612	2.328



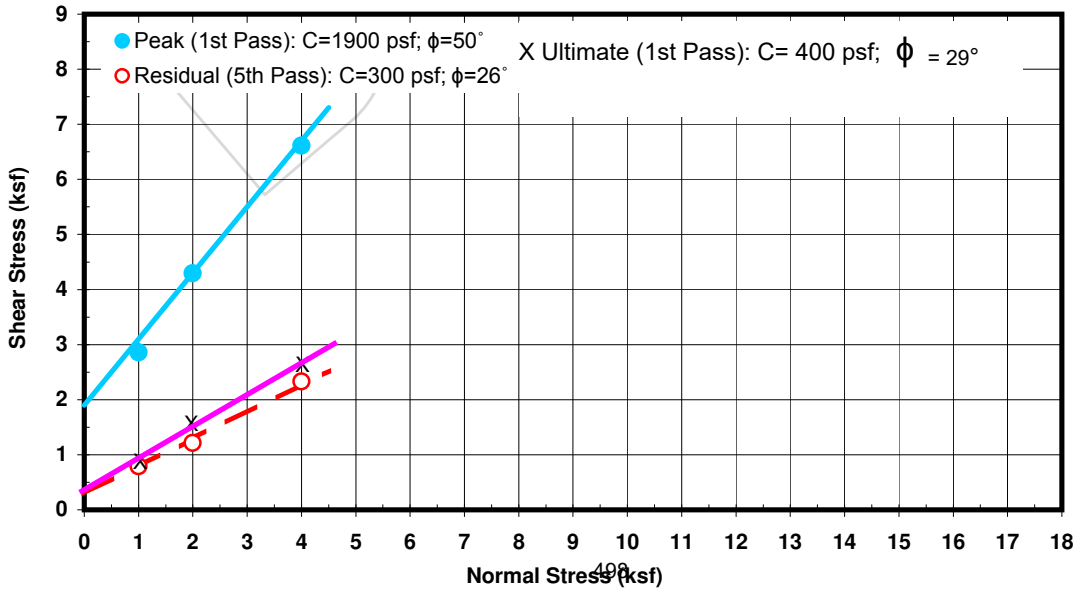


PLATE B-5b

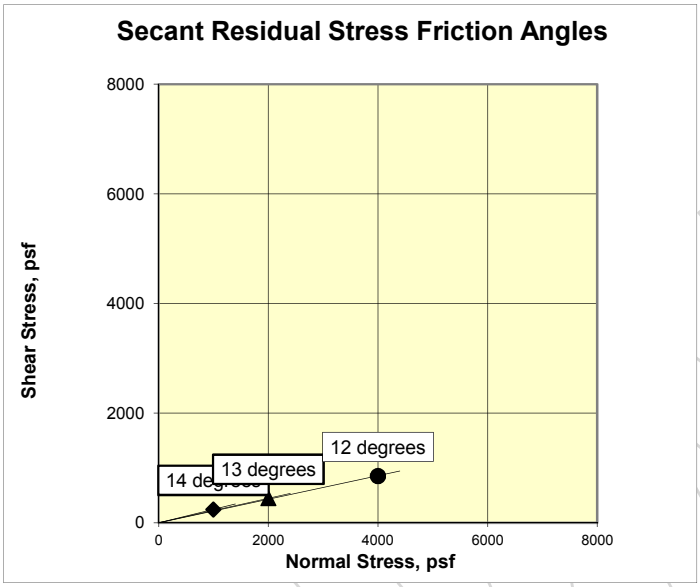
Drained Residual Torsional Shear Strength (ASTM D6467)

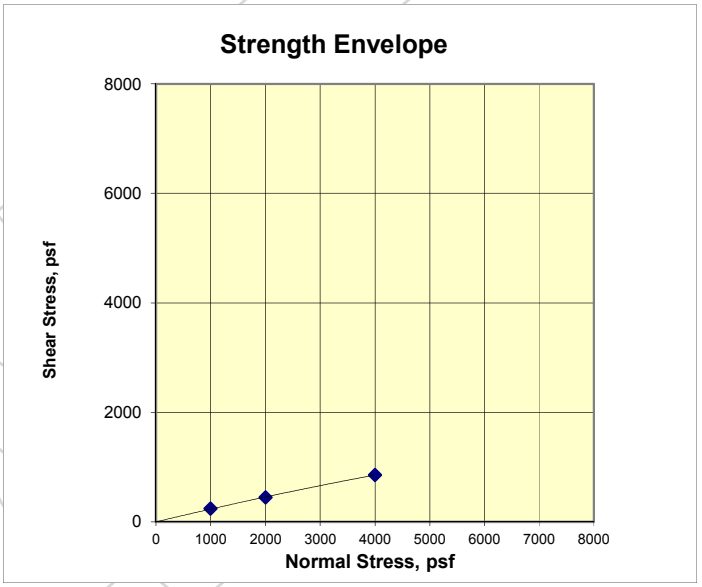
CTL Job No.:	446-299	**Boring:**	BA1	**Date:**	6/21/2018	**Clay, %:**	
Client:	Fugro Consultants	**Sample:**	S13	**By:**	PJ	**LL:**	
Project Name:	Cherry Willow Tank	**Depth (ft):**	18-19	**Checked:**	DC	**PL:**	
Project Number:	04.61180021	**Test Type:**	Fully Softened Residual				

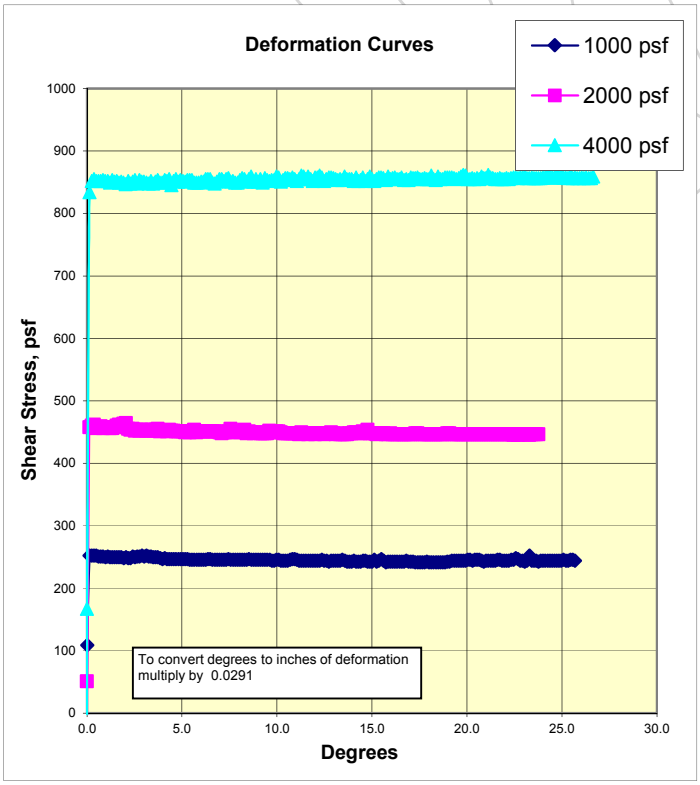
Soil Type: Gray CLAY

Normal Stress, psf:	1000	2000	4000
Secant Phi, deg.:	14	13	12

Remarks: A small friction correction was applied to each point.







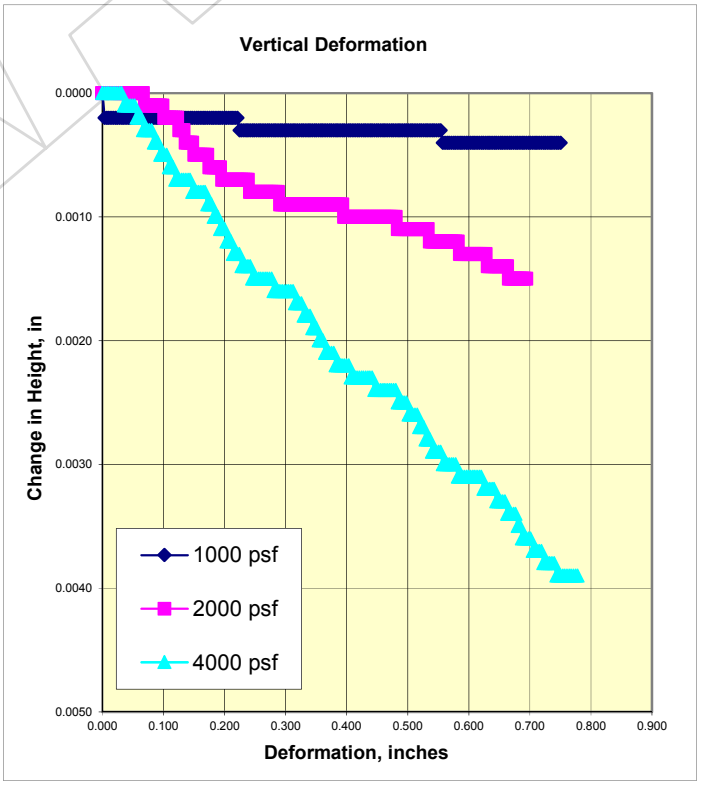


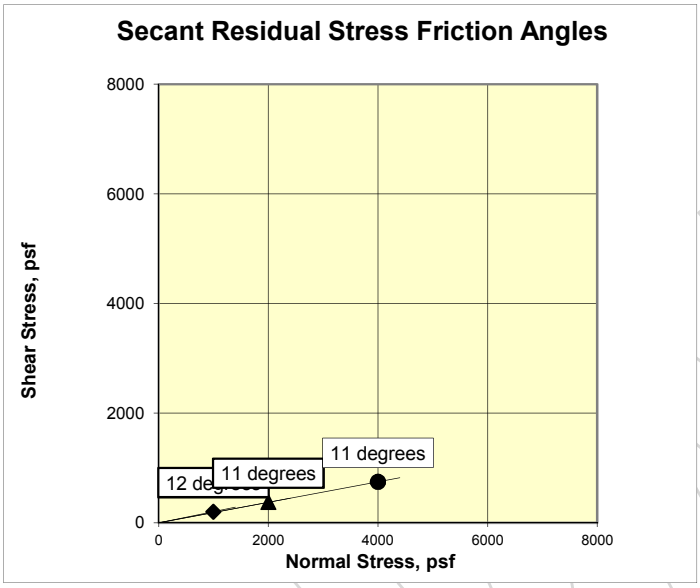
PLATE B-6a

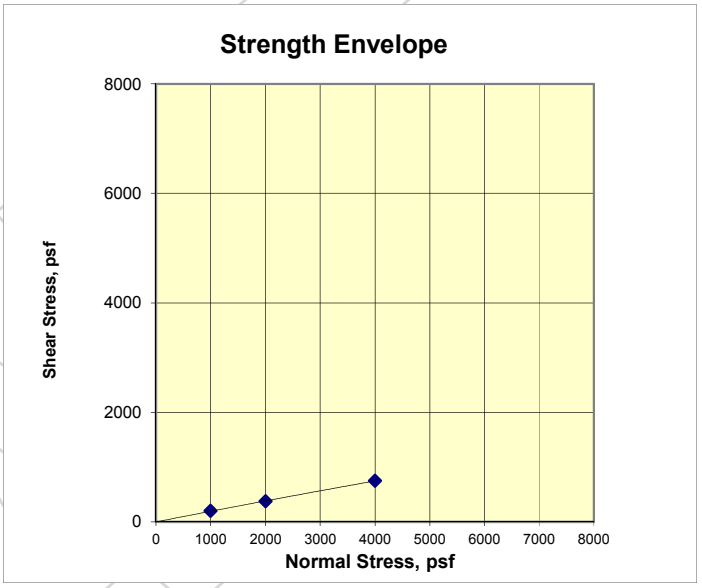
Drained Residual Torsional Shear Strength (ASTM D6467)

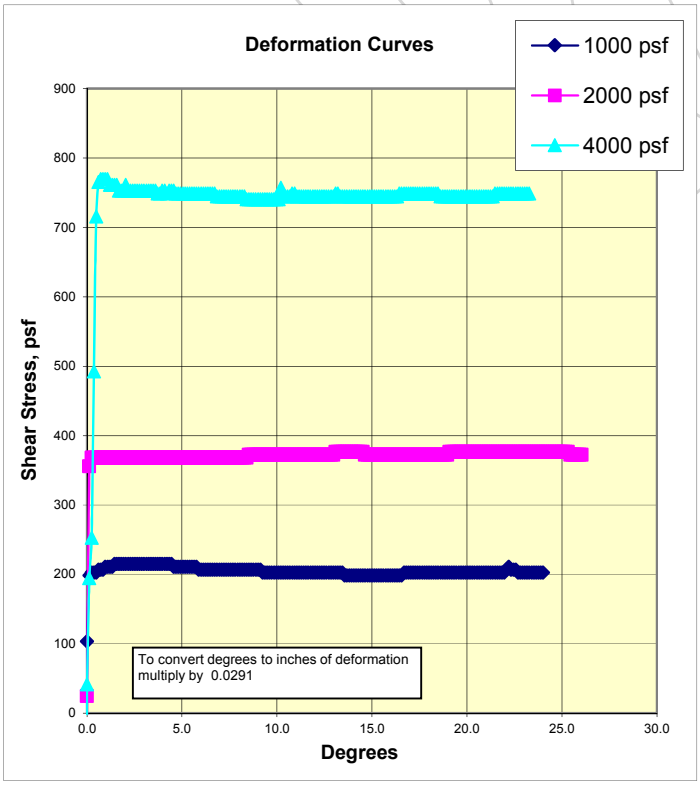
CTL Job No.:	446-299	**Boring:**	BA2	**Date:**	6/20/2018	**Clay, %:**	
Client:	Fugro Consultants	**Sample:**	S13	**By:**	PJ	**LL:**	
Project Name:	Cherry Willow Tank	**Depth (ft):**	17.6	**Checked:**	DC	**PL:**	
Project Number:	04.61180021	**Test Type:**	Fully Softened Residual				
Soil Type:	Olive Brown CLAY w/ Sand						

Normal Stress, psf:	1000	2000	4000
Secant Phi, deg.:	12	11	11

Remarks: A small friction correction was applied to each point.







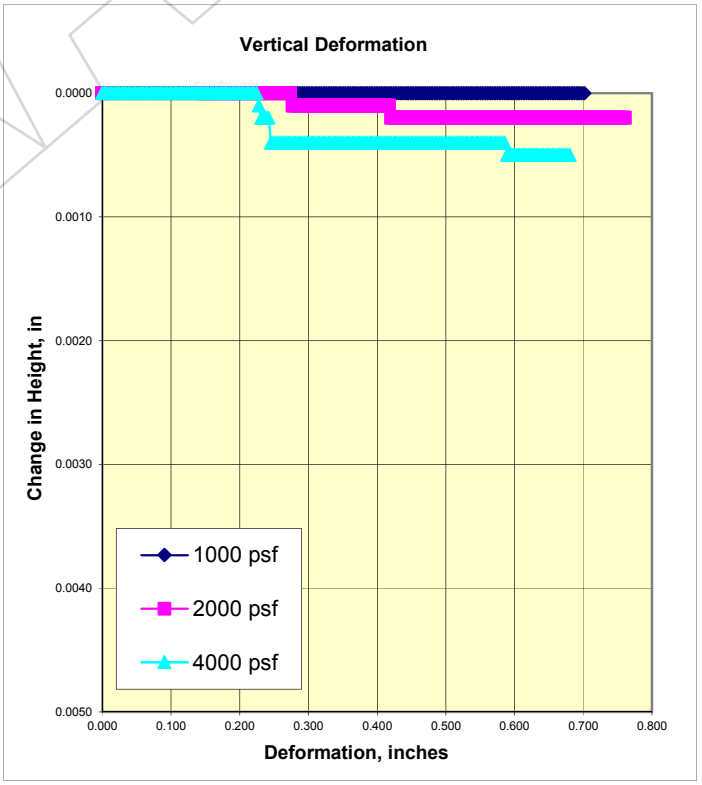


PLATE B-6b

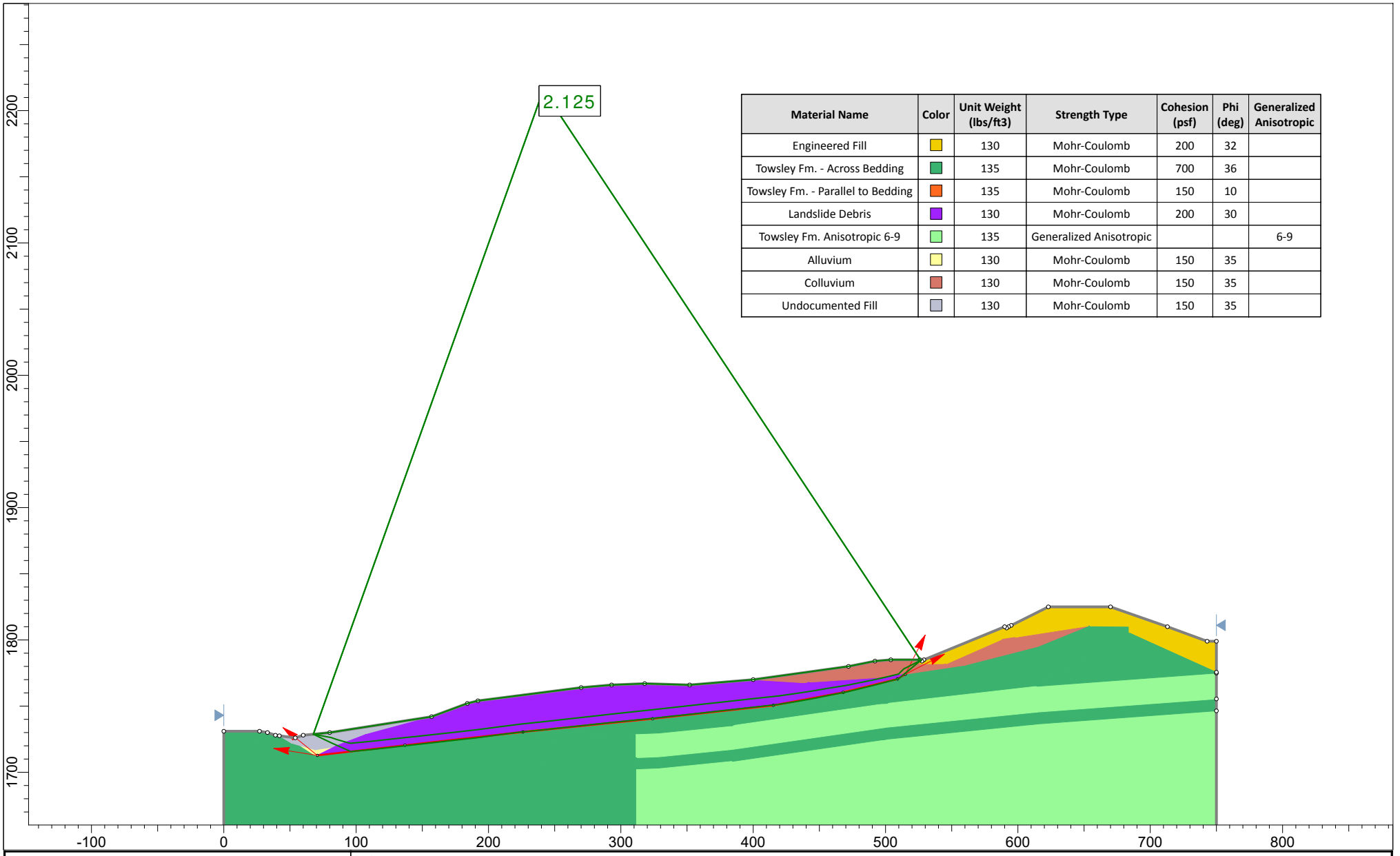
APPENDIX C
Slope Stability Calculations

October 30, 2020
W.O. 8485

CROSS SECTION	STATIC FS	PSEUDO-STATIC FS (for k = 0.15)	TEMPORARY FS	DESCRIPTION	FILE NAME	PLATE NUMBERS
WT13-WT13'	2.12	0.98	N/A	BASE OF SLIDE	WT13.slmd	C.4 - C.23
	2.24	1.28	N/A	DEEP BEDROCK		C.24 - C.43
	2.27	1.59	N/A	FILL SLOPE		C.44 - C.61
WT14-WT14'	1.67	0.82	N/A	BASE OF SLIDE	WT14.slmd	C.62 - C.82
	2.58	1.22	N/A	DEEP BEDROCK		C.83 - C.103
WT15-WT15'	1.30	0.77	N/A	BASE OF SLIDE	WT15.slmd	C.104 - C.123
	2.08	1.25	N/A	DEEP BEDROCK		C.124 - C.143
R1-R1'	N/A	N/A	1.41	3/4:1 BACKCUT	R1.slmd	C.144 - C.151
R3-R3'	N/A	N/A	1.51	1:1 BACKCUT	R3.slmd	C.152 - C.158

Boring	Depth Interval (ft)	Shear Strength	Dip Range (deg)	Rationale
WB1B	0 to 16	Colluvium	all	colluvium exposed
	16 to 20	Landslide Debris	all	postulated landslide exposed
	20 to 21	Towsley Fm. - Parallel to Bedding	all	clay shear at 21 ft
	21 to 36	Towsley Fm. - Across Bedding	all	favorable bedding orientation
	36 to 54	Towsley Fm. - Parallel to Bedding	6 to 9	unfavorable bedding orientation
	54 to 63	Towsley Fm. - Across Bedding	all	coarse-grained
	63 +	Towsley Fm. - Parallel to Bedding	6 to 9	material unexplored
WB2	0 to 17.5	Landslide Debris	all	postulated landslide exposed
	17.5 to 18.5	Towsley Fm. - Parallel to Bedding	all	base of postulated landslide
	18.5 to 43	Towsley Fm. - Across Bedding	all	favorable bedding orientation
	43 to 60	Towsley Fm. - Parallel to Bedding	6 to 9	unfavorable bedding orientation
	60 to 69	Towsley Fm. - Across Bedding	all	projection of coarse-grained material from WB4
	69 +	Towsley Fm. - Parallel to Bedding	6 to 9	material unexplored
WB3	0 to 4	Engineered Fill	all	engineered fill exposed
	4 to 16	Colluvium	all	colluvium exposed
	16 to 46	Towsley Fm. - Across Bedding	all	favorable bedding orientation
	46 to 65	Towsley Fm. - Parallel to Bedding	6 to 9	unfavorable bedding orientation
	65 to 74	Towsley Fm. - Across Bedding	all	coarse-grained
	74 +	Towsley Fm. - Parallel to Bedding	6 to 9	material unexplored
WB4	0 to 4.5	Engineered Fill	all	engineered fill exposed
	4.5 to 19	Landslide Debris	all	postulated landslide exposed
	19 to 20	Towsley Fm. - Parallel to Bedding	all	clay shears at 18.9 ft and 19.3 ft
	20 to 44	Towsley Fm. - Across Bedding	all	favorable bedding orientation in WB1B, WB2, and WB5
	44 to 61	Towsley Fm. - Parallel to Bedding	6 to 9	unfavorable bedding orientation
	61 to 65	Towsley Fm. - Across Bedding	all	coarse-grained
	65 to 70	Towsley Fm. - Across Bedding	all	projection of coarse-grained material from WB1B
	70 +	Towsley Fm. - Parallel to Bedding	6 to 9	material unexplored
WB5	0 to 5	Engineered Fill	all	engineered fill exposed
	5 to 30 +	Towsley Fm. - Across Bedding	all	favorable bedding orientation

Boring	Depth Interval (ft)	Shear Strength	Dip Range (deg)	Rationale
P8	0 to 29	Landslide Debris	all	landslide debris exposed
	29 to 30	Towsley Fm. - Parallel to Bedding	all	base of landslide
	30 to 47 +	Towsley Fm. - Across Bedding	all	favorable bedding orientation
P38	0 to 8	Engineered Fill	all	fill
	8 to 24	Towsley Fm. - Across Bedding	all	coarse-grained
	24 to 41	Towsley Fm. - Across Bedding	all	favorable bedding orientation
	41 to 57	Towsley Fm. - Parallel to Bedding	6 to 9	unfavorable bedding orientation
	57 to 60	Towsley Fm. - Parallel to Bedding	6 to 9	projection from WB3
	60 to 69	Towsley Fm. - Across Bedding	all	projection from WB3
	69 +	Towsley Fm. - Parallel to Bedding	6 to 9	material unexplored



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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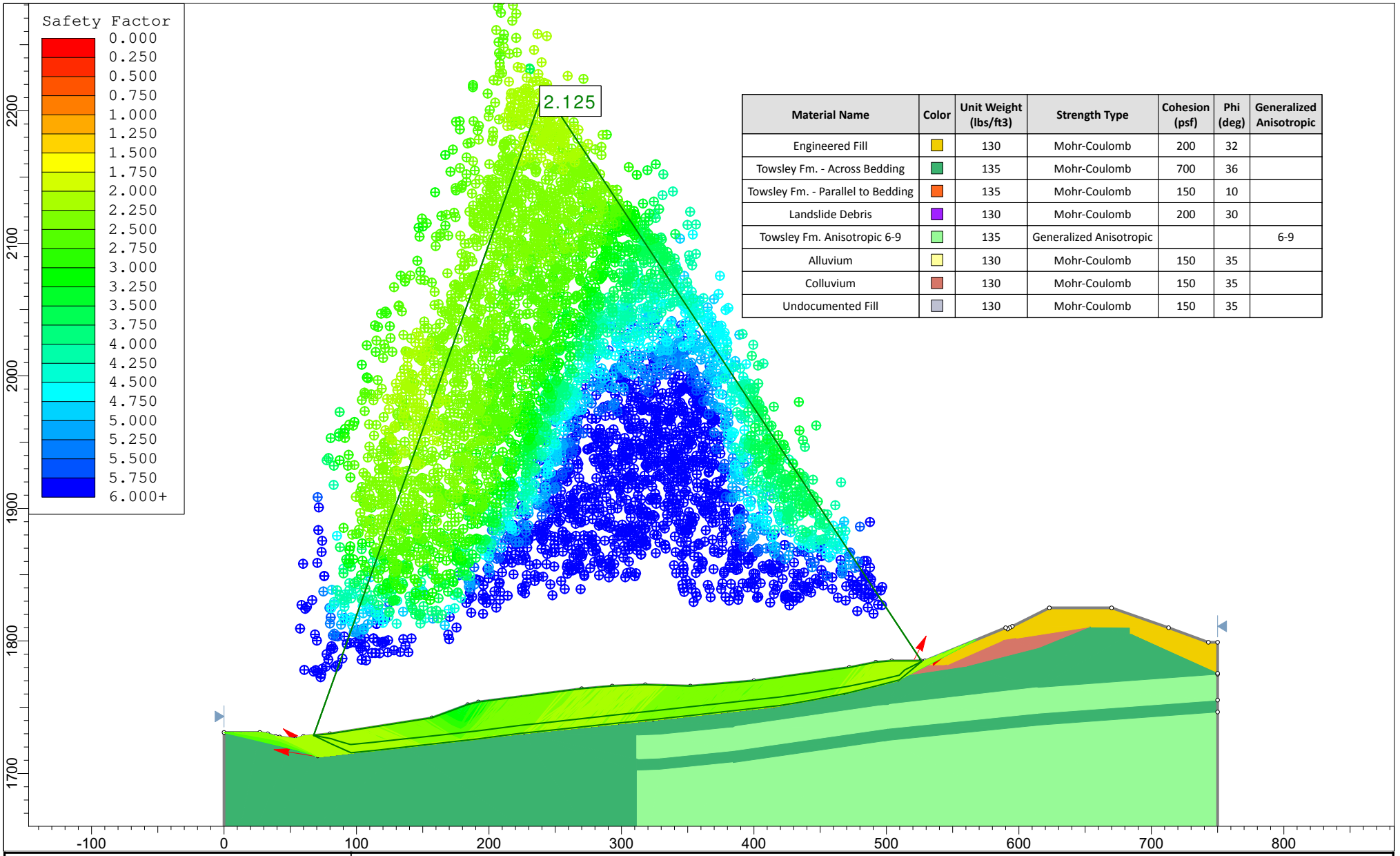
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Base of slide - Static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	505		File Name WT13.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Base of slide - Static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	506		File Name WT13.slmd

Slide Analysis Information

WT13

Project Summary

File Name:	WT13.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:05.695s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT13-WT13' - Base of slide - Static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	27

Right Projection Angle (End Angle) [°]:	63
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Colluvium	Undocumented Fill
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130	130
Cohesion [psf]	200	700	150	200		150	150	150
Friction Angle [°]	32	36	10	30		35	35	35
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	2.124830
Axis Location:	241.423, 2215.637
Left Slip Surface Endpoint:	67.705, 1728.771
Right Slip Surface Endpoint:	526.685, 1784.543
Resisting Moment:	1.57179e+08 lb-ft
Driving Moment:	7.39726e+07 lb-ft
Resisting Horizontal Force:	314619 lb
Driving Horizontal Force:	148068 lb
Total Slice Area:	9882 ft2
Surface Horizontal Width:	458.98 ft
Surface Average Height:	21.5304 ft

Global Minimum Coordinates

Method: spencer

X	Y
67.7053	1728.77
81.0189	1722.36
95.9612	1715.65
113.033	1717.36
129.638	1719.19
144.84	1720.89
160.056	1722.6
175.324	1724.31
190.745	1726.04
206.165	1728.08

X	Y
223.044	1730.27
240.235	1732.04
257.425	1733.8
274.616	1735.63
291.807	1737.46
308.998	1739.23
326.188	1740.99
338.179	1742.3
350.171	1743.62
362.162	1744.94
373.918	1746.23
396.474	1748.72
419.03	1751.21
432.147	1753.32
445.227	1755.7
457.884	1758.22
470.532	1760.66
490.155	1765.52
509.777	1770.54
526.685	1784.54

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4901
Number of Invalid Surfaces: 108

Error Codes:

Error Code -108 reported for 50 surfaces
Error Code -111 reported for 58 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.12483**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	13.3136	6706.76	-25.7242	Undocumented Fill	150	35	309.089	656.762	723.734	0	723.734	574.819	574.819
2	4.66452	5586.38	-24.1661	Undocumented Fill	150	35	601.305	1277.67	1610.47	0	1610.47	1340.66	1340.66
3	9.37327	16396.3	-24.1661	Landslide Debris	200	30	705.859	1499.83	2251.38	0	2251.38	1934.65	1934.65
4	0.904587	1948.86	-24.1661	Towsley Fm. - Parallel to Bedding	150	10	271.675	577.264	2423.13	0	2423.13	2301.23	2301.23
5	8.53582	18972.7	5.70032	Towsley Fm. - Parallel to Bedding	150	10	253.247	538.106	2201.06	0	2201.06	2226.34	2226.34
6	8.53582	19509.9	5.70032	Towsley Fm. - Parallel to Bedding	150	10	258.417	549.092	2263.37	0	2263.37	2289.16	2289.16
7	8.30276	19442.3	6.31349	Towsley Fm. - Parallel to Bedding	150	10	262.563	557.902	2313.33	0	2313.33	2342.38	2342.38
8	8.30276	19849.9	6.31349	Towsley Fm. - Parallel to Bedding	150	10	266.588	566.454	2361.83	0	2361.83	2391.33	2391.33
9	7.60061	18523.4	6.38864	Towsley Fm. - Parallel to Bedding	150	10	270.329	574.403	2406.91	0	2406.91	2437.18	2437.18
10	7.60061	18853.7	6.38864	Towsley Fm. - Parallel to Bedding	150	10	273.892	581.974	2449.85	0	2449.85	2480.52	2480.52
11	7.608	19202.2	6.38884	Towsley Fm. - Parallel to Bedding	150	10	277.448	589.53	2492.7	0	2492.7	2523.77	2523.77
12	7.608	19662.6	6.38884	Towsley Fm. - Parallel to Bedding	150	10	282.408	600.07	2552.48	0	2552.48	2584.1	2584.1

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
13	7.63422	21395	6.38773	Towsley Fm. - Parallel to Bedding	150	10	300.282	638.049	2767.87	0	2767.87	2801.48	2801.48
14	7.63422	23353.1	6.38773	Towsley Fm. - Parallel to Bedding	150	10	321.305	682.719	3021.2	0	3021.2	3057.17	3057.17
15	11.6418	39310.6	6.40215	Towsley Fm. - Parallel to Bedding	150	10	347.33	738.018	3334.82	0	3334.82	3373.79	3373.79
16	3.77891	13473.3	6.40215	Towsley Fm. - Parallel to Bedding	150	10	362.797	770.883	3521.2	0	3521.2	3561.91	3561.91
17	7.71034	27873	7.54256	Towsley Fm. - Parallel to Bedding	150	10	365.622	776.885	3555.25	0	3555.25	3603.66	3603.66
18	7.71034	27847	7.54256	Towsley Fm. - Parallel to Bedding	150	10	365.347	776.301	3551.93	0	3551.93	3600.3	3600.3
19	8.43929	30448.9	7.38765	Towsley Fm. - Parallel to Bedding	150	10	365.217	776.024	3550.36	0	3550.36	3597.71	3597.71
20	8.43929	30429.2	7.38765	Towsley Fm. - Parallel to Bedding	150	10	365.027	775.621	3548.07	0	3548.07	3595.39	3595.39
21	8.59536	31104.9	5.86961	Towsley Fm. - Parallel to Bedding	150	10	367.756	781.419	3580.95	0	3580.95	3618.76	3618.76
22	8.59536	31348.8	5.86961	Towsley Fm. - Parallel to Bedding	150	10	370.086	786.37	3609.03	0	3609.03	3647.07	3647.07
23	8.59536	31592.4	5.87119	Towsley Fm. - Parallel to Bedding	150	10	372.41	791.309	3637.05	0	3637.05	3675.34	3675.34
24	8.59536	31835.8	5.87119	Towsley Fm. - Parallel to Bedding	150	10	374.736	796.25	3665.07	0	3665.07	3703.6	3703.6
25	8.59535	32061	6.07809	Towsley Fm. - Parallel to Bedding	150	10	376.655	800.327	3688.19	0	3688.19	3728.3	3728.3
26	8.59535	32210.8	6.07809	Towsley Fm. - Parallel to Bedding	150	10	378.085	803.367	3705.43	0	3705.43	3745.68	3745.68
27	8.59535	32064.1	6.07809	Towsley Fm. - Parallel to Bedding	150	10	376.685	800.391	3688.55	0	3688.55	3728.66	3728.66
28	8.59535	31874.9	6.07809	Towsley Fm. - Parallel to Bedding	150	10	374.879	796.554	3666.79	0	3666.79	3706.7	3706.7
29	8.59536	31538.4	5.85275	Towsley Fm. - Parallel to Bedding	150	10	371.915	790.256	3631.07	0	3631.07	3669.19	3669.19
30	8.59536	30942.2	5.85275	Towsley Fm. - Parallel to Bedding	150	10	366.22	778.155	3562.44	0	3562.44	3599.98	3599.98
31	8.59536	30341.7	5.85275	Towsley Fm. - Parallel to Bedding	150	10	360.483	765.965	3493.31	0	3493.31	3530.26	3530.26
32	8.59536	29438.8	5.85275	Towsley Fm. - Parallel to Bedding	150	10	351.857	747.637	3389.37	0	3389.37	3425.44	3425.44
33	11.9911	38887	6.2612	Towsley Fm. - Parallel to Bedding	150	10	336.511	715.028	3204.43	0	3204.43	3241.35	3241.35
34	11.9911	36286.6	6.2612	Towsley Fm. - Parallel to Bedding	150	10	318.728	677.243	2990.15	0	2990.15	3025.12	3025.12
35	11.9911	34443	6.2612	Towsley Fm. - Parallel to Bedding	150	10	306.12	650.454	2838.21	0	2838.21	2871.8	2871.8
36	11.7561	33263.4	6.27322	Towsley Fm. - Parallel to Bedding	150	10	302.591	642.954	2795.68	0	2795.68	2828.94	2828.94
37	11.278	31457.6	6.30046	Towsley Fm. - Parallel to Bedding	150	10	299.273	635.904	2755.7	0	2755.7	2788.74	2788.74
38	11.278	31009.7	6.30046	Towsley Fm. - Parallel to Bedding	150	10	296.017	628.985	2716.46	0	2716.46	2749.14	2749.14
39	22.5561	61986.2	6.30046	Towsley Fm. - Parallel to Bedding	150	10	295.896	628.728	2715.01	0	2715.01	2747.67	2747.67
40	13.1172	36353.2	9.1378	Towsley Fm. - Parallel to Bedding	150	10	295.376	627.623	2708.73	0	2708.73	2756.24	2756.24
41	13.0798	35535.3	10.3366	Towsley Fm. - Parallel to Bedding	150	10	289.935	616.063	2643.17	0	2643.17	2696.05	2696.05
42	12.6574	33292.9	11.2518	Towsley Fm. - Parallel to Bedding	150	10	282.19	599.606	2549.84	0	2549.84	2605.98	2605.98
43	12.6476	32075.6	10.9181	Towsley Fm. - Parallel to Bedding	150	10	274.857	584.025	2461.48	0	2461.48	2514.5	2514.5
44	9.81134	24047.8	13.9016	Towsley Fm. - Parallel to Bedding	150	10	265.698	564.563	2351.1	0	2351.1	2416.86	2416.86
45	9.81134	23443.1	13.9016	Towsley Fm. - Parallel to Bedding	150	10	260.771	554.095	2291.74	0	2291.74	2356.28	2356.28
46	9.81134	22310	14.3627	Towsley Fm. - Parallel to Bedding	150	10	251.209	533.777	2176.51	0	2176.51	2240.83	2240.83
47	9.81134	19988.2	14.3627	Towsley Fm. - Parallel to Bedding	150	10	232.325	493.652	1948.95	0	1948.95	2008.44	2008.44
48	4.11676	6834.05	39.625	Towsley Fm. - Parallel to Bedding	150	10	186.797	396.911	1400.3	0	1400.3	1554.97	1554.97

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
49	12.1058	9499.18	39.625	Colluvium	150	35	252.872	537.31	553.136	0	553.136	762.516	762.516
50	0.685174	45.6101	39.625	Engineered Fill	200	32	93.857	199.43	-0.911922	0	-0.911922	76.8024	76.8024

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.12483**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	67.7053	1728.77	0	0	0
2	81.0189	1722.36	8757.35	946.112	6.16611
3	85.6834	1720.26	14932.9	1613.29	6.16609
4	95.0566	1716.06	31018	3351.08	6.16613
5	95.9612	1715.65	32247.3	3483.88	6.16611
6	104.497	1716.5	32533.6	3514.81	6.16611
7	113.033	1717.36	32811	3544.78	6.16611
8	121.336	1718.27	32865.9	3550.71	6.16611
9	129.638	1719.19	32909.7	3555.45	6.16612
10	137.239	1720.04	32916.1	3556.13	6.1661
11	144.84	1720.89	32913	3555.8	6.16611
12	152.448	1721.75	32900.3	3554.43	6.16611
13	160.056	1722.6	32874.5	3551.64	6.16611
14	167.69	1723.45	32801.3	3543.74	6.16612
15	175.324	1724.31	32672.2	3529.78	6.1661
16	186.966	1725.61	32359.5	3496.01	6.16612
17	190.745	1726.04	32237.5	3482.82	6.16611
18	198.455	1727.06	31427	3395.25	6.1661
19	206.165	1728.08	30617.7	3307.82	6.1661
20	214.605	1729.17	29815	3221.1	6.1661
21	223.044	1730.27	29013.2	3134.48	6.16611
22	231.639	1731.15	29009.9	3134.13	6.16612
23	240.235	1732.04	29001.9	3133.26	6.16611
24	248.83	1732.92	28988.2	3131.78	6.16611
25	257.425	1733.8	28969.7	3129.78	6.16611
26	266.021	1734.72	28831.6	3114.86	6.16611
27	274.616	1735.63	28690	3099.56	6.16611
28	283.212	1736.55	28551.7	3084.62	6.16611
29	291.807	1737.46	28417.9	3070.17	6.16612
30	300.402	1738.35	28415.4	3069.89	6.1661
31	308.998	1739.23	28424.4	3070.87	6.16611
32	317.593	1740.11	28445	3073.09	6.1661
33	326.188	1740.99	28483	3077.2	6.16611
34	338.179	1742.3	28302.4	3057.69	6.16612
35	350.171	1743.62	28190.4	3045.59	6.16612
36	362.162	1744.94	28127.2	3038.76	6.16611
37	373.918	1746.23	28071.5	3032.75	6.16613
38	385.196	1747.47	28015.4	3026.68	6.16611
39	396.474	1748.72	27971.3	3021.92	6.16612
40	419.03	1751.21	27884.1	3012.5	6.16612
41	432.147	1753.32	26043.5	2813.64	6.1661
42	445.227	1755.7	23530.1	2542.11	6.16612
43	457.884	1758.22	20681.1	2234.31	6.16611
44	470.532	1760.66	18152.2	1961.09	6.16609
45	480.343	1763.09	15049.7	1625.92	6.16613
46	490.155	1765.52	12043.1	1301.09	6.1661
47	499.966	1768.03	9039.74	976.621	6.16611
48	509.777	1770.54	6422.8	693.895	6.1661
49	513.894	1773.95	2418.57	261.294	6.16612
50	526	1783.98	-64.6755	-6.9873	6.16611
51	526.685	1784.54	0	0	0

Entity Information

Group: Proposed Grades

Shared Entities

Type	Coordinates	
	X	Y
External Boundary	743	1799
	713	1810
	670	1825
	623	1825
	595	1811
	593	1810
	591.5	1809
	590	1810
	529	1785
	527.5	1784
	526	1785
	504	1785
	492	1784
	472	1780
	400	1770
	352	1766
	318	1767
	293	1766
	270	1764
	192	1754
	184	1752
	157	1742
	80	1730
	60	1728
	54	1726
	42	1727.6
	39	1728
	33	1730
	27	1731
	0	1731
	0	1600
	311.567	1600
	750	1600
	750	1746.45
	750	1755.45
	750	1774.95
	750	1775.56
	750	1799

Type	X	Y
Material Boundary	311.567	1600
	311.567	1701.99
	311.567	1710.99
	311.567	1728.99
	328.966	1729.7
	384.366	1735.29
	501	1752
	615	1765
	750	1774.95

Type	X	Y
Material Boundary	311.567	1710.99
	328.966	1711.7
	384.366	1717.29
	501	1734
	615	1745.5
	750	1755.45

Type	Coordinates	
	X	Y
Material Boundary	311.567	1701.99
	328.966	1702.7
	384.366	1708.29
	501	1725
	615	1736.5
	750	1746.45

	X	Y
	595	1811
	607	1811
Material Boundary	653.192	1810.56
	654	1810.56
	684	1810.27
	713	1810

	X	Y
	42	1727.6
	51.0038	1722.08
	56	1720.68
Material Boundary	69.1119	1717
	82.2691	1718.96
	85	1720
	106.948	1728.39
	157	1742

	X	Y
	56	1720.68
Material Boundary	69.1119	1712
	71.7039	1713.31
	85	1720

	X	Y
	400	1770
	437.424	1767.68
	441.603	1767.96
	501	1772
Material Boundary	513.929	1773.96
	516.158	1774.29
	560.024	1780.94
	615.003	1795
	654	1810.56

	X	Y
	526	1785
	526	1782
	546	1782
Material Boundary	587.659	1800.3
	598	1802
	653.192	1810.56

	X	Y
	684	1810.27
Material Boundary	684	1805.27
	750	1775.56

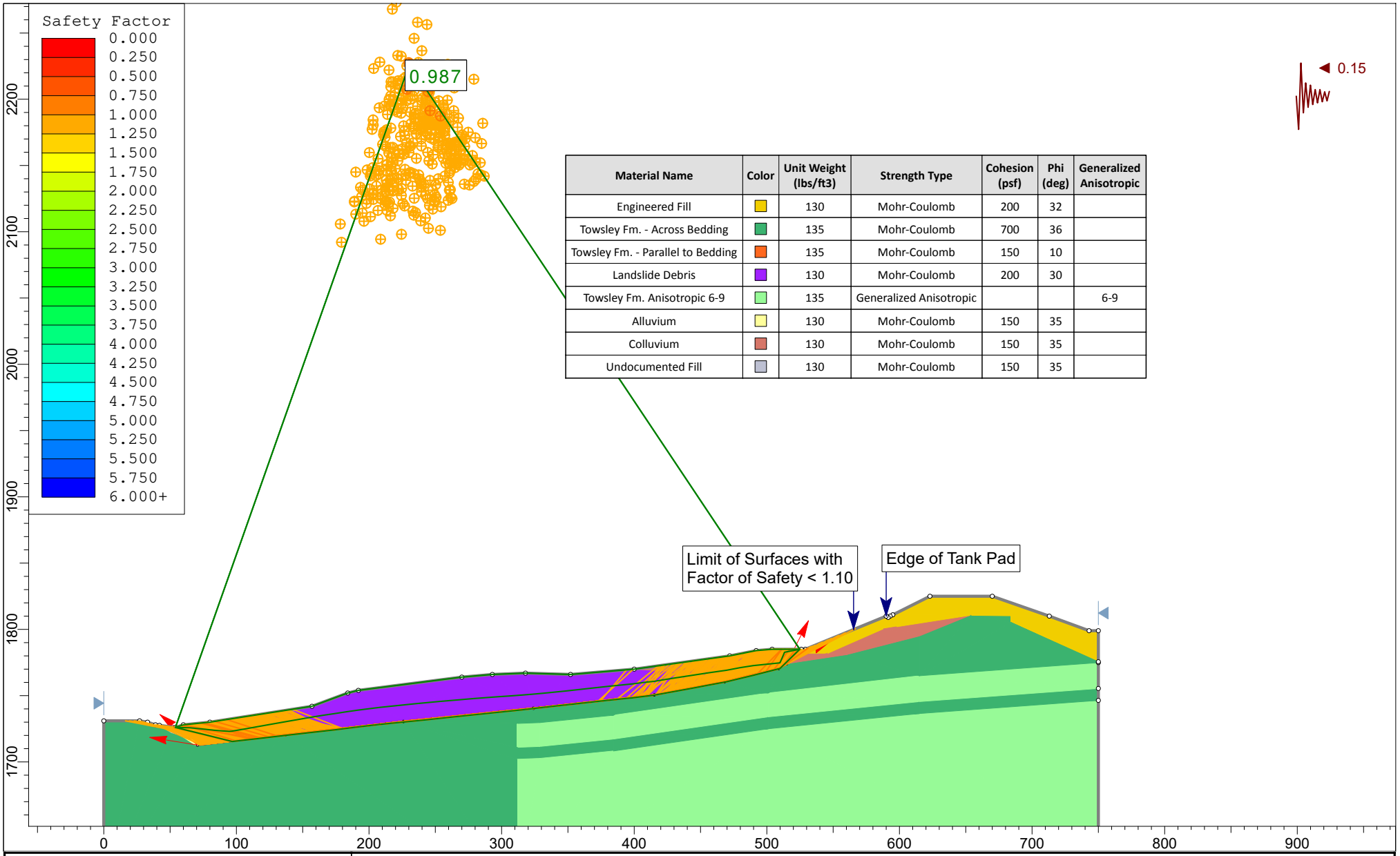
	X	Y
	415.192	1750.04
	418.014	1751.57
Material Boundary	424.99	1755.36
	432.321	1760.37
	441.603	1767.96

Type	Coordinates	
	X	Y
Material Boundary	69.1119	1712
	137	1720
	226	1730
	324	1740
	415.192	1750.04
	468	1760
	509	1770
	516.158	1774.29

Type	Coordinates	
	X	Y
Material Boundary	71.7039	1713.31
	137	1721
	226	1731
	324	1741
	415.192	1751.04
	418.014	1751.57
	468	1761
	509	1771
	513.929	1773.96

Scenario-based Entities

Type	Coordinates		slide plane static
	X	Y	
Block Search Polyline	70.6533	1712.78	✓
	136.981	1720.44	
	226.047	1730.46	
	324.057	1740.5	
	415.211	1750.55	
	468.004	1760.41	
	508.994	1770.5	
	514.929	1774.11	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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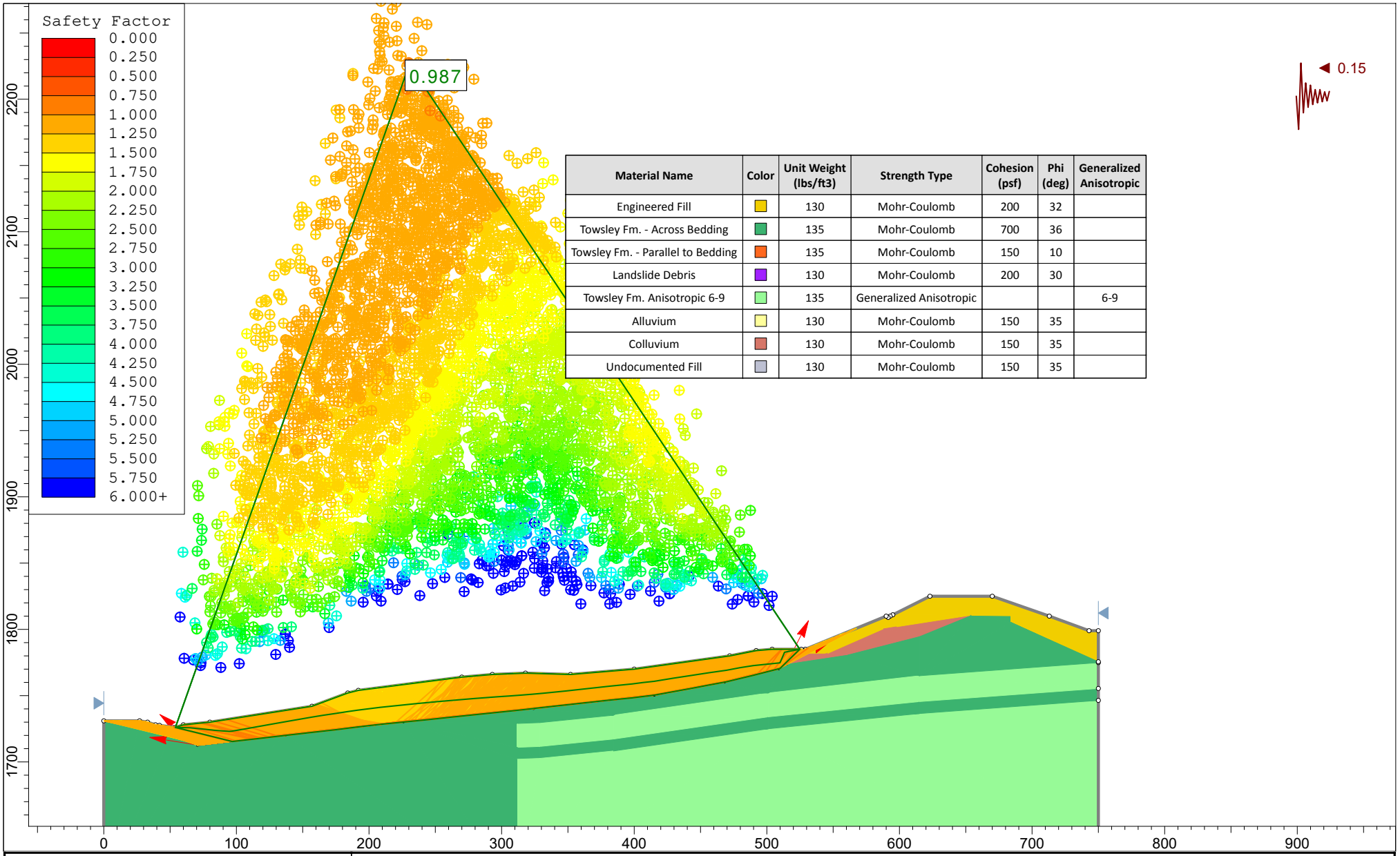
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Base of slide - Pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	515		File Name WT13.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Base of slide - Pseudo-static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 516		File Name: WT13.slmd	

Slide Analysis Information

WT13

Project Summary

File Name:	WT13.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:03.550s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT13-WT13' - Base of slide - Pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	27

Right Projection Angle (End Angle) [°]:	63
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Seismic Load Coefficient (Horizontal): 0.15

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Colluvium	Undocumented Fill
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130	130
Cohesion [psf]	200	700	150	200		150	150	150
Friction Angle [°]	32	36	10	30		35	35	35
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	0.986817
Axis Location:	230.416, 2226.332
Left Slip Surface Endpoint:	54.000, 1726.000
Right Slip Surface Endpoint:	524.832, 1785.000
Resisting Moment:	1.70665e+08 lb-ft
Driving Moment:	1.72945e+08 lb-ft
Resisting Horizontal Force:	333971 lb
Driving Horizontal Force:	338432 lb
Total Slice Area:	10092.2 ft2
Surface Horizontal Width:	470.832 ft
Surface Average Height:	21.4347 ft

Global Minimum Coordinates

Method: spencer

X	Y
54	1726
76.0846	1720.62
96.8828	1715.43
115.406	1717.51
136.004	1719.89
156.603	1722.26
173.838	1724.15
191.074	1726.3

X	Y
208.333	1728.29
226.067	1730.06
243.815	1731.86
261.562	1733.72
279.31	1735.57
297.058	1737.43
314.805	1739.29
331.526	1741.13
348.246	1742.97
364.966	1744.82
381.686	1746.69
398.418	1748.36
415.149	1750.44
429.428	1753.03
443.707	1755.62
456.672	1758.07
469.638	1760.51
489.785	1765.37
509.931	1770.53
524.832	1785

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4989
Number of Invalid Surfaces: 18

Error Codes:

Error Code -108 reported for 8 surfaces
Error Code -111 reported for 10 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 0.986817**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	11.0423	4185.88	-13.6834	Undocumented Fill	150	35	652.081	643.485	704.769	0	704.769	546.008	546.008
2	11.0423	10176.2	-13.6834	Undocumented Fill	150	35	1252.89	1236.37	1551.49	0	1551.49	1246.46	1246.46
3	6.37601	8393.81	-14.0197	Undocumented Fill	150	35	1705.78	1683.29	2189.76	0	2189.76	1763.84	1763.84
4	0.408991	608.002	-14.0197	Alluvium	150	35	1895.96	1870.97	2457.8	0	2457.8	1984.39	1984.39
5	11.7207	21171.4	-14.0197	Landslide Debris	200	30	1805.99	1782.18	2740.41	0	2740.41	2289.47	2289.47
6	2.29255	4992.77	-14.0197	Towsley Fm. - Parallel to Bedding	150	10	603.36	595.406	2526.02	0	2526.02	2375.37	2375.37
7	9.26138	20992.7	6.40866	Towsley Fm. - Parallel to Bedding	150	10	544.45	537.273	2196.33	0	2196.33	2257.49	2257.49
8	9.26138	21480.3	6.40866	Towsley Fm. - Parallel to Bedding	150	10	553.502	546.205	2246.99	0	2246.99	2309.16	2309.16
9	10.2995	24439.4	6.57678	Towsley Fm. - Parallel to Bedding	150	10	562.144	554.733	2295.35	0	2295.35	2360.17	2360.17
10	10.2995	25000	6.57678	Towsley Fm. - Parallel to Bedding	150	10	571.488	563.954	2347.65	0	2347.65	2413.54	2413.54
11	20.5989	51676.4	6.57678	Towsley Fm. - Parallel to Bedding	150	10	585.459	577.741	2425.84	0	2425.84	2493.34	2493.34
12	8.61754	23252.7	6.24123	Towsley Fm. - Parallel to Bedding	150	10	619.262	611.098	2615.02	0	2615.02	2682.74	2682.74
13	8.61754	25771.4	6.24123	Towsley Fm. - Parallel to Bedding	150	10	669.557	660.73	2896.5	0	2896.5	2969.72	2969.72

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
14	8.61754	28213.4	7.13057	Towsley Fm. - Parallel to Bedding	150	10	714.403	704.985	3147.47	0	3147.47	3236.85	3236.85
15	8.61754	30185.1	7.13057	Towsley Fm. - Parallel to Bedding	150	10	753.532	743.598	3366.46	0	3366.46	3460.72	3460.72
16	8.62987	31029.5	6.58363	Towsley Fm. - Parallel to Bedding	150	10	772.025	761.847	3469.96	0	3469.96	3559.07	3559.07
17	8.62987	31159	6.58363	Towsley Fm. - Parallel to Bedding	150	10	774.601	764.389	3484.38	0	3484.38	3573.78	3573.78
18	8.86684	32225.4	5.69707	Towsley Fm. - Parallel to Bedding	150	10	782.994	772.672	3531.35	0	3531.35	3609.46	3609.46
19	8.86684	32521.1	5.69707	Towsley Fm. - Parallel to Bedding	150	10	788.754	778.356	3563.59	0	3563.59	3642.28	3642.28
20	8.87383	32833.7	5.77226	Towsley Fm. - Parallel to Bedding	150	10	793.966	783.499	3592.75	0	3592.75	3673.01	3673.01
21	8.87383	33111.6	5.77226	Towsley Fm. - Parallel to Bedding	150	10	799.374	788.836	3623.02	0	3623.02	3703.82	3703.82
22	8.87383	33370.2	5.97937	Towsley Fm. - Parallel to Bedding	150	10	803.363	792.772	3645.34	0	3645.34	3729.49	3729.49
23	8.87383	33609.3	5.97937	Towsley Fm. - Parallel to Bedding	150	10	808.009	797.357	3671.34	0	3671.34	3755.97	3755.97
24	17.7477	67703.7	5.97937	Towsley Fm. - Parallel to Bedding	150	10	812.721	802.007	3697.72	0	3697.72	3782.84	3782.84
25	8.87383	33673.4	5.97079	Towsley Fm. - Parallel to Bedding	150	10	809.298	798.629	3678.56	0	3678.56	3763.21	3763.21
26	8.87383	33441.7	5.97079	Towsley Fm. - Parallel to Bedding	150	10	804.796	794.186	3653.36	0	3653.36	3737.53	3737.53
27	8.87383	32850.3	5.97079	Towsley Fm. - Parallel to Bedding	150	10	793.305	782.847	3589.06	0	3589.06	3672.03	3672.03
28	8.87383	32188.1	5.97079	Towsley Fm. - Parallel to Bedding	150	10	780.44	770.151	3517.06	0	3517.06	3598.68	3598.68
29	8.36013	29571.8	6.29266	Towsley Fm. - Parallel to Bedding	150	10	763.384	753.32	3421.6	0	3421.6	3505.78	3505.78
30	8.36013	28346.9	6.29266	Towsley Fm. - Parallel to Bedding	150	10	738.181	728.45	3280.56	0	3280.56	3361.96	3361.96
31	8.36013	27077.7	6.29266	Towsley Fm. - Parallel to Bedding	150	10	712.065	702.678	3134.39	0	3134.39	3212.91	3212.91
32	8.36013	25808.4	6.29266	Towsley Fm. - Parallel to Bedding	150	10	685.949	676.906	2988.23	0	2988.23	3063.87	3063.87
33	8.36013	24694.7	6.29266	Towsley Fm. - Parallel to Bedding	150	10	663.032	654.291	2859.98	0	2859.98	2933.09	2933.09
34	8.36013	24346.6	6.29266	Towsley Fm. - Parallel to Bedding	150	10	655.869	647.223	2819.89	0	2819.89	2892.21	2892.21
35	8.36013	24094	6.38575	Towsley Fm. - Parallel to Bedding	150	10	650.304	641.731	2788.74	0	2788.74	2861.52	2861.52
36	8.36013	23833.6	6.38575	Towsley Fm. - Parallel to Bedding	150	10	644.95	636.448	2758.79	0	2758.79	2830.97	2830.97
37	8.36568	23645.3	5.70881	Towsley Fm. - Parallel to Bedding	150	10	643.392	634.91	2750.06	0	2750.06	2814.38	2814.38
38	8.36568	23497.5	5.70881	Towsley Fm. - Parallel to Bedding	150	10	640.34	631.898	2732.98	0	2732.98	2796.99	2796.99
39	8.36568	23400.2	7.09342	Towsley Fm. - Parallel to Bedding	150	10	633.006	624.661	2691.94	0	2691.94	2770.71	2770.71
40	8.36568	23517.6	7.09342	Towsley Fm. - Parallel to Bedding	150	10	635.406	627.029	2705.37	0	2705.37	2784.44	2784.44
41	14.2789	39689.7	10.2779	Towsley Fm. - Parallel to Bedding	150	10	618.07	609.922	2608.35	0	2608.35	2720.42	2720.42
42	14.2789	38572.2	10.2779	Towsley Fm. - Parallel to Bedding	150	10	604.975	597	2535.06	0	2535.06	2644.76	2644.76
43	12.9656	33976.2	10.6699	Towsley Fm. - Parallel to Bedding	150	10	590.07	582.291	2451.65	0	2451.65	2562.82	2562.82
44	12.9656	32894.6	10.6699	Towsley Fm. - Parallel to Bedding	150	10	576.149	568.554	2373.74	0	2373.74	2482.29	2482.29
45	10.0733	24702.8	13.561	Towsley Fm. - Parallel to Bedding	150	10	552.525	545.241	2241.53	0	2241.53	2374.8	2374.8
46	10.0733	24138.4	13.561	Towsley Fm. - Parallel to Bedding	150	10	543.361	536.198	2190.24	0	2190.24	2321.3	2321.3
47	20.1467	43611.2	14.3705	Towsley Fm. - Parallel to Bedding	150	10	503.12	496.487	1965.03	0	1965.03	2093.93	2093.93
48	2.77403	4739.9	44.1616	Towsley Fm. - Parallel to Bedding	150	10	356.213	351.517	1142.86	0	1142.86	1488.79	1488.79
49	0.669671	996.946	44.1616	Landslide Debris	200	30	658.541	649.859	779.179	0	779.179	1418.72	1418.72
50	11.4569	8285.85	44.1616	Colluvium	150	35	389.768	384.63	335.086	0	335.086	713.612	713.612

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 0.986817**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	54	1726	0	0	0
2	65.0423	1723.31	8467.33	1843.34	12.2817
3	76.0846	1720.62	24946.7	5430.9	12.2817
4	82.4606	1719.03	38050	8283.47	12.2816
5	82.8696	1718.93	38985.2	8487.07	12.2817
6	94.5903	1716	64996.9	14149.8	12.2816
7	96.8828	1715.43	67077.2	14602.7	12.2817
8	106.144	1716.47	66685.9	14517.5	12.2816
9	115.406	1717.51	66252.6	14423.2	12.2817
10	125.705	1718.7	65650.9	14292.2	12.2817
11	136.004	1719.89	64999.2	14150.3	12.2816
12	156.603	1722.26	63546.4	13834	12.2816
13	165.221	1723.2	62930.5	13700	12.2817
14	173.838	1724.15	62105	13520.2	12.2816
15	182.456	1725.22	60636.3	13200.5	12.2816
16	191.074	1726.3	58972.9	12838.4	12.2817
17	199.703	1727.3	57524.9	12523.2	12.2817
18	208.333	1728.29	56065.3	12205.4	12.2816
19	217.2	1729.18	55050.4	11984.5	12.2817
20	226.067	1730.06	54013.8	11758.8	12.2817
21	234.941	1730.96	52911.4	11518.8	12.2816
22	243.815	1731.86	51788.3	11274.3	12.2816
23	252.688	1732.79	50523.5	10999	12.2817
24	261.562	1733.72	49239.9	10719.5	12.2816
25	279.31	1735.57	46634.6	10152.4	12.2817
26	288.184	1736.5	45351.1	9872.94	12.2817
27	297.058	1737.43	44085.8	9597.48	12.2817
28	305.931	1738.36	42866.9	9332.13	12.2817
29	314.805	1739.29	41700	9078.1	12.2817
30	323.165	1740.21	40492	8815.1	12.2817
31	331.526	1741.13	39386.9	8574.53	12.2817
32	339.886	1742.05	38388.7	8357.22	12.2817
33	348.246	1742.97	37497.3	8163.15	12.2816
34	356.606	1743.9	36699.5	7989.49	12.2817
35	364.966	1744.82	35931.1	7822.2	12.2817
36	373.326	1745.75	35144.4	7650.93	12.2817
37	381.686	1746.69	34380	7484.53	12.2817
38	390.052	1747.53	33915.8	7383.46	12.2816
39	398.418	1748.36	33462.4	7284.77	12.2817
40	406.783	1749.4	32445.6	7063.4	12.2816
41	415.149	1750.44	31417.2	6839.52	12.2817
42	429.428	1753.03	27535.5	5994.48	12.2817
43	443.707	1755.62	23824.2	5186.53	12.2817
44	456.672	1758.07	20389.5	4438.78	12.2816
45	469.638	1760.51	17126.8	3728.5	12.2816
46	479.711	1762.94	13540.8	2947.84	12.2817
47	489.785	1765.37	10071.8	2192.64	12.2817
48	509.931	1770.53	3523.46	767.056	12.2816
49	512.705	1773.22	721.742	157.123	12.2816
50	513.375	1773.87	506.464	110.257	12.2816
51	524.832	1785	0	0	0

Entity Information

Group: Proposed Grades

Shared Entities

Type	Coordinates

Type	Coordinates	
	X	Y
External Boundary	743	1799
	713	1810
	670	1825
	623	1825
	595	1811
	593	1810
	591.5	1809
	590	1810
	529	1785
	527.5	1784
	526	1785
	504	1785
	492	1784
	472	1780
	400	1770
	352	1766
	318	1767
	293	1766
	270	1764
	192	1754
	184	1752
	157	1742
	80	1730
	60	1728
	54	1726
	42	1727.6
	39	1728
	33	1730
	27	1731
	0	1731
	0	1600
	311.567	1600
	750	1600
	750	1746.45
	750	1755.45
	750	1774.95
	750	1775.56
	750	1799

Type	X	Y
Material Boundary	311.567	1600
	311.567	1701.99
	311.567	1710.99
	311.567	1728.99
	328.966	1729.7
	384.366	1735.29
	501	1752
	615	1765
	750	1774.95

Type	X	Y
Material Boundary	311.567	1710.99
	328.966	1711.7
	384.366	1717.29
	501	1734
	615	1745.5
	750	1755.45

Type	Coordinates	
	X	Y
Material Boundary	311.567	1701.99
	328.966	1702.7
	384.366	1708.29
	501	1725
	615	1736.5
	750	1746.45

	X	Y
	595	1811
	607	1811
Material Boundary	653.192	1810.56
	654	1810.56
	684	1810.27
	713	1810

	X	Y
	42	1727.6
	51.0038	1722.08
	56	1720.68
Material Boundary	69.1119	1717
	82.2691	1718.96
	85	1720
	106.948	1728.39
	157	1742

	X	Y
	56	1720.68
Material Boundary	69.1119	1712
	71.7039	1713.31
	85	1720

	X	Y
	400	1770
	437.424	1767.68
	441.603	1767.96
	501	1772
Material Boundary	513.929	1773.96
	516.158	1774.29
	560.024	1780.94
	615.003	1795
	654	1810.56

	X	Y
	526	1785
	526	1782
	546	1782
Material Boundary	587.659	1800.3
	598	1802
	653.192	1810.56

	X	Y
	684	1810.27
Material Boundary	684	1805.27
	750	1775.56

	X	Y
	415.192	1750.04
	418.014	1751.57
Material Boundary	424.99	1755.36
	432.321	1760.37
	441.603	1767.96

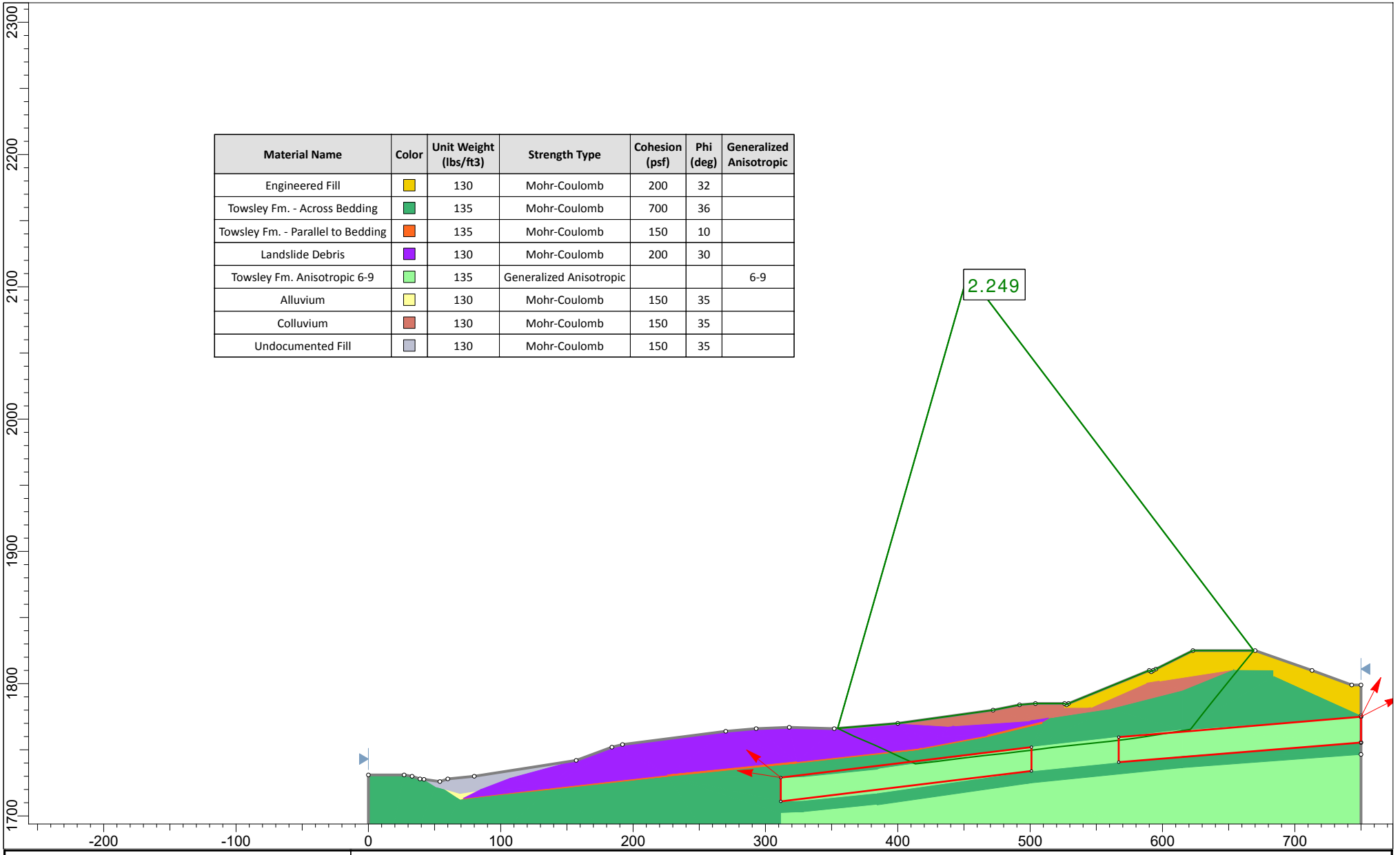
Type	Coordinates	
	X	Y
Material Boundary	69.1119	1712
	137	1720
	226	1730
	324	1740
	415.192	1750.04
	468	1760
	509	1770
	516.158	1774.29

Type	Coordinates	
	X	Y
Material Boundary	71.7039	1713.31
	137	1721
	226	1731
	324	1741
	415.192	1751.04
	418.014	1751.57
	468	1761
	509	1771
	513.929	1773.96

Scenario-based Entities

Type	Coordinates		slide plane pseudo
	X	Y	
Block Search Polyline	70.6533	1712.78	✓
	136.981	1720.44	
	226.047	1730.46	
	324.057	1740.5	
	415.211	1750.55	
	468.004	1760.41	
	508.994	1770.5	
	514.929	1774.11	

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	



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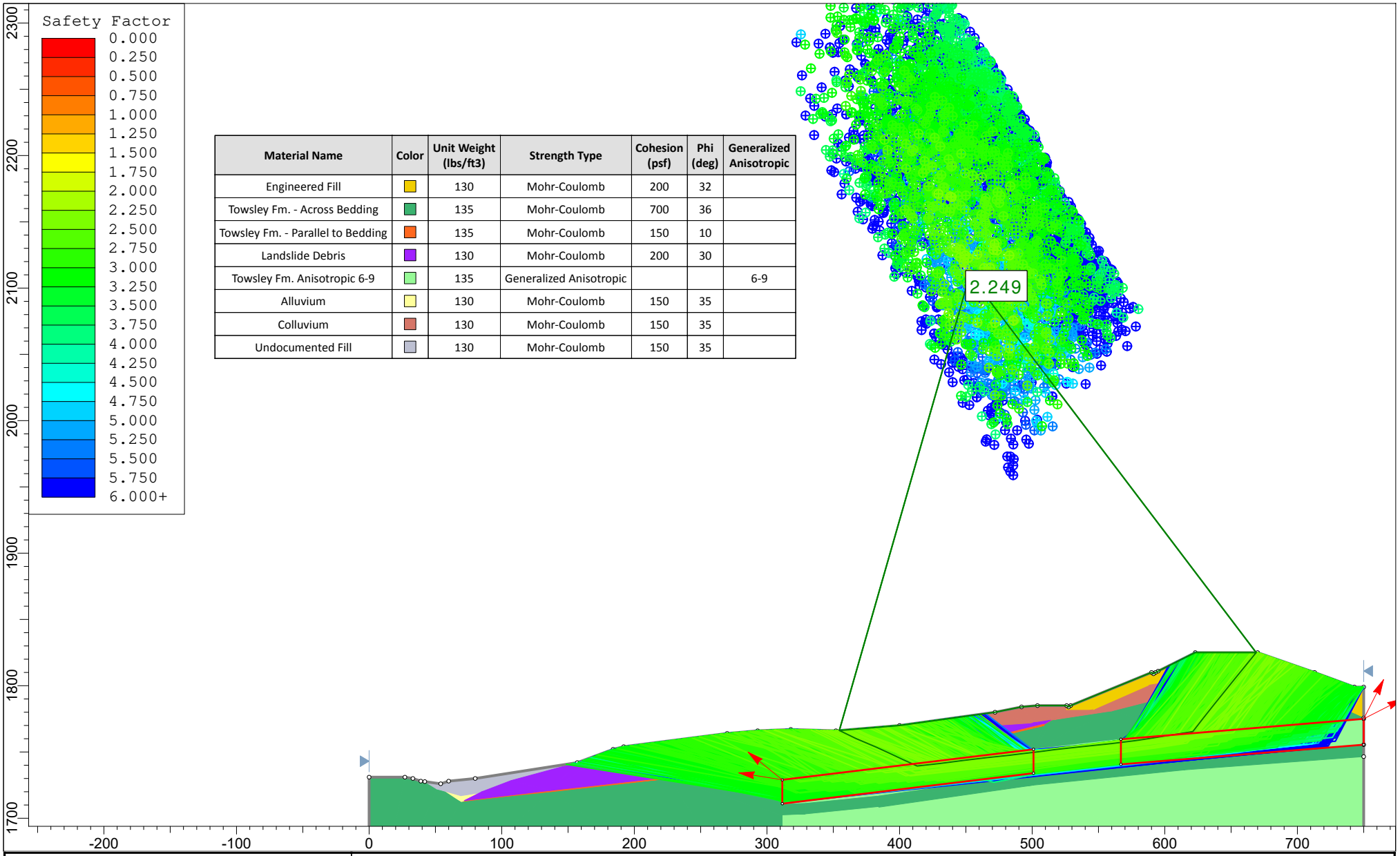
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Deep Bedrock - Static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	525		File Name WT13.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Deep Bedrock - Static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	526		File Name WT13.slmd

Slide Analysis Information

WT13

Project Summary

File Name:	WT13.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:13.131s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT13-WT13' - Deep Bedrock - Static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	27

Right Projection Angle (End Angle) [°]:	63
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Colluvium	Undocumented Fill
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130	130
Cohesion [psf]	200	700	150	200		150	150	150
Friction Angle [°]	32	36	10	30		35	35	35
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	2.249290
Axis Location:	452.952, 2109.958
Left Slip Surface Endpoint:	354.563, 1766.214
Right Slip Surface Endpoint:	668.914, 1825.000
Resisting Moment:	1.89955e+08 lb-ft
Driving Moment:	8.44512e+07 lb-ft
Resisting Horizontal Force:	453748 lb
Driving Horizontal Force:	201729 lb
Total Slice Area:	10406.6 ft2
Surface Horizontal Width:	314.351 ft
Surface Average Height:	33.1051 ft

Global Minimum Coordinates

Method: spencer

X	Y
354.563	1766.21
367.02	1760.1
382.161	1753.68
392.255	1749.04
402.353	1744.26
413.186	1739.42
430.434	1741.33
447.803	1743.52
465.172	1745.65
473.888	1746.57

X	Y
482.604	1747.5
491.286	1748.53
499.968	1749.57
508.651	1750.67
517.333	1751.77
534.693	1753.64
552.053	1755.56
569.412	1757.4
578.092	1758.6
586.792	1759.92
603.951	1762.64
621.11	1765.35
628.987	1775.46
636.879	1785.45
644.887	1795.38
652.896	1805.28
660.905	1815.11
668.914	1825

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 5020
Number of Invalid Surfaces: 10

Error Codes:

Error Code -108 reported for 9 surfaces
Error Code -111 reported for 1 surface

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.24929**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	6.22828	1448.4	-26.1557	Landslide Debris	200	30	183.998	413.864	370.423	0	370.423	280.062	280.062
2	6.22828	4345.21	-26.1557	Landslide Debris	200	30	337.674	759.526	969.127	0	969.127	803.296	803.296
3	7.57068	8932.63	-22.98	Landslide Debris	200	30	481.933	1084.01	1531.14	0	1531.14	1326.77	1326.77
4	7.57068	12713.2	-22.98	Landslide Debris	200	30	641.607	1443.16	2153.21	0	2153.21	1881.13	1881.13
5	5.04712	10633.5	-24.6513	Landslide Debris	200	30	791.099	1779.41	2735.62	0	2735.62	2372.57	2372.57
6	5.04712	12429.2	-24.6513	Landslide Debris	200	30	906.802	2039.66	3186.39	0	3186.39	2770.24	2770.24
7	0.909294	2430.96	-25.3541	Landslide Debris	200	30	982.328	2209.54	3480.63	0	3480.63	3015.15	3015.15
8	1.71259	4745.45	-25.3541	Towsley Fm. - Parallel to Bedding	150	10	313.98	706.232	3154.55	0	3154.55	3005.77	3005.77
9	7.47565	23322.4	-25.3541	Towsley Fm. - Across Bedding	700	36	1748.25	3932.31	4448.89	0	4448.89	3620.48	3620.48
10	5.41632	19658.5	-24.0752	Towsley Fm. - Across Bedding	700	36	1939.22	4361.86	5040.11	0	5040.11	4173.66	4173.66
11	5.41632	21973.9	-24.0752	Towsley Fm. - Across Bedding	700	36	2121.93	4772.83	5605.77	0	5605.77	4657.69	4657.69
12	5.74948	24617.1	6.33109	Towsley Fm. - Parallel to Bedding	150	10	398.148	895.551	4228.23	0	4228.23	4272.41	4272.41
13	5.74948	24749.2	6.33109	Towsley Fm. - Parallel to Bedding	150	10	399.927	899.551	4250.91	0	4250.91	4295.28	4295.28
14	5.74948	24882.1	6.33109	Towsley Fm. - Parallel to Bedding	150	10	401.716	903.575	4273.73	0	4273.73	4318.3	4318.3
15	8.68443	37760	7.17212	Towsley Fm. - Parallel to Bedding	150	10	402.183	904.626	4279.69	0	4279.69	4330.3	4330.3

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
16	8.68443	37911.7	7.17212	Towsley Fm. - Parallel to Bedding	150	10	403.53	907.657	4296.89	0	4296.89	4347.67	4347.67
17	5.78962	25365.2	7.01003	Towsley Fm. - Parallel to Bedding	150	10	404.954	910.859	4315.04	0	4315.04	4364.83	4364.83
18	5.78962	25445.6	7.01003	Towsley Fm. - Parallel to Bedding	150	10	406.026	913.271	4328.72	0	4328.72	4378.65	4378.65
19	5.78962	25526	7.01003	Towsley Fm. - Parallel to Bedding	150	10	407.099	915.683	4342.4	0	4342.4	4392.46	4392.46
20	8.71615	38688	6.03436	Towsley Fm. - Parallel to Bedding	150	10	410.699	923.782	4388.34	0	4388.34	4431.75	4431.75
21	8.71615	39485.4	6.03436	Towsley Fm. - Parallel to Bedding	150	10	417.787	939.724	4478.75	0	4478.75	4522.92	4522.92
22	8.6822	40240.3	6.80505	Towsley Fm. - Parallel to Bedding	150	10	424.821	955.546	4568.48	0	4568.48	4619.18	4619.18
23	8.6822	40596.2	6.80505	Towsley Fm. - Parallel to Bedding	150	10	427.989	962.671	4608.89	0	4608.89	4659.96	4659.96
24	8.6822	40139.3	7.22472	Towsley Fm. - Parallel to Bedding	150	10	423.34	952.214	4549.58	0	4549.58	4603.25	4603.25
25	8.6822	39078	7.22472	Towsley Fm. - Parallel to Bedding	150	10	413.911	931.005	4429.31	0	4429.31	4481.78	4481.78
26	5.78667	25424.8	6.14045	Towsley Fm. - Parallel to Bedding	150	10	407.074	915.628	4342.09	0	4342.09	4385.88	4385.88
27	5.78667	24769.2	6.14045	Towsley Fm. - Parallel to Bedding	150	10	398.3	895.892	4230.16	0	4230.16	4273.01	4273.01
28	5.78667	25365.8	6.14045	Towsley Fm. - Parallel to Bedding	150	10	406.285	913.852	4332.02	0	4332.02	4375.73	4375.73
29	5.78667	26682.3	6.30775	Towsley Fm. - Parallel to Bedding	150	10	423.672	952.962	4553.81	0	4553.81	4600.65	4600.65
30	5.78667	27992	6.30775	Towsley Fm. - Parallel to Bedding	150	10	441.19	992.364	4777.28	0	4777.28	4826.05	4826.05
31	5.78667	29301.8	6.30775	Towsley Fm. - Parallel to Bedding	150	10	458.708	1031.77	5000.75	0	5000.75	5051.45	5051.45
32	5.78647	30620.6	6.05391	Towsley Fm. - Parallel to Bedding	150	10	476.762	1072.38	5231.05	0	5231.05	5281.62	5281.62
33	5.78647	31953.8	6.05391	Towsley Fm. - Parallel to Bedding	150	10	494.613	1112.53	5458.76	0	5458.76	5511.21	5511.21
34	5.78647	33300	6.05391	Towsley Fm. - Parallel to Bedding	150	10	512.633	1153.06	5688.66	0	5688.66	5743.03	5743.03
35	8.67971	52312	7.87753	Towsley Fm. - Parallel to Bedding	150	10	530.465	1193.17	5916.13	0	5916.13	5989.53	5989.53
36	8.70014	55076.4	8.66085	Towsley Fm. - Parallel to Bedding	150	10	552.374	1242.45	6195.56	0	6195.56	6279.7	6279.7
37	5.71968	37244.9	8.98352	Towsley Fm. - Parallel to Bedding	150	10	565.663	1272.34	6365.09	0	6365.09	6454.51	6454.51
38	5.71968	37926.5	8.98352	Towsley Fm. - Parallel to Bedding	150	10	574.795	1292.88	6481.6	0	6481.6	6572.47	6572.47
39	5.71968	39399.2	8.98352	Towsley Fm. - Parallel to Bedding	150	10	594.53	1337.27	6733.35	0	6733.35	6827.34	6827.34
40	5.71968	40868.7	8.99917	Towsley Fm. - Parallel to Bedding	150	10	614.189	1381.49	6984.14	0	6984.14	7081.41	7081.41
41	5.71968	42337.6	8.99917	Towsley Fm. - Parallel to Bedding	150	10	633.876	1425.77	7235.23	0	7235.23	7335.62	7335.62
42	5.71968	43819.7	8.99917	Towsley Fm. - Parallel to Bedding	150	10	653.735	1470.44	7488.58	0	7488.58	7592.11	7592.11
43	0.0802512	624.948	52.059	Towsley Fm. - Across Bedding	700	36	1870.44	4207.16	4827.2	0	4827.2	7226.34	7226.34
44	7.7969	56292.3	52.059	Towsley Fm. - Across Bedding	700	36	1751.31	3939.21	4458.38	0	4458.38	6704.73	6704.73
45	7.8911	46551.6	51.715	Towsley Fm. - Across Bedding	700	36	1480.58	3330.26	3620.24	0	3620.24	5495.99	5495.99
46	8.00888	36605.2	51.0899	Towsley Fm. - Across Bedding	700	36	1209.68	2720.93	2781.57	0	2781.57	4280.21	4280.21
47	8.00888	26013.2	51.0497	Towsley Fm. - Across Bedding	700	36	928.915	2089.4	1912.34	0	1912.34	3061.49	3061.49
48	4.27397	9553.33	50.8132	Towsley Fm. - Across Bedding	700	36	715.381	1609.1	1251.27	0	1251.27	2128.82	2128.82
49	3.7349	5915.06	50.8132	Engineered Fill	200	32	370.939	834.349	1015.17	0	1015.17	1470.2	1470.2
50	8.00888	5149.4	51.0045	Engineered Fill	200	32	192.036	431.944	371.188	0	371.188	608.37	608.37

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.24929**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	354.563	1766.21	0	0	0
2	360.792	1763.15	2279.01	295.901	7.39776
3	367.02	1760.1	7346.43	953.843	7.39776
4	374.591	1756.89	15910.7	2065.8	7.39774
5	382.161	1753.68	27680.8	3594.01	7.39776
6	387.208	1751.36	38009.9	4935.11	7.39776
7	392.255	1749.04	49967	6487.59	7.39776
8	393.165	1748.61	52359.9	6798.29	7.39777
9	394.877	1747.8	55457.6	7200.48	7.39776
10	402.353	1744.26	84286.5	10943.6	7.39779
11	407.769	1741.84	106987	13891	7.3978
12	413.186	1739.42	132046	17144.6	7.39779
13	418.935	1740.06	131638	17091.6	7.39778
14	424.685	1740.69	131226	17038.1	7.39778
15	430.434	1741.33	130809	16984	7.39779
16	439.118	1742.42	129625	16830.2	7.39776
17	447.803	1743.52	128434	16675.6	7.39778
18	453.593	1744.23	127707	16581.1	7.39773
19	459.382	1744.94	126976	16486.2	7.39774
20	465.172	1745.65	126241	16390.9	7.39779
21	473.888	1746.57	125778	16330.7	7.39776
22	482.604	1747.5	125293	16267.7	7.39774
23	491.286	1748.53	124248	16132	7.39773
24	499.968	1749.57	123188	15994.5	7.39779
25	508.651	1750.67	121857	15821.6	7.39775
26	517.333	1751.77	120575	15655.2	7.39778
27	523.12	1752.39	120228	15610.1	7.39775
28	528.906	1753.01	119899	15567.4	7.39776
29	534.693	1753.64	119553	15522.5	7.39777
30	540.48	1754.28	119092	15462.6	7.39775
31	546.266	1754.92	118589	15397.3	7.39776
32	552.053	1755.56	118045	15326.7	7.39777
33	557.839	1756.17	117594	15268.1	7.39775
34	563.626	1756.78	117106	15204.7	7.39773
35	569.412	1757.4	116581	15136.6	7.39776
36	578.092	1758.6	114080	14811.9	7.39777
37	586.792	1759.92	110676	14369.8	7.39771
38	592.512	1760.83	108155	14042.6	7.39777
39	598.232	1761.73	105582	13708.6	7.39781
40	603.951	1762.64	102894	13359.6	7.39781
41	609.671	1763.54	100081	12994.3	7.39777
42	615.391	1764.45	97152.7	12614.1	7.39778
43	621.11	1765.35	94108.5	12218.8	7.39775
44	621.191	1765.46	93761.8	12173.8	7.39776
45	628.987	1775.46	62829.2	8157.59	7.39776
46	636.879	1785.45	38320.3	4975.41	7.39775
47	644.887	1795.38	20409.9	2649.97	7.39776
48	652.896	1805.28	8902.53	1155.88	7.39774
49	657.17	1810.53	5399.83	701.101	7.39776
50	660.905	1815.11	2134.16	277.094	7.39776
51	668.914	1825	0	0	0

Entity Information

Group: Proposed Grades

Shared Entities

Type	Coordinates

Type	Coordinates	
	X	Y
External Boundary	743	1799
	713	1810
	670	1825
	623	1825
	595	1811
	593	1810
	591.5	1809
	590	1810
	529	1785
	527.5	1784
	526	1785
	504	1785
	492	1784
	472	1780
	400	1770
	352	1766
	318	1767
	293	1766
	270	1764
	192	1754
	184	1752
	157	1742
	80	1730
	60	1728
	54	1726
	42	1727.6
	39	1728
	33	1730
	27	1731
	0	1731
	0	1600
	311.567	1600
	750	1600
	750	1746.45
	750	1755.45
	750	1774.95
	750	1775.56
	750	1799

Type	X	Y
Material Boundary	311.567	1600
	311.567	1701.99
	311.567	1710.99
	311.567	1728.99
	328.966	1729.7
	384.366	1735.29
	501	1752
	615	1765
	750	1774.95

Type	X	Y
Material Boundary	311.567	1710.99
	328.966	1711.7
	384.366	1717.29
	501	1734
	615	1745.5
	750	1755.45

Type	Coordinates	
	X	Y
Material Boundary	311.567	1701.99
	328.966	1702.7
	384.366	1708.29
	501	1725
	615	1736.5
	750	1746.45

	X	Y
	595	1811
	607	1811
Material Boundary	653.192	1810.56
	654	1810.56
	684	1810.27
	713	1810

	X	Y
	42	1727.6
	51.0038	1722.08
	56	1720.68
Material Boundary	69.1119	1717
	82.2691	1718.96
	85	1720
	106.948	1728.39
	157	1742

	X	Y
	56	1720.68
Material Boundary	69.1119	1712
	71.7039	1713.31
	85	1720

	X	Y
	400	1770
	437.424	1767.68
	441.603	1767.96
	501	1772
Material Boundary	513.929	1773.96
	516.158	1774.29
	560.024	1780.94
	615.003	1795
	654	1810.56

	X	Y
	526	1785
	526	1782
	546	1782
Material Boundary	587.659	1800.3
	598	1802
	653.192	1810.56

	X	Y
	684	1810.27
Material Boundary	684	1805.27
	750	1775.56

	X	Y
	415.192	1750.04
	418.014	1751.57
Material Boundary	424.99	1755.36
	432.321	1760.37
	441.603	1767.96

Type	Coordinates	
	X	Y
Material Boundary	69.1119	1712
	137	1720
	226	1730
	324	1740
	415.192	1750.04
	468	1760
	509	1770
	516.158	1774.29

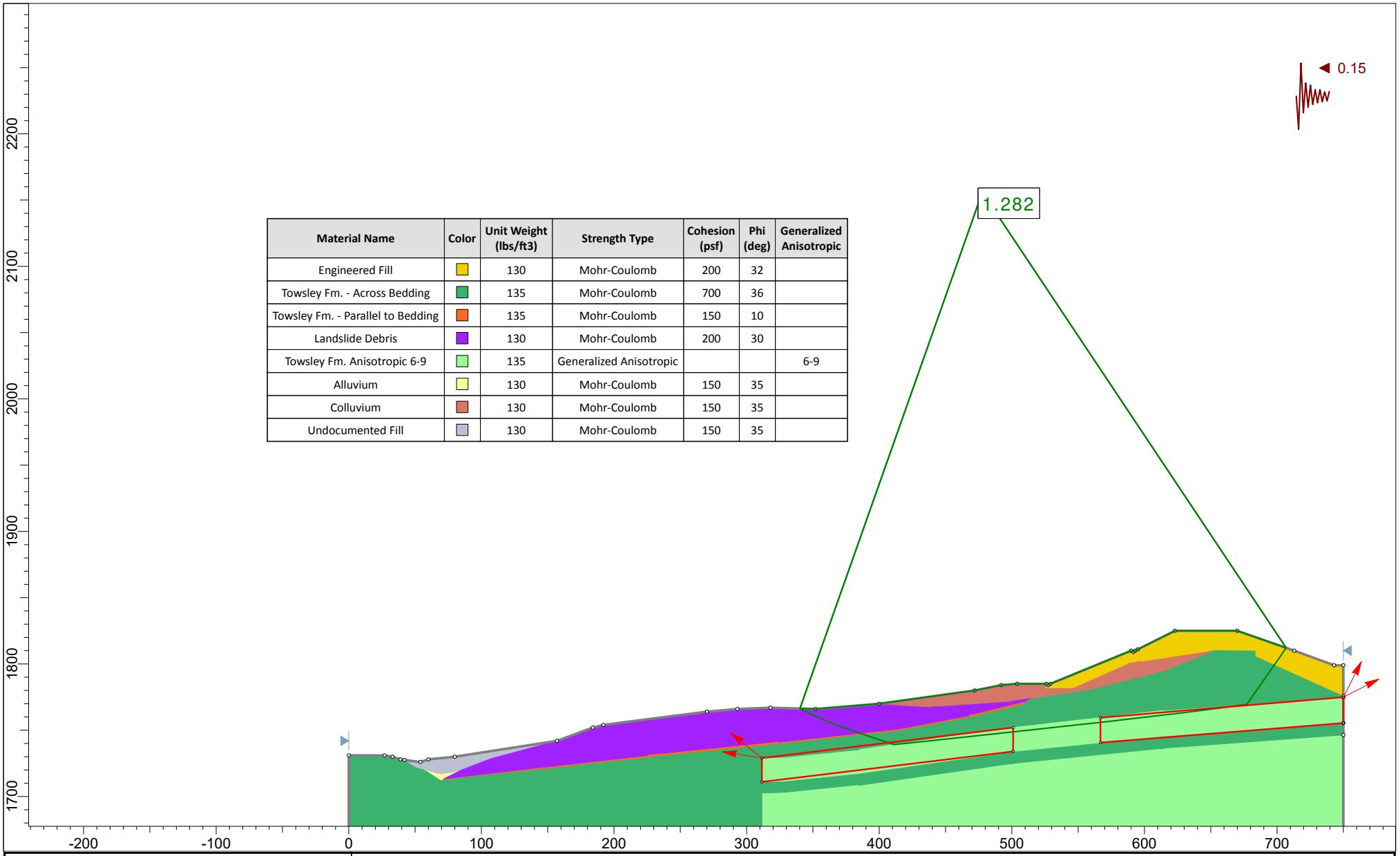
Type	Coordinates	
	X	Y
Material Boundary	71.7039	1713.31
	137	1721
	226	1731
	324	1741
	415.192	1751.04
	418.014	1751.57
	468	1761
	509	1771
	513.929	1773.96

Scenario-based Entities

Type	Coordinates		unox static
	X	Y	
Block Search Window	311.567	1728.99	
	311.567	1710.99	✓
	501	1734	
	501	1752	

Type	Coordinates		unox static
	X	Y	
Block Search Window	566.906	1759.52	
	566.906	1740.65	✓
	750	1755.45	
	750	1774.95	

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	



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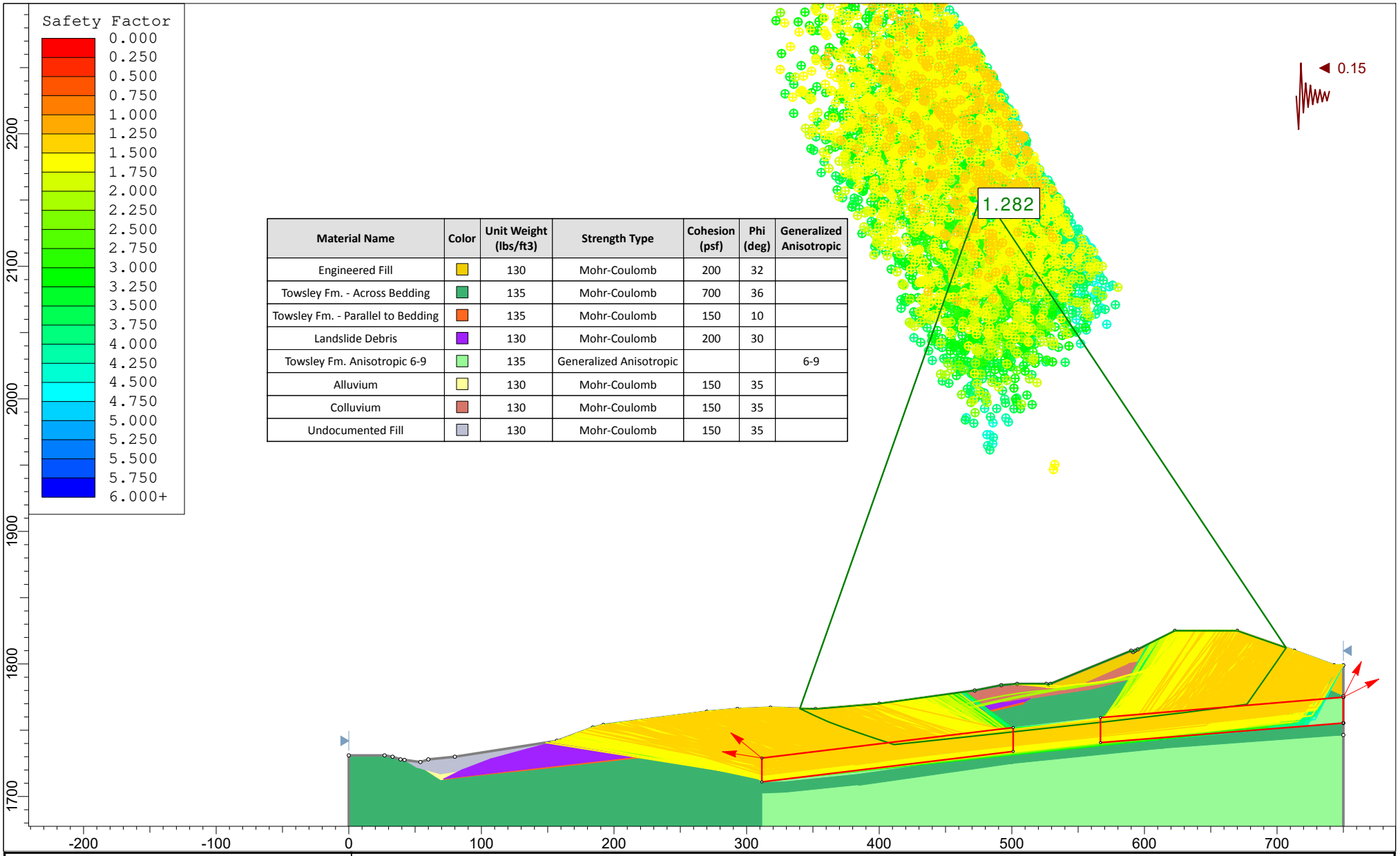
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Deep Bedrock - Pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	535		File Name WT13.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Deep Bedrock - Pseudo-static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 536		File Name: WT13.slmd	

Slide Analysis Information

WT13

Project Summary

File Name:	WT13.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:08.429s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT13-WT13' - Deep Bedrock - Pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	27

Right Projection Angle (End Angle) [°]:	63
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Seismic Load Coefficient (Horizontal): 0.15

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Colluvium	Undocumented Fill
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130	130
Cohesion [psf]	200	700	150	200		150	150	150
Friction Angle [°]	32	36	10	30		35	35	35
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	1.281960
Axis Location:	477.791, 2155.899
Left Slip Surface Endpoint:	340.240, 1766.346
Right Slip Surface Endpoint:	706.903, 1812.127
Resisting Moment:	2.38371e+08 lb-ft
Driving Moment:	1.85943e+08 lb-ft
Resisting Horizontal Force:	536573 lb
Driving Horizontal Force:	418557 lb
Total Slice Area:	13624.3 ft2
Surface Horizontal Width:	366.663 ft
Surface Average Height:	37.1576 ft

Global Minimum Coordinates

Method: spencer

X	Y
340.24	1766.35
350.976	1761.19
361.711	1756.37
373.748	1751.8
385.174	1747.86
396.917	1743.83
411.185	1739.13
421.644	1740.25

X	Y
432.102	1741.36
442.401	1742.46
452.701	1743.56
467.495	1745.14
479.14	1746.38
490.784	1747.62
502.429	1748.86
514.074	1750.1
525.719	1751.38
537.363	1752.68
549.008	1753.98
560.653	1755.28
572.57	1756.61
585.165	1758.02
600.531	1759.83
619.633	1762.1
638.689	1764.42
657.739	1766.8
677.263	1769.58
685.93	1781.97
692.921	1791.96
699.912	1801.95
706.903	1812.13

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 5007
Number of Invalid Surfaces: 8

Error Codes:

Error Code -111 reported for 8 surfaces

Error Codes

The following errors were encountered during the computation:

-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.28196**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	10.7354	3378.37	-25.6594	Landslide Debris	200	30	469.386	601.734	695.824	0	695.824	470.333	470.333
2	10.7353	10592.1	-24.1872	Landslide Debris	200	30	934.043	1197.41	1727.56	0	1727.56	1308.03	1308.03
3	12.0375	20703.1	-20.7969	Landslide Debris	200	30	1359.11	1742.33	2671.4	0	2671.4	2155.21	2155.21
4	5.71284	12802.7	-18.9966	Landslide Debris	200	30	1648.08	2112.77	3313.01	0	3313.01	2745.65	2745.65
5	5.71284	14616.9	-18.9966	Landslide Debris	200	30	1851.47	2373.51	3764.63	0	3764.63	3127.24	3127.24
6	0.284328	774.871	-18.9674	Landslide Debris	200	30	1957.17	2509.02	3999.34	0	3999.34	3326.67	3326.67
7	2.20387	6163.85	-18.9674	Towsley Fm. - Parallel to Bedding	150	10	564.069	723.114	3250.29	0	3250.29	3056.42	3056.42
8	9.25463	28947.4	-18.9674	Towsley Fm. - Across Bedding	700	36	3601.63	4617.15	5391.5	0	5391.5	4153.65	4153.65
9	7.13391	25700.6	-18.2109	Towsley Fm. - Across Bedding	700	36	3953.63	5068.4	6012.6	0	6012.6	4711.88	4711.88
10	7.13391	28873.5	-18.2109	Towsley Fm. - Across Bedding	700	36	4341.86	5566.09	6697.61	0	6697.61	5269.17	5269.17
11	10.4595	44923.1	6.08744	Towsley Fm. - Parallel to Bedding	150	10	686.386	879.919	4139.57	0	4139.57	4212.78	4212.78
12	10.4573	45413.6	6.08744	Towsley Fm. - Parallel to Bedding	150	10	692.708	888.024	4185.54	0	4185.54	4259.42	4259.42
13	10.2995	45220	6.08744	Towsley Fm. - Parallel to Bedding	150	10	699.022	896.118	4231.44	0	4231.44	4305.99	4305.99

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
14	10.2995	45708.1	6.08744	Towsley Fm. - Parallel to Bedding	150	10	705.287	904.15	4276.99	0	4276.99	4352.21	4352.21
15	7.3972	33129.3	6.08744	Towsley Fm. - Parallel to Bedding	150	10	710.67	911.05	4316.13	0	4316.13	4391.92	4391.92
16	7.3972	33381.1	6.08744	Towsley Fm. - Parallel to Bedding	150	10	715.17	916.819	4348.85	0	4348.85	4425.12	4425.12
17	5.82238	26462.4	6.08744	Towsley Fm. - Parallel to Bedding	150	10	719.436	922.288	4379.86	0	4379.86	4456.58	4456.58
18	5.82238	26816.4	6.08744	Towsley Fm. - Parallel to Bedding	150	10	727.474	932.592	4438.3	0	4438.3	4515.88	4515.88
19	11.6448	54936.8	6.08744	Towsley Fm. - Parallel to Bedding	150	10	742.278	951.571	4545.93	0	4545.93	4625.09	4625.09
20	5.82238	27959.5	6.08744	Towsley Fm. - Parallel to Bedding	150	10	753.428	965.865	4626.99	0	4626.99	4707.35	4707.35
21	5.82238	27891.2	6.08744	Towsley Fm. - Parallel to Bedding	150	10	751.878	963.877	4615.72	0	4615.72	4695.91	4695.91
22	11.6448	55017.1	6.08744	Towsley Fm. - Parallel to Bedding	150	10	743.19	952.74	4552.56	0	4552.56	4631.82	4631.82
23	5.82238	26870.3	6.24208	Towsley Fm. - Parallel to Bedding	150	10	728.087	933.378	4442.76	0	4442.76	4522.39	4522.39
24	5.82238	26395.4	6.24208	Towsley Fm. - Parallel to Bedding	150	10	717.313	919.567	4364.43	0	4364.43	4442.88	4442.88
25	5.82238	25892.6	6.36441	Towsley Fm. - Parallel to Bedding	150	10	705.44	904.346	4278.1	0	4278.1	4356.79	4356.79
26	5.82238	27122.1	6.36441	Towsley Fm. - Parallel to Bedding	150	10	733.311	940.075	4480.73	0	4480.73	4562.52	4562.52
27	5.82238	28443.3	6.36846	Towsley Fm. - Parallel to Bedding	150	10	763.242	978.446	4698.36	0	4698.36	4783.55	4783.55
28	5.82238	29764.3	6.36846	Towsley Fm. - Parallel to Bedding	150	10	793.187	1016.83	4916.06	0	4916.06	5004.59	5004.59
29	5.82238	31085.3	6.36846	Towsley Fm. - Parallel to Bedding	150	10	823.131	1055.22	5133.76	0	5133.76	5225.63	5225.63
30	5.82238	32406.5	6.36846	Towsley Fm. - Parallel to Bedding	150	10	853.077	1093.61	5351.49	0	5351.49	5446.71	5446.71
31	5.95854	34543.1	6.36846	Towsley Fm. - Parallel to Bedding	150	10	883.618	1132.76	5573.53	0	5573.53	5672.15	5672.15
32	5.95854	35945.2	6.36846	Towsley Fm. - Parallel to Bedding	150	10	914.67	1172.57	5799.3	0	5799.3	5901.39	5901.39
33	6.29745	39511.9	6.40678	Towsley Fm. - Parallel to Bedding	150	10	946.371	1213.21	6029.77	0	6029.77	6136.03	6136.03
34	6.29745	41074.4	6.40678	Towsley Fm. - Parallel to Bedding	150	10	979.11	1255.18	6267.78	0	6267.78	6377.72	6377.72
35	7.68309	51796.4	6.7123	Towsley Fm. - Parallel to Bedding	150	10	1006.32	1290.06	6465.6	0	6465.6	6584.03	6584.03
36	7.68309	53593.1	6.7123	Towsley Fm. - Parallel to Bedding	150	10	1037.12	1329.54	6689.52	0	6689.52	6811.58	6811.58
37	9.55077	70761.1	6.77987	Towsley Fm. - Parallel to Bedding	150	10	1093.79	1402.2	7101.58	0	7101.58	7231.62	7231.62
38	9.55077	75350.5	6.77987	Towsley Fm. - Parallel to Bedding	150	10	1157.06	1483.3	7561.52	0	7561.52	7699.08	7699.08
39	9.52795	78540.3	6.9501	Towsley Fm. - Parallel to Bedding	150	10	1202.46	1541.51	7891.64	0	7891.64	8038.22	8038.22
40	9.52795	77595.9	6.9501	Towsley Fm. - Parallel to Bedding	150	10	1189.43	1524.8	7796.86	0	7796.86	7941.85	7941.85
41	9.52531	76244.7	7.11061	Towsley Fm. - Parallel to Bedding	150	10	1170.01	1499.9	7655.68	0	7655.68	7801.63	7801.63
42	9.52531	74883.4	7.11061	Towsley Fm. - Parallel to Bedding	150	10	1151.23	1475.83	7519.15	0	7519.15	7662.76	7662.76
43	6.50789	50253.1	8.11675	Towsley Fm. - Parallel to Bedding	150	10	1126.49	1444.12	7339.3	0	7339.3	7499.96	7499.96
44	6.50789	49422.8	8.11675	Towsley Fm. - Parallel to Bedding	150	10	1109.82	1422.75	7218.15	0	7218.15	7376.43	7376.43
45	6.50789	47435.1	8.11675	Towsley Fm. - Parallel to Bedding	150	10	1069.94	1371.62	6928.15	0	6928.15	7080.74	7080.74
46	8.66678	52344.7	55.0181	Towsley Fm. - Across Bedding	700	36	2024.74	2595.63	2609.11	0	2609.11	5502.67	5502.67
47	6.99121	28964.1	55.0181	Towsley Fm. - Across Bedding	700	36	1500.52	1923.61	1684.16	0	1684.16	3828.56	3828.56
48	4.94668	13391.7	55.0181	Towsley Fm. - Across Bedding	700	36	1103.74	1414.95	984.044	0	984.044	2561.4	2561.4
49	2.04453	3835.6	55.0181	Engineered Fill	200	32	575.609	737.908	860.832	0	860.832	1683.44	1683.44
50	6.99119	5731.91	55.5065	Engineered Fill	200	32	309.173	396.347	314.22	0	314.22	764.178	764.178

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.28196**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	340.24	1766.35	0	0	0
2	350.976	1761.19	8120.81	1670.87	11.6264
3	361.711	1756.37	24889.2	5121.01	11.6265
4	373.748	1751.8	50357.5	10361.2	11.6265
5	379.461	1749.83	64368.1	13243.9	11.6265
6	385.174	1747.86	80156.7	16492.4	11.6265
7	385.458	1747.76	80987.8	16663.4	11.6265
8	387.662	1747.01	83768.3	17235.5	11.6265
9	396.917	1743.83	129907	26728.7	11.6265
10	404.051	1741.48	168369	34642.2	11.6264
11	411.185	1739.13	210732	43358.5	11.6265
12	421.644	1740.25	206555	42499.1	11.6265
13	432.102	1741.36	202319	41627.5	11.6265
14	442.401	1742.46	198088	40756.9	11.6264
15	452.701	1743.56	193798	39874.3	11.6265
16	460.098	1744.35	190680	39232.8	11.6265
17	467.495	1745.14	187533	38585.2	11.6264
18	473.317	1745.76	185032	38070.8	11.6265
19	479.14	1746.38	182490	37547.6	11.6264
20	490.784	1747.62	177247	36469	11.6265
21	496.607	1748.24	174567	35917.5	11.6265
22	502.429	1748.86	171895	35367.8	11.6265
23	514.074	1750.1	166643	34287.2	11.6265
24	519.896	1750.74	164022	33747.9	11.6265
25	525.719	1751.38	161460	33220.8	11.6265
26	531.541	1752.03	158905	32695.1	11.6265
27	537.363	1752.68	156197	32137.8	11.6265
28	543.186	1753.33	153321	31546.1	11.6265
29	549.008	1753.98	150280	30920.4	11.6265
30	554.831	1754.63	147074	30260.7	11.6264
31	560.653	1755.28	143702	29567	11.6265
32	566.612	1755.94	140079	28821.6	11.6265
33	572.57	1756.61	136281	28040	11.6264
34	578.868	1757.31	132050	27169.5	11.6264
35	585.165	1758.02	127623	26258.6	11.6264
36	592.848	1758.92	121738	25047.9	11.6265
37	600.531	1759.83	115619	23788.8	11.6264
38	610.082	1760.96	107388	22095.3	11.6265
39	619.633	1762.1	98550.3	20276.9	11.6265
40	629.161	1763.26	89060.4	18324.4	11.6265
41	638.689	1764.42	79698.1	16398.1	11.6265
42	648.214	1765.61	70309.5	14466.3	11.6265
43	657.739	1766.8	61108.3	12573.2	11.6265
44	664.247	1767.73	54089.5	11129	11.6264
45	670.755	1768.66	47199.2	9711.34	11.6265
46	677.263	1769.58	40616.7	8356.97	11.6265
47	685.93	1781.97	17997.2	3702.97	11.6265
48	692.921	1791.96	7316.42	1505.37	11.6265
49	697.868	1799.03	3811	784.121	11.6265
50	699.912	1801.95	1897.3	390.372	11.6264
51	706.903	1812.13	0	0	0

Entity Information

Group: Proposed Grades

Shared Entities

Type	Coordinates

Type	Coordinates	
	X	Y
External Boundary	743	1799
	713	1810
	670	1825
	623	1825
	595	1811
	593	1810
	591.5	1809
	590	1810
	529	1785
	527.5	1784
	526	1785
	504	1785
	492	1784
	472	1780
	400	1770
	352	1766
	318	1767
	293	1766
	270	1764
	192	1754
	184	1752
	157	1742
	80	1730
	60	1728
	54	1726
	42	1727.6
	39	1728
	33	1730
	27	1731
	0	1731
	0	1600
	311.567	1600
	750	1600
	750	1746.45
	750	1755.45
	750	1774.95
	750	1775.56
	750	1799

Type	X	Y
Material Boundary	311.567	1600
	311.567	1701.99
	311.567	1710.99
	311.567	1728.99
	328.966	1729.7
	384.366	1735.29
	501	1752
	615	1765
	750	1774.95

Type	X	Y
Material Boundary	311.567	1710.99
	328.966	1711.7
	384.366	1717.29
	501	1734
	615	1745.5
	750	1755.45

Type	Coordinates	
	X	Y
Material Boundary	311.567	1701.99
	328.966	1702.7
	384.366	1708.29
	501	1725
	615	1736.5
	750	1746.45

	X	Y
	595	1811
	607	1811
Material Boundary	653.192	1810.56
	654	1810.56
	684	1810.27
	713	1810

	X	Y
	42	1727.6
	51.0038	1722.08
	56	1720.68
Material Boundary	69.1119	1717
	82.2691	1718.96
	85	1720
	106.948	1728.39
	157	1742

	X	Y
	56	1720.68
Material Boundary	69.1119	1712
	71.7039	1713.31
	85	1720

	X	Y
	400	1770
	437.424	1767.68
	441.603	1767.96
	501	1772
Material Boundary	513.929	1773.96
	516.158	1774.29
	560.024	1780.94
	615.003	1795
	654	1810.56

	X	Y
	526	1785
	526	1782
	546	1782
Material Boundary	587.659	1800.3
	598	1802
	653.192	1810.56

	X	Y
	684	1810.27
Material Boundary	684	1805.27
	750	1775.56

	X	Y
	415.192	1750.04
	418.014	1751.57
Material Boundary	424.99	1755.36
	432.321	1760.37
	441.603	1767.96

Type	Coordinates	
	X	Y
Material Boundary	69.1119	1712
	137	1720
	226	1730
	324	1740
	415.192	1750.04
	468	1760
	509	1770
	516.158	1774.29

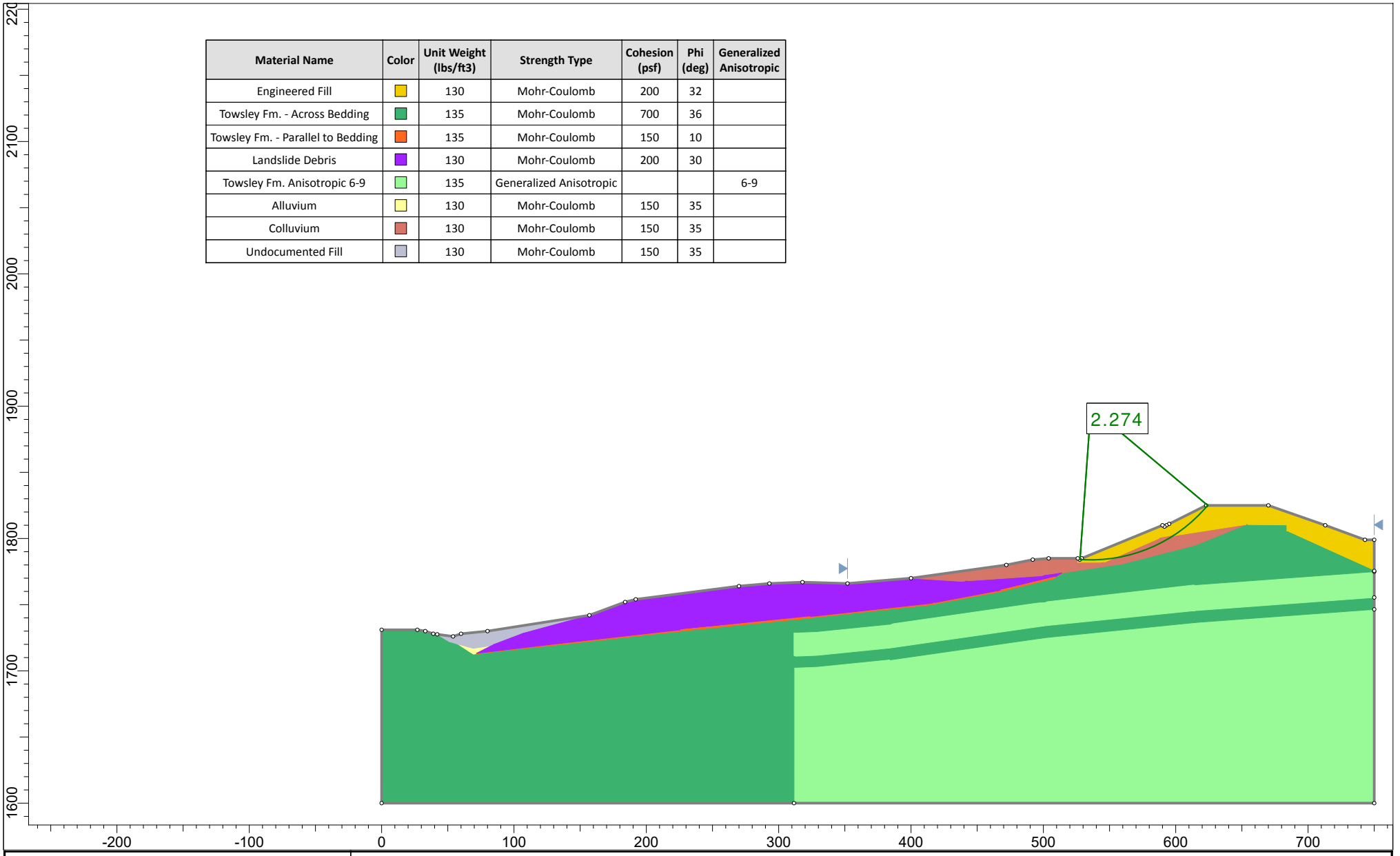
Type	Coordinates	
	X	Y
Material Boundary	71.7039	1713.31
	137	1721
	226	1731
	324	1741
	415.192	1751.04
	418.014	1751.57
	468	1761
	509	1771
	513.929	1773.96

Scenario-based Entities

Type	Coordinates		unox pseudo
	X	Y	
Block Search Window	311.567	1728.99	
	311.567	1710.99	✓
	501	1734	
	501	1752	

Type	Coordinates		unox pseudo
	X	Y	
Block Search Window	566.906	1759.52	
	566.906	1740.65	✓
	750	1755.45	
	750	1774.95	

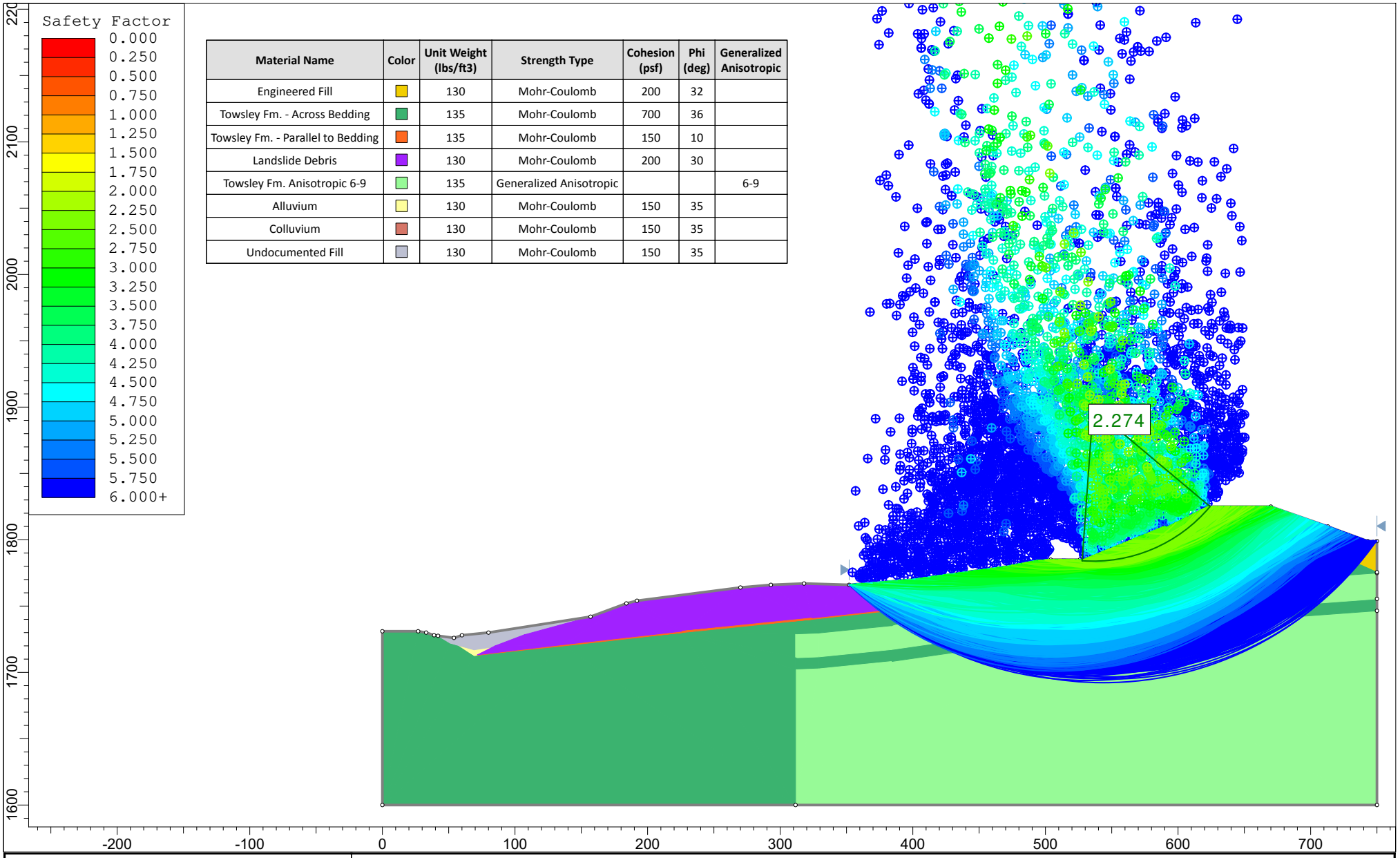
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	



rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Fill Slope - Static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	545		File Name WT13.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Fill Slope - Static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	546		File Name WT13.slmd

Slide Analysis Information

WT13

Project Summary

File Name:	WT13.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:01.758s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT13-WT13' - Fill Slope - Static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Slope Search
Number of Surfaces:	5000
Upper Angle [°]:	Not Defined
Lower Angle [°]:	Not Defined
Composite Surfaces:	Disabled
Reverse Curvature:	Create Tension Crack
Minimum Elevation:	Not Defined

Minimum Depth: Not Defined
Minimum Area: Not Defined
Minimum Weight: Not Defined

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Colluvium	Undocumented Fill
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130	130
Cohesion [psf]	200	700	150	200		150	150	150
Friction Angle [°]	32	36	10	30		35	35	35
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	2.274140
Center:	535.932, 1899.051
Radius:	115.214
Left Slip Surface Endpoint:	527.697, 1784.131
Right Slip Surface Endpoint:	624.198, 1825.000
Resisting Moment:	1.05008e+07 lb-ft
Driving Moment:	4.61747e+06 lb-ft
Resisting Horizontal Force:	82937.8 lb
Driving Horizontal Force:	36470 lb
Total Slice Area:	860.623 ft2
Surface Horizontal Width:	96.5009 ft
Surface Average Height:	8.91829 ft

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4804
Number of Invalid Surfaces: 196

Error Codes:

Error Code -101 reported for 1 surface
Error Code -105 reported for 2 surfaces
Error Code -106 reported for 96 surfaces
Error Code -107 reported for 14 surfaces
Error Code -108 reported for 23 surfaces
Error Code -111 reported for 59 surfaces
Error Code -112 reported for 1 surface

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.27414**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.95492	174.192	-3.61187	Engineered Fill	200	32	128.733	292.757	148.441	0	148.441	140.315	140.315
2	1.95492	433.275	-2.6382	Engineered Fill	200	32	169.705	385.932	297.553	0	297.553	289.733	289.733
3	1.95492	655.558	-1.6653	Engineered Fill	200	32	203.783	463.431	421.578	0	421.578	415.654	415.654
4	1.95492	869.4	-0.692868	Engineered Fill	200	32	235.697	536.008	537.727	0	537.727	534.877	534.877
5	1.95492	1074.81	0.27936	Engineered Fill	200	32	265.523	603.837	646.275	0	646.275	647.57	647.57
6	1.95492	1271.79	1.25167	Engineered Fill	200	32	293.332	667.078	747.48	0	747.48	753.889	753.889
7	1.95492	1460.32	2.22434	Engineered Fill	200	32	319.19	725.883	841.59	0	841.59	853.988	853.988
8	1.95492	1640.41	3.19765	Engineered Fill	200	32	343.157	780.388	928.816	0	928.816	947.987	947.987
9	1.95492	1812.03	4.17188	Engineered Fill	200	32	365.292	830.725	1009.37	0	1009.37	1036.02	1036.02
10	1.95492	1975.15	5.14733	Engineered Fill	200	32	385.646	877.012	1083.44	0	1083.44	1118.18	1118.18
11	1.95492	2129.73	6.12427	Engineered Fill	200	32	404.268	919.361	1151.22	0	1151.22	1194.6	1194.6
12	1.95492	2275.74	7.10301	Engineered Fill	200	32	421.204	957.877	1212.86	0	1212.86	1265.34	1265.34
13	1.95492	2413.12	8.08384	Engineered Fill	200	32	436.497	992.655	1268.51	0	1268.51	1330.51	1330.51
14	1.95312	2539.41	9.0666	Colluvium	150	35	473.309	1076.37	1322.99	0	1322.99	1398.52	1398.52
15	1.95312	2659.13	10.0516	Colluvium	150	35	486.843	1107.15	1366.95	0	1366.95	1453.25	1453.25
16	1.95312	2770.05	11.0396	Colluvium	150	35	498.636	1133.97	1405.25	0	1405.25	1502.54	1502.54
17	1.95312	2872.07	12.031	Colluvium	150	35	508.729	1156.92	1438.03	0	1438.03	1546.45	1546.45
18	1.95312	2965.1	13.026	Colluvium	150	35	517.154	1176.08	1465.39	0	1465.39	1585.03	1585.03
19	1.95312	3049.04	14.025	Colluvium	150	35	523.948	1191.53	1487.46	0	1487.46	1618.34	1618.34
20	1.95312	3123.77	15.0284	Colluvium	150	35	529.141	1203.34	1504.32	0	1504.32	1646.39	1646.39
21	1.95312	3189.17	16.0366	Colluvium	150	35	532.764	1211.58	1516.09	0	1516.09	1669.23	1669.23
22	1.95312	3245.1	17.0499	Colluvium	150	35	534.844	1216.31	1522.85	0	1522.85	1686.88	1686.88
23	1.95312	3291.4	18.0687	Colluvium	150	35	535.407	1217.59	1524.67	0	1524.67	1699.35	1699.35
24	1.95312	3327.92	19.0934	Colluvium	150	35	534.47	1215.46	1521.64	0	1521.64	1706.65	1706.65
25	1.95312	3354.47	20.1246	Colluvium	150	35	532.065	1209.99	1513.82	0	1513.82	1708.78	1708.78
26	1.95312	3370.86	21.1626	Colluvium	150	35	528.204	1201.21	1501.28	0	1501.28	1705.76	1705.76
27	1.95312	3376.89	22.2079	Colluvium	150	35	522.905	1189.16	1484.08	0	1484.08	1697.55	1697.55
28	1.95312	3372.31	23.2611	Colluvium	150	35	516.191	1173.89	1462.27	0	1462.27	1684.16	1684.16
29	1.95312	3356.9	24.3226	Colluvium	150	35	508.069	1155.42	1435.9	0	1435.9	1665.54	1665.54
30	1.95312	3330.36	25.3932	Colluvium	150	35	498.562	1133.8	1405.01	0	1405.01	1641.68	1641.68
31	1.95312	3292.42	26.4733	Colluvium	150	35	487.676	1109.04	1369.66	0	1369.66	1612.52	1612.52
32	1.95312	3239.36	27.5637	Colluvium	150	35	474.993	1080.2	1328.46	0	1328.46	1576.4	1576.4
33	1.95312	2893.2	28.665	Colluvium	150	35	425.744	968.201	1168.51	0	1168.51	1401.26	1401.26
34	1.95312	2790.67	29.778	Colluvium	150	35	407.774	927.336	1110.15	0	1110.15	1343.48	1343.48
35	1.95312	2755.73	30.9035	Colluvium	150	35	398.373	905.957	1079.62	0	1079.62	1318.07	1318.07
36	1.95312	2700.08	32.0424	Colluvium	150	35	386.574	879.123	1041.3	0	1041.3	1283.25	1283.25
37	1.86895	2518.97	33.1706	Engineered Fill	200	32	363.205	825.98	1001.78	0	1001.78	1239.18	1239.18
38	1.86895	2442.8	34.2882	Engineered Fill	200	32	350.63	797.382	956.011	0	956.011	1195.09	1195.09
39	1.86895	2353.55	35.4209	Engineered Fill	200	32	336.826	765.989	905.771	0	905.771	1145.33	1145.33
40	1.86895	2250.69	36.5698	Engineered Fill	200	32	321.79	731.795	851.049	0	851.049	1089.77	1089.77
41	1.86895	2133.59	37.7361	Engineered Fill	200	32	305.52	694.795	791.836	0	791.836	1028.28	1028.28
42	1.86895	2001.59	38.9211	Engineered Fill	200	32	288.011	654.978	728.116	0	728.116	960.687	960.687
43	1.86895	1853.93	40.1262	Engineered Fill	200	32	269.258	612.33	659.867	0	659.867	886.813	886.813
44	1.86895	1689.77	41.353	Engineered Fill	200	32	249.254	566.838	587.063	0	587.063	806.447	806.447
45	1.86895	1508.17	42.6035	Engineered Fill	200	32	227.99	518.482	509.676	0	509.676	719.349	719.349
46	1.86895	1308.08	43.8796	Engineered Fill	200	32	205.458	467.241	427.677	0	427.677	625.253	625.253
47	1.86895	1088.29	45.1836	Engineered Fill	200	32	181.648	413.093	341.02	0	341.02	523.836	523.836
48	1.86895	847.421	46.5183	Engineered Fill	200	32	156.547	356.01	249.668	0	249.668	414.74	414.74
49	1.86895	583.901	47.8867	Engineered Fill	200	32	130.143	295.963	153.573	0	153.573	297.537	297.537
50	1.86895	249.257	49.2922	Engineered Fill	200	32	98.5505	224.118	38.596	0	38.596	153.14	153.14

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.27414**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	527.697	1784.13	0	0	0
2	529.652	1784.01	269.493	101.141	20.5712
3	531.607	1783.92	627.413	235.469	20.5712
4	533.562	1783.86	1048.98	393.684	20.5712
5	535.517	1783.84	1521.57	571.047	20.5712
6	537.472	1783.85	2033.49	763.168	20.5711
7	539.427	1783.89	2573.89	965.982	20.5711
8	541.381	1783.97	3132.77	1175.73	20.5711
9	543.336	1784.07	3700.88	1388.94	20.5711
10	545.291	1784.22	4269.68	1602.41	20.5711
11	547.246	1784.39	4831.33	1813.2	20.5711
12	549.201	1784.6	5378.64	2018.61	20.5712
13	551.156	1784.85	5905.01	2216.15	20.5711
14	553.111	1785.12	6404.46	2403.6	20.5712
15	555.064	1785.44	6914.76	2595.11	20.5711
16	557.017	1785.78	7390.54	2773.67	20.5711
17	558.97	1786.16	7827.08	2937.51	20.5712
18	560.923	1786.58	8220.18	3085.04	20.5712
19	562.877	1787.03	8566.16	3214.88	20.5711
20	564.83	1787.52	8861.82	3325.84	20.5711
21	566.783	1788.04	9104.46	3416.91	20.5711
22	568.736	1788.61	9291.87	3487.24	20.5711
23	570.689	1789.2	9422.29	3536.19	20.5711
24	572.642	1789.84	9494.47	3563.28	20.5711
25	574.595	1790.52	9507.59	3568.2	20.5711
26	576.548	1791.23	9461.34	3550.84	20.5711
27	578.501	1791.99	9355.87	3511.26	20.5711
28	580.455	1792.79	9191.84	3449.7	20.5711
29	582.408	1793.63	8970.4	3366.59	20.5711
30	584.361	1794.51	8693.2	3262.56	20.5711
31	586.314	1795.44	8362.45	3138.43	20.5711
32	588.267	1796.41	7980.9	2995.23	20.5711
33	590.22	1797.43	7552.47	2834.44	20.5711
34	592.173	1798.5	7134.71	2677.66	20.5711
35	594.126	1799.61	6688.94	2510.36	20.5711
36	596.08	1800.78	6203.34	2328.12	20.5712
37	598.033	1802.01	5683.97	2133.2	20.5712
38	599.902	1803.23	5137.66	1928.17	20.5712
39	601.771	1804.5	4573.42	1716.41	20.5712
40	603.639	1805.83	3997.74	1500.35	20.5711
41	605.508	1807.22	3418.02	1282.78	20.5711
42	607.377	1808.66	2842.63	1066.84	20.5711
43	609.246	1810.17	2281	856.06	20.5711
44	611.115	1811.75	1743.79	654.447	20.5712
45	612.984	1813.39	1243.03	466.51	20.5711
46	614.853	1815.11	792.276	297.342	20.5712
47	616.722	1816.91	406.886	152.705	20.5712
48	618.591	1818.79	104.273	39.1336	20.5711
49	620.46	1820.76	-95.7419	-35.932	20.5711
50	622.329	1822.83	-170.484	-63.9829	20.5712
51	624.198	1825	0	0	0

Entity Information

Group: Proposed Grades

Shared Entities

Type	Coordinates

Type	Coordinates	
	X	Y
External Boundary	743	1799
	713	1810
	670	1825
	623	1825
	595	1811
	593	1810
	591.5	1809
	590	1810
	529	1785
	527.5	1784
	526	1785
	504	1785
	492	1784
	472	1780
	400	1770
	352	1766
	318	1767
	293	1766
	270	1764
	192	1754
	184	1752
	157	1742
	80	1730
	60	1728
	54	1726
	42	1727.6
	39	1728
	33	1730
	27	1731
	0	1731
	0	1600
	311.567	1600
	750	1600
	750	1746.45
	750	1755.45
	750	1774.95
	750	1775.56
	750	1799

Type	X	Y
Material Boundary	311.567	1600
	311.567	1701.99
	311.567	1710.99
	311.567	1728.99
	328.966	1729.7
	384.366	1735.29
	501	1752
	615	1765
	750	1774.95

Type	X	Y
Material Boundary	311.567	1710.99
	328.966	1711.7
	384.366	1717.29
	501	1734
	615	1745.5
	750	1755.45

Type	Coordinates	
	X	Y
Material Boundary	311.567	1701.99
	328.966	1702.7
	384.366	1708.29
	501	1725
	615	1736.5
	750	1746.45

Type	X	Y
Material Boundary	595	1811
	607	1811
	653.192	1810.56
	654	1810.56
	684	1810.27
	713	1810

Type	X	Y
Material Boundary	42	1727.6
	51.0038	1722.08
	56	1720.68
	69.1119	1717
	82.2691	1718.96
	85	1720
	106.948	1728.39
	157	1742

Type	X	Y
Material Boundary	56	1720.68
	69.1119	1712
	71.7039	1713.31
	85	1720

Type	X	Y
Material Boundary	400	1770
	437.424	1767.68
	441.603	1767.96
	501	1772
	513.929	1773.96
	516.158	1774.29
	560.024	1780.94
	615.003	1795
	654	1810.56

Type	X	Y
Material Boundary	526	1785
	526	1782
	546	1782
	587.659	1800.3
	598	1802
	653.192	1810.56

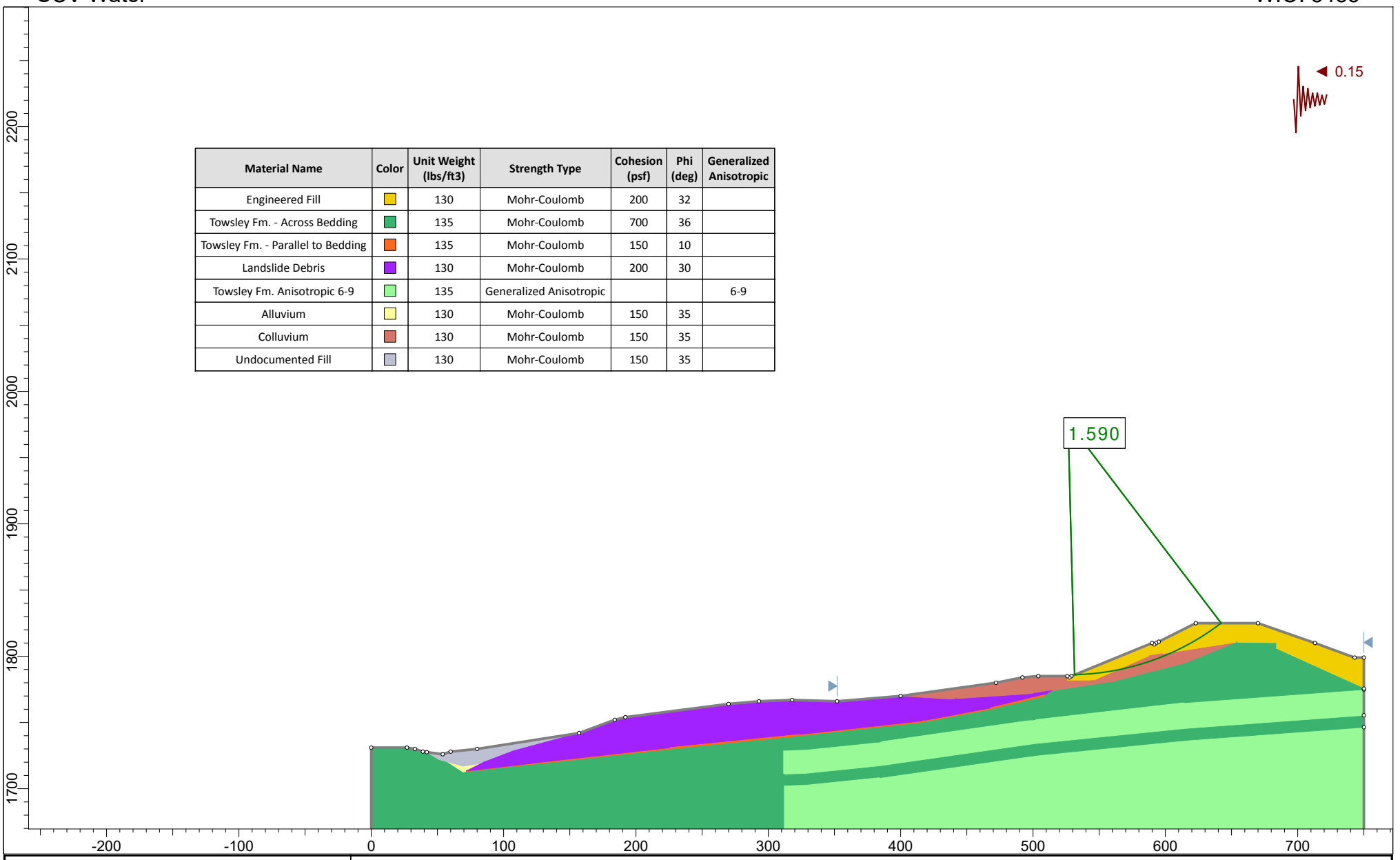
Type	X	Y
Material Boundary	684	1810.27
	684	1805.27
	750	1775.56

Type	X	Y
Material Boundary	415.192	1750.04
	418.014	1751.57
	424.99	1755.36
	432.321	1760.37
	441.603	1767.96

Type	Coordinates	
	X	Y
Material Boundary	69.1119	1712
	137	1720
	226	1730
	324	1740
	415.192	1750.04
	468	1760
	509	1770
	516.158	1774.29

	X	Y
Material Boundary	71.7039	1713.31
	137	1721
	226	1731
	324	1741
	415.192	1751.04
	418.014	1751.57
	468	1761
	509	1771
	513.929	1773.96

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	



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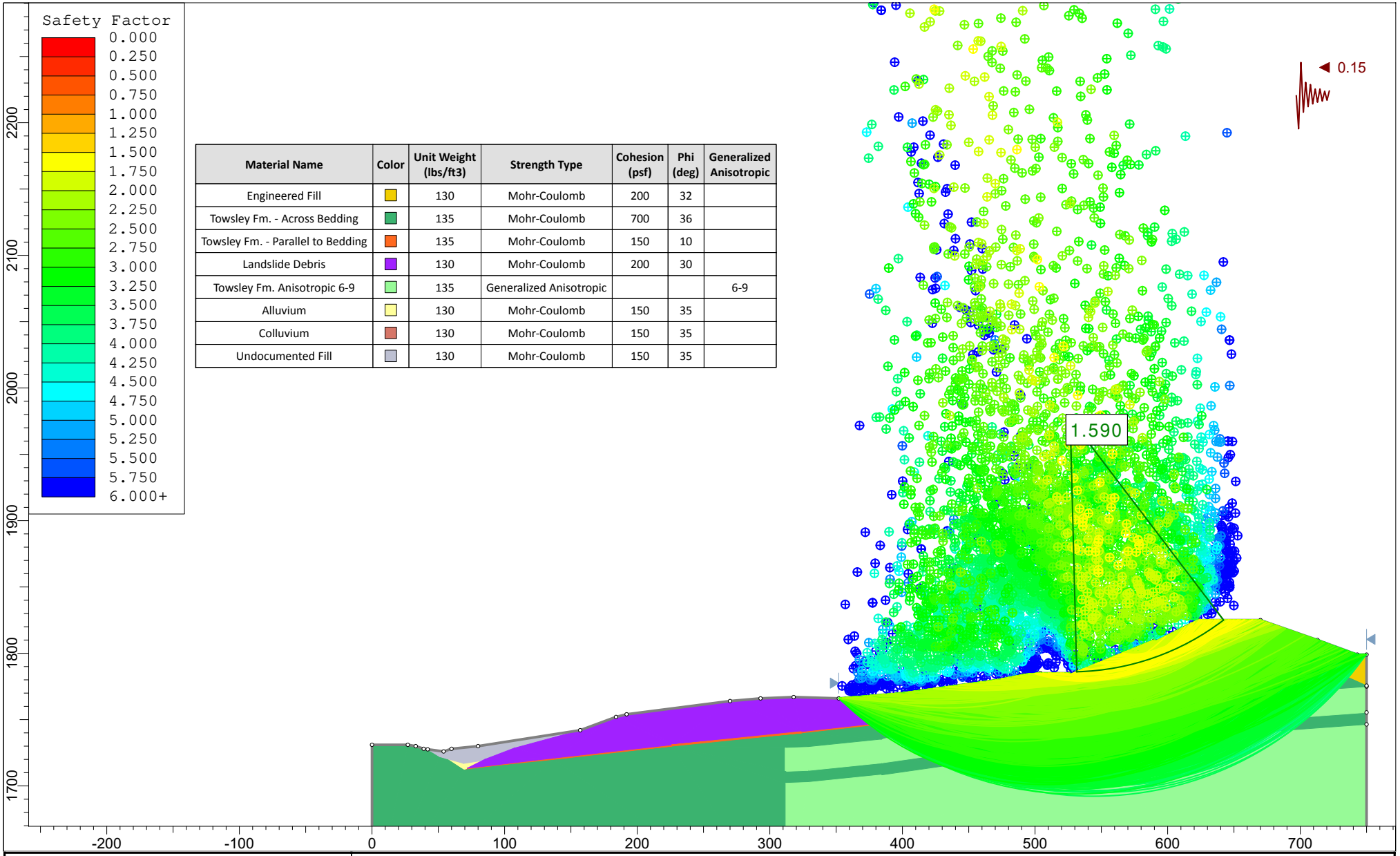
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Fill Slope - Pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date			File Name WT13.slmd

554



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Colluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT13-WT13' - Fill Slope - Pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	555		File Name WT13.slmd

Slide Analysis Information

WT13

Project Summary

File Name:	WT13.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:01.734s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT13-WT13' - Fill Slope - Pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used

Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Slope Search
Number of Surfaces:	5000
Upper Angle [°]:	Not Defined
Lower Angle [°]:	Not Defined
Composite Surfaces:	Disabled
Reverse Curvature:	Create Tension Crack
Minimum Elevation:	Not Defined

Minimum Depth: Not Defined
Minimum Area: Not Defined
Minimum Weight: Not Defined

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Seismic Load Coefficient (Horizontal): 0.15

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Colluvium	Undocumented Fill
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130	130
Cohesion [psf]	200	700	150	200		150	150	150
Friction Angle [°]	32	36	10	30		35	35	35
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	1.590330
Center:	526.443, 1976.869
Radius:	190.944
Left Slip Surface Endpoint:	531.415, 1785.990
Right Slip Surface Endpoint:	642.181, 1825.000
Resisting Moment:	1.95139e+07 lb-ft
Driving Moment:	1.22704e+07 lb-ft
Resisting Horizontal Force:	95301.9 lb
Driving Horizontal Force:	59925.9 lb
Total Slice Area:	1034.57 ft2
Surface Horizontal Width:	110.767 ft
Surface Average Height:	9.34012 ft

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4718
Number of Invalid Surfaces: 282

Error Codes:

Error Code -101 reported for 1 surface
Error Code -105 reported for 2 surfaces
Error Code -106 reported for 96 surfaces
Error Code -108 reported for 5 surfaces
Error Code -111 reported for 178 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.59033**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.25242	124.614	1.83023	Engineered Fill	200	32	178.56	283.97	134.38	0	134.38	140.086	140.086
2	2.25242	369.943	2.5066	Engineered Fill	200	32	224.404	356.877	251.056	0	251.056	260.88	260.88
3	2.25242	607.469	3.18333	Engineered Fill	200	32	267.626	425.613	361.056	0	361.056	375.94	375.94
4	2.25242	837.179	3.86049	Engineered Fill	200	32	308.308	490.312	464.599	0	464.599	485.404	485.404
5	2.25242	1059.05	4.5382	Engineered Fill	200	32	346.534	551.104	561.885	0	561.885	589.391	589.391
6	2.25242	1273.07	5.21655	Engineered Fill	200	32	382.38	608.11	653.113	0	653.113	688.023	688.023
7	2.25242	1479.22	5.89563	Engineered Fill	200	32	415.917	661.446	738.467	0	738.467	781.416	781.416
8	2.25242	1677.45	6.57554	Engineered Fill	200	32	447.216	711.221	818.125	0	818.125	869.676	869.676
9	2.25242	1867.76	7.25638	Engineered Fill	200	32	476.341	757.54	892.252	0	892.252	952.905	952.905
10	2.25242	2050.09	7.93826	Engineered Fill	200	32	503.355	800.501	961.002	0	961.002	1031.19	1031.19
11	2.25242	2224.41	8.62126	Engineered Fill	200	32	528.317	840.199	1024.53	0	1024.53	1104.64	1104.64
12	2.25242	2390.68	9.30551	Engineered Fill	200	32	551.284	876.723	1082.98	0	1082.98	1173.31	1173.31
13	2.25242	2548.85	9.9911	Engineered Fill	200	32	572.308	910.158	1136.49	0	1136.49	1237.31	1237.31
14	2.25242	2698.88	10.6781	Engineered Fill	200	32	591.441	940.587	1185.19	0	1185.19	1296.71	1296.71
15	2.25771	2847.54	11.3675	Colluvium	150	35	639.324	1016.74	1237.83	0	1237.83	1366.36	1366.36
16	2.25771	2981.72	12.0594	Colluvium	150	35	656.817	1044.55	1277.56	0	1277.56	1417.88	1417.88
17	2.25771	3107.52	12.7531	Colluvium	150	35	672.285	1069.15	1312.69	0	1312.69	1464.85	1464.85
18	2.25771	3224.88	13.4487	Colluvium	150	35	685.781	1090.62	1343.34	0	1343.34	1507.33	1507.33
19	2.25771	3333.71	14.1463	Colluvium	150	35	697.355	1109.03	1369.63	0	1369.63	1545.39	1545.39
20	2.25771	3433.96	14.846	Colluvium	150	35	707.056	1124.45	1391.66	0	1391.66	1579.09	1579.09
21	2.25771	3525.53	15.5481	Colluvium	150	35	714.93	1136.97	1409.55	0	1409.55	1608.46	1608.46
22	2.25771	3608.33	16.2525	Colluvium	150	35	721.02	1146.66	1423.38	0	1423.38	1633.57	1633.57
23	2.25771	3682.28	16.9595	Colluvium	150	35	725.371	1153.58	1433.25	0	1433.25	1654.46	1654.46
24	2.25771	3747.27	17.6691	Colluvium	150	35	728.012	1157.78	1439.26	0	1439.26	1671.17	1671.17
25	2.25771	3803.21	18.3816	Colluvium	150	35	729	1159.35	1441.5	0	1441.5	1683.75	1683.75
26	2.25771	3849.86	19.097	Colluvium	150	35	728.339	1158.3	1440	0	1440	1692.16	1692.16
27	2.25771	3573.09	19.8155	Colluvium	150	35	675.52	1074.3	1320.03	0	1320.03	1563.44	1563.44
28	2.25771	3560.66	20.5372	Colluvium	150	35	665.909	1059.01	1298.21	0	1298.21	1547.68	1547.68
29	2.25771	3644.26	21.2624	Colluvium	150	35	671.504	1067.91	1310.92	0	1310.92	1572.22	1572.22
30	2.25771	3712.85	21.9912	Colluvium	150	35	674.52	1072.71	1317.76	0	1317.76	1590.17	1590.17
31	2.25771	3771.61	22.7238	Colluvium	150	35	675.839	1074.81	1320.76	0	1320.76	1603.8	1603.8
32	2.25771	3820.38	23.4603	Colluvium	150	35	675.491	1074.25	1319.97	0	1319.97	1613.12	1613.12
33	2.25771	3859.01	24.2009	Colluvium	150	35	673.507	1071.1	1315.46	0	1315.46	1618.16	1618.16
34	2.13743	3679.76	24.9259	Engineered Fill	200	32	638.94	1016.13	1306.07	0	1306.07	1603.01	1603.01
35	2.13743	3696.2	25.6352	Engineered Fill	200	32	634.819	1009.57	1295.59	0	1295.59	1600.22	1600.22
36	2.13743	3703.58	26.3488	Engineered Fill	200	32	629.454	1001.04	1281.93	0	1281.93	1593.7	1593.7
37	2.13743	3701.71	27.0668	Engineered Fill	200	32	622.861	990.554	1265.15	0	1265.15	1583.43	1583.43
38	2.13743	3690.43	27.7894	Engineered Fill	200	32	615.055	978.141	1245.29	0	1245.29	1569.42	1569.42
39	2.13743	3669.54	28.5169	Engineered Fill	200	32	606.054	963.826	1222.38	0	1222.38	1551.67	1551.67
40	2.13743	3638.85	29.2494	Engineered Fill	200	32	595.873	947.634	1196.47	0	1196.47	1530.16	1530.16
41	2.13743	3598.15	29.9872	Engineered Fill	200	32	584.524	929.586	1167.58	0	1167.58	1504.88	1504.88
42	2.13743	3406.33	30.7305	Engineered Fill	200	32	554.186	881.339	1090.37	0	1090.37	1419.82	1419.82
43	2.13743	3048.06	31.4796	Engineered Fill	200	32	503.616	800.916	961.668	0	961.668	1270.04	1270.04
44	2.13743	2678.97	32.2348	Engineered Fill	200	32	452.792	720.088	832.316	0	832.316	1117.84	1117.84
45	2.13743	2298.89	32.9962	Engineered Fill	200	32	401.734	638.889	702.37	0	702.37	963.222	963.222
46	2.13743	1907.54	33.7644	Engineered Fill	200	32	350.449	557.33	571.846	0	571.846	806.135	806.135
47	2.13743	1504.62	34.5394	Engineered Fill	200	32	298.948	475.426	440.774	0	440.774	646.538	646.538
48	2.13743	1089.79	35.3218	Engineered Fill	200	32	247.239	393.191	309.17	0	309.17	484.365	484.365
49	2.13743	662.725	36.1118	Engineered Fill	200	32	195.329	310.638	177.057	0	177.057	319.555	319.555
50	2.13743	223.043	36.9098	Engineered Fill	200	32	143.117	227.604	44.175	0	44.175	151.669	151.669

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.59033**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	531.415	1785.99	0	0	0
2	533.667	1786.06	374.336	195.843	27.6174
3	535.92	1786.16	800.181	418.635	27.6175
4	538.172	1786.29	1267.4	663.07	27.6174
5	540.425	1786.44	1766.52	924.199	27.6174
6	542.677	1786.62	2288.73	1197.41	27.6175
7	544.929	1786.82	2825.83	1478.4	27.6174
8	547.182	1787.05	3370.19	1763.2	27.6175
9	549.434	1787.31	3914.74	2048.1	27.6175
10	551.687	1787.6	4452.96	2329.68	27.6175
11	553.939	1787.92	4978.81	2604.79	27.6174
12	556.191	1788.26	5486.76	2870.54	27.6175
13	558.444	1788.63	5971.76	3124.28	27.6175
14	560.696	1789.02	6429.17	3363.58	27.6174
15	562.949	1789.45	6854.83	3586.28	27.6175
16	565.206	1789.9	7311.08	3824.98	27.6175
17	567.464	1790.38	7732.38	4045.39	27.6175
18	569.722	1790.89	8115.21	4245.68	27.6175
19	571.98	1791.43	8456.47	4424.22	27.6175
20	574.237	1792	8753.46	4579.6	27.6175
21	576.495	1792.6	9003.86	4710.6	27.6175
22	578.753	1793.23	9205.76	4816.23	27.6175
23	581.01	1793.89	9357.6	4895.66	27.6174
24	583.268	1794.58	9458.19	4948.29	27.6174
25	585.526	1795.3	9506.72	4973.68	27.6174
26	587.784	1796.05	9502.73	4971.59	27.6174
27	590.041	1796.83	9446.1	4941.97	27.6175
28	592.299	1797.64	9363.32	4898.66	27.6175
29	594.557	1798.49	9236.53	4832.32	27.6174
30	596.814	1799.37	9056.17	4737.97	27.6175
31	599.072	1800.28	8822.54	4615.74	27.6175
32	601.33	1801.22	8535.76	4465.7	27.6175
33	603.587	1802.2	8196.36	4288.14	27.6175
34	605.845	1803.22	7805.22	4083.5	27.6175
35	607.983	1804.21	7323.3	3831.37	27.6175
36	610.12	1805.24	6798.58	3556.85	27.6175
37	612.257	1806.3	6233.04	3260.97	27.6174
38	614.395	1807.39	5628.97	2944.94	27.6175
39	616.532	1808.51	4988.97	2610.1	27.6174
40	618.67	1809.68	4315.97	2258.01	27.6175
41	620.807	1810.87	3613.23	1890.35	27.6174
42	622.945	1812.11	2884.36	1509.03	27.6175
43	625.082	1813.38	2173.96	1137.36	27.6174
44	627.219	1814.68	1535.95	803.573	27.6175
45	629.357	1816.03	981.327	513.406	27.6175
46	631.494	1817.42	521.463	272.816	27.6174
47	633.632	1818.85	168.191	87.9934	27.6175
48	635.769	1820.32	-66.172	-34.6196	27.6175
49	637.907	1821.84	-168.788	-88.3059	27.6175
50	640.044	1823.39	-126.255	-66.0537	27.6175
51	642.181	1825	0	0	0

Entity Information

Group: Proposed Grades

Shared Entities

Type	Coordinates

Type	Coordinates	
	X	Y
External Boundary	743	1799
	713	1810
	670	1825
	623	1825
	595	1811
	593	1810
	591.5	1809
	590	1810
	529	1785
	527.5	1784
	526	1785
	504	1785
	492	1784
	472	1780
	400	1770
	352	1766
	318	1767
	293	1766
	270	1764
	192	1754
	184	1752
	157	1742
	80	1730
	60	1728
	54	1726
	42	1727.6
	39	1728
	33	1730
	27	1731
	0	1731
	0	1600
	311.567	1600
	750	1600
	750	1746.45
	750	1755.45
	750	1774.95
	750	1775.56
	750	1799

Type	X	Y
Material Boundary	311.567	1600
	311.567	1701.99
	311.567	1710.99
	311.567	1728.99
	328.966	1729.7
	384.366	1735.29
	501	1752
	615	1765
	750	1774.95

Type	X	Y
Material Boundary	311.567	1710.99
	328.966	1711.7
	384.366	1717.29
	501	1734
	615	1745.5
	750	1755.45

Type	Coordinates	
	X	Y
Material Boundary	311.567	1701.99
	328.966	1702.7
	384.366	1708.29
	501	1725
	615	1736.5
	750	1746.45

	X	Y
	595	1811
	607	1811
Material Boundary	653.192	1810.56
	654	1810.56
	684	1810.27
	713	1810

	X	Y
	42	1727.6
	51.0038	1722.08
	56	1720.68
Material Boundary	69.1119	1717
	82.2691	1718.96
	85	1720
	106.948	1728.39
	157	1742

	X	Y
	56	1720.68
Material Boundary	69.1119	1712
	71.7039	1713.31
	85	1720

	X	Y
	400	1770
	437.424	1767.68
	441.603	1767.96
	501	1772
Material Boundary	513.929	1773.96
	516.158	1774.29
	560.024	1780.94
	615.003	1795
	654	1810.56

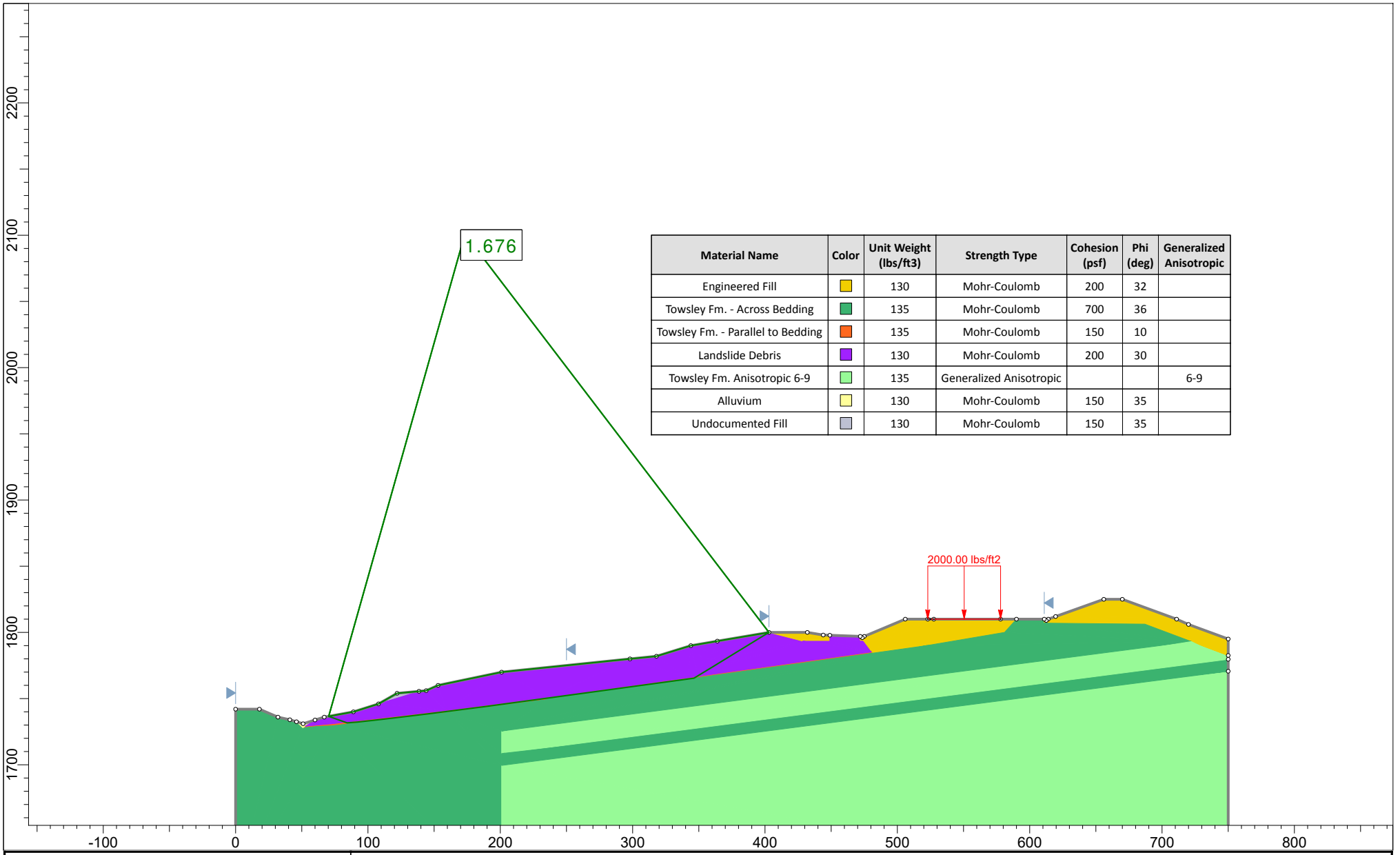
	X	Y
	526	1785
	526	1782
	546	1782
Material Boundary	587.659	1800.3
	598	1802
	653.192	1810.56

	X	Y
	684	1810.27
Material Boundary	684	1805.27
	750	1775.56

	X	Y
	415.192	1750.04
	418.014	1751.57
Material Boundary	424.99	1755.36
	432.321	1760.37
	441.603	1767.96

Type	Coordinates	
	X	Y
Material Boundary	69.1119	1712
	137	1720
	226	1730
	324	1740
	415.192	1750.04
	468	1760
	509	1770
	516.158	1774.29

	X	Y
Material Boundary	71.7039	1713.31
	137	1721
	226	1731
	324	1741
	415.192	1751.04
	418.014	1751.57
	468	1761
	509	1771
	513.929	1773.96



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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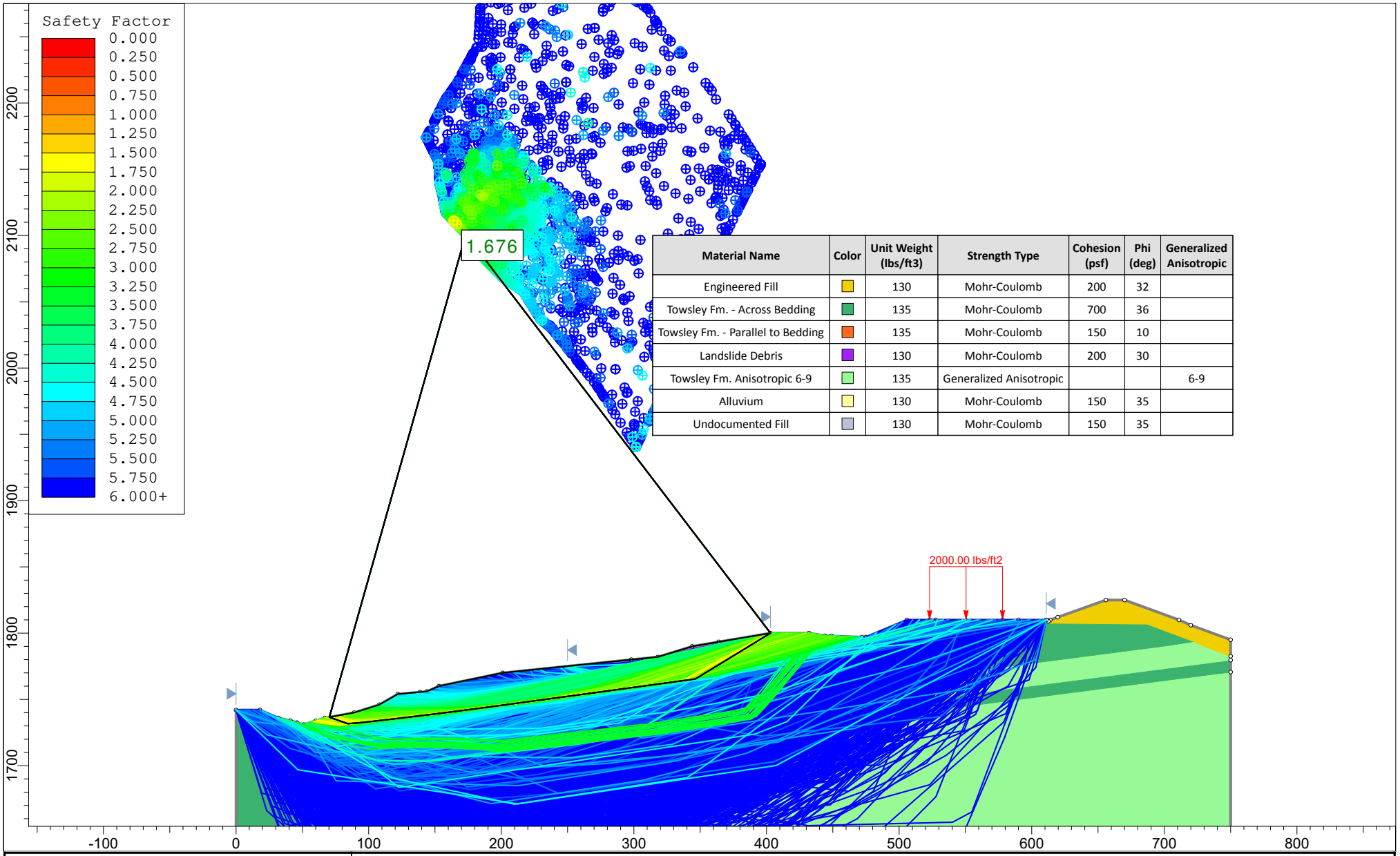
SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Base of slide - static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	563		File Name WT14.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Base of slide - static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date			File Name WT14.slmd

Slide Analysis Information

WT14

Project Summary

File Name:	WT14.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:18.148s
Project Title:	Cherry Willow Water Tanks
Analysis:	WT14-WT14' - Base of slide - static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Search Method:	Cuckoo Search
Initial # of Surface Vertices:	8
Maximum Iterations:	500
Number of Nests:	10
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Convex Surfaces Only: Enabled

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 2000
Orientation: Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	1.675560
Axis Location:	173.280, 2100.960
Left Slip Surface Endpoint:	70.344, 1736.608
Right Slip Surface Endpoint:	403.000, 1800.000
Resisting Moment:	8.28211e+07 lb-ft
Driving Moment:	4.94333e+07 lb-ft
Resisting Horizontal Force:	218243 lb
Driving Horizontal Force:	130262 lb
Total Slice Area:	6119.55 ft2
Surface Horizontal Width:	332.656 ft
Surface Average Height:	18.3961 ft

Global Minimum Coordinates

Method: spencer

X	Y
70.3442	1736.61
84.2608	1731.68
91.9344	1732.23
102.663	1733.46

X	Y
112.973	1734.65
121.84	1735.69
130.171	1736.68
138.406	1737.65
146.534	1738.61
161.389	1740.37
176.245	1742.37
190.466	1744.29
204.684	1746.2
218.903	1748.12
233.121	1750.04
247.339	1751.95
261.557	1753.87
270.674	1755.1
279.791	1756.33
288.908	1757.57
298.025	1758.81
311.463	1760.65
322.197	1762.11
332.924	1763.58
346.332	1765.43
359.716	1773.54
372.623	1781.43
379.938	1785.9
387.18	1790.32
395.198	1795.22
403	1800

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 3613
Number of Invalid Surfaces: 1430

Error Codes:

Error Code -108 reported for 28 surfaces
Error Code -111 reported for 64 surfaces
Error Code -112 reported for 57 surfaces
Error Code -114 reported for 17 surfaces
Error Code -121 reported for 95 surfaces
Error Code -124 reported for 6 surfaces
Error Code -1000 reported for 1163 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
-114 = Surface with Reverse Curvature.
-121 = Concave failure surface, only convex surfaces have been defined as being allowed.
-124 = A slice has a width less than the minimum acceptable value.
-1000 = No valid slip surface is generated

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.67556**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	6.28712	1377.39	-19.5079	Landslide Debris	200	30	242.845	406.901	358.363	0	358.363	272.329	272.329
2	6.28712	4132.16	-19.5079	Landslide Debris	200	30	437.066	732.331	922.025	0	922.025	767.183	767.183
3	1.3424	1241.29	-19.5079	Towsley Fm. - Parallel to Bedding	150	10	203.358	340.738	1081.73	0	1081.73	1009.69	1009.69

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
4	7.67362	7969.84	4.0997	Towsley Fm. - Parallel to Bedding	150	10	199.222	333.808	1042.43	0	1042.43	1056.71	1056.71
5	5.36419	6468.83	6.53351	Towsley Fm. - Parallel to Bedding	150	10	215.036	360.305	1192.7	0	1192.7	1217.33	1217.33
6	5.36419	7221.94	6.53351	Towsley Fm. - Parallel to Bedding	150	10	229.615	384.733	1331.24	0	1331.24	1357.53	1357.53
7	9.33473	14623	6.58845	Towsley Fm. - Parallel to Bedding	150	10	252.431	422.964	1548.06	0	1548.06	1577.22	1577.22
8	0.975884	1777.46	6.58845	Towsley Fm. - Parallel to Bedding	150	10	278.892	467.3	1799.49	0	1799.49	1831.7	1831.7
9	0.415399	773.701	6.736	Towsley Fm. - Parallel to Bedding	150	10	283.015	474.209	1838.68	0	1838.68	1872.11	1872.11
10	8.45132	17948.7	6.736	Towsley Fm. - Parallel to Bedding	150	10	310.118	519.621	2096.22	0	2096.22	2132.85	2132.85
11	8.33048	19725.6	6.736	Towsley Fm. - Parallel to Bedding	150	10	335.444	562.056	2336.89	0	2336.89	2376.51	2376.51
12	8.235	19258.4	6.736	Towsley Fm. - Parallel to Bedding	150	10	332.407	556.968	2308.03	0	2308.03	2347.29	2347.29
13	8.12799	18920	6.736	Towsley Fm. - Parallel to Bedding	150	10	331.281	555.081	2297.32	0	2297.32	2336.45	2336.45
14	14.8555	39424	6.74541	Towsley Fm. - Parallel to Bedding	150	10	365.098	611.743	2618.68	0	2618.68	2661.86	2661.86
15	7.42796	20942.9	7.6761	Towsley Fm. - Parallel to Bedding	150	10	380.941	638.29	2769.23	0	2769.23	2820.57	2820.57
16	7.42796	21469.2	7.6761	Towsley Fm. - Parallel to Bedding	150	10	388.261	650.555	2838.78	0	2838.78	2891.11	2891.11
17	7.11055	21044.7	7.6761	Towsley Fm. - Parallel to Bedding	150	10	395.424	662.557	2906.85	0	2906.85	2960.15	2960.15
18	7.11055	21526.9	7.6761	Towsley Fm. - Parallel to Bedding	150	10	402.431	674.298	2973.44	0	2973.44	3027.68	3027.68
19	7.10912	22004.7	7.6761	Towsley Fm. - Parallel to Bedding	150	10	409.437	686.037	3040.02	0	3040.02	3095.21	3095.21
20	7.10912	22393.8	7.6761	Towsley Fm. - Parallel to Bedding	150	10	415.093	695.514	3093.76	0	3093.76	3149.71	3149.71
21	7.10911	22264.6	7.6761	Towsley Fm. - Parallel to Bedding	150	10	413.216	692.368	3075.92	0	3075.92	3131.62	3131.62
22	7.10911	22055.1	7.6761	Towsley Fm. - Parallel to Bedding	150	10	410.172	687.268	3047	0	3047	3102.28	3102.28
23	7.10912	21845.8	7.6761	Towsley Fm. - Parallel to Bedding	150	10	407.128	682.167	3018.06	0	3018.06	3072.94	3072.94
24	7.10912	21636.3	7.6761	Towsley Fm. - Parallel to Bedding	150	10	404.084	677.067	2989.14	0	2989.14	3043.6	3043.6
25	7.10912	21427.3	7.6761	Towsley Fm. - Parallel to Bedding	150	10	401.047	671.978	2960.28	0	2960.28	3014.34	3014.34
26	7.10912	21220.2	7.6761	Towsley Fm. - Parallel to Bedding	150	10	398.036	666.934	2931.68	0	2931.68	2985.32	2985.32
27	7.10913	21013.3	7.6761	Towsley Fm. - Parallel to Bedding	150	10	395.029	661.895	2903.1	0	2903.1	2956.34	2956.34
28	7.10913	20806.4	7.6761	Towsley Fm. - Parallel to Bedding	150	10	392.022	656.856	2874.52	0	2874.52	2927.36	2927.36
29	9.11697	26380	7.6761	Towsley Fm. - Parallel to Bedding	150	10	388.59	651.106	2841.91	0	2841.91	2894.29	2894.29
30	9.11697	26039.7	7.6761	Towsley Fm. - Parallel to Bedding	150	10	384.733	644.644	2805.27	0	2805.27	2857.12	2857.12
31	9.11697	25690.5	7.76575	Towsley Fm. - Parallel to Bedding	150	10	380.646	637.796	2766.43	0	2766.43	2818.34	2818.34
32	9.11697	25331.8	7.77117	Towsley Fm. - Parallel to Bedding	150	10	376.575	630.974	2727.74	0	2727.74	2779.13	2779.13
33	6.71884	18429.4	7.77117	Towsley Fm. - Parallel to Bedding	150	10	372.9	624.816	2692.82	0	2692.82	2743.7	2743.7
34	6.71884	18216.1	7.77117	Towsley Fm. - Parallel to Bedding	150	10	369.621	619.323	2661.67	0	2661.67	2712.11	2712.11
35	5.36706	14398	7.77117	Towsley Fm. - Parallel to Bedding	150	10	366.673	614.383	2633.64	0	2633.64	2683.68	2683.68
36	5.36706	14499.7	7.77117	Towsley Fm. - Parallel to Bedding	150	10	368.631	617.663	2652.25	0	2652.25	2702.55	2702.55
37	5.36348	15112.6	7.77117	Towsley Fm. - Parallel to Bedding	150	10	380.619	637.75	2766.17	0	2766.17	2818.11	2818.11
38	5.36348	15753.4	7.77117	Towsley Fm. - Parallel to Bedding	150	10	392.958	658.425	2883.42	0	2883.42	2937.05	2937.05
39	6.42852	19720.9	7.8707	Towsley Fm. - Parallel to Bedding	150	10	406.29	680.763	3010.1	0	3010.1	3066.26	3066.26

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
40	6.42852	20603.1	7.8707	Towsley Fm. - Parallel to Bedding	150	10	420.457	704.501	3144.73	0	3144.73	3202.85	3202.85
41	0.551375	1791.61	7.8707	Towsley Fm. - Parallel to Bedding	150	10	425.039	712.179	3188.27	0	3188.27	3247.03	3247.03
42	2.1463	6840.36	31.224	Towsley Fm. - Parallel to Bedding	150	10	380.838	638.117	2768.25	0	2768.25	2999.11	2999.11
43	5.61839	16653.7	31.224	Landslide Debris	200	30	923.172	1546.83	2332.77	0	2332.77	2892.39	2892.39
44	5.61839	14861.6	31.224	Landslide Debris	200	30	835.04	1399.16	2077.01	0	2077.01	2583.2	2583.2
45	6.45383	14846.8	31.4263	Landslide Debris	200	30	738.458	1237.33	1796.71	0	1796.71	2247.93	2247.93
46	6.45383	12456	31.4263	Landslide Debris	200	30	636.291	1066.14	1500.2	0	1500.2	1888.99	1888.99
47	7.31465	11226.9	31.4263	Landslide Debris	200	30	527.311	883.541	1183.93	0	1183.93	1506.13	1506.13
48	7.24264	8090.46	31.4263	Landslide Debris	200	30	412.088	690.478	849.532	0	849.532	1101.33	1101.33
49	8.01787	5444.79	31.4263	Landslide Debris	200	30	291.299	488.089	498.985	0	498.985	676.978	676.978
50	7.80166	1751.34	31.4735	Landslide Debris	200	30	166.16	278.411	135.812	0	135.812	237.53	237.53

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.67556**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	70.3442	1736.61	0	0	0
2	76.6313	1734.38	2326.03	338.304	8.27523
3	82.9184	1732.15	7129.45	1036.93	8.27526
4	84.2608	1731.68	7917.07	1151.48	8.27523
5	91.9344	1732.23	8873.51	1290.59	8.27525
6	97.2986	1732.84	9295.04	1351.9	8.27525
7	102.663	1733.46	9709.72	1412.21	8.27524
8	111.998	1734.53	10398.6	1512.41	8.27528
9	112.973	1734.65	10468.2	1522.52	8.27521
10	113.389	1734.7	10495.6	1526.51	8.27524
11	121.84	1735.69	11025.8	1603.63	8.27527
12	130.171	1736.68	11522.8	1675.91	8.27524
13	138.406	1737.65	12017.2	1747.81	8.27521
14	146.534	1738.61	12506.2	1818.94	8.27525
15	161.389	1740.37	13332.4	1939.1	8.27523
16	168.817	1741.37	13391.5	1947.7	8.27525
17	176.245	1742.37	13435.4	1954.09	8.27527
18	183.356	1743.33	13463.2	1958.12	8.27521
19	190.466	1744.29	13477	1960.13	8.27522
20	197.575	1745.25	13476.8	1960.11	8.27526
21	204.684	1746.2	13465.4	1958.45	8.27525
22	211.794	1747.16	13457.7	1957.33	8.27525
23	218.903	1748.12	13456.1	1957.1	8.27526
24	226.012	1749.08	13460.6	1957.74	8.2752
25	233.121	1750.04	13471.1	1959.27	8.27522
26	240.23	1750.99	13487.6	1961.68	8.27526
27	247.339	1751.95	13510.2	1964.96	8.27523
28	254.448	1752.91	13538.7	1969.11	8.27525
29	261.557	1753.87	13573.2	1974.13	8.27526
30	270.674	1755.1	13626.3	1981.84	8.2752
31	279.791	1756.33	13689.2	1990.99	8.27521
32	288.908	1757.57	13722.3	1995.81	8.27523
33	298.025	1758.81	13764	2001.87	8.27521
34	304.744	1759.73	13802	2007.41	8.27527
35	311.463	1760.65	13846.6	2013.89	8.27524
36	316.83	1761.38	13886.9	2019.75	8.27524
37	322.197	1762.11	13924	2025.15	8.27525
38	327.561	1762.84	13942.1	2027.78	8.27524
39	332.924	1763.58	13940.6	2027.57	8.27527
40	339.353	1764.47	13879.2	2018.63	8.27523
41	345.781	1765.35	13789.3	2005.56	8.27526
42	346.332	1765.43	13780.8	2004.32	8.27524
43	348.479	1766.73	10997	1599.44	8.27526
44	354.097	1770.14	8242.23	1198.77	8.27521

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
45	359.716	1773.54	5863.04	852.738	8.27524
46	366.169	1777.49	3546.83	515.861	8.27524
47	372.623	1781.43	1740.06	253.079	8.27523
48	379.938	1785.9	308.208	44.8266	8.27523
49	387.18	1790.32	-464.771	-67.5975	8.27522
50	395.198	1795.22	-572.212	-83.2242	8.27524
51	403	1800	0	0	0

Entity Information

Group: Removals Cuckoo

Shared Entities

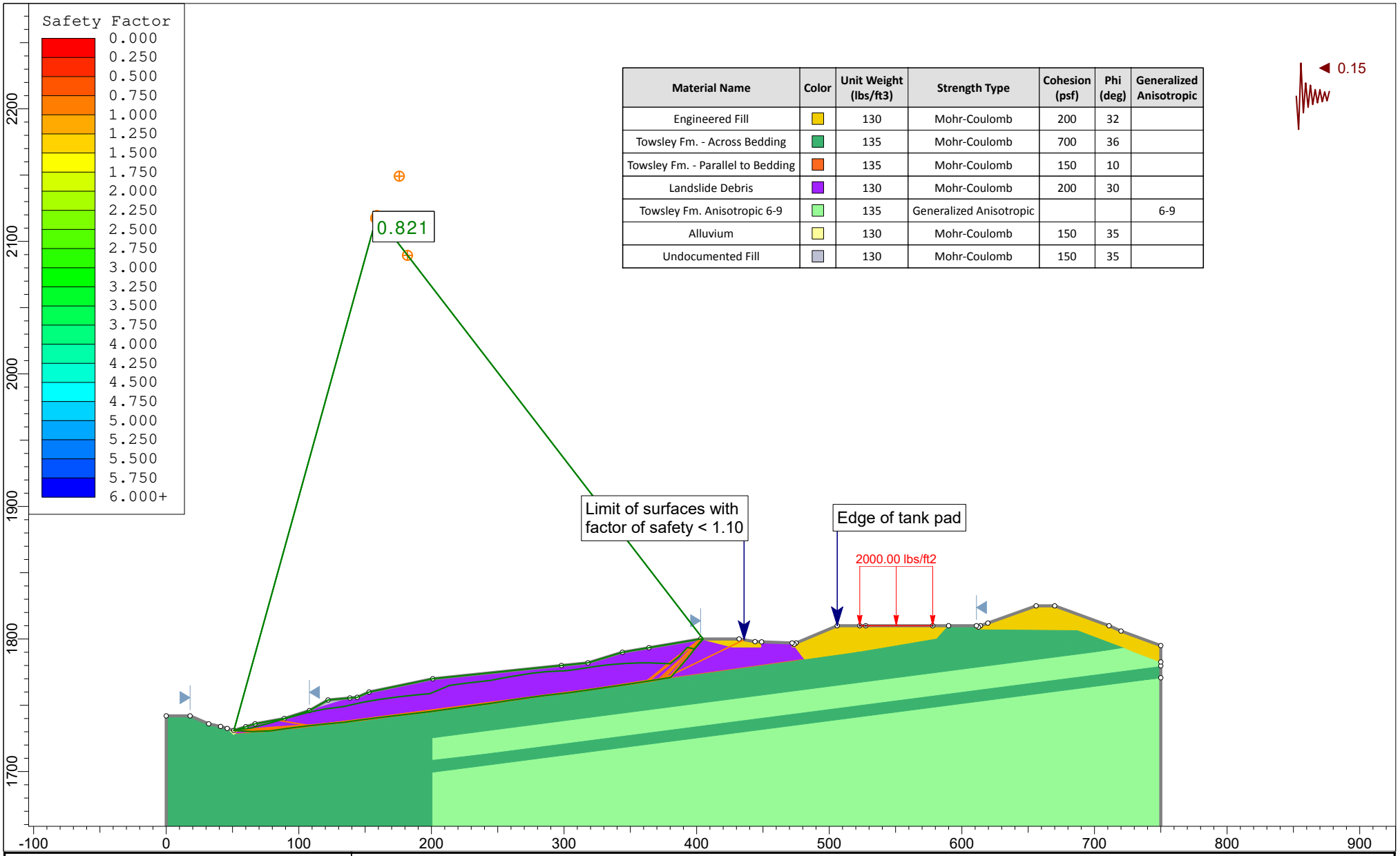
Type	Coordinates	
	X	Y
External Boundary	720	1806
	711	1810
	670	1825
	656	1825
	619.6	1812
	614	1810
	612.5	1809
	611	1810
	590	1810
	578	1810
	527.556	1810
	523	1810
	506	1810
	475	1797
	473.5	1796
	472	1797
	449	1797.82
	444	1798
	432	1800
	403	1800
	364	1793.39
	344	1790
	318	1782
	298	1780
	201	1770
	153	1760
	144	1756
	138.55	1755.5
	122	1754
	108	1746
	89	1740
	67	1736
	60	1733.81
	51	1731
	46	1732.5
	41	1734
	32	1736
	18	1742
	0	1742
	0	1600
	201	1600
	750	1600
	750	1770.69
	750	1779.69
	750	1782.62
	750	1795

Type	Coordinates
Material Boundary	X: 619.6, 638, 707, 711 / Y: 1812, 1812, 1811, 1810
Material Boundary	X: 522, 581, 590 / Y: 1790, 1800, 1810
Material Boundary	X: 46, 50.8197, 52.6617, 60 / Y: 1732.5, 1728, 1729.17, 1733.81
Material Boundary	X: 108, 138.55 / Y: 1746, 1755.5
Material Boundary	X: 403, 429, 449, 449 / Y: 1800, 1793.32, 1793.32, 1797.82
Material Boundary	X: 472, 472, 474.25, 492, 527.556 / Y: 1797, 1794, 1794, 1794, 1810
Material Boundary	X: 611, 611, 687, 722.133, 750 / Y: 1810, 1807, 1806.29, 1793.09, 1782.62
Material Boundary	X: 581, 581 / Y: 1800, 1801
Material Boundary	X: 522, 581 / Y: 1791, 1801
Material Boundary	X: 73, 159, 236, 339.832, 481.498, 522 / Y: 1730, 1740, 1750, 1764.52, 1784.34, 1790
Material Boundary	X: 73, 159, 236, 341.831, 480.82, 522 / Y: 1731, 1741, 1751, 1765.8, 1785.24, 1791

Type	Coordinates
Material Boundary	X: 50.8197, 73; Y: 1728, 1730
Material Boundary	X: 52.6617, 73; Y: 1729.17, 1731
Material Boundary	X: 339.832, 341.831, 348.488, 355.176, 360.526, 364; Y: 1764.52, 1765.8, 1770.06, 1777.7, 1784.77, 1793.39
Material Boundary	X: 472, 474.25, 480.82, 481.498; Y: 1797, 1794, 1785.24, 1784.34
Material Boundary	X: 201, 722.133, 722.134; Y: 1725.49, 1793.09, 1793.09
Material Boundary	X: 201, 750; Y: 1708.49, 1779.69
Material Boundary	X: 201, 750; Y: 1699.49, 1770.69
Material Boundary	X: 201, 201, 201, 201; Y: 1600, 1699.49, 1708.49, 1725.49

Scenario-based Entities

Type	Coordinates	slide plane static
Distributed Load	X: 523, 525, 527.556, 578; Y: 1810, 1810, 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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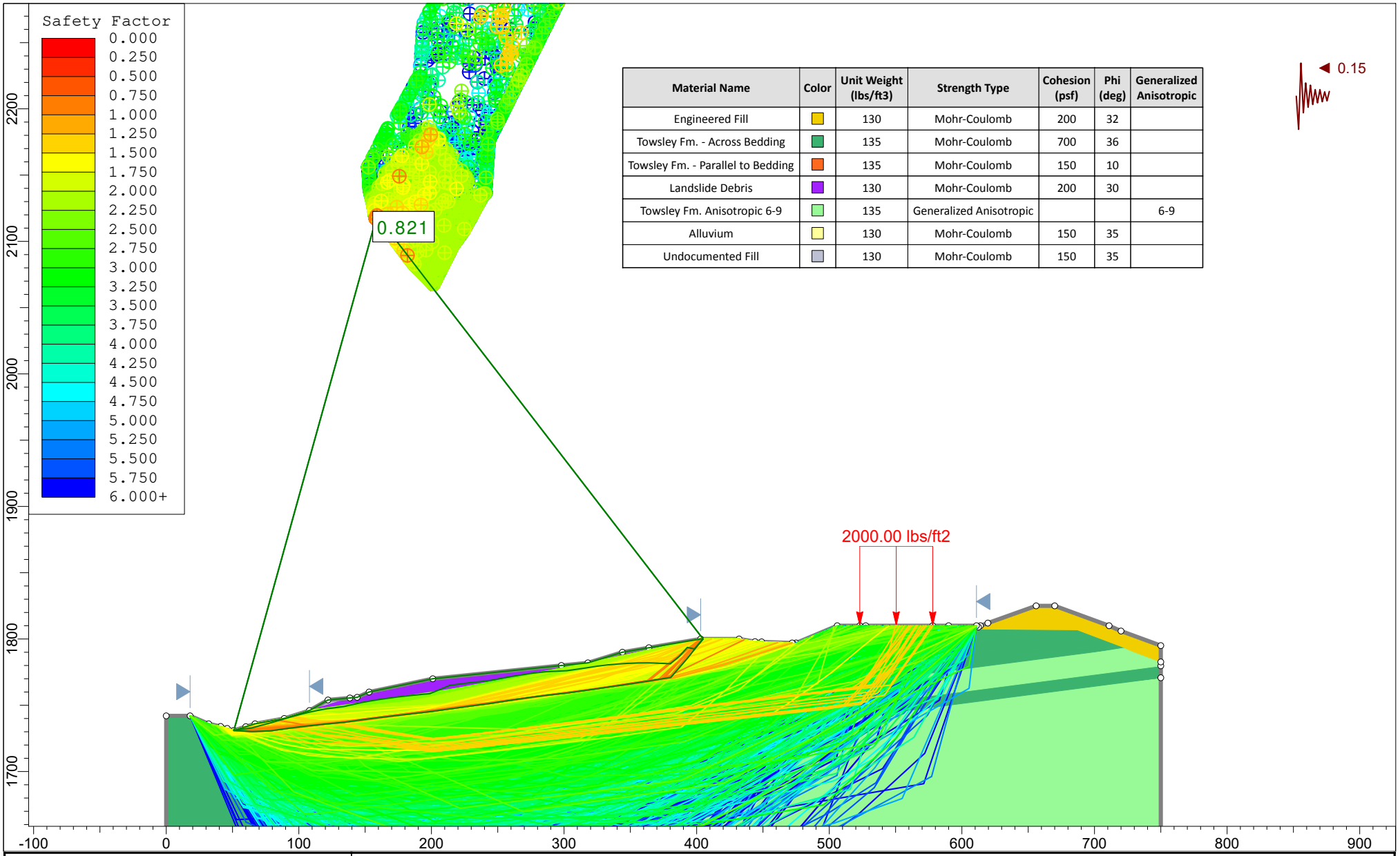
SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Base of slide - pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	573		File Name WT14.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Base of slide - pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	574		File Name WT14.slmd

Slide Analysis Information

WT14

Project Summary

File Name:	WT14.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:16.436s
Project Title:	Cherry Willow Water Tanks
Analysis:	WT14-WT14' - Base of slide - pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Search Method:	Cuckoo Search
Initial # of Surface Vertices:	8
Maximum Iterations:	500
Number of Nests:	10
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Convex Surfaces Only: Enabled

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Seismic Load Coefficient (Horizontal): 0.15

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 2000
Orientation: Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	0.820580
Axis Location:	158.933, 2119.367
Left Slip Surface Endpoint:	51.000, 1731.000
Right Slip Surface Endpoint:	404.867, 1800.000
Resisting Moment:	8.27608e+07 lb-ft
Driving Moment:	1.01048e+08 lb-ft
Resisting Horizontal Force:	208990 lb
Driving Horizontal Force:	255170 lb
Total Slice Area:	6671.84 ft2
Surface Horizontal Width:	353.867 ft
Surface Average Height:	18.8541 ft

Global Minimum Coordinates

Method: spencer

X	Y
51	1731
64.5728	1730.19

X	Y
78.238	1730.64
92.4122	1732.65
106.586	1734.41
120.76	1735.91
134.289	1737.15
147.952	1739.04
161.111	1740.72
174.27	1742.31
186.461	1743.73
198.652	1745.15
213.765	1747.27
228.877	1749.32
244.494	1751.36
260.11	1753.78
275.727	1756.07
286.582	1757.51
302.095	1759.25
317.58	1761.41
332.48	1763.56
347.367	1765.74
364.117	1768.29
380.414	1771.01
386.696	1778.18
392.977	1785.51
398.209	1791.98
404.867	1800

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 3440
Number of Invalid Surfaces: 1602

Error Codes:

Error Code -108 reported for 15 surfaces
Error Code -111 reported for 137 surfaces
Error Code -112 reported for 67 surfaces
Error Code -114 reported for 8 surfaces
Error Code -121 reported for 114 surfaces
Error Code -124 reported for 1 surface
Error Code -1000 reported for 1260 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
-114 = Surface with Reverse Curvature.
-121 = Concave failure surface, only convex surfaces have been defined as being allowed.
-124 = A slice has a width less than the minimum acceptable value.
-1000 = No valid slip surface is generated

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 0.82058**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	4.16562	419.468	-3.39935	Alluvium	150	35	421.185	345.616	279.37	0	279.37	254.351	254.351
2	9.0927	3829.82	-3.39935	Landslide Debris	200	30	769.632	631.545	747.458	0	747.458	701.742	701.742
3	0.314502	204.024	-3.39935	Towsley Fm. - Parallel to Bedding	150	10	352.512	289.264	789.802	0	789.802	768.863	768.863

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
4	6.8326	5175.82	1.87769	Towsley Fm. - Parallel to Bedding	150	10	362.035	297.079	834.129	0	834.129	845.998	845.998
5	6.8326	6145.52	1.87769	Towsley Fm. - Parallel to Bedding	150	10	392.73	322.266	976.967	0	976.967	989.842	989.842
6	7.08708	6982.08	8.05078	Towsley Fm. - Parallel to Bedding	150	10	391.796	321.5	972.627	0	972.627	1028.04	1028.04
7	7.08708	7340.77	8.05078	Towsley Fm. - Parallel to Bedding	150	10	402.011	329.882	1020.16	0	1020.16	1077.02	1077.02
8	7.08707	8411.98	7.10804	Towsley Fm. - Parallel to Bedding	150	10	435.78	357.592	1177.31	0	1177.31	1231.65	1231.65
9	7.08707	9657.58	7.10804	Towsley Fm. - Parallel to Bedding	150	10	471.621	387.003	1344.11	0	1344.11	1402.92	1402.92
10	7.08707	11502.1	6.03985	Towsley Fm. - Parallel to Bedding	150	10	529.512	434.507	1613.53	0	1613.53	1669.55	1669.55
11	7.08707	14511.7	6.03985	Towsley Fm. - Parallel to Bedding	150	10	617.144	506.416	2021.33	0	2021.33	2086.63	2086.63
12	6.76404	15780.4	5.20695	Towsley Fm. - Parallel to Bedding	150	10	681.208	558.986	2319.47	0	2319.47	2381.55	2381.55
13	6.76404	15832.8	5.20695	Towsley Fm. - Parallel to Bedding	150	10	682.823	560.311	2326.99	0	2326.99	2389.22	2389.22
14	6.83195	15847.2	7.88153	Towsley Fm. - Parallel to Bedding	150	10	662.115	543.318	2230.62	0	2230.62	2322.28	2322.28
15	6.83195	15912.7	7.88153	Towsley Fm. - Parallel to Bedding	150	10	664.052	544.908	2239.64	0	2239.64	2331.56	2331.56
16	6.57944	16887.1	7.26896	Towsley Fm. - Parallel to Bedding	150	10	716.078	587.599	2481.75	0	2481.75	2573.08	2573.08
17	6.57944	17730.4	7.26896	Towsley Fm. - Parallel to Bedding	150	10	742.169	609.009	2603.17	0	2603.17	2697.84	2697.84
18	6.57944	18202.8	6.92144	Towsley Fm. - Parallel to Bedding	150	10	759.232	623.011	2682.59	0	2682.59	2774.75	2774.75
19	6.57944	18693.9	6.92144	Towsley Fm. - Parallel to Bedding	150	10	774.485	635.527	2753.56	0	2753.56	2847.58	2847.58
20	6.09544	17770.9	6.60812	Towsley Fm. - Parallel to Bedding	150	10	791.968	649.873	2834.91	0	2834.91	2926.66	2926.66
21	6.09544	18220.2	6.60812	Towsley Fm. - Parallel to Bedding	150	10	807.083	662.276	2905.27	0	2905.27	2998.76	2998.76
22	6.09544	18667.5	6.65506	Towsley Fm. - Parallel to Bedding	150	10	821.764	674.323	2973.58	0	2973.58	3069.46	3069.46
23	6.09544	19112.6	6.65506	Towsley Fm. - Parallel to Bedding	150	10	836.731	686.605	3043.24	0	3043.24	3140.87	3140.87
24	0.0801759	254.352	8.00668	Towsley Fm. - Parallel to Bedding	150	10	833.579	684.018	3028.56	0	3028.56	3145.81	3145.81
25	7.51626	23906	8.00668	Towsley Fm. - Parallel to Bedding	150	10	835.221	685.366	3036.21	0	3036.21	3153.69	3153.69
26	7.51626	23662.2	8.00668	Towsley Fm. - Parallel to Bedding	150	10	828.674	679.993	3005.74	0	3005.74	3122.3	3122.3
27	7.55635	23526.9	7.72002	Towsley Fm. - Parallel to Bedding	150	10	823.898	676.074	2983.52	0	2983.52	3095.21	3095.21
28	7.55635	23284.2	7.72002	Towsley Fm. - Parallel to Bedding	150	10	817.394	670.737	2953.25	0	2953.25	3064.06	3064.06
29	7.80823	23825.8	7.44309	Towsley Fm. - Parallel to Bedding	150	10	813.417	667.474	2934.73	0	2934.73	3041	3041
30	7.80823	23608.9	7.44309	Towsley Fm. - Parallel to Bedding	150	10	807.775	662.844	2908.48	0	2908.48	3014.01	3014.01
31	7.80824	23293.6	8.80525	Towsley Fm. - Parallel to Bedding	150	10	789.489	647.839	2823.39	0	2823.39	2945.68	2945.68
32	7.80824	22878.4	8.80525	Towsley Fm. - Parallel to Bedding	150	10	778.844	639.104	2773.85	0	2773.85	2894.5	2894.5
33	15.6165	44649	8.33572	Towsley Fm. - Parallel to Bedding	150	10	767.968	630.179	2723.23	0	2723.23	2835.75	2835.75
34	10.8553	30334	7.534	Towsley Fm. - Parallel to Bedding	150	10	760.563	624.103	2688.77	0	2688.77	2789.36	2789.36
35	15.513	42903.2	6.40533	Towsley Fm. - Parallel to Bedding	150	10	762.687	625.846	2698.66	0	2698.66	2784.28	2784.28
36	7.74232	21182.3	7.96608	Towsley Fm. - Parallel to Bedding	150	10	745.716	611.92	2619.68	0	2619.68	2724.03	2724.03
37	7.74232	20871.1	7.96608	Towsley Fm. - Parallel to Bedding	150	10	737.595	605.256	2581.89	0	2581.89	2685.11	2685.11
38	7.45031	20441.1	8.20756	Towsley Fm. - Parallel to Bedding	150	10	745.621	611.842	2619.24	0	2619.24	2726.79	2726.79
39	7.45031	21617	8.20756	Towsley Fm. - Parallel to Bedding	150	10	777.421	637.936	2767.22	0	2767.22	2879.35	2879.35

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
40	7.44308	22766	8.30593	Towsley Fm. - Parallel to Bedding	150	10	808.349	663.315	2911.15	0	2911.15	3029.16	3029.16
41	7.44308	23827.1	8.30593	Towsley Fm. - Parallel to Bedding	150	10	837.04	686.858	3044.68	0	3044.68	3166.88	3166.88
42	8.37499	27147	8.6814	Towsley Fm. - Parallel to Bedding	150	10	842.154	691.055	3068.48	0	3068.48	3197.07	3197.07
43	8.37499	27295.7	8.6814	Towsley Fm. - Parallel to Bedding	150	10	845.713	693.975	3085.04	0	3085.04	3214.17	3214.17
44	16.2976	53295.5	9.45365	Towsley Fm. - Parallel to Bedding	150	10	841.797	690.762	3066.81	0	3066.81	3206.98	3206.98
45	0.18909	616.395	48.7874	Towsley Fm. - Parallel to Bedding	150	10	583.673	478.95	1865.57	0	1865.57	2531.99	2531.99
46	6.09239	17438.4	48.7874	Landslide Debris	200	30	1136.02	932.197	1268.21	0	1268.21	2565.29	2565.29
47	6.28147	13002	49.4145	Landslide Debris	200	30	860.098	705.779	876.034	0	876.034	1880.04	1880.04
48	5.23188	6800.87	51.0184	Landslide Debris	200	30	587.473	482.069	488.557	0	488.557	1214.5	1214.5
49	6.32974	3210.27	50.3096	Landslide Debris	200	30	339.54	278.62	136.173	0	136.173	545.29	545.29
50	0.328032	8.42757	50.3096	Engineered Fill	200	32	314.213	257.837	92.559	0	92.559	471.16	471.16

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 0.82058**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	51	1731	0	0	0
2	55.1656	1730.75	1765.43	706.173	21.8014
3	64.2583	1730.21	8611.56	3444.62	21.8014
4	64.5728	1730.19	8706.87	3482.75	21.8014
5	71.4054	1730.42	10224	4089.59	21.8014
6	78.238	1730.64	11773.9	4709.56	21.8014
7	85.3251	1731.64	12535.8	5014.31	21.8014
8	92.4122	1732.65	13268.8	5307.51	21.8014
9	99.4993	1733.53	14063.2	5625.3	21.8015
10	106.586	1734.41	14778.2	5911.27	21.8014
11	113.673	1735.16	15605.7	6242.29	21.8014
12	120.76	1735.91	16298.8	6519.51	21.8014
13	127.525	1736.53	17122.1	6848.85	21.8014
14	134.289	1737.15	17943.9	7177.57	21.8014
15	141.12	1738.09	17992.9	7197.17	21.8014
16	147.952	1739.04	18036.8	7214.74	21.8015
17	154.532	1739.88	18145.1	7258.05	21.8014
18	161.111	1740.72	18197.1	7278.85	21.8014
19	167.691	1741.52	18332.9	7333.17	21.8014
20	174.27	1742.31	18439	7375.59	21.8014
21	180.366	1743.02	18611.9	7444.75	21.8014
22	186.461	1743.73	18760.1	7504.04	21.8014
23	192.557	1744.44	18867.7	7547.07	21.8014
24	198.652	1745.15	18950.4	7580.16	21.8014
25	198.732	1745.16	18945.1	7578.05	21.8014
26	206.248	1746.22	18443.9	7377.55	21.8014
27	213.765	1747.27	17962.1	7184.84	21.8014
28	221.321	1748.3	17619.3	7047.74	21.8015
29	228.877	1749.32	17294.7	6917.89	21.8014
30	236.686	1750.34	17095.6	6838.25	21.8014
31	244.494	1751.36	16911.7	6764.67	21.8014
32	252.302	1752.57	16183.9	6473.54	21.8013
33	260.11	1753.78	15494.9	6197.96	21.8014
34	275.727	1756.07	14591.7	5836.67	21.8014
35	286.582	1757.51	14459.8	5783.91	21.8014
36	302.095	1759.25	15188	6075.2	21.8014
37	309.837	1760.33	14961.5	5984.61	21.8014
38	317.58	1761.41	14759.6	5903.85	21.8014
39	325.03	1762.49	14448.9	5779.55	21.8014
40	332.48	1763.56	14040.3	5616.11	21.8014
41	339.923	1764.65	13494.9	5397.96	21.8014

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
42	347.367	1765.74	12859.4	5143.75	21.8014
43	355.742	1767.02	11935.5	4774.2	21.8014
44	364.117	1768.29	10998	4399.2	21.8014
45	380.414	1771.01	8437.42	3374.97	21.8014
46	380.603	1771.22	8052.85	3221.14	21.8014
47	386.696	1778.18	3554.98	1421.99	21.8014
48	392.977	1785.51	598.418	239.367	21.8014
49	398.209	1791.98	-498.4	-199.36	21.8014
50	404.539	1799.6	136.483	54.5932	21.8014
51	404.867	1800	0	0	0

Entity Information

Group: Removals Cuckoo

Shared Entities

Type	Coordinates

Type	Coordinates	
	X	Y
External Boundary	720	1806
	711	1810
	670	1825
	656	1825
	619.6	1812
	614	1810
	612.5	1809
	611	1810
	590	1810
	578	1810
	527.556	1810
	523	1810
	506	1810
	475	1797
	473.5	1796
	472	1797
	449	1797.82
	444	1798
	432	1800
	403	1800
	364	1793.39
	344	1790
	318	1782
	298	1780
	201	1770
	153	1760
	144	1756
	138.55	1755.5
	122	1754
	108	1746
	89	1740
	67	1736
	60	1733.81
	51	1731
	46	1732.5
	41	1734
	32	1736
	18	1742
	0	1742
	0	1600
	201	1600
	750	1600
	750	1770.69
	750	1779.69
	750	1782.62
	750	1795

Type	X	Y
Material Boundary	619.6	1812
	638	1812
	707	1811
	711	1810

Type	X	Y
Material Boundary	522	1790
	581	1800
	590	1810

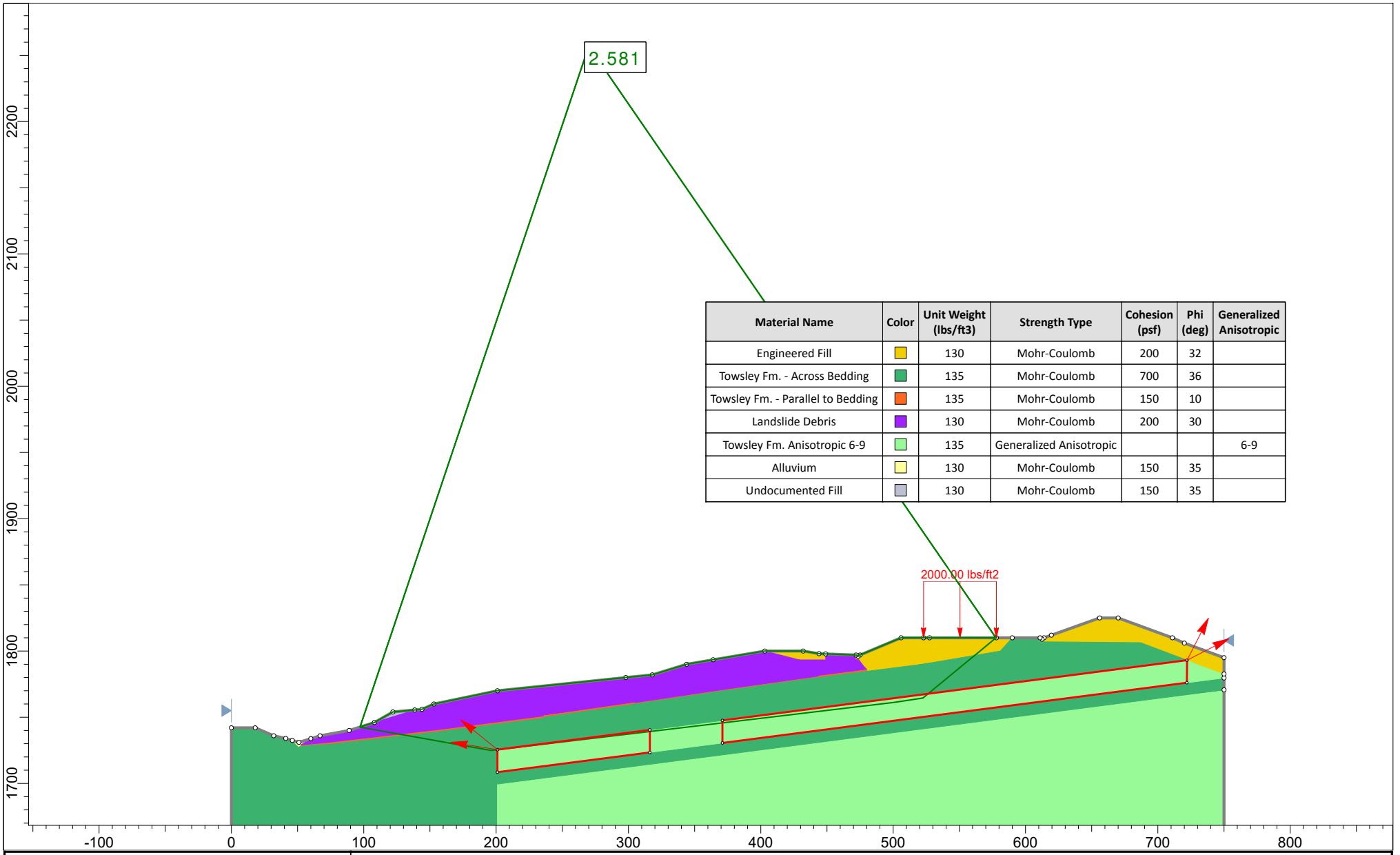
Type	X	Y
Material Boundary	46	1732.5
	50.8197	1728
	52.6617	1729.17
	60	1733.81

Type	Coordinates
Material Boundary	X: 108, 138.55 / Y: 1746, 1755.5
Material Boundary	X: 403, 429, 449, 449 / Y: 1800, 1793.32, 1793.32, 1797.82
Material Boundary	X: 472, 472, 474.25, 492, 527.556 / Y: 1797, 1794, 1794, 1794, 1810
Material Boundary	X: 611, 611, 687, 722.133, 750 / Y: 1810, 1807, 1806.29, 1793.09, 1782.62
Material Boundary	X: 581, 581 / Y: 1800, 1801
Material Boundary	X: 522, 581 / Y: 1791, 1801
Material Boundary	X: 73, 159, 236, 339.832, 481.498, 522 / Y: 1730, 1740, 1750, 1764.52, 1784.34, 1790
Material Boundary	X: 73, 159, 236, 341.831, 480.82, 522 / Y: 1731, 1741, 1751, 1765.8, 1785.24, 1791
Material Boundary	X: 50.8197, 73 / Y: 1728, 1730
Material Boundary	X: 52.6617, 73 / Y: 1729.17, 1731
Material Boundary	X: 339.832, 341.831, 348.488, 355.176, 360.526, 364 / Y: 1764.52, 1765.8, 1770.06, 1777.7, 1784.77, 1793.39

Type	Coordinates
Material Boundary	X: 472, 474.25, 480.82, 481.498 / Y: 1797, 1794, 1785.24, 1784.34
Material Boundary	X: 201, 722.133, 722.134 / Y: 1725.49, 1793.09, 1793.09
Material Boundary	X: 201, 750 / Y: 1708.49, 1779.69
Material Boundary	X: 201, 750 / Y: 1699.49, 1770.69
Material Boundary	X: 201, 201, 201, 201 / Y: 1600, 1699.49, 1708.49, 1725.49

Scenario-based Entities

Type	Coordinates	slide plane pseudo
Distributed Load	X: 523, 527.556, 578 / Y: 1810, 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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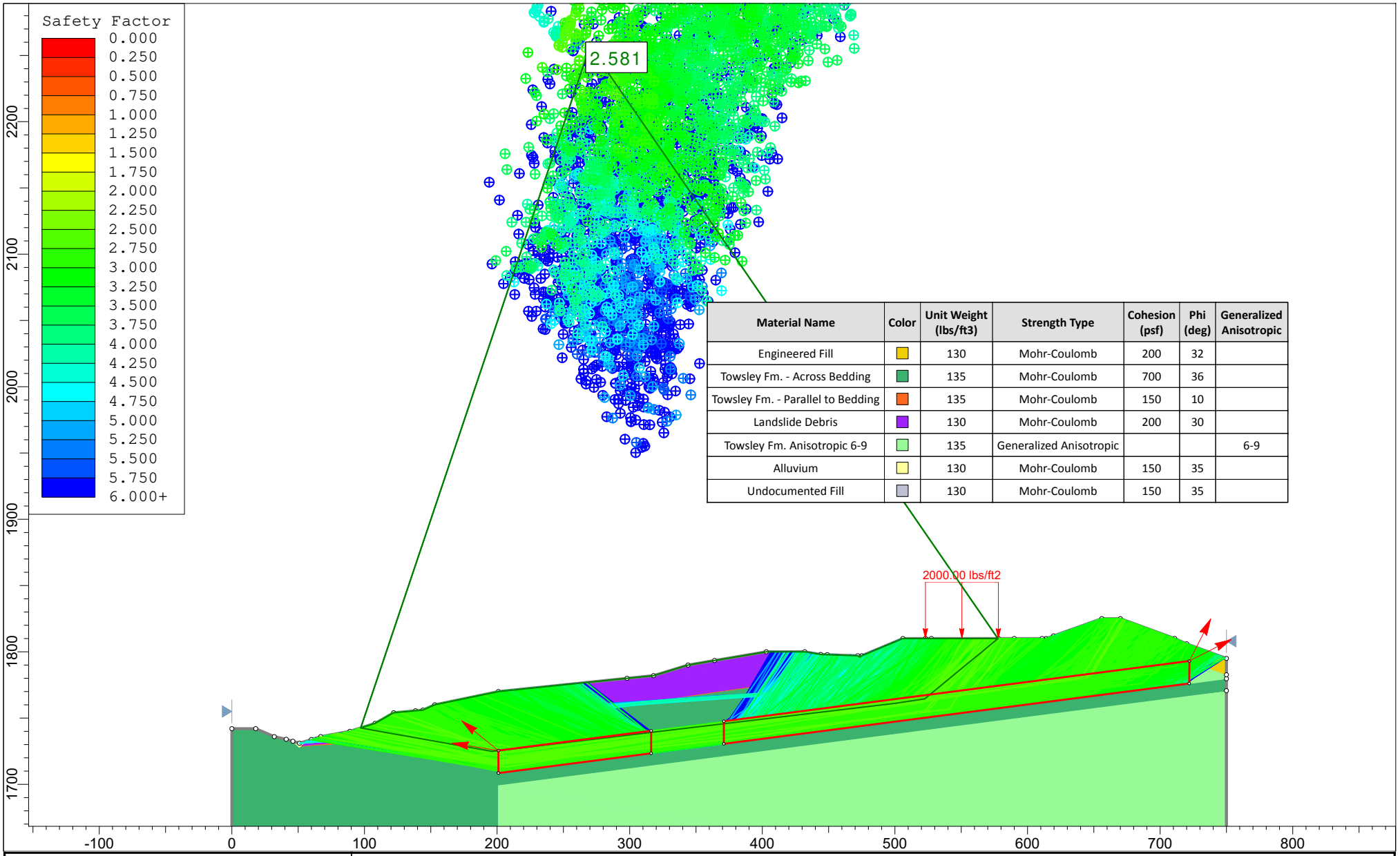
SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Deep bedrock - static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	584		File Name WT14.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Deep bedrock - static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	585		File Name WT14.slmd

Slide Analysis Information

WT14

Project Summary

File Name:	WT14.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:31.331s
Project Title:	Cherry Willow Water Tanks
Analysis:	WT14-WT14' - Deep bedrock - static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	27

Right Projection Angle (End Angle) [°]:	63
Minimum Elevation:	Not Defined
Minimum Depth [ft]:	35
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution:	Constant
Magnitude [psf]:	2000
Orientation:	Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	2.581260
Axis Location:	270.019, 2256.839
Left Slip Surface Endpoint:	97.165, 1742.578
Right Slip Surface Endpoint:	577.715, 1810.000
Resisting Moment:	4.9968e+08 lb-ft
Driving Moment:	1.9358e+08 lb-ft
Resisting Horizontal Force:	882178 lb
Driving Horizontal Force:	341763 lb
Total Slice Area:	18346.7 ft2
Surface Horizontal Width:	480.55 ft
Surface Average Height:	38.1785 ft

Global Minimum Coordinates

Method: spencer

X	Y

X	Y
97.1652	1742.58
116.317	1739.09
136.317	1735.54
156.318	1731.98
176.318	1728.43
196.203	1724.9
215.827	1727.23
239.545	1730.05
261.154	1732.63
277.819	1734.61
293.674	1736.5
309.528	1738.39
325.383	1740.28
341.237	1742.17
357.092	1744.06
372.947	1745.95
388.801	1747.84
404.656	1749.73
420.51	1751.62
435.997	1753.46
453.706	1755.57
477.284	1758.38
501.074	1761.23
522.493	1764.49
533.197	1773.3
543.901	1782.1
554.964	1791.2
564.781	1799.28
577.715	1810

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 5021
Number of Invalid Surfaces: 35

Error Codes:

Error Code -108 reported for 35 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.58126**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	9.57579	2967.94	-10.3243	Landslide Debris	200	30	159.208	410.957	365.388	0	365.388	336.385	336.385
2	9.57579	10053.2	-10.3243	Landslide Debris	200	30	340.727	879.506	1176.94	0	1176.94	1114.87	1114.87
3	10.3865	20309.2	-10.0732	Landslide Debris	200	30	561.966	1450.58	2166.08	0	2166.08	2066.25	2066.25
4	3.40224	7810.47	-10.0732	Towsley Fm. - Parallel to Bedding	150	10	222.845	575.22	2411.54	0	2411.54	2371.95	2371.95
5	6.21175	15346.6	-10.0732	Towsley Fm. - Across Bedding	700	36	1072.19	2767.61	2845.82	0	2845.82	2655.35	2655.35
6	10.0002	27778.5	-10.0707	Towsley Fm. - Across Bedding	700	36	1168.66	3016.61	3188.54	0	3188.54	2980.99	2980.99
7	10.0002	34487.1	-10.0707	Towsley Fm. - Across Bedding	700	36	1379.34	3560.43	3937.05	0	3937.05	3692.08	3692.08
8	10.0002	40338.6	-10.0707	Towsley Fm. - Across Bedding	700	36	1563.1	4034.77	4589.92	0	4589.92	4312.31	4312.31

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
9	10.0002	45509.4	-10.0707	Towsley Fm. - Across Bedding	700	36	1725.49	4453.94	5166.85	0	5166.85	4860.41	4860.41
10	9.94235	50372.3	-10.0707	Towsley Fm. - Across Bedding	700	36	1887.42	4871.91	5742.14	0	5742.14	5406.94	5406.94
11	9.94235	55483.8	-10.0707	Towsley Fm. - Across Bedding	700	36	2048.87	5288.67	6315.77	0	6315.77	5951.89	5951.89
12	4.79715	28138.6	6.7666	Towsley Fm. - Across Bedding	700	36	1898.76	4901.19	5782.44	0	5782.44	6007.73	6007.73
13	14.8266	87169	6.7666	Towsley Fm. - Parallel to Bedding	150	10	454.174	1172.34	5797.95	0	5797.95	5851.84	5851.84
14	11.8592	69409	6.7821	Towsley Fm. - Parallel to Bedding	150	10	452.368	1167.68	5771.55	0	5771.55	5825.35	5825.35
15	11.8592	69127.7	6.7821	Towsley Fm. - Parallel to Bedding	150	10	450.772	1163.56	5748.16	0	5748.16	5801.77	5801.77
16	10.8046	62740	6.79581	Towsley Fm. - Parallel to Bedding	150	10	449.253	1159.64	5725.96	0	5725.96	5779.49	5779.49
17	10.8046	62511.1	6.79581	Towsley Fm. - Parallel to Bedding	150	10	447.828	1155.96	5705.06	0	5705.06	5758.42	5758.42
18	8.33239	48051.5	6.79584	Towsley Fm. - Parallel to Bedding	150	10	446.561	1152.69	5686.55	0	5686.55	5739.76	5739.76
19	8.33239	47915.4	6.79584	Towsley Fm. - Parallel to Bedding	150	10	445.461	1149.85	5670.44	0	5670.44	5723.52	5723.52
20	7.9273	45459.5	6.79584	Towsley Fm. - Parallel to Bedding	150	10	444.387	1147.08	5654.72	0	5654.72	5707.68	5707.68
21	7.9273	45336.2	6.79584	Towsley Fm. - Parallel to Bedding	150	10	443.34	1144.38	5639.39	0	5639.39	5692.22	5692.22
22	15.8546	90276.3	6.79584	Towsley Fm. - Parallel to Bedding	150	10	441.657	1140.03	5614.74	0	5614.74	5667.37	5667.37
23	15.8546	90425.9	6.79584	Towsley Fm. - Parallel to Bedding	150	10	442.292	1141.67	5624.05	0	5624.05	5676.76	5676.76
24	7.9273	47052.9	6.79584	Towsley Fm. - Parallel to Bedding	150	10	457.928	1182.03	5852.92	0	5852.92	5907.49	5907.49
25	7.9273	48602.4	6.79584	Towsley Fm. - Parallel to Bedding	150	10	471.096	1216.02	6045.68	0	6045.68	6101.82	6101.82
26	15.8546	100314	6.79584	Towsley Fm. - Parallel to Bedding	150	10	484.302	1250.11	6239.05	0	6239.05	6296.76	6296.76
27	7.9273	50822.1	6.79584	Towsley Fm. - Parallel to Bedding	150	10	489.955	1264.7	6321.79	0	6321.79	6380.18	6380.18
28	7.9273	51242.6	6.79584	Towsley Fm. - Parallel to Bedding	150	10	493.53	1273.93	6374.1	0	6374.1	6432.91	6432.91
29	15.8546	103741	6.79584	Towsley Fm. - Parallel to Bedding	150	10	498.865	1287.7	6452.21	0	6452.21	6511.66	6511.66
30	7.9273	52497.4	6.79584	Towsley Fm. - Parallel to Bedding	150	10	504.192	1301.45	6530.19	0	6530.19	6590.27	6590.27
31	7.9273	52885.1	6.79584	Towsley Fm. - Parallel to Bedding	150	10	507.485	1309.95	6578.41	0	6578.41	6638.89	6638.89
32	7.9273	52351.7	6.79584	Towsley Fm. - Parallel to Bedding	150	10	502.952	1298.25	6512.06	0	6512.06	6572	6572
33	7.9273	51385	6.79584	Towsley Fm. - Parallel to Bedding	150	10	494.739	1277.05	6391.8	0	6391.8	6450.76	6450.76
34	7.74322	49258.4	6.79584	Towsley Fm. - Parallel to Bedding	150	10	486.619	1256.09	6272.95	0	6272.95	6330.94	6330.94
35	7.74322	48163	6.79584	Towsley Fm. - Parallel to Bedding	150	10	477.089	1231.49	6133.44	0	6133.44	6190.3	6190.3
36	8.85454	52532.9	6.79584	Towsley Fm. - Parallel to Bedding	150	10	457.745	1181.56	5850.28	0	5850.28	5904.83	5904.83
37	8.85454	50413.7	6.79584	Towsley Fm. - Parallel to Bedding	150	10	441.625	1139.95	5614.28	0	5614.28	5666.9	5666.9
38	11.789	64675.5	6.79584	Towsley Fm. - Parallel to Bedding	150	10	427.651	1103.88	5409.71	0	5409.71	5460.67	5460.67
39	11.789	61894.3	6.79584	Towsley Fm. - Parallel to Bedding	150	10	411.759	1062.86	5177.08	0	5177.08	5226.15	5226.15
40	11.8951	65520.8	6.81783	Towsley Fm. - Parallel to Bedding	150	10	429.113	1107.65	5431.12	0	5431.12	5482.42	5482.42
41	11.8951	71022.7	6.81783	Towsley Fm. - Parallel to Bedding	150	10	460.267	1188.07	5887.19	0	5887.19	5942.22	5942.22
42	10.7093	67497.2	8.67196	Towsley Fm. - Parallel to Bedding	150	10	479.952	1238.88	6175.37	0	6175.37	6248.57	6248.57
43	10.7093	65869.7	8.67196	Towsley Fm. - Parallel to Bedding	150	10	469.778	1212.62	6026.43	0	6026.43	6098.08	6098.08
44	3.89543	22707.8	39.437	Towsley Fm. - Across Bedding	700	36	1874.86	4839.49	5697.53	0	5697.53	7239.58	7239.58

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
45	6.80875	35675	39.437	Towsley Fm. - Across Bedding	700	36	1803.29	4654.75	5443.25	0	5443.25	6926.44	6926.44
46	10.7042	45757.4	39.437	Towsley Fm. - Across Bedding	700	36	1593.55	4113.37	4698.11	0	4698.11	6008.79	6008.79
47	11.0626	34023	39.437	Towsley Fm. - Across Bedding	700	36	1332.87	3440.49	3771.97	0	3771.97	4868.25	4868.25
48	6.71152	14066.7	39.4624	Towsley Fm. - Across Bedding	700	36	1119.7	2890.24	3014.61	0	3014.61	3936.38	3936.38
49	3.10576	4843.78	39.4624	Engineered Fill	200	32	746.957	1928.09	2765.52	0	2765.52	3380.44	3380.44
50	12.9345	9011.59	39.6481	Engineered Fill	200	32	581.274	1500.42	2081.11	0	2081.11	2562.8	2562.8

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.58126**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	97.1652	1742.58	0	0	0
2	106.741	1740.83	2161.93	253.209	6.68015
3	116.317	1739.09	7477.73	875.807	6.68016
4	126.703	1737.24	17311.2	2027.52	6.68015
5	130.105	1736.64	19526.9	2287.03	6.68016
6	136.317	1735.54	29327.4	3434.89	6.68017
7	146.317	1733.76	46677.3	5466.93	6.68015
8	156.318	1731.98	67463.4	7901.44	6.68016
9	166.318	1730.21	91246.7	10687	6.68016
10	176.318	1728.43	117679	13782.7	6.68011
11	186.26	1726.67	146583	17168.1	6.68016
12	196.203	1724.9	178106	20860.1	6.68015
13	201	1725.47	183923	21541.5	6.68018
14	215.827	1727.23	180457	21135.5	6.68017
15	227.686	1728.64	177682	20810.5	6.68017
16	239.545	1730.05	174921	20487.1	6.68016
17	250.35	1731.34	172402	20192.1	6.68017
18	261.154	1732.63	169895	19898.5	6.68018
19	269.487	1733.62	167970	19672.9	6.68013
20	277.819	1734.61	166051	19448.2	6.68015
21	285.746	1735.56	164232	19235.1	6.68013
22	293.674	1736.5	162419	19022.8	6.68015
23	309.528	1738.39	158813	18600.5	6.68016
24	325.383	1740.28	155199	18177.2	6.68016
25	333.31	1741.22	153300	17954.8	6.68016
26	341.237	1742.17	151323	17723.3	6.68018
27	357.092	1744.06	147214	17242	6.68016
28	365.019	1745	145126	16997.4	6.68014
29	372.947	1745.95	143017	16750.4	6.68015
30	388.801	1747.84	138735	16248.9	6.68015
31	396.728	1748.78	136563	15994.5	6.68015
32	404.656	1749.73	134371	15737.8	6.68016
33	412.583	1750.67	132207	15484.3	6.68014
34	420.51	1751.62	130090	15236.4	6.68016
35	428.254	1752.54	128070	14999.8	6.68016
36	435.997	1753.46	126105	14769.6	6.68013
37	444.851	1754.52	123985	14521.3	6.68013
38	453.706	1755.57	121971	14285.5	6.68017
39	465.495	1756.98	119412	13985.8	6.68018
40	477.284	1758.38	116993	13702.5	6.68018
41	489.179	1759.8	114374	13395.7	6.68016
42	501.074	1761.23	111476	13056.3	6.68017
43	511.783	1762.86	106529	12476.9	6.68017
44	522.493	1764.49	101717	11913.3	6.68016
45	526.388	1767.7	90765.7	10630.7	6.68019
46	533.197	1773.3	72561	8498.48	6.68015
47	543.901	1782.1	48256.1	5651.85	6.68016
48	554.964	1791.2	28680.5	3359.12	6.68017

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
49	561.675	1796.72	19539.2	2288.47	6.68016
50	564.781	1799.28	14788.3	1732.04	6.68018
51	577.715	1810	0	0	0

Entity Information

Group: Deep Rock

Shared Entities

Type	Coordinates	
	X	Y
External Boundary	720	1806
	711	1810
	670	1825
	656	1825
	619.6	1812
	614	1810
	612.5	1809
	611	1810
	590	1810
	578	1810
	527.556	1810
	523	1810
	506	1810
	475	1797
	473.5	1796
	472	1797
	449	1797.82
	444	1798
	432	1800
	403	1800
	364	1793.39
	344	1790
	318	1782
	298	1780
	201	1770
	153	1760
	144	1756
	138.55	1755.5
	122	1754
	108	1746
	89	1740
	67	1736
	60	1733.81
	51	1731
	46	1732.5
	41	1734
	32	1736
	18	1742
	0	1742
	0	1600
	201	1600
	750	1600
	750	1770.69
	750	1779.69
	750	1782.62
	750	1795

Type	X	Y
Material Boundary	619.6	1812
	638	1812
	707	1811
	711	1810

Type	Coordinates	
	X	Y
Material Boundary	443	1780
	481.13	1784.83
	522	1790
	581	1800
	590	1810

Type	X	Y
Material Boundary	46	1732.5
	50.8197	1728
	52.6617	1729.17
	60	1733.81

Type	X	Y
Material Boundary	108	1746
	138.55	1755.5

Type	X	Y
Material Boundary	341.448	1765.44
	343.418	1766.73
	348.488	1770.06
	355.176	1777.7
	360.526	1784.77
	364	1793.39

Type	X	Y
Material Boundary	403	1800
	429	1793.32
	449	1793.32
	449	1797.82

Type	X	Y
Material Boundary	472	1797
	472	1794
	474.25	1794
	492	1794
	527.556	1810

Type	X	Y
Material Boundary	611	1810
	611	1807
	687	1806.29
	722.133	1793.09
	750	1782.62

Type	X	Y
Material Boundary	581	1800
	581	1801

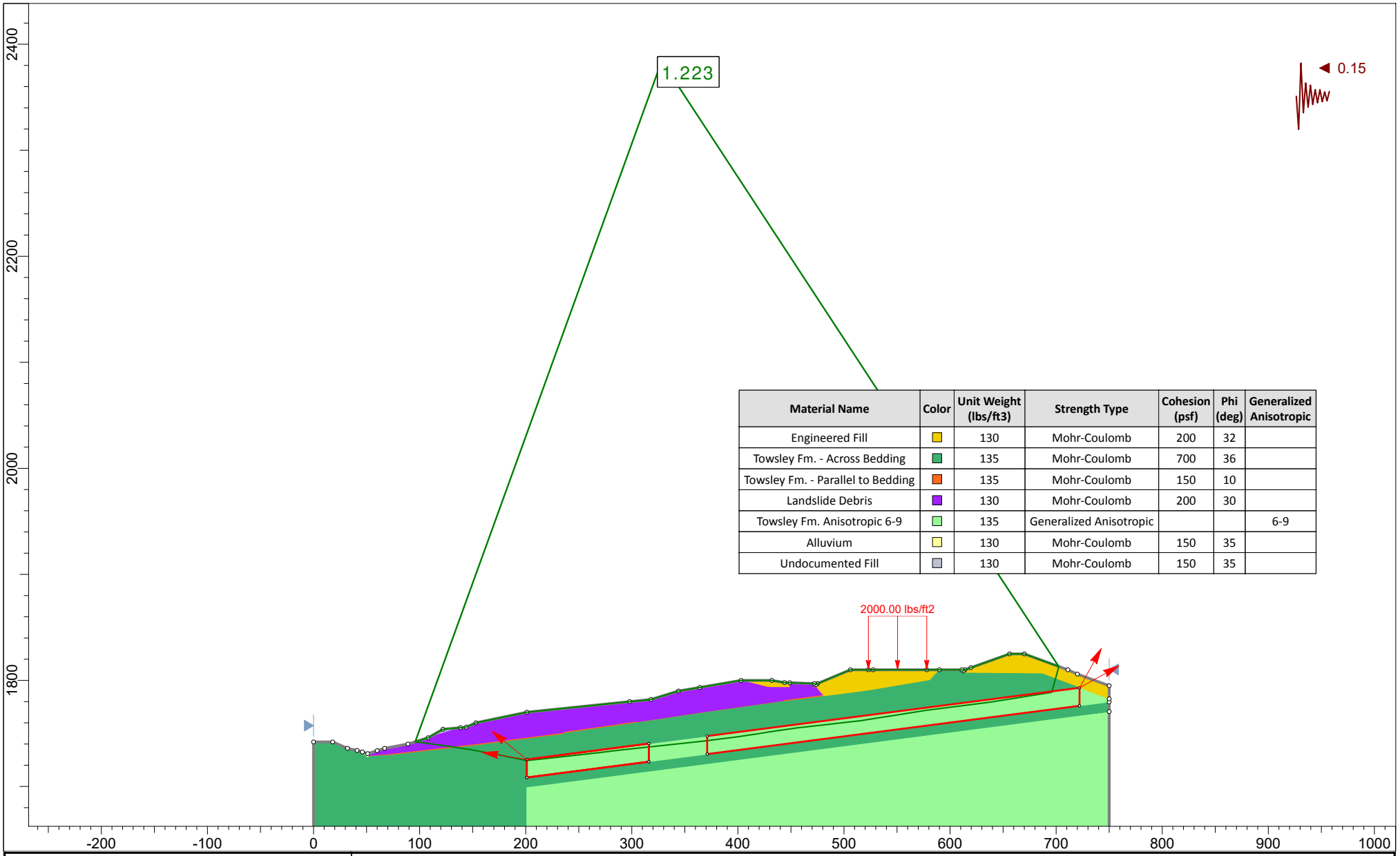
Type	X	Y
Material Boundary	443	1781
	480.445	1785.74
	522	1791
	581	1801

Type	X	Y
Material Boundary	73	1730
	159	1740
	236	1750
	305	1760
	341.448	1765.44
	372	1770
	443	1780

Type	Coordinates
Material Boundary	X: 73, 159, 236, 305, 343.418, 372, 443 Y: 1731, 1741, 1751, 1761, 1766.73, 1771, 1781
Material Boundary	X: 50.8197, 73 Y: 1728, 1730
Material Boundary	X: 52.6617, 73 Y: 1729.17, 1731
Material Boundary	X: 201, 722.133, 722.134 Y: 1725.49, 1793.09, 1793.09
Material Boundary	X: 201, 750 Y: 1708.49, 1779.69
Material Boundary	X: 201, 750 Y: 1699.49, 1770.69
Material Boundary	X: 201, 201, 201, 201 Y: 1600, 1699.49, 1708.49, 1725.49
Material Boundary	X: 472, 474.25, 480.445, 481.13 Y: 1797, 1794, 1785.74, 1784.83

Scenario-based Entities

Type	Coordinates	unox static
Distributed Load	X: 523, 525, 527.556, 578 Y: 1810, 1810, 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No
Block Search Window	X: 201, 201, 316.156, 316.156 Y: 1725.49, 1708.49, 1723.42, 1740.42	✓
Block Search Window	X: 371.013, 371.013, 721.971, 722.134 Y: 1747.54, 1730.54, 1776.06, 1793.09	✓



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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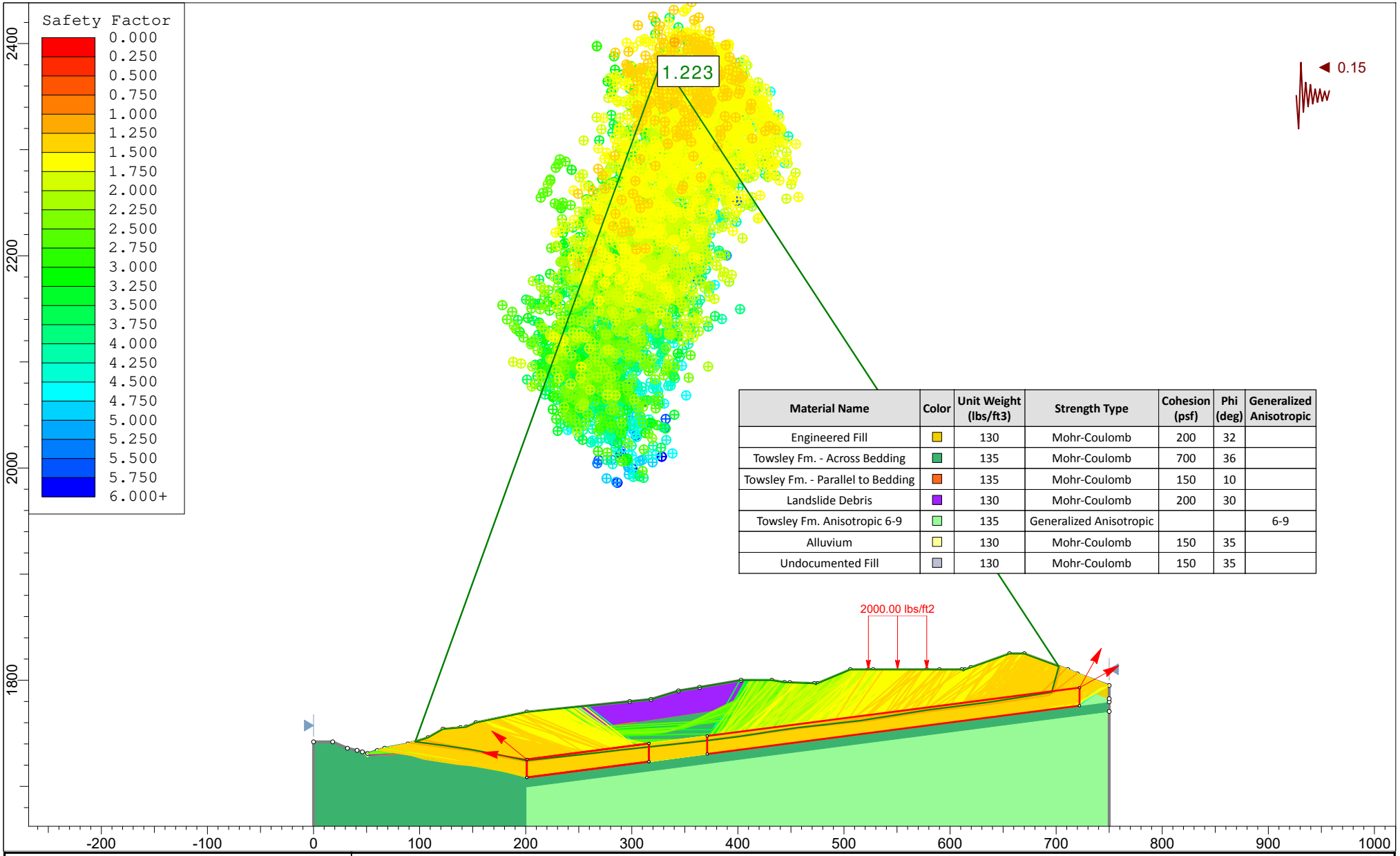
SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Deep bedrock - pseudo-static		
Drawn By	RMP	Scale 1:1500	Company GWV
Date	594		File Name WT14.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	WT14-WT14' - Deep bedrock - pseudo-static		
Drawn By	RMP	Scale 1:1500	Company GWV
Date	595		File Name WT14.slmd

Slide Analysis Information

WT14

Project Summary

File Name:	WT14.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:26.72s
Project Title:	Cherry Willow Water Tanks
Analysis:	WT14-WT14' - Deep bedrock - pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	29

Right Projection Angle (End Angle) [°]:	61
Minimum Elevation:	Not Defined
Minimum Depth [ft]:	35
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.15

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution:	Constant
Magnitude [psf]:	2000
Orientation:	Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	1.222650
Axis Location:	328.193, 2384.344
Left Slip Surface Endpoint:	95.793, 1742.145
Right Slip Surface Endpoint:	702.512, 1813.105
Resisting Moment:	6.34083e+08 lb-ft
Driving Moment:	5.18613e+08 lb-ft
Resisting Horizontal Force:	952266 lb
Driving Horizontal Force:	778853 lb
Total Slice Area:	24307 ft2
Surface Horizontal Width:	606.719 ft
Surface Average Height:	40.063 ft

Global Minimum Coordinates

Method: spencer

X	Y
95.7934	1742.15
122.059	1738.64
148.325	1734.67
174.592	1729.8
200.889	1724.46
223.353	1726.83
245.79	1729.28
268.923	1731.96
292.057	1734.61
319.438	1737.6
346.819	1740.6
374.201	1743.53
401.582	1747.11
428.963	1751.4
456.345	1755.35
483.726	1758.38
499.636	1760.21
515.547	1762.04
531.132	1764.49
546.717	1766.95
577.872	1771.87
607.456	1775.65
637.032	1779.43
666.453	1784.09
695.874	1788.75
702.512	1813.11

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4901
Number of Invalid Surfaces: 149

Error Codes:

Error Code -108 reported for 2 surfaces
Error Code -111 reported for 14 surfaces
Error Code -112 reported for 130 surfaces
Error Code -124 reported for 3 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
-124 = A slice has a width less than the minimum acceptable value.

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.22265**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	13.133	5051.6	-7.60589	Landslide Debris	200	30	409.087	500.17	519.911	0	519.911	465.284	465.284
2	13.133	18382.2	-7.60589	Landslide Debris	200	30	976.215	1193.57	1720.91	0	1720.91	1590.56	1590.56
3	7.23572	15278.3	-8.58173	Landslide Debris	200	30	1392.83	1702.94	2603.17	0	2603.17	2392.98	2392.98
4	3.74267	8557.88	-8.58173	Towsley Fm. - Parallel to Bedding	150	10	476.758	582.908	2455.14	0	2455.14	2383.2	2383.2
5	15.2877	40153.5	-8.58173	Towsley Fm. - Across Bedding	700	36	2699.37	3300.39	3579.13	0	3579.13	3171.77	3171.77
6	13.133	46122.1	-10.5179	Towsley Fm. - Across Bedding	700	36	3484.15	4259.89	4899.76	0	4899.76	4252.89	4252.89

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
7	13.133	55559.8	-10.5179	Towsley Fm. - Across Bedding	700	36	4044.45	4944.95	5842.67	0	5842.67	5091.76	5091.76
8	13.1486	64949	-11.468	Towsley Fm. - Across Bedding	700	36	4680.25	5722.31	6912.62	0	6912.62	5963.13	5963.13
9	13.1486	74478.5	-11.468	Towsley Fm. - Across Bedding	700	36	5255.85	6426.07	7881.23	0	7881.23	6814.96	6814.96
10	11.232	67700.4	6.0042	Towsley Fm. - Parallel to Bedding	150	10	962.033	1176.23	5820.05	0	5820.05	5921.23	5921.23
11	11.232	67681.8	6.0042	Towsley Fm. - Parallel to Bedding	150	10	961.804	1175.95	5818.46	0	5818.46	5919.62	5919.62
12	11.2187	67546.9	6.24551	Towsley Fm. - Parallel to Bedding	150	10	959.866	1173.58	5804.99	0	5804.99	5910.04	5910.04
13	11.2187	67459.5	6.24551	Towsley Fm. - Parallel to Bedding	150	10	958.786	1172.26	5797.5	0	5797.5	5902.42	5902.42
14	11.5666	69406.7	6.61476	Towsley Fm. - Parallel to Bedding	150	10	955.13	1167.79	5772.16	0	5772.16	5882.92	5882.92
15	11.5666	69202.2	6.61476	Towsley Fm. - Parallel to Bedding	150	10	952.677	1164.79	5755.17	0	5755.17	5865.65	5865.65
16	11.5666	69013.2	6.51789	Towsley Fm. - Parallel to Bedding	150	10	950.918	1162.64	5742.95	0	5742.95	5851.6	5851.6
17	11.5666	68839.6	6.51789	Towsley Fm. - Parallel to Bedding	150	10	948.841	1160.1	5728.54	0	5728.54	5836.95	5836.95
18	13.6907	81306.2	6.24422	Towsley Fm. - Parallel to Bedding	150	10	948.473	1159.65	5726.03	0	5726.03	5829.81	5829.81
19	13.6907	81147.3	6.24422	Towsley Fm. - Parallel to Bedding	150	10	946.861	1157.68	5714.86	0	5714.86	5818.46	5818.46
20	13.6907	83989.2	6.24422	Towsley Fm. - Parallel to Bedding	150	10	975.676	1192.91	5914.65	0	5914.65	6021.4	6021.4
21	13.6907	88786.4	6.24422	Towsley Fm. - Parallel to Bedding	150	10	1024.32	1252.38	6251.91	0	6251.91	6363.99	6363.99
22	13.6907	91379.8	6.10785	Towsley Fm. - Parallel to Bedding	150	10	1051.4	1285.49	6439.68	0	6439.68	6552.19	6552.19
23	13.6907	92941.8	6.10785	Towsley Fm. - Parallel to Bedding	150	10	1067.25	1304.87	6549.58	0	6549.58	6663.78	6663.78
24	13.6907	94197.7	7.4524	Towsley Fm. - Parallel to Bedding	150	10	1072.05	1310.74	6582.86	0	6582.86	6723.09	6723.09
25	13.6907	95149.7	7.4524	Towsley Fm. - Parallel to Bedding	150	10	1081.63	1322.45	6649.32	0	6649.32	6790.8	6790.8
26	13.6907	94113.3	8.91215	Towsley Fm. - Parallel to Bedding	150	10	1062.67	1299.27	6517.83	0	6517.83	6684.47	6684.47
27	13.6907	90299.6	8.91215	Towsley Fm. - Parallel to Bedding	150	10	1024.6	1252.73	6253.87	0	6253.87	6414.54	6414.54
28	13.6907	85392.3	8.2111	Towsley Fm. - Parallel to Bedding	150	10	979.348	1197.4	5940.08	0	5940.08	6081.4	6081.4
29	13.6907	79202.6	8.2111	Towsley Fm. - Parallel to Bedding	150	10	917.31	1121.55	5509.93	0	5509.93	5642.3	5642.3
30	13.6907	75211.6	6.30674	Towsley Fm. - Parallel to Bedding	150	10	886.383	1083.74	5295.48	0	5295.48	5393.44	5393.44
31	13.6907	73848.3	6.30674	Towsley Fm. - Parallel to Bedding	150	10	872.566	1066.84	5199.67	0	5199.67	5296.11	5296.11
32	15.9104	94593	6.55476	Towsley Fm. - Parallel to Bedding	150	10	947.777	1158.8	5721.21	0	5721.21	5830.11	5830.11
33	15.9104	102142	6.55476	Towsley Fm. - Parallel to Bedding	150	10	1013.53	1239.19	6177.08	0	6177.08	6293.54	6293.54
34	15.5851	96793.5	8.95287	Towsley Fm. - Parallel to Bedding	150	10	1118.55	1367.59	6905.35	0	6905.35	7081.57	7081.57
35	15.5851	91829	8.95287	Towsley Fm. - Parallel to Bedding	150	10	1209.57	1478.88	7536.44	0	7536.44	7727	7727
36	10.3852	58434.7	8.96907	Towsley Fm. - Parallel to Bedding	150	10	1173.21	1434.43	7284.34	0	7284.34	7469.51	7469.51
37	10.3852	56228.1	8.96907	Towsley Fm. - Parallel to Bedding	150	10	1144.19	1398.94	7083.08	0	7083.08	7263.67	7263.67
38	10.3852	54021.5	8.96907	Towsley Fm. - Parallel to Bedding	150	10	1115.16	1363.45	6881.81	0	6881.81	7057.82	7057.82
39	14.7917	73876.4	7.28734	Towsley Fm. - Parallel to Bedding	150	10	815.275	996.796	4802.42	0	4802.42	4906.67	4906.67
40	14.7917	70484.7	7.28734	Towsley Fm. - Parallel to Bedding	150	10	781.192	955.125	4566.09	0	4566.09	4665.99	4665.99
41	9.85881	44844.6	7.29393	Towsley Fm. - Parallel to Bedding	150	10	751.302	918.58	4358.83	0	4358.83	4455	4455
42	9.85881	46821.2	7.29393	Towsley Fm. - Parallel to Bedding	150	10	778.961	952.397	4550.62	0	4550.62	4650.32	4650.32

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
43	9.85881	49649.9	7.29393	Towsley Fm. - Parallel to Bedding	150	10	818.543	1000.79	4825.08	0	4825.08	4929.85	4929.85
44	14.7104	78898.2	8.999	Towsley Fm. - Parallel to Bedding	150	10	855.809	1046.36	5083.48	0	5083.48	5219.01	5219.01
45	14.7104	81772.1	8.999	Towsley Fm. - Parallel to Bedding	150	10	882.492	1078.98	5268.5	0	5268.5	5408.26	5408.26
46	14.7104	74592.7	8.999	Towsley Fm. - Parallel to Bedding	150	10	815.833	997.478	4806.29	0	4806.29	4935.49	4935.49
47	14.7104	59891.2	8.999	Towsley Fm. - Parallel to Bedding	150	10	679.333	830.587	3859.8	0	3859.8	3967.39	3967.39
48	0.262784	914.76	74.7516	Towsley Fm. - Across Bedding	700	36	791.752	968.036	368.92	0	368.92	3273.34	3273.34
49	3.24925	8203.01	74.7516	Towsley Fm. - Across Bedding	700	36	645.292	788.966	122.452	0	122.452	2489.61	2489.61
50	3.12655	2563.31	74.7516	Engineered Fill	200	32	197.047	240.919	65.4846	0	65.4846	788.321	788.321

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.22265**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	95.7934	1742.15	0	0	0
2	108.926	1740.39	5526.6	1058.97	10.8472
3	122.059	1738.64	18607.9	3565.52	10.8472
4	129.295	1737.55	29236.9	5602.16	10.8471
5	133.038	1736.98	31124.2	5963.81	10.8472
6	148.325	1734.67	74625.7	14299.3	10.8472
7	161.459	1732.24	125412	24030.6	10.8472
8	174.592	1729.8	184440	35341.2	10.8472
9	187.74	1727.13	254676	48799.3	10.8472
10	200.889	1724.46	333635	63928.8	10.8471
11	212.121	1725.64	327410	62736	10.8471
12	223.353	1726.83	321187	61543.6	10.8471
13	234.572	1728.05	314696	60299.9	10.8471
14	245.79	1729.28	308216	59058.1	10.8471
15	257.357	1730.62	301110	57696.6	10.8471
16	268.923	1731.96	294029	56339.9	10.8472
17	280.49	1733.28	287087	55009.6	10.8471
18	292.057	1734.61	280165	53683.4	10.8472
19	305.747	1736.1	272377	52191.1	10.8472
20	319.438	1737.6	264608	50702.3	10.8471
21	333.129	1739.1	256507	49150.1	10.8471
22	346.819	1740.6	247848	47490.9	10.8471
23	360.51	1742.06	239101	45814.9	10.8471
24	374.201	1743.53	230176	44104.7	10.8471
25	387.891	1745.32	218934	41950.7	10.8472
26	401.582	1747.11	207562	39771.6	10.8471
27	415.273	1749.26	194001	37173.1	10.8471
28	428.963	1751.4	181057	34692.9	10.8471
29	442.654	1753.38	169921	32559.2	10.8472
30	456.345	1755.35	159714	30603.4	10.8472
31	470.035	1756.87	152555	29231.6	10.8472
32	483.726	1758.38	145557	27890.5	10.8471
33	499.636	1760.21	135988	26057.1	10.8472
34	515.547	1762.04	125499	24047.3	10.8472
35	531.132	1764.49	111459	21356.9	10.8471
36	546.717	1766.95	98031.3	18784.1	10.8472
37	557.102	1768.59	89510.4	17151.4	10.8472
38	567.487	1770.23	81348.9	15587.5	10.8471
39	577.872	1771.87	73546.8	14092.5	10.8471
40	592.664	1773.76	65440.8	12539.3	10.8471
41	607.456	1775.65	57786.3	11072.6	10.8471
42	617.315	1776.91	52966.3	10149	10.8471
43	627.174	1778.17	47880.4	9174.52	10.8472

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
44	637.032	1779.43	42414.2	8127.11	10.8471
45	651.743	1781.76	31326.1	6002.49	10.8471
46	666.453	1784.09	19768.5	3787.9	10.8471
47	681.163	1786.42	9383.94	1798.09	10.8472
48	695.874	1788.75	1401.62	268.569	10.8472
49	696.137	1789.72	1116.84	214	10.8471
50	699.386	1801.64	523.559	100.321	10.8472
51	702.512	1813.11	0	0	0

Entity Information

Group: Deep Rock

Shared Entities

Type	Coordinates	
	X	Y
External Boundary	720	1806
	711	1810
	670	1825
	656	1825
	619.6	1812
	614	1810
	612.5	1809
	611	1810
	590	1810
	578	1810
	527.556	1810
	523	1810
	506	1810
	475	1797
	473.5	1796
	472	1797
	449	1797.82
	444	1798
	432	1800
	403	1800
	364	1793.39
	344	1790
	318	1782
	298	1780
	201	1770
	153	1760
	144	1756
	138.55	1755.5
	122	1754
	108	1746
	89	1740
	67	1736
	60	1733.81
	51	1731
	46	1732.5
	41	1734
	32	1736
	18	1742
	0	1742
	0	1600
	201	1600
	750	1600
	750	1770.69
	750	1779.69
	750	1782.62
	750	1795

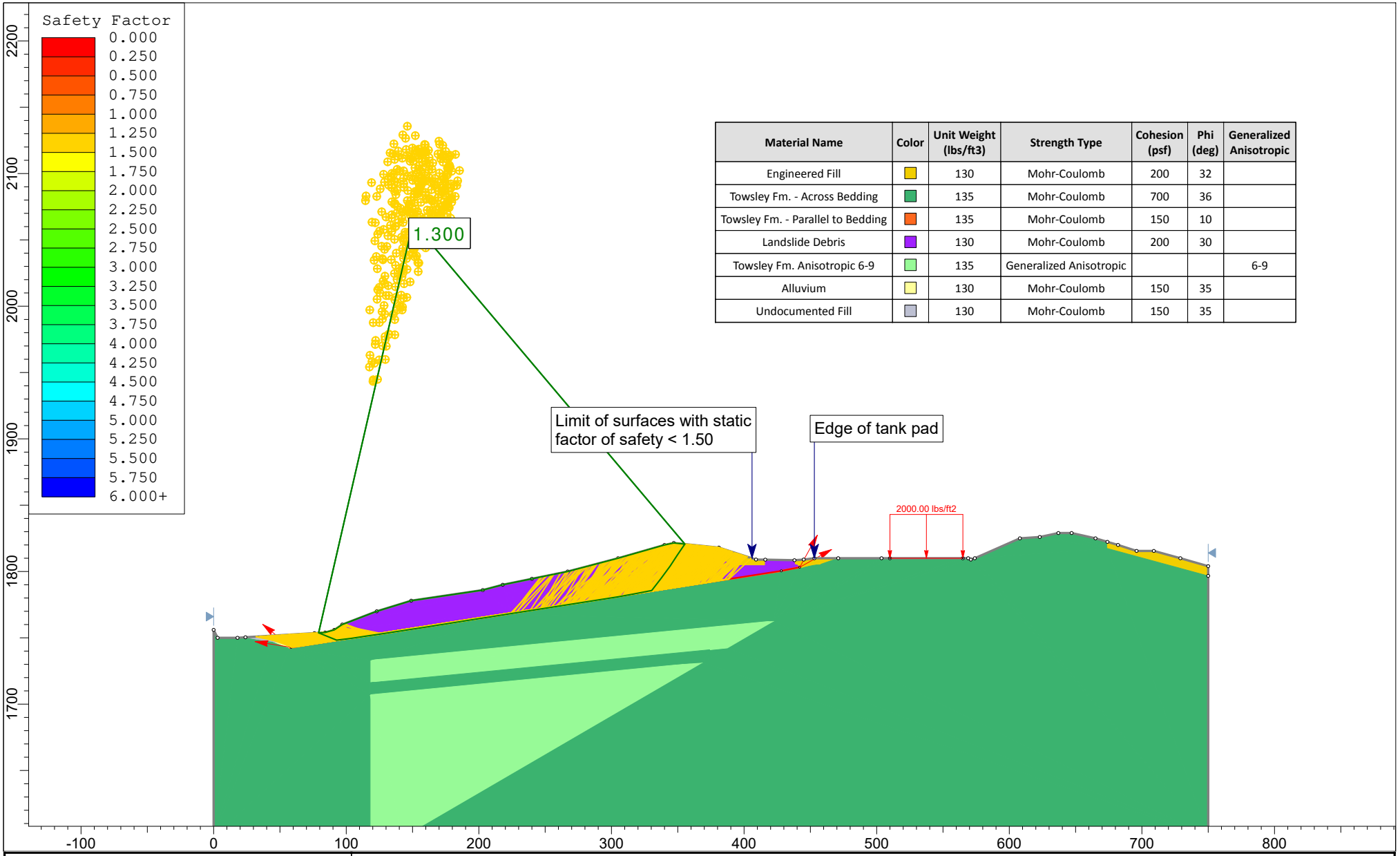
Type	Coordinates
Material Boundary	X: 619.6, 638, 707, 711 / Y: 1812, 1812, 1811, 1810
Material Boundary	X: 443, 481.13, 522, 581, 590 / Y: 1780, 1784.83, 1790, 1800, 1810
Material Boundary	X: 46, 50.8197, 52.6617, 60 / Y: 1732.5, 1728, 1729.17, 1733.81
Material Boundary	X: 108, 138.55 / Y: 1746, 1755.5
Material Boundary	X: 341.448, 343.418, 348.488, 355.176, 360.526, 364 / Y: 1765.44, 1766.73, 1770.06, 1777.7, 1784.77, 1793.39
Material Boundary	X: 403, 429, 449, 449 / Y: 1800, 1793.32, 1793.32, 1797.82
Material Boundary	X: 472, 472, 474.25, 492, 527.556 / Y: 1797, 1794, 1794, 1794, 1810
Material Boundary	X: 611, 611, 687, 722.133, 750 / Y: 1810, 1807, 1806.29, 1793.09, 1782.62
Material Boundary	X: 581, 581 / Y: 1800, 1801
Material Boundary	X: 443, 480.445, 522, 581 / Y: 1781, 1785.74, 1791, 1801

Type	Coordinates
Material Boundary	X: 73, 159, 236, 305, 341.448, 372, 443 Y: 1730, 1740, 1750, 1760, 1765.44, 1770, 1780
Material Boundary	X: 73, 159, 236, 305, 343.418, 372, 443 Y: 1731, 1741, 1751, 1761, 1766.73, 1771, 1781
Material Boundary	X: 50.8197, 73 Y: 1728, 1730
Material Boundary	X: 52.6617, 73 Y: 1729.17, 1731
Material Boundary	X: 201, 722.133, 722.134 Y: 1725.49, 1793.09, 1793.09
Material Boundary	X: 201, 750 Y: 1708.49, 1779.69
Material Boundary	X: 201, 750 Y: 1699.49, 1770.69
Material Boundary	X: 201, 201, 201, 201 Y: 1600, 1699.49, 1708.49, 1725.49
Material Boundary	X: 472, 474.25, 480.445, 481.13 Y: 1797, 1794, 1785.74, 1784.83

Scenario-based Entities

Type	Coordinates	unox pseudo
Distributed Load	X: 523, 527.556, 578 Y: 1810, 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No

Type	Coordinates	unox pseudo
Block Search Window	X: 201, 201, 316.156, 316.156 Y: 1725.49, 1708.49, 1723.42, 1740.42	✓
Block Search Window	X: 201, 201, 316.156, 316.156 Y: 1725.49, 1708.49, 1723.42, 1740.42	✓
Block Search Window	X: 371.013, 371.013, 721.971, 722.134 Y: 1747.54, 1730.54, 1776.06, 1793.09	✓



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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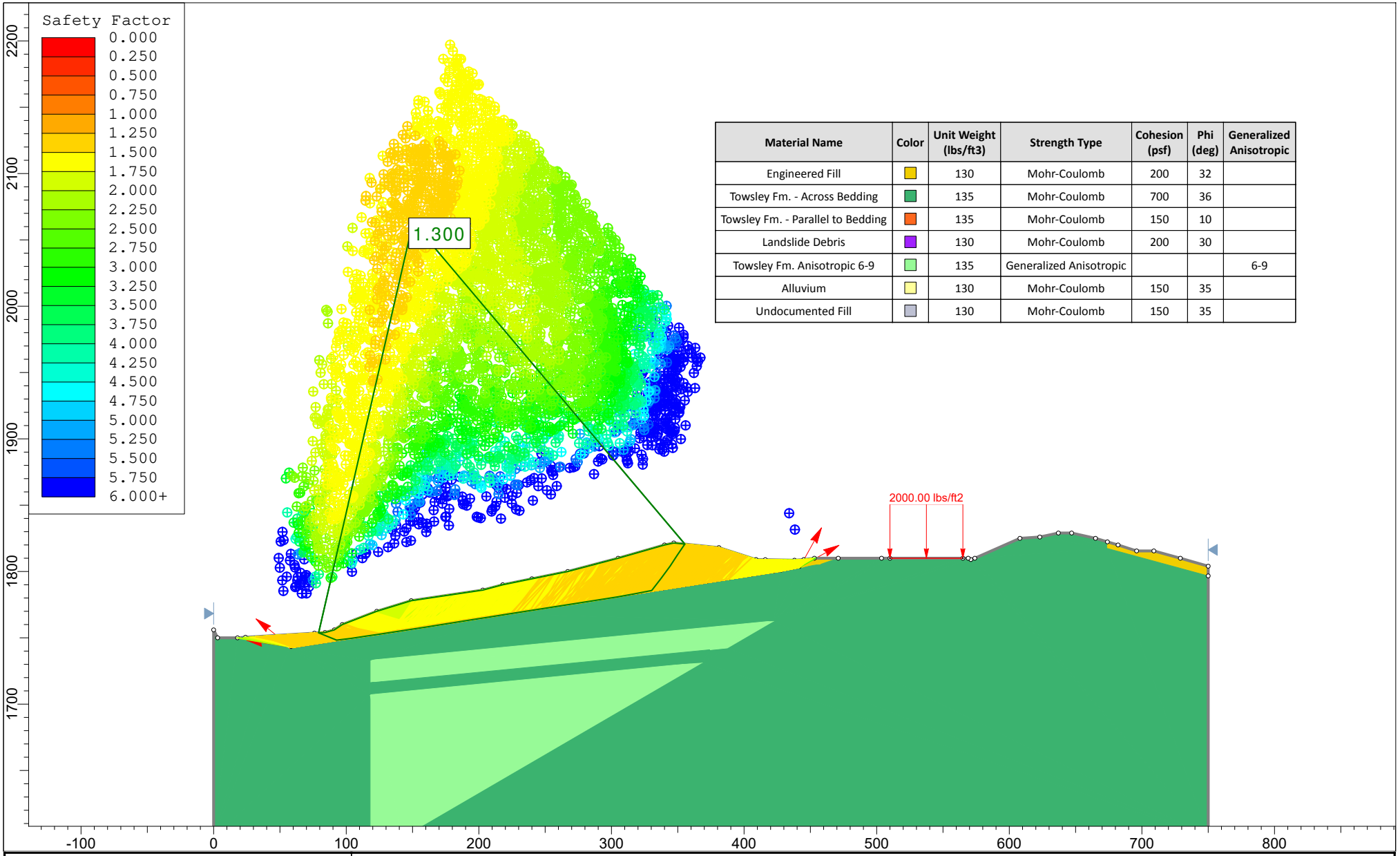
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Base of slide - static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 605		File Name: WT15.slmd	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Base of slide - static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 606		File Name: WT15.slmd	

Slide Analysis Information

WT15

Project Summary

File Name:	WT15.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:04.164s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT15-WT15' - Base of slide - static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	29

Right Projection Angle (End Angle) [°]:	61
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution:	Constant
Magnitude [psf]:	2000
Orientation:	Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	1.299550
Axis Location:	150.277, 2063.329
Left Slip Surface Endpoint:	79.141, 1753.705
Right Slip Surface Endpoint:	355.294, 1820.646
Resisting Moment:	6.25726e+07 lb-ft
Driving Moment:	4.81495e+07 lb-ft
Resisting Horizontal Force:	187224 lb
Driving Horizontal Force:	144068 lb
Total Slice Area:	5870.34 ft2
Surface Horizontal Width:	276.153 ft
Surface Average Height:	21.2575 ft

Global Minimum Coordinates

Method: spencer

X	Y

X	Y
79.1407	1753.71
92.757	1748.2
103.713	1749.52
114.669	1751.21
125.625	1752.78
136.271	1754.4
146.419	1755.98
156.373	1757.54
170.342	1759.73
183.603	1761.83
195.505	1763.71
207.407	1765.59
219.31	1767.47
231.212	1769.35
243.114	1771.23
255.016	1773.11
266.918	1774.92
278.82	1776.7
291.639	1778.81
304.459	1780.79
317.345	1783.13
330.288	1785.64
337.239	1794.58
344.189	1804.06
349.742	1812.45
355.294	1820.65

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4651
Number of Invalid Surfaces: 357

Error Codes:

Error Code -108 reported for 23 surfaces
Error Code -111 reported for 334 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.29955**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	6.44161	1291.24	-22.0261	Landslide Debris	200	30	352.785	458.462	447.67	0	447.67	304.948	304.948
2	6.44161	4695.19	-22.0261	Landslide Debris	200	30	711.682	924.866	1255.5	0	1255.5	967.589	967.589
3	0.7331	818.619	-22.0261	Towsley Fm. - Parallel to Bedding	150	10	307.131	399.132	1412.9	0	1412.9	1288.65	1288.65
4	5.47816	7441.14	6.91105	Towsley Fm. - Parallel to Bedding	150	10	298.403	387.79	1348.57	0	1348.57	1384.74	1384.74
5	5.47816	8804.1	6.91105	Towsley Fm. - Parallel to Bedding	150	10	331.707	431.07	1594.03	0	1594.03	1634.23	1634.23
6	5.47772	9770.55	8.73252	Towsley Fm. - Parallel to Bedding	150	10	352.333	457.874	1746.04	0	1746.04	1800.16	1800.16
7	5.47772	10672.1	8.73252	Towsley Fm. - Parallel to Bedding	150	10	374.133	486.204	1906.71	0	1906.71	1964.18	1964.18
8	5.47791	11593.8	8.18336	Towsley Fm. - Parallel to Bedding	150	10	397.456	516.514	2078.6	0	2078.6	2135.75	2135.75

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
9	5.47791	12500.7	8.18336	Towsley Fm. - Parallel to Bedding	150	10	419.453	545.1	2240.73	0	2240.73	2301.05	2301.05
10	5.32316	12785.5	8.64876	Towsley Fm. - Parallel to Bedding	150	10	434.391	564.513	2350.82	0	2350.82	2416.89	2416.89
11	5.32316	13359.2	8.64876	Towsley Fm. - Parallel to Bedding	150	10	448.675	583.075	2456.08	0	2456.08	2524.33	2524.33
12	5.07394	13261.6	8.8485	Towsley Fm. - Parallel to Bedding	150	10	462.006	600.4	2554.35	0	2554.35	2626.27	2626.27
13	5.07394	13770.5	8.8485	Towsley Fm. - Parallel to Bedding	150	10	475.281	617.651	2652.18	0	2652.18	2726.17	2726.17
14	4.977	13941.2	8.88451	Towsley Fm. - Parallel to Bedding	150	10	486.731	632.531	2736.57	0	2736.57	2812.65	2812.65
15	4.977	13983.9	8.88451	Towsley Fm. - Parallel to Bedding	150	10	487.868	634.009	2744.94	0	2744.94	2821.21	2821.21
16	4.6565	13058.5	8.92483	Towsley Fm. - Parallel to Bedding	150	10	487.063	632.963	2739.03	0	2739.03	2815.52	2815.52
17	4.6565	13033.4	8.92483	Towsley Fm. - Parallel to Bedding	150	10	486.348	632.034	2733.75	0	2733.75	2810.12	2810.12
18	4.6565	13008.2	8.92483	Towsley Fm. - Parallel to Bedding	150	10	485.634	631.106	2728.48	0	2728.48	2804.75	2804.75
19	6.63058	18476.6	8.98087	Towsley Fm. - Parallel to Bedding	150	10	484.574	629.728	2720.68	0	2720.68	2797.26	2797.26
20	6.63058	18419.7	8.98087	Towsley Fm. - Parallel to Bedding	150	10	483.438	628.252	2712.31	0	2712.31	2788.71	2788.71
21	5.95102	16483.6	8.97574	Towsley Fm. - Parallel to Bedding	150	10	482.378	626.874	2704.49	0	2704.49	2780.68	2780.68
22	5.95102	16438.2	8.97574	Towsley Fm. - Parallel to Bedding	150	10	481.368	625.562	2697.05	0	2697.05	2773.08	2773.08
23	5.95102	16392.7	8.97646	Towsley Fm. - Parallel to Bedding	150	10	480.356	624.247	2689.59	0	2689.59	2765.47	2765.47
24	5.95102	16496.9	8.97646	Towsley Fm. - Parallel to Bedding	150	10	482.672	627.256	2706.66	0	2706.66	2782.9	2782.9
25	5.95102	16978.4	8.98255	Towsley Fm. - Parallel to Bedding	150	10	493.359	641.145	2785.42	0	2785.42	2863.4	2863.4
26	5.95102	17471.1	8.98255	Towsley Fm. - Parallel to Bedding	150	10	504.309	655.375	2866.13	0	2866.13	2945.85	2945.85
27	5.95102	17770.3	8.98159	Towsley Fm. - Parallel to Bedding	150	10	510.961	664.02	2915.15	0	2915.15	2995.91	2995.91
28	5.95102	17981.9	8.98159	Towsley Fm. - Parallel to Bedding	150	10	515.665	670.132	2949.81	0	2949.81	3031.31	3031.31
29	5.95103	18193.9	8.97162	Towsley Fm. - Parallel to Bedding	150	10	520.402	676.289	2984.73	0	2984.73	3066.89	3066.89
30	5.95103	18406.3	8.97162	Towsley Fm. - Parallel to Bedding	150	10	525.125	682.426	3019.54	0	3019.54	3102.44	3102.44
31	5.95103	18619.1	8.9646	Towsley Fm. - Parallel to Bedding	150	10	529.872	688.595	3054.52	0	3054.52	3138.11	3138.11
32	5.95103	18832.1	8.9646	Towsley Fm. - Parallel to Bedding	150	10	534.607	694.749	3089.42	0	3089.42	3173.76	3173.76
33	5.9511	19057.5	8.67979	Towsley Fm. - Parallel to Bedding	150	10	540.39	702.264	3132.04	0	3132.04	3214.53	3214.53
34	5.9511	19294.9	8.67979	Towsley Fm. - Parallel to Bedding	150	10	545.676	709.133	3170.99	0	3170.99	3254.29	3254.29
35	5.95111	19672.4	8.49755	Towsley Fm. - Parallel to Bedding	150	10	554.591	720.719	3236.71	0	3236.71	3319.57	3319.57
36	5.95111	20197.3	8.49755	Towsley Fm. - Parallel to Bedding	150	10	566.29	735.922	3322.93	0	3322.93	3407.53	3407.53
37	6.4097	22298.5	9.35105	Towsley Fm. - Parallel to Bedding	150	10	575.058	747.316	3387.55	0	3387.55	3482.24	3482.24
38	6.4097	22822.8	9.35105	Towsley Fm. - Parallel to Bedding	150	10	585.854	761.346	3467.12	0	3467.12	3563.59	3563.59
39	6.40963	23375.4	8.7768	Towsley Fm. - Parallel to Bedding	150	10	598.995	778.424	3563.97	0	3563.97	3656.45	3656.45
40	6.40963	23956.6	8.7768	Towsley Fm. - Parallel to Bedding	150	10	611.005	794.031	3652.49	0	3652.49	3746.82	3746.82
41	6.44321	24643.4	10.2811	Towsley Fm. - Parallel to Bedding	150	10	617.742	802.786	3702.14	0	3702.14	3814.19	3814.19
42	6.44321	25200.8	10.2811	Towsley Fm. - Parallel to Bedding	150	10	629.098	817.544	3785.84	0	3785.84	3899.95	3899.95
43	6.47129	25835.9	10.9904	Towsley Fm. - Parallel to Bedding	150	10	637.414	828.351	3847.12	0	3847.12	3970.91	3970.91
44	6.47129	26326.1	10.9904	Towsley Fm. - Parallel to Bedding	150	10	647.318	841.222	3920.12	0	3920.12	4045.83	4045.83

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
45	0.0760362	311.814	52.1175	Towsley Fm. - Parallel to Bedding	150	10	500.836	650.862	2840.53	0	2840.53	3484.29	3484.29
46	6.87516	25087.3	52.1175	Landslide Debris	200	30	1044.98	1358	2005.72	0	2005.72	3348.9	3348.9
47	6.95051	18788.7	53.7605	Landslide Debris	200	30	781.507	1015.61	1412.67	0	1412.67	2478.92	2478.92
48	5.55218	9398.97	56.5025	Landslide Debris	200	30	506.094	657.694	792.75	0	792.75	1557.45	1557.45
49	4.43254	3035.38	55.8831	Landslide Debris	200	30	270.544	351.585	262.554	0	262.554	661.892	661.892
50	1.1198	128.699	55.8831	Engineered Fill	200	32	133.184	173.079	-43.0817	0	-43.0817	153.506	153.506

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.29955**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	79.1407	1753.71	0	0	0
2	85.5823	1751.1	3439.14	673.139	11.0744
3	92.0239	1748.49	11295.4	2210.83	11.0744
4	92.757	1748.2	11939.6	2336.92	11.0744
5	98.2351	1748.86	12678.8	2481.61	11.0744
6	103.713	1749.52	13437.5	2630.11	11.0744
7	109.191	1750.37	13898.4	2720.32	11.0744
8	114.669	1751.21	14343.5	2807.44	11.0744
9	120.147	1752	14883.3	2913.1	11.0745
10	125.625	1752.78	15415.9	3017.34	11.0744
11	130.948	1753.59	15824.9	3097.38	11.0744
12	136.271	1754.4	16224.6	3175.61	11.0744
13	141.345	1755.19	16551.1	3239.53	11.0744
14	146.419	1755.98	16867.8	3301.51	11.0744
15	151.396	1756.76	17161.2	3358.94	11.0744
16	156.373	1757.54	17453.7	3416.2	11.0745
17	161.029	1758.27	17718.8	3468.09	11.0745
18	165.686	1759	17984.4	3520.07	11.0744
19	170.342	1759.73	18250.6	3572.17	11.0744
20	176.973	1760.78	18612.6	3643.02	11.0744
21	183.603	1761.83	18975.8	3714.11	11.0744
22	189.554	1762.77	19304.3	3778.42	11.0745
23	195.505	1763.71	19633.9	3842.91	11.0744
24	201.456	1764.65	19964.1	3907.56	11.0745
25	207.407	1765.59	20292.2	3971.76	11.0744
26	213.359	1766.53	20608	4033.57	11.0744
27	219.31	1767.47	20913	4093.27	11.0744
28	225.261	1768.41	21211.8	4151.76	11.0744
29	231.212	1769.35	21506	4209.33	11.0744
30	237.163	1770.29	21798.7	4266.62	11.0744
31	243.114	1771.23	22086.8	4323.01	11.0744
32	249.065	1772.17	22372.5	4378.95	11.0744
33	255.016	1773.11	22653.7	4433.98	11.0744
34	260.967	1774.02	23024.2	4506.49	11.0744
35	266.918	1774.92	23390.7	4578.23	11.0744
36	272.869	1775.81	23813.3	4660.94	11.0744
37	278.82	1776.7	24228.8	4742.27	11.0744
38	285.23	1777.76	24339.2	4763.88	11.0744
39	291.639	1778.81	24434.8	4782.6	11.0744
40	298.049	1779.8	24747.3	4843.75	11.0744
41	304.459	1780.79	25049.1	4902.83	11.0744
42	310.902	1781.96	24702.5	4834.99	11.0744
43	317.345	1783.13	24331.3	4762.34	11.0744
44	323.816	1784.39	23621.3	4623.36	11.0744
45	330.288	1785.64	22883.6	4478.98	11.0744
46	330.364	1785.74	22644.1	4432.09	11.0744
47	337.239	1794.58	12103.7	2369.05	11.0745
48	344.189	1804.06	4139.33	810.187	11.0744
49	349.742	1812.45	298.711	58.4664	11.0744
50	354.174	1818.99	-219.892	-43.0392	11.0744

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
51	355.294	1820.65	0	0	0

Entity Information

Group: Removals Slots

Shared Entities

Type	Coordinates	
	X	Y
External Boundary	0	1600
	118	1600
	142.82	1600
	750	1600
	750	1796.64
	750	1804
	729	1810
	709	1815.5
	696	1815.5
	682	1820
	674	1822.35
	665	1825
	647	1829
	637	1829
	623	1826
	608	1825
	574	1810
	571	1809
	569	1810
	565	1810
	510	1810
	503.637	1810
	471	1810
	453	1810
	445	1809
	438	1808.5
	416	1808.88
	409	1809
	381	1818
	347	1821.5
	340	1820
	305	1810
	267	1800
	240	1794.49
	218	1790
	203	1786
	149	1778
	123	1770
	97	1760
	91	1756
	84	1754
	76	1753.52
	24	1750.36
	18	1750
	3	1750
	0	1756

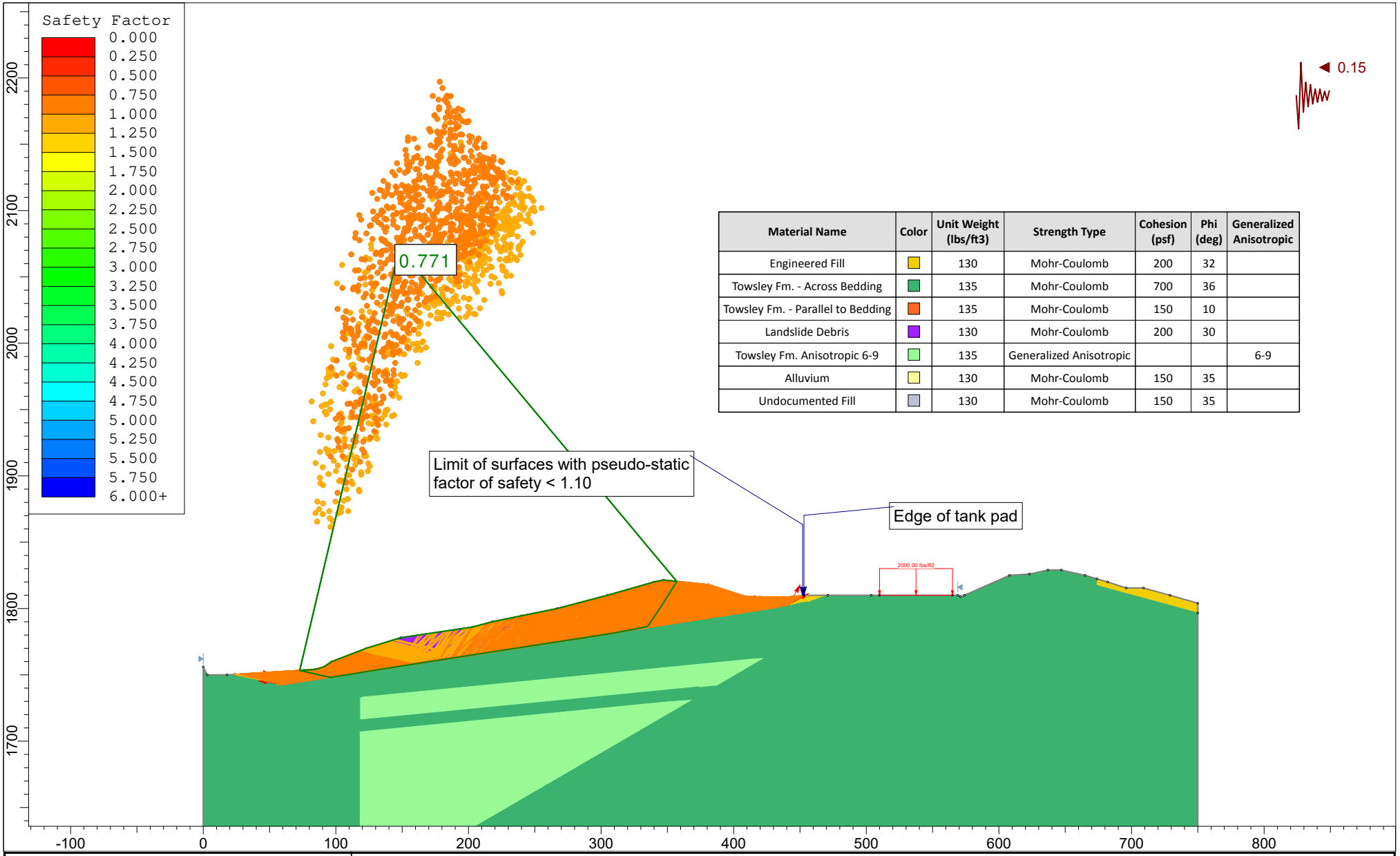
	X	Y
Material Boundary	118	1600
	118	1707.04
	118	1716.04
	118	1733.04
	422.401	1762.72

Type	Coordinates
Material Boundary	X: 374.004, 387.309 / Y: 1741, 1742.3
Material Boundary	X: 118, 374.004 / Y: 1716.04, 1741
Material Boundary	X: 118, 368.737 / Y: 1707.04, 1731.49
Material Boundary	X: 142.82, 368.737, 387.309, 422.401, 503.637 / Y: 1600, 1731.49, 1742.3, 1762.72, 1810
Material Boundary	X: 44, 57, 221.835, 428, 442.345, 457.15 / Y: 1746.7, 1742, 1767.77, 1800, 1802.71, 1805.5
Material Boundary	X: 24, 44, 44.1834, 57, 68.0457, 76 / Y: 1750.36, 1746.7, 1746.67, 1745, 1748.3, 1753.52
Material Boundary	X: 57, 59.4618, 68.0457 / Y: 1742, 1743.4, 1748.3
Material Boundary	X: 347, 396, 416, 416 / Y: 1821.5, 1804.38, 1804.38, 1808.88
Material Boundary	X: 438, 438, 440.25, 451.85, 457.15, 458, 471 / Y: 1808.5, 1805.5, 1805.5, 1805.5, 1805.5, 1805.5, 1810
Material Boundary	X: 674, 674, 750 / Y: 1822.35, 1817.35, 1796.64

Type	Coordinates
Material Boundary	X: 59.4618, 223.964, 428, 441.688, 451.85 Y: 1743.4, 1769.11, 1801, 1803.58, 1805.5
Material Boundary	X: 438, 440.25, 441.688, 442.345 Y: 1808.5, 1805.5, 1803.58, 1802.71
Material Boundary	X: 221.835, 223.964, 226.819, 230.899, 235.205, 238.691, 240 Y: 1767.77, 1769.11, 1770.92, 1774.6, 1780.95, 1788.63, 1794.49

Scenario-based Entities

Type	Coordinates	slide plane static
Distributed Load	X: 510, 565 Y: 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No
Block Search Polyline	X: 58.3596, 428.02, 441.971 Y: 1742.78, 1800.51, 1803.21	✓



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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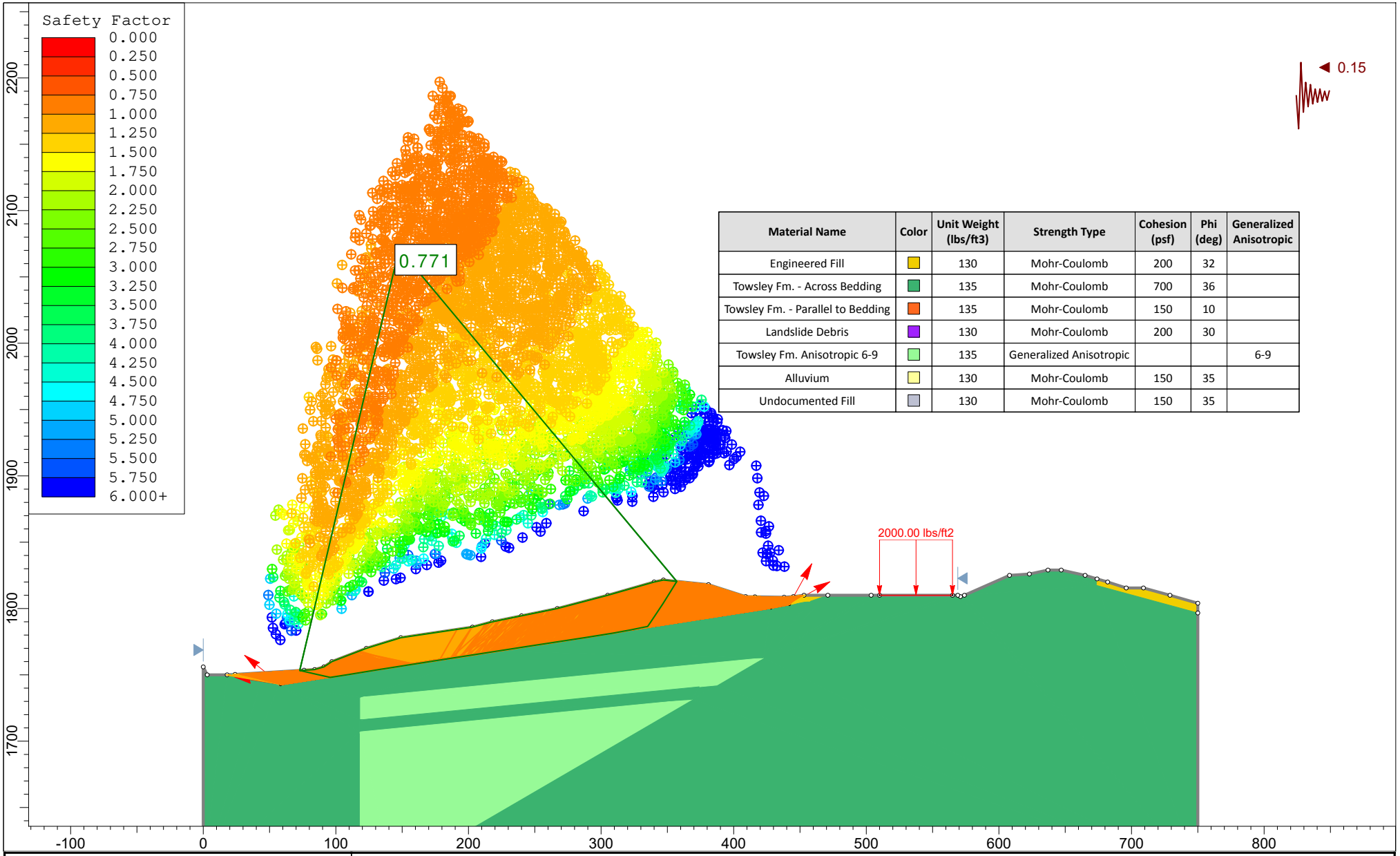
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Base of slide - pseudo-static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 615		File Name: WT15.slmd	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Base of slide - pseudo-static		
Drawn By	RMP	Scale 1:1200	Company GWV
Date	616		File Name WT15.slmd

Slide Analysis Information

WT15

Project Summary

File Name:	WT15.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:06.222s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT15-WT15' - Base of slide - pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	29

Right Projection Angle (End Angle) [°]:	61
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.15

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution:	Constant
Magnitude [psf]:	2000
Orientation:	Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	0.771208
Axis Location:	147.793, 2071.255
Left Slip Surface Endpoint:	72.750, 1753.318
Right Slip Surface Endpoint:	357.117, 1820.459
Resisting Moment:	6.36255e+07 lb-ft
Driving Moment:	8.2501e+07 lb-ft
Resisting Horizontal Force:	189025 lb
Driving Horizontal Force:	245103 lb
Total Slice Area:	5982.64 ft2
Surface Horizontal Width:	284.367 ft
Surface Average Height:	21.0384 ft

Global Minimum Coordinates

Method: spencer

X	Y
72.7501	1753.32
84.2752	1750.72
95.8003	1748.11
109.583	1750.29
123.365	1752.52
132.626	1753.99
141.777	1755.46
151.05	1756.93
160.319	1758.39
170.959	1760.01
181.598	1761.67
190.164	1762.97
198.73	1764.3
207.296	1765.64
215.861	1766.97
224.427	1768.3
232.993	1769.64
241.558	1770.97
250.124	1772.3
258.69	1773.6
266.878	1774.84
281.73	1777.14
294.746	1779.18
308.773	1781.43
321.976	1783.85
335.178	1786.5
340.852	1794.95
346.525	1803.4
351.821	1811.93
357.117	1820.46

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4865
Number of Invalid Surfaces: 143

Error Codes:

Error Code -108 reported for 12 surfaces
Error Code -111 reported for 131 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 0.771208**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	2.19343	89.5798	-12.7264	Undocumented Fill	150	35	551.531	425.345	393.234	0	393.234	268.674	268.674
2	9.33165	2384.67	-12.7264	Landslide Debris	200	30	872.193	672.642	818.64	0	818.64	621.661	621.661
3	4.49174	2634.78	-12.7264	Landslide Debris	200	30	1359.93	1048.79	1470.14	0	1470.14	1163.01	1163.01
4	4.49174	4102.84	-12.7264	Landslide Debris	200	30	1841.47	1420.16	2113.37	0	2113.37	1697.49	1697.49
5	2.54161	3294.9	-12.7264	Towsley Fm. - Parallel to Bedding	150	10	584.867	451.054	1707.36	0	1707.36	1575.27	1575.27
6	6.89118	10943	8.96925	Towsley Fm. - Parallel to Bedding	150	10	543.25	418.959	1525.34	0	1525.34	1611.08	1611.08
7	6.89118	12369.1	8.96925	Towsley Fm. - Parallel to Bedding	150	10	587.542	453.117	1719.06	0	1719.06	1811.79	1811.79

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
8	6.89118	13754.4	9.2195	Towsley Fm. - Parallel to Bedding	150	10	629.238	485.273	1901.43	0	1901.43	2003.57	2003.57
9	6.89118	15124.7	9.2195	Towsley Fm. - Parallel to Bedding	150	10	671.688	518.011	2087.1	0	2087.1	2196.12	2196.12
10	4.63065	10815	9.0158	Towsley Fm. - Parallel to Bedding	150	10	702.97	542.136	2223.92	0	2223.92	2335.45	2335.45
11	4.63065	11230.2	9.0158	Towsley Fm. - Parallel to Bedding	150	10	722.149	556.927	2307.8	0	2307.8	2422.38	2422.38
12	4.57518	11501.7	9.08341	Towsley Fm. - Parallel to Bedding	150	10	740.698	571.232	2388.91	0	2388.91	2507.33	2507.33
13	4.57518	11903.5	9.08341	Towsley Fm. - Parallel to Bedding	150	10	759.475	585.713	2471.06	0	2471.06	2592.48	2592.48
14	4.63651	12474.9	9.01355	Towsley Fm. - Parallel to Bedding	150	10	778.94	600.725	2556.19	0	2556.19	2679.75	2679.75
15	4.63651	12847.7	9.01355	Towsley Fm. - Parallel to Bedding	150	10	796.141	613.99	2631.43	0	2631.43	2757.72	2757.72
16	4.63465	12883.6	8.96458	Towsley Fm. - Parallel to Bedding	150	10	798.385	615.721	2641.24	0	2641.24	2767.19	2767.19
17	4.63465	12856.7	8.96458	Towsley Fm. - Parallel to Bedding	150	10	797.139	614.76	2635.78	0	2635.78	2761.53	2761.53
18	5.31987	14734.4	8.6676	Towsley Fm. - Parallel to Bedding	150	10	798.309	615.662	2640.89	0	2640.89	2762.59	2762.59
19	5.31987	14719.1	8.6676	Towsley Fm. - Parallel to Bedding	150	10	797.693	615.187	2638.21	0	2638.21	2759.82	2759.82
20	5.31987	14697.2	8.86165	Towsley Fm. - Parallel to Bedding	150	10	795.44	613.45	2628.35	0	2628.35	2752.37	2752.37
21	5.31987	14668.7	8.86165	Towsley Fm. - Parallel to Bedding	150	10	794.292	612.564	2623.33	0	2623.33	2747.17	2747.17
22	8.56571	23582.6	8.59135	Towsley Fm. - Parallel to Bedding	150	10	795.294	613.337	2627.72	0	2627.72	2747.87	2747.87
23	4.28285	11775.6	8.86126	Towsley Fm. - Parallel to Bedding	150	10	792.607	611.265	2615.96	0	2615.96	2739.53	2739.53
24	4.28285	11757.1	8.86126	Towsley Fm. - Parallel to Bedding	150	10	791.683	610.552	2611.92	0	2611.92	2735.35	2735.35
25	4.28285	11738.7	8.86126	Towsley Fm. - Parallel to Bedding	150	10	790.759	609.84	2607.88	0	2607.88	2731.16	2731.16
26	4.28285	11862.3	8.86126	Towsley Fm. - Parallel to Bedding	150	10	796.948	614.613	2634.94	0	2634.94	2759.19	2759.19
27	8.56571	24517.2	8.86126	Towsley Fm. - Parallel to Bedding	150	10	816.772	629.901	2721.65	0	2721.65	2848.99	2848.99
28	8.56571	25407.2	8.84512	Towsley Fm. - Parallel to Bedding	150	10	839.158	647.165	2819.56	0	2819.56	2950.15	2950.15
29	4.28285	12886.3	8.84512	Towsley Fm. - Parallel to Bedding	150	10	848.303	654.218	2859.57	0	2859.57	2991.57	2991.57
30	4.28285	13002	8.84512	Towsley Fm. - Parallel to Bedding	150	10	854.089	658.68	2884.87	0	2884.87	3017.78	3017.78
31	8.56571	26350.9	8.84512	Towsley Fm. - Parallel to Bedding	150	10	862.769	665.374	2922.83	0	2922.83	3057.09	3057.09
32	8.56571	26813.4	8.84512	Towsley Fm. - Parallel to Bedding	150	10	874.34	674.298	2973.45	0	2973.45	3109.51	3109.51
33	8.5657	27296.8	8.60916	Towsley Fm. - Parallel to Bedding	150	10	888.325	685.083	3034.61	0	3034.61	3169.1	3169.1
34	8.18856	26568.4	8.58439	Towsley Fm. - Parallel to Bedding	150	10	900.949	694.819	3089.83	0	3089.83	3225.83	3225.83
35	4.95065	16370.9	8.81854	Towsley Fm. - Parallel to Bedding	150	10	912.384	703.638	3139.84	0	3139.84	3281.39	3281.39
36	4.95065	16715.1	8.81854	Towsley Fm. - Parallel to Bedding	150	10	927.291	715.134	3205.03	0	3205.03	3348.89	3348.89
37	4.95065	17059.4	8.81854	Towsley Fm. - Parallel to Bedding	150	10	942.2	726.632	3270.24	0	3270.24	3416.42	3416.42
38	6.50773	22943.9	8.91329	Towsley Fm. - Parallel to Bedding	150	10	958.465	739.176	3341.38	0	3341.38	3491.7	3491.7
39	6.50773	23529.2	8.91329	Towsley Fm. - Parallel to Bedding	150	10	977.725	754.029	3425.62	0	3425.62	3578.96	3578.96
40	7.01351	26001.3	9.11177	Towsley Fm. - Parallel to Bedding	150	10	995.56	767.784	3503.63	0	3503.63	3663.3	3663.3
41	7.01351	26678.4	9.11177	Towsley Fm. - Parallel to Bedding	150	10	1016.19	783.696	3593.87	0	3593.87	3756.85	3756.85
42	6.60145	25759.5	10.4011	Towsley Fm. - Parallel to Bedding	150	10	1024.99	790.484	3632.36	0	3632.36	3820.5	3820.5
43	6.60145	26332.4	10.4011	Towsley Fm. - Parallel to Bedding	150	10	1043.29	804.596	3712.4	0	3712.4	3903.9	3903.9

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
44	6.60136	26856.4	11.3117	Towsley Fm. - Parallel to Bedding	150	10	1051.24	810.721	3747.13	0	3747.13	3957.41	3957.41
45	6.60136	27332.2	11.3117	Towsley Fm. - Parallel to Bedding	150	10	1066.29	822.335	3813	0	3813	4026.29	4026.29
46	5.67309	21170.6	56.134	Landslide Debris	200	30	1276.8	984.677	1359.1	0	1359.1	3261.62	3261.62
47	5.67309	15940.7	56.134	Landslide Debris	200	30	1002.69	773.279	992.95	0	992.95	2487.02	2487.02
48	5.29621	9365.82	58.1582	Landslide Debris	200	30	660.775	509.595	536.234	0	536.234	1600.22	1600.22
49	4.02379	2943.21	58.1582	Landslide Debris	200	30	368.762	284.392	146.171	0	146.171	739.956	739.956
50	1.27242	180.289	58.1582	Engineered Fill	200	32	199.859	154.133	-73.4029	0	-73.4029	248.412	248.412

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 0.771208**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	72.7501	1753.32	0	0	0
2	74.9435	1752.82	1391.11	499.949	19.7679
3	84.2752	1750.72	10897.7	3916.51	19.7679
4	88.7669	1749.7	18102.4	6505.76	19.7678
5	93.2586	1748.69	27902.3	10027.7	19.7677
6	95.8003	1748.11	29874.6	10736.6	19.7679
7	102.691	1749.2	30317.7	10895.8	19.7678
8	109.583	1750.29	30641.5	11012.2	19.7678
9	116.474	1751.41	30787.7	11064.7	19.7678
10	123.365	1752.52	30813.3	11073.9	19.7678
11	127.996	1753.26	30812.3	11073.6	19.7679
12	132.626	1753.99	30776.2	11060.6	19.7678
13	137.201	1754.73	30692.4	11030.5	19.7679
14	141.777	1755.46	30574.1	10987.9	19.7677
15	146.413	1756.19	30434.4	10937.8	19.7679
16	151.05	1756.93	30263.3	10876.2	19.7677
17	155.684	1757.66	30099.9	10817.5	19.7678
18	160.319	1758.39	29938.8	10759.6	19.7678
19	165.639	1759.2	29833.9	10721.9	19.7678
20	170.959	1760.01	29730.2	10684.7	19.7679
21	176.279	1760.84	29577.2	10629.7	19.7678
22	181.598	1761.67	29426.6	10575.6	19.7679
23	190.164	1762.97	29301	10530.4	19.7678
24	194.447	1763.63	29182.6	10487.9	19.7679
25	198.73	1764.3	29065.7	10445.8	19.7677
26	203.013	1764.97	28950.3	10404.4	19.7678
27	207.296	1765.64	28824.8	10359.3	19.7679
28	215.861	1766.97	28508.9	10245.8	19.7679
29	224.427	1768.3	28127.5	10108.7	19.7679
30	228.71	1768.97	27921.9	10034.8	19.7678
31	232.993	1769.64	27706.9	9957.52	19.7678
32	241.558	1770.97	27248.6	9792.79	19.7678
33	250.124	1772.3	26752.5	9614.51	19.7678
34	258.69	1773.6	26331.7	9463.3	19.7678
35	266.878	1774.84	25904.6	9309.79	19.7678
36	271.829	1775.6	25554.4	9183.92	19.7678
37	276.78	1776.37	25176.2	9048.02	19.7678
38	281.73	1777.14	24770.2	8902.09	19.7678
39	288.238	1778.16	24155.7	8681.27	19.7678
40	294.746	1779.18	23492.9	8443.05	19.7678
41	301.759	1780.31	22634	8134.38	19.7678
42	308.773	1781.43	21716.8	7804.74	19.7678
43	315.374	1782.64	20217.9	7266.07	19.7678
44	321.976	1783.85	18657	6705.08	19.7678
45	328.577	1785.18	16620.1	5973.06	19.7678
46	335.178	1786.5	14524.3	5219.85	19.7678
47	340.852	1794.95	7103.29	2552.83	19.7678
48	346.525	1803.4	2006.86	721.242	19.7678

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
49	351.821	1811.93	-471.409	-169.419	19.7679
50	355.845	1818.41	-376.128	-135.176	19.7678
51	357.117	1820.46	0	0	0

Entity Information

Group: Removals Slots

Shared Entities

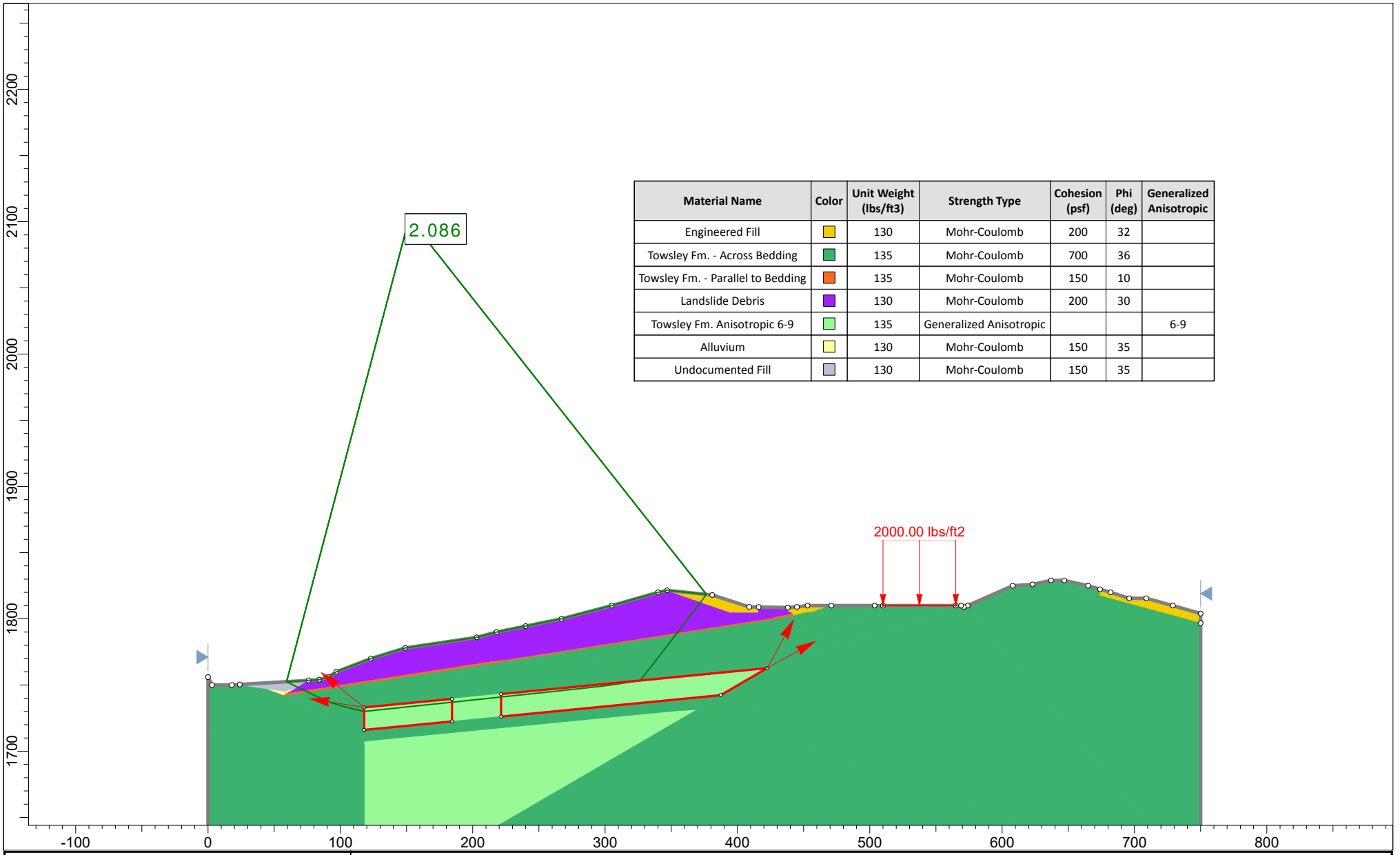
Type	Coordinates	
	X	Y
External Boundary	0	1600
	118	1600
	142.82	1600
	750	1600
	750	1796.64
	750	1804
	729	1810
	709	1815.5
	696	1815.5
	682	1820
	674	1822.35
	665	1825
	647	1829
	637	1829
	623	1826
	608	1825
	574	1810
	571	1809
	569	1810
	565	1810
	510	1810
	503.637	1810
	471	1810
	453	1810
	445	1809
	438	1808.5
	416	1808.88
	409	1809
	381	1818
	347	1821.5
	340	1820
	305	1810
	267	1800
	240	1794.49
	218	1790
	203	1786
	149	1778
	123	1770
	97	1760
	91	1756
	84	1754
	76	1753.52
	24	1750.36
	18	1750
	3	1750
	0	1756

Type	Coordinates
Material Boundary	X: 118, 118, 118, 118, 422.401 / Y: 1600, 1707.04, 1716.04, 1733.04, 1762.72
Material Boundary	X: 374.004, 387.309 / Y: 1741, 1742.3
Material Boundary	X: 118, 374.004 / Y: 1716.04, 1741
Material Boundary	X: 118, 368.737 / Y: 1707.04, 1731.49
Material Boundary	X: 142.82, 368.737, 387.309, 422.401, 503.637 / Y: 1600, 1731.49, 1742.3, 1762.72, 1810
Material Boundary	X: 44, 57, 221.835, 428, 442.345, 457.15 / Y: 1746.7, 1742, 1767.77, 1800, 1802.71, 1805.5
Material Boundary	X: 24, 44, 44.1834, 57, 68.0457, 76 / Y: 1750.36, 1746.7, 1746.67, 1745, 1748.3, 1753.52
Material Boundary	X: 57, 59.4618, 68.0457 / Y: 1742, 1743.4, 1748.3
Material Boundary	X: 347, 396, 416, 416 / Y: 1821.5, 1804.38, 1804.38, 1808.88
Material Boundary	X: 438, 438, 440.25, 451.85, 457.15, 458, 471 / Y: 1808.5, 1805.5, 1805.5, 1805.5, 1805.5, 1805.5, 1810

Type	Coordinates
Material Boundary	X: 674, 674, 750 / Y: 1822.35, 1817.35, 1796.64
Material Boundary	X: 59.4618, 223.964, 428, 441.688, 451.85 / Y: 1743.4, 1769.11, 1801, 1803.58, 1805.5
Material Boundary	X: 438, 440.25, 441.688, 442.345 / Y: 1808.5, 1805.5, 1803.58, 1802.71
Material Boundary	X: 221.835, 223.964, 226.819, 230.899, 235.205, 238.691, 240 / Y: 1767.77, 1769.11, 1770.92, 1774.6, 1780.95, 1788.63, 1794.49

Scenario-based Entities

Type	Coordinates	slide plane pseudo
Distributed Load	X: 510, 565 / Y: 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No
Block Search Polyline	X: 58.3596, 428.02, 441.994 / Y: 1742.78, 1800.51, 1803.18	✓



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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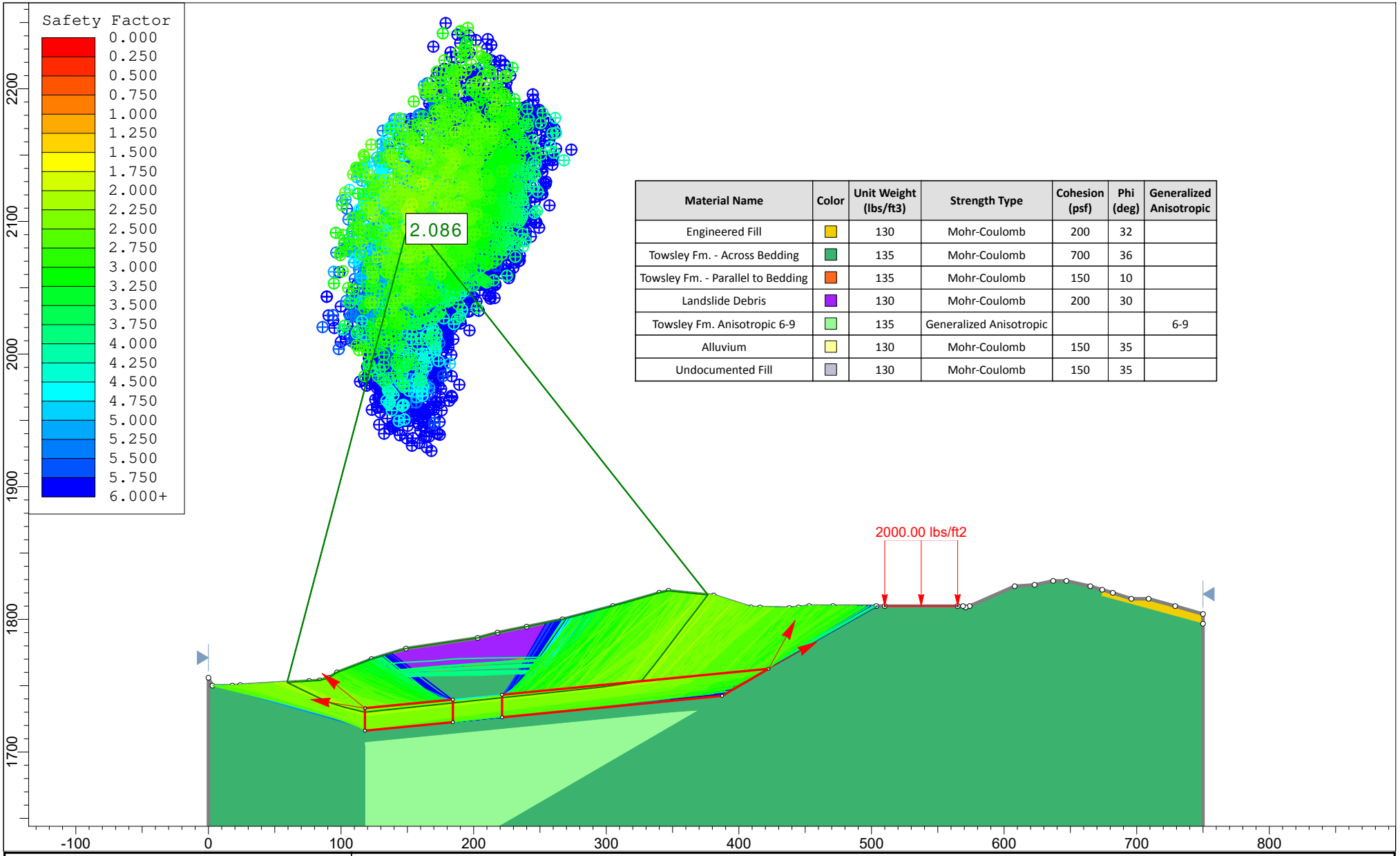
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Deep bedrock - static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 625		File Name: WT15.slmd	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Deep bedrock - static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 626		File Name: WT15.slmd	

Slide Analysis Information

WT15

Project Summary

File Name:	WT15.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:13.761s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT15-WT15' - Deep bedrock - static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	29

Right Projection Angle (End Angle) [°]:	61
Minimum Elevation:	Not Defined
Minimum Depth [ft]:	35
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution:	Constant
Magnitude [psf]:	2000
Orientation:	Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	2.086450
Axis Location:	152.009, 2102.773
Left Slip Surface Endpoint:	59.310, 1752.504
Right Slip Surface Endpoint:	376.605, 1818.452
Resisting Moment:	2.33149e+08 lb-ft
Driving Moment:	1.11744e+08 lb-ft
Resisting Horizontal Force:	558637 lb
Driving Horizontal Force:	267745 lb
Total Slice Area:	13287.1 ft2
Surface Horizontal Width:	317.294 ft
Surface Average Height:	41.8763 ft

Global Minimum Coordinates

Method: spencer

X	Y

X	Y
59.3105	1752.5
67.7979	1748.25
75.6311	1744.47
83.4642	1740.74
92.8646	1736.72
102.265	1733.79
117.937	1730
130.112	1731.29
142.34	1732.58
154.549	1733.87
170.626	1735.57
186.702	1737.26
198.893	1738.55
211.084	1739.84
223.275	1741.13
235.466	1742.41
247.657	1743.7
259.848	1744.99
272.039	1746.27
284.23	1747.56
297.503	1749.06
311.901	1751.18
326.285	1753.35
335.77	1765.05
344.463	1776.4
352.499	1786.88
360.534	1797.36
368.569	1807.84
376.605	1818.45

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 5001
Number of Invalid Surfaces: 31

Error Codes:

Error Code -108 reported for 26 surfaces
Error Code -111 reported for 3 surfaces
Error Code -115 reported for 2 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-115 = Surface too shallow, below the minimum depth.

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.08645**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	8.48744	2630.5	-26.6192	Undocumented Fill	150	35	240.694	502.195	502.987	0	502.987	382.355	382.355
2	0.0843257	52.5209	-25.7518	Alluvium	150	35	384.204	801.623	930.613	0	930.613	745.281	745.281
3	5.46238	4471.51	-25.7518	Landslide Debris	200	30	418.013	872.164	1164.22	0	1164.22	962.581	962.581
4	1.5955	1707.58	-25.7518	Towsley Fm. - Parallel to Bedding	150	10	179.519	374.557	1273.53	0	1273.53	1186.93	1186.93
5	0.690934	797.751	-25.7518	Towsley Fm. - Across Bedding	700	36	1005.38	2097.67	1923.72	0	1923.72	1438.75	1438.75
6	7.83314	11481	-25.456	Towsley Fm. - Across Bedding	700	36	1153.3	2406.31	2348.53	0	2348.53	1799.52	1799.52

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
7	9.40039	20637.1	-23.1921	Towsley Fm. - Across Bedding	700	36	1464.5	3055.6	3242.2	0	3242.2	2614.75	2614.75
8	9.4004	30860.6	-17.3094	Towsley Fm. - Across Bedding	700	36	1841.8	3842.83	4325.74	0	4325.74	3751.75	3751.75
9	7.83587	31964.7	-13.5673	Towsley Fm. - Across Bedding	700	36	2103.04	4387.88	5075.93	0	5075.93	4568.42	4568.42
10	7.83587	37083.1	-13.5673	Towsley Fm. - Across Bedding	700	36	2377.31	4960.13	5863.56	0	5863.56	5289.86	5289.86
11	6.08744	31468.4	6.0269	Towsley Fm. - Parallel to Bedding	150	10	503.821	1051.2	5110.95	0	5110.95	5164.14	5164.14
12	6.08744	32579.6	6.0269	Towsley Fm. - Parallel to Bedding	150	10	519.065	1083	5291.32	0	5291.32	5346.12	5346.12
13	6.1143	33713	6.0269	Towsley Fm. - Parallel to Bedding	150	10	532.58	1111.2	5451.24	0	5451.24	5507.47	5507.47
14	6.1143	34704.7	6.0269	Towsley Fm. - Parallel to Bedding	150	10	546.125	1139.46	5611.52	0	5611.52	5669.18	5669.18
15	6.10445	35638.2	6.0269	Towsley Fm. - Parallel to Bedding	150	10	559.659	1167.7	5771.67	0	5771.67	5830.76	5830.76
16	6.10445	36307.4	6.0269	Towsley Fm. - Parallel to Bedding	150	10	568.813	1186.8	5879.99	0	5879.99	5940.04	5940.04
17	16.0767	96659.2	6.02716	Towsley Fm. - Parallel to Bedding	150	10	574.215	1198.07	5943.93	0	5943.93	6004.55	6004.55
18	8.03833	48890.5	6.02717	Towsley Fm. - Parallel to Bedding	150	10	580.043	1210.23	6012.87	0	6012.87	6074.12	6074.12
19	8.03833	49264.4	6.02717	Towsley Fm. - Parallel to Bedding	150	10	583.93	1218.34	6058.83	0	6058.83	6120.49	6120.49
20	6.09547	37606.5	6.02717	Towsley Fm. - Parallel to Bedding	150	10	587.342	1225.46	6099.24	0	6099.24	6161.25	6161.25
21	6.09547	37821.5	6.02717	Towsley Fm. - Parallel to Bedding	150	10	590.29	1231.61	6134.1	0	6134.1	6196.43	6196.43
22	6.09547	38067	6.02717	Towsley Fm. - Parallel to Bedding	150	10	593.65	1238.62	6173.9	0	6173.9	6236.58	6236.58
23	6.09547	38724.6	6.02717	Towsley Fm. - Parallel to Bedding	150	10	602.66	1257.42	6280.48	0	6280.48	6344.11	6344.11
24	6.09547	39512	6.02717	Towsley Fm. - Parallel to Bedding	150	10	613.449	1279.93	6408.15	0	6408.15	6472.92	6472.92
25	6.09547	40186.3	6.02717	Towsley Fm. - Parallel to Bedding	150	10	622.684	1299.2	6517.44	0	6517.44	6583.18	6583.18
26	6.09548	40674.2	6.02717	Towsley Fm. - Parallel to Bedding	150	10	629.37	1313.15	6596.55	0	6596.55	6663	6663
27	6.09548	41159.4	6.02717	Towsley Fm. - Parallel to Bedding	150	10	636.018	1327.02	6675.18	0	6675.18	6742.34	6742.34
28	6.09548	41644.6	6.02717	Towsley Fm. - Parallel to Bedding	150	10	642.661	1340.88	6753.84	0	6753.84	6821.69	6821.69
29	6.09548	42129.8	6.02717	Towsley Fm. - Parallel to Bedding	150	10	649.309	1354.75	6832.49	0	6832.49	6901.05	6901.05
30	6.09548	42614.9	6.02717	Towsley Fm. - Parallel to Bedding	150	10	655.956	1368.62	6911.15	0	6911.15	6980.41	6980.41
31	6.09548	43100.1	6.02717	Towsley Fm. - Parallel to Bedding	150	10	662.604	1382.49	6989.8	0	6989.8	7059.76	7059.76
32	6.09547	43585.3	6.02717	Towsley Fm. - Parallel to Bedding	150	10	669.252	1396.36	7068.44	0	7068.44	7139.11	7139.11
33	6.09547	44168	6.02717	Towsley Fm. - Parallel to Bedding	150	10	677.232	1413.01	7162.91	0	7162.91	7234.41	7234.41
34	6.09547	44934.2	6.02717	Towsley Fm. - Parallel to Bedding	150	10	687.728	1434.91	7287.11	0	7287.11	7359.72	7359.72
35	6.09547	45704.7	6.02717	Towsley Fm. - Parallel to Bedding	150	10	698.287	1456.94	7412.02	0	7412.02	7485.75	7485.75
36	6.6367	50617.4	6.44043	Towsley Fm. - Parallel to Bedding	150	10	707.93	1477.06	7526.16	0	7526.16	7606.07	7606.07
37	6.6367	51487.4	6.44043	Towsley Fm. - Parallel to Bedding	150	10	718.862	1499.87	7655.47	0	7655.47	7736.62	7736.62
38	7.19902	56714.2	8.36293	Towsley Fm. - Parallel to Bedding	150	10	723.588	1509.73	7711.4	0	7711.4	7817.78	7817.78
39	7.19902	57569	8.36293	Towsley Fm. - Parallel to Bedding	150	10	733.408	1530.22	7827.64	0	7827.64	7935.46	7935.46
40	7.19176	58431.8	8.59615	Towsley Fm. - Parallel to Bedding	150	10	743.344	1550.95	7945.19	0	7945.19	8057.56	8057.56
41	7.19176	59337.8	8.59615	Towsley Fm. - Parallel to Bedding	150	10	753.754	1572.67	8068.38	0	8068.38	8182.32	8182.32
42	9.48457	73065.6	50.9794	Towsley Fm. - Across Bedding	700	36	1973.8	4118.23	4704.79	0	4704.79	7140.43	7140.43

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
43	8.69355	56352.9	52.5283	Towsley Fm. - Across Bedding	700	36	1666.03	3476.08	3820.95	0	3820.95	5994.38	5994.38
44	8.03546	41628.1	52.5283	Towsley Fm. - Across Bedding	700	36	1381.83	2883.12	3004.82	0	3004.82	4807.5	4807.5
45	1.14805	4971.66	52.5283	Towsley Fm. - Across Bedding	700	36	1196.24	2495.89	2471.83	0	2471.83	4032.39	4032.39
46	0.874349	3619.53	52.5283	Towsley Fm. - Parallel to Bedding	150	10	337.724	704.645	3145.55	0	3145.55	3586.13	3586.13
47	6.01306	21088.2	52.5283	Landslide Debris	200	30	717.357	1496.73	2246.01	0	2246.01	3181.84	3181.84
48	8.03545	17853.2	52.5283	Landslide Debris	200	30	482.15	1005.98	1396	0	1396	2024.99	2024.99
49	3.66536	4206.32	52.8581	Landslide Debris	200	30	284.461	593.514	681.586	0	681.586	1057.14	1057.14
50	4.37009	1766.66	52.8581	Engineered Fill	200	32	152.413	318.003	188.843	0	188.843	390.064	390.064

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 2.08645**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	59.3105	1752.5	0	0	0
2	67.7979	1748.25	4182.44	614.732	8.36142
3	67.8822	1748.21	4252.69	625.057	8.36142
4	73.3446	1745.57	9603.7	1411.54	8.3614
5	74.9401	1744.8	10870.3	1597.7	8.36138
6	75.6311	1744.47	12206.1	1794.04	8.36141
7	83.4642	1740.74	29997.3	4408.99	8.36144
8	92.8646	1736.72	56822	8351.66	8.36143
9	102.265	1733.79	86808.3	12759	8.36141
10	110.101	1731.89	112886	16591.9	8.36142
11	117.937	1730	142602	20959.5	8.36141
12	124.024	1730.65	142384	20927.5	8.36143
13	130.112	1731.29	142143	20892.1	8.36143
14	136.226	1731.93	141880	20853.4	8.36142
15	142.34	1732.58	141597	20811.8	8.36142
16	148.445	1733.22	141293	20767.2	8.36145
17	154.549	1733.87	140976	20720.6	8.36144
18	170.626	1735.57	140118	20594.5	8.36145
19	178.664	1736.42	139677	20529.7	8.36146
20	186.702	1737.26	139229	20463.8	8.36143
21	192.798	1737.91	138884	20413	8.3614
22	198.893	1738.55	138534	20361.6	8.36141
23	204.989	1739.19	138179	20309.5	8.36145
24	211.084	1739.84	137811	20255.3	8.3614
25	217.18	1740.48	137426	20198.7	8.36139
26	223.275	1741.13	137027	20140.1	8.36141
27	229.371	1741.77	136618	20080	8.36142
28	235.466	1742.41	136198	20018.3	8.36143
29	241.562	1743.06	135769	19955.2	8.36141
30	247.657	1743.7	135330	19890.7	8.36142
31	253.753	1744.34	134880	19824.6	8.36144
32	259.848	1744.99	134421	19757	8.36138
33	265.944	1745.63	133951	19688	8.36142
34	272.039	1746.27	133469	19617.2	8.36143
35	278.135	1746.92	132971	19544	8.36143
36	284.23	1747.56	132457	19468.5	8.36145
37	290.867	1748.31	131517	19330.3	8.36144
38	297.503	1749.06	130553	19188.6	8.36143
39	304.702	1750.12	127601	18754.7	8.36142
40	311.901	1751.18	124597	18313.1	8.36139
41	319.093	1752.26	121305	17829.3	8.36142
42	326.285	1753.35	117954	17336.8	8.36143
43	335.77	1765.05	81610.6	11995.1	8.36145
44	344.463	1776.4	52759.9	7754.6	8.36141
45	352.499	1786.88	32364.8	4756.95	8.36142
46	353.647	1788.38	30036.1	4414.68	8.36142

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
47	354.521	1789.52	26743.4	3930.72	8.36141
48	360.534	1797.36	13438.3	1975.16	8.36146
49	368.569	1807.84	2678.71	393.714	8.36141
50	372.235	1812.68	423.082	62.1843	8.36143
51	376.605	1818.45	0	0	0

Entity Information

Group: Removals Slots

Shared Entities

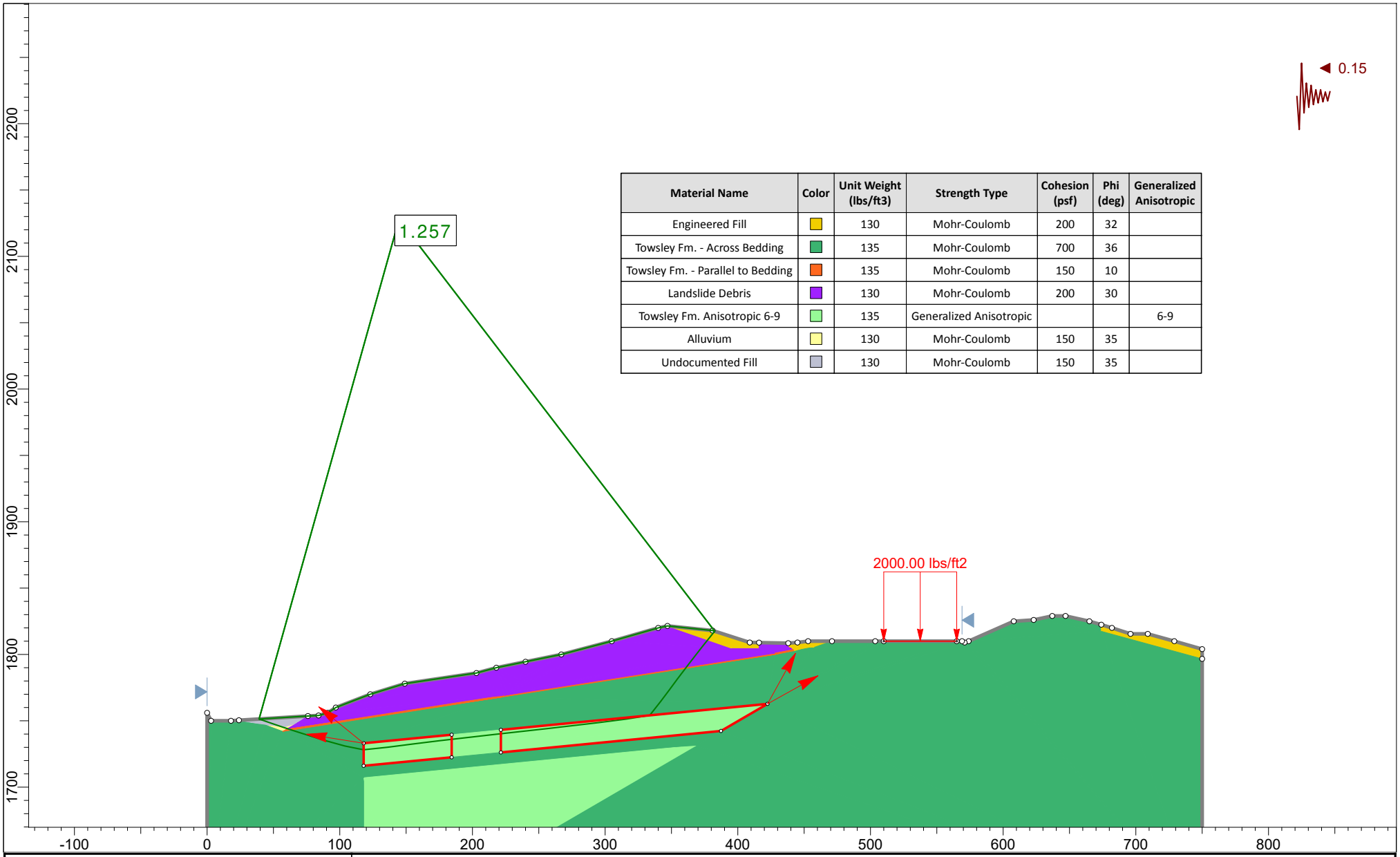
Type	Coordinates	
	X	Y
External Boundary	0	1600
	118	1600
	142.82	1600
	750	1600
	750	1796.64
	750	1804
	729	1810
	709	1815.5
	696	1815.5
	682	1820
	674	1822.35
	665	1825
	647	1829
	637	1829
	623	1826
	608	1825
	574	1810
	571	1809
	569	1810
	565	1810
	510	1810
	503.637	1810
	471	1810
	453	1810
	445	1809
	438	1808.5
	416	1808.88
	409	1809
	381	1818
	347	1821.5
	340	1820
	305	1810
	267	1800
	240	1794.49
	218	1790
	203	1786
	149	1778
	123	1770
	97	1760
	91	1756
	84	1754
	76	1753.52
	24	1750.36
	18	1750
	3	1750
	0	1756

Type	Coordinates
Material Boundary	X: 118, 118, 118, 118, 422.401 / Y: 1600, 1707.04, 1716.04, 1733.04, 1762.72
Material Boundary	X: 374.004, 387.309 / Y: 1741, 1742.3
Material Boundary	X: 118, 374.004 / Y: 1716.04, 1741
Material Boundary	X: 118, 368.737 / Y: 1707.04, 1731.49
Material Boundary	X: 142.82, 368.737, 387.309, 422.401, 503.637 / Y: 1600, 1731.49, 1742.3, 1762.72, 1810
Material Boundary	X: 44, 57, 221.835, 428, 442.345, 457.15 / Y: 1746.7, 1742, 1767.77, 1800, 1802.71, 1805.5
Material Boundary	X: 24, 44, 44.1834, 57, 68.0457, 76 / Y: 1750.36, 1746.7, 1746.67, 1745, 1748.3, 1753.52
Material Boundary	X: 57, 59.4618, 68.0457 / Y: 1742, 1743.4, 1748.3
Material Boundary	X: 347, 396, 416, 416 / Y: 1821.5, 1804.38, 1804.38, 1808.88
Material Boundary	X: 438, 438, 440.25, 451.85, 457.15, 458, 471 / Y: 1808.5, 1805.5, 1805.5, 1805.5, 1805.5, 1805.5, 1810

Type	Coordinates
Material Boundary	X: 674, 674, 750 / Y: 1822.35, 1817.35, 1796.64
Material Boundary	X: 59.4618, 223.964, 428, 441.688, 451.85 / Y: 1743.4, 1769.11, 1801, 1803.58, 1805.5
Material Boundary	X: 438, 440.25, 441.688, 442.345 / Y: 1808.5, 1805.5, 1803.58, 1802.71
Material Boundary	X: 221.835, 223.964, 226.819, 230.899, 235.205, 238.691, 240 / Y: 1767.77, 1769.11, 1770.92, 1774.6, 1780.95, 1788.63, 1794.49

Scenario-based Entities

Type	Coordinates	unox static
Distributed Load	X: 510, 565 / Y: 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No
Block Search Window	X: 118, 118, 184.359, 184.359 / Y: 1733.04, 1716.04, 1722.51, 1739.51	✓
Block Search Window	X: 221.396, 221.396, 387.309, 422.401 / Y: 1743.12, 1726.12, 1742.3, 1762.72	✓



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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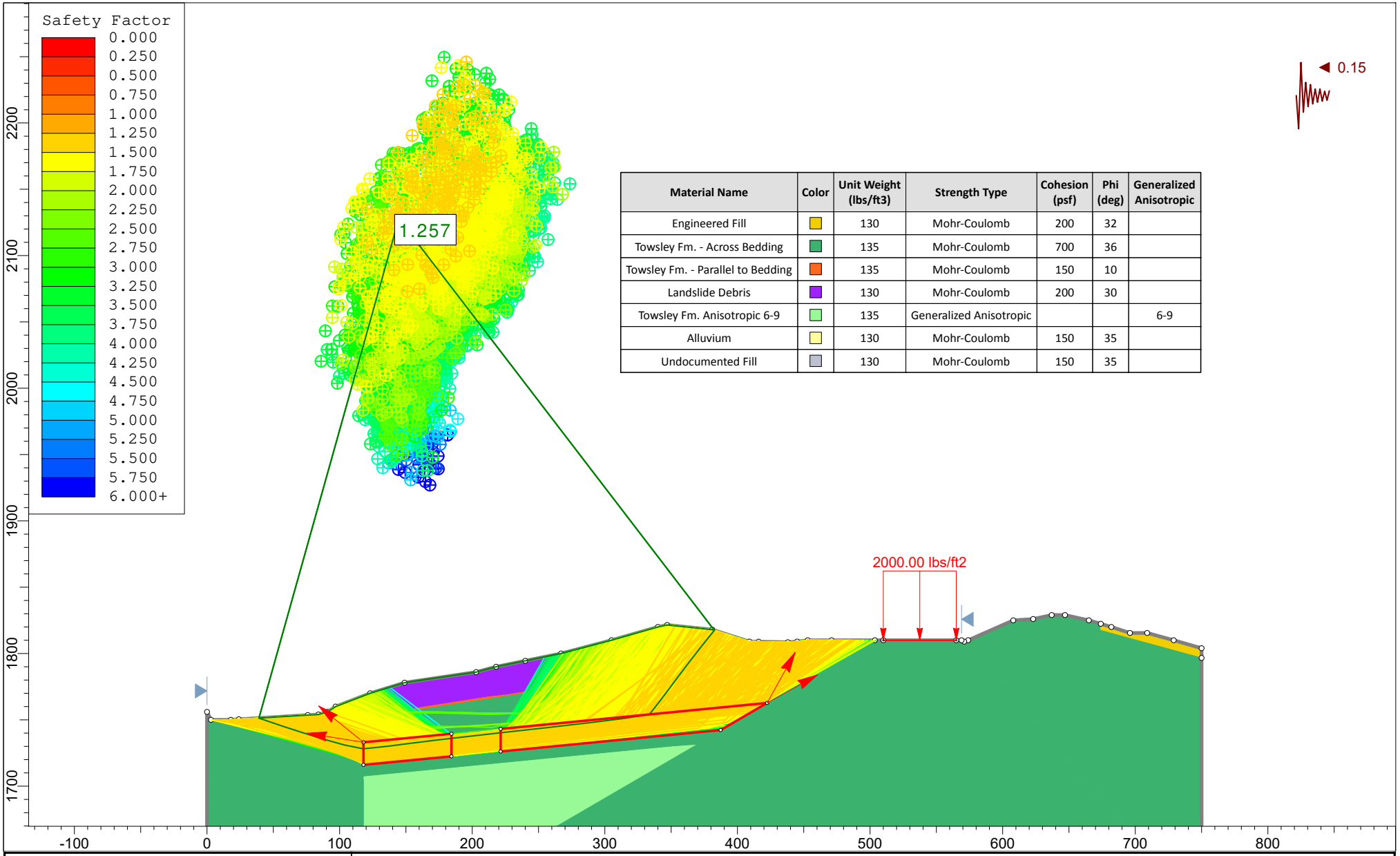
SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Deep bedrock - pseudo-static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 635		File Name: WT15.slmd	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Generalized Anisotropic
Engineered Fill		130	Mohr-Coulomb	200	32	
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36	
Towsley Fm. - Parallel to Bedding		135	Mohr-Coulomb	150	10	
Landslide Debris		130	Mohr-Coulomb	200	30	
Towsley Fm. Anisotropic 6-9		135	Generalized Anisotropic			6-9
Alluvium		130	Mohr-Coulomb	150	35	
Undocumented Fill		130	Mohr-Coulomb	150	35	

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SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	WT15-WT15' - Deep bedrock - pseudo-static		
Drawn By: RMP	Scale: 1:1200	Company: GWV	
Date: 636		File Name: WT15.slmd	

Slide Analysis Information

WT15

Project Summary

File Name:	WT15.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:07.578s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	WT15-WT15' - Deep bedrock - pseudo-static
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Non-Circular Block Search
Number of Surfaces:	5000
Multiple Groups:	Disabled
Pseudo-Random Surfaces:	Enabled
Convex Surfaces Only:	Disabled
Left Projection Angle (Start Angle) [°]:	141
Left Projection Angle (End Angle) [°]:	171
Right Projection Angle (Start Angle) [°]:	29

Right Projection Angle (End Angle) [°]:	61
Minimum Elevation:	Not Defined
Minimum Depth [ft]:	45
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Seismic Load Coefficient (Horizontal): 0.15

Loading

- 1 Distributed Load present

Distributed Load 1

Distribution:	Constant
Magnitude [psf]:	2000
Orientation:	Vertical

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Towsley Fm. - Parallel to Bedding	Landslide Debris	Towsley Fm. Anisotropic 6-9	Alluvium	Undocumented Fill
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Generalized Anisotropic	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	135	130	135	130	130
Cohesion [psf]	200	700	150	200		150	150
Friction Angle [°]	32	36	10	30		35	35
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Generalized Anisotropic Functions

Name: 6-9

Angle From	Angle To	Material
6	-90	Towsley Fm. - Across Bedding
9	6	Towsley Fm. - Parallel to Bedding
90	9	Towsley Fm. - Across Bedding

Global Minimums

Method: spencer

FS	1.256930
Axis Location:	144.661, 2127.797
Left Slip Surface Endpoint:	39.167, 1751.283
Right Slip Surface Endpoint:	382.576, 1817.493
Resisting Moment:	2.74353e+08 lb-ft
Driving Moment:	2.18272e+08 lb-ft
Resisting Horizontal Force:	631863 lb
Driving Horizontal Force:	502702 lb
Total Slice Area:	14193.5 ft2
Surface Horizontal Width:	343.409 ft
Surface Average Height:	41.331 ft

Global Minimum Coordinates

Method: spencer

X	Y
39.1666	1751.28
48.3193	1748.16
57.4721	1745.03
69.4919	1741.16
86.6806	1735.75
103.869	1730.94
117.934	1728.09
136.159	1730.08
154.364	1732.41
172.56	1734.59
190.773	1736.77
208.585	1738.68
226.397	1740.8
244.208	1742.7
262.02	1744.85
279.842	1746.73
297.665	1748.82
315.648	1751.22
333.632	1754.07
341.902	1764.62
348.234	1773.07
354.611	1781.62
363.933	1793.9
373.254	1805.86
382.576	1817.49

Valid/Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4991
Number of Invalid Surfaces: 26

Error Codes:

Error Code -108 reported for 8 surfaces
Error Code -111 reported for 18 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.25693**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	9.15272	2190.06	-18.8599	Undocumented Fill	150	35	401.699	504.907	506.86	0	506.86	369.643	369.643
2	8.9789	6404.6	-18.8599	Undocumented Fill	150	35	831.325	1044.92	1278.08	0	1278.08	994.103	994.103
3	0.173823	165.579	-18.8599	Alluvium	150	35	1048.2	1317.51	1667.38	0	1667.38	1309.32	1309.32
4	3.0936	3198.78	-17.8341	Alluvium	150	35	1093.66	1374.65	1748.98	0	1748.98	1397.13	1397.13
5	0.956743	1085.57	-17.8341	Landslide Debris	200	30	978.471	1229.87	1783.79	0	1783.79	1469	1469
6	2.13303	2589.47	-17.8341	Towsley Fm. - Parallel to Bedding	150	10	325.195	408.747	1467.43	0	1467.43	1362.8	1362.8
7	5.8365	8296.97	-17.8341	Towsley Fm. - Across Bedding	700	36	2188.91	2751.31	2823.38	0	2823.38	2119.16	2119.16
8	8.59432	15413.4	-17.4761	Towsley Fm. - Across Bedding	700	36	2514.03	3159.96	3385.85	0	3385.85	2594.33	2594.33
9	8.59432	19297.6	-17.4761	Towsley Fm. - Across Bedding	700	36	2932.22	3685.59	4109.3	0	4109.3	3186.12	3186.12
10	8.59432	25004	-15.6281	Towsley Fm. - Across Bedding	700	36	3392.27	4263.84	4905.21	0	4905.21	3956.28	3956.28

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
11	8.59432	32925.4	-15.6281	Towsley Fm. - Across Bedding	700	36	4206.19	5286.89	6313.32	0	6313.32	5136.7	5136.7
12	7.03222	31593	-11.4503	Towsley Fm. - Across Bedding	700	36	4368.64	5491.07	6594.34	0	6594.34	5709.47	5709.47
13	7.03222	35456.4	-11.4503	Towsley Fm. - Across Bedding	700	36	4809.56	6045.28	7357.15	0	7357.15	6382.97	6382.97
14	6.07512	32959.5	6.23285	Towsley Fm. - Parallel to Bedding	150	10	849.331	1067.55	5203.68	0	5203.68	5296.44	5296.44
15	6.07512	34048.8	6.23285	Towsley Fm. - Parallel to Bedding	150	10	873.385	1097.78	5375.15	0	5375.15	5470.54	5470.54
16	6.07512	35009.8	6.23285	Towsley Fm. - Parallel to Bedding	150	10	894.604	1124.45	5526.42	0	5526.42	5624.12	5624.12
17	6.06817	35882.6	7.2881	Towsley Fm. - Parallel to Bedding	150	10	908.883	1142.4	5628.19	0	5628.19	5744.43	5744.43
18	6.06817	36748.6	7.2881	Towsley Fm. - Parallel to Bedding	150	10	927.888	1166.29	5763.68	0	5763.68	5882.35	5882.35
19	6.06817	37316.1	7.2881	Towsley Fm. - Parallel to Bedding	150	10	940.347	1181.95	5852.51	0	5852.51	5972.77	5972.77
20	9.09831	56196.6	6.80785	Towsley Fm. - Parallel to Bedding	150	10	946.751	1190	5898.16	0	5898.16	6011.18	6011.18
21	9.09831	56521.5	6.80785	Towsley Fm. - Parallel to Bedding	150	10	951.525	1196	5932.16	0	5932.16	6045.76	6045.76
22	9.10666	56896.5	6.82998	Towsley Fm. - Parallel to Bedding	150	10	956.139	1201.8	5965.04	0	5965.04	6079.56	6079.56
23	9.10666	57217.5	6.82998	Towsley Fm. - Parallel to Bedding	150	10	960.849	1207.72	5998.61	0	5998.61	6113.69	6113.69
24	8.90583	56333.3	6.12052	Towsley Fm. - Parallel to Bedding	150	10	970.754	1220.17	6069.23	0	6069.23	6173.33	6173.33
25	8.90583	57015	6.12052	Towsley Fm. - Parallel to Bedding	150	10	981.025	1233.08	6142.47	0	6142.47	6247.67	6247.67
26	8.90583	58529.5	6.79558	Towsley Fm. - Parallel to Bedding	150	10	999.674	1256.52	6275.38	0	6275.38	6394.51	6394.51
27	8.90583	59778.3	6.79558	Towsley Fm. - Parallel to Bedding	150	10	1018.41	1280.07	6408.97	0	6408.97	6530.33	6530.33
28	8.90583	60737.5	6.07793	Towsley Fm. - Parallel to Bedding	150	10	1037.42	1303.96	6544.44	0	6544.44	6654.9	6654.9
29	8.90583	61763.6	6.07793	Towsley Fm. - Parallel to Bedding	150	10	1052.89	1323.41	6654.73	0	6654.73	6766.84	6766.84
30	8.90583	62713	6.88844	Towsley Fm. - Parallel to Bedding	150	10	1061.84	1334.66	6718.53	0	6718.53	6846.81	6846.81
31	8.90583	63585.7	6.88844	Towsley Fm. - Parallel to Bedding	150	10	1074.93	1351.11	6811.82	0	6811.82	6941.68	6941.68
32	5.94075	42941	6.01975	Towsley Fm. - Parallel to Bedding	150	10	1092.64	1373.37	6938.05	0	6938.05	7053.27	7053.27
33	5.94075	43578.3	6.01975	Towsley Fm. - Parallel to Bedding	150	10	1107.05	1391.48	7040.77	0	7040.77	7157.51	7157.51
34	5.94075	44310.9	6.01975	Towsley Fm. - Parallel to Bedding	150	10	1123.61	1412.3	7158.85	0	7158.85	7277.34	7277.34
35	8.91113	67776	6.69257	Towsley Fm. - Parallel to Bedding	150	10	1138.56	1431.09	7265.4	0	7265.4	7399	7399
36	8.91113	69296.8	6.69257	Towsley Fm. - Parallel to Bedding	150	10	1161.38	1459.77	7428.09	0	7428.09	7564.37	7564.37
37	8.99182	71380.8	7.61185	Towsley Fm. - Parallel to Bedding	150	10	1176.26	1478.48	7534.16	0	7534.16	7691.35	7691.35
38	8.99182	72909.5	7.61185	Towsley Fm. - Parallel to Bedding	150	10	1198.86	1506.88	7695.24	0	7695.24	7855.46	7855.46
39	5.99455	49439.7	8.99305	Towsley Fm. - Parallel to Bedding	150	10	1206.87	1516.95	7752.36	0	7752.36	7943.36	7943.36
40	5.99455	50034.8	8.99305	Towsley Fm. - Parallel to Bedding	150	10	1219.94	1533.38	7845.54	0	7845.54	8038.61	8038.61
41	5.99455	50629.8	8.99305	Towsley Fm. - Parallel to Bedding	150	10	1233.01	1549.81	7938.73	0	7938.73	8133.87	8133.87
42	8.26966	65647.3	51.9062	Towsley Fm. - Across Bedding	700	36	2702.3	3396.6	3711.56	0	3711.56	7158.69	7158.69
43	6.33256	43584.2	53.163	Towsley Fm. - Across Bedding	700	36	2338.29	2939.07	3081.82	0	3081.82	6203.28	6203.28
44	6.37708	36601.8	53.2728	Towsley Fm. - Across Bedding	700	36	2008.44	2524.47	2511.16	0	2511.16	5203.02	5203.02
45	5.94889	27102.1	52.8082	Towsley Fm. - Across Bedding	700	36	1686.13	2119.35	1953.56	0	1953.56	4175.62	4175.62
46	0.864032	3375.65	52.8082	Towsley Fm. - Parallel to Bedding	150	10	466.475	586.327	2474.53	0	2474.53	3089.28	3089.28

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
47	2.5086	9013.11	52.8082	Landslide Debris	200	30	992.991	1248.12	1815.4	0	1815.4	3124	3124
48	9.32153	23504.4	52.0646	Landslide Debris	200	30	740.667	930.966	1266.07	0	1266.07	2216.29	2216.29
49	4.04813	5369.26	51.2954	Landslide Debris	200	30	450.27	565.958	633.858	0	633.858	1195.8	1195.8
50	5.2734	2642.68	51.2954	Engineered Fill	200	32	248.186	311.953	179.162	0	179.162	488.898	488.898

Interslice Data

- **Global Minimum Query (spencer) - Safety Factor: 1.25693**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	39.1666	1751.28	0	0	0
2	48.3193	1748.16	4932.85	1193.23	13.5983
3	57.2982	1745.09	15356.6	3714.67	13.5983
4	57.4721	1745.03	15613	3776.69	13.5983
5	60.5657	1744.03	20257.2	4900.11	13.5983
6	61.5224	1743.73	21579.6	5219.98	13.5983
7	63.6554	1743.04	22891.8	5537.4	13.5983
8	69.4919	1741.16	39724.5	9609.12	13.5983
9	78.0863	1738.46	68180.5	16492.5	13.5983
10	86.6806	1735.75	101605	24577.8	13.5984
11	95.2749	1733.35	138802	33575.4	13.5983
12	103.869	1730.94	185191	44796.6	13.5983
13	110.901	1729.52	220566	53353.6	13.5983
14	117.934	1728.09	259549	62783.3	13.5983
15	124.009	1728.76	256312	62000.4	13.5983
16	130.084	1729.42	252944	61185.7	13.5983
17	136.159	1730.08	249461	60343.1	13.5983
18	142.227	1730.86	245226	59318.7	13.5983
19	148.295	1731.64	240871	58265.4	13.5983
20	154.364	1732.41	236438	57193	13.5983
21	163.462	1733.5	230216	55687.9	13.5983
22	172.56	1734.59	223952	54172.6	13.5983
23	181.667	1735.68	217618	52640.6	13.5983
24	190.773	1736.77	211243	51098.4	13.5983
25	199.679	1737.72	205642	49743.7	13.5983
26	208.585	1738.68	199961	48369.4	13.5983
27	217.491	1739.74	193425	46788.3	13.5983
28	226.397	1740.8	186726	45168	13.5983
29	235.303	1741.75	180649	43697.9	13.5983
30	244.208	1742.7	174450	42198.5	13.5983
31	253.114	1743.77	167272	40462	13.5983
32	262.02	1744.85	159978	38697.8	13.5983
33	267.961	1745.47	155681	37658.5	13.5984
34	273.902	1746.1	151311	36601.2	13.5983
35	279.842	1746.73	146854	35523.2	13.5983
36	288.754	1747.77	139237	33680.6	13.5983
37	297.665	1748.82	131424	31790.8	13.5983
38	306.656	1750.02	122240	29569.3	13.5984
39	315.648	1751.22	112837	27294.6	13.5983
40	321.643	1752.17	105301	25471.7	13.5983
41	327.637	1753.12	97665.7	23624.8	13.5983
42	333.632	1754.07	89931.2	21753.8	13.5983
43	341.902	1764.62	63278	15306.6	13.5983
44	348.234	1773.07	45495.5	11005.1	13.5983
45	354.611	1781.62	31350.3	7583.46	13.5983
46	360.56	1789.46	22000.3	5321.74	13.5983
47	361.424	1790.6	19079.3	4615.18	13.5983
48	363.933	1793.9	14216.8	3438.96	13.5983
49	373.254	1805.86	2454.65	593.767	13.5983
50	377.302	1810.91	269.732	65.2466	13.5983
51	382.576	1817.49	0	0	0

Entity Information

Group: Removals Slots

Shared Entities

Type	Coordinates	
	X	**Y**
External Boundary	0	1600
	118	1600
	142.82	1600
	750	1600
	750	1796.64
	750	1804
	729	1810
	709	1815.5
	696	1815.5
	682	1820
	674	1822.35
	665	1825
	647	1829
	637	1829
	623	1826
	608	1825
	574	1810
	571	1809
	569	1810
	565	1810
	510	1810
	503.637	1810
	471	1810
	453	1810
	445	1809
	438	1808.5
	416	1808.88
	409	1809
	381	1818
	347	1821.5
	340	1820
	305	1810
	267	1800
	240	1794.49
	218	1790
	203	1786
	149	1778
	123	1770
	97	1760
	91	1756
	84	1754
	76	1753.52
	24	1750.36
	18	1750
	3	1750
	0	1756

Type	X	Y
Material Boundary	118	1600
	118	1707.04
	118	1716.04
	118	1733.04
	422.401	1762.72

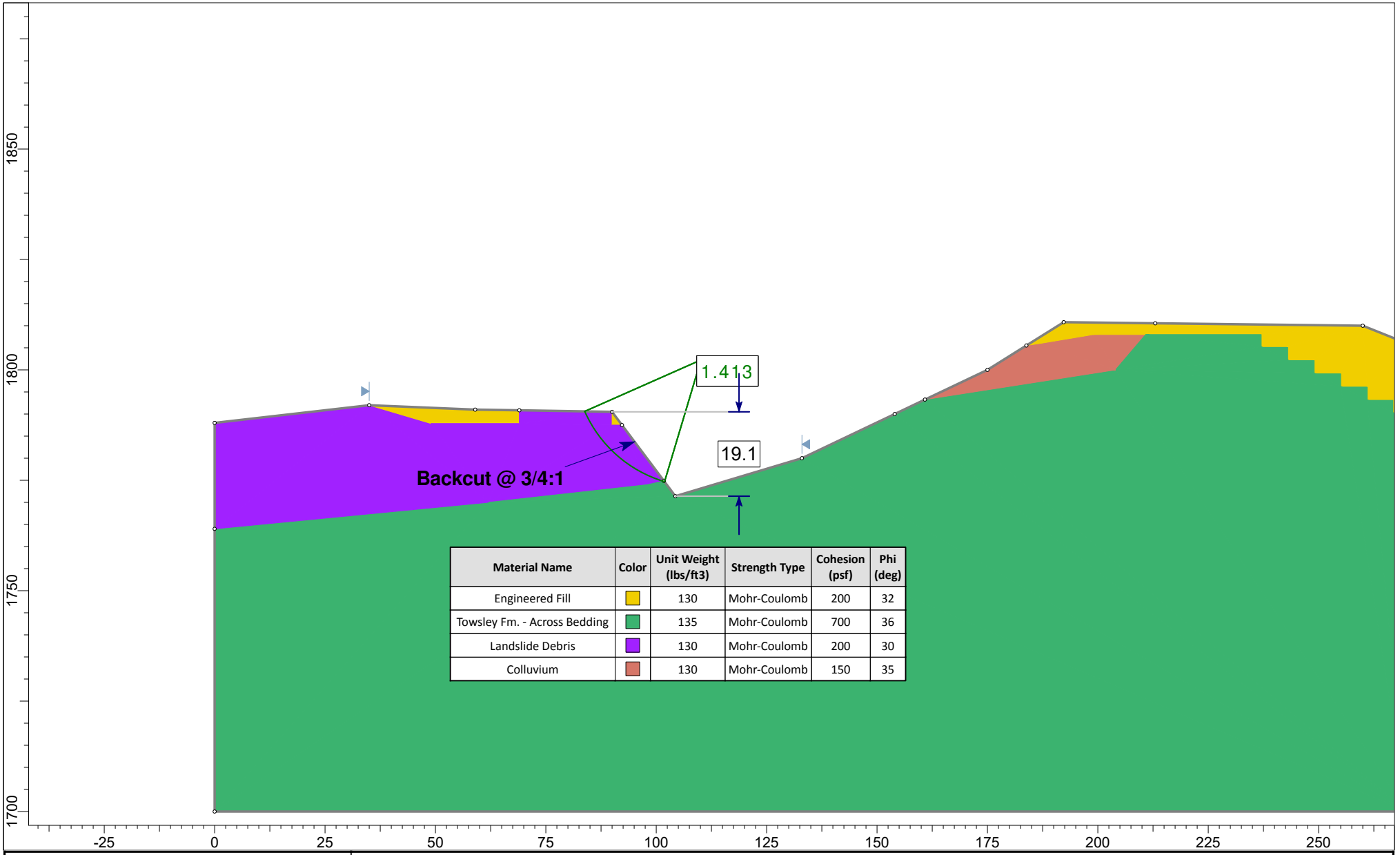
Type	X	Y
Material Boundary	374.004	1741
	387.309	1742.3

Type	Coordinates
Material Boundary	X: 118, 374.004 / Y: 1716.04, 1741
Material Boundary	X: 118, 368.737 / Y: 1707.04, 1731.49
Material Boundary	X: 142.82, 368.737, 387.309, 422.401, 503.637 / Y: 1600, 1731.49, 1742.3, 1762.72, 1810
Material Boundary	X: 44, 57, 221.835, 428, 442.345, 457.15 / Y: 1746.7, 1742, 1767.77, 1800, 1802.71, 1805.5
Material Boundary	X: 24, 44, 44.1834, 57, 68.0457, 76 / Y: 1750.36, 1746.7, 1746.67, 1745, 1748.3, 1753.52
Material Boundary	X: 57, 59.4618, 68.0457 / Y: 1742, 1743.4, 1748.3
Material Boundary	X: 347, 396, 416, 416 / Y: 1821.5, 1804.38, 1804.38, 1808.88
Material Boundary	X: 438, 438, 440.25, 451.85, 457.15, 458, 471 / Y: 1808.5, 1805.5, 1805.5, 1805.5, 1805.5, 1805.5, 1810
Material Boundary	X: 674, 674, 750 / Y: 1822.35, 1817.35, 1796.64
Material Boundary	X: 59.4618, 223.964, 428, 441.688, 451.85 / Y: 1743.4, 1769.11, 1801, 1803.58, 1805.5

Type	Coordinates
Material Boundary	X: 438, 440.25, 441.688, 442.345 Y: 1808.5, 1805.5, 1803.58, 1802.71
Material Boundary	X: 221.835, 223.964, 226.819, 230.899, 235.205, 238.691, 240 Y: 1767.77, 1769.11, 1770.92, 1774.6, 1780.95, 1788.63, 1794.49

Scenario-based Entities

Type	Coordinates	unox pseudo
Distributed Load	X: 510, 565 Y: 1810, 1810	Constant Distribution Orientation: Vertical Magnitude: 2000 lbs/ft2 Creates Excess Pore Pressure: No
Block Search Window	X: 118, 118, 184.359, 184.359 Y: 1733.04, 1716.04, 1722.51, 1739.51	✓
Block Search Window	X: 221.396, 221.396, 387.309, 422.401 Y: 1743.12, 1726.12, 1742.3, 1762.72	✓

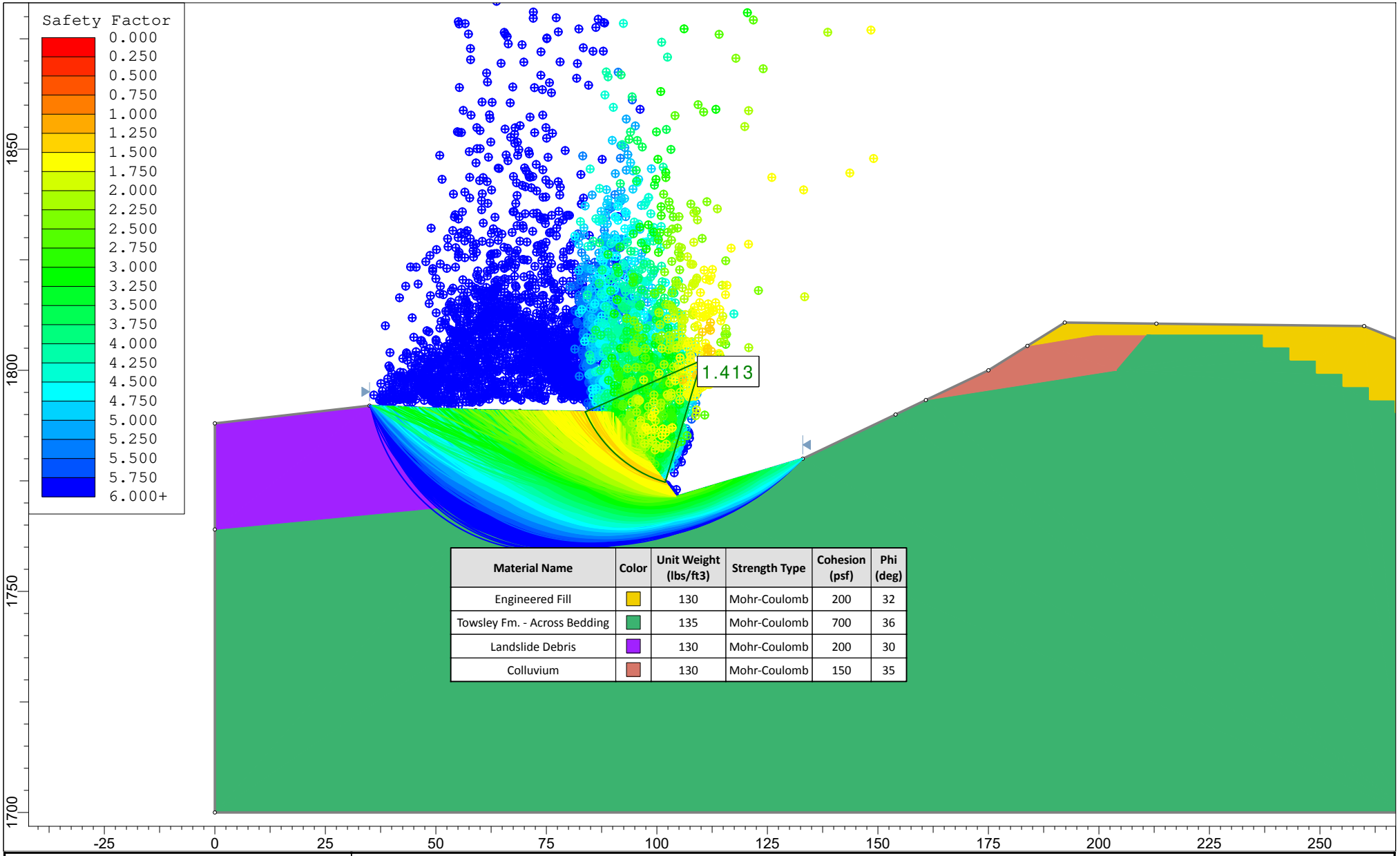


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		130	Mohr-Coulomb	200	32
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36
Landslide Debris		130	Mohr-Coulomb	200	30
Colluvium		130	Mohr-Coulomb	150	35

rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	R1-R1' - 3/4:1 Backcut; H=20 ft		
Drawn By: RMP	Scale: 1:360	Company: GWV	
Date: 645		File Name: R1.slmd	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
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Landslide Debris		130	Mohr-Coulomb	200	30
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rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Recycled Water Tanks		
Analysis Description	R1-R1' - 3/4:1 Backcut; H=20 ft		
Drawn By: RMP	Scale: 1:360	Company: GWV	
Date: 646		File Name: R1.slmd	

Slide Analysis Information

R1

Project Summary

File Name:	R1.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.942s
Project Title:	Cherry Willow Recycled Water Tanks
Analysis:	R1-R1' - 3/4:1 Backcut; H=20 ft
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Bishop simplified Spencer
Number of slices:	20
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Slope Search
Number of Surfaces:	5000
Upper Angle [°]:	Not Defined
Lower Angle [°]:	Not Defined
Composite Surfaces:	Disabled
Reverse Curvature:	Create Tension Crack

Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Landslide Debris	Colluvium
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	130	130
Cohesion [psf]	200	700	200	150
Friction Angle [°]	32	36	30	35
Water Surface	None	None	None	None
Ru Value	0	0	0	0

Global Minimums

Method: bishop simplified

FS	1.415470
Center:	110.111, 1802.253
Radius:	28.783
Left Slip Surface Endpoint:	83.793, 1790.600
Right Slip Surface Endpoint:	101.868, 1774.676
Resisting Moment:	303875 lb-ft
Driving Moment:	214682 lb-ft
Total Slice Area:	91.2049 ft2
Surface Horizontal Width:	18.0756 ft
Surface Average Height:	5.04575 ft

Method: spencer

FS	1.412790
Center:	110.111, 1802.253
Radius:	28.783
Left Slip Surface Endpoint:	83.793, 1790.600
Right Slip Surface Endpoint:	101.868, 1774.676
Resisting Moment:	303301 lb-ft
Driving Moment:	214682 lb-ft
Resisting Horizontal Force:	7992.13 lb
Driving Horizontal Force:	5656.98 lb
Total Slice Area:	91.2049 ft2
Surface Horizontal Width:	18.0756 ft
Surface Average Height:	5.04575 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	4851
Number of Invalid Surfaces:	149

Error Codes:

Error Code -105 reported for 1 surface
Error Code -106 reported for 68 surfaces
Error Code -108 reported for 30 surfaces
Error Code -112 reported for 49 surfaces
Error Code -123 reported for 1 surface

Method: spencer

Number of Valid Surfaces: 4099
Number of Invalid Surfaces: 901

Error Codes:

Error Code -105 reported for 1 surface
Error Code -106 reported for 68 surfaces
Error Code -108 reported for 106 surfaces
Error Code -111 reported for 676 surfaces
Error Code -112 reported for 49 surfaces
Error Code -123 reported for 1 surface

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
-123 = Surface radius equal or less than the internal cutoff of 0.01.

Slice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 1.41547**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.933011	115.097	-63.9994	Landslide Debris	200	30	104.449	147.844	-90.3373	0	-90.3373	123.808	123.808
2	0.933011	327.372	-60.0217	Landslide Debris	200	30	166.751	236.031	62.4073	0	62.4073	351.481	351.481
3	0.933011	509.064	-56.481	Landslide Debris	200	30	225.358	318.987	206.092	0	206.092	546.324	546.324
4	0.933011	668.43	-53.2469	Landslide Debris	200	30	280.588	397.164	341.497	0	341.497	717.208	717.208
5	0.933011	810.386	-50.2426	Landslide Debris	200	30	332.762	471.014	469.41	0	469.41	869.407	869.407
6	0.933011	938.149	-47.4178	Landslide Debris	200	30	382.161	540.937	590.52	0	590.52	1006.38	1006.38
7	0.933011	1044.99	-44.7378	Landslide Debris	200	30	426.227	603.312	698.557	0	698.557	1120.9	1120.9
8	0.933011	1033.22	-42.1772	Landslide Debris	200	30	433.224	613.216	715.712	0	715.712	1108.22	1108.22
9	0.933011	980.599	-39.7166	Landslide Debris	200	30	425.958	602.931	697.897	0	697.897	1051.74	1051.74
10	0.933011	919.883	-37.3412	Landslide Debris	200	30	414.671	586.955	670.225	0	670.225	986.591	986.591
11	0.933011	851.841	-35.0388	Landslide Debris	200	30	399.633	565.669	633.358	0	633.358	913.588	913.588
12	0.933011	777.094	-32.7996	Landslide Debris	200	30	381.062	539.382	587.827	0	587.827	833.401	833.401
13	0.933011	696.155	-30.6157	Landslide Debris	200	30	359.131	508.339	534.06	0	534.06	746.582	746.582
14	0.933011	609.447	-28.48	Landslide Debris	200	30	333.98	472.739	472.398	0	472.398	653.583	653.583
15	0.933011	517.327	-26.3867	Landslide Debris	200	30	305.72	432.738	403.115	0	403.115	554.787	554.787
16	0.933011	420.095	-24.3308	Landslide Debris	200	30	274.44	388.461	326.425	0	326.425	450.517	450.517
17	0.933011	318.007	-22.3078	Landslide Debris	200	30	240.205	340.003	242.493	0	242.493	341.046	341.046
18	0.933011	211.28	-20.3137	Landslide Debris	200	30	203.064	287.432	151.436	0	151.436	226.607	226.607
19	0.933011	100.101	-18.345	Landslide Debris	200	30	163.05	230.793	53.3347	0	53.3347	107.401	107.401
20	0.348381	8.21198	-17.004	Towsley Fm. - Across Bedding	700	36	438.023	620.009	-110.099	0	-110.099	23.8519	23.8519

- **Global Minimum Query (spencer) - Safety Factor: 1.41279**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.933011	115.097	-63.9994	Landslide Debris	200	30	133.137	188.094	-20.6213	0	-20.6213	252.342	252.342
2	0.933011	327.372	-60.0217	Landslide Debris	200	30	173.298	244.833	77.6533	0	77.6533	378.076	378.076
3	0.933011	509.064	-56.481	Landslide Debris	200	30	216.082	305.279	182.349	0	182.349	508.579	508.579
4	0.933011	668.43	-53.2469	Landslide Debris	200	30	259.878	367.153	289.517	0	289.517	637.497	637.497
5	0.933011	810.386	-50.2426	Landslide Debris	200	30	303.977	429.455	397.427	0	397.427	762.823	762.823
6	0.933011	938.149	-47.4178	Landslide Debris	200	30	348.045	491.715	505.266	0	505.266	883.999	883.999
7	0.933011	1044.99	-44.7378	Landslide Debris	200	30	389.687	550.546	607.163	0	607.163	993.3	993.3
8	0.933011	1033.22	-42.1772	Landslide Debris	200	30	402.365	568.457	638.186	0	638.186	1002.74	1002.74
9	0.933011	980.599	-39.7166	Landslide Debris	200	30	403.049	569.424	639.861	0	639.861	974.677	974.677
10	0.933011	919.883	-37.3412	Landslide Debris	200	30	399.813	564.852	631.943	0	631.943	936.973	936.973

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
11	0.933011	851.841	-35.0388	Landslide Debris	200	30	392.739	554.858	614.632	0	614.632	890.027	890.027
12	0.933011	777.094	-32.7996	Landslide Debris	200	30	381.866	539.496	588.024	0	588.024	834.117	834.117
13	0.933011	696.155	-30.6157	Landslide Debris	200	30	367.194	518.768	552.122	0	552.122	769.416	769.416
14	0.933011	609.447	-28.48	Landslide Debris	200	30	348.691	492.627	506.844	0	506.844	696.01	696.01
15	0.933011	517.327	-26.3867	Landslide Debris	200	30	326.29	460.979	452.029	0	452.029	613.906	613.906
16	0.933011	420.095	-24.3308	Landslide Debris	200	30	299.892	423.685	387.433	0	387.433	523.034	523.034
17	0.933011	318.007	-22.3078	Landslide Debris	200	30	269.366	380.558	312.736	0	312.736	423.254	423.254
18	0.933011	211.28	-20.3137	Landslide Debris	200	30	234.546	331.364	227.53	0	227.53	314.355	314.355
19	0.933011	100.101	-18.345	Landslide Debris	200	30	195.227	275.815	131.315	0	131.315	196.05	196.05
20	0.348381	8.21198	-17.004	Towsley Fm. - Across Bedding	700	36	583.849	824.856	171.849	0	171.849	350.394	350.394

Interslice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 1.41547**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	83.7927	1790.6	0	0	0
2	84.7257	1788.69	-270.054	0	0
3	85.6587	1787.07	-324.37	0	0
4	86.5917	1785.66	-243.888	0	0
5	87.5247	1784.41	-78.4951	0	0
6	88.4577	1783.29	138.141	0	0
7	89.3907	1782.28	381.867	0	0
8	90.3237	1781.35	630.848	0	0
9	91.2568	1780.51	832.499	0	0
10	92.1898	1779.73	976.818	0	0
11	93.1228	1779.02	1067.82	0	0
12	94.0558	1778.36	1110.1	0	0
13	94.9888	1777.76	1108.76	0	0
14	95.9218	1777.21	1069.25	0	0
15	96.8548	1776.7	997.406	0	0
16	97.7878	1776.24	899.356	0	0
17	98.7208	1775.82	781.547	0	0
18	99.6539	1775.44	650.728	0	0
19	100.587	1775.09	513.967	0	0
20	101.52	1774.78	378.658	0	0
21	101.868	1774.68	0	0	0

- **Global Minimum Query (spencer) - Safety Factor: 1.41279**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	83.7927	1790.6	0	0	0
2	84.7257	1788.69	-163.313	-95.9185	30.427
3	85.6587	1787.07	-198.945	-116.846	30.4269
4	86.5917	1785.66	-143.123	-84.0604	30.427
5	87.5247	1784.41	-23.2083	-13.6309	30.4269
6	88.4577	1783.29	139.706	82.0535	30.427
7	89.3907	1782.28	328.879	193.16	30.4269
8	90.3237	1781.35	527.654	309.906	30.4269
9	91.2568	1780.51	692.781	406.89	30.4269
10	92.1898	1779.73	813.725	477.924	30.4269
11	93.1228	1779.02	891.582	523.651	30.4269
12	94.0558	1778.36	928.307	545.221	30.4269
13	94.9888	1777.76	926.595	544.216	30.4269
14	95.9218	1777.21	889.81	522.61	30.4269
15	96.8548	1776.7	821.943	482.75	30.4269
16	97.7878	1776.24	727.608	427.345	30.4269
17	98.7208	1775.82	612.045	359.471	30.4269
18	99.6539	1775.44	481.151	282.594	30.427
19	100.587	1775.09	341.521	200.585	30.4269
20	101.52	1774.78	200.514	117.767	30.4268
21	101.868	1774.68	0	0	0

Entity Information

Group: Full Removal

Shared Entities

Type	Coordinates	
	X	Y
External Boundary	260	1810
	213	1810.55
	192.26	1810.79
	183.816	1805.51
	175	1800
	160.837	1793.26
	154	1790
	133	1780
	104.327	1771.4
	101.75	1774.83
	92.25	1787.5
	90	1790.5
	69	1790.84
	59	1791
	35	1792
	0	1788
	0	1764
	0	1700
	270	1700
	270	1790.27
	270	1806

Type	X	Y
Material Boundary	0	1764
	62	1770
	98	1774
	101.75	1774.83

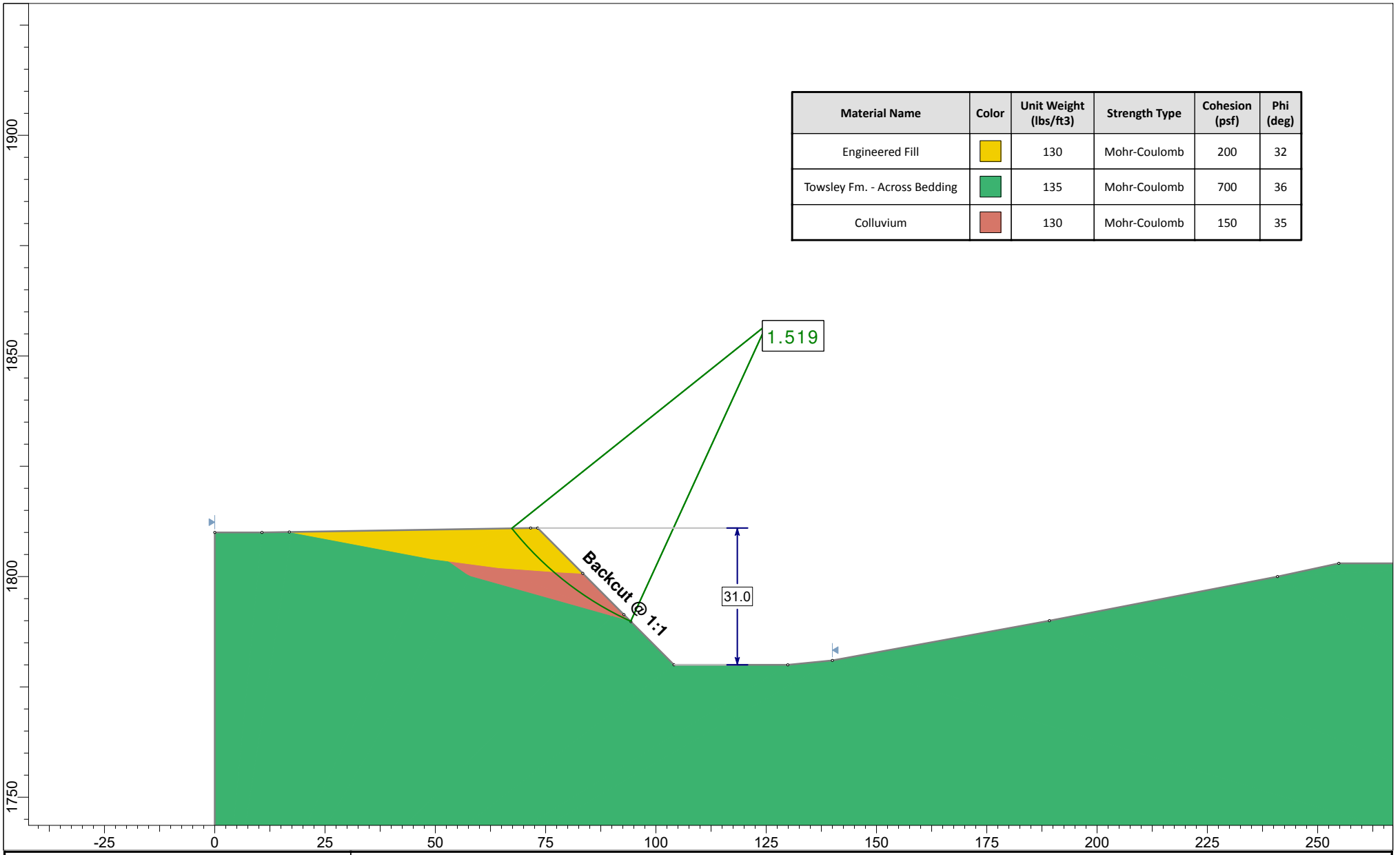
Type	X	Y
Material Boundary	160.837	1793.26
	204	1800
	210.827	1808
	213	1810.55

Type	X	Y
Material Boundary	90	1790.5
	90	1787.5
	92.25	1787.5

Type	X	Y
Material Boundary	35	1792
	49	1787.84
	69	1787.84
	69	1790.84

Type	Coordinates	
	X	Y
Material Boundary	183.816	1805.51
	187	1806
	199	1808
	210.827	1808
	237	1808
	237	1805.27
	243	1805.27
	243	1802.27
	249	1802.27
	249	1799.27
	255	1799.27
	255	1796.27
	261	1796.27
	261	1793.27
	267	1793.27
	267	1790.27
	270	1790.27

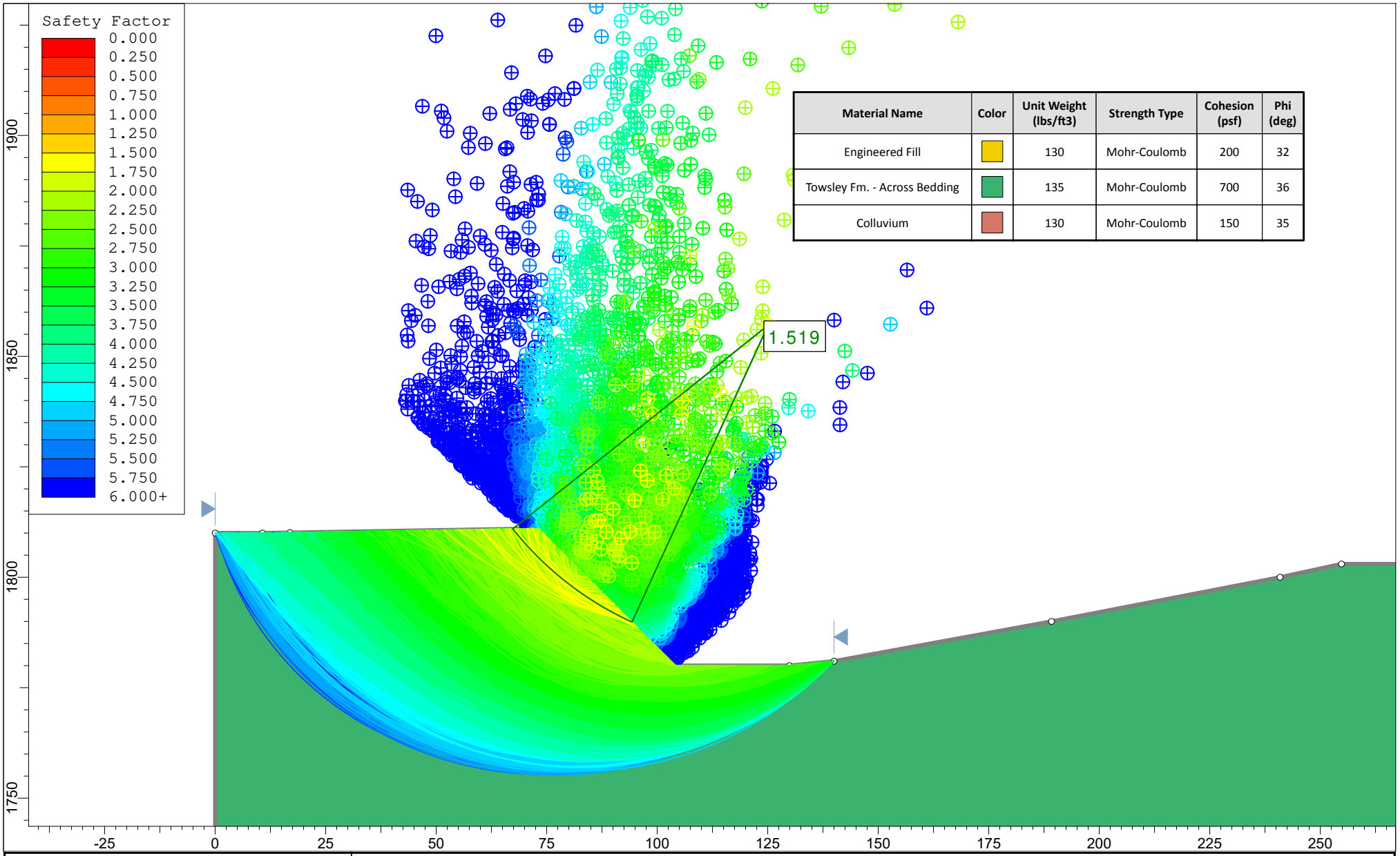
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		130	Mohr-Coulomb	200	32
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36
Colluvium		130	Mohr-Coulomb	150	35



rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	R3-R3' - 1:1 Backcut; H=30 ft		
Drawn By: RMP	Scale: 1:360	Company: GWV	
Date: 653		File Name: R3.slmd	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		130	Mohr-Coulomb	200	32
Towsley Fm. - Across Bedding		135	Mohr-Coulomb	700	36
Colluvium		130	Mohr-Coulomb	150	35

rocscience

SLIDEINTERPRET 8.032

Project	Cherry Willow Water Tanks		
Analysis Description	R3-R3' - 1:1 Backcut; H=30 ft		
Drawn By: RMP	Scale: 1:360	Company: GWV	
Date: 654		File Name: R3.slmd	

Slide Analysis Information

R3

Project Summary

File Name:	R3.slmd
Slide Modeler Version:	8.032
Compute Time:	00h:00m:01.255s
Project Title:	Cherry Willow Water Tanks
Analysis:	R3-R3' - 1:1 Backcut; H=30 ft
Author:	RMP
Company:	GWV

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	inches/hour
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Analysis Methods Used	
Slices Type:	Vertical Bishop simplified Spencer
Number of slices:	20
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Slope Search
Number of Surfaces:	5000
Upper Angle [°]:	Not Defined
Lower Angle [°]:	Not Defined
Composite Surfaces:	Disabled
Reverse Curvature:	Create Tension Crack

Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Property	Engineered Fill	Towsley Fm. - Across Bedding	Colluvium
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	135	130
Cohesion [psf]	200	700	150
Friction Angle [°]	32	36	35
Water Surface	None	None	None
Ru Value	0	0	0

Global Minimums

Method: bishop simplified

FS	1.518990
Center:	125.101, 1857.061
Radius:	73.934
Left Slip Surface Endpoint:	67.324, 1810.930
Right Slip Surface Endpoint:	94.271, 1789.861
Resisting Moment:	986769 lb-ft
Driving Moment:	649621 lb-ft
Total Slice Area:	108.681 ft2
Surface Horizontal Width:	26.9474 ft
Surface Average Height:	4.03308 ft

Method: spencer

FS	1.516650
Center:	125.101, 1857.061
Radius:	73.934
Left Slip Surface Endpoint:	67.324, 1810.930
Right Slip Surface Endpoint:	94.271, 1789.861
Resisting Moment:	985247 lb-ft
Driving Moment:	649621 lb-ft
Resisting Horizontal Force:	10384 lb
Driving Horizontal Force:	6846.67 lb
Total Slice Area:	108.681 ft2
Surface Horizontal Width:	26.9474 ft
Surface Average Height:	4.03308 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	4645
Number of Invalid Surfaces:	355

Error Codes:

Error Code -101 reported for 1 surface
Error Code -105 reported for 2 surfaces
Error Code -106 reported for 61 surfaces
Error Code -107 reported for 55 surfaces
Error Code -108 reported for 79 surfaces

Error Code -109 reported for 1 surface
Error Code -112 reported for 156 surfaces

Method: spencer

Number of Valid Surfaces: 3674
Number of Invalid Surfaces: 1326

Error Codes:

Error Code -101 reported for 1 surface
Error Code -105 reported for 2 surfaces
Error Code -106 reported for 61 surfaces
Error Code -107 reported for 55 surfaces
Error Code -108 reported for 105 surfaces
Error Code -109 reported for 1 surface
Error Code -111 reported for 945 surfaces
Error Code -112 reported for 156 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-109 = Soiltype for slice base not located. This error should occur very rarely, if at all. It may occur if a very low number of slices is combined with certain soil geometries, such that the midpoint of a slice base is actually outside the soil region,even though the slip surface is wholly within the soil region.
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 1.51899**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.35212	146.466	-50.5696	Engineered Fill	200	32	117.465	178.428	-34.5232	0	-34.5232	108.326	108.326
2	1.35212	431.332	-48.947	Engineered Fill	200	32	178.557	271.226	113.986	0	113.986	319.008	319.008
3	1.35212	700.803	-47.3755	Engineered Fill	200	32	238.347	362.046	259.327	0	259.327	518.305	518.305
4	1.35212	955.487	-45.8497	Engineered Fill	200	32	296.658	450.62	401.076	0	401.076	706.665	706.665
5	1.35212	1143.52	-44.3646	Engineered Fill	200	32	341.982	519.467	511.255	0	511.255	845.735	845.735
6	1.35212	1145.63	-42.9163	Engineered Fill	200	32	347.357	527.632	524.321	0	524.321	847.29	847.29
7	1.35212	1122.8	-41.5014	Engineered Fill	200	32	346.981	527.061	523.406	0	523.406	830.404	830.404
8	1.34481	1083.83	-40.1203	Colluvium	150	35	338.695	514.475	520.525	0	520.525	805.939	805.939
9	1.34481	1041.41	-38.7705	Colluvium	150	35	332.587	505.196	507.272	0	507.272	774.397	774.397
10	1.34481	989.962	-37.4458	Colluvium	150	35	323.784	491.824	488.175	0	488.175	736.137	736.137
11	1.34481	929.954	-36.1442	Colluvium	150	35	312.352	474.459	463.376	0	463.376	691.515	691.515
12	1.34481	861.817	-34.8638	Colluvium	150	35	298.348	453.188	432.997	0	432.997	640.848	640.848
13	1.34481	785.931	-33.603	Colluvium	150	35	281.825	428.09	397.153	0	397.153	584.419	584.419
14	1.34481	702.636	-32.3605	Colluvium	150	35	262.827	399.232	355.94	0	355.94	522.481	522.481
15	1.34481	612.241	-31.1348	Colluvium	150	35	241.394	366.675	309.445	0	309.445	455.263	455.263
16	1.34481	515.021	-29.9247	Colluvium	150	35	217.561	330.473	257.742	0	257.742	382.97	382.97
17	1.34481	411.227	-28.7292	Colluvium	150	35	191.357	290.67	200.897	0	200.897	305.789	305.789
18	1.34481	301.088	-27.5473	Colluvium	150	35	162.809	247.305	138.966	0	138.966	223.889	223.889
19	1.34481	184.809	-26.3779	Colluvium	150	35	131.937	200.411	71.9943	0	71.9943	137.425	137.425
20	1.34481	62.5798	-25.2202	Colluvium	150	35	98.759	150.014	0.0199123	0	0.0199123	46.535	46.535

- **Global Minimum Query (spencer) - Safety Factor: 1.51665**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.35212	146.466	-50.5696	Engineered Fill	200	32	133.865	203.026	4.84201	0	4.84201	167.635	167.635
2	1.35212	431.332	-48.947	Engineered Fill	200	32	183.672	278.566	125.732	0	125.732	336.629	336.629
3	1.35212	700.803	-47.3755	Engineered Fill	200	32	233.47	354.093	246.601	0	246.601	500.281	500.281
4	1.35212	955.487	-45.8497	Engineered Fill	200	32	283.103	429.368	367.066	0	367.066	658.692	658.692
5	1.35212	1143.52	-44.3646	Engineered Fill	200	32	322.949	489.801	463.778	0	463.778	779.643	779.643

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
6	1.35212	1145.63	-42.9163	Engineered Fill	200	32	329.941	500.405	480.749	0	480.749	787.524	787.524
7	1.35212	1122.8	-41.5014	Engineered Fill	200	32	332.129	503.723	486.058	0	486.058	779.914	779.914
8	1.34481	1083.83	-40.1203	Colluvium	150	35	323.991	491.381	487.543	0	487.543	760.566	760.566
9	1.34481	1041.41	-38.7705	Colluvium	150	35	321.305	487.307	481.725	0	481.725	739.789	739.789
10	1.34481	989.962	-37.4458	Colluvium	150	35	316.087	479.394	470.424	0	470.424	712.491	712.491
11	1.34481	929.954	-36.1442	Colluvium	150	35	308.321	467.615	453.601	0	453.601	678.797	678.797
12	1.34481	861.817	-34.8638	Colluvium	150	35	297.982	451.934	431.206	0	431.206	638.801	638.801
13	1.34481	785.931	-33.603	Colluvium	150	35	285.041	432.308	403.178	0	403.178	592.581	592.581
14	1.34481	702.636	-32.3605	Colluvium	150	35	269.468	408.689	369.447	0	369.447	540.196	540.196
15	1.34481	612.241	-31.1348	Colluvium	150	35	251.225	381.02	329.931	0	329.931	481.687	481.687
16	1.34481	515.021	-29.9247	Colluvium	150	35	230.268	349.236	284.538	0	284.538	417.081	417.081
17	1.34481	411.227	-28.7292	Colluvium	150	35	206.551	313.265	233.166	0	233.166	346.386	346.386
18	1.34481	301.088	-27.5473	Colluvium	150	35	180.02	273.028	175.702	0	175.702	269.604	269.604
19	1.34481	184.809	-26.3779	Colluvium	150	35	150.62	228.438	112.021	0	112.021	186.717	186.717
20	1.34481	62.5798	-25.2202	Colluvium	150	35	121.267	183.919	48.4421	0	48.4421	105.558	105.558

Interslice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 1.51899**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	67.324	1810.93	0	0	0
2	68.6761	1809.29	-215.59	0	0
3	70.0282	1807.73	-280.05	0	0
4	71.3803	1806.26	-221.324	0	0
5	72.7325	1804.87	-63.8047	0	0
6	74.0846	1803.55	149.915	0	0
7	75.4367	1802.29	339.423	0	0
8	76.7888	1801.1	496.427	0	0
9	78.1336	1799.96	630.84	0	0
10	79.4784	1798.88	731.494	0	0
11	80.8233	1797.85	798.841	0	0
12	82.1681	1796.87	833.941	0	0
13	83.5129	1795.93	838.396	0	0
14	84.8577	1795.04	814.294	0	0
15	86.2025	1794.19	764.159	0	0
16	87.5473	1793.37	690.914	0	0
17	88.8921	1792.6	597.851	0	0
18	90.237	1791.86	488.608	0	0
19	91.5818	1791.16	367.145	0	0
20	92.9266	1790.49	237.732	0	0
21	94.2714	1789.86	0	0	0

- **Global Minimum Query (spencer) - Safety Factor: 1.51665**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	67.324	1810.93	0	0	0
2	68.6761	1809.29	-173.2	-90.2755	27.5295
3	70.0282	1807.73	-226.565	-118.09	27.5294
4	71.3803	1806.26	-180.231	-93.9401	27.5295
5	72.7325	1804.87	-52.1024	-27.1568	27.5294
6	74.0846	1803.55	124.169	64.7193	27.5294
7	75.4367	1802.29	282.041	147.005	27.5294
8	76.7888	1801.1	414.039	215.805	27.5294
9	78.1336	1799.96	530.452	276.483	27.5295
10	79.4784	1798.88	618.292	322.266	27.5294
11	80.8233	1797.85	677.319	353.033	27.5295
12	82.1681	1796.87	707.861	368.952	27.5295
13	83.5129	1795.93	710.767	370.467	27.5295
14	84.8577	1795.04	687.375	358.274	27.5295
15	86.2025	1794.19	639.489	333.315	27.5295
16	87.5473	1793.37	569.359	296.761	27.5294
17	88.8921	1792.6	479.669	250.013	27.5294

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
18	90.237	1791.86	373.529	194.691	27.5295
19	91.5818	1791.16	254.47	132.635	27.5295
20	92.9266	1790.49	126.442	65.9043	27.5295
21	94.2714	1789.86	0	0	0

Entity Information

Group: Full Removal

Shared Entities

Type	Coordinates	
	X	Y
	350.1	1826
	340.3	1825
	310	1810
	308.5	1809
	306.9	1810
	304.687	1809.99
	297.2	1803
	254.8	1803
	240.9	1800
	189.2	1790
	140	1781
	129.9	1780
External Boundary	104.1	1780
	94.3299	1789.8
	92.7476	1791.39
	83.4336	1800.74
	73.1916	1811.01
	71.6	1811
	16.9056	1810.1
	10.7	1810
	3.30679e-06	1810
	3.30679e-06	1700
	408	1700
	408	1842
	382.5	1842

Type	X	Y
	53	1803.5
	58	1800
Material Boundary	90	1791
	94.3299	1789.8

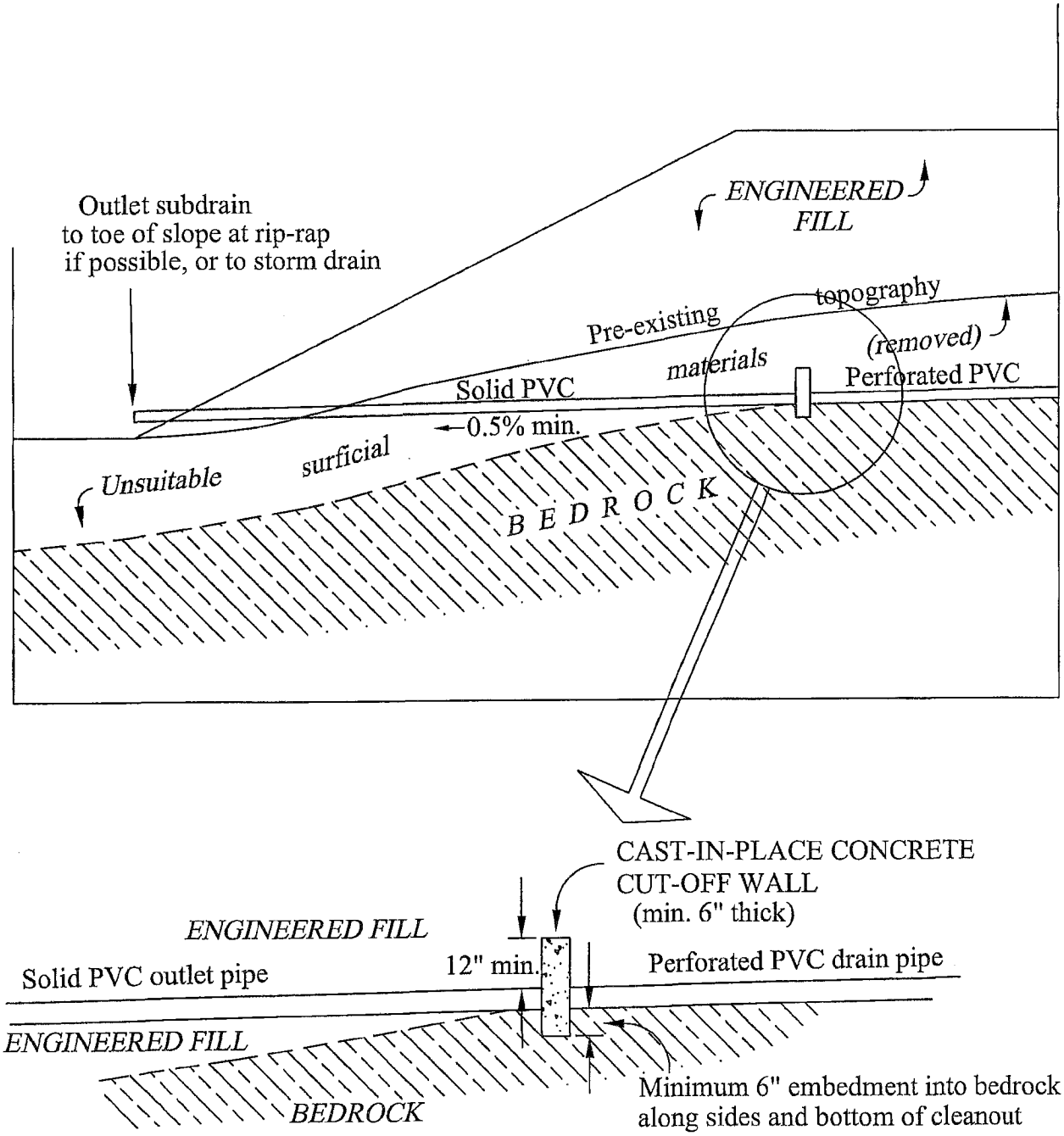
Type	X	Y
	16.9056	1810.1
	17.5	1810
	49.2	1804
Material Boundary	53	1803.5
	64.3	1802
	78.1	1801
	83.4336	1800.74

Type	X	Y
	90	1791
Material Boundary	92.7476	1791.39

APPENDIX D
Typical Grading Details

October 30, 2020
W.O. 8485

TYPICAL SUBDRAIN CUT-OFF WALL DETAIL



Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY

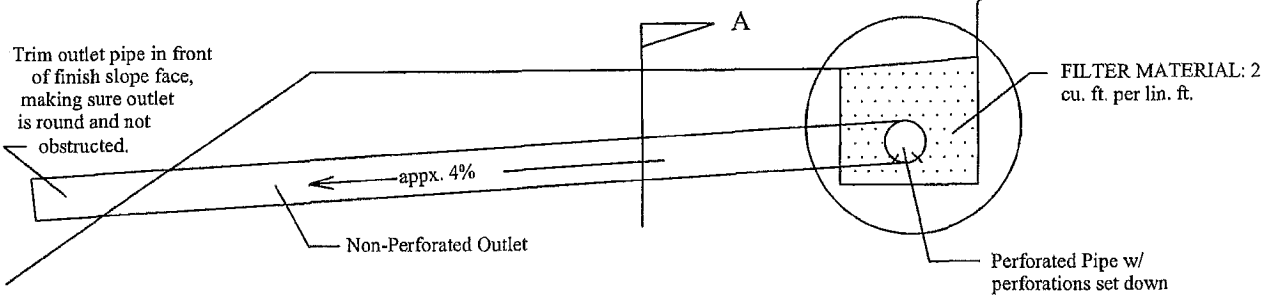
SCALE N.T.S. W.O. 8485

CUT-OFF WALL.DWG

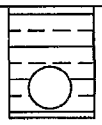
PLATE D.1

TYPICAL BACKDRAIN

SECTION PERPENDICULAR TO SLOPE



SECTION A



Backfill about outlet pipe should be free of rocks and hard, cemented clods.
V-shaped profile is acceptable alternative.

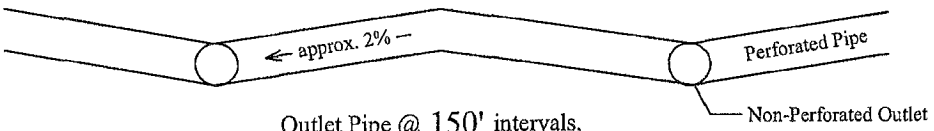
Lowermost drain level should be placed at heel of key, at direction of soil engineer, if gravity flow outlet is practical. Use 6" pipe if over 500'.

Lowermost backdrain to drain one way, following toe, when toe of slope falls one direction (i.e. continuously terraced pads), with outlets at regular intervals (if drain above toe).

Backdrains should be installed at approximately 15 feet vertical intervals.

Outlets should be surveyed and plotted on plans by civil engineer.

SECTION PARALLEL TO SLOPE



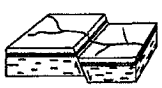
Outlet Pipe @ 150' intervals, preferably located at property line

Backdrain pipe to consist of 4" diameter Sch. 40 PVC, SDR 35 or other approved material. Use 6" diameter pipe where run to outlet is over 500'.

FILTER MATERIAL

Sieve Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
#4	24-50
#8	15-35
#30	5-15
#50	0-7
#200	0-2

Alternative Filter Material: Pea Gravel or Crushed Rock. Gravel or Rock Should be Enclosed in Filter Fabric.



Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY

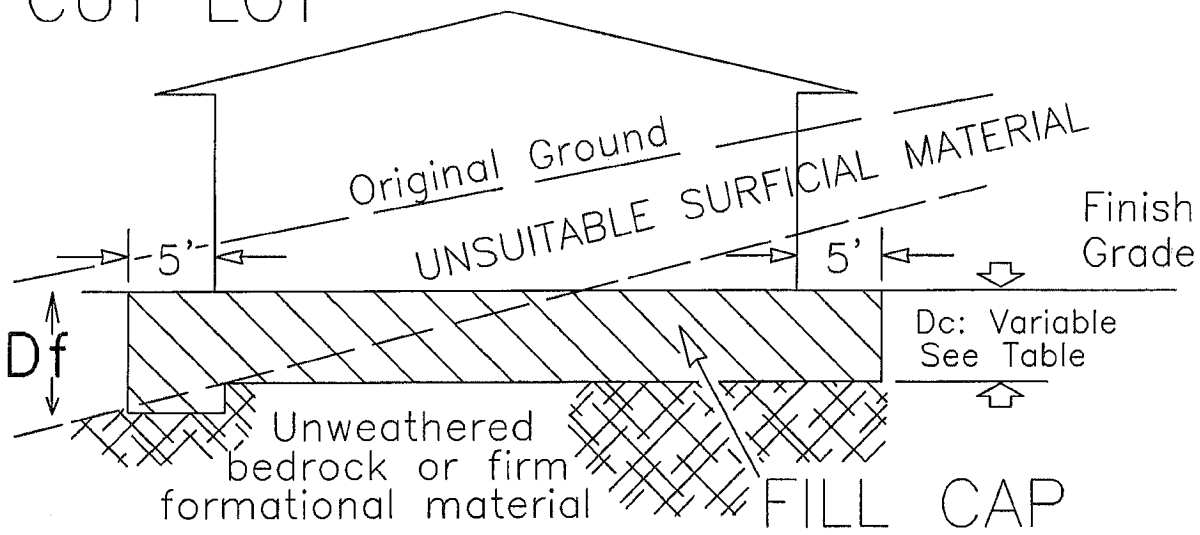
SCALE N.T.S. W.O. 8485

Backdrain.dwg
6/3/2005

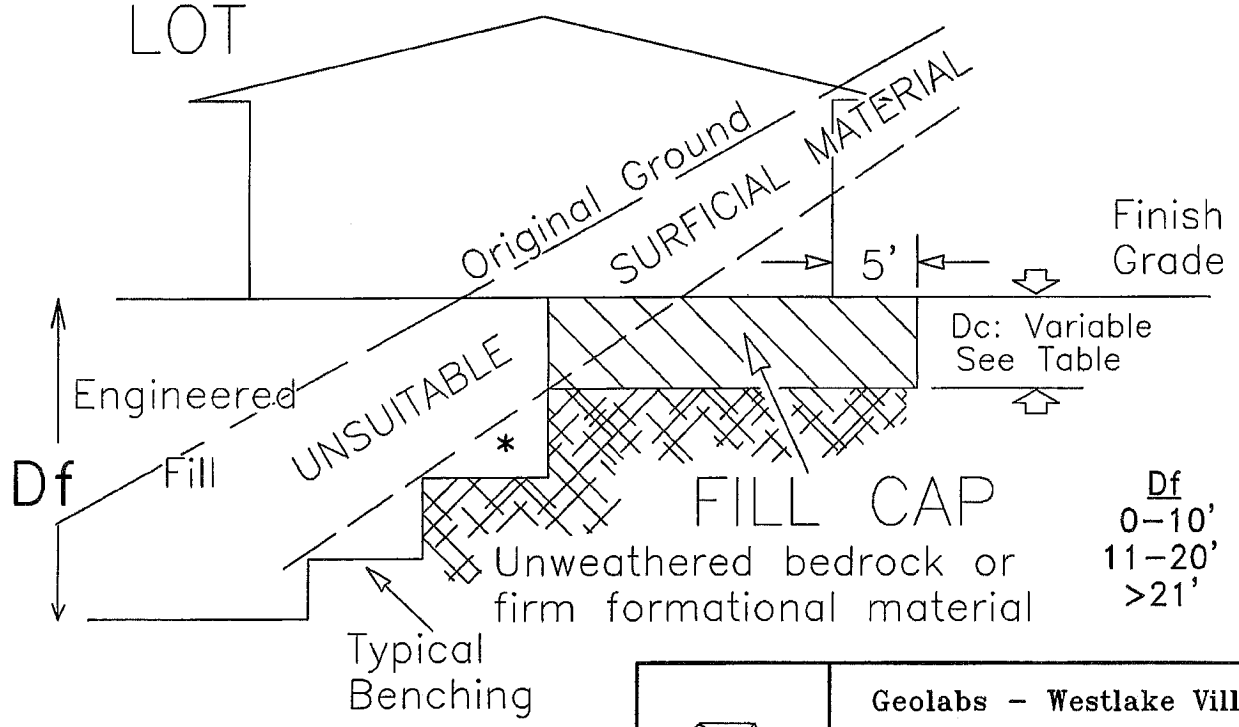
PLATE D.2

FILL CAP DETAIL

CUT LOT

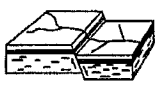


TRANSITION LOT



Df	Dc
0–10'	5'
11–20'	7'
>21'	10'

* For backslopes steeper than 3:1 the uppermost bench is to be 15' wide.



Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY

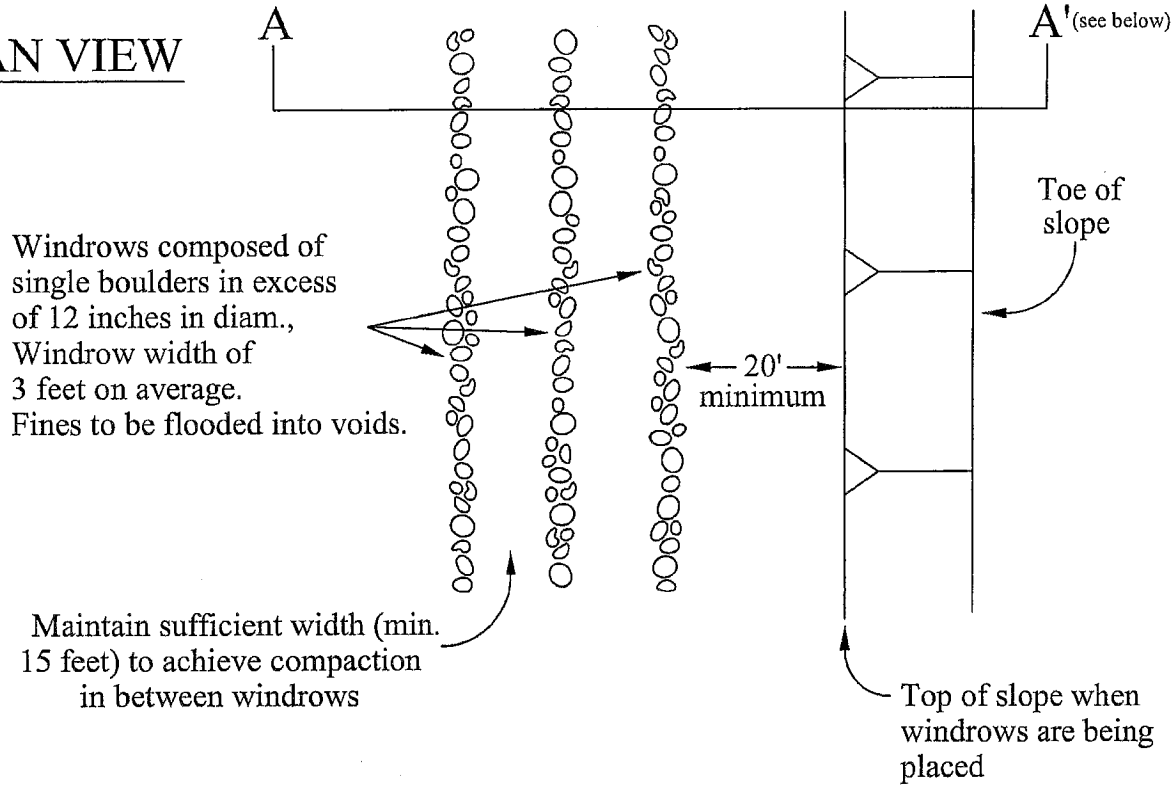
SCALE N.T.S. W.O. 8485

TRANSLOT

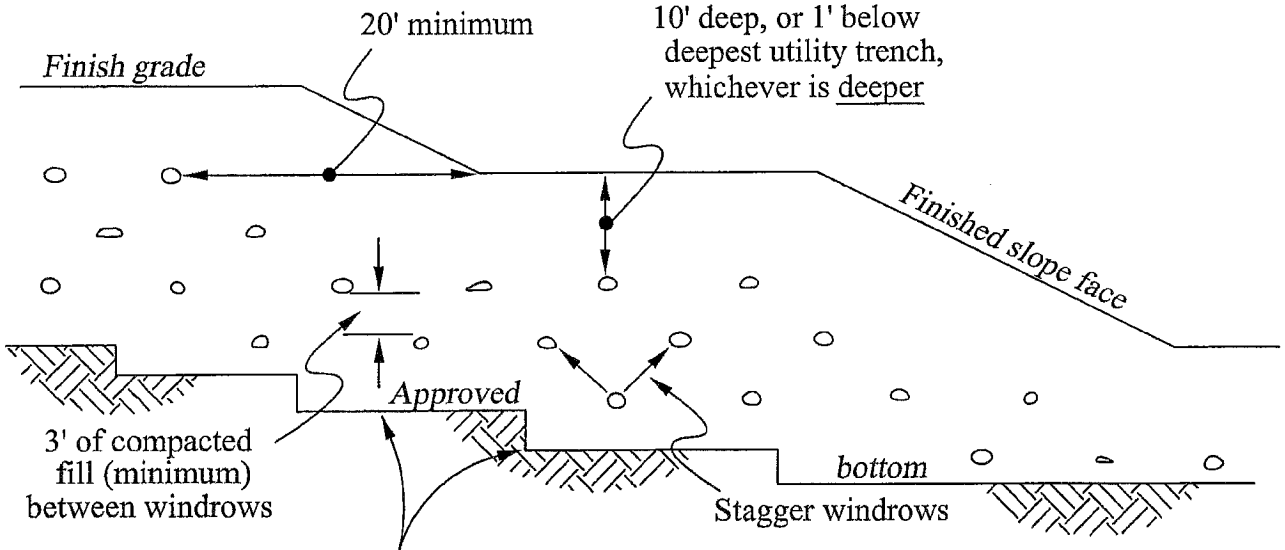
PLATE D.3

ROCK DISPOSAL DETAIL

PLAN VIEW



SECTION A-A'



Typical benching into approved bottom. Need for backdrains to be determined by field conditions.

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY

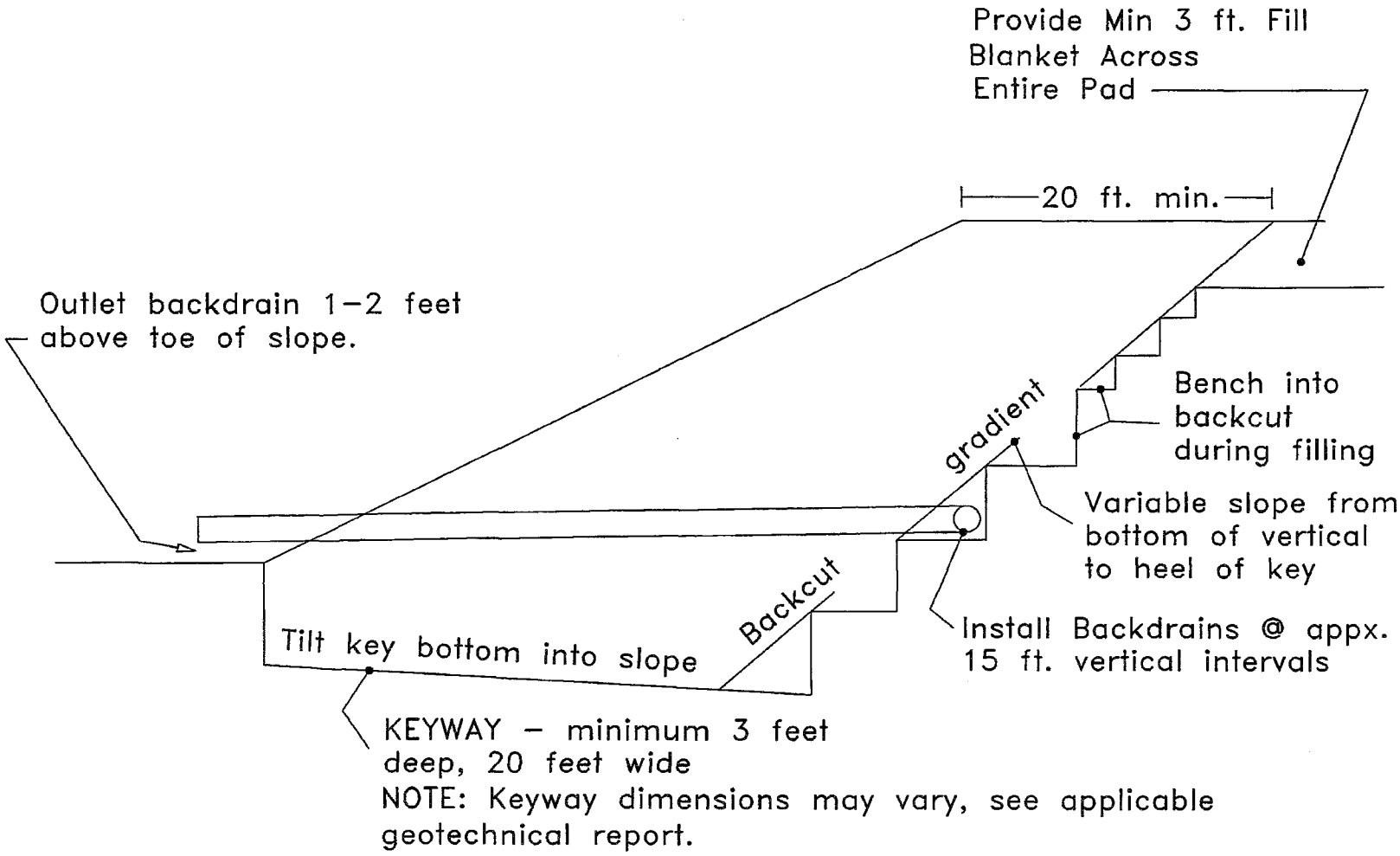
SCALE N.T.S. W.O. 8485

RockDisposal.dwg
10/7/2004

PLATE D.4

SF2

TYPICAL STABILITY/BUTTRESS FILL BELOW PAD OR OTHER FLAT GRADED AREA



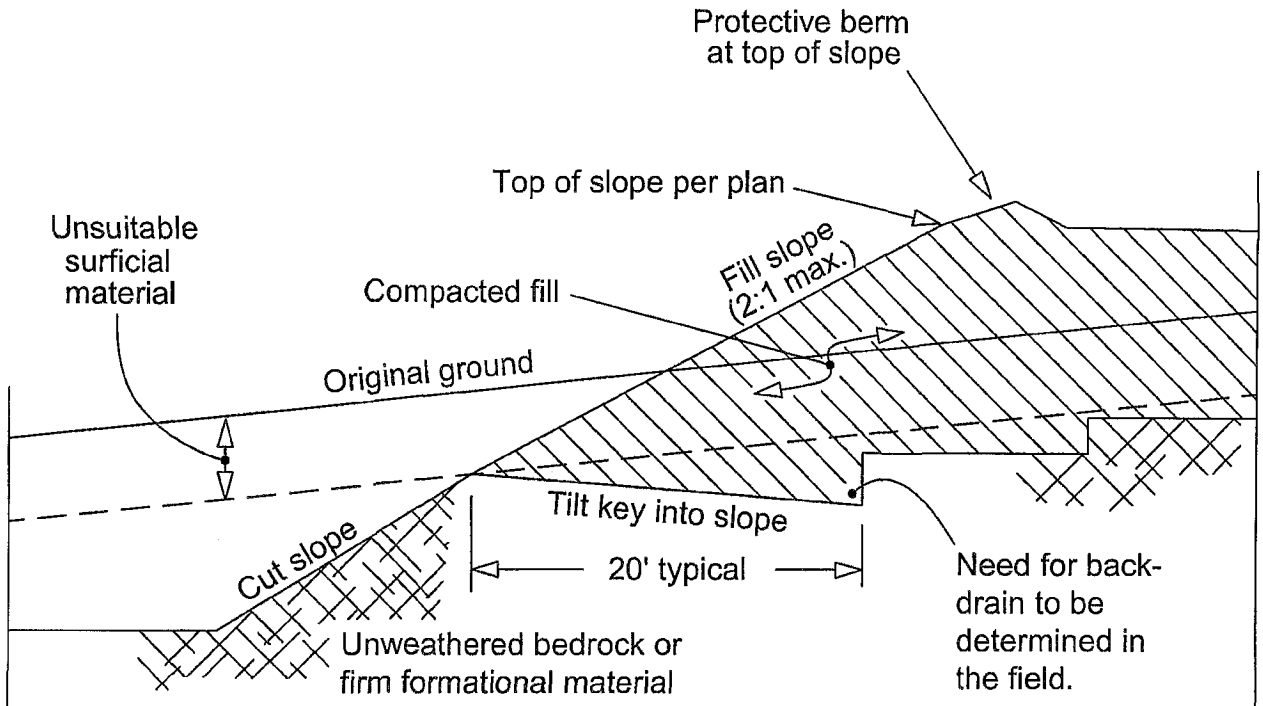
Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY
SCALE N.T.S. W.O 8485

665

PLATE D.5

TYPICAL FILL OVER CUT SLOPE



Cut portion of the slope should be excavated and observed by the project geologist prior to constructing the fill portion of the slope.

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 9/23/2020 BY

SCALE N.T.S. W.O. 8485

FILL OVER CUT.DWG

PLATE D.6

RESOLUTION NO. XXX

**RESOLUTION OF BOARD OF DIRECTORS
OF THE SANTA CLARITA VALLEY WATER AGENCY
ADOPTING THE SUPPLEMENTAL MITIGATED NEGATIVE DECLARATION
AND MITIGATION MONITORING AND REPORTING PROGRAM
UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT
FOR THE RECYCLED WATER VISTA CANYON
EXTENSION (PHASE 2B) PROJECT**

WHEREAS, the Santa Clarita Valley Water Agency (SCV Water) determined that recycled water is an important component of future water supplies; and

WHEREAS, the proposed Recycled Water Vista Canyon Extension (Phase 2B) Project is a component of the 2016 Recycled Water Master Plan; and

WHEREAS, on November 20, 2017, the Castaic Lake Water Agency's Board of Directors adopted the Mitigated Negative Declaration (MND) and Mitigation Monitoring and Reporting Program (MMRP) for the Vista Canyon Recycled Water (Phase 2B) project by Resolution 3211; and

WHEREAS, in November 2020, a supplemental MND and MMRP was prepared to analyze the potential environmental impacts associated with project modifications to the original Recycled Water Vista Canyon Extension (Phase 2B) project due to the relocation of the proposed recycled water tanks to an alternate site location; and

WHEREAS, in accordance with State CEQA Guidelines Section 15072(b), on November 19, 2020, SCV Water mailed a Notice of Intent to Adopt the Draft Supplemental MND to all responsible and reviewing agencies, the Office of Planning and Research, and members of the public that have requested notice; the Agency also published the Notice of Intent to Adopt the Draft Supplemental MND in the *Santa Clarita Valley Signal*, a newspaper of general circulation; and

WHEREAS, required by State CEQA Guidelines section 15072(d), the Notice of Intent to Adopt the Draft Supplemental MND was concurrently posted by the Clerk of the Board for the County of Los Angeles; and

WHEREAS, in accordance with State CEQA Guidelines section 15073, the Draft Supplemental MND was circulated for at least 30 days, from November 19, 2020 through December 21, 2020; and

WHEREAS, SCV Water received no written public comments from the public or reviewing agencies during the comment review period; and

WHEREAS, the Final Supplemental MND and the MMRP are attached as Exhibit A; and

WHEREAS, a notice of public meeting relating to the Supplemental MND was duly given and posted in the manner and for the time frame prescribed by law, and the Engineering and Operations Committee held a public online meeting on February 4, 2021, at 5:30 P.M., as part of its decision process concerning the Project; and

WHEREAS, the Engineering and Operations Committee recommended that the SCV Water Board of Directors ("Board") approve a resolution adopting the Final Supplemental MND and Mitigation Monitoring and Reporting Program ("MMRP"); and

WHEREAS, a notice of public meeting relating to the Supplemental MND was duly given and posted in the manner and for the time frame prescribed by law, and the SCV Water Board held a public online meeting on the Project on March 2, 2021, at 6:30 P.M., as part of its decision process concerning the Project, at which time all persons wishing to comment in connection the Supplemental MND were heard; and

WHEREAS, no comments made during the public review period, and no additional information submitted to SCV Water have produced substantial new information requiring recirculation of the Supplemental MND or additional environmental review of the Project under State CEQA Guidelines section 15073.5; and

WHEREAS, all the requirements of the Public Resources Code and the State CEQA Guidelines have been satisfied in connection with the preparation of the Supplemental MND, which is sufficiently detailed so that all of the potentially significant environmental effects of the Project, as well as feasible mitigation measures, have been adequately evaluated; and

WHEREAS, the SCV Water Board reviewed the Supplemental MND and MMRP; and

WHEREAS, the SCV Water Board, acting as a Lead Agency, will need to adopt the Supplemental IS/MND; and

WHEREAS, the SCV Water Board has determined that the proposed Project can be approved because there is no substantial evidence in light of the whole record that the Project may have a significant effect on the environment; and

WHEREAS, the SCV Water and its Board have considered all of the information presented to it as set forth above and this Resolution and action taken hereby is a result of the Board's independent judgment and analysis.

NOW, THEREFORE, BE IT RESOLVED that the SCV Water Board does hereby find and determine as follows:

SECTION 1. RECITALS. The SCV Water finds that the foregoing recitals are true and correct and are incorporated herein as substantive findings of this Resolution.

SECTION 2. COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT. As a decision-making body for the Project, the SCV Water has reviewed and considered the information contained in the Supplemental MND, comments received, and other documents contained in the administrative record for the Project. Based on the Agency's independent review and analysis, the SCV Water finds that the Supplemental MND and administrative record contain a complete and accurate reporting of the environmental impacts associated with the Project, and that the Supplemental MND has been completed in compliance with CEQA and the State CEQA Guidelines.

SECTION 3. FINDINGS ON ENVIRONMENTAL IMPACTS. Based on the whole record before it, including the Supplemental MND, the administrative record, and all other written and oral evidence presented to the SCV Water, the SCV Water finds that all environmental impacts of the Project are either less than significant or can be mitigated to a level of less than significant under the mitigation measures outlined in the Supplemental MND and the MMRP. The SCV Water finds that substantial evidence fully supports the conclusion that no significant and unavoidable impacts will occur and that, alternatively, there is no substantial evidence in the administrative record supporting a fair argument that the Project may result in any significant environmental impacts. The SCV Water finds that the Supplemental MND contains a complete, objective, and accurate reporting of the environmental impacts associated with the Project and reflects the independent judgment and analysis of the SCV Water.

SECTION 4. ADOPTION OF THE SUPPLEMENTAL MITIGATED NEGATIVE DECLARATION. The SCV Water hereby approves and adopts the Supplemental MND as the Lead Agency.

SECTION 5. ADOPTION OF THE SUPPLEMENTAL MITIGATION MONITORING AND REPORTING PROGRAM. In accordance with Public Resources Code section 21081.6, the SCV Water hereby adopts the Supplemental MMRP, attached hereto as Exhibit "A". In the event of any inconsistencies between the Mitigation Measures as set forth in the Supplemental MND and the MMRP, the MMRP shall control.

SECTION 6. LOCATION AND CUSTODIAN OF RECORDS. The documents and materials associated with the Project and the Supplemental MND that constitute the record of proceedings on which these findings are based are located at the offices of the Santa Clarita Valley Water Agency, 26521 Summit Circle, Santa Clarita, CA 91350. The Custodian of Record is Mr. Courtney Mael.

SECTION 7. NOTICE OF DETERMINATION. The SCV Water hereby directs staff to prepare, execute, and file a Notice of Determination with the Los Angeles County Clerk's office and the Office of Planning and Research within five (5) working days of adoption of this Resolution.

_____

President

I, the undersigned, hereby certify: That I am the duly appointed and acting Secretary of the Santa Clarita Valley Water Agency, and that at a regular meeting of the Board of Directors of said Agency held on March 2, 2021, the foregoing Resolution No. SCV-XXX was duly and regularly adopted by said Board, and that said resolution has not been rescinded or amended since the date of its adoption, and that it is now in full force and effect.

DATED: March 2, 2021

_____

Secretary

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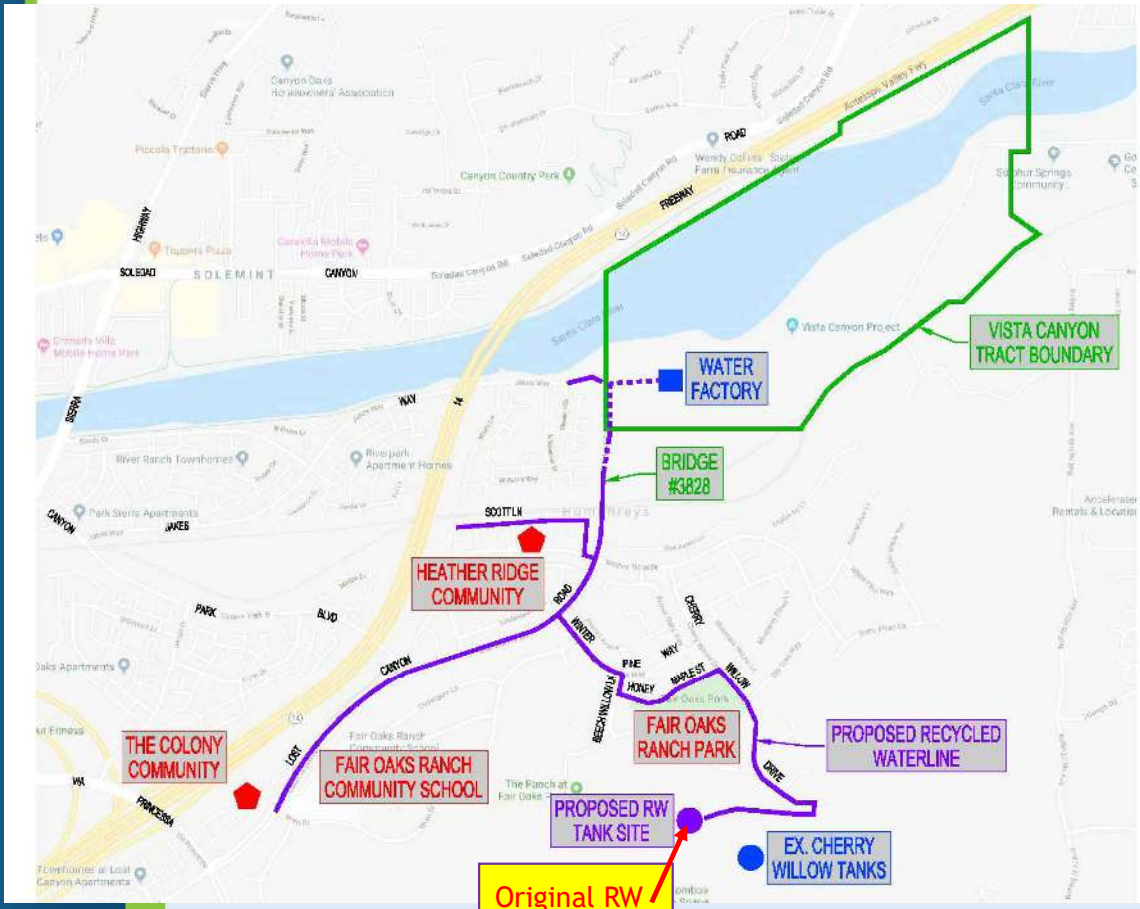
February 4, 2021

Vista Canyon Recycled Water (Phase 2B) Tank

Approval of the Final Supplemental Initial Study-Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program

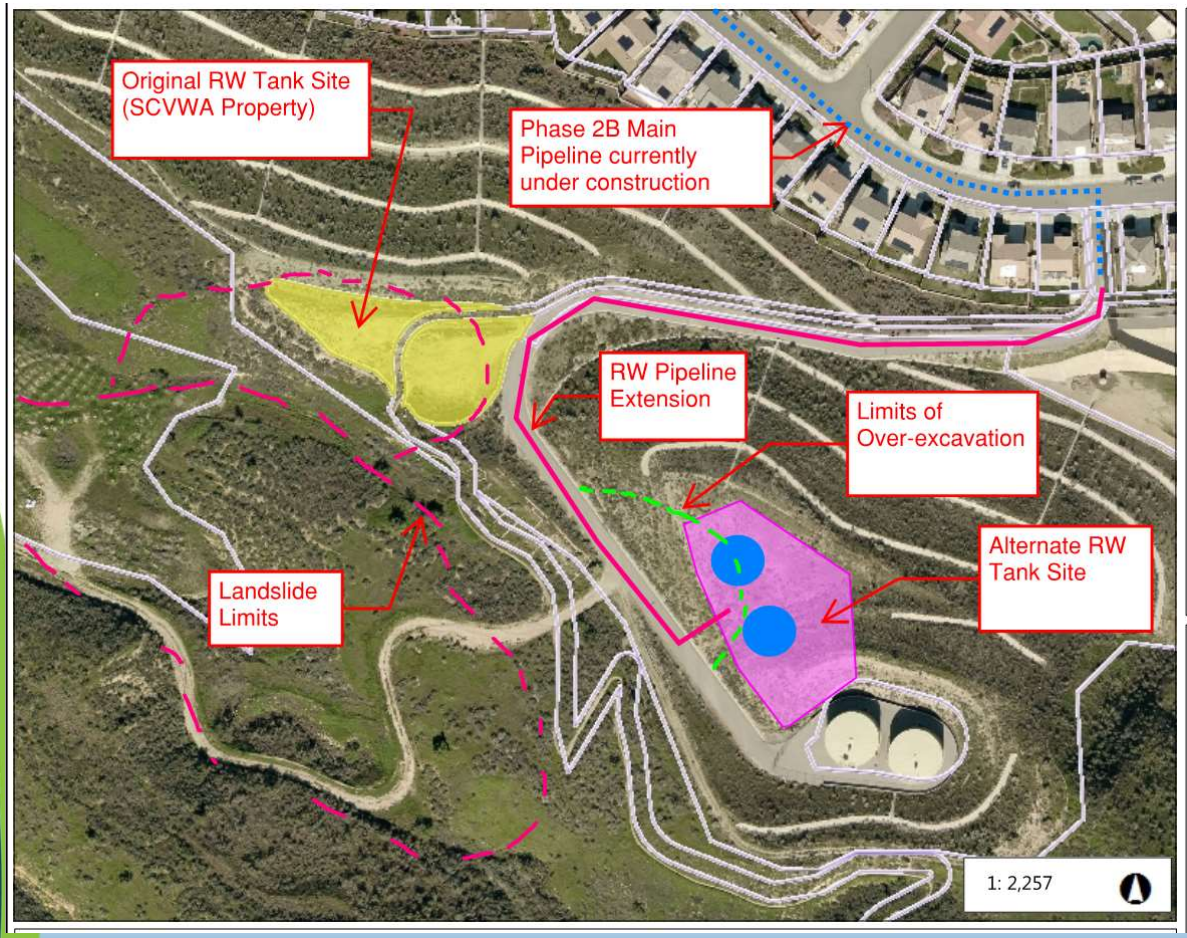
Engineering & Operations Committee

Vista Canyon Recycled Water (Phase 2B) Project
Project Overview



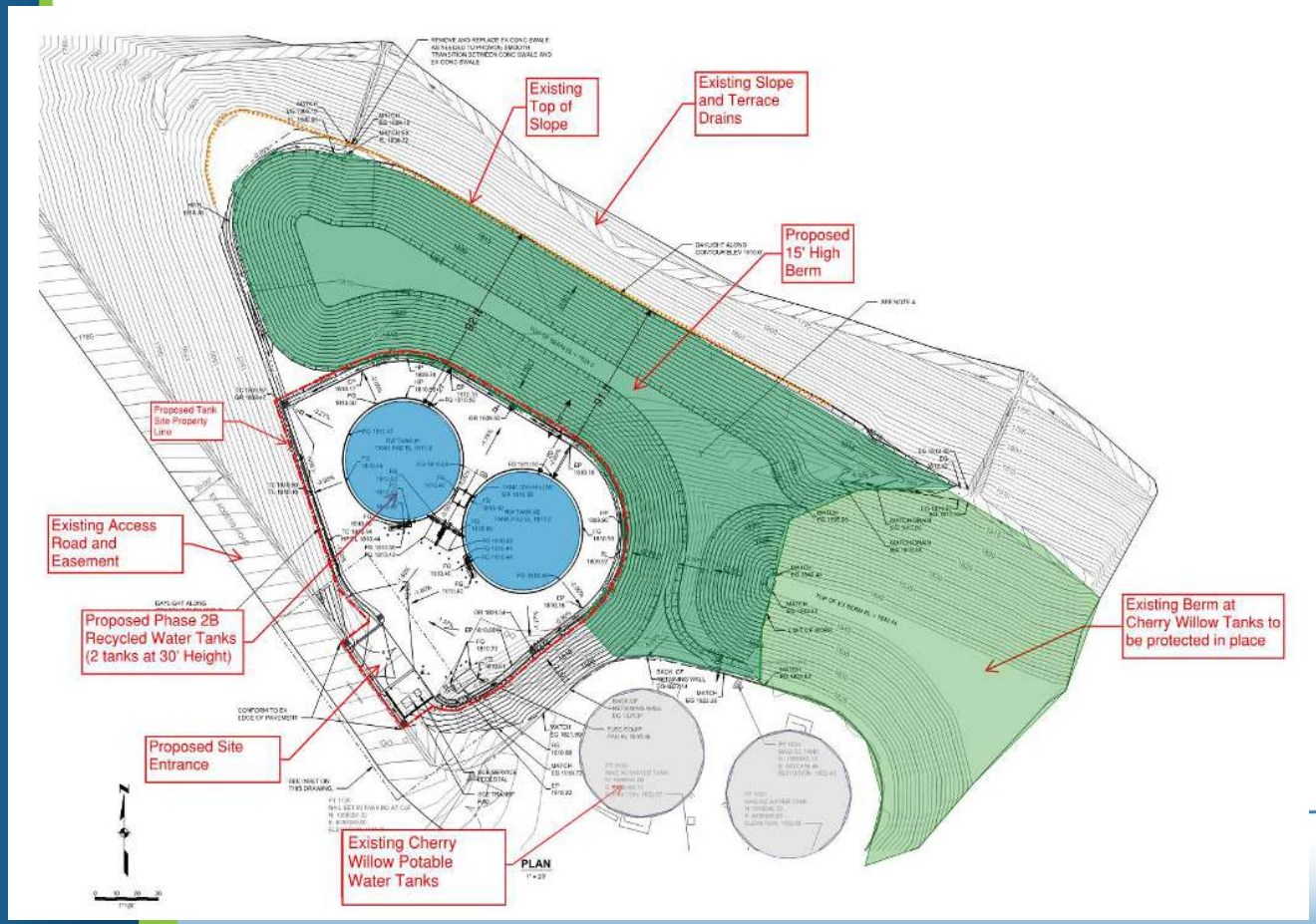
- Vista Canyon Water Factory will supply recycled water to irrigation customers in the Fair Oaks and Vista Canyon Communities
- Recycled Water Pipelines are currently in construction
- Tanks provide recycled water storage to be used for peak demands and to maintain system pressure to irrigation customers

Vista Canyon Recycled Water (Phase 2B) Project Alternate Tank Site



- CEQA MND & MMRP adopted by CLWA in 2017 for pipeline and original tank location
- Tanks relocated to new tank location due to presence of landslide and slope stability concerns
- Final engineering of tank at alternate site completed in December 2020

Vista Canyon Recycled Water (Phase 2B) Project
Proposed Tank Site



Project Modifications

- New site located 400 ft from original site and near existing Cherry Willow Tanks
- Additional Earthwork- Approximately 25,000 cubic yards of cut and fill
- Berm construction along north side of tank site
- 500 ft extension of the Recycled Water Line

Vista Canyon Recycled Water (Phase 2B) Project Potential Environmental Impacts & Mitigation Measures

Environmental Impacts due to original and modified project would be reduced to less than significant with implementation of the Mitigation Measures noted below:

	Potential Environmental Concern	Proposed Mitigation Measure	Conclusion
Adopted 2017 MND & MMRP	Aesthetics	AES-1	Impact reduced to less than significant
	Cultural Resources	CUL-1	Impact reduced to less than significant
	Noise	NOISE-1	Impact reduced to less than significant
Proposed Supplemental MND & MMRP	Biological Resources	BIO-1 & BIO-2	Impact reduced to less than significant

Vista Canyon Recycled Water (Phase 2B) Project
Project Schedule

- CEQA Timeline
  - Public Review of Draft IS-MND completed on December 21, 2020
  - Engineering & Operations Committee Meeting - February 4, 2021
  - Board of Directors Meeting – March 2, 2021

- Prop 84 Grant Timeline
  - Tank Construction must be completed by December 31, 2021 to receive full grant reimbursement of $2,406,600

- Bid & Construction Timeline
  - Tank project is currently in public bid
  - End of public bidding – February 5, 2021
  - Engineering & Operations Committee Meeting – March 4, 2021
  - Board of Directors Meeting – April 6, 2021
  - Tank Construction Completion – December 31, 2021

Vista Canyon Recycled Water (Phase 2B) Project Recommendation

That the Engineering and Operations Committee recommends that the Board of Directors:

Approve a resolution adopting the Final Supplemental Initial Study-Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program Under the California Environmental Quality Act for the Vista Canyon Recycled Water (Phase 2B) Project.

Questions?

ITEM NO. 4

COMMITTEE MEMORANDUM

DATE: February 4, 2021

TO: Engineering and Operations Committee

FROM: Mike Alvord
Director of Operations & Maintenance

SUBJECT: Recommend Approval of the Interconnection between the NWD and SCWD systems and the VWD and SCWD systems in the area referred to as West Newhall

---

SUMMARY

SCV Water currently consists of 7 separate Public Water System Operating Permits issued by Division of Drinking Water (DDW). There are several interconnections between the various systems. The original intent of these connections was to provide emergency or stand-by water supply to the neighboring utility. Since the formation of SCV Water, the goal has broadened to integrate the separate systems into one distribution system.

The West Newhall Interconnection will be between the Newhall Water Division-Newhall system and the Santa Clarita Division system and the Valencia Water Division system and the SCWD system. The goal is to provide more robust and reliable service to this area.

DISCUSSION

Over the years, there have been several interconnections between these separate distribution systems. DDW recognizes these interconnections as Active, Stand-by, and Emergency connections, each with their own set of operating criteria. Recently, in response to the temporary loss of groundwater capacity due to PFAS, SCV Water submitted two permit amendments with DDW in order to construct two new interconnections. These interconnections are between the Tesoro system and the Valencia Water Division's (VWD) Zone IIIA and between the Santa Clarita Water Division (SCWD) system and the VWD Zone IIA-North. Both interconnections were approved by DDW and are in Active status.

Interconnections provide operational flexibility, source reliability, and redundancy. While it was important to have interconnections between separate agencies, it is even more important to interconnect the various distribution systems as a single agency.

Prior to the formation of SCV Water there were several areas identified that would benefit from new interconnections. The West Newhall area was one of these locations. West Newhall is an area currently serviced by the SCWD system. It is located south of Lyons Avenue and west of Wheeler Road. Water is supplied to this area from two locations, one along Wiley Cyn and the other along Lyons Ave and is within the Circle J pressure zone. If one of these two supply lines were interrupted, the West Newhall area would have a difficult time meeting fire flow demand. Connecting the NWD and VWD systems to this area would provide additional reliability and redundancy. In 2019, Akel Engineering was commissioned to conduct a hydraulic analysis to

provide recommendations for this part of the distribution system. The resulting recommendation was to make the two connections between these systems to allow for reliability and for mitigating the low pressures during fire flow events in the West Newhall area.

The NWD-SCWD interconnection will consist of the installation of approximately 30 feet of 8" and 80 feet of 12" ductile iron pipe, a pressure-reducing valve, and various other appurtenances. The VWD-SCWD interconnection will consist of the installation of approximately 60 feet of 12" diameter ductile iron pipe, a pressure-reducing valve and various other appurtenances.

SCV Water crews will be responsible for completing this project except for paving. The total project estimated cost is approximately $345,000 with internal labor and equipment comprising approximately 25% of the estimated cost. Since the paving estimate is more than $30,000 a formal request for proposal process will be followed in accordance with the Purchasing Policy.

According to section 15282(k) of the California Environmental Quality Act, the installation of new pipeline as set forth in Section 21080.21 of the Public Resources Code is considered statutorily exempt as long as the project does not exceed one mile in length. Therefore, a Notice of Exemption for CEQA under Section 15282(k) will be filed for this project.

FINANCIAL CONSIDERATIONS

Funds for this project are included in the FY 2020/21 Interconnection Budget in the amount of $400,000.

RECOMMENDATION

That the Engineering and Operations Committee recommend that the Board of Directors find this project to be exempt from CEQA and authorize the General Manager to direct staff to complete this project in an amount not to exceed $400,000.

Attachment

M65

NOTICE OF EXEMPTION

To: Registrar-Recorder/County Clerk
Los Angeles County
12400 Imperial Highway
Norwalk, CA 90650

From: Santa Clarita Valley Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350

Project Title:

Location -- Specific: Approximately 380 ft east of Wiley Cyn Rd and 580 ft south of Wabuska St along Old Wiley Cyn Rd and along the east side of Wiley Cyn Rd at the intersection of Vista Ridge Dr. and Wiley Cyn Rd

Location -- **Counties:** Los Angeles County

Description of Activity:

Installation of approximately 110 feet of water mainline and associated appurtenances along Old Wiley Cyn Rd and 60 feet of water mainline and associated appurtenances along Wiley Cyn Rd at the intersection of Vista Ridge Dr.

Name of Public Agencies Approving or Carrying Out Activity: Santa Clarita Valley Water Agency (Lead Agency).

Exempt Status:

- ☐ Ministerial
- ☐ Declared Emergency
- ☐ Emergency Project
- ☐ **Categorical Exemption.** State type and section number: See CEQA Guidelines Section 15301.
- ■ **Statutory Exemption.** State code number: See CEQA Guidelines Section 15061(b)3. Section 15282(k)

Reasons why activity is exempt: Installation of approximately 170 of pipeline.

Lead Agency Contact Person: **Telephone**:

Signature: _____ **Title**: _____ **Date:**_____

- ☑ Signed by Lead Agency
- ☑ Signed by Applicant

Date received for filing by County Clerk:

_____

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ITEM NO.
5

Monthly Operations & Production Report

December 2020

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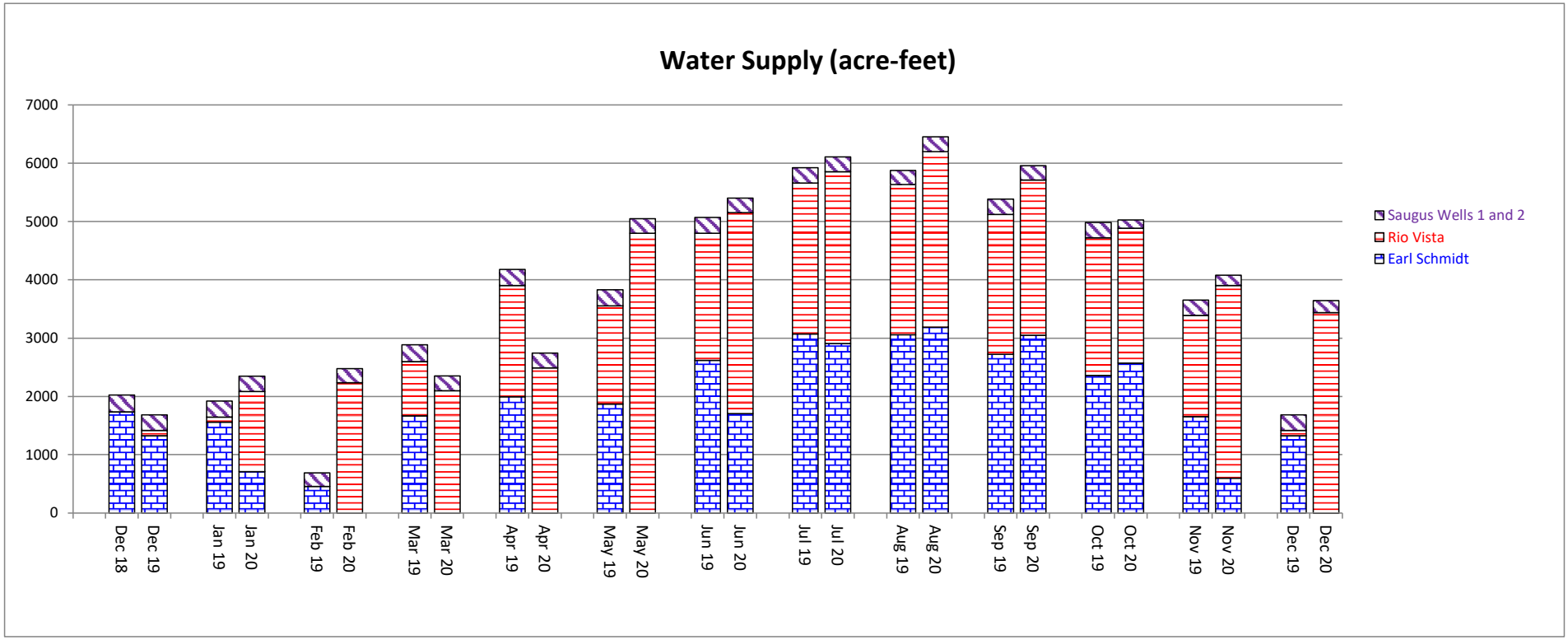
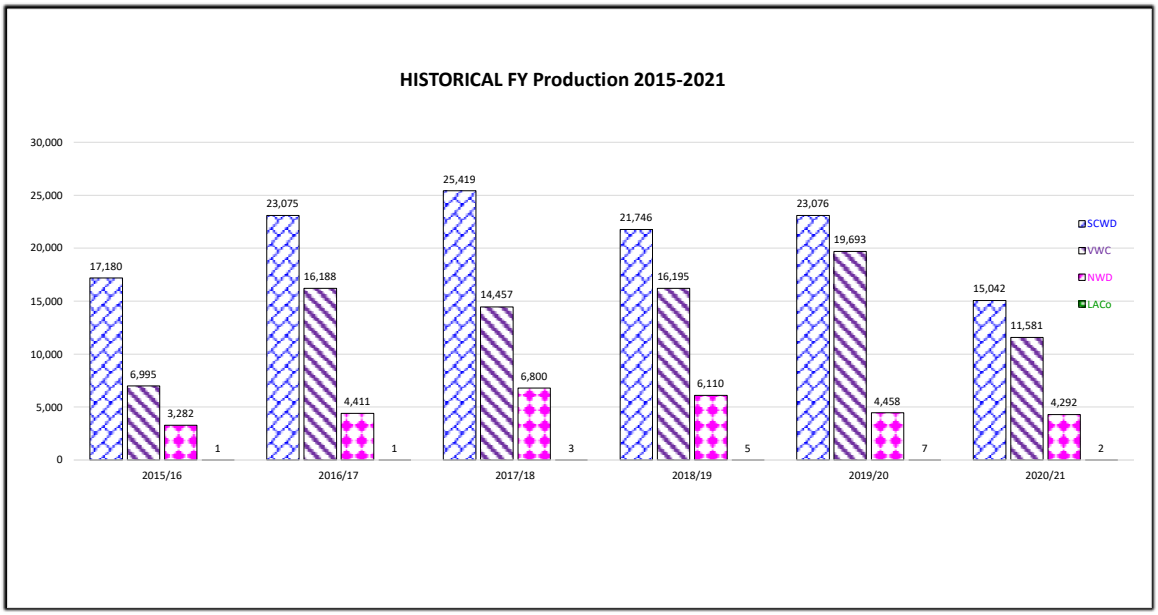
SANTA CLARITA VALLEY WATER AGENCY

December 2020 Regional Operations Report



Source	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Total
Earl Schmidt	87	708	0	0	0	0	1706	2906	3187	3050	2571	601	0	14816
Rio Vista	1328	1374	2235	2096	2490	4801	3445	2950	3013	2662	2314	3302	3436	35446
Saugus 1 and 2	271	265	243	256	253	249	249	251	252	245	145	176	211	3066
Total	1686	2347	2478	2352	2743	5050	5400	6107	6452	5957	5030	4079	3647	53328
Total Sold	1715	2270	2411	2309	2660	5004	5336	6048	6373	5870	4970	4050	3605	52621
RVWTP Use/Storage	-46.25	31.54	55.91	2.55	49	39	35	22	43.68	31.48	33.8	6.41	42.02	346.14
Total Use	1668.75	2301.54	2466.91	2311.55	2709	5043	5371	6070	6416.68	5901.48	5003.8	4056.41	3647.02	52967.14
Water Loss	-1.02%	-1.94%	-0.45%	-1.72%	-1.24%	-0.14%	-0.54%	-0.61%	-0.55%	-0.93%	-0.52%	-0.55%	-0.01%	-0.79%
Recycled Water	**Dec-19**	**Jan-20**	**Feb-20**	**Mar-20**	**Apr-20**	**May-20**	**Jun-20**	**Jul-20**	**Aug-20**	**Sep-20**	**Oct-20**	**Nov-20**	**Dec-20**	**Total**
Valencia	2	10	22	8	22	64	70	76	68	64	18	27	19.79	470.79

* Water loss includes water usage at Rio Vista Water Treatment Plant facilities and system storage.



HISTORICAL FY PRODUCTION 2015-2021

2015/16	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
SCWD	1,731	1,800	1,616	1,629	1,427	1,180	829	1,060	1,185	1,176	1,612	1,935	17,180
VWC	691	773	583	550	547	364	157	366	412	462	715	1,375	6,995
NCWD	347	373	325	276	233	199	148	195	206	250	319	411	3,282
LACo	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	2,769	2,946	2,524	2,455	2,207	1,743	1,134	1,622	1,803	1,888	2,646	3,721	**27,458**
Cum. FYTD	2,769	5,715	8,239	10,694	12,901	14,644	15,778	17,400	19,203	21,091	23,737	27,458	
2016/17	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
SCWD	2,404	2,663	2,368	2,128	1,712	1,377	952	844	1,359	2,040	2,456	2,772	23,075
VWC	1,565	1,640	1,305	1,080	607	620	643	764	1,123	1,728	2,499	2,614	16,188
NCWD	478	467	418	372	293	234	141	109	216	384	604	695	4,411
LACo	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	4,447	4,770	4,091	3,580	2,612	2,231	1,736	1,716	2,699	4,152	5,559	6,081	**43,674**
Cum. FYTD	4,447	9,218	13,309	16,888	19,501	21,732	23,467	25,184	27,882	32,034	37,593	43,674	
2017/18	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
SCWD	3,085	3,035	2,589	2,462	1,922	1,955	1,578	1,580	969	1,905	2,076	2,264	25,419
VWC	2,089	1,723	1,184	1,260	966	969	853	676	619	1,160	1,336	1,622	14,457
NCWD	785	856	845	801	640	556	253	275	157	349	473	808	6,800
LACo	0	0	0	0	0	0	0	1	0	0	1	0	3
Total	5,958	5,615	4,619	4,522	3,528	3,481	2,684	2,532	1,746	3,414	3,885	4,695	**46,680**
Cum. FYTD	5,958	11,573	16,192	20,714	24,242	27,723	30,407	32,939	34,685	38,099	41,984	46,680	
2018/19	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
SCWD	2,694	2,816	2,535	2,174	1,882	1,274	1,110	493	1,177	1,770	1,632	2,189	21,746
VWD	1,921	2,026	1,743	1,300	1,084	459	513	232	1,205	1,819	1,701	2,193	16,195
NWD	1,023	1,012	881	537	382	214	181	76	352	428	422	603	6,110
LACo	1	0	0	1	0	0	1	1	1	0	0	0	5
Total	5,639	5,855	5,160	4,011	3,349	1,947	1,805	802	2,735	4,016	3,754	4,985	**44,057**
Cum. FYTD	5,639	11,494	16,654	20,665	24,014	25,961	27,766	28,567	31,302	35,318	39,072	44,057	
2019/20	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
SCWD	2,610	2,743	2,475	2,310	1,845	980	1,207	1,416	1,212	1,368	2,358	2,552	23,076
VWD	2,491	2,518	2,348	2,145	1,526	604	957	762	919	1,066	2,171	2,186	19,693
NWD	721	518	492	422	280	130	188	232	177	226	475	597	4,458
LACo	2	0	0	1	1	1	1	0	0	0	0	0	7
Total	5,823	5,779	5,316	4,879	3,651	1,715	2,353	2,411	2,309	2,660	5,004	5,336	**47,234**
Cum. FYTD	5,823	11,602	16,918	21,796	25,448	27,162	29,515	31,926	34,235	36,894	41,898	47,234	
2019/20	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
SCWD	2,849	3,117	2,792	2,470	1,907	1,907	0	0	0	0	0	0	15,042
VWD	2,316	2,257	2,115	1,915	1,653	1,324	0	0	0	0	0	0	11,581
NWD	882	999	963	584	490	375	0	0	0	0	0	0	4,292
LACo	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	6,048	6,373	5,870	4,970	4,050	3,605	0	0	0	0	0	0	**30,918**
Cum. FYTD	6,048	12,422	18,292	23,262	27,312	30,918	30,918	30,918	30,918	30,918	30,918	30,918	

*Total does not include recycled water.

SANTA CLARITA VALLEY WATER AGENCY

Record of Weather Observations

December 2020

DATE	High Temperature	Low Temperature	Precipitation 2020	Precipitation 2019
1-Dec	74	36	0.00	0.00
2-Dec	73	43	0.00	0.00
3-Dec	64	49	0.00	0.00
4-Dec	70	35	0.00	1.24
5-Dec	74	32	0.00	0.00
6-Dec	76	32	0.00	0.18
7-Dec	70	36	0.00	0.18
8-Dec	74	62	0.00	0.32
9-Dec	78	41	0.00	0.01
10-Dec	62	34	0.00	0.01
11-Dec	59	34	0.00	0.01
12-Dec	63	36	0.00	0.00
13-Dec	64	46	0.00	0.00
14-Dec	55	35	0.00	0.01
15-Dec	62	34	0.00	0.00
16-Dec	67	36	0.00	0.00
17-Dec	61	38	0.00	0.00
18-Dec	63	35	0.00	0.00
19-Dec	70	38	0.00	0.00
20-Dec	76	37	0.00	0.00
21-Dec	82	41	0.00	0.00
22-Dec	72	35	0.00	0.57
23-Dec	66	36	0.01	0.40
24-Dec	59	41	0.00	0.01
25-Dec	71	34	0.00	1.29
26-Dec	68	34	0.00	0.88
27-Dec	68	42	0.03	0.00
28-Dec	50	34	1.35	0.00
29-Dec	55	32	0.01	0.01
30-Dec	64	33	0.00	0.00
31-Dec	57	30	0.00	0.00
TOTAL			**1.40**	**5.12**

		2020-2021	2019-2020
Total Precipitation of Current Month		1.40	5.12
Total Precipitation End of Previous Month		0.18	2.62
Total Precipitation Since October 1st		**1.58**	**7.74**
Temperature Averages for Current Month	**HIGH**	66.7	60.4
	LOW	37.5	37.3

Santa Clarita Valley Water Agency

Summary of Annual Precipitation

October 1st through September 30th

(Total in Inches)

	1999-00	*2000-01*	*2001-02*	*2002-03*	*2003-04*	*2004-05*	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*
Oct	0.00	1.13	0.22	0.00	1.10	4.79	1.91	0.42	0.25	0.09	4.04
Nov	0.00	0.00	3.18	3.01	0.63	0.64	0.59	0.05	0.50	1.78	0.08
Dec	0.05	0.00	1.30	5.85	2.57	8.54	0.14	0.83	2.67	3.01	4.28
Jan	1.21	5.84	1.55	0.00	0.65	17.06	3.27	1.66	17.54	0.69	9.13
Feb	9.43	10.76	0.51	9.03	8.07	16.69	3.78	1.38	1.82	6.78	4.96
Mar	3.15	3.38	0.38	2.38	0.37	2.70	5.68	0.17	0.10	1.18	0.69
Apr	2.10	2.56	0.05	2.35	0.20	1.42	4.22	0.71	0.07	0.07	2.40
May	0.00	0.00	0.12	1.70	0.00	0.45	0.99	0.00	0.17	0.01	0.07
Jun	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
Jul	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.00	0.00	0.00
Aug	0.31	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00
Sep	0.00	0.00	0.02	0.00	0.00	0.17	0.00	1.32	0.00	0.00	0.00
TOTAL	**16.25**	**23.67**	**7.34**	**24.34**	**13.59**	**52.55**	**20.58**	**6.58**	**23.12**	**13.64**	**25.65**

	2010-11	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019-20*	*2020-21*
Oct	1.34	1.97	0.15	0.11	0.32	0.17	0.43	0.00	0.52	0.01	0.04
Nov	1.87	2.50	2.20	1.41	0.64	0.21	1.49	0.06	1.87	2.61	0.14
Dec	11.97	1.19	1.54	0.37	6.16	0.49	3.44	0.01	2.77	5.12	1.40
Jan	0.96	1.23	1.94	0.06	1.44	6.07	10.30	3.18	8.08	0.54	
Feb	5.36	0.13	0.42	5.26	0.74	0.69	8.98	0.35	8.56	0.12	
Mar	8.86	4.99	1.21	1.64	1.09	2.75	0.33	7.50	4.15	5.81	
Apr	0.12	4.02	0.00	0.31	0.16	0.37	0.09	0.02	0.09	4.45	
May	0.74	0.01	0.74	0.00	0.66	0.09	0.26	0.01	1.60	0.16	
Jun	0.04	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	
Jul	0.01	0.00	0.08	0.02	0.87	0.00	0.01	0.00	0.00	0.00	
Aug	0.00	0.01	0.00	0.05	0.00	0.02	0.07	0.00	0.00	0.00	
Sep	0.00	0.02	0.00	0.00	0.78	0.00	0.13	0.02	0.03	0.01	
TOTAL	**31.27**	**16.07**	**8.28**	**9.23**	**12.87**	**10.87**	**25.53**	**11.15**	**27.68**	**18.84**	**1.58**

SANTA CLARITA VALLEY WATER AGENCY
WATER PRODUCTION BY WELL 2020 (ACRE-FEET)

NEWHALL WATER DIVISION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
N12	104	108	96	94	178	175	164	177	179	183	115	127	**1700**
N13	120	126	111	109	127	197	183	74	49	205	128	140	**1569**
C1	19	27	17	29	53	58	60	61	27	50	32	31	**465**
C2	13	14	9	14	27	29	29	29	13	23	15	14	**230**
C7	35	37	25	38	71	78	79	79	36	66	43	41	**627**
P1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
P3	0	0	0	0	0	0	0	0	0	0	0	0	**0**
P4	0	0	0	0	0	0	0	0	0	0	0	0	**0**
P5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOTAL NWD	**291**	**312**	**257**	**285**	**456**	**537**	**516**	**419**	**303**	**528**	**333**	**354**	**4591**

SANTA CLARITA WATER DIVISION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
LOST CANYON NO.2	36	2	0	0	26	31	46	40	44	47	44	26	**342**
LOST CANYON NO.2A	70	45	13	18	62	64	87	61	100	107	94	60	**781**
SAND CANYON	80	50	15	20	66	60	76	66	54	100	99	60	**746**
MITCHELL 5A	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MITCHELL 5B	0	0	1	1	0	0	0	0	0	0	0	0	**2**
SIERRA	7	18	6	11	13	8	0	0	0	0	0	0	**63**
NORTH OAKS EAST	0	0	0	0	0	0	0	0	0	0	0	0	**0**
NORTH OAKS CENTRAL	1	3	1	0	0	0	0	0	0	0	0	0	**5**
NORTH OAKS WEST	0	0	0	0	0	0	0	0	0	0	0	0	**0**
HONBY	1	15	0	0	0	0	0	0	0	0	0	0	**16**
GUIDA	24	46	0	23	69	52	69	54	54	62	37	1	**491**
CLARK	17	29	1	0	0	0	0	0	0	0	0	0	**47**
SANTA CLARA	1	20	3	0	0	0	0	0	0	0	0	0	**24**
VALLEY CENTER	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOTAL SCWD	**237**	**228**	**40**	**73**	**236**	**215**	**278**	**221**	**252**	**316**	**274**	**147**	**2517**

VALENCIA WATER DIVISION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
D	20	56	20	23	71	59	36	58	52	48	19	0	**462**
E15	25	103	33	39	92	90	84	102	90	88	86	84	**916**
E17												38	**38**
N	53	69	19	0	0	0	0	0	0	0	0	50	**191**
N7	29	120	9	0	0	0	0	0	0	0	0	69	**227**
N8	89	108	14	0	0	0	0	0	0	0	0	56	**267**
Q2	0	0	0	0	0	0	0	0	0	0	0	0	**0**
T7	3	19	2	0	0	0	0	0	0	0	0	0	**23**
U6	1	7	5	47	83	0	0	0	0	0	0	0	**142**
U4	1	4	0	0	0	0	0	0	0	0	0	0	**6**
S6	0	0	0	0	0	0	0	0	0	0	0	0	**0**
S7	13	31	0	0	0	0	0	0	0	0	0	0	**44**
S8	9	14	6	0	0	0	0	0	0	0	0	0	**29**
W11	40	29	18	36	55	68	91	86	67	34	7	22	**552**
W9	51	87	57	70	93	102	64	58	59	17	14	17	**688**
W10	75	63	10	0	0	0	0	0	0	0	0	0	**148**
159 (GOLF COURSE IRRIGATION)	0	1	0	1	4	7	4	5	4	2	1	1	**29**
160 (SYSTEM)	1	2	2	2	2	3	2	0	0	0	3	2	**20**
160 (GOLF COURSE IRRIGATION)	20	29	11	38	73	74	85	69	45	80	31	28	**583**
201 (SYSTEM)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
205	0	0	0	0	0	0	0	0	0	0	0	0	**0**
206	68	98	95	74	58	115	96	175	77	152	45	55	**1107**
207	78	116	62	109	150	139	192	89	158	63	94	63	**1314**
TOTAL VWD	**575**	**956**	**362**	**438**	**680**	**656**	**654**	**644**	**553**	**484**	**300**	**484**	**6786**

S1	137	129	131	131	132	129	134	135	131	124	128	120	**1562**
S2	128	114	125	122	117	120	117	117	114	21	47	91	**1232**
TOTAL S1 & S2	**265**	**243**	**256**	**253**	**249**	**249**	**251**	**252**	**245**	**145**	**176**	**211**	**2794**

TOTAL WELL PRODUCTION	***1367***	***1739***	***915***	***1049***	***1621***	***1656***	***1700***	***1536***	***1353***	***1472***	***1083***	***1197***	***16687***

WELL 201 (NON-SYSTEM)	107	61	108	103	102	102	111	102	104	106	103	104	**1212**
VALLEY CENTER (NON-SYSTEM)	0	0	0	0	0	0	0	0	0	0.46	3.48	0	**3.94**
Q2 (NON SYSTEM)	0.12	0.03	0.05	0.05	0.13	0.30	0	0.17	0.17	0	0	0	**1.01**
205 (NON-SYSTEM)	0	0	0	0	0	0	0	0	0	0	0	0	**0.00**
N (NON-SYSTEM)	0	0	0.06	0	0	0	0	0	17.64	10.57	26.63	13.29	**68.19**
N7 (NON-SYSTEM)	0	0	0	0	0	0	0	0	0.00	15.23	30.15	21.21	**66.59**
N8 (NON-SYSTEM)	0	0	0	0	0	0	0	0	38.40	69.40	37.71	20.87	**166.38**
S8 (NON-SYSTEM)	0	0	0	0.19	0.23	0	0.68	0.21	0.11	0.60	0.39	0.32	**2.73**
W10 (NON-SYSTEM)	0	0	0	0.25	0.11	0.16	0.17	0.29	0.36	0.18	0.29	0	**1.81**
HONBY (NON-SYSTEM)				0	0	0.23	0	0	0	0	0	0	**0.23**
MITCHELL 5B (NON-SYSTEM)							0.54	0.30	0	0	0.24	0.35	**1.43**
NORTH OAKS CENTAL (NON-SYSTEM)				0	0	0	0	0	0	0.14	0.48	0	**0.62**
T7 (NON-SYSTEM)				0	0	0	0	0	0	0	0	0.01	**0.01**

NEWHALL WATER DIVISION
WATER PRODUCTION 2020 (ACRE-FEET)

GROUNDWATER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
NEWHALL SYSTEM													
N12	104	108	96	94	178	175	164	177	179	183	115	127	***1700***
N13	120	126	111	109	127	197	183	74	49	205	128	140	***1569***
CASTAIC SYSTEM													
C1	19	27	17	29	53	58	60	61	27	50	32	31	***465***
C2	13	14	9	14	27	29	29	29	13	23	15	14	***230***
C7	35	37	25	38	71	78	79	79	36	66	43	41	***627***
PINETREE SYSTEM													
P1	0	0	0	0	0	0	0	0	0	0	0	0	***0***
P3	0	0	0	0	0	0	0	0	0	0	0	0	***0***
P4	0	0	0	0	0	0	0	0	0	0	0	0	***0***
P5	0	0	0	0	0	0	0	0	0	0	0	0	***0***
S1 & S2	71	65	68	68	67	67	67	68	66	39	47	57	**749**
TOTAL GROUNDWATER	**362**	**377**	**326**	**352**	**523**	**603**	**583**	**487**	**369**	**567**	**380**	**411**	***5340***

IMPORT + S1 & S2	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
NEWHALL SYSTEM													
N-3	8	30	10	41	110	78	165	260	245	34	92	48	***1121***
CASTAIC SYSTEM													
N-1	25	27	36	20	45	36	42	54	123	39	54	42	***542***
PINETREE SYSTEM													
N-2	102	119	88	108	199	216	239	245	217	198	157	142	***2030***
TESORO SYSTEM													
N-4	53	56	43	57	120	268	436	440	378	313	187	143	**2494**
TOTAL IMPORT + S1 & S2	**188**	**232**	**177**	**226**	**475**	**597**	**882**	**999**	**963**	**584**	**490**	**375**	**6188**

TOTAL GROUNDWATER (INCLUDES S1 & S2)	**362**	**377**	**326**	**352**	**523**	**603**	**583**	**487**	**369**	**567**	**380**	**411**	**5340**
TOTAL IMPORT (NO S1 & S2)	**117**	**167**	**109**	**158**	**408**	**531**	**815**	**931**	**897**	**545**	**443**	**318**	**5439**
TOTAL PRODUCTION *(GW + IMPORT)*	**479**	**544**	**434**	**510**	**931**	**1134**	**1398**	**1418**	**1266**	**1111**	**823**	**729**	**10778**

% BY SOURCE													
GROUNDWATER	76%	69%	75%	69%	56%	53%	42%	34%	29%	51%	46%	56%	50%
IMPORT	24%	31%	25%	31%	44%	47%	58%	66%	71%	49%	54%	44%	50%

SANTA CLARITA WATER DIVISION
WATER PRODUCTION 2020 (ACRE-FEET)

GROUNDWATER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
LOST CANYON NO.2	36	2	0	0	26	31	46	40	44	47	44	26	342
LOST CANYON NO.2A	70	45	13	18	62	64	87	61	100	107	94	60	781
SAND CANYON	80	50	15	20	66	60	76	66	54	100	99	60	746
MITCHELL 5A	0	0	0	0	0	0	0	0	0	0	0	0	0
MITCHELL 5B	0	0	1	1	0	0	0	0	0	0	0	0	2
SIERRA	7	18	6	11	13	8	0	0	0	0	0	0	63
NORTH OAKS EAST	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH OAKS CENTRAL	1	3	1	0	0	0	0	0	0	0	0	0	5
NORTH OAKS WEST	0	0	0	0	0	0	0	0	0	0	0	0	0
HONBY	1	15	0	0	0	0	0	0	0	0	0	0	16
GUIDA	24	46	0	23	69	52	69	54	54	62	37	1	491
CLARK	17	29	1	0	0	0	0	0	0	0	0	0	47
SANTA CLARA	1	20	3	0	0	0	0	0	0	0	0	0	24
VALLEY CENTER	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ALLUVIUM	237	228	40	73	236	215	278	221	252	316	274	147	2517
SAUGUS WELLS S1 & S2	194	178	187	185	182	182	184	184	179	106	129	155	2045
TOTAL GROUNDWATER	**431**	**406**	**227**	**258**	**418**	**397**	**462**	**405**	**431**	**422**	**403**	**302**	**4562**

IMPORT + S1 & S2	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
SC-1 BOUQUET	129	99	161	164	184	191	233	287	346	320	249	258	2621
SC-2 HONBY	174	260	211	225	360	324	2	0	0	0	0	0	1555
SC-3 WILEY	97	103	93	112	148	153	170	176	155	135	100	91	1534
SC-4 HONBY #2	211	94	161	224	373	432	631	637	580	535	467	496	4840
SC-5 RIO VISTA	138	176	111	116	238	226	298	269	301	255	195	151	2475
SC-6 LOST CANYON	76	104	64	90	170	173	199	231	142	84	100	140	1572
SC-7	104	128	46	42	105	199	410	425	360	303	226	184	2531
SC-8	130	184	157	164	309	334	380	419	359	393	206	172	3207
SC-9	93	89	32	47	90	103	197	237	233	203	125	90	1539
SC-10	25	55	23	20	52	71	74	54	93	30	40	63	602
SC-11	1	2	1	1	1	0	1	0	0	0	0	0	5
SC-12	10	87	150	155	169	181	146	150	121	121	105	140	1536
SC-13	20	36	3	8	157	166	109	231	101	89	95	122	1136
TOTAL IMPORT + S1 & S2	**1207**	**1,416**	**1,212**	**1,368**	**2,358**	**2,552**	**2,849**	**3,117**	**2,792**	**2,470**	**1,907**	**1,907**	**25,155**
METERING ADJUSTMENT	-6.7	0.01	0	0	0	0	0	0	0	0	0	0	-7
NET IMPORT + S1 & S2	***1,201***	***1,416***	***1,212***	***1,368***	***2,358***	***2,552***	***2,849***	***3,117***	***2,792***	***2,470***	***1,907***	***1,907***	***25,148***
TOTAL GROUNDWATER (INCLUDES S1 & S2)	**431**	**406**	**227**	**258**	**418**	**397**	**462**	**405**	**431**	**422**	**403**	**302**	**4562**
TOTAL IMPORT (NO S1 & S2)	**1,014**	**1,238**	**1,025**	**1,183**	**2,176**	**2,370**	**2,665**	**2,932**	**2,613**	**2,364**	**1,779**	**1,752**	**23,110**
TOTAL PRODUCTION *(GW + IMPORT)*	**1,444**	**1,644**	**1,252**	**1,441**	**2,594**	**2,767**	**3,127**	**3,338**	**3,044**	**2,786**	**2,181**	**2,054**	**27,672**

% BY SOURCE													
GROUNDWATER	30%	25%	18%	18%	16%	14%	15%	12%	14%	15%	18%	15%	16%
IMPORT	70%	75%	82%	82%	84%	86%	85%	88%	86%	85%	82%	85%	84%
VALLEY CENTER (NON-SYSTEM) *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	3.48	0.00	3.94
HONBY (NON-SYSTEM) *						0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.23
MITCHELL 5B (NON-SYSTEM) *							0.54	0.30	0.00	0.00	0.24	0.35	1.43
NORTH OAKS CENTRAL (NON-SYSTEM) *										0.14	0.48	0.00	0.62

* Not used in the calculation for % by Source

VALENCIA WATER DIVISION
WATER PRODUCTION 2020 (ACRE-FEET)

ALLUVIUM	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
D	20	56	20	23	71	59	36	58	52	48	19	0	462
E15	25	103	33	39	92	90	84	102	90	88	86	84	916
E17												38	38
N	53	69	19	0	0	0	0	0	0	0	0	50	191
N7	29	120	9	0	0	0	0	0	0	0	0	69	227
N8	89	108	14	0	0	0	0	0	0	0	0	56	267
Q2	0	0	0	0	0	0	0	0	0	0	0	0	0
T7	3	19	2	0	0	0	0	0	0	0	0	0	23
U6	1	7	5	47	83	0	0	0	0	0	0	0	142
U4	1	4	0	0	0	0	0	0	0	0	0	0	6
S6	0	0	0	0	0	0	0	0	0	0	0	0	0
S7	13	31	0	0	0	0	0	0	0	0	0	0	44
S8	9	14	6	0	0	0	0	0	0	0	0	0	29
W11	40	29	18	36	55	68	91	86	67	34	7	22	552
W9	51	87	57	70	93	102	64	58	59	17	14	17	688
W10	75	63	10	0	0	0	0	0	0	0	0	0	148
TOTAL ALLUVIUM	***408***	***711***	***192***	***214***	***393***	***318***	***275***	***305***	***268***	***187***	***127***	***335***	**3732**

SAUGUS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
159	0	1	0	1	4	7	4	5	4	2	1	1	29
160 - DOM	1	2	2	2	2	3	2	0	0	0	3	2	20
160 - VGC*	20	29	11	38	73	74	85	69	45	80	31	28	583
201	0	0	0	0	0	0	0	0	0	0	0	0	0
205	0	0	0	0	0	0	0	0	0	0	0	0	0
206	68	98	95	74	58	115	96	175	77	152	45	55	1107
207	78	116	62	109	150	139	192	89	158	63	94	63	1314
TOTAL SAUGUS	**167**	**246**	**170**	**224**	**287**	**338**	**379**	**339**	**285**	**297**	**173**	**149**	**3054**

IMPORT WATER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
V-1	143	65	126	146	197	213	254	237	239	213	182	153	2168
V-2	139	284	138	211	514	419	320	303	191	194	85	121	2919
V-4	105	1	68	90	402	327	229	224	207	158	182	72	2066
V-5	246	161	179	188	276	323	425	443	461	396	444	398	3942
V-6	85	198	134	133	185	136	68	53	77	123	126	212	1530
V-7	23	3	15	12	78	105	240	235	208	193	168	118	1398
V-8	217	50	259	285	520	664	780	761	733	639	465	250	5620
TOTAL IMPORT	**957**	**762**	**919**	**1,066**	**2,171**	**2,186**	**2,316**	**2,257**	**2,115**	**1,915**	**1,653**	**1,324**	**19,642**

TOTAL GROUNDWATER	**575**	**956**	**362**	**438**	**680**	**656**	**654**	**644**	**553**	**484**	**300**	**484**	**6,786**
TOTAL IMPORT	**957**	**762**	**919**	**1,066**	**2,171**	**2,186**	**2,316**	**2,257**	**2,115**	**1,915**	**1,653**	**1,324**	**19,642**
TOTAL PRODUCTION	**1,531**	**1,718**	**1,282**	**1,505**	**2,851**	**2,842**	**2,970**	**2,901**	**2,668**	**2,399**	**1,952**	**1,808**	**26,428**

% BY SOURCE													
GROUNDWATER	37%	55%	28%	27%	22%	21%	20%	20%	19%	17%	14%	26%	24%
IMPORT WATER	63%	45%	72%	73%	78%	79%	80%	80%	81%	83%	86%	74%	76%

RECYCLED WATER	**10**	**22**	**8**	**22**	**64**	**70**	**76**	**68**	**64**	**18**	**27**	**20**	**468**
Well 201 Discharge *	**107**	**61**	**108**	**103**	**102**	**102**	**111**	**102**	**104**	**106**	**103**	**104**	**1212**
Well Q2 Non-System *	**0.12**	**0.03**	**0.05**	**0.05**	**0.13**	**0.30**	**0**	**0.17**	**0.17**	**0**	**0**	**0.00**	**1.01**
Well 205 Non-System *	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
Well N Non-System *	**0**	**0**	**0.06**	**0**	**0**	**0**	**0**	**0**	**17.64**	**10.57**	**26.63**	**13.29**	**68.19**
Well N7 Non-System *	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15.23**	**30.15**	**21.21**	**66.59**
Well N8 Non-System *	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38.40**	**69.4**	**37.71**	**20.87**	**166.38**
Well S8 Non-System *	**0**	**0**	**0**	**0.19**	**0.23**	**0**	**0.68**	**0.21**	**0.11**	**0.60**	**0.39**	**0.324**	**2.73**
Well W10 Non-System *	**0**	**0**	**0**	**0.25**	**0.11**	**0.16**	**0.17**	**0.29**	**0.36**	**0.18**	**0.29**	**0**	**1.81**
Well T7 Non-System *	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.01**	**0.01**

*Not used in the calculation for % by source

LOS ANGELES COUNTY WATERWORKS DISTRICT 36

SOURCE

TURNOUT	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	TOTAL
LA 1	0	0.0031	0	0	0	0.00	0	0	0	0	0	0	0.00
LA 2	0.7764	0.4818	0.3621	0.4082	0.2793	0.42	0.424	0.4389	0.3928	0.445	0.3713	0.325302	5.12
TOTAL	0.7764	0.4849	0.3621	0.4082	0.2793	0.4174	0.424	0.4389	0.3928	0.445	0.3713	0.33	5.13

RAW WATER

SOURCE	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	TOTAL
RVTP	1,374	2,235	2,096	2,490	4801	3445	2,950	3,013	2,662	2,314	3,302	3,436	34,118.89
ESTP	708	0	0	0	0	1706	2,906	3,187	3,050	2,571	601	0	14,729.80
Wells	265	243	256	253	249	249	251	252	245	145	176	211	2,793.93
TOTAL	2,347	2,478	2,351	2,742	5,049	5,400	6,107	6,453	5,957	5,030	4,079	3,648	51,642.62

S1/S2 TREATMENT

SOURCE	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	TOTAL
S1	137.13	129.09	130.51	130.97	132.2	129.15	134.3	134.95	131.29	124.05	128.45	120.3035	1562.43
S2	127.54	114.13	125.05	121.57	116.52	119.61	117.1	117.00	113.86	20.85	47.325	90.99865	1231.50
TOTAL	264.67	243.22	255.56	252.54	248.72	248.76	251.4	251.9556	245.15	144.9	175.77	211.3021	2793.93

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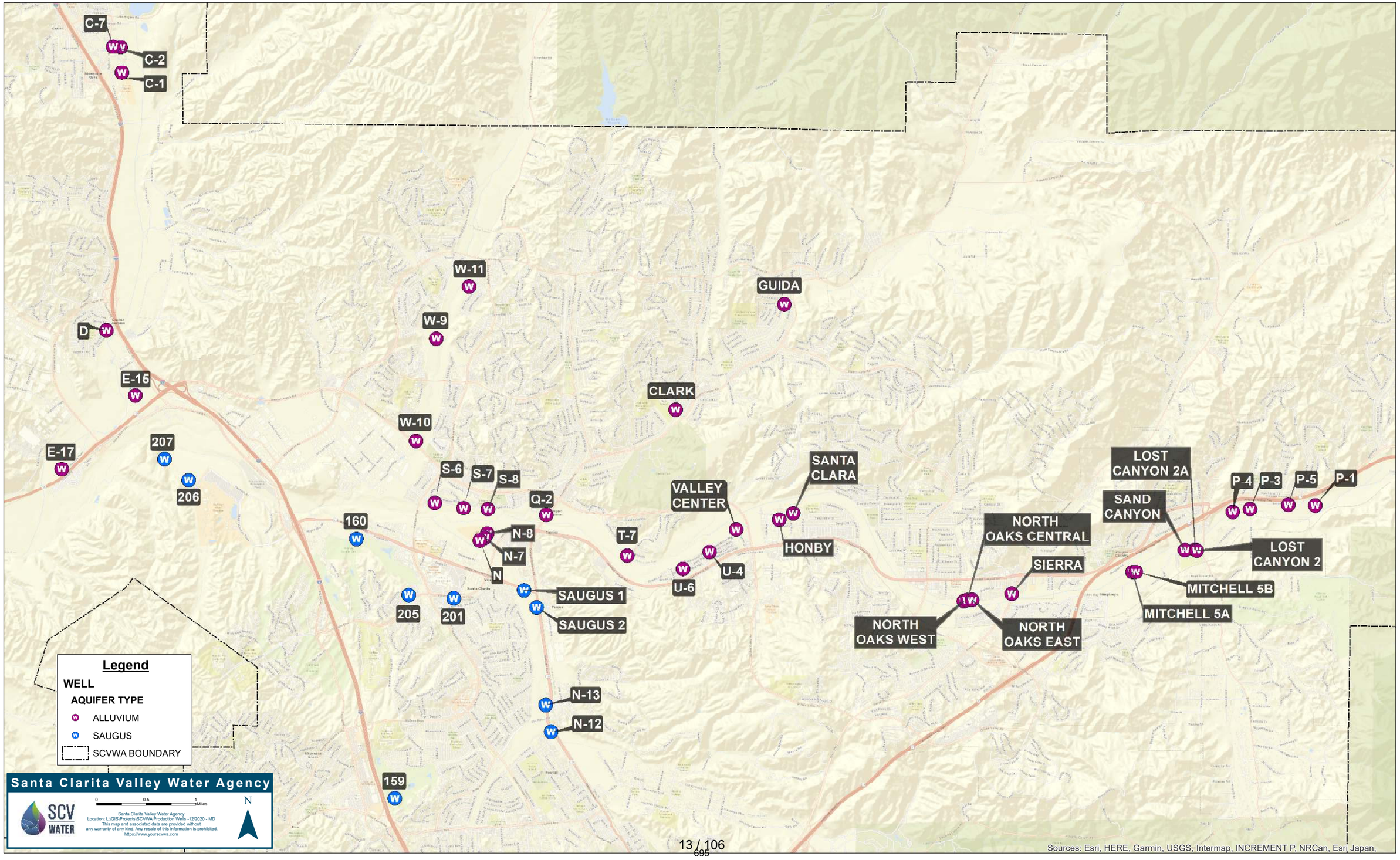
SCVWA PRODUCTION WELLS



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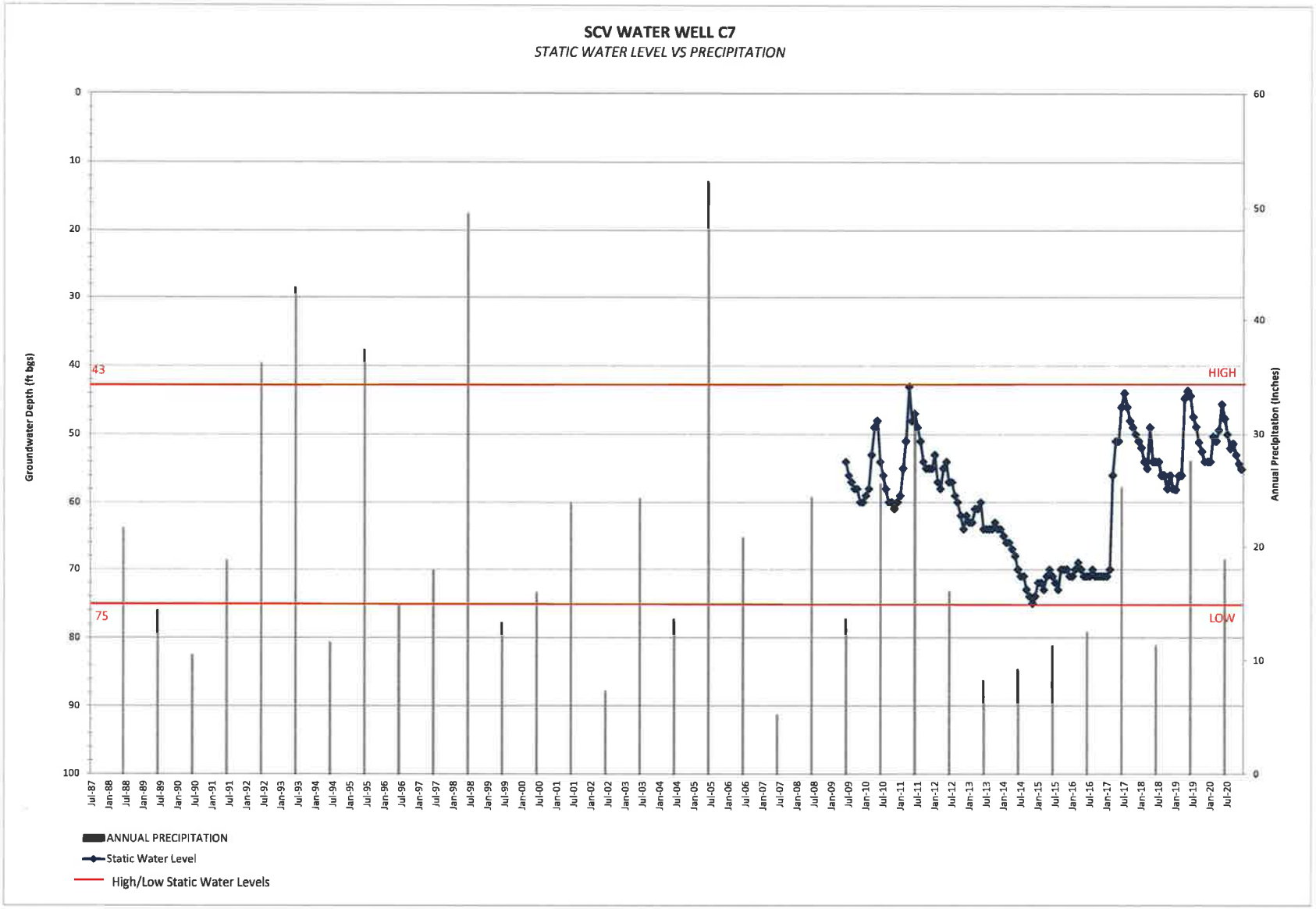
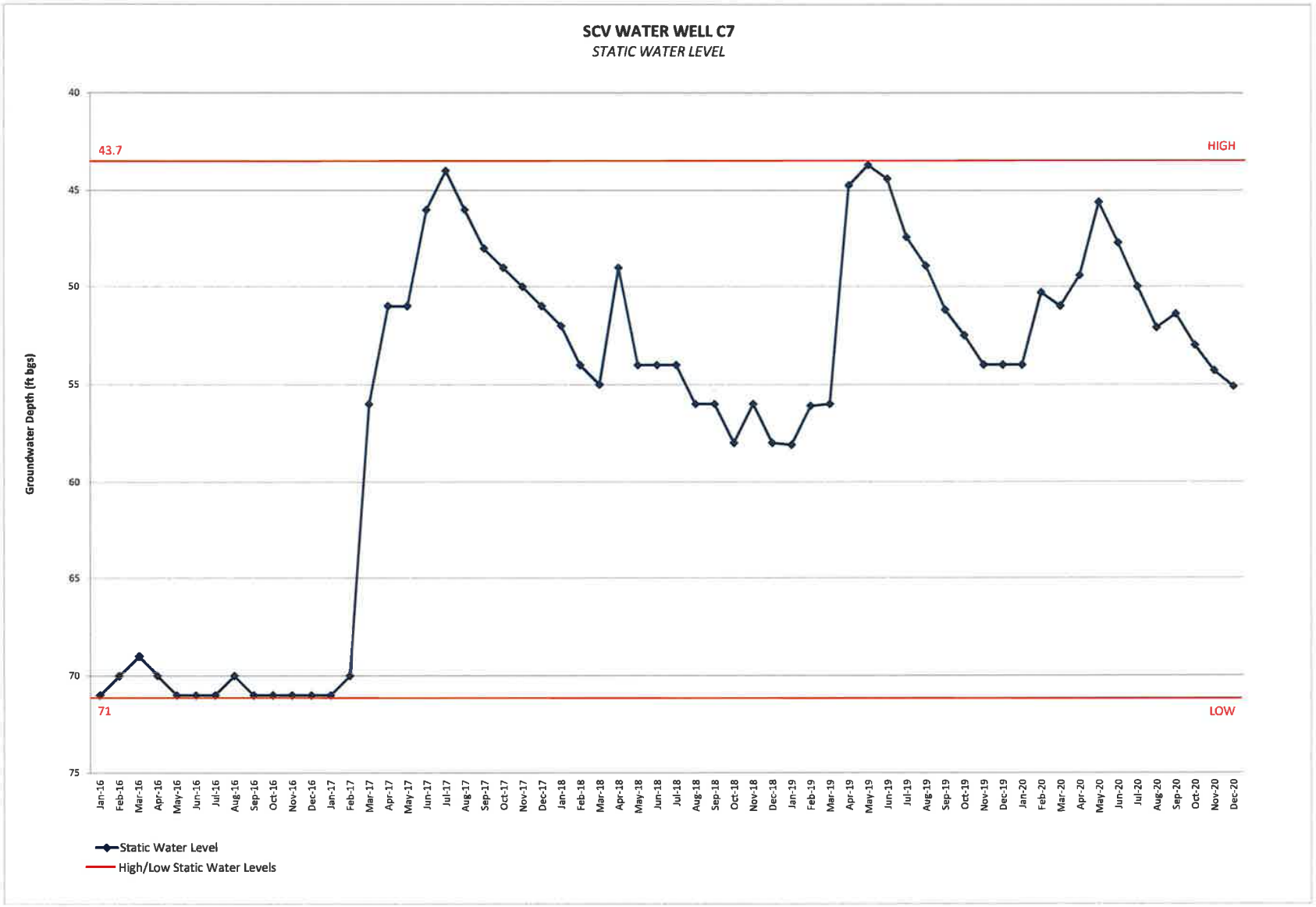

SCV WATER WELL C7
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
43
HIGH
75
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL C7
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
40
45
50
55
60
65
70
75
43.7
HIGH
71
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
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Oct-16
Nov-16
Dec-16
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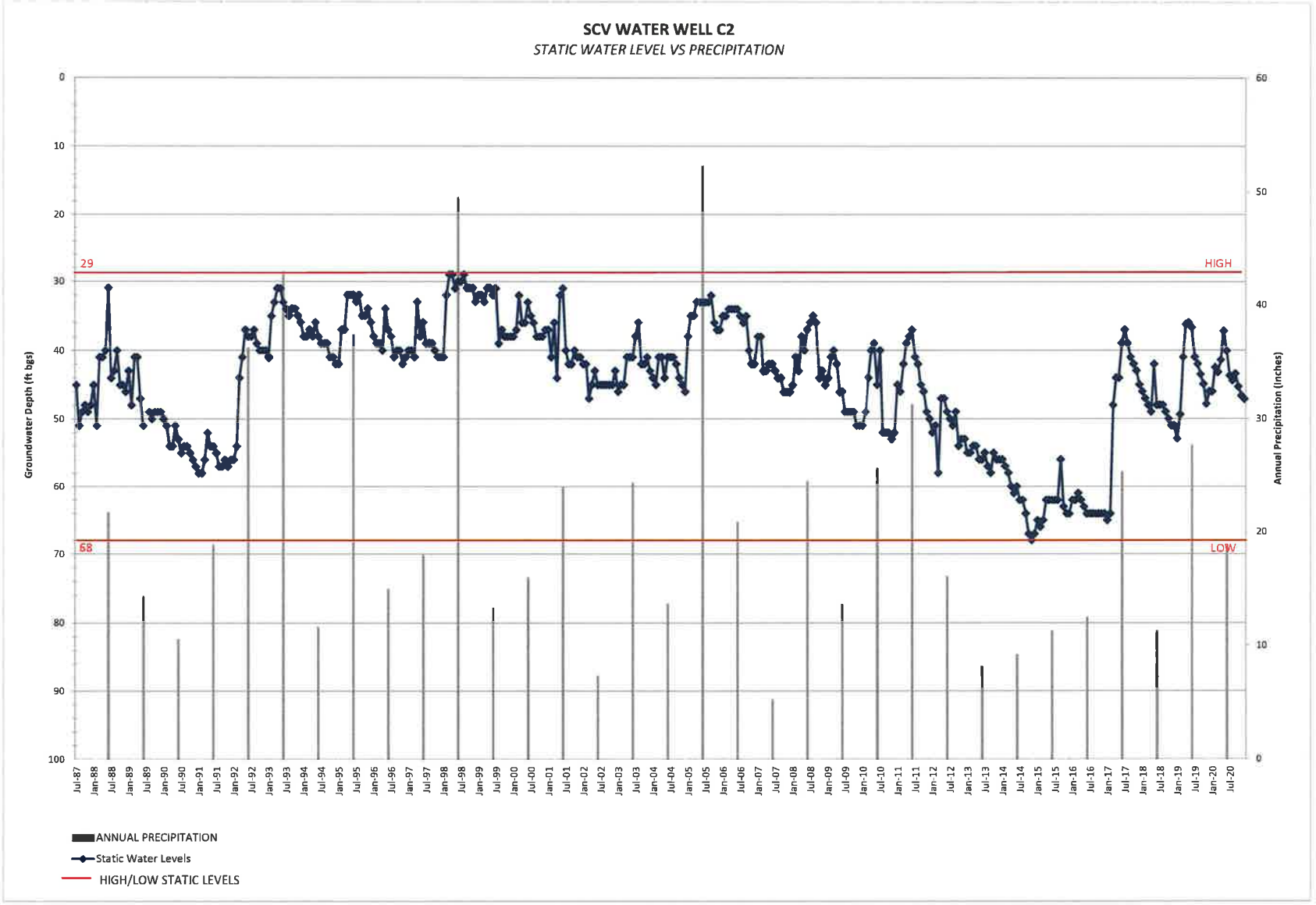
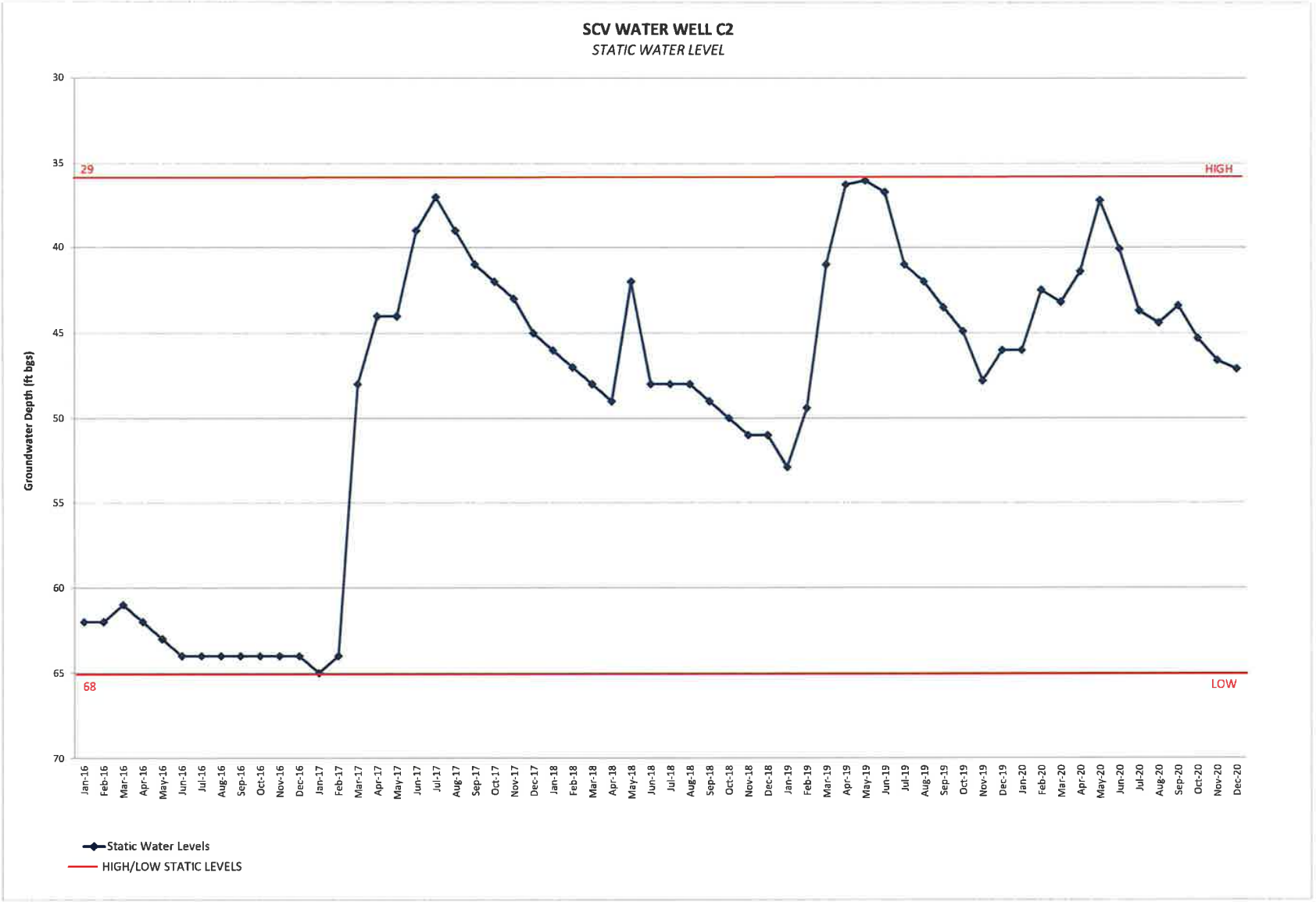
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL C2
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
29
HIGH
68
LOW
ANNUAL PRECIPITATION
Static Water Levels
HIGH/LOW STATIC LEVELS


SCV WATER WELL C2
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
70
29
HIGH
68
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
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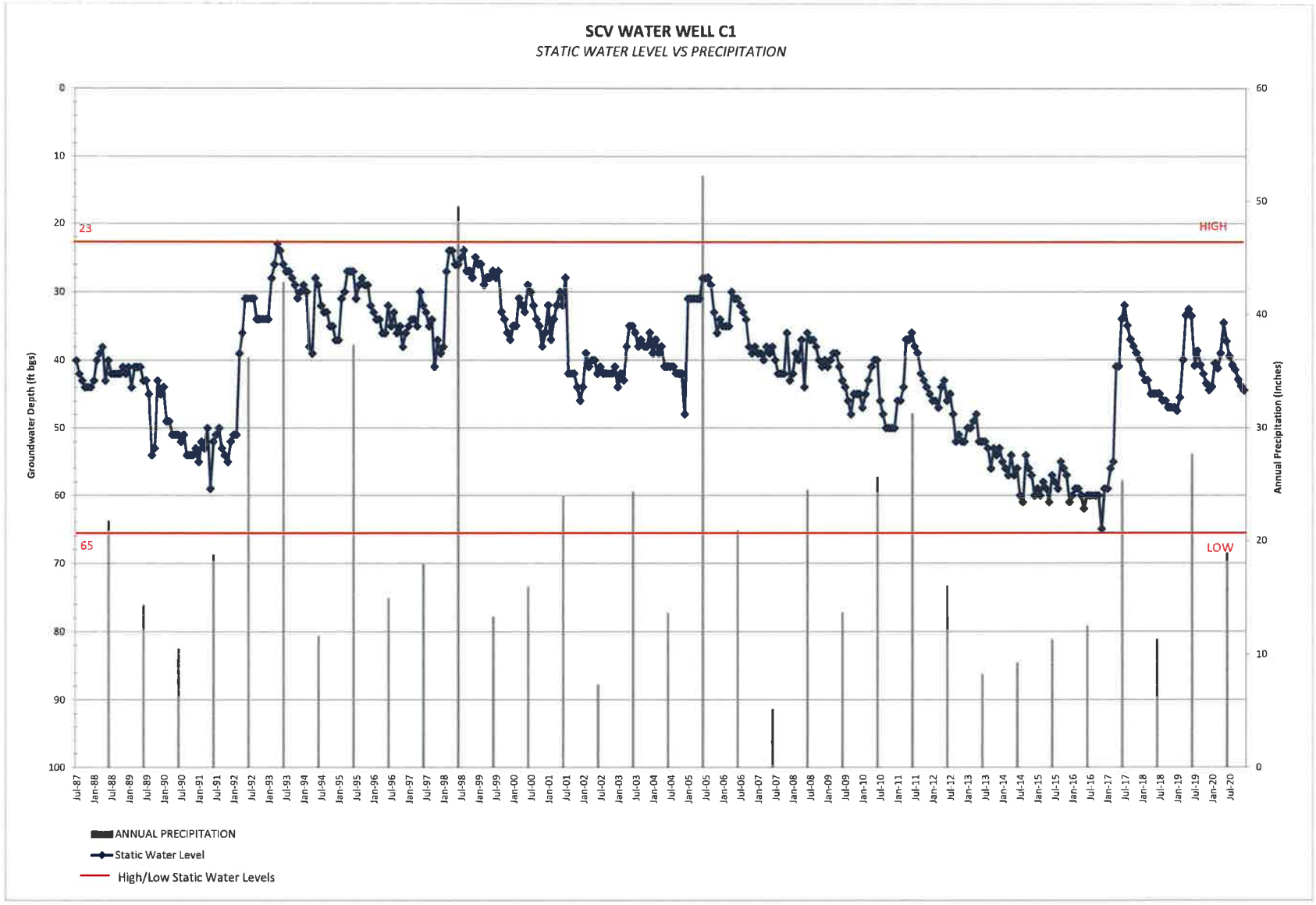
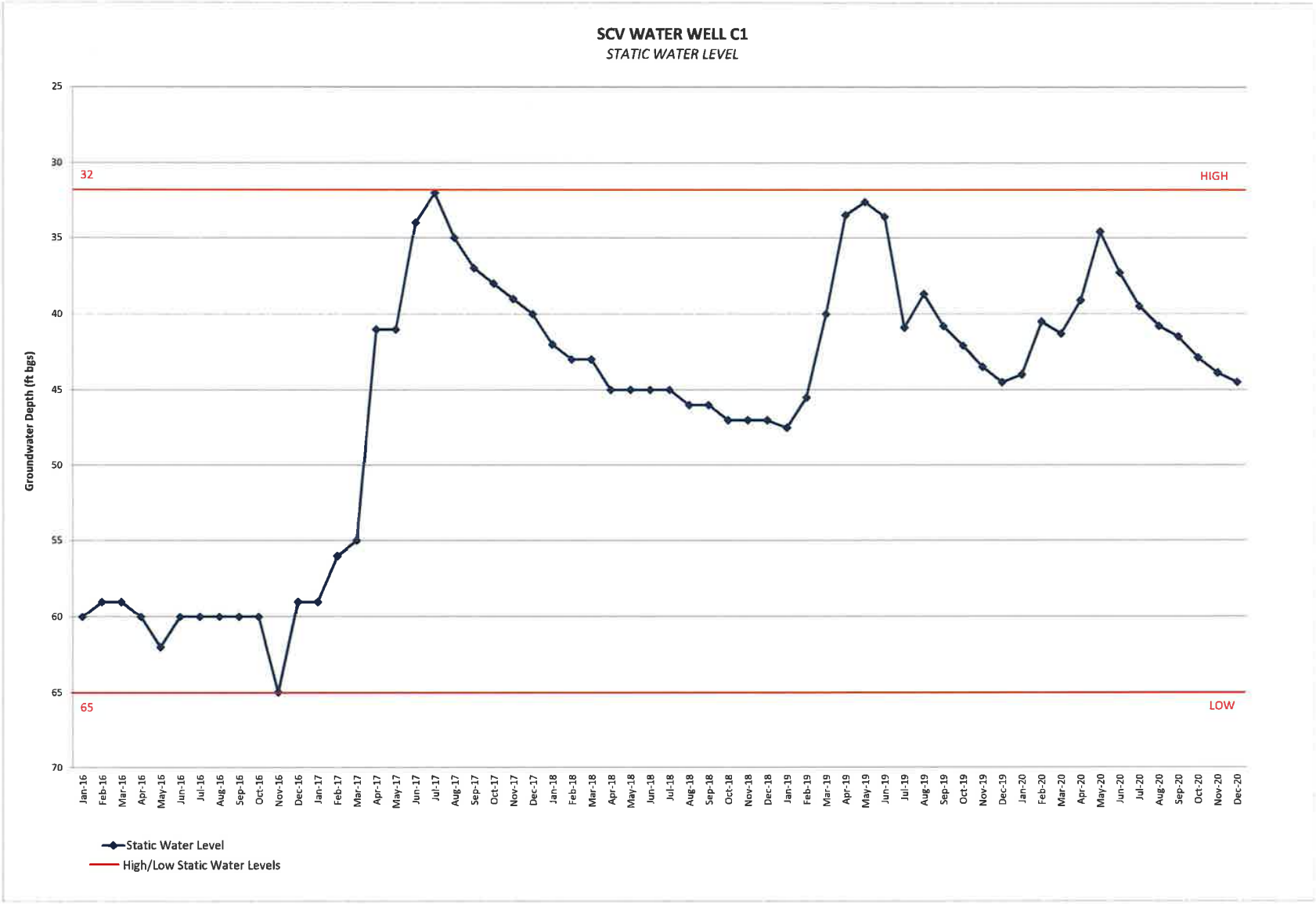
Oct-20
Nov-20
Dec-20
Static Water Levels
HIGH/LOW STATIC LEVELS


SCV WATER WELL C1
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
23
HIGH
65
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL C1
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
25
30
35
40
45
50
55
60
65
70
32
HIGH
65
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
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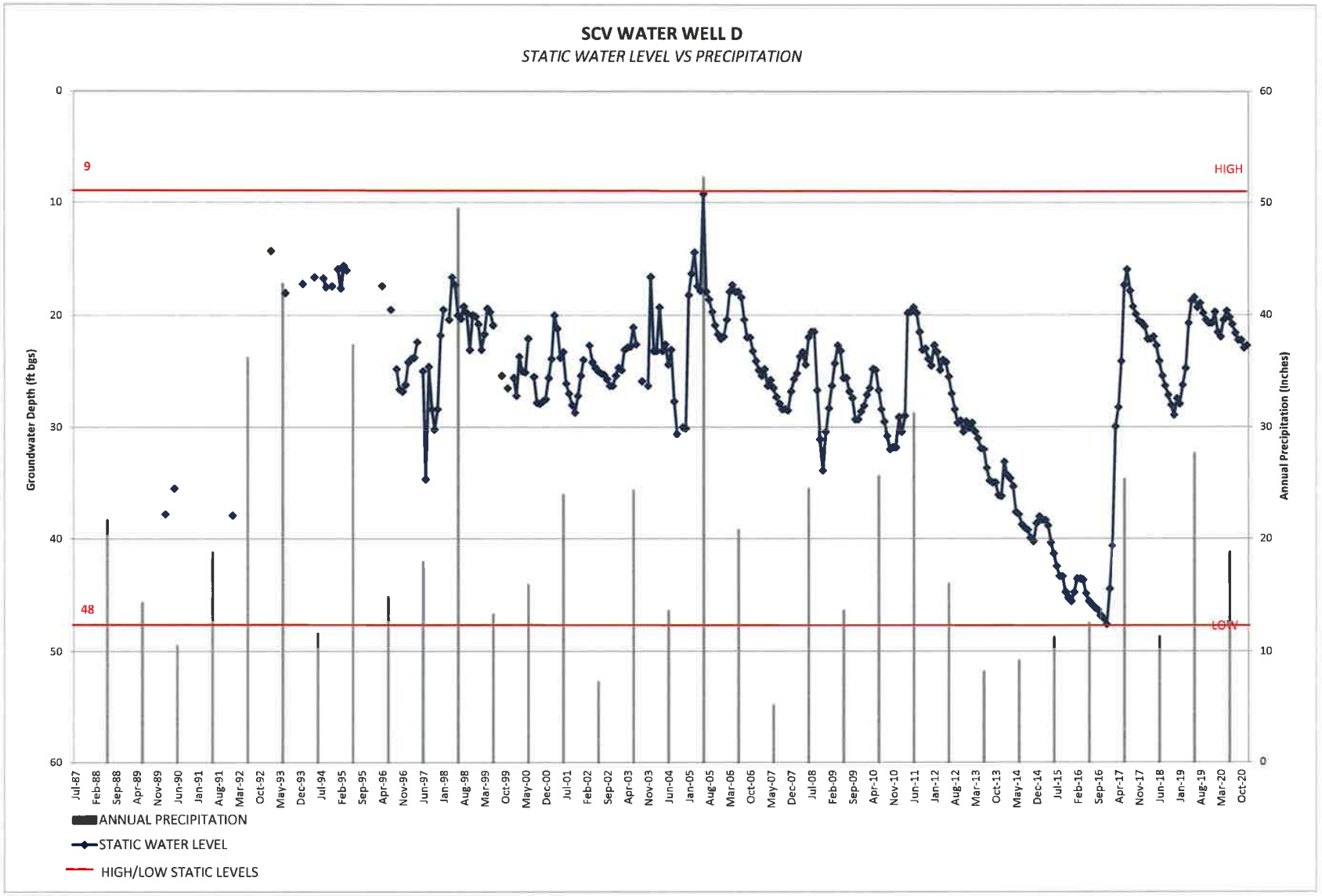
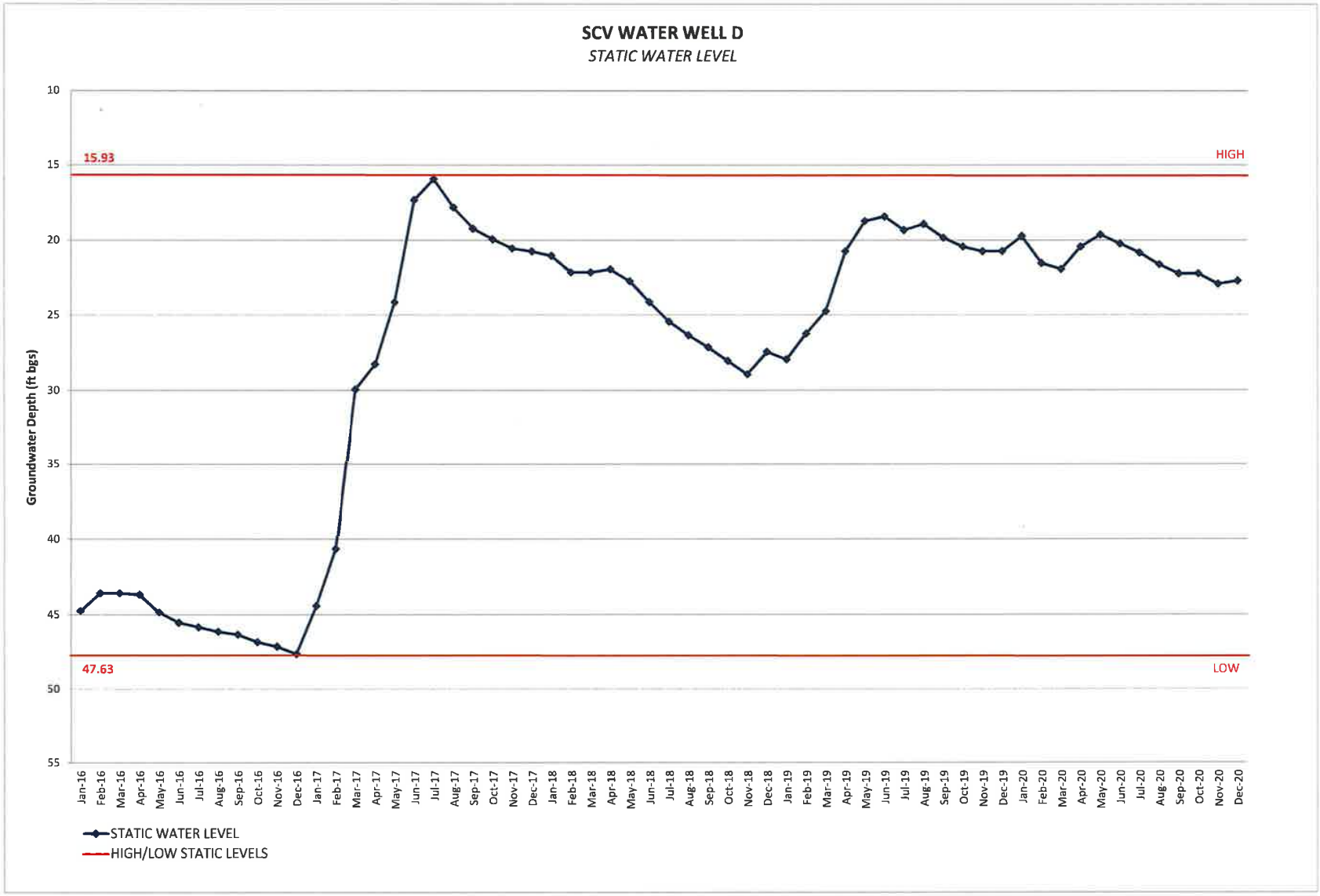
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL D
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
9
HIGH
48
LOW
0
10
20
30
40
50
60
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL D
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
10
15
20
25
30
35
40
45
50
55
15.93
HIGH
47.63
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
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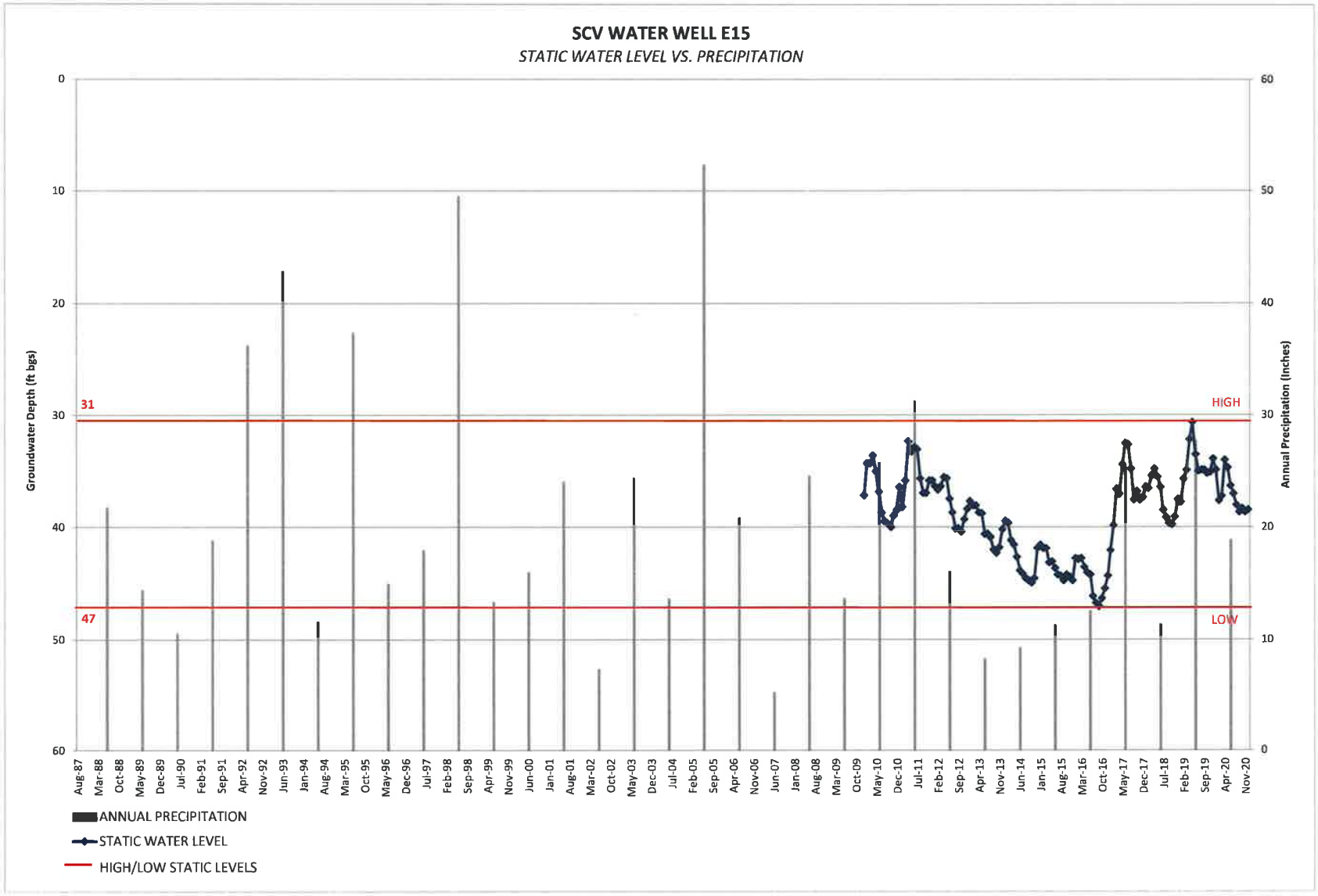
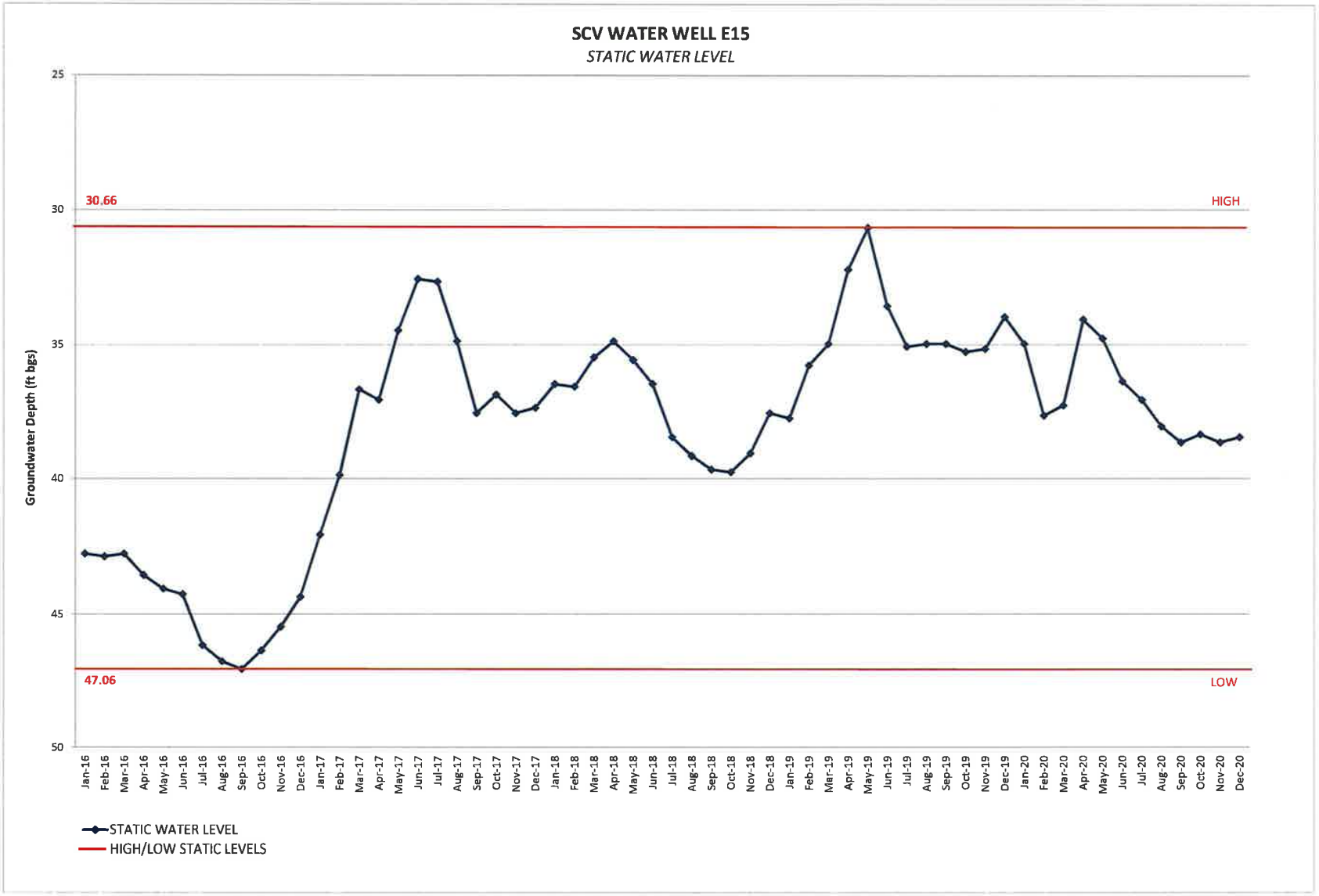
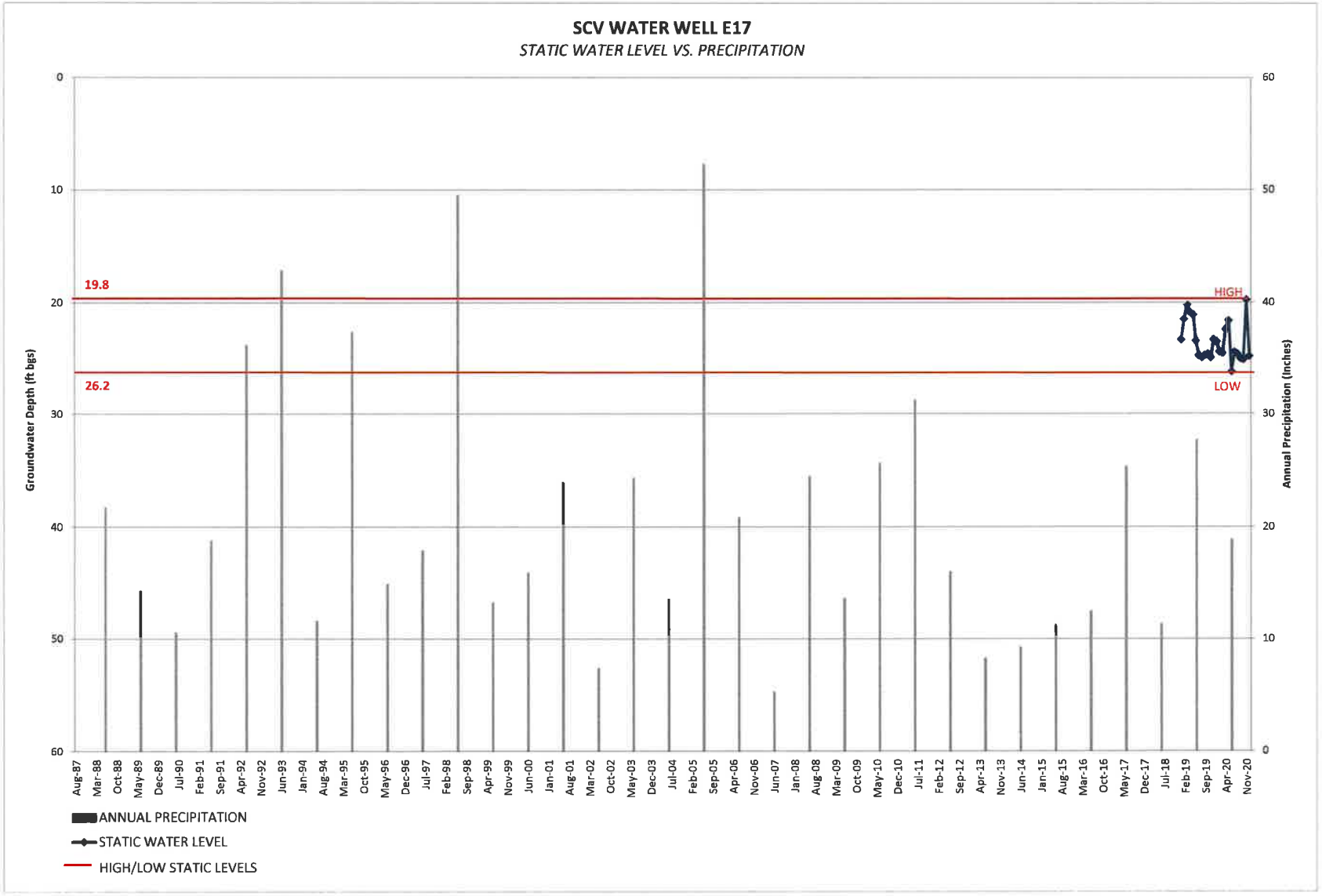
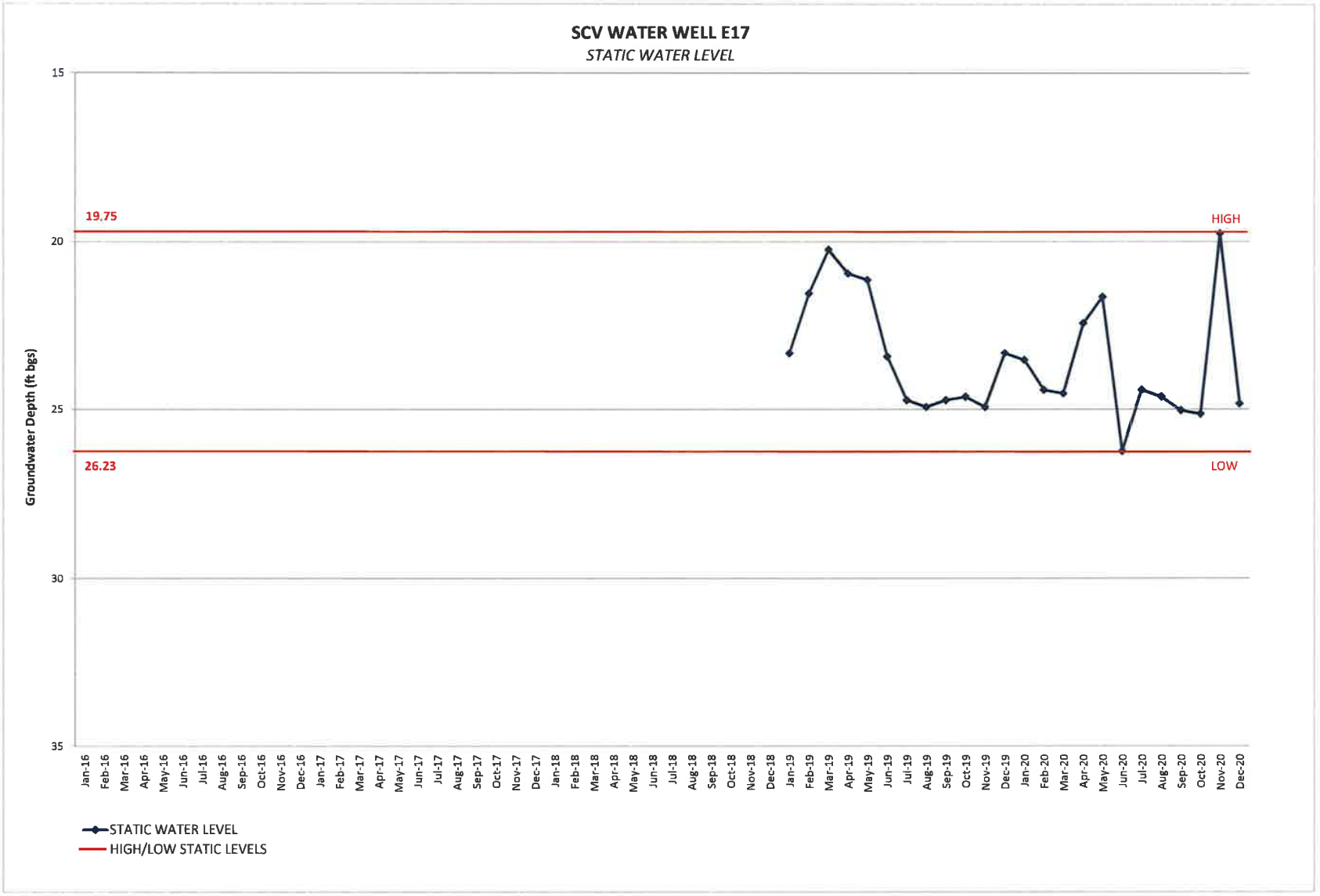
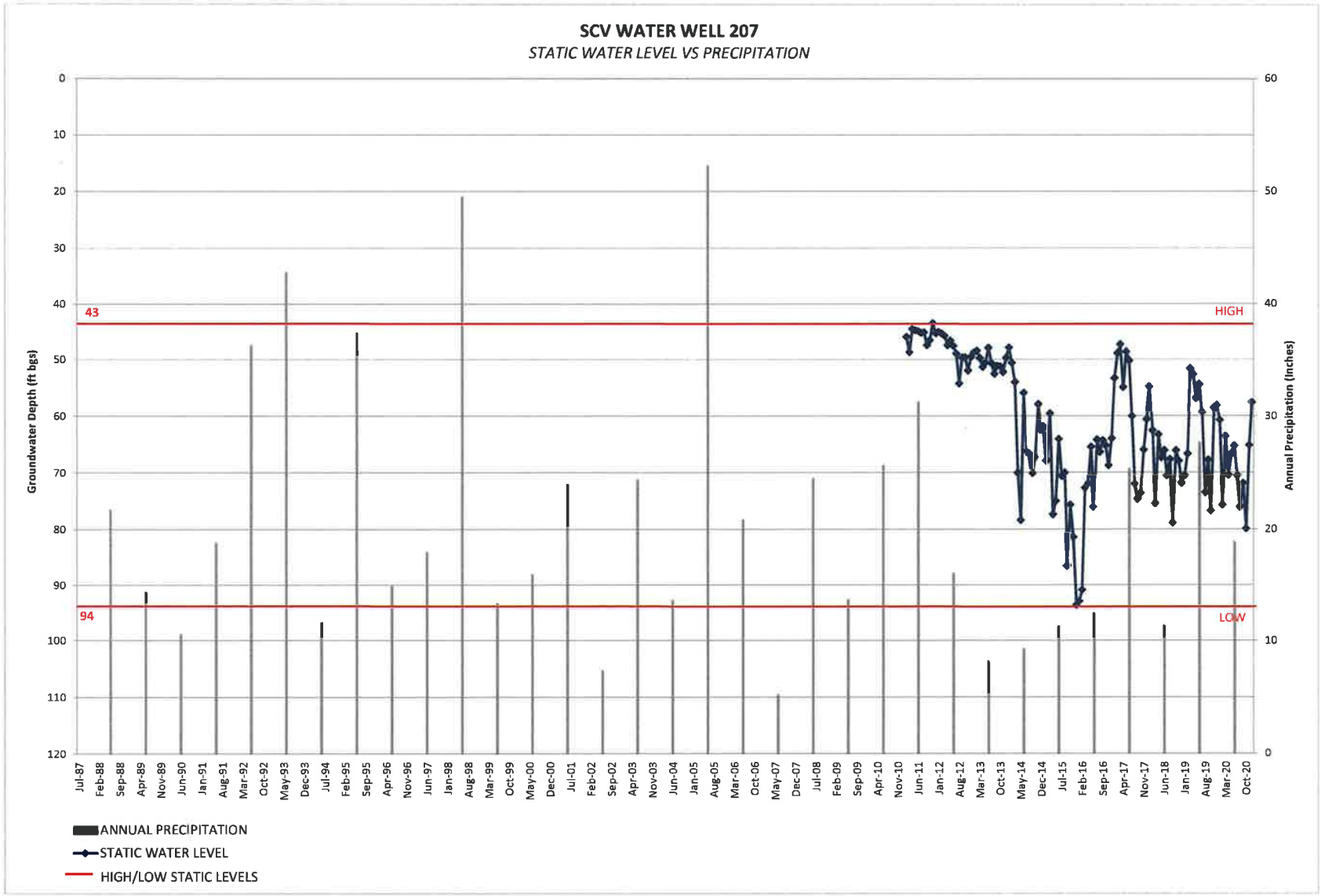
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

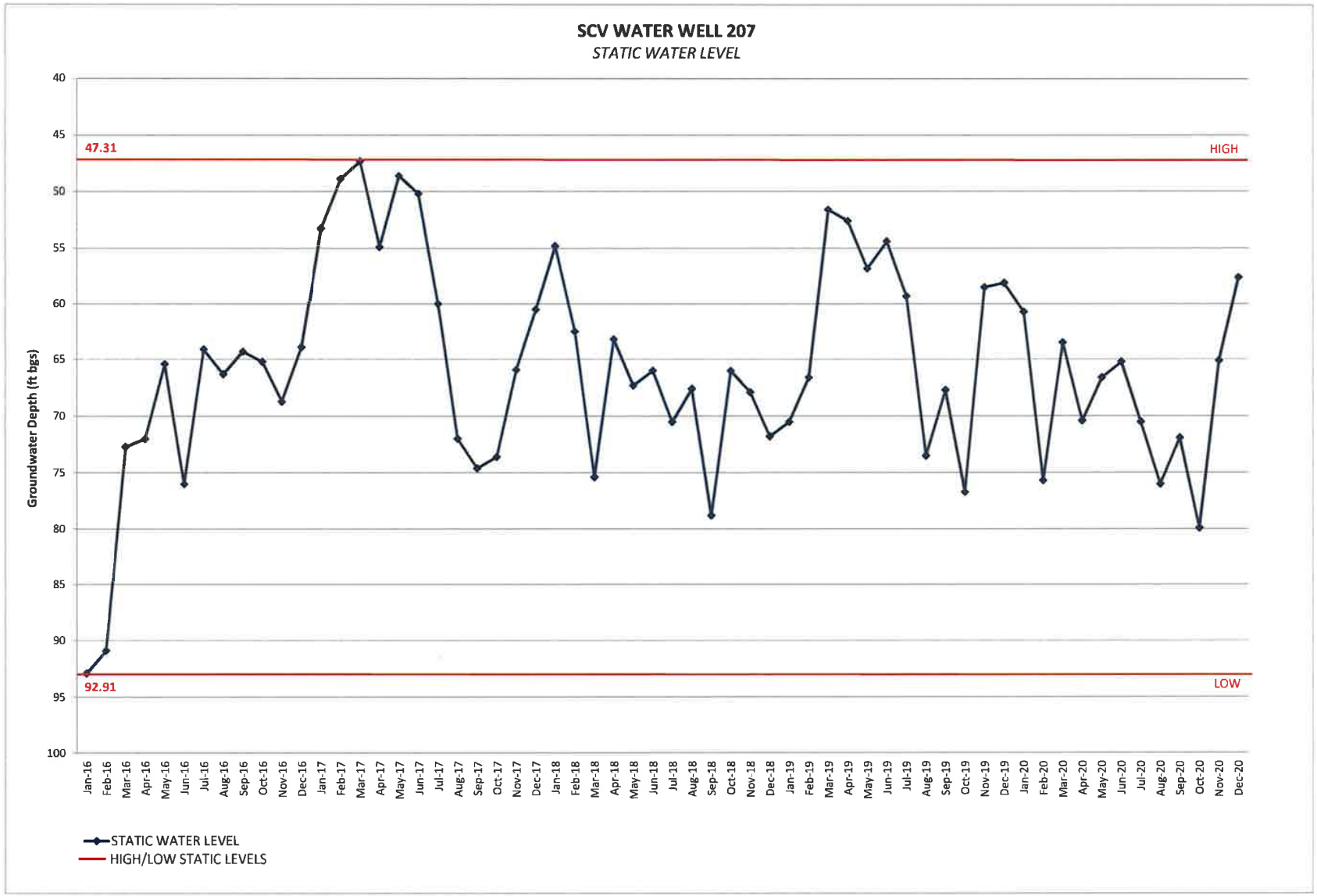

SCV WATER WELL E15
STATIC WATER LEVEL VS. PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
0
10
20
30
40
50
60
31
47
HIGH
LOW
Aug-87
Mar-88
Oct-88
May-89
Dec-89
Jul-90
Feb-91
Sep-91
Apr-92
Nov-92
Jun-93
Jan-94
Aug-94
Mar-95
Oct-95
May-96
Dec-96
Jul-97
Feb-98
Sep-98
Apr-99
Nov-99
Jun-00
Jan-01
Aug-01
Mar-02
Oct-02
May-03
Dec-03
Jul-04
Feb-05
Sep-05
Apr-06
Nov-06
Jun-07
Jan-08
Aug-08
Mar-09
Oct-09
May-10
Dec-10
Jul-11
Feb-12
Sep-12
Apr-13
Nov-13
Jun-14
Jan-15
Aug-15
Mar-16
Oct-16
May-17
Dec-17
Jul-18
Feb-19
Sep-19
Apr-20
Nov-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL E15
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
25
30
35
40
45
50
30.66
HIGH
47.06
LOW
Jan-16 Feb-16 Mar-16 Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16 Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-18 Jan-19 Feb-19 Mar-19 Apr-19 May-19 Jun-19 Jul-19 Aug-19 Sep-19 Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

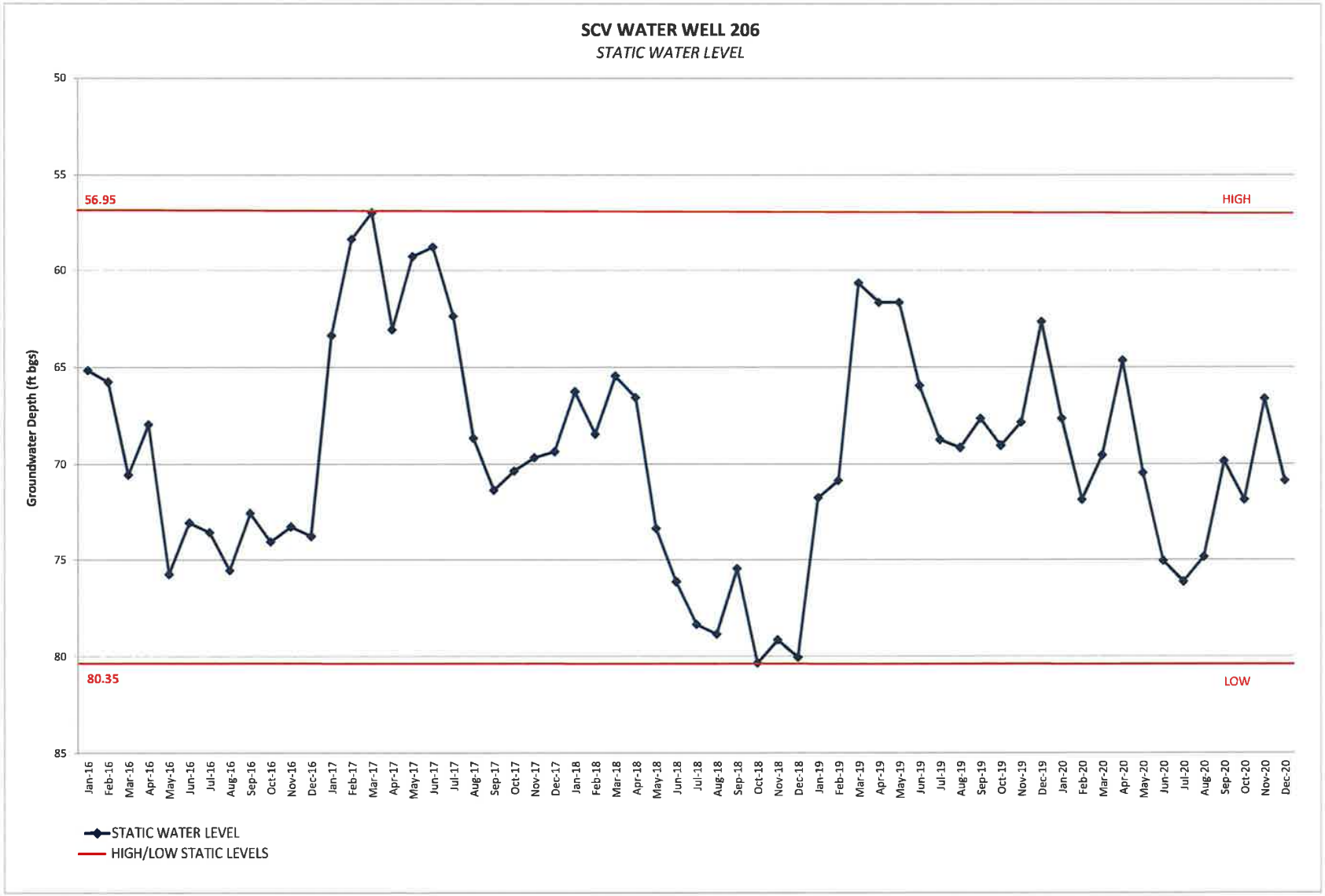

SCV WATER WELL E17
STATIC WATER LEVEL VS. PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
19.8
26.2
HIGH
LOW
0
10
20
30
40
50
60
Aug-87
Mar-88
Oct-88
May-89
Dec-89
Jul-90
Feb-91
Sep-91
Apr-92
Nov-92
Jun-93
Jan-94
Aug-94
Mar-95
Oct-95
May-96
Dec-96
Jul-97
Feb-98
Sep-98
Apr-99
Nov-99
Jun-00
Jan-01
Aug-01
Mar-02
Oct-02
May-03
Dec-03
Jul-04
Feb-05
Sep-05
Apr-06
Nov-06
Jun-07
Jan-08
Aug-08
Mar-09
Oct-09
May-10
Dec-10
Jul-11
Feb-12
Sep-12
Apr-13
Nov-13
Jun-14
Jan-15
Aug-15
Mar-16
Oct-16
May-17
Dec-17
Jul-18
Feb-19
Sep-19
Apr-20
Nov-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

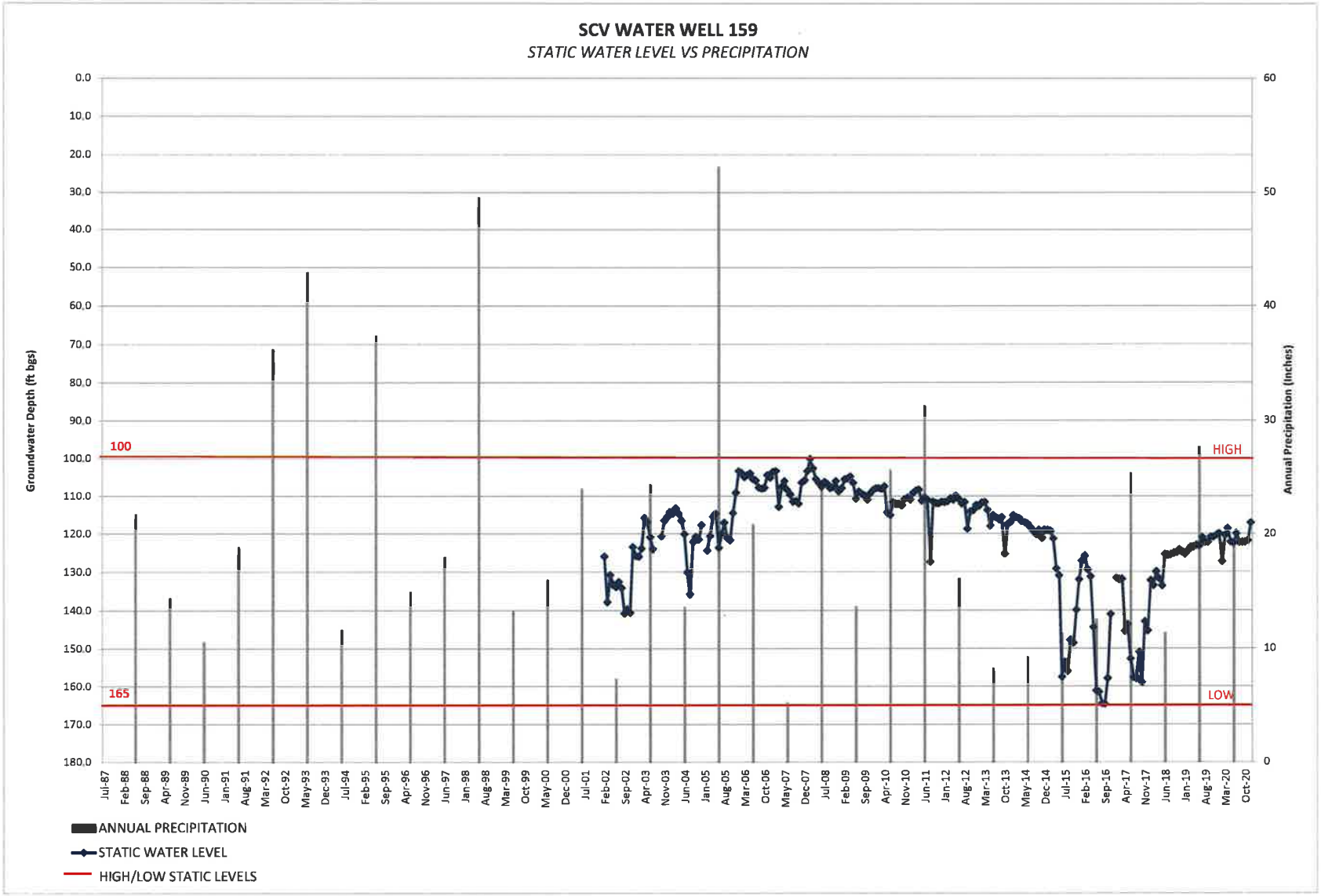

SCV WATER WELL E17
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
15
20
25
30
35
19.75
HIGH
26.23
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

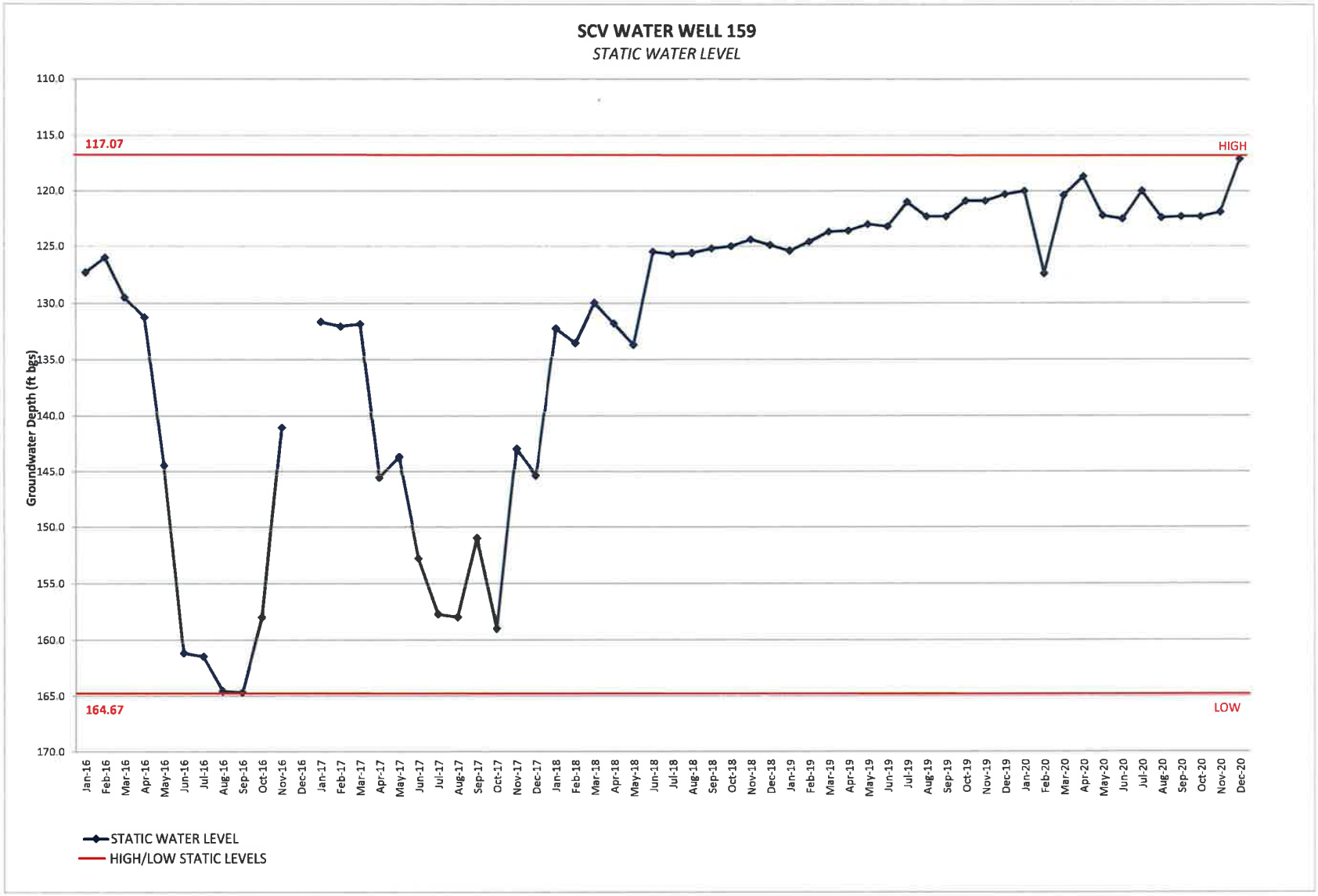

SCV WATER WELL 207
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
43
HIGH
94
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

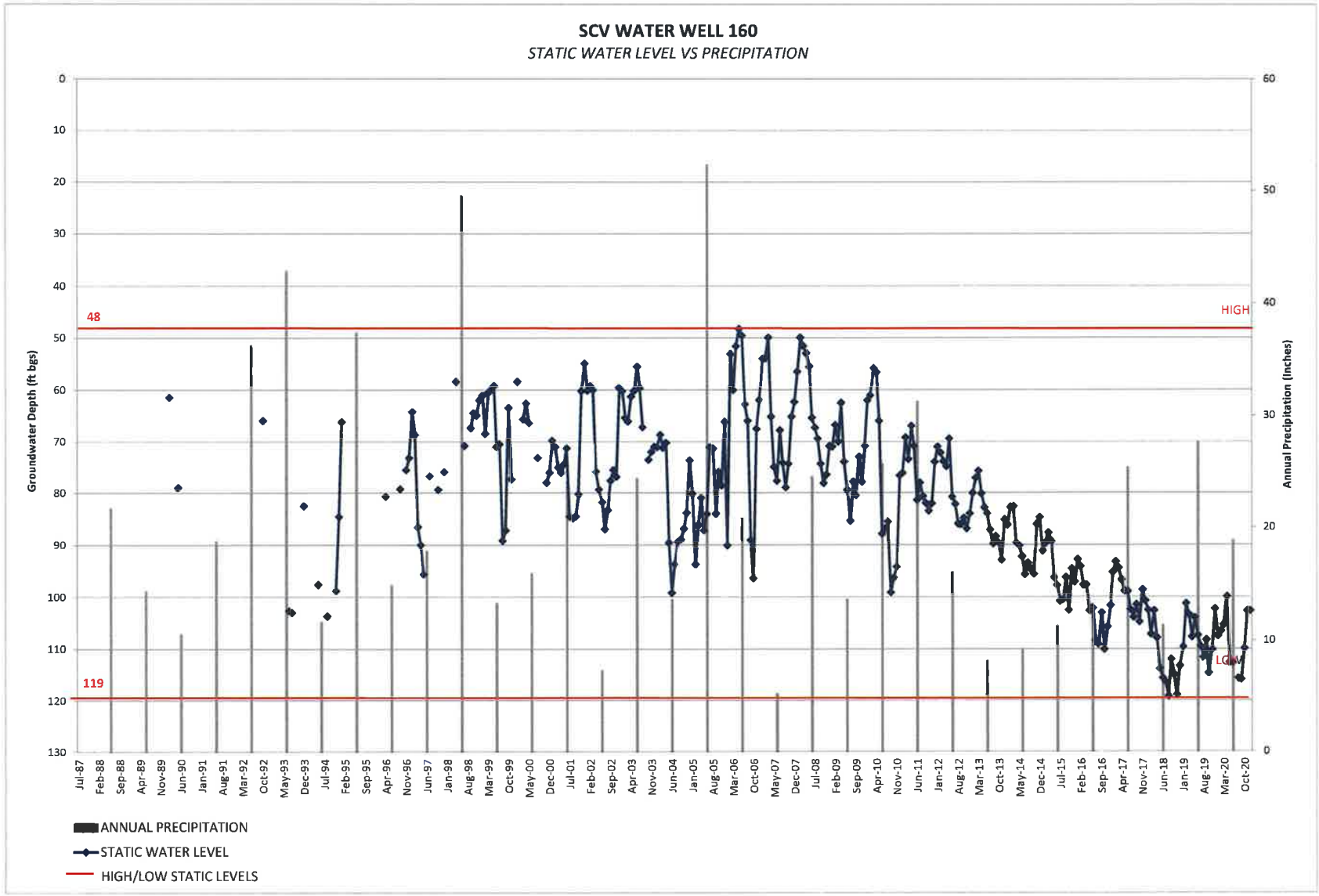

SCV WATER WELL 207
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
40
45
50
55
60
65
70
75
80
85
90
95
100
47.31
HIGH
92.91
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

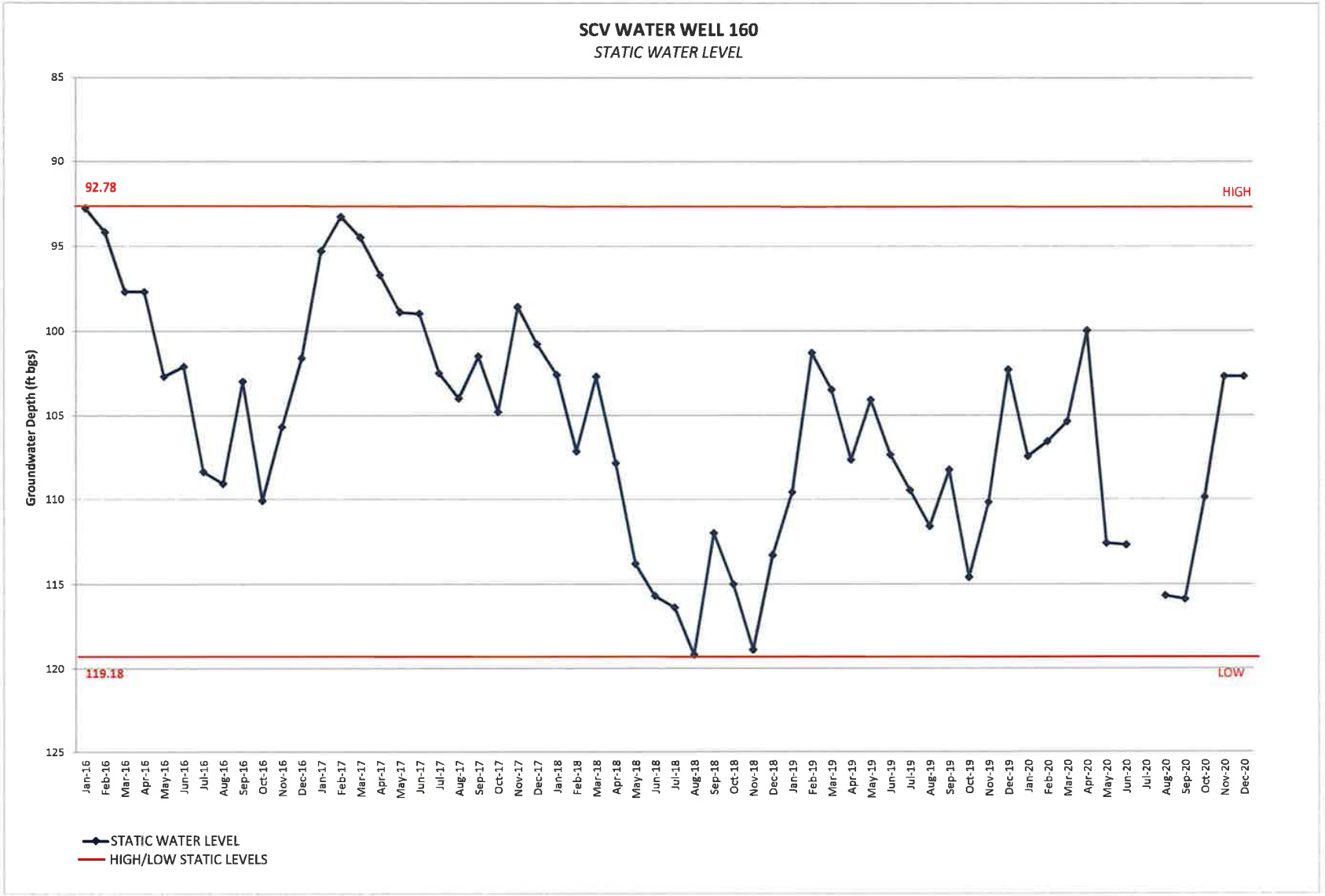

SCV WATER WELL 206
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
45
HIGH
80.35
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

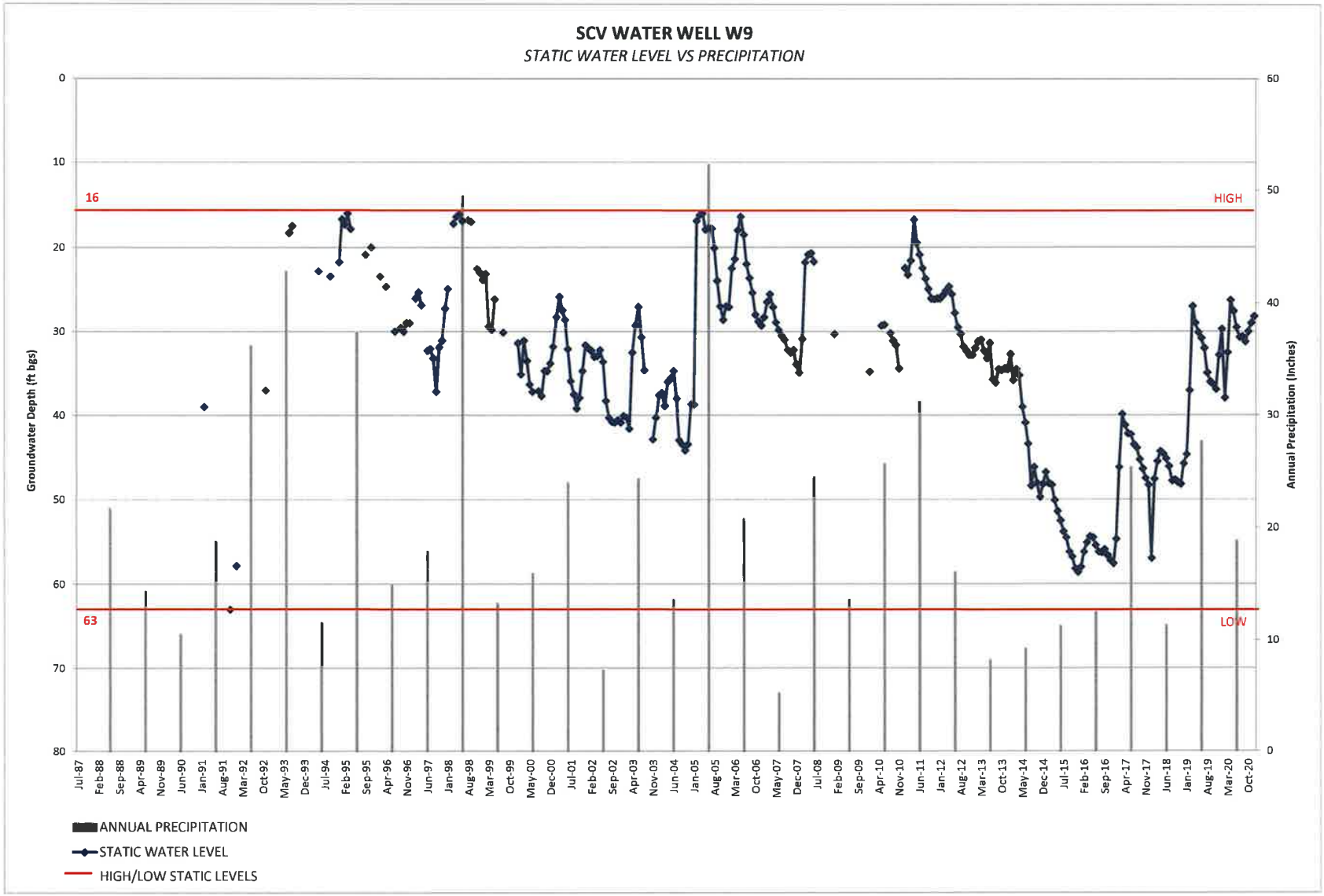

SCV WATER WELL 206
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
50
55
60
65
70
75
80
85
56.95
HIGH
80.35
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

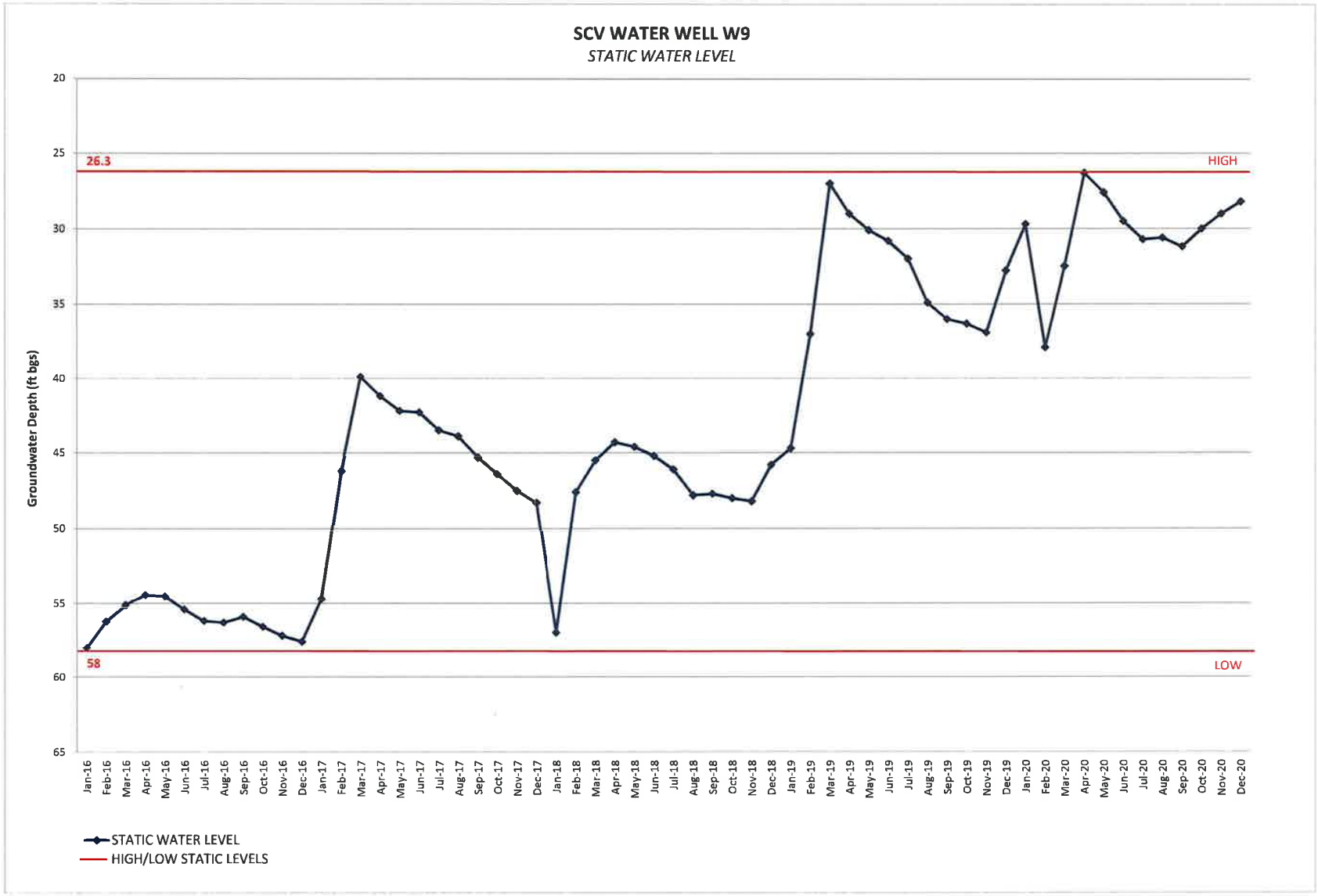

SCV WATER WELL 159
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
60
50
40
30
20
10
0
100
165
HIGH
LOW
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

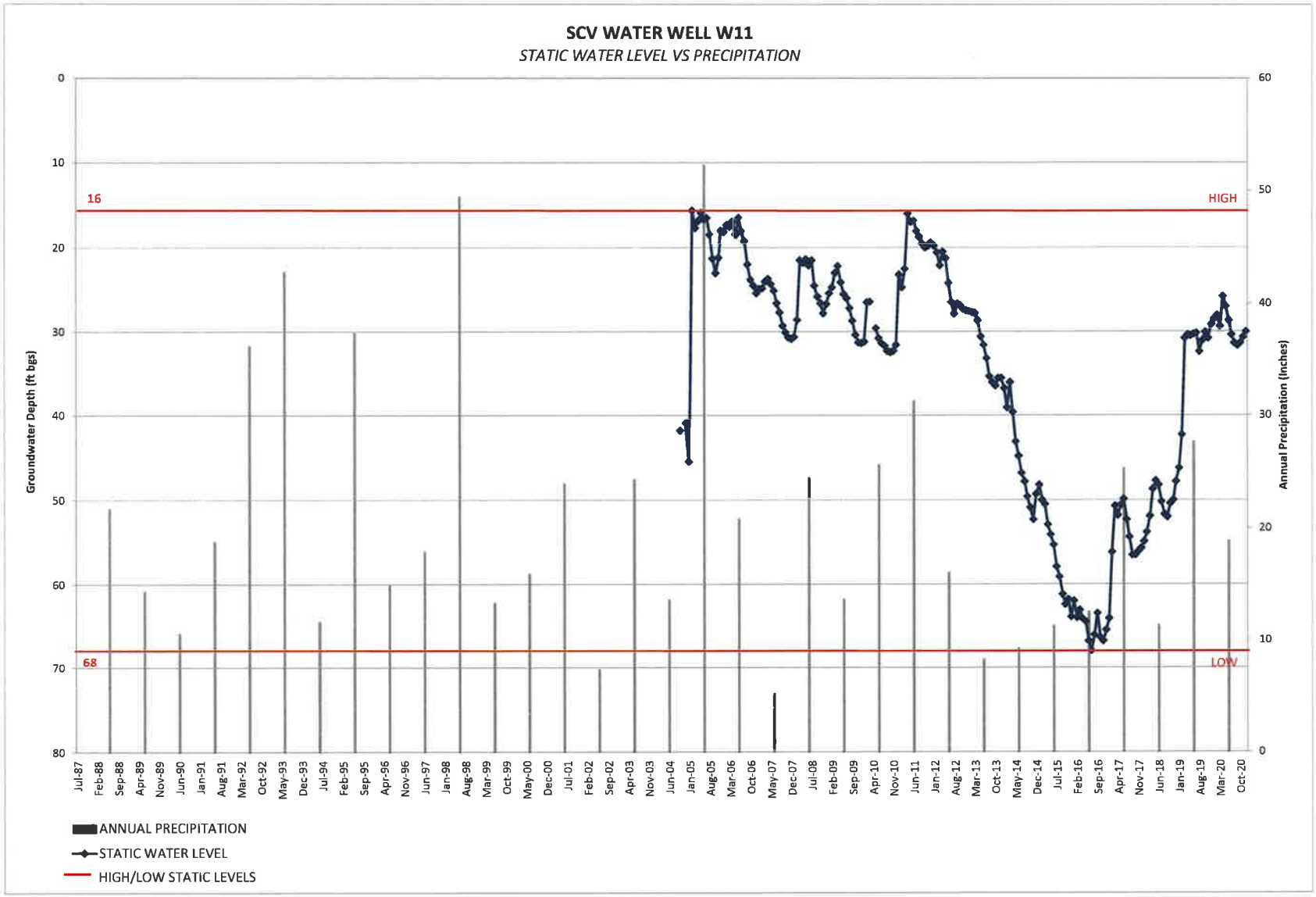

SCV WATER WELL 159
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0
150.0
155.0
160.0
165.0
170.0
117.07
HIGH
164.67
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

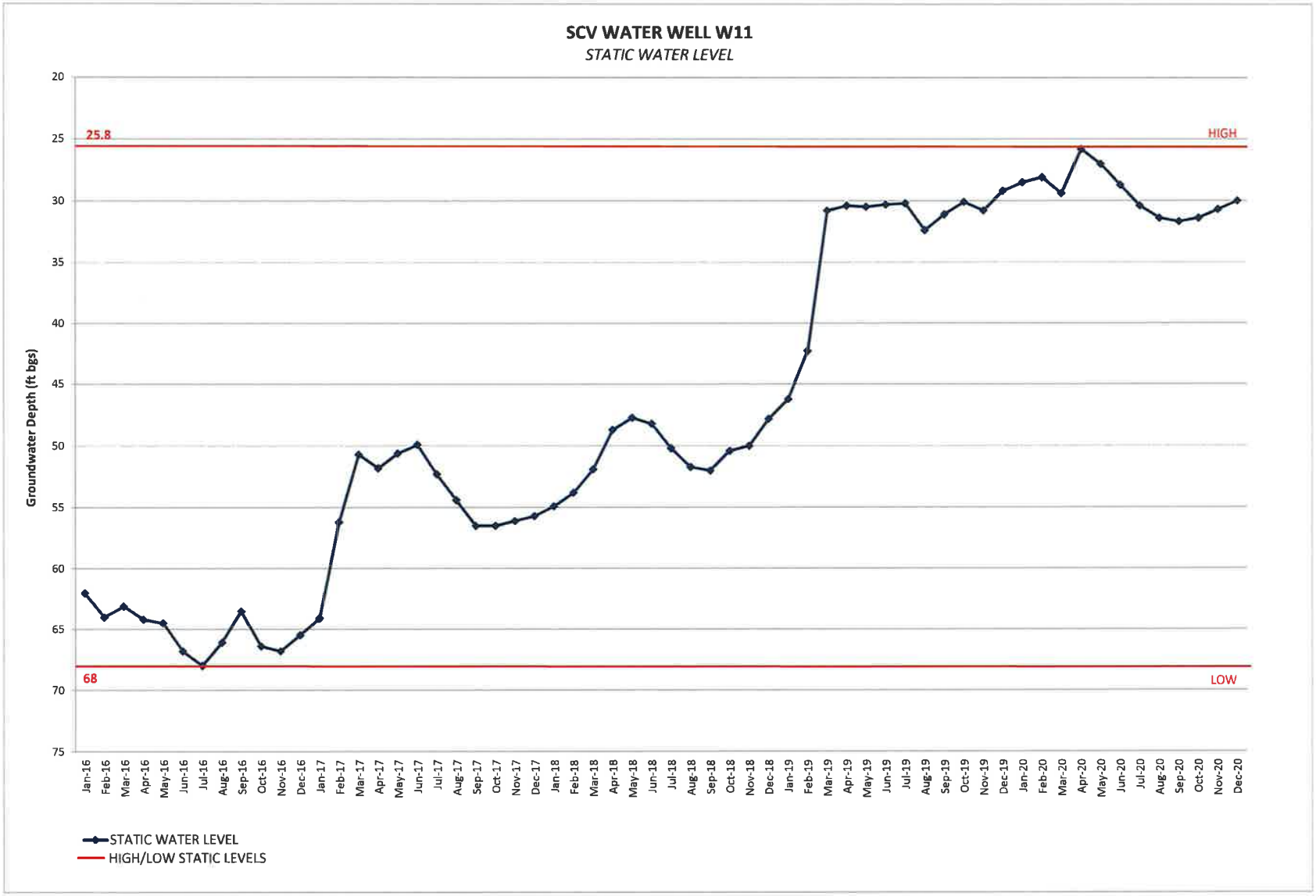

SCV WATER WELL 160
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
48
HIGH
119
LOW
0
10
20
30
40
50
60
70
80
90
100
110
120
130
60
50
40
30
20
10
0
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

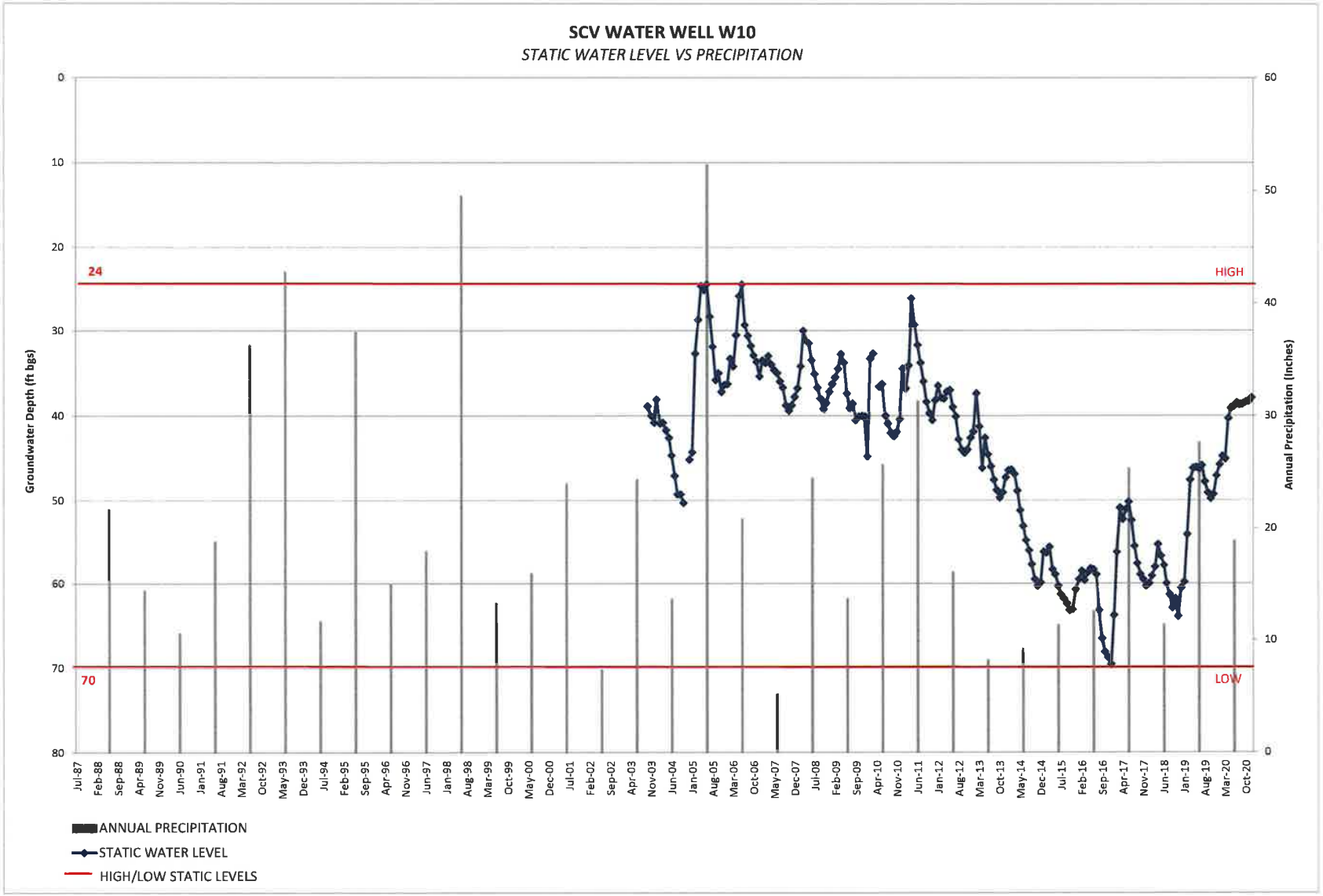

SCV WATER WELL 160
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
85
90
95
100
105
110
115
120
125
92.78
HIGH
119.18
LOW
Jan-16 Feb-16 Mar-16 Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16 Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-18 Jan-19 Feb-19 Mar-19 Apr-19 May-19 Jun-19 Jul-19 Aug-19 Sep-19 Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

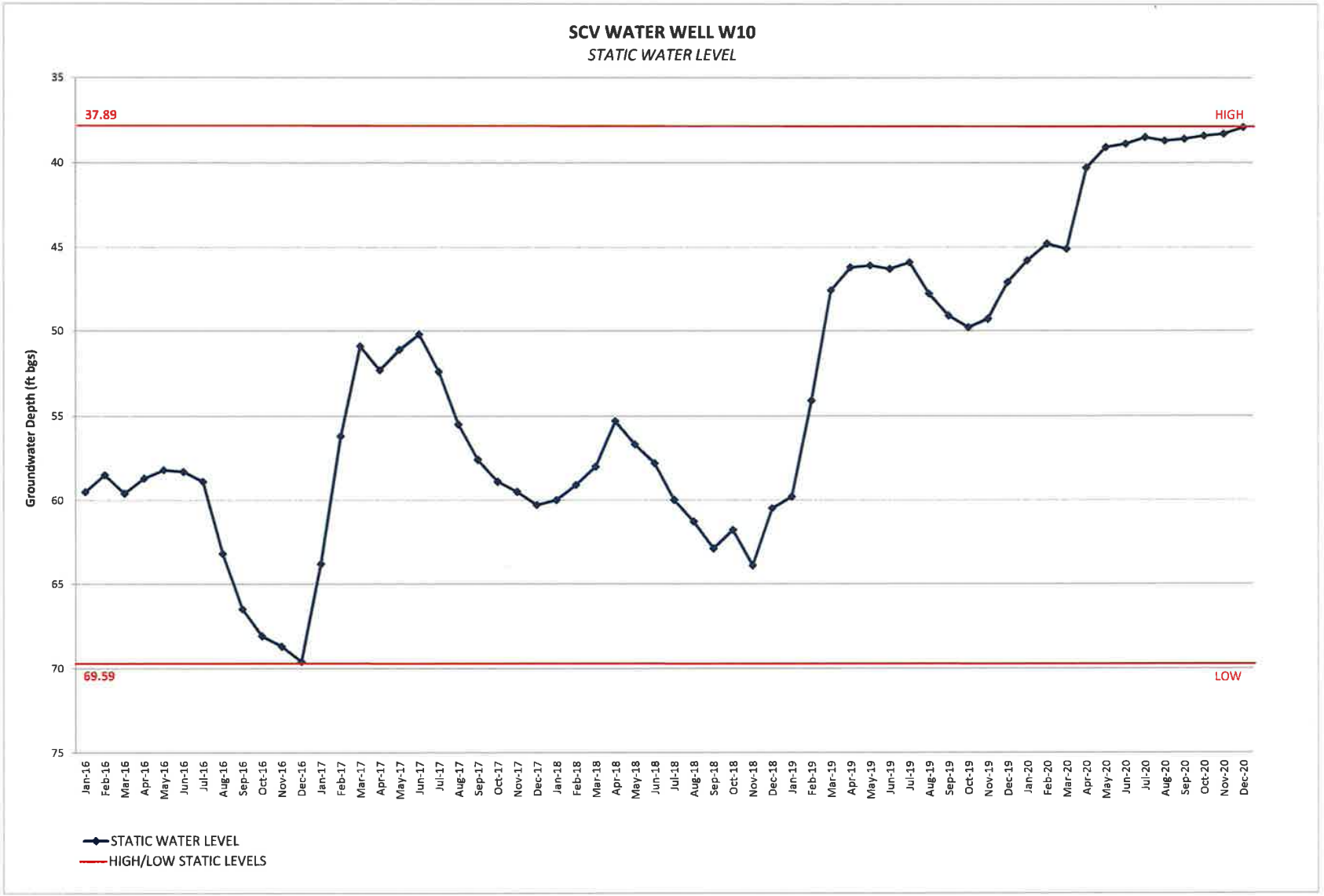

SCV WATER WELL W9
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
16
HIGH
63
LOW
0
10
20
30
40
50
60
70
80
60
50
40
30
20
10
0
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

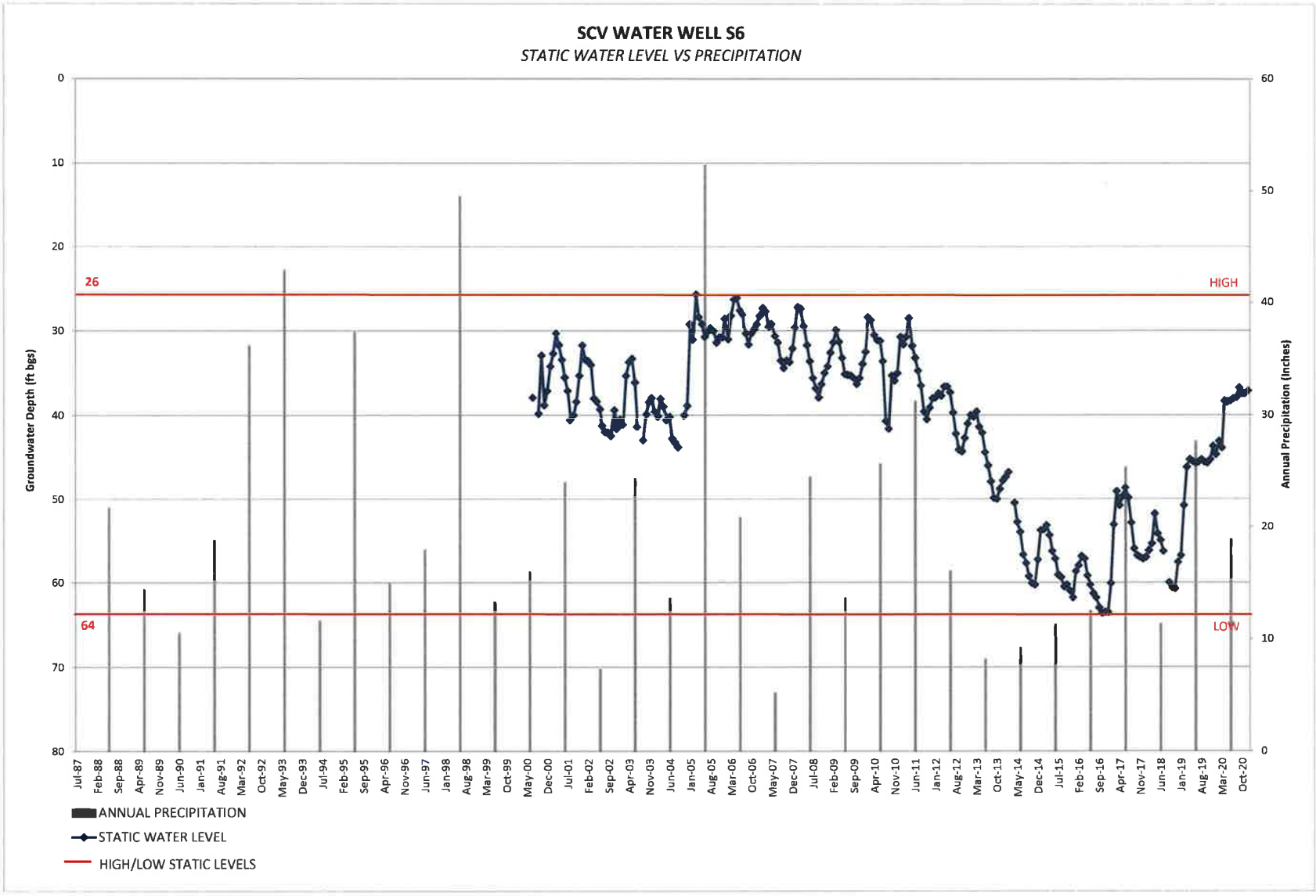

SCV WATER WELL W9
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
20
25
30
35
40
45
50
55
60
65
26.3
HIGH
58
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

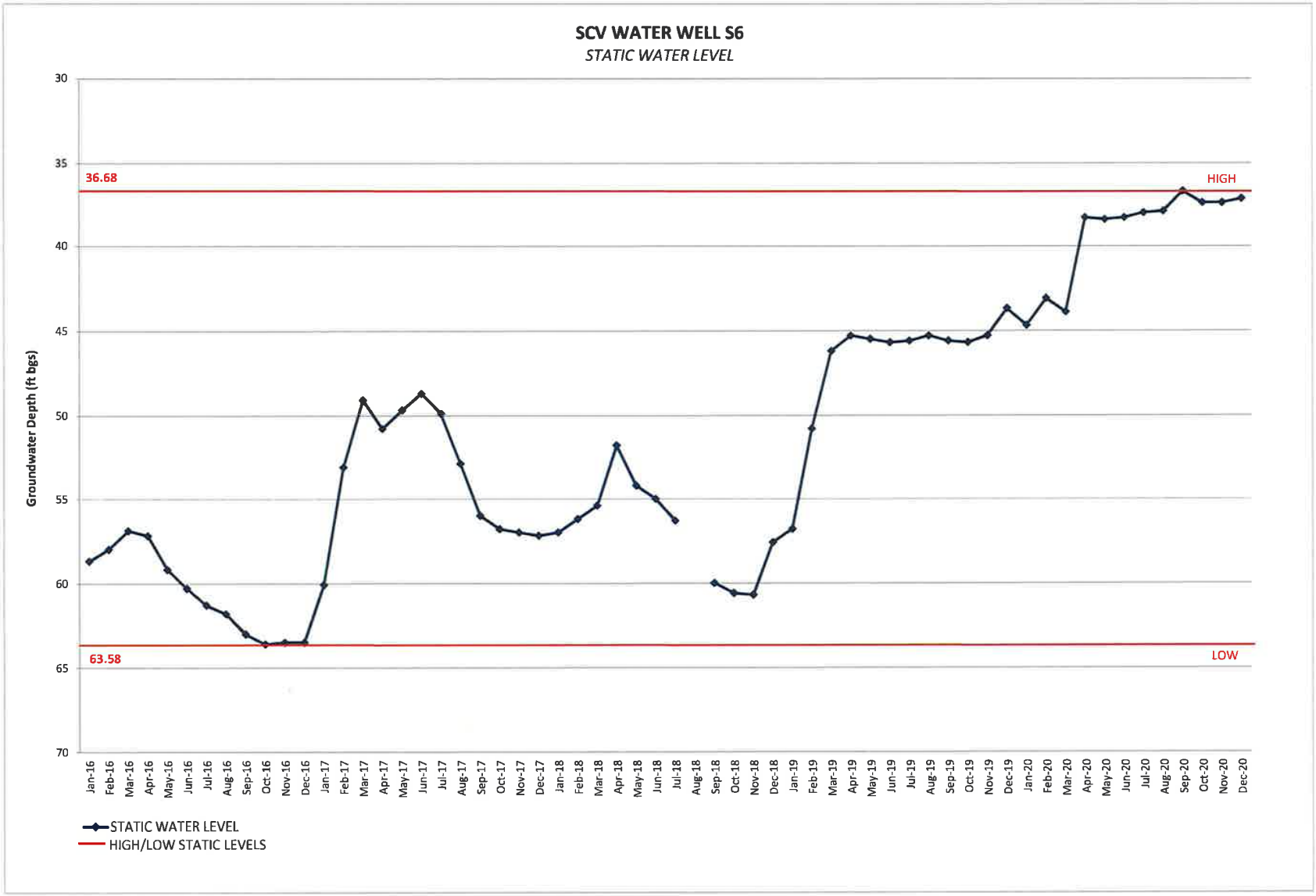

SCV WATER WELL W11
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
16
HIGH
68
LOW
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

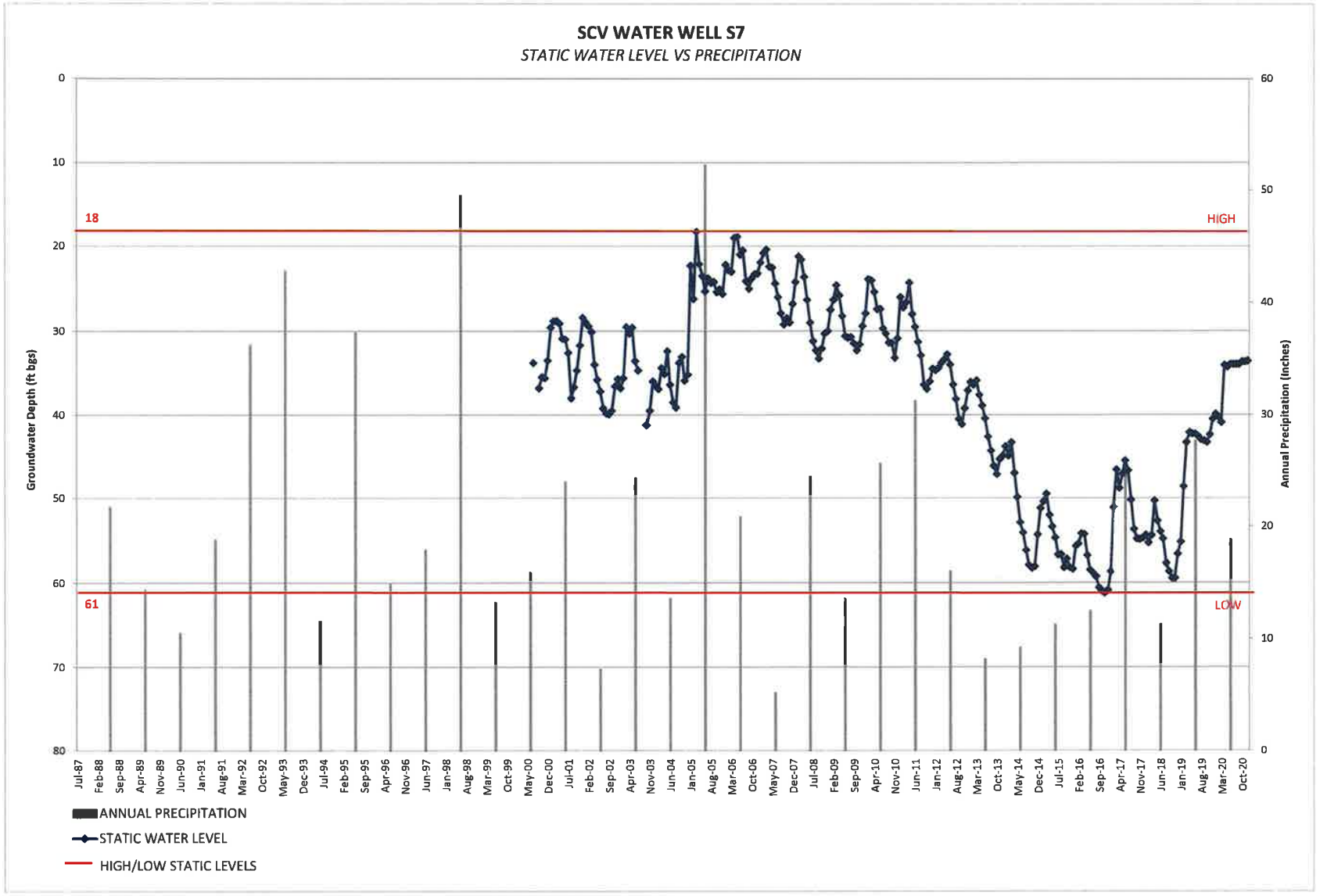

SCV WATER WELL W11
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
20
25
30
35
40
45
50
55
60
65
70
75
25.8
HIGH
68
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

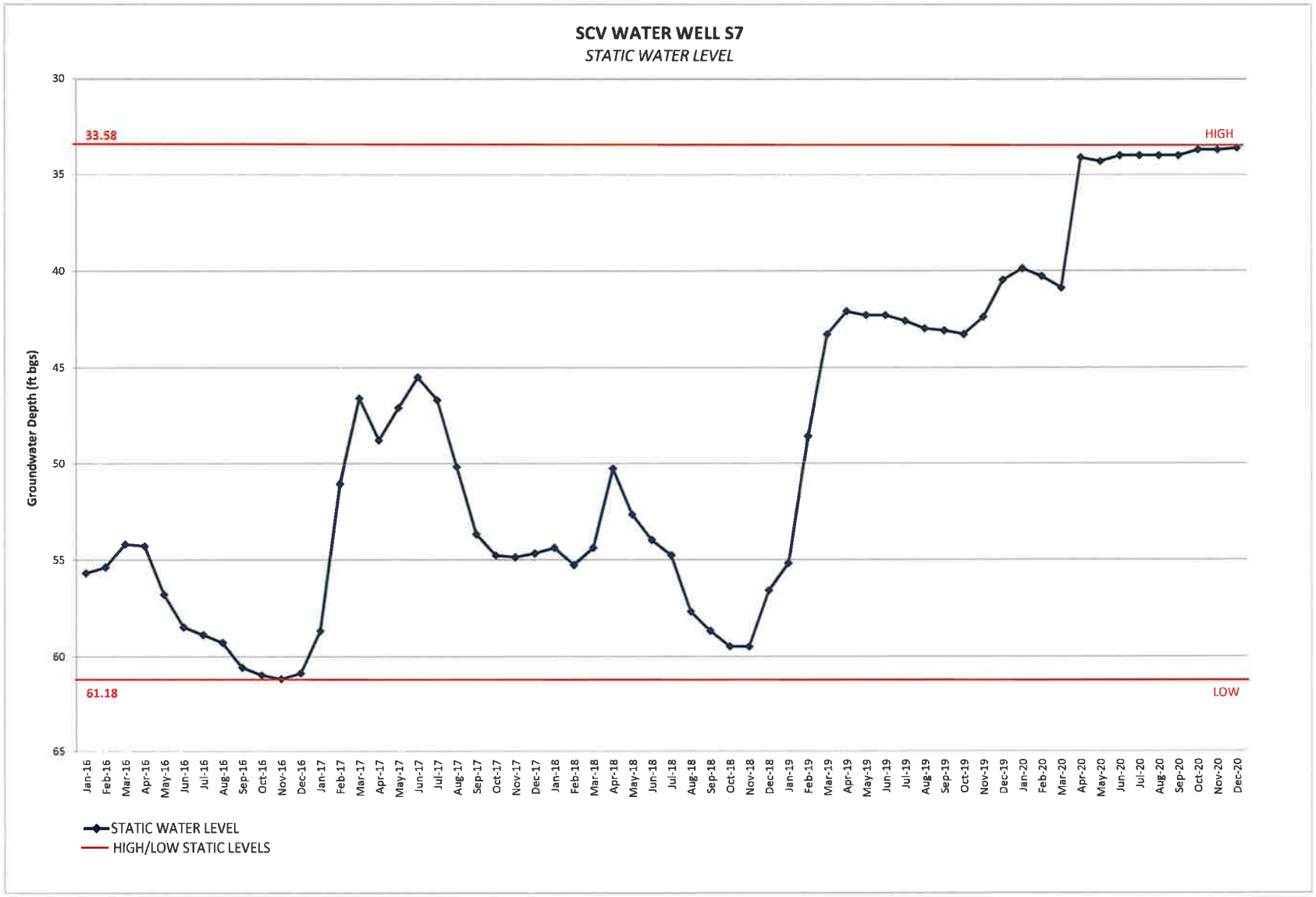

SCV WATER WELL W10
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
24
HIGH
70
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

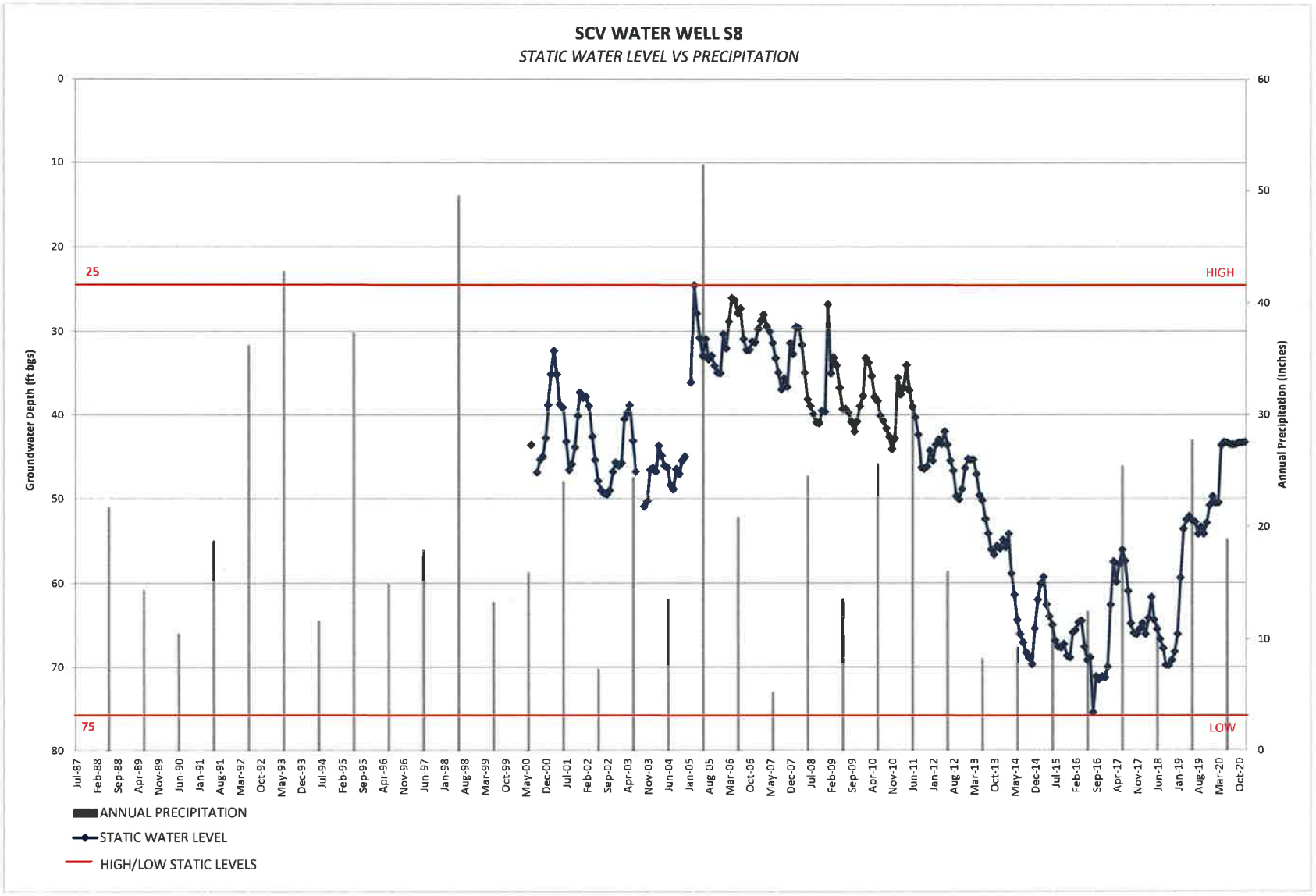

SCV WATER WELL W10
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
35
40
45
50
55
60
65
70
75
37.89
HIGH
69.59
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL S6
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
26
HIGH
64
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

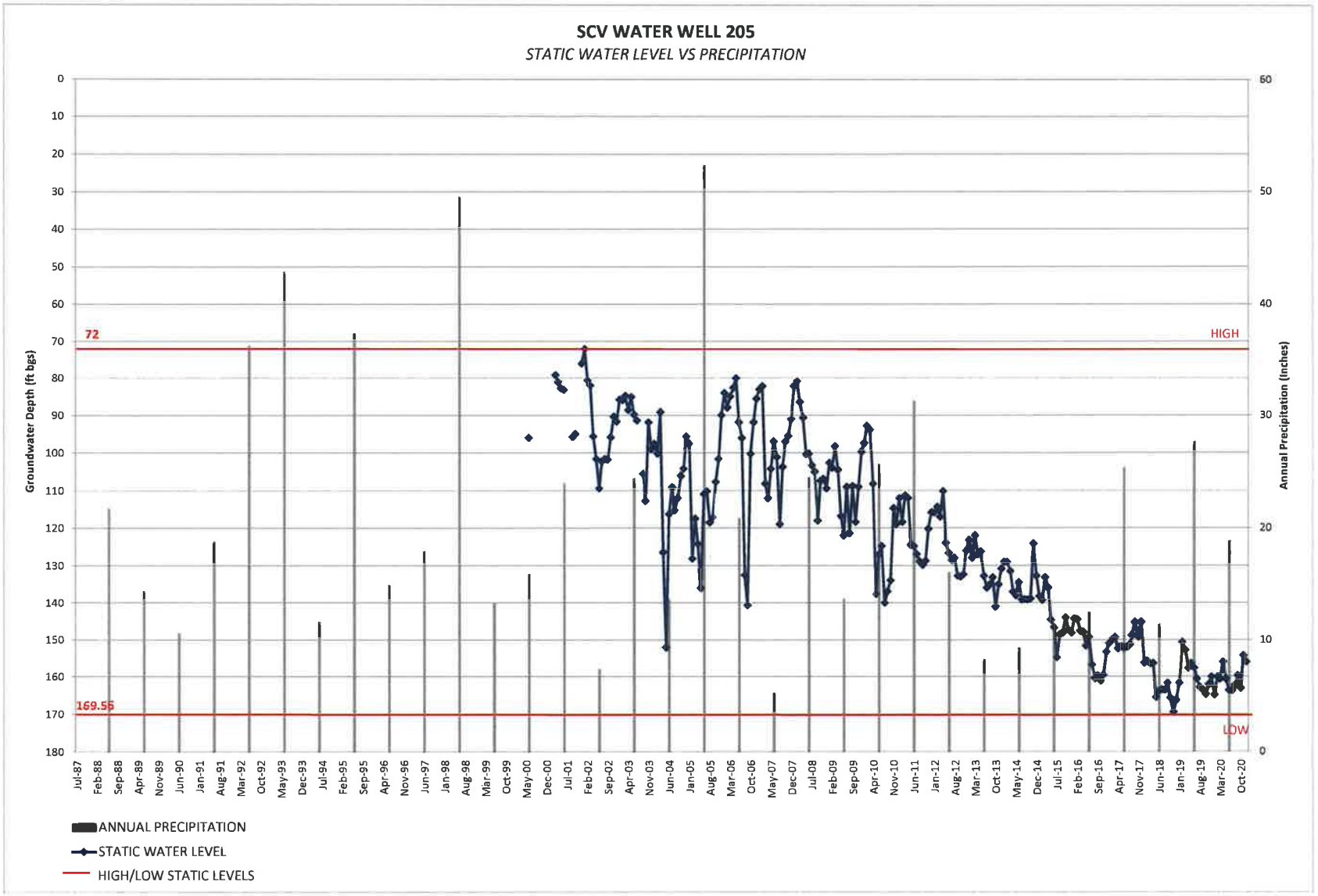

SCV WATER WELL S6
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
70
36.68
HIGH
63.58
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

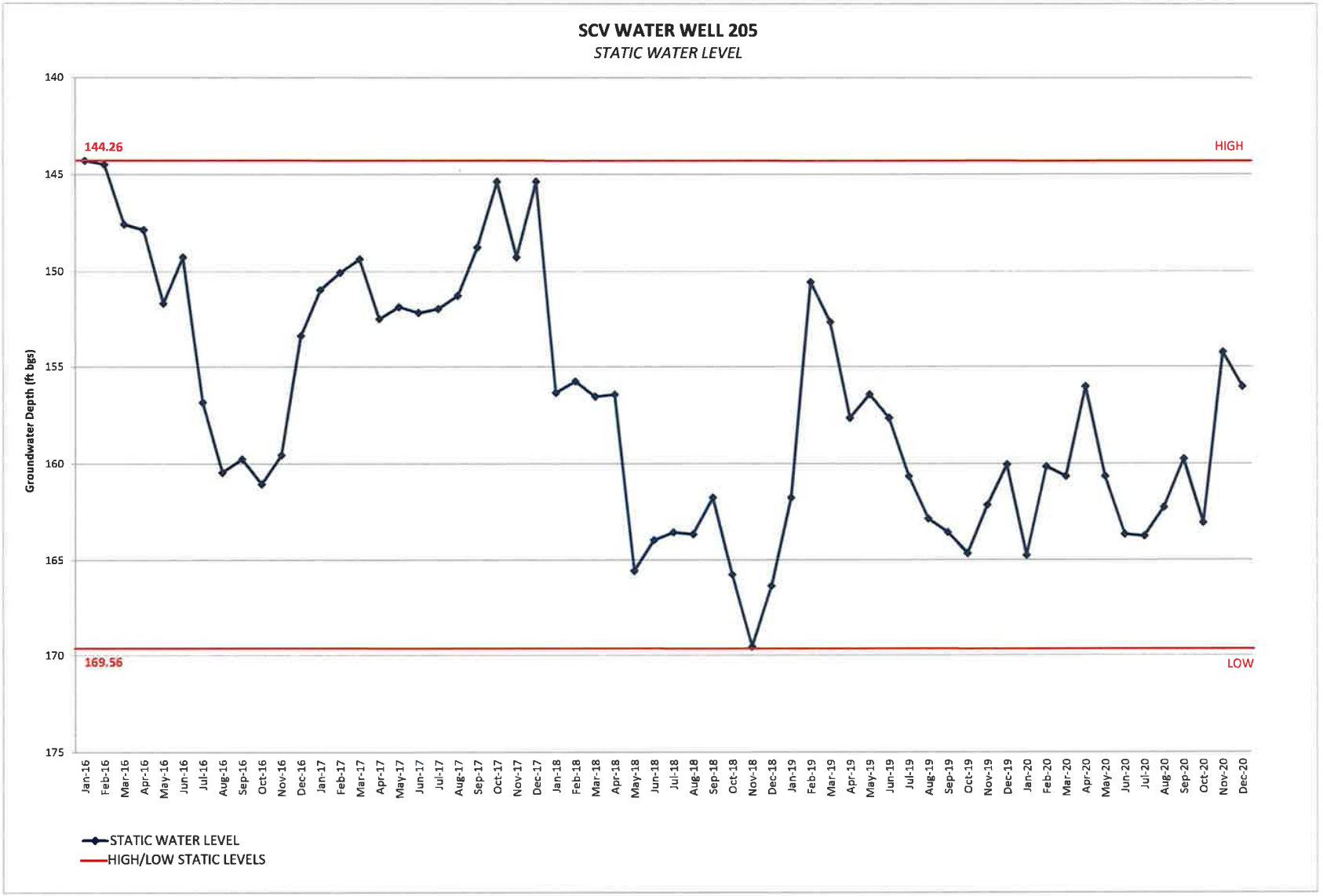

SCV WATER WELL S7
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
18
HIGH
61
LOW
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

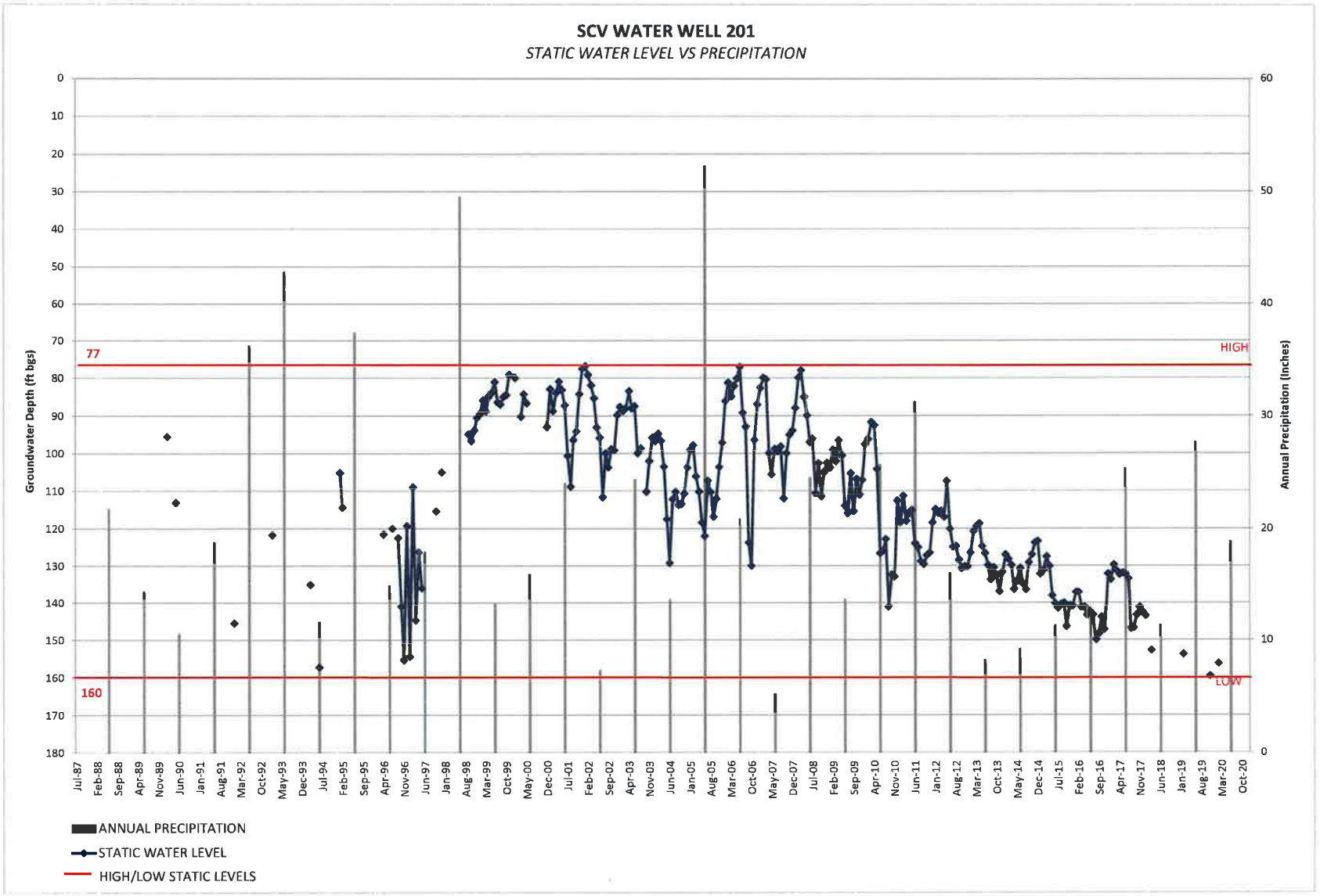

SCV WATER WELL S7
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
33.58
HIGH
61.18
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

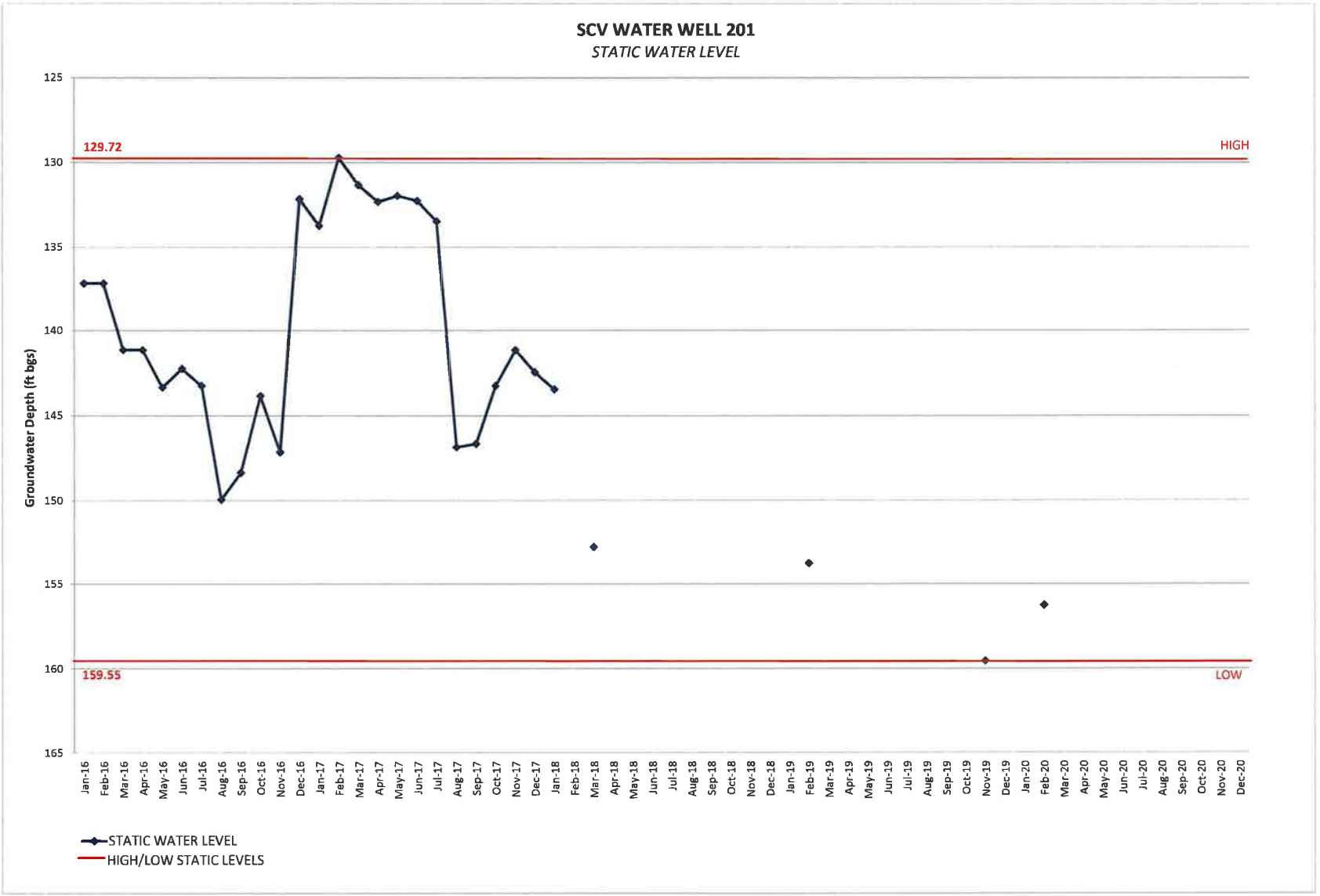

SCV WATER WELL S8
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
25
HIGH
75
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

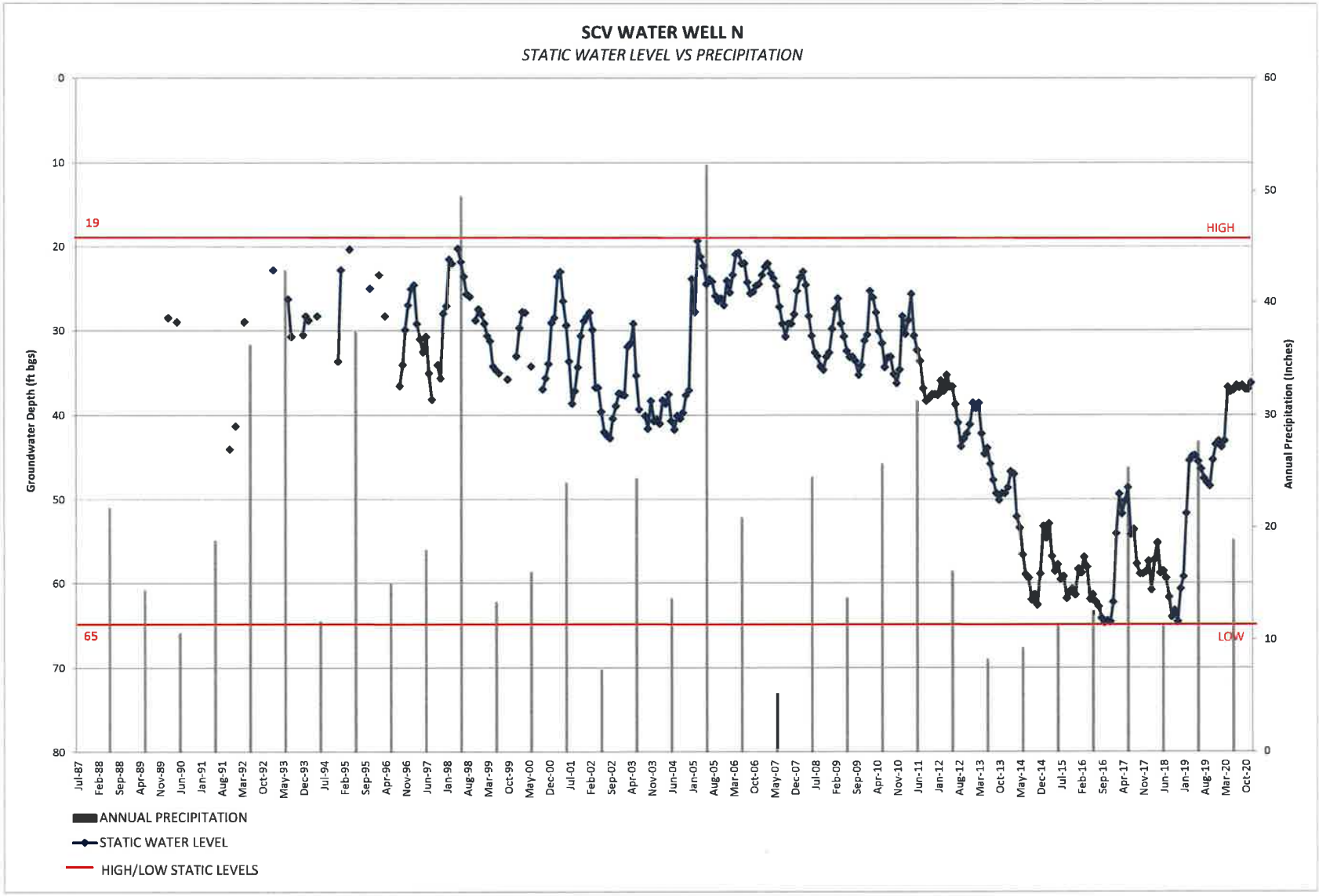

SCV WATER WELL S8
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
40
45
50
55
60
65
70
75
80
43.27
HIGH
75.47
LOW
Jan-16 Feb-16 Mar-16 Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16 Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-18 Jan-19 Feb-19 Mar-19 Apr-19 May-19 Jun-19 Jul-19 Aug-19 Sep-19 Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

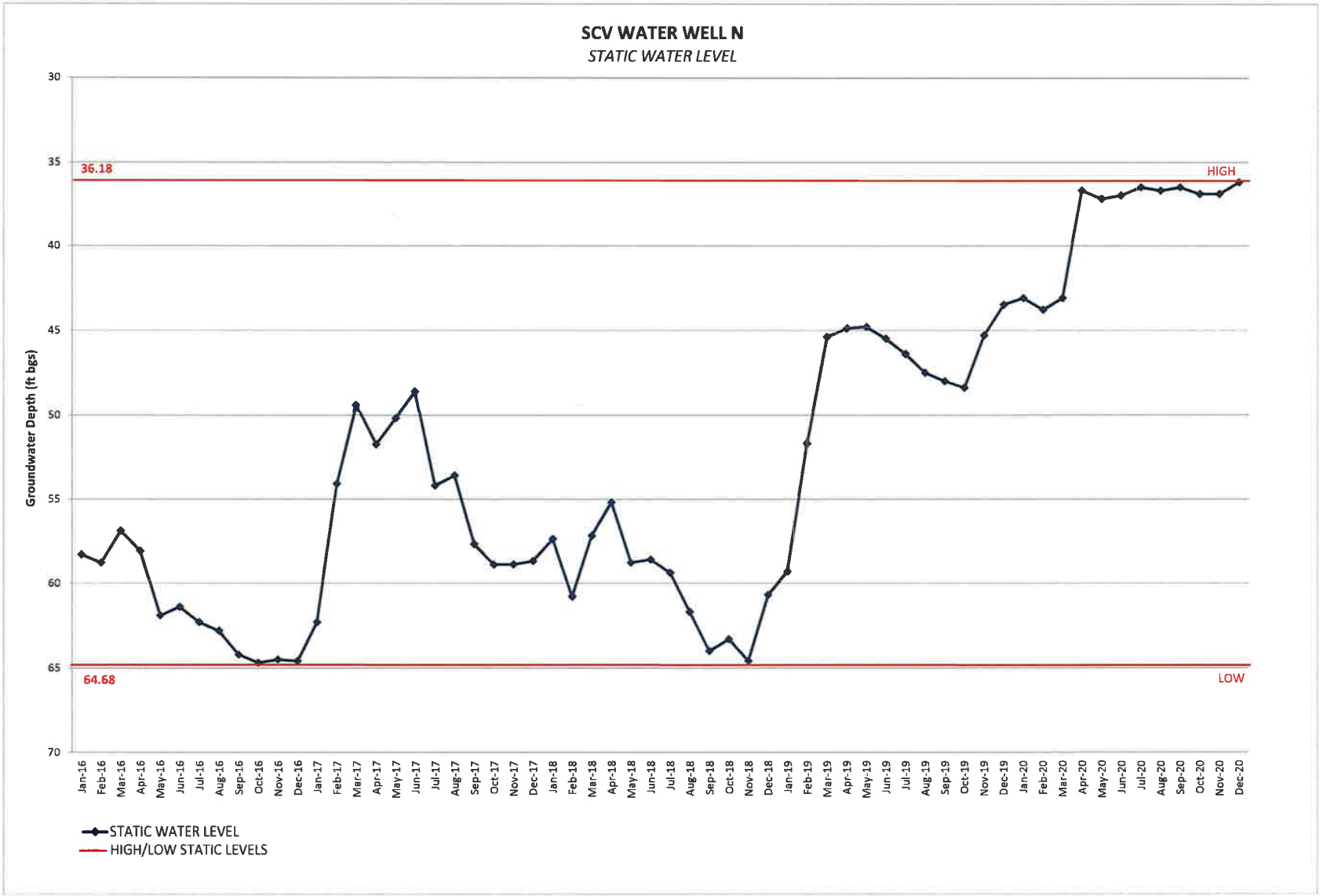

SCV WATER WELL 205
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
72
HIGH
169.55
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

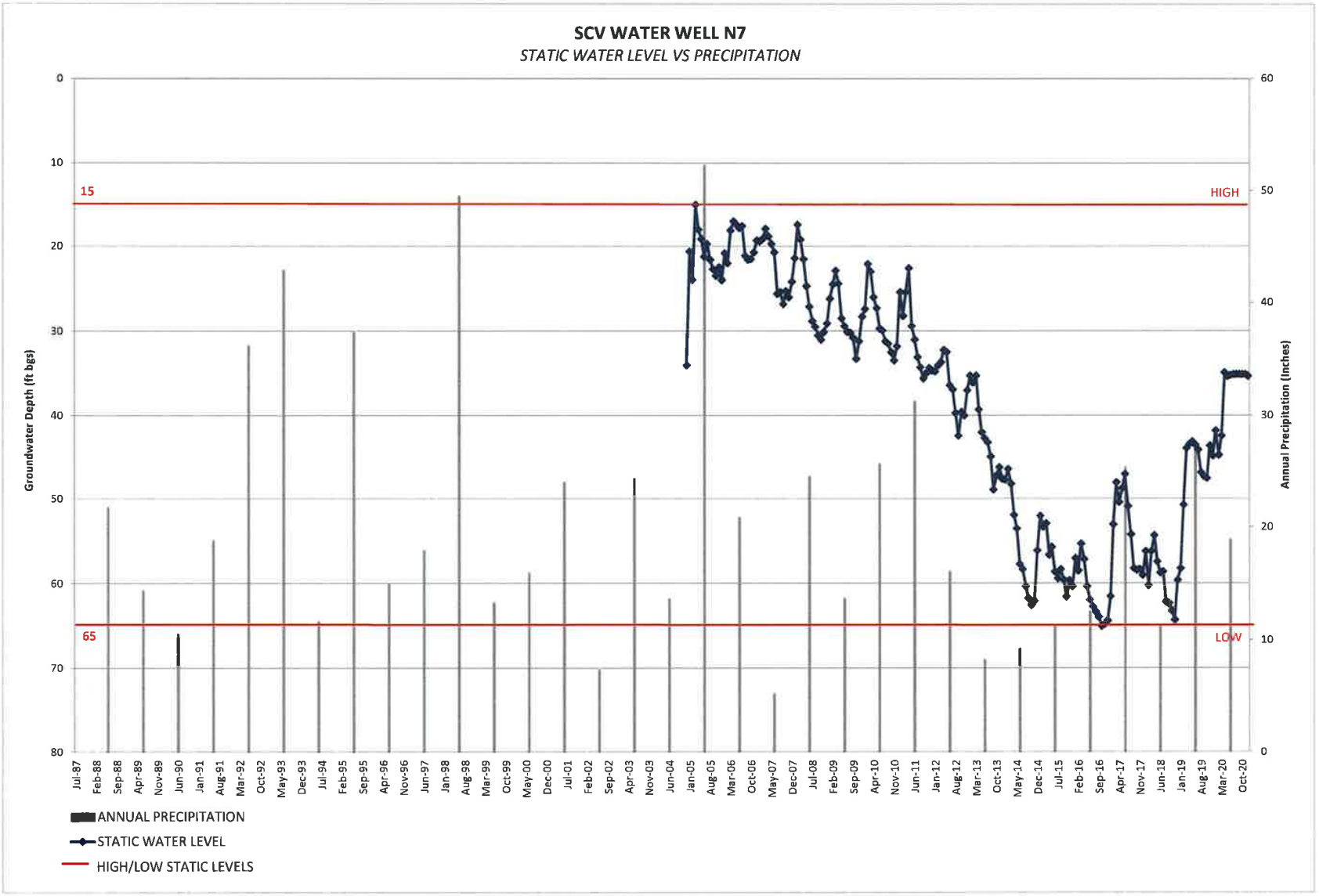

SCV WATER WELL 205
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
140
145
150
155
160
165
170
175
144.26
HIGH
169.56
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

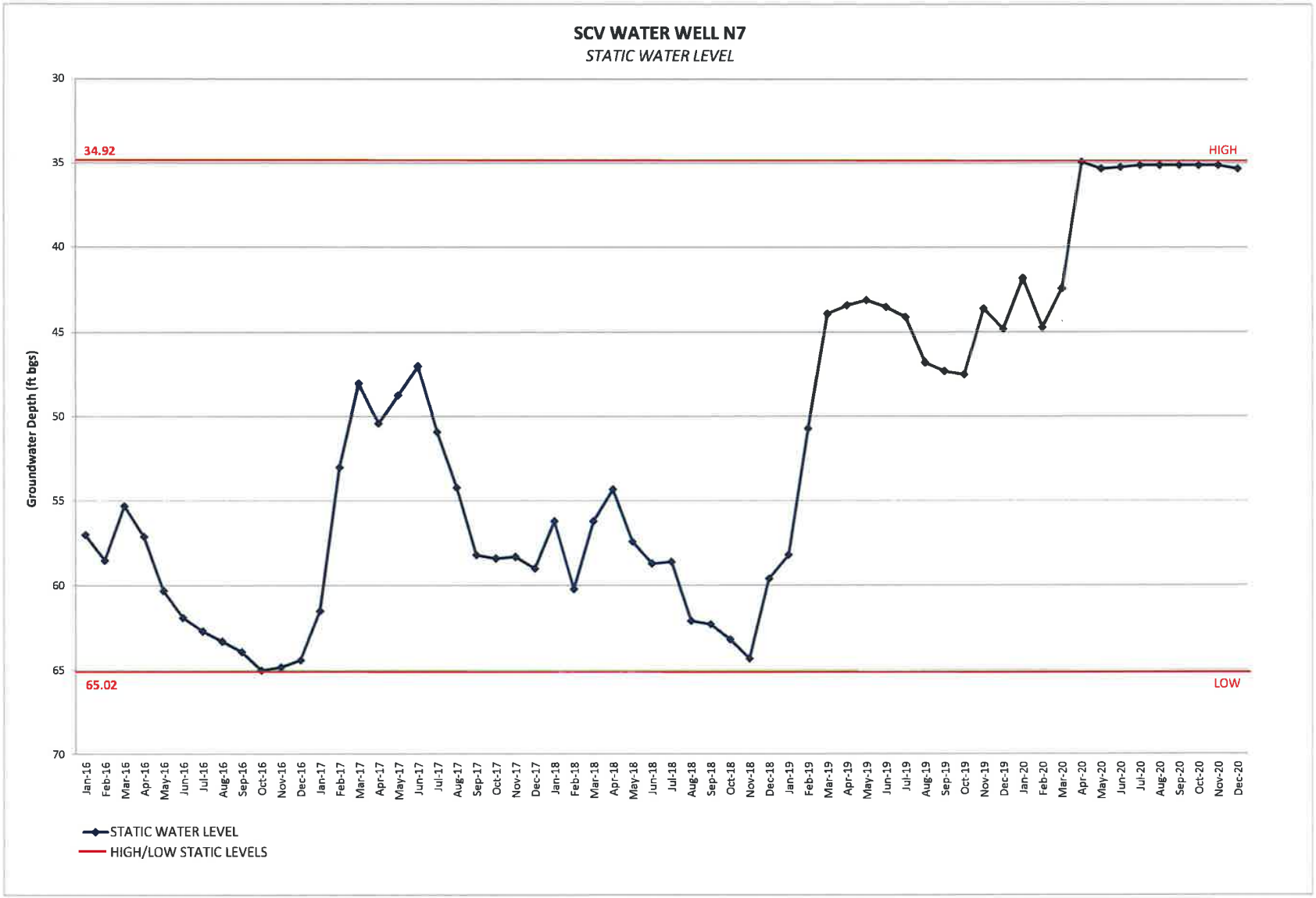

SCV WATER WELL 201
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
77
HIGH
160
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

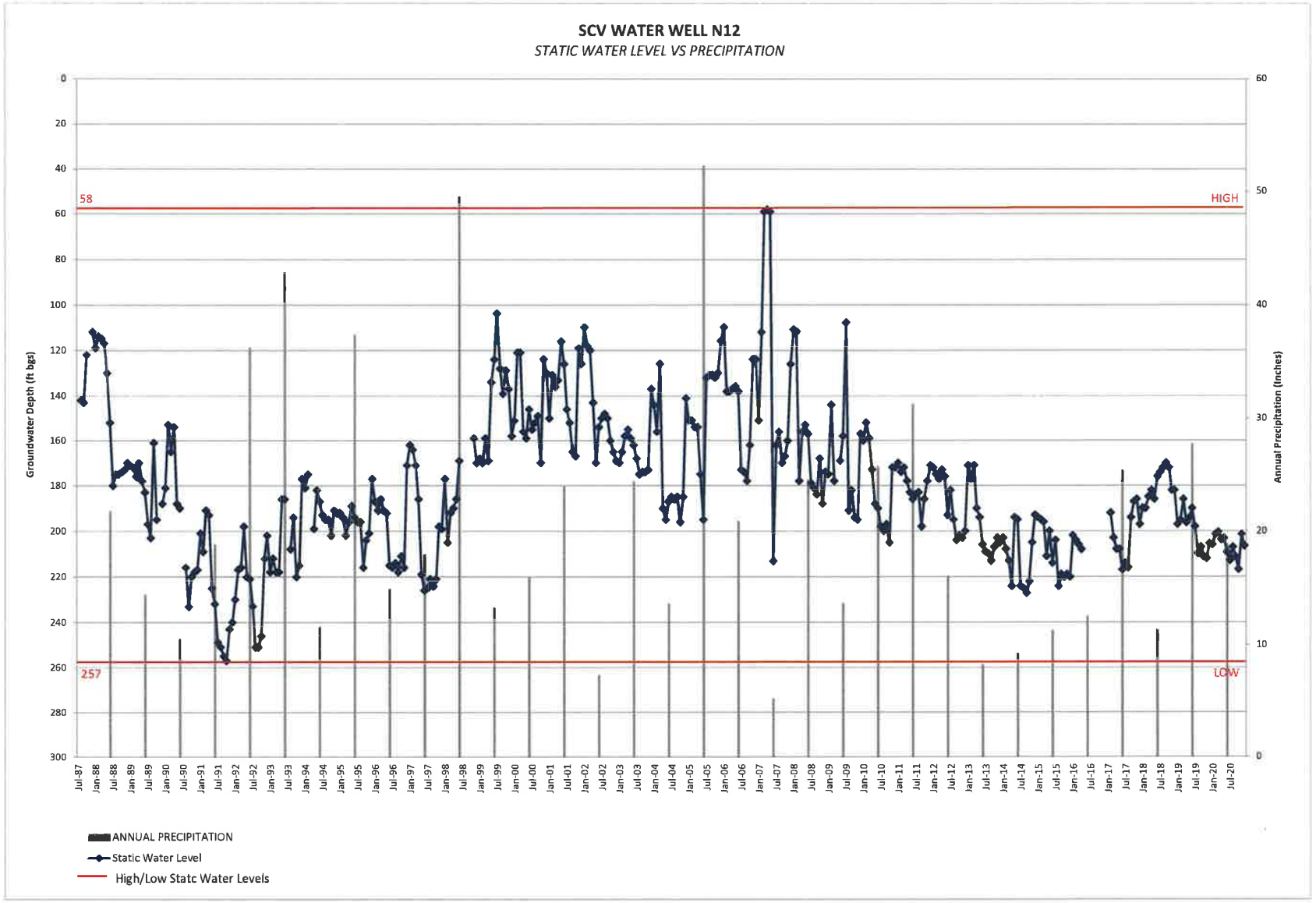

SCV WATER WELL 201
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
125
130
135
140
145
150
155
160
165
129.72
HIGH
159.55
LOW
Jan-16 Feb-16 Mar-16 Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16 Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-18 Jan-19 Feb-19 Mar-19 Apr-19 May-19 Jun-19 Jul-19 Aug-19 Sep-19 Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

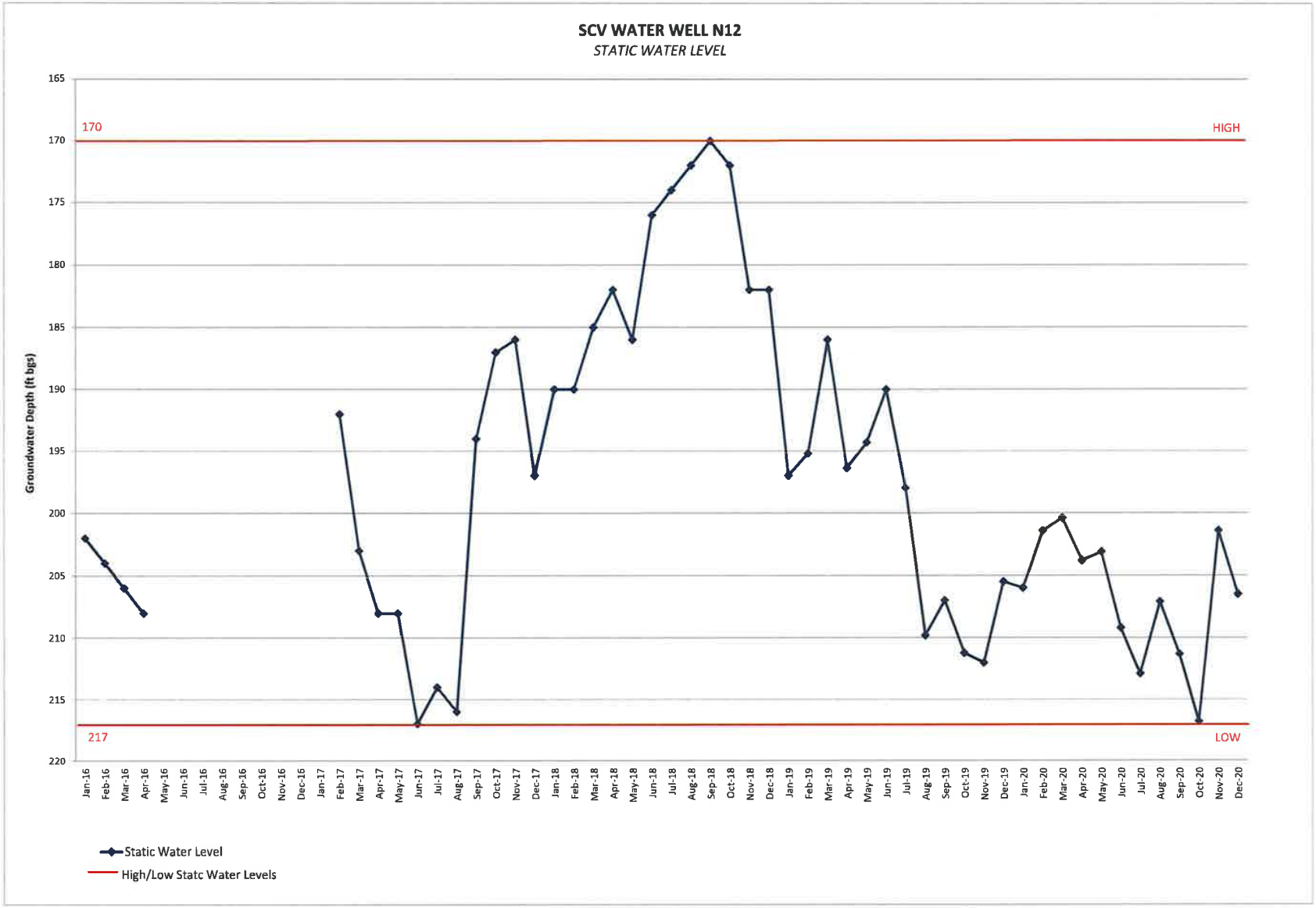

SCV WATER WELL N
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
19
HIGH
65
LOW
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

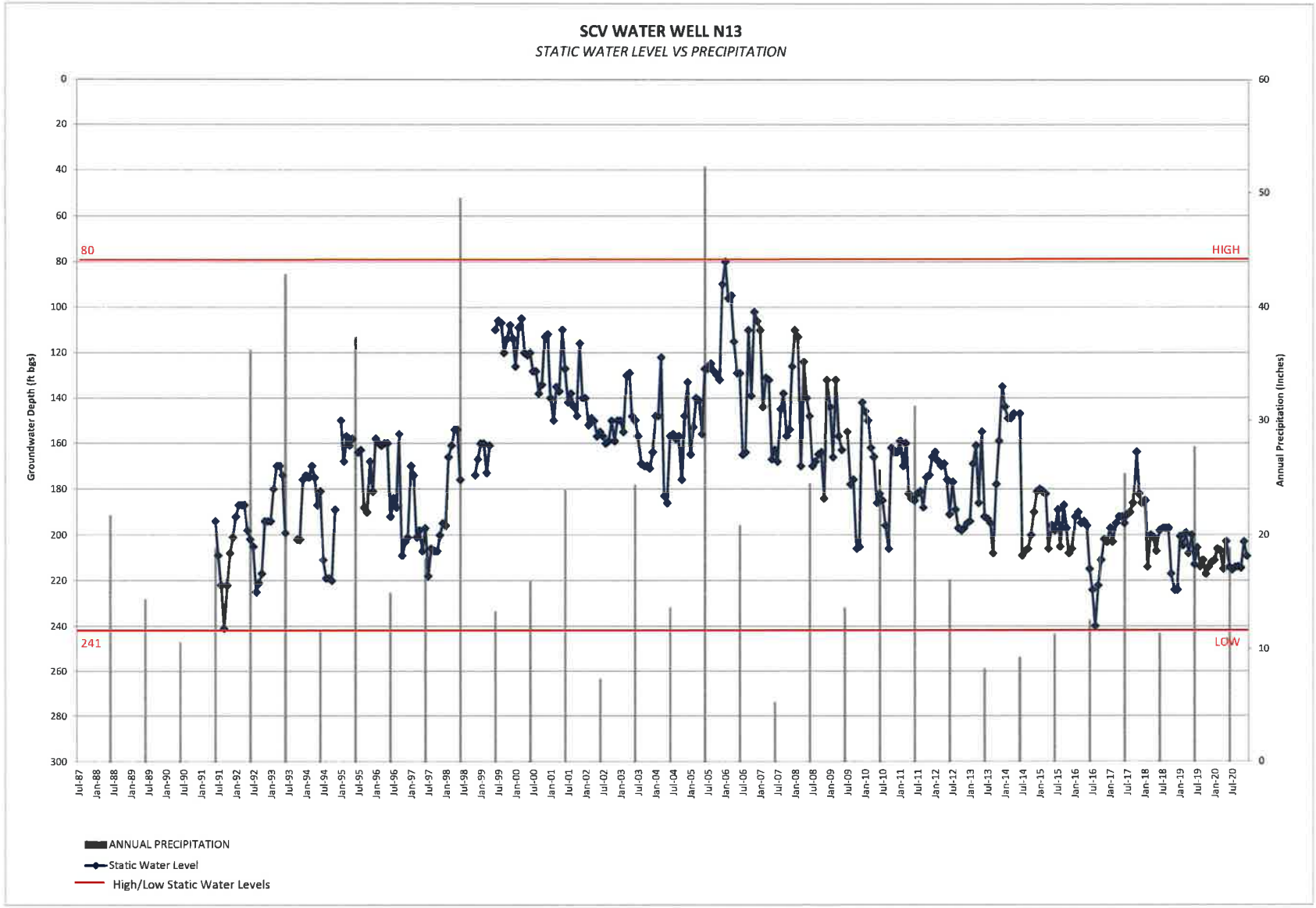

SCV WATER WELL N
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
70
36.18
HIGH
64.68
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

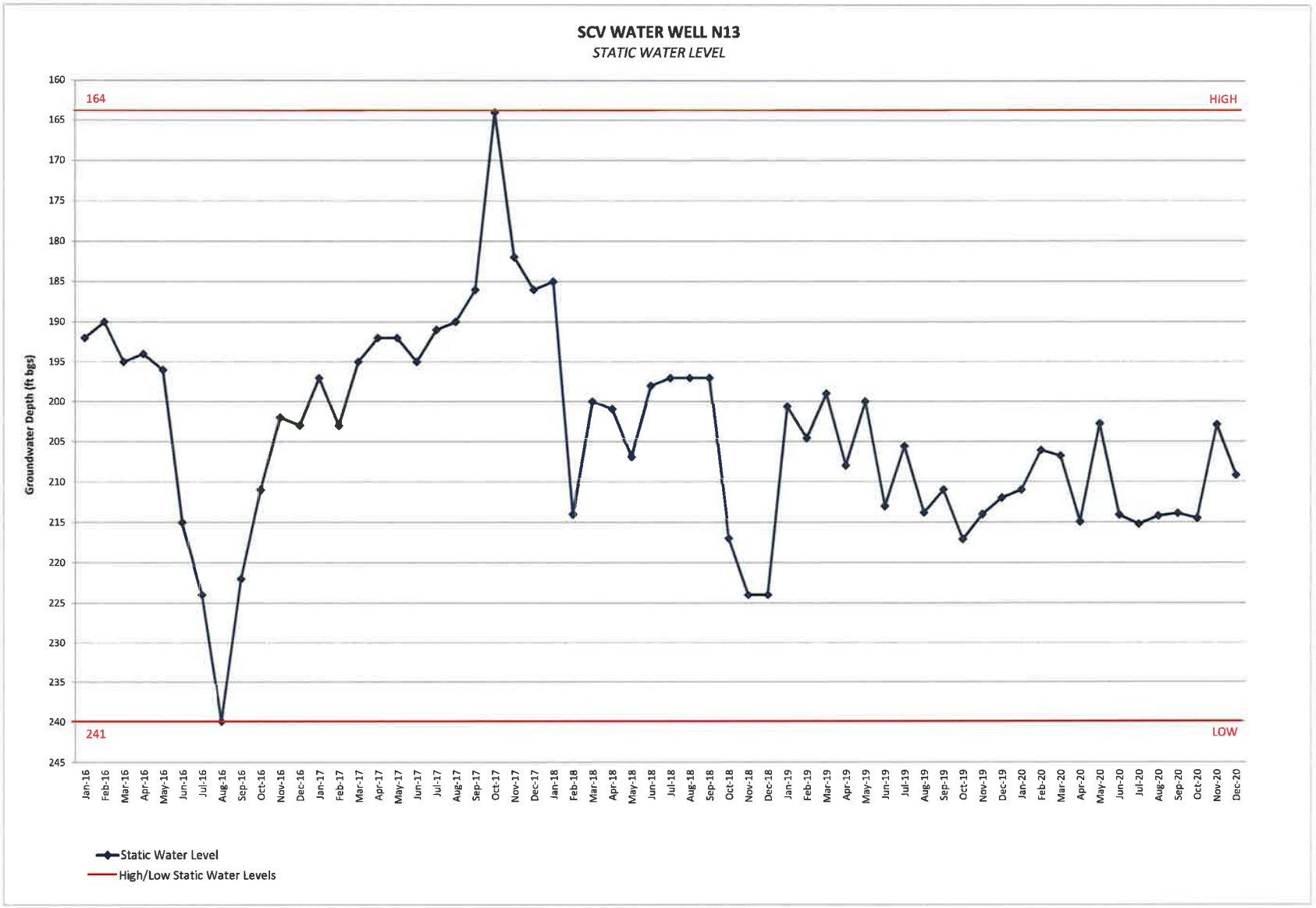

SCV WATER WELL N7
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
15
HIGH
65
LOW
0
10
20
30
40
50
60
70
80
60
50
40
30
20
10
0
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS

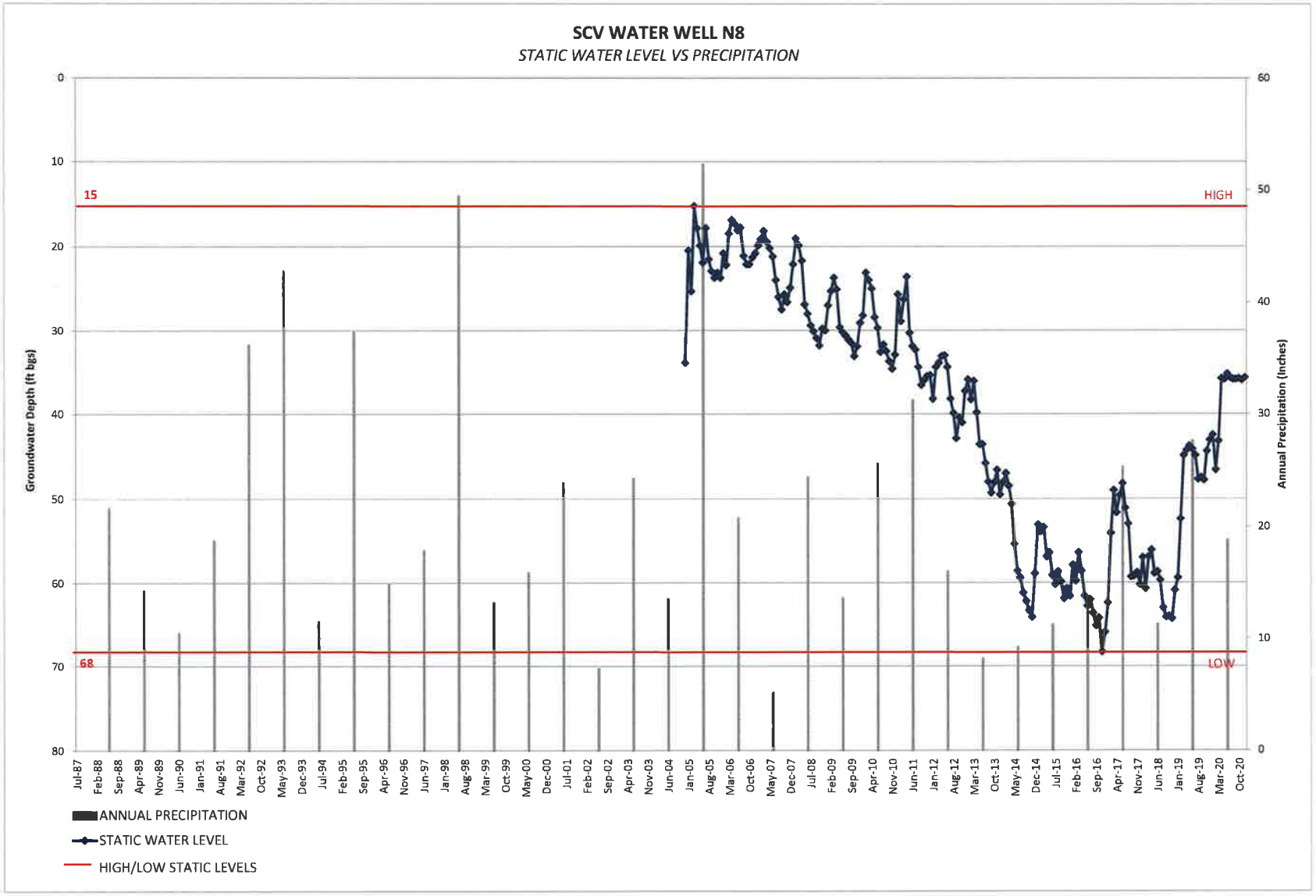

SCV WATER WELL N7
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
70
34.92
HIGH
65.02
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL N12
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
58
HIGH
257
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Statc Water Levels


SCV WATER WELL N12
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
165
170
175
180
185
190
195
200
205
210
215
220
170
HIGH
217
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Statc Water Levels


SCV WATER WELL N13
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
80
HIGH
241
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL N13
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
164
HIGH
241
LOW
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL N8
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
15
HIGH
68
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL N8
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
70
75
35.22
HIGH
68.29
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
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Jul-20
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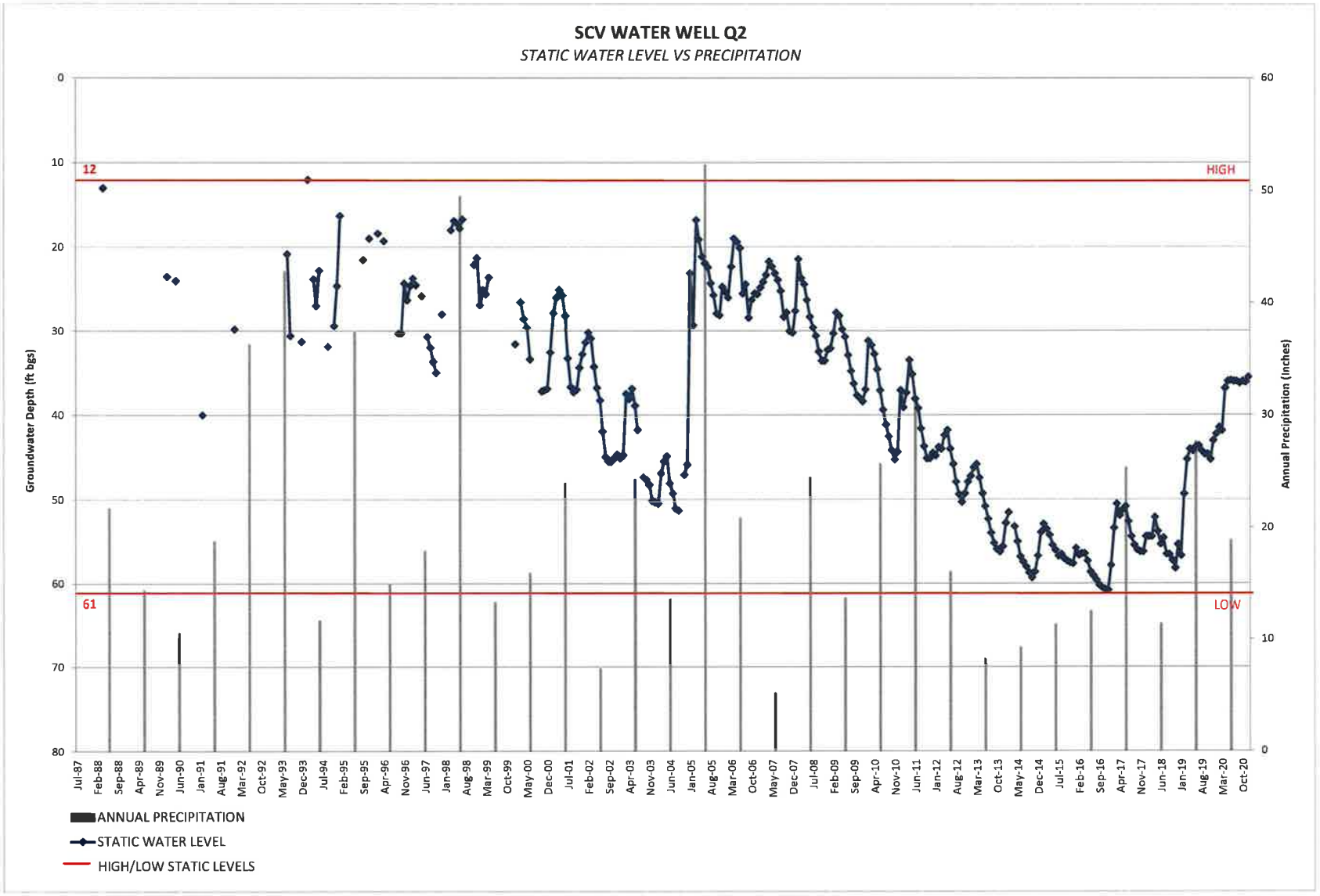
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL Q2
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
12
HIGH
61
LOW
0
10
20
30
40
50
60
70
80
60
50
40
30
20
10
0
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
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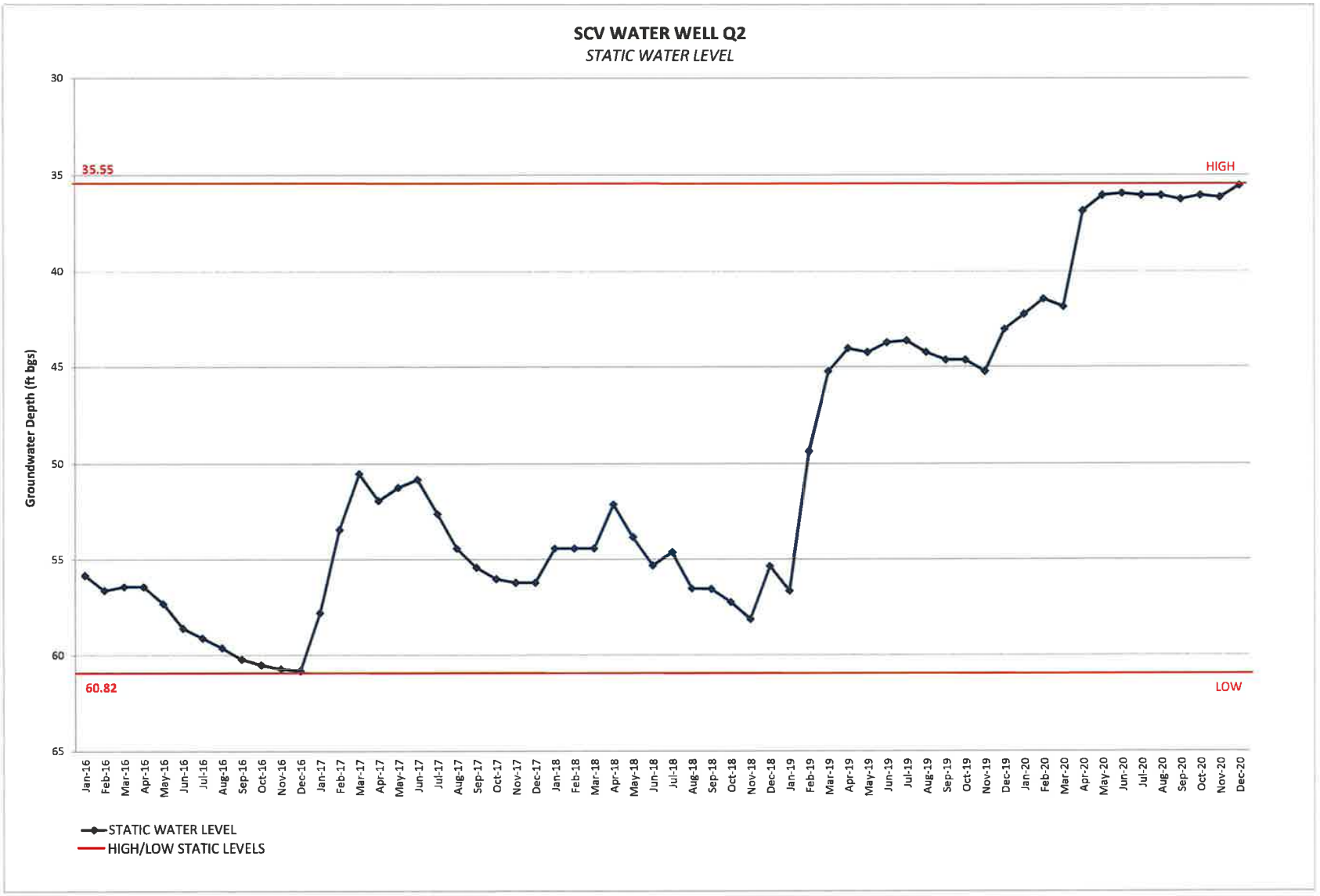
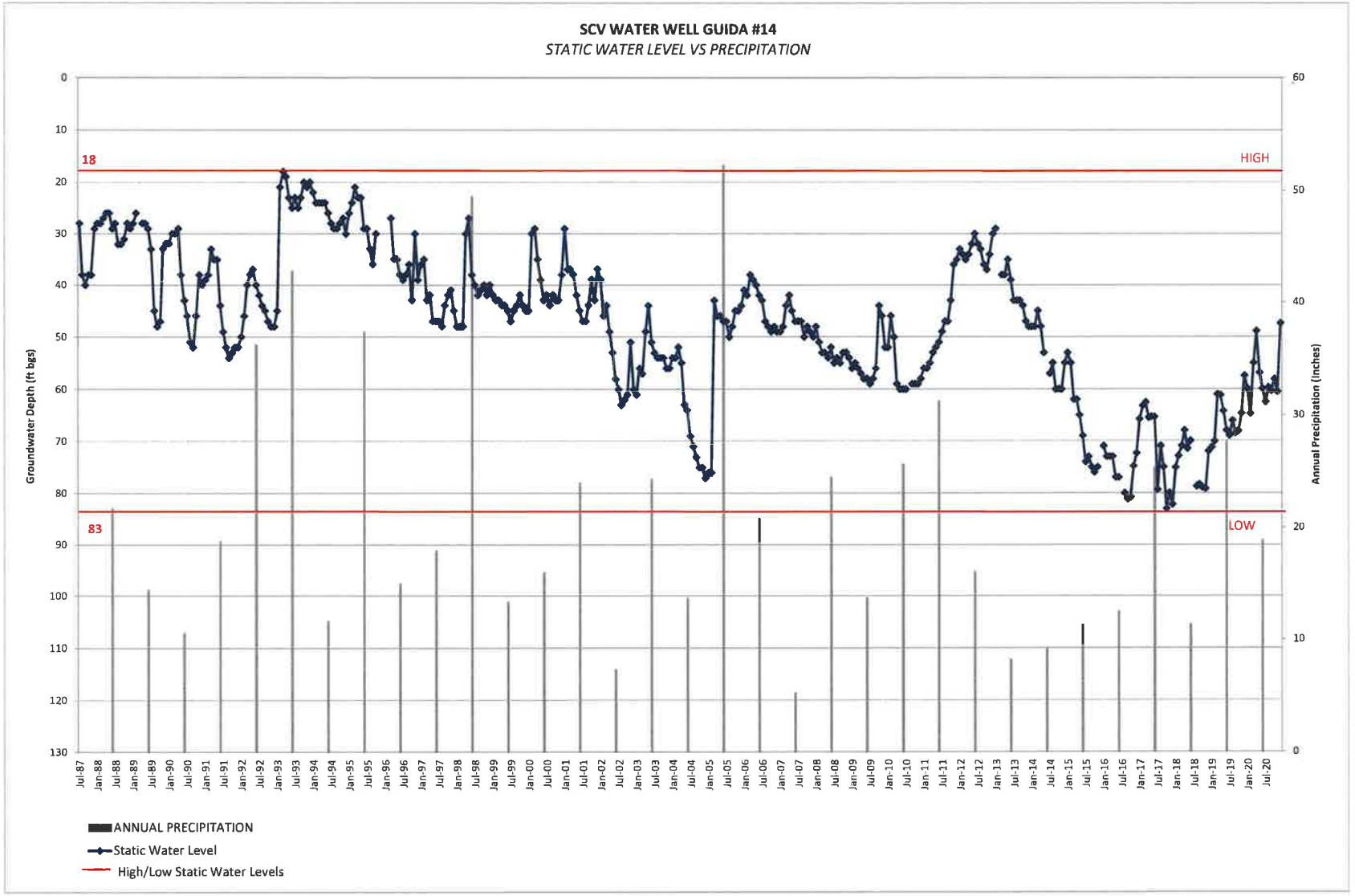
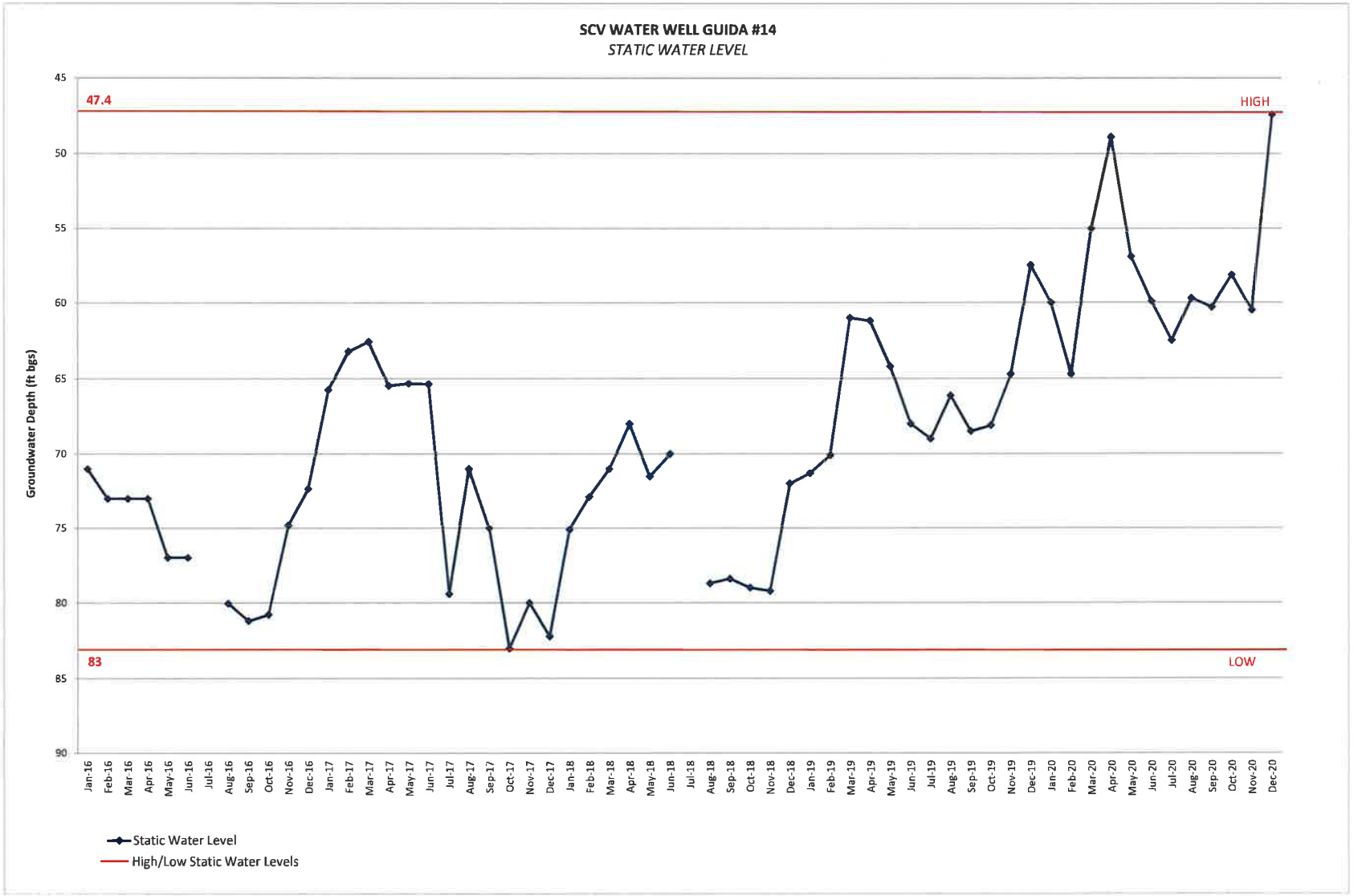
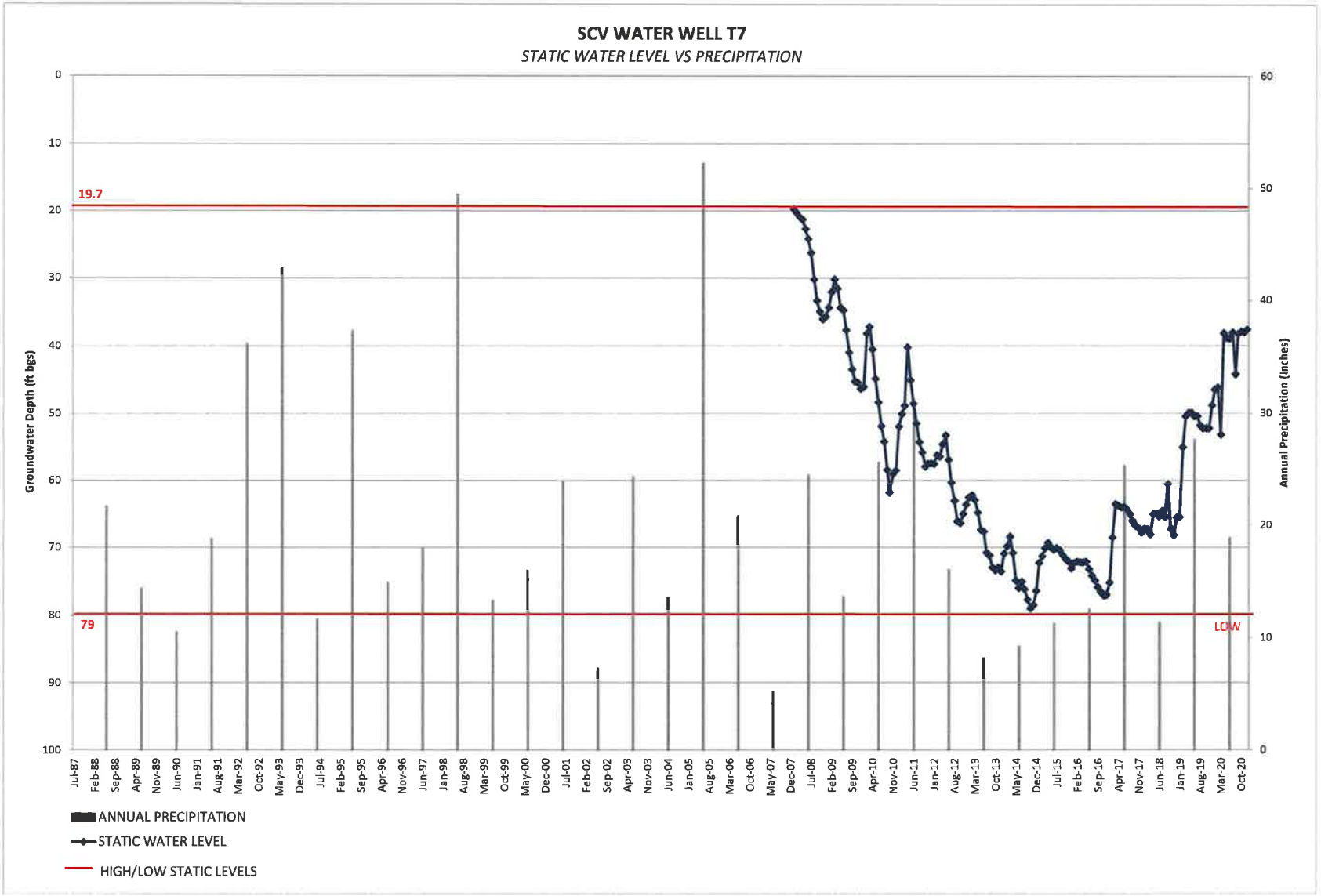
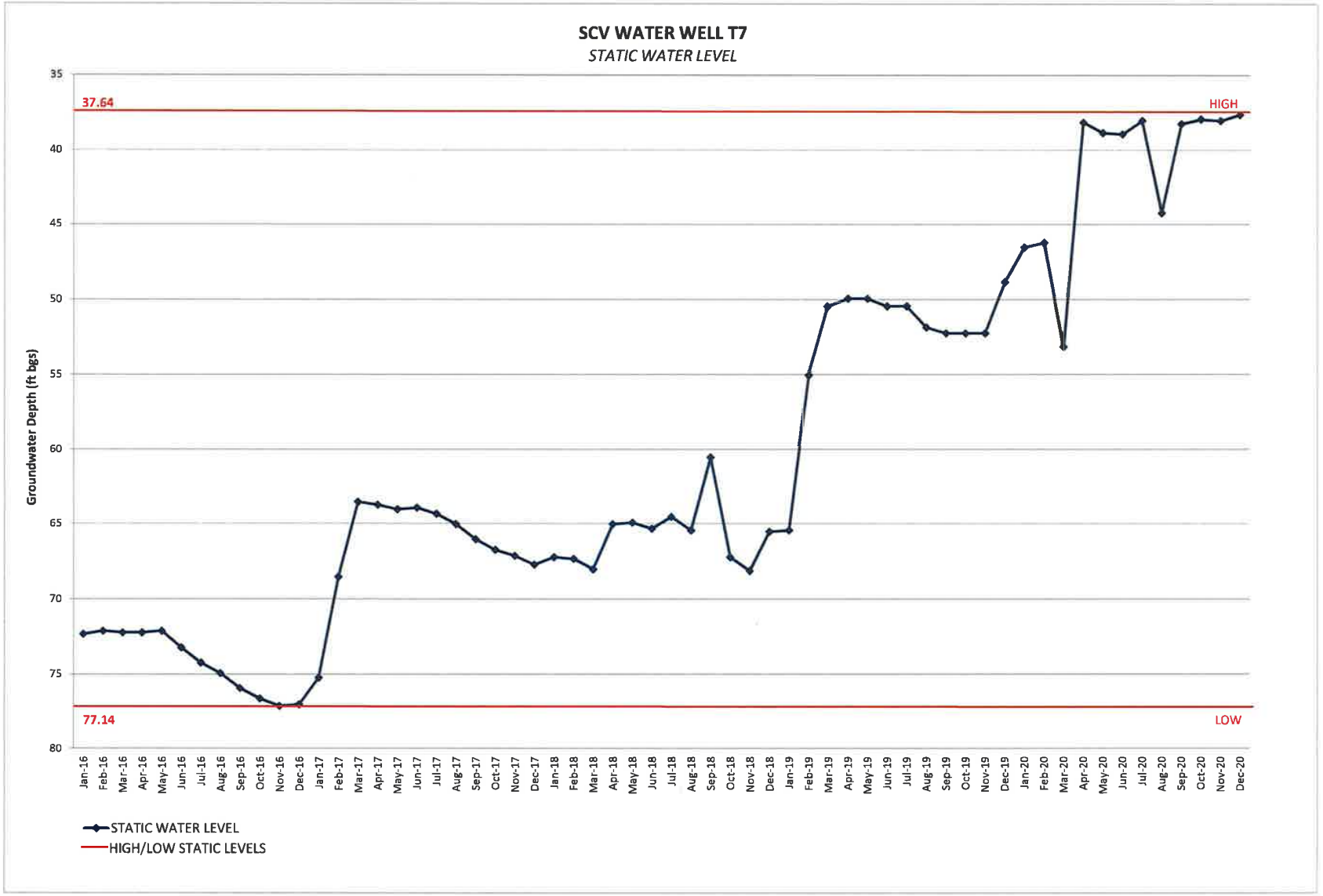
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL Q2
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
35.55
HIGH
60.82
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL GUIDA #14
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
18
HIGH
83
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL GUIDA #14
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
47.4
HIGH
83
LOW
45
50
55
60
65
70
75
80
85
90
Jan-16 Feb-16 Mar-16 Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16 Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-18 Jan-19 Feb-19 Mar-19 Apr-19 May-19 Jun-19 Jul-19 Aug-19 Sep-19 Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL T7
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
19.7
79
LOW
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL T7
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
35
40
45
50
55
60
65
70
75
80
37.64
HIGH
77.14
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
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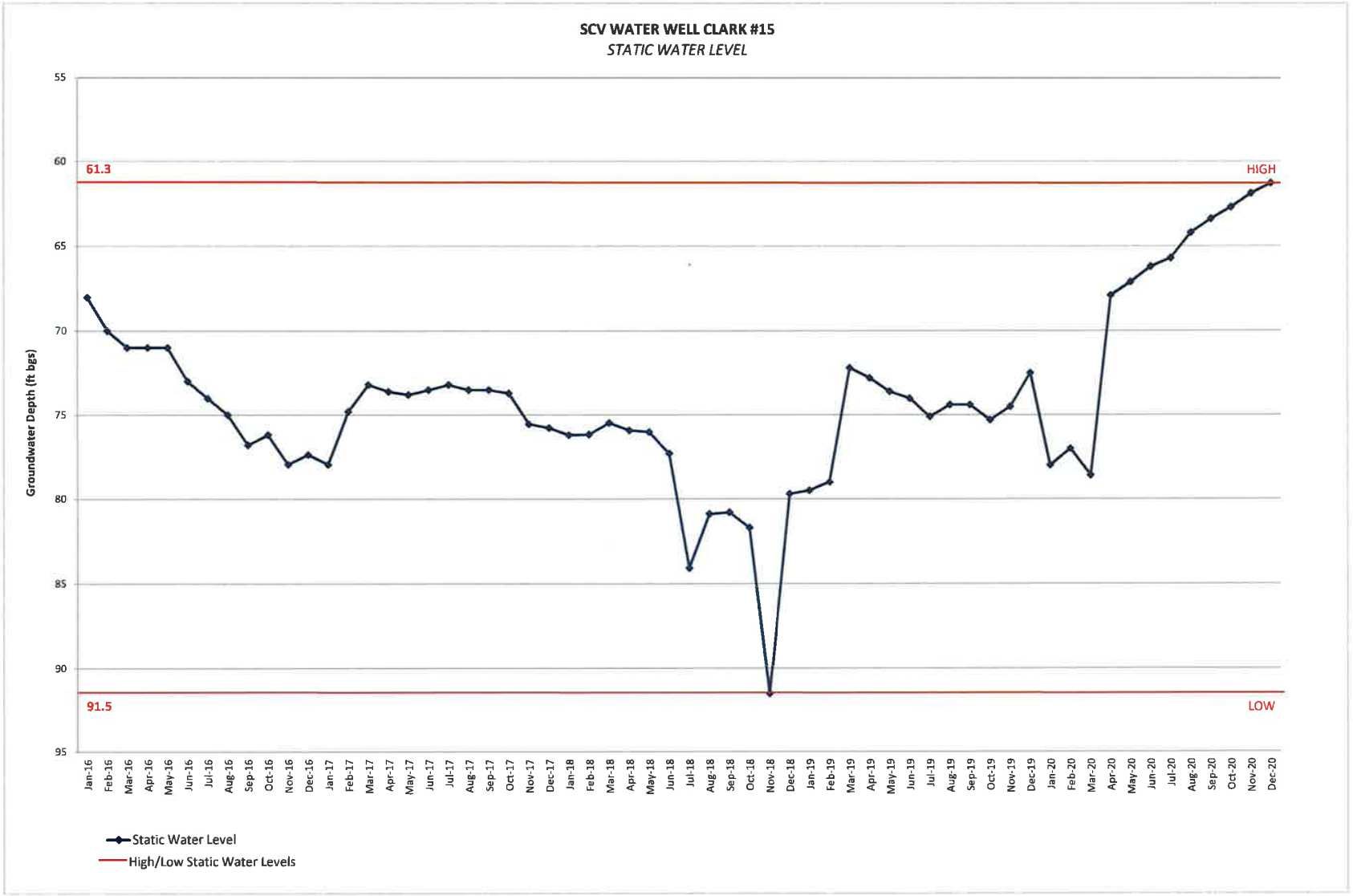
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL CLARK #15
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
17
HIGH
91.5
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL CLARK #15
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
55
60
65
70
75
80
85
90
95
61.3
HIGH
91.5
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
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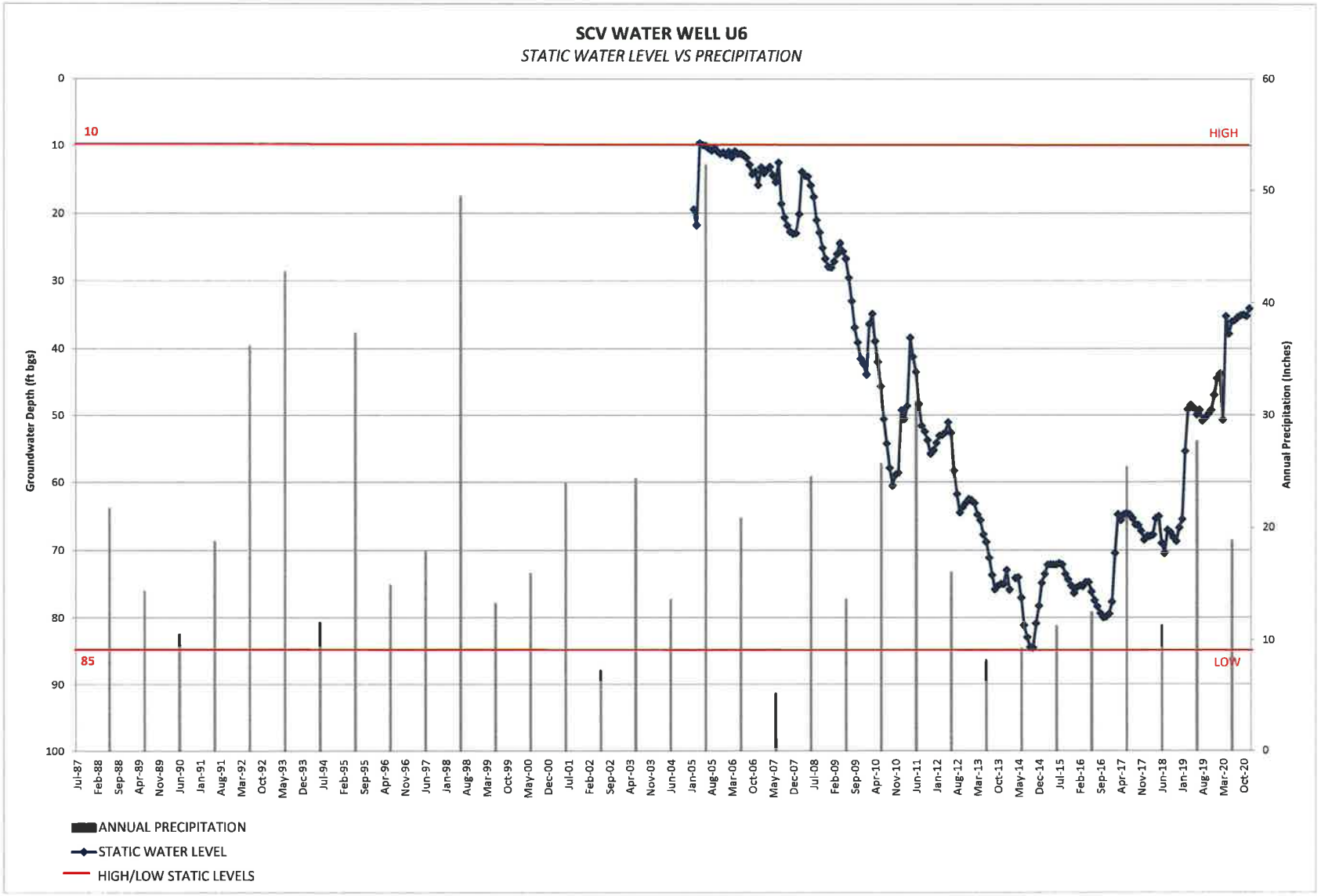
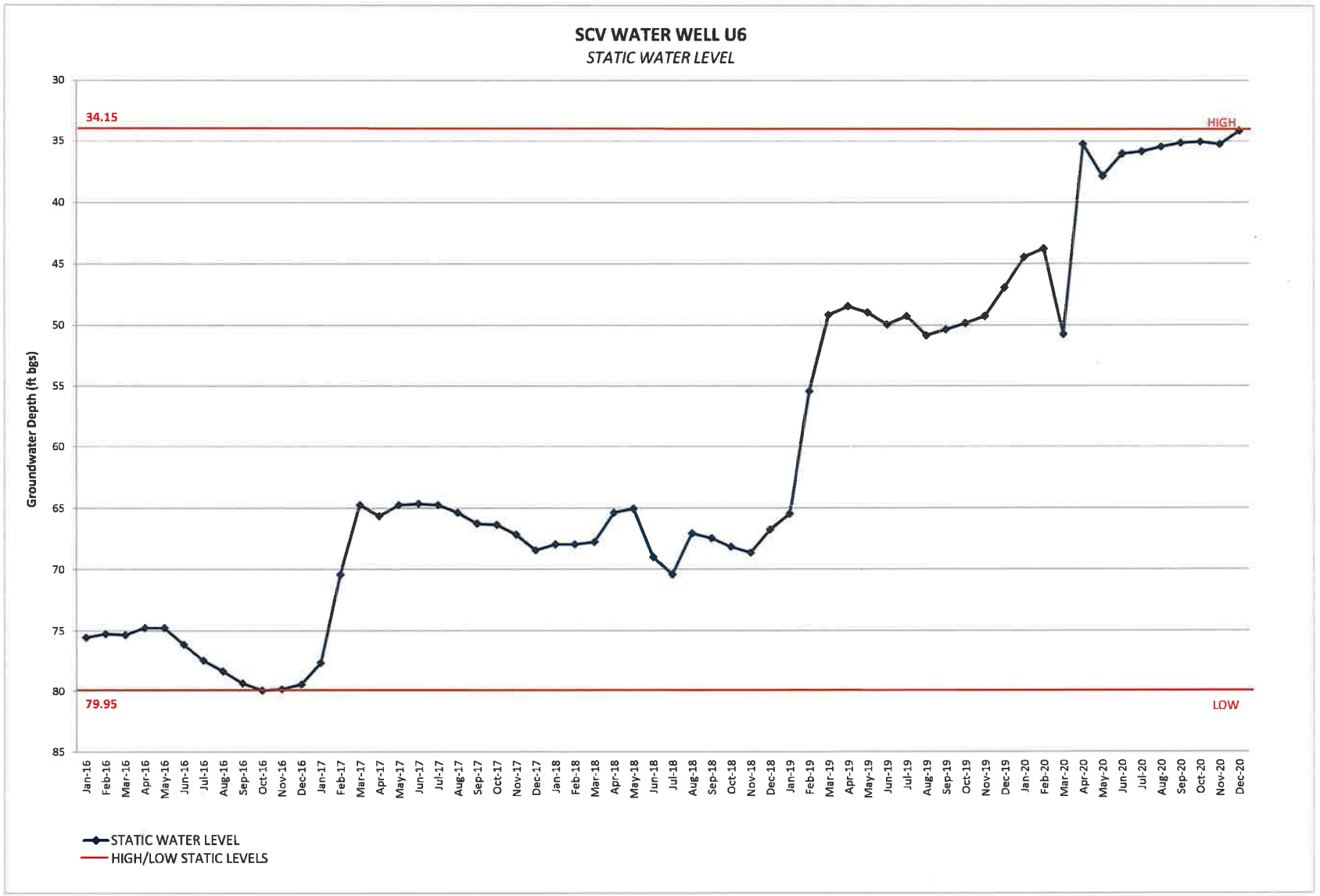
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL U6
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
10
HIGH
85
LOW
0
10
20
30
40
50
60
70
80
90
100
0
10
20
30
40
50
60
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL U6
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
34.15
HIGH
79.95
LOW
30
35
40
45
50
55
60
65
70
75
80
85
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
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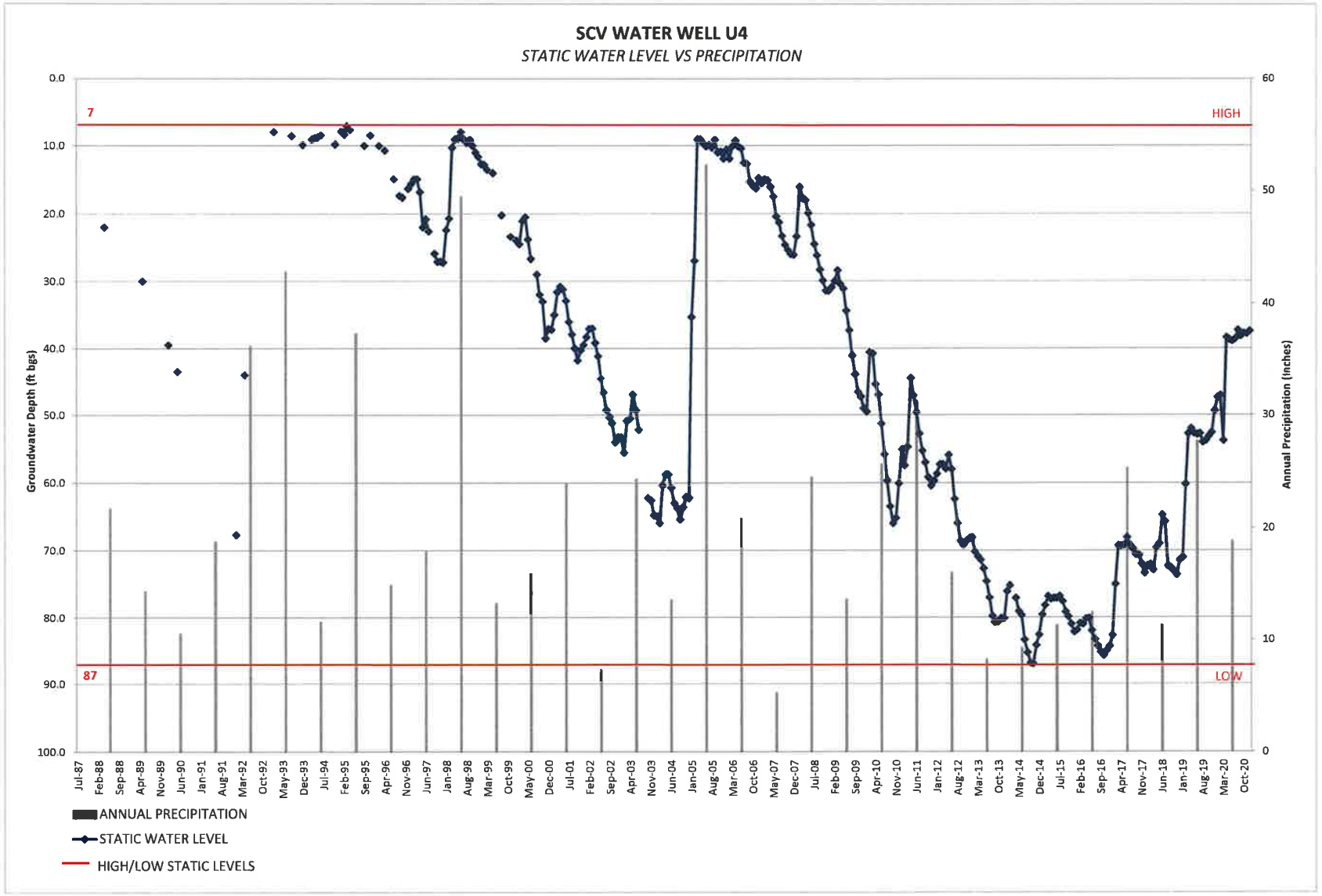
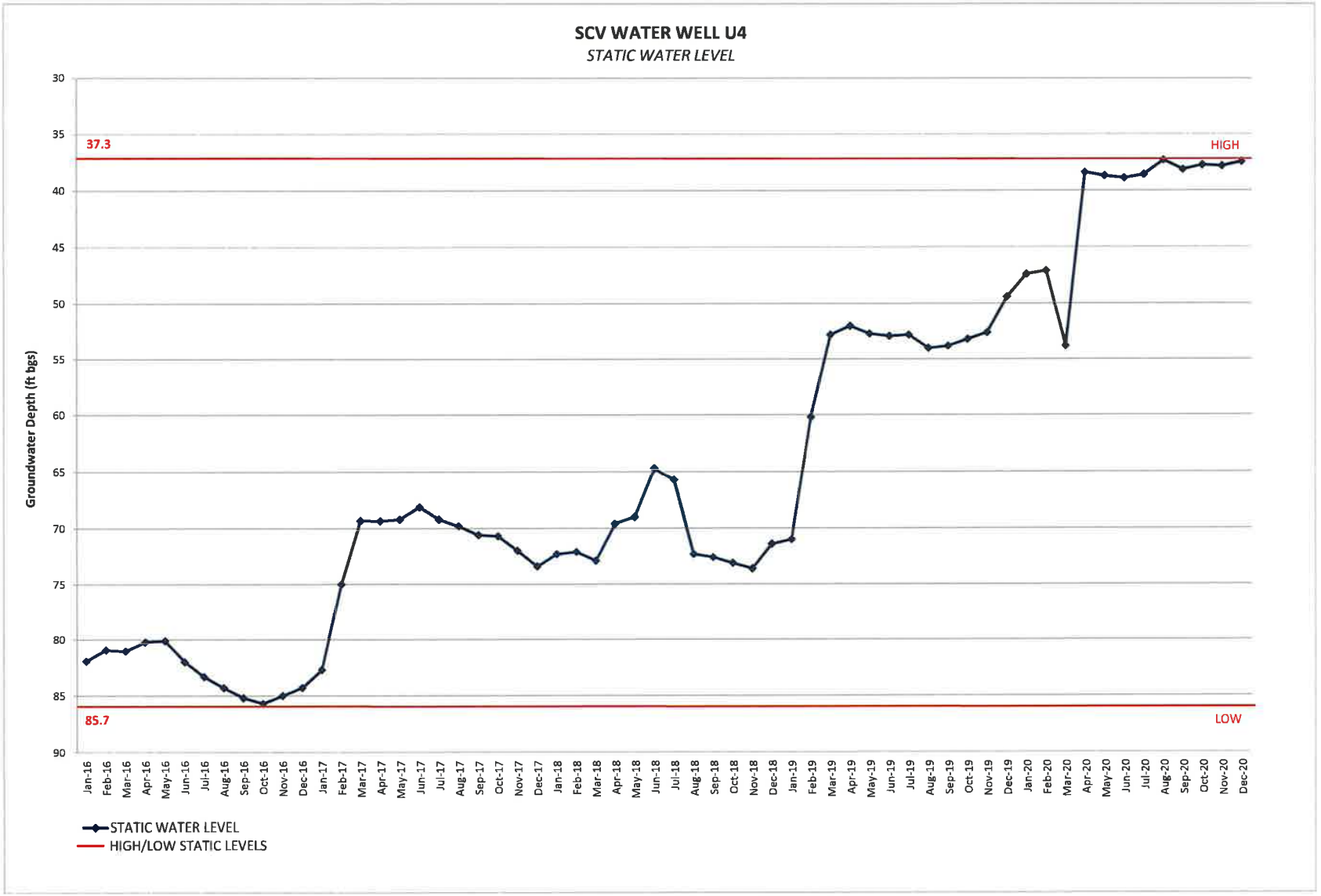
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL U4
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
7
HIGH
87
LOW
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
60
50
40
30
20
10
0
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL U4
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
30
35
40
45
50
55
60
65
70
75
80
85
90
37.3
HIGH
85.7
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
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May-17
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Sep-17
Oct-17
Nov-17
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Jul-19
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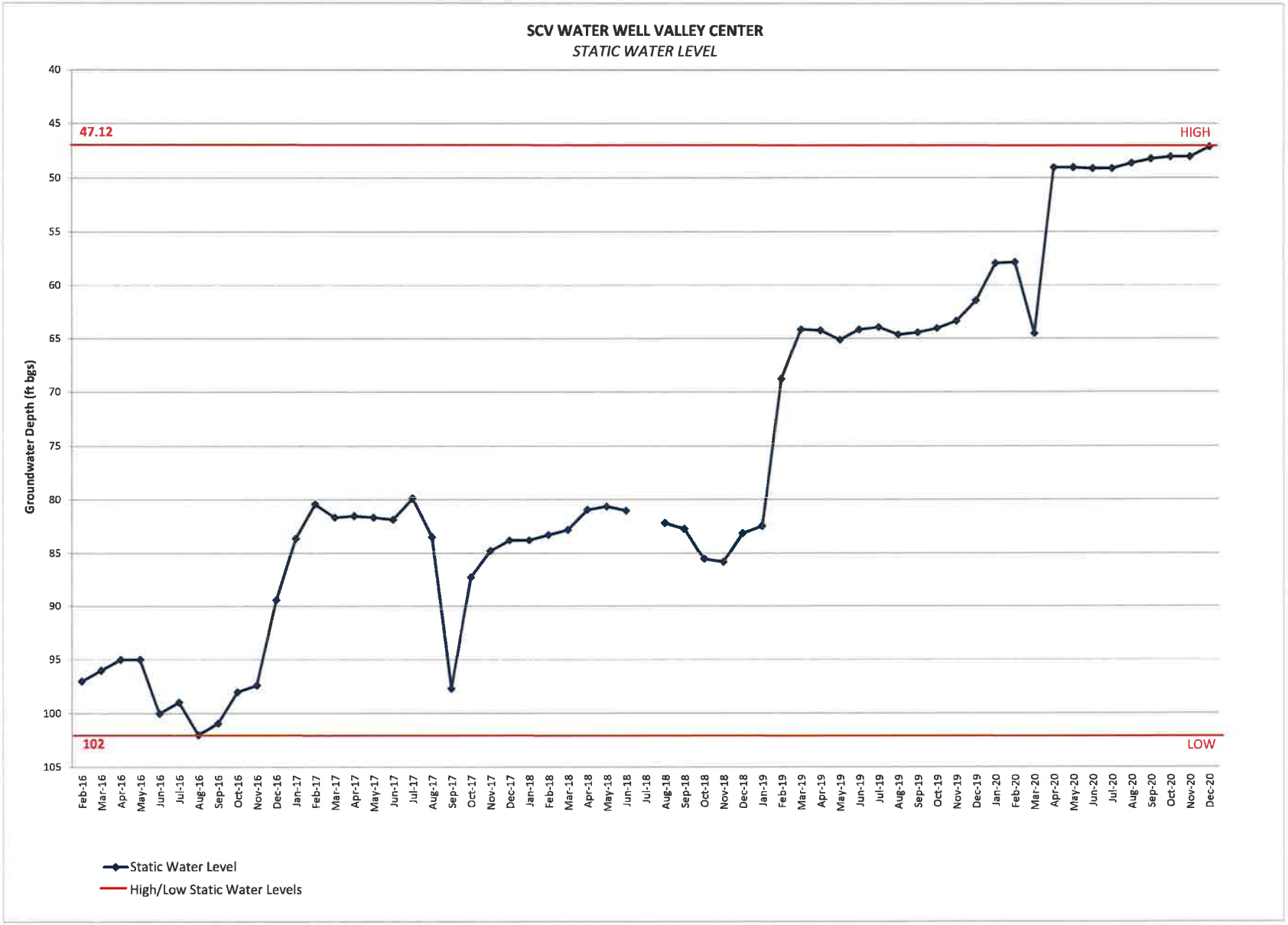
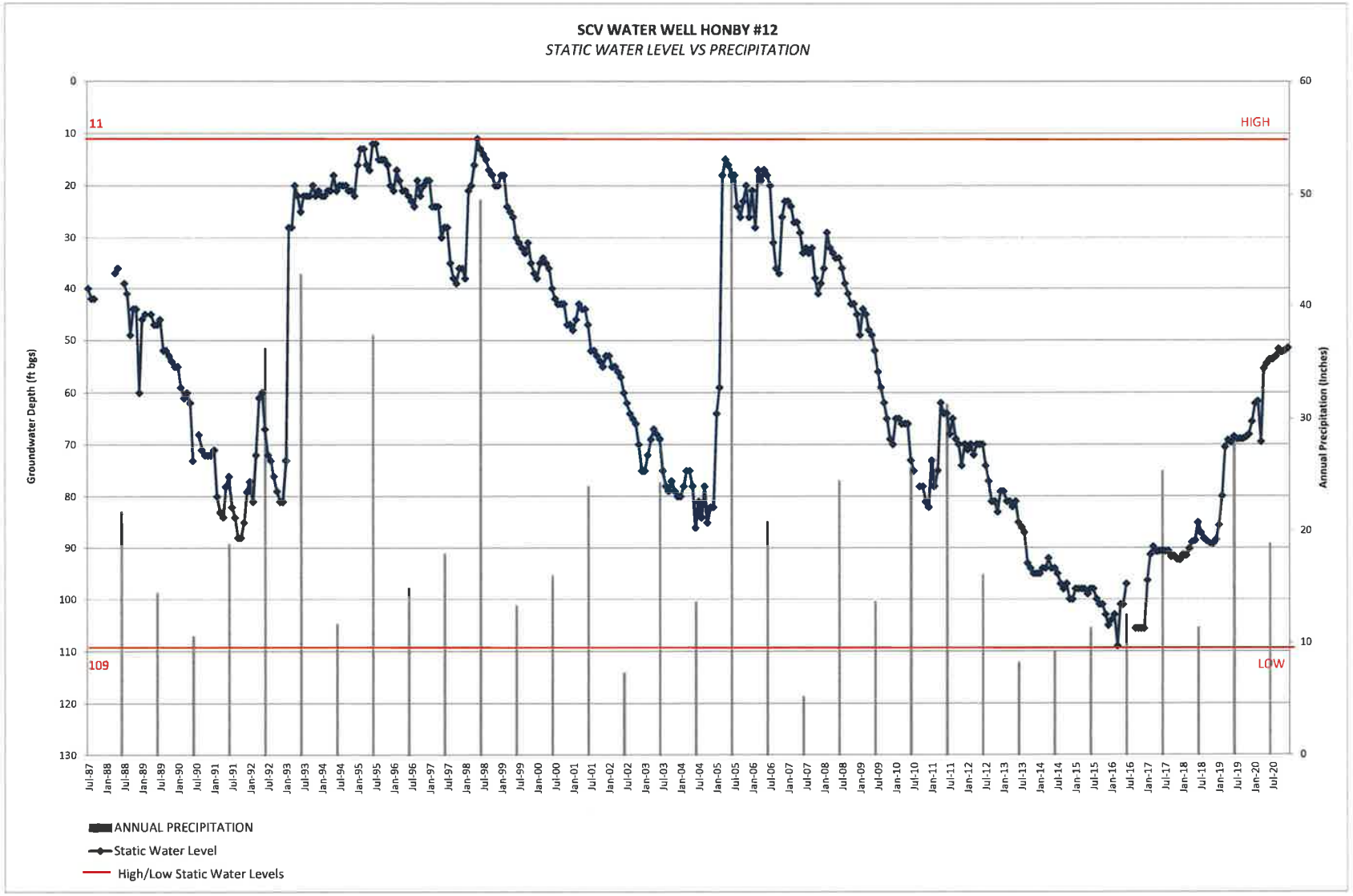
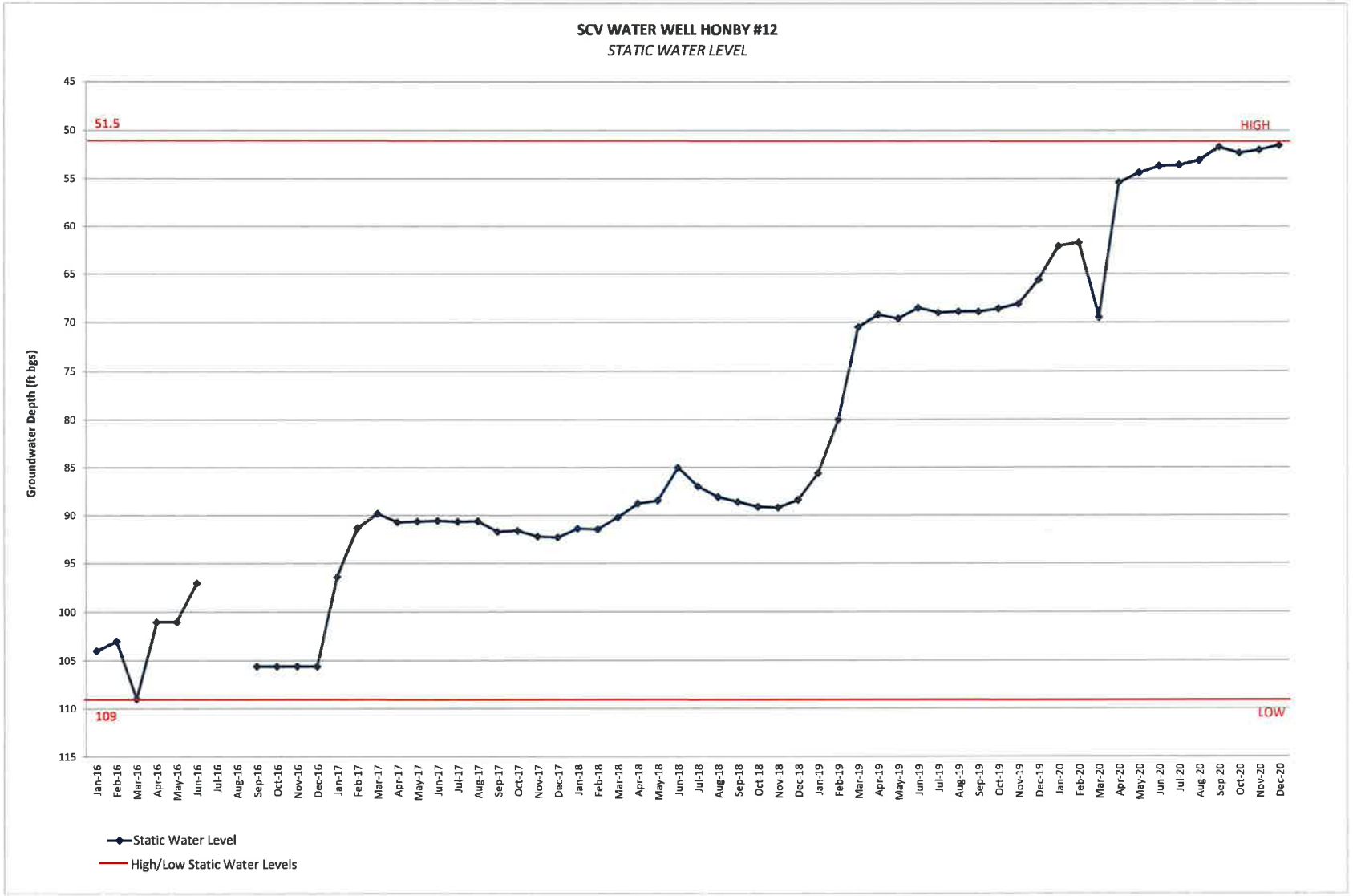
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
STATIC WATER LEVEL
HIGH/LOW STATIC LEVELS


SCV WATER WELL VALLEY CENTER
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
47.12
HIGH
102
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL VALLEY CENTER
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
40
45
50
55
60
65
70
75
80
85
90
95
100
105
47.12
HIGH
102
LOW
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL HONBY #12
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
11
HIGH
109
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL HONBY #12
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
51.5
HIGH
109
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
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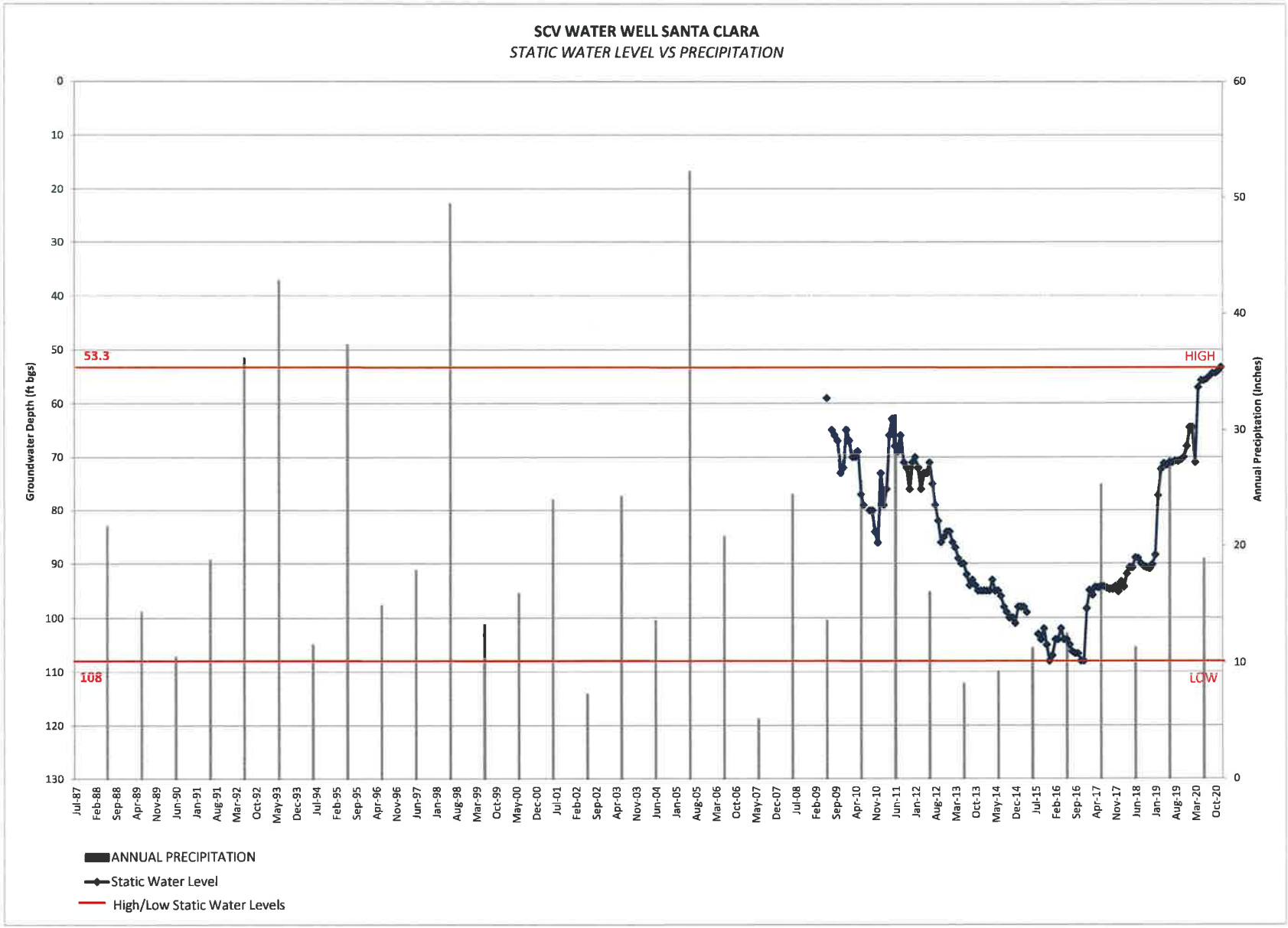
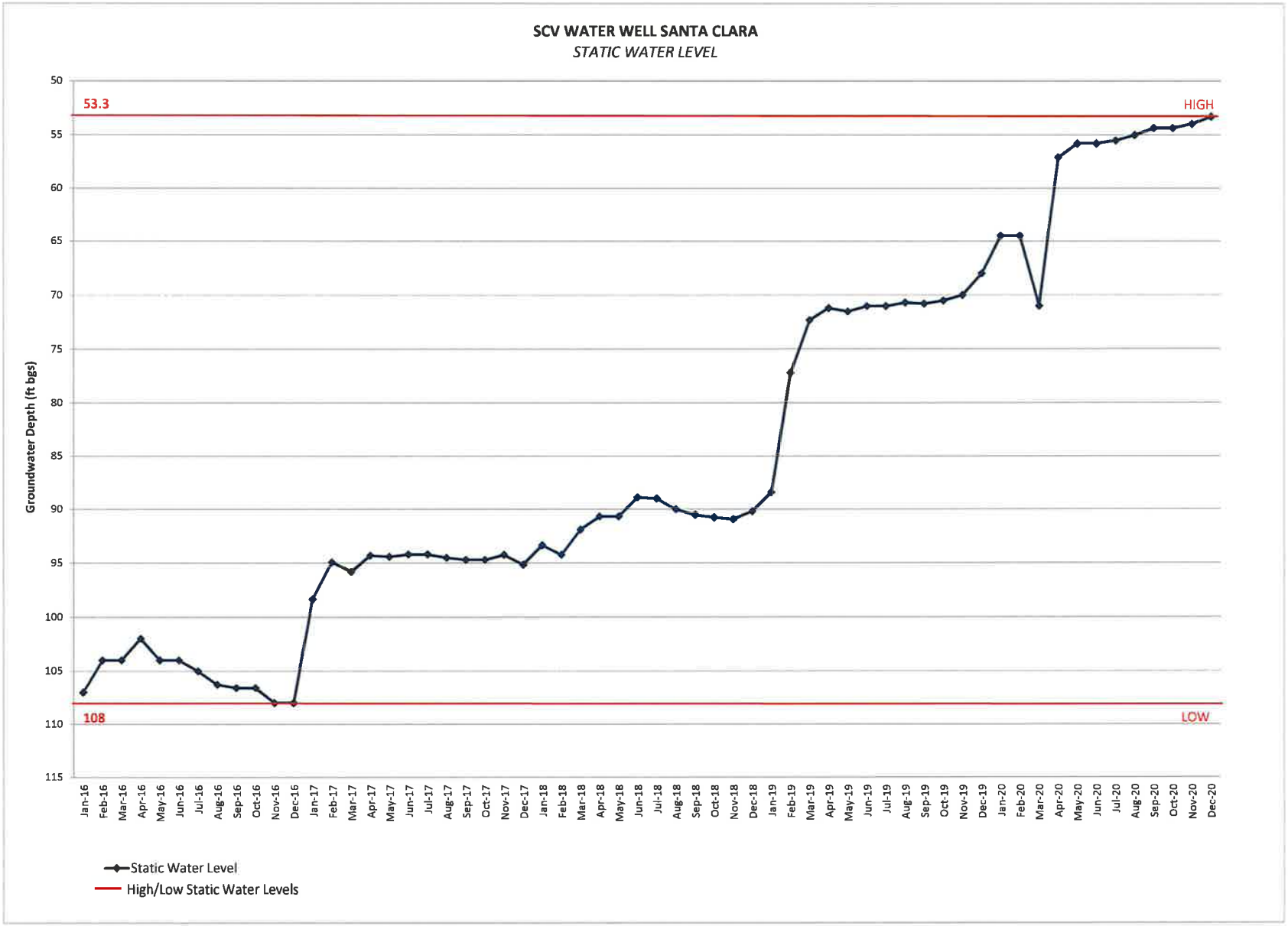
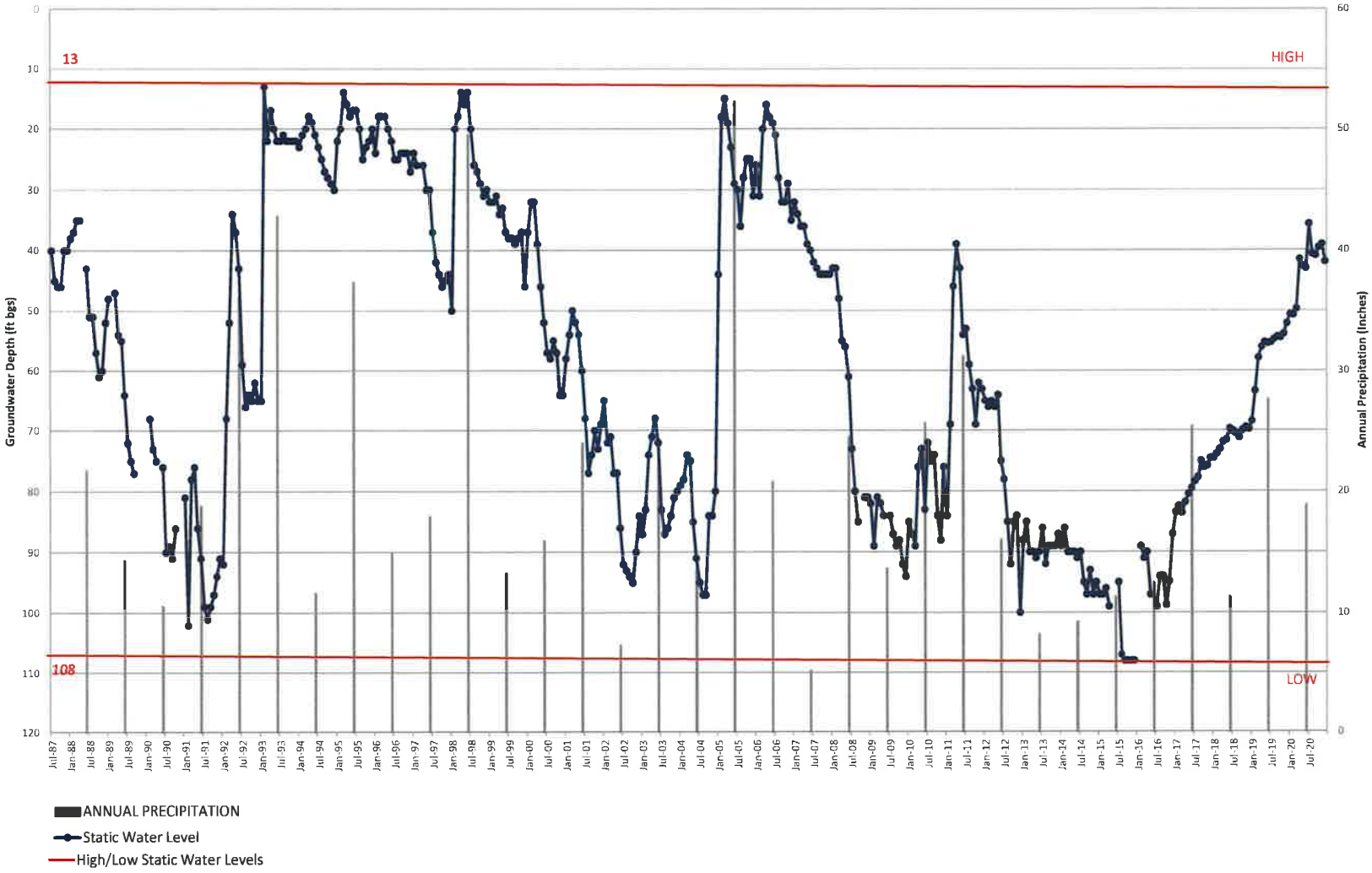
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL SANTA CLARA
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
53.3
HIGH
108
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL SANTA CLARA
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
53.3
HIGH
108
LOW
Static Water Level
High/Low Static Water Levels

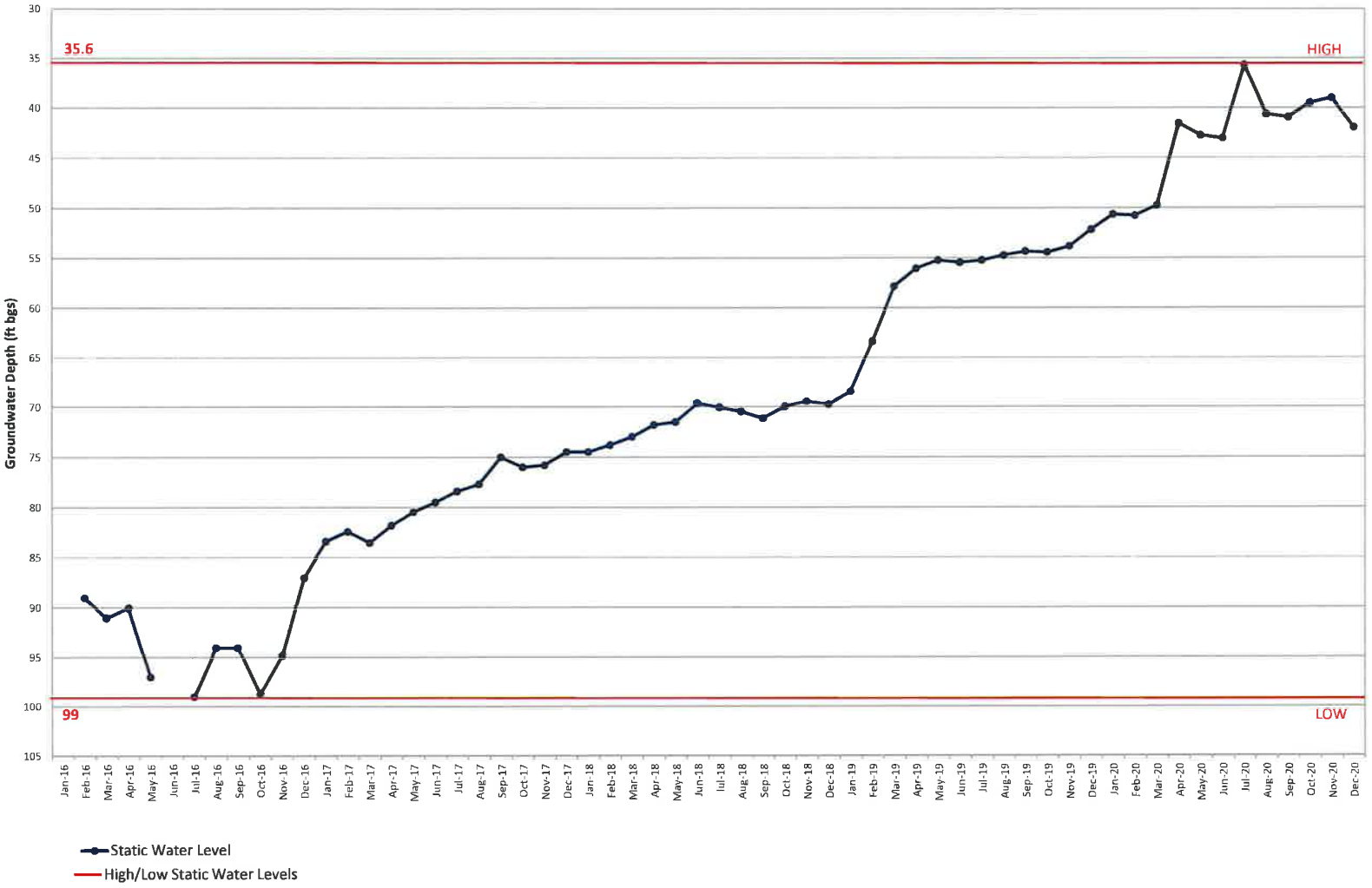
SCV WATER WELL NORTH OAKS CENTRAL #8

STATIC WATER LEVEL VS. PRECIPITATION

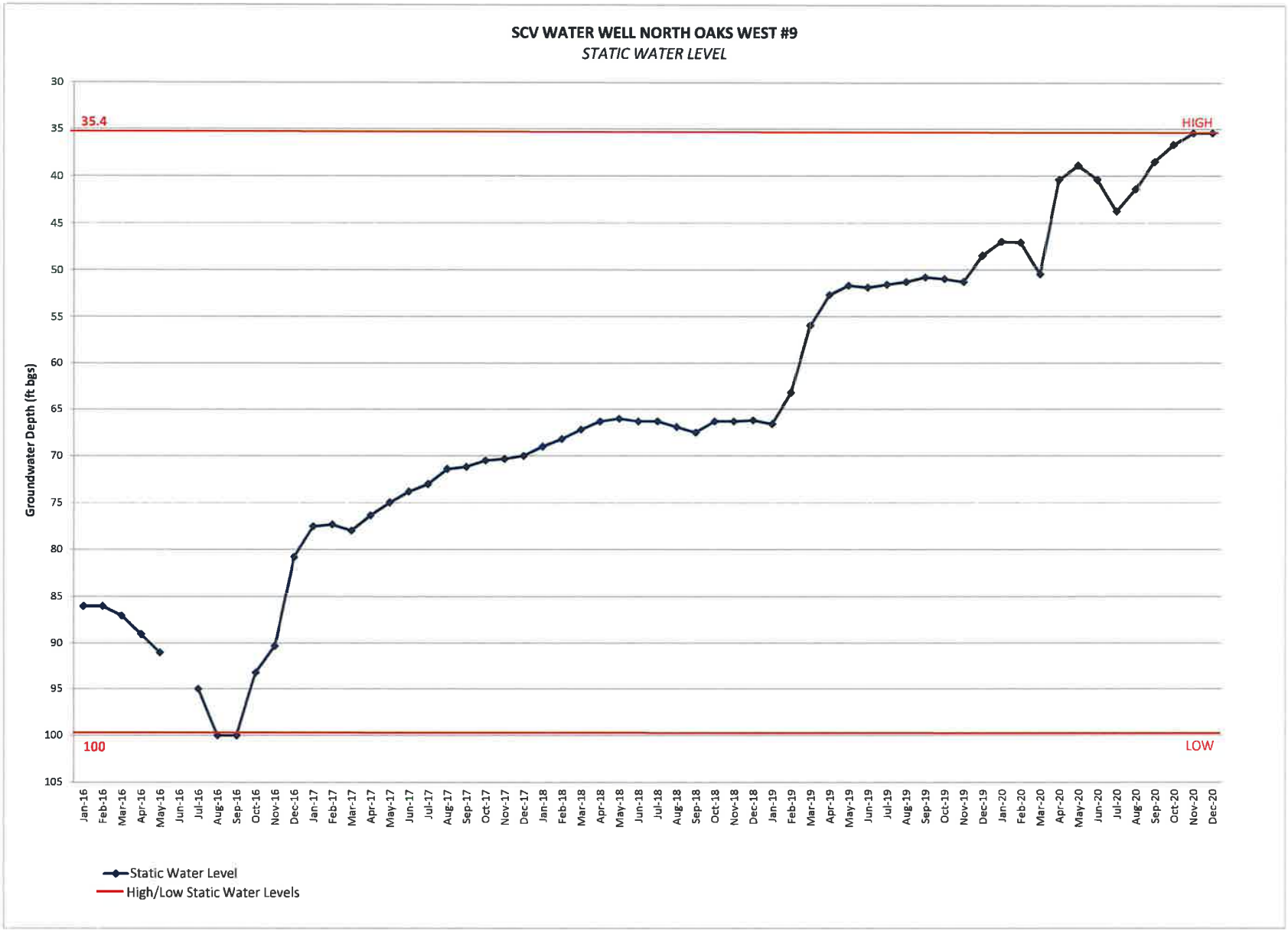


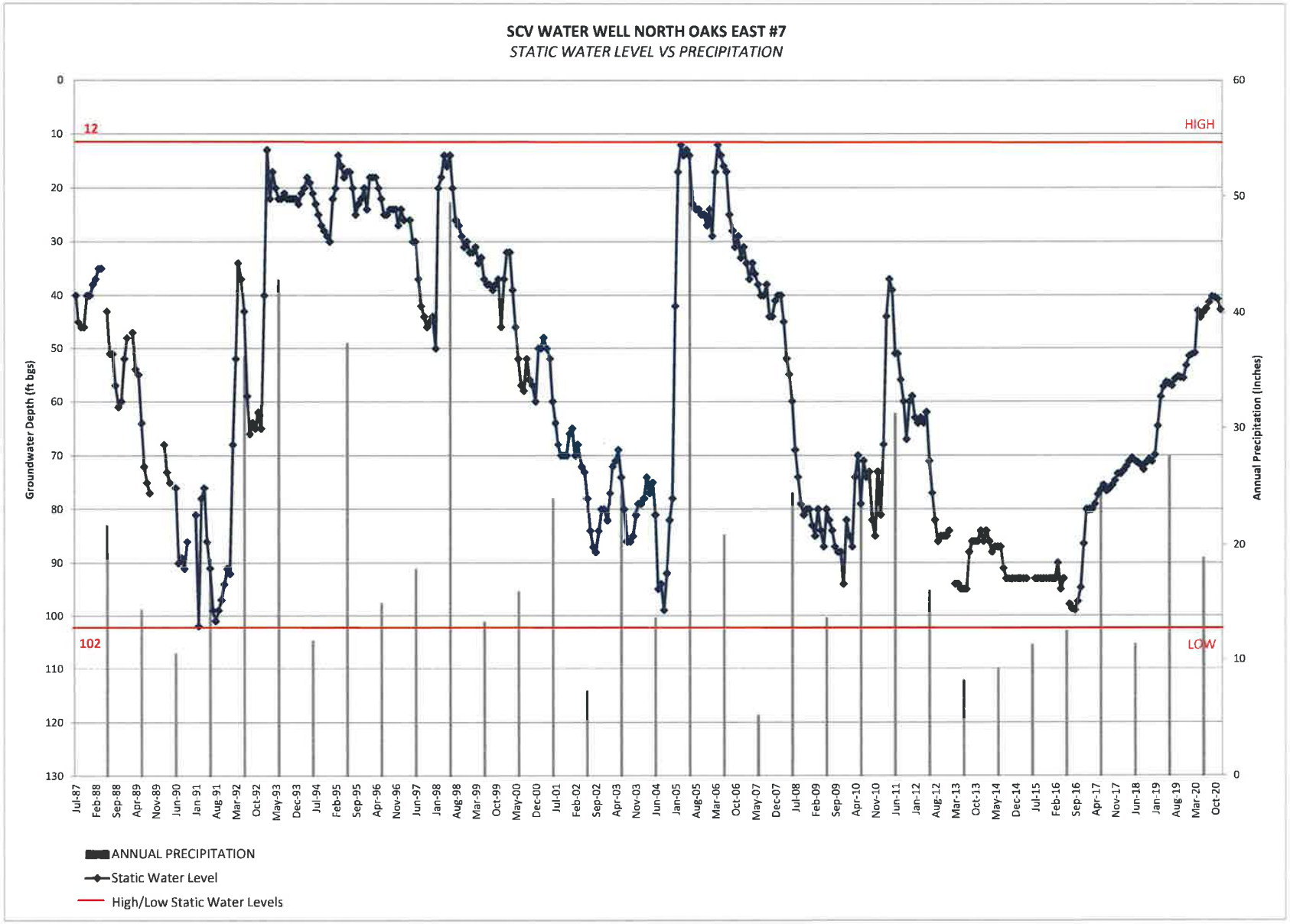
SCV WATER WELL NORTH OAKS CENTRAL #8

STATIC WATER LEVEL




SCV WATER WELL NORTH OAKS WEST #9
STATIC WATER LEVEL VS PRECIPITATION
8
HIGH
100
LOW
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
60
50
40
30
20
10
0
Jul-87
Feb-88
Sep-88
Apr-89
Nov-89
Jun-90
Jan-91
Aug-91
Mar-92
Oct-92
May-93
Dec-93
Jul-94
Feb-95
Sep-95
Apr-96
Nov-96
Jun-97
Jan-98
Aug-98
Mar-99
Oct-99
May-00
Dec-00
Jul-01
Feb-02
Sep-02
Apr-03
Nov-03
Jun-04
Jan-05
Aug-05
Mar-06
Oct-06
May-07
Dec-07
Jul-08
Feb-09
Sep-09
Apr-10
Nov-10
Jun-11
Jan-12
Aug-12
Mar-13
Oct-13
May-14
Dec-14
Jul-15
Feb-16
Sep-16
Apr-17
Nov-17
Jun-18
Jan-19
Aug-19
Mar-20
Oct-20
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL NORTH OAKS WEST #9
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
35.4
HIGH
100
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL NORTH OAKS EAST #7
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
12
HIGH
102
LOW
0
10
20
30
40
50
60
70
80
90
100
110
120
130
60
50
40
30
20
10
0
Jul-87
Feb-88
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Jun-90
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Aug-12
Mar-13
Oct-13
May-14
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Jul-15
Feb-16
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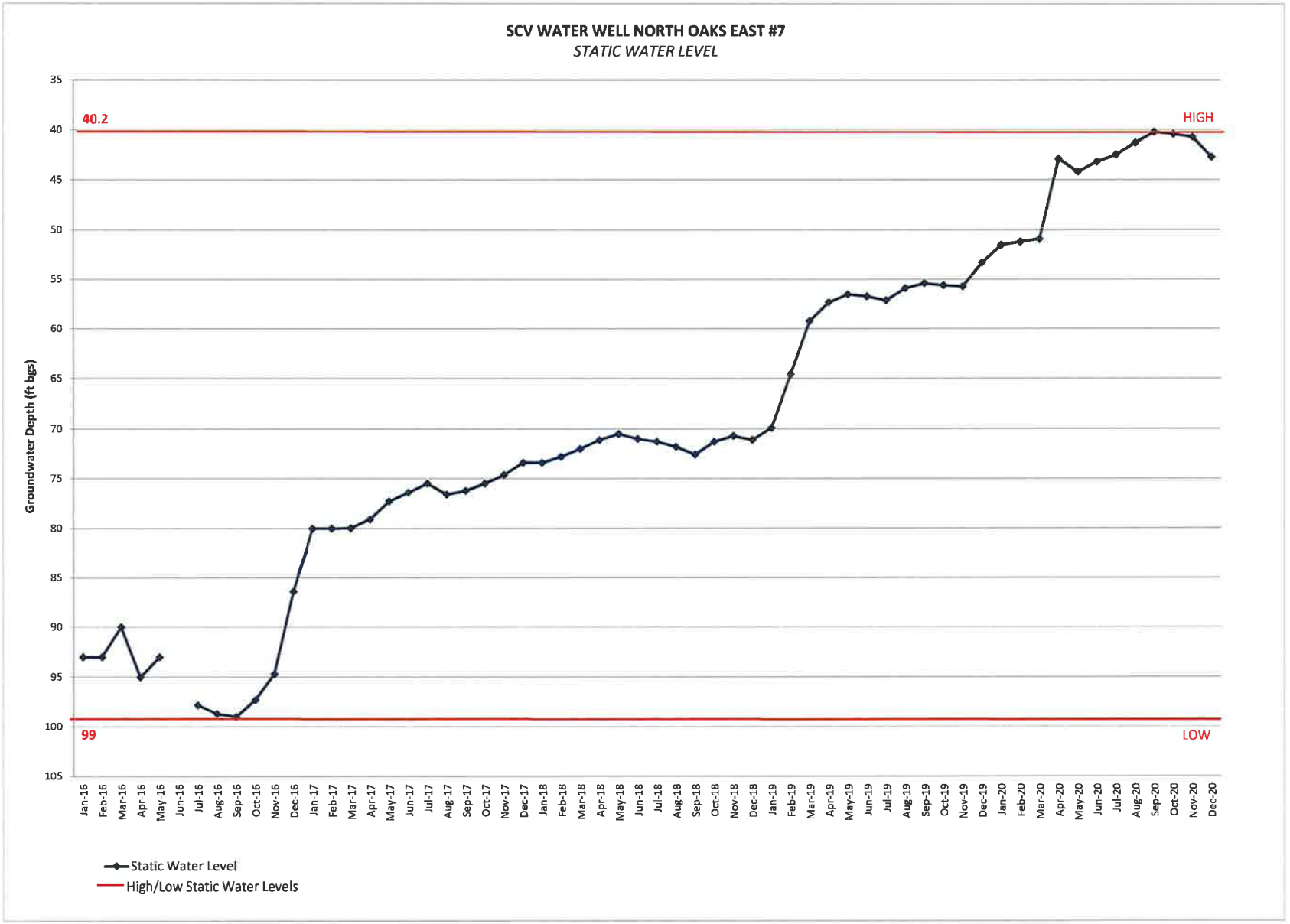
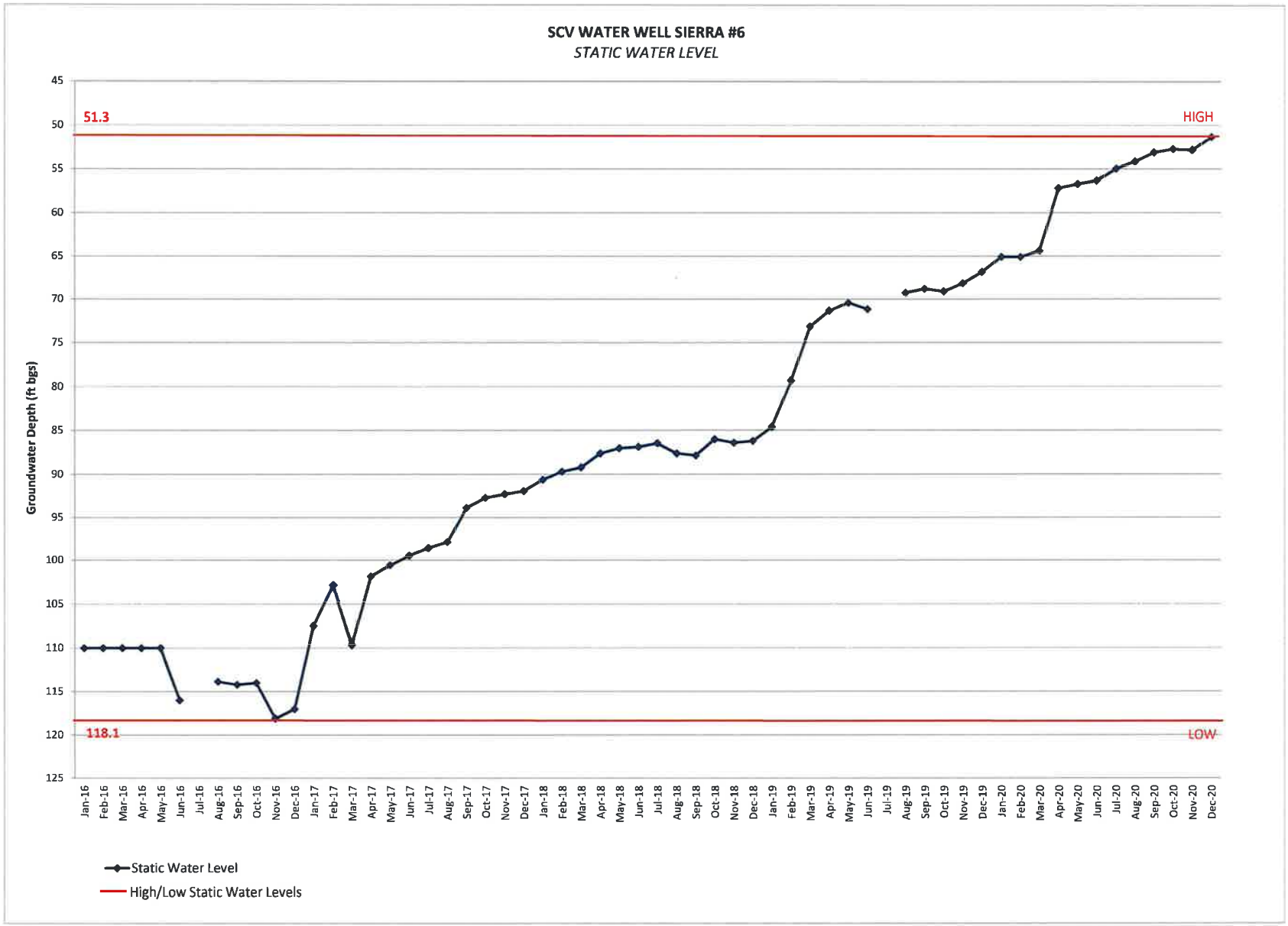
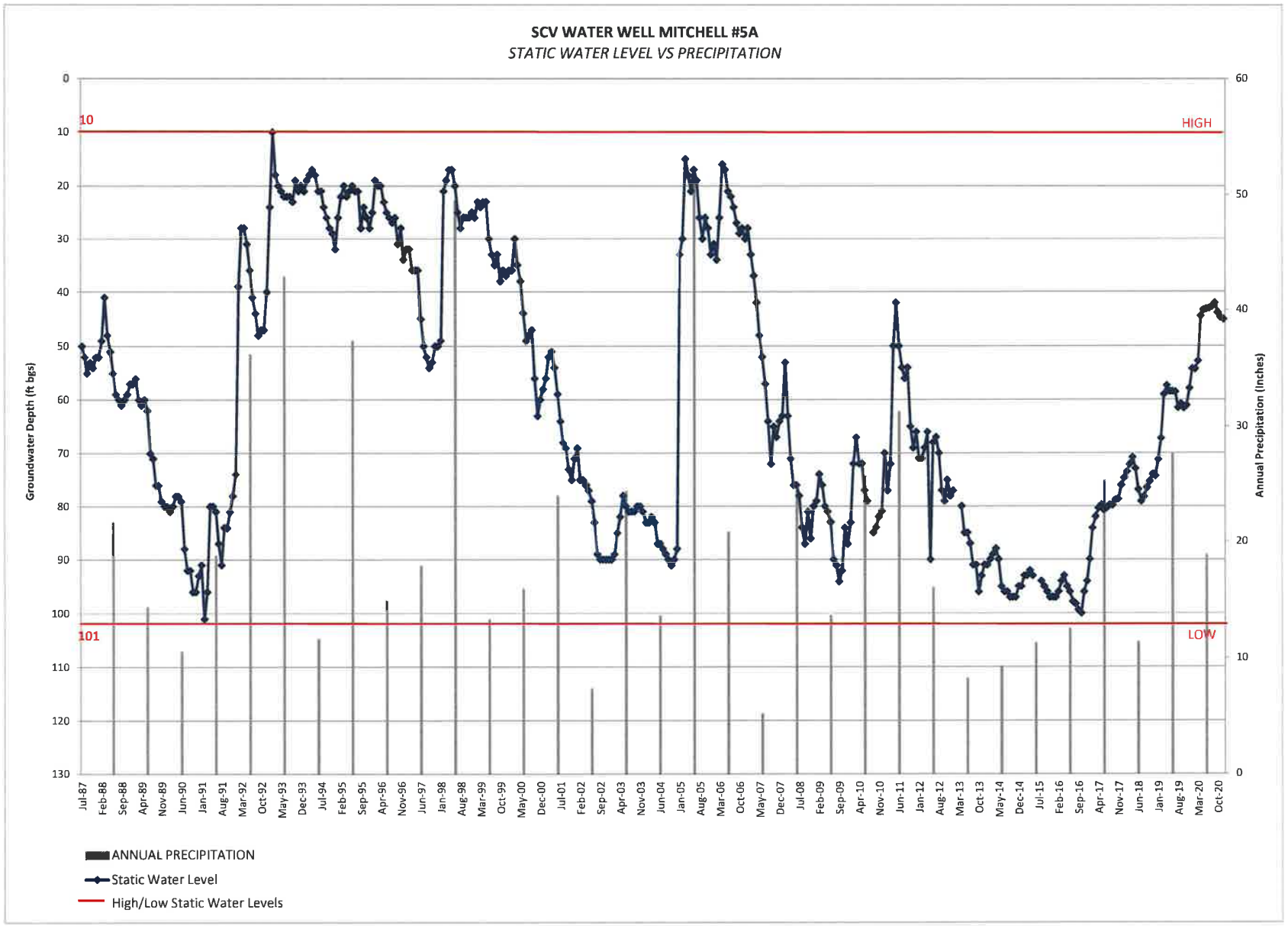
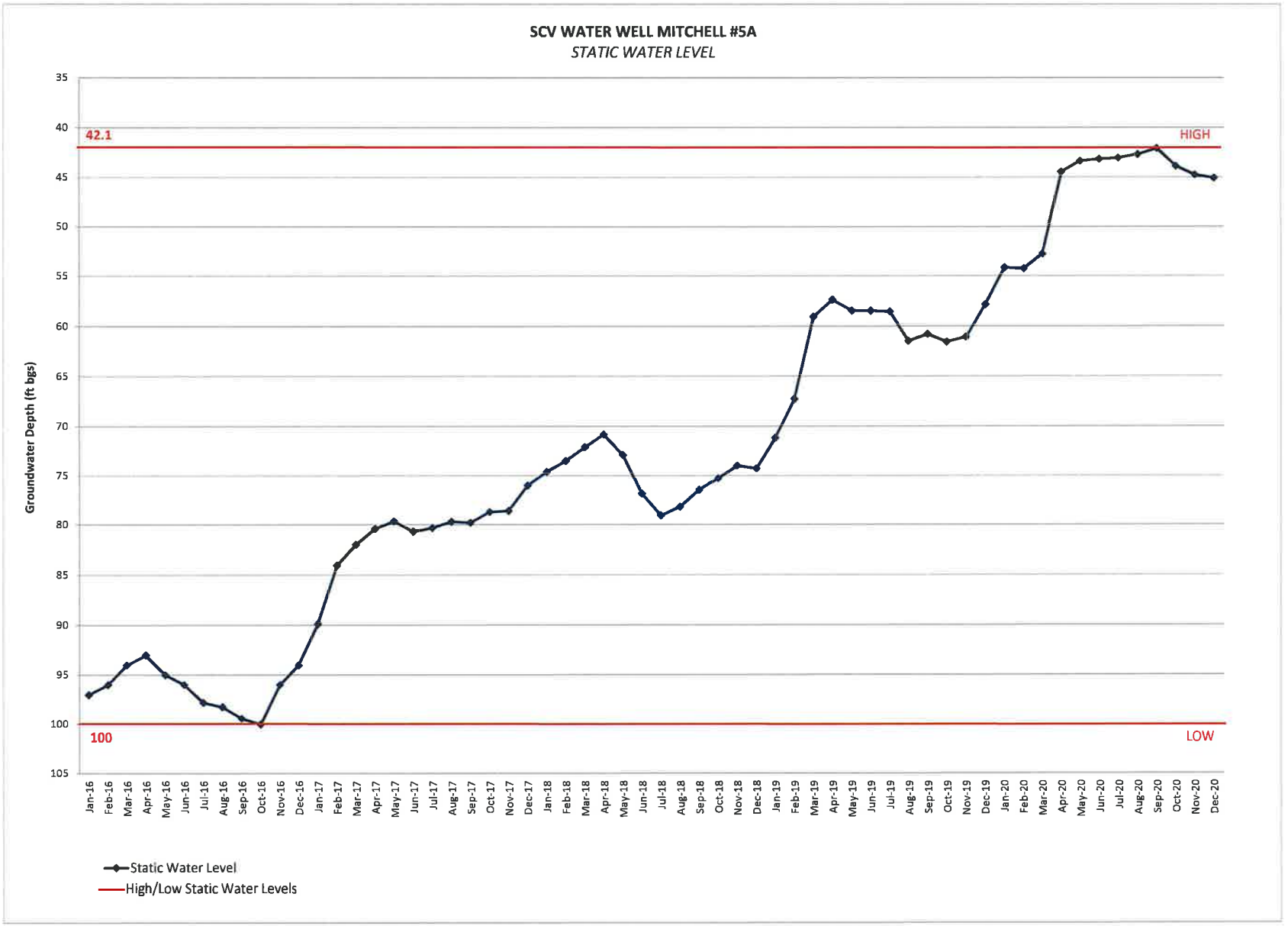
Mar-20
Oct-20
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL NORTH OAKS EAST #7
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
40.2
HIGH
99
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL SIERRA #6
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
20
HIGH
118
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL SIERRA #6
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
51.3
HIGH
118.1
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL MITCHELL #5A
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
10
HIGH
101
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL MITCHELL #5A
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
42.1
HIGH
100
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
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Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL MITCHELL #5B
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
14
HIGH
97
LOW
0
10
20
30
40
50
60
70
80
90
100
110
120
130
0
10
20
30
40
50
60
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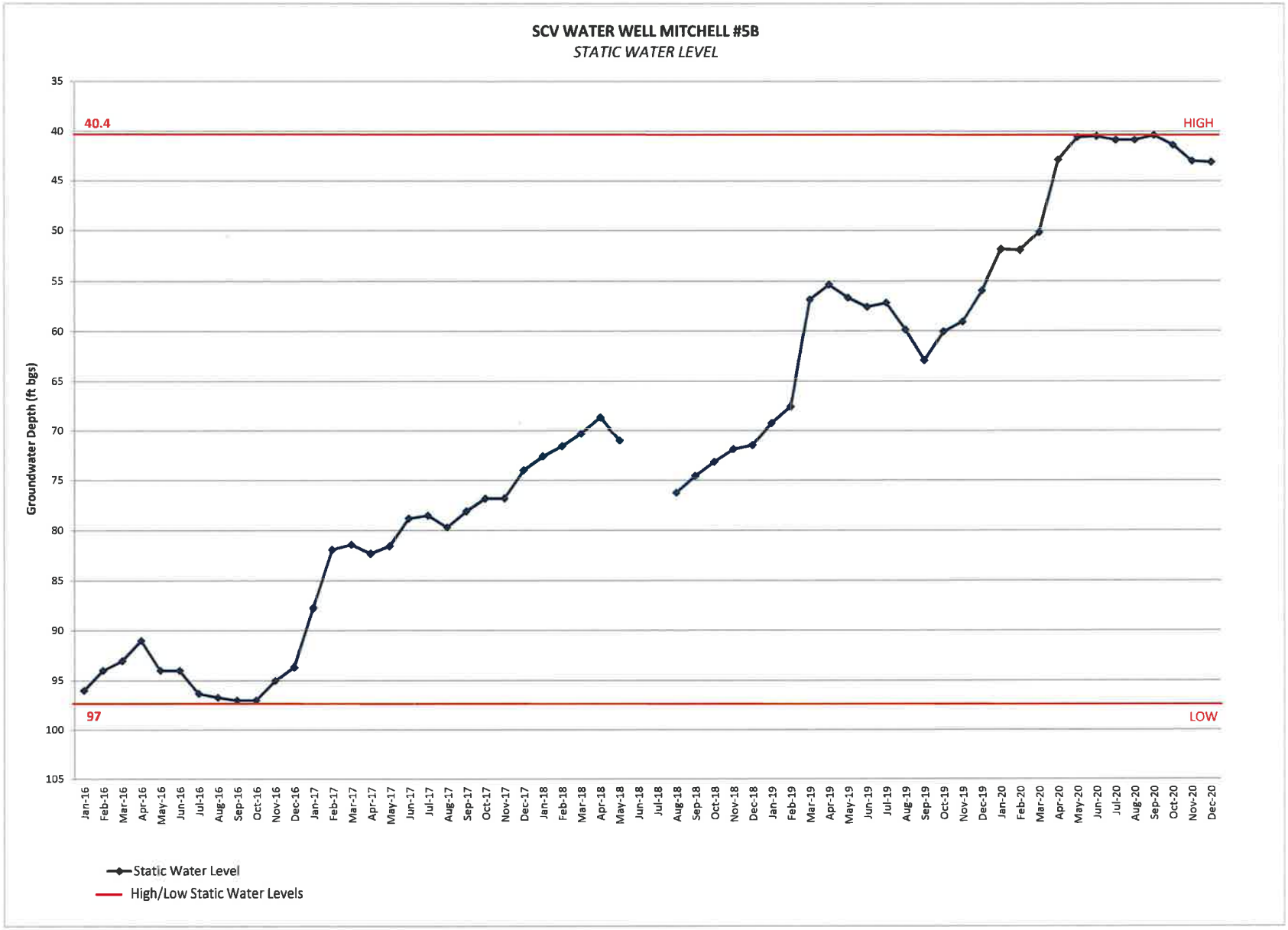
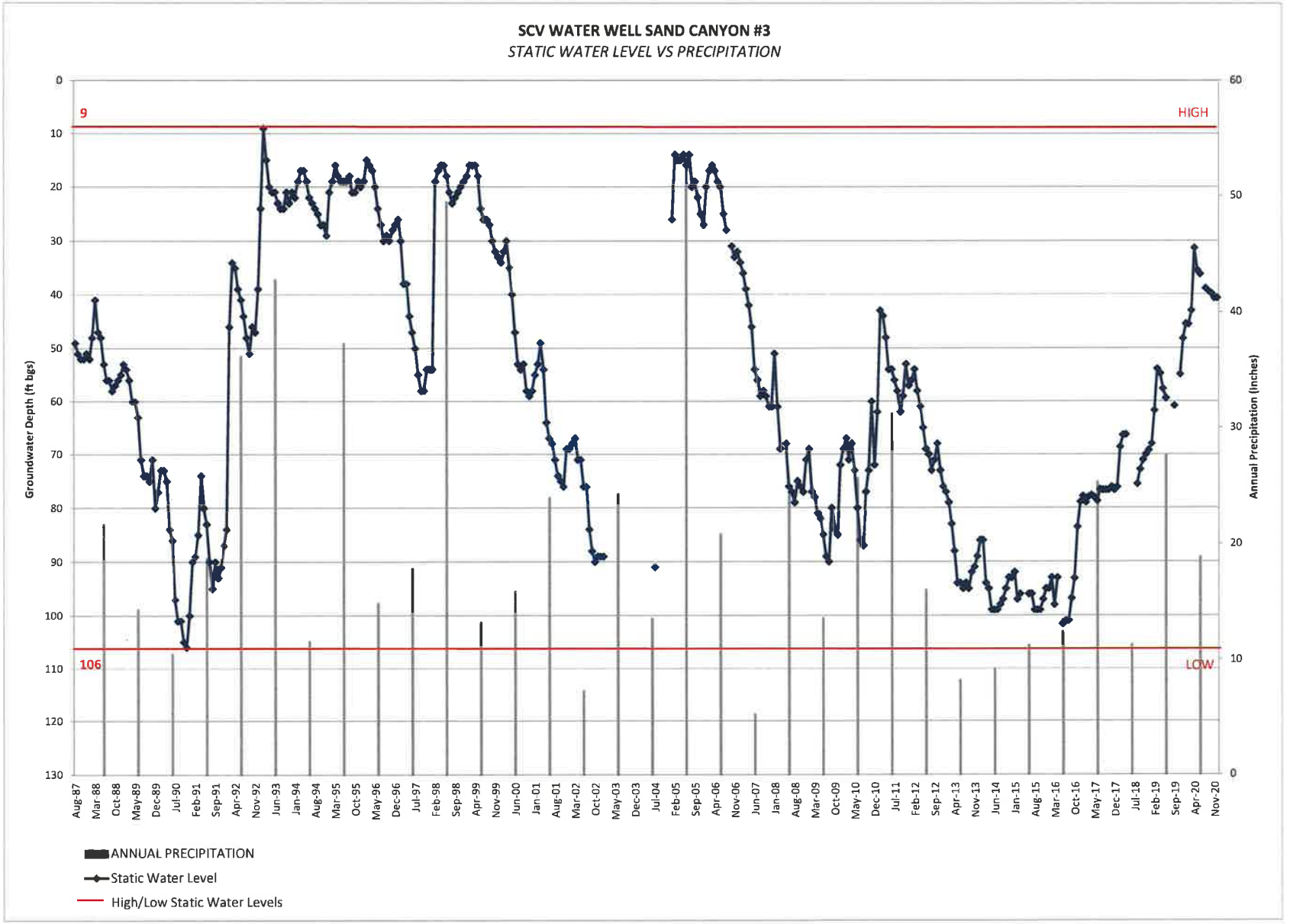
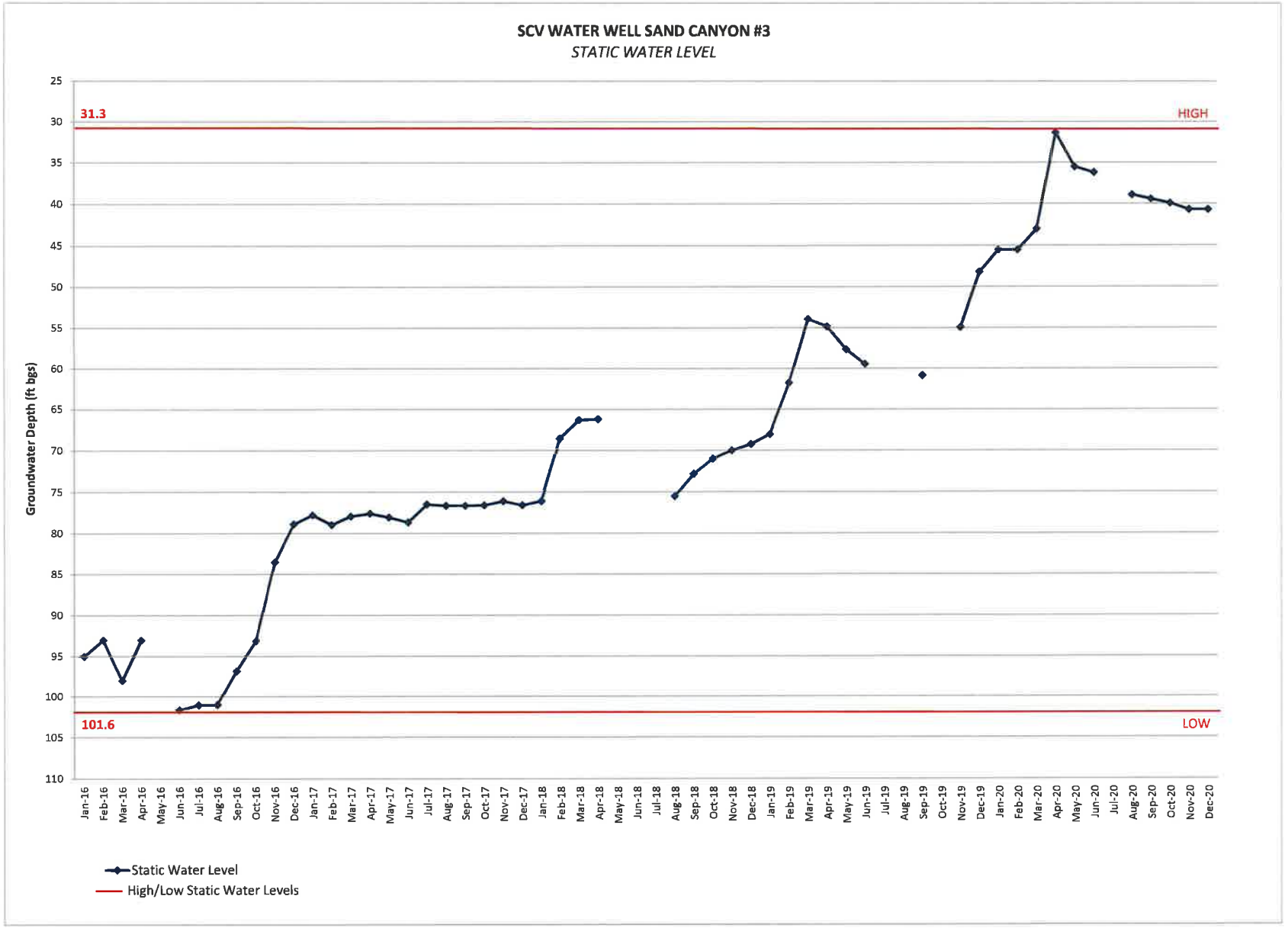
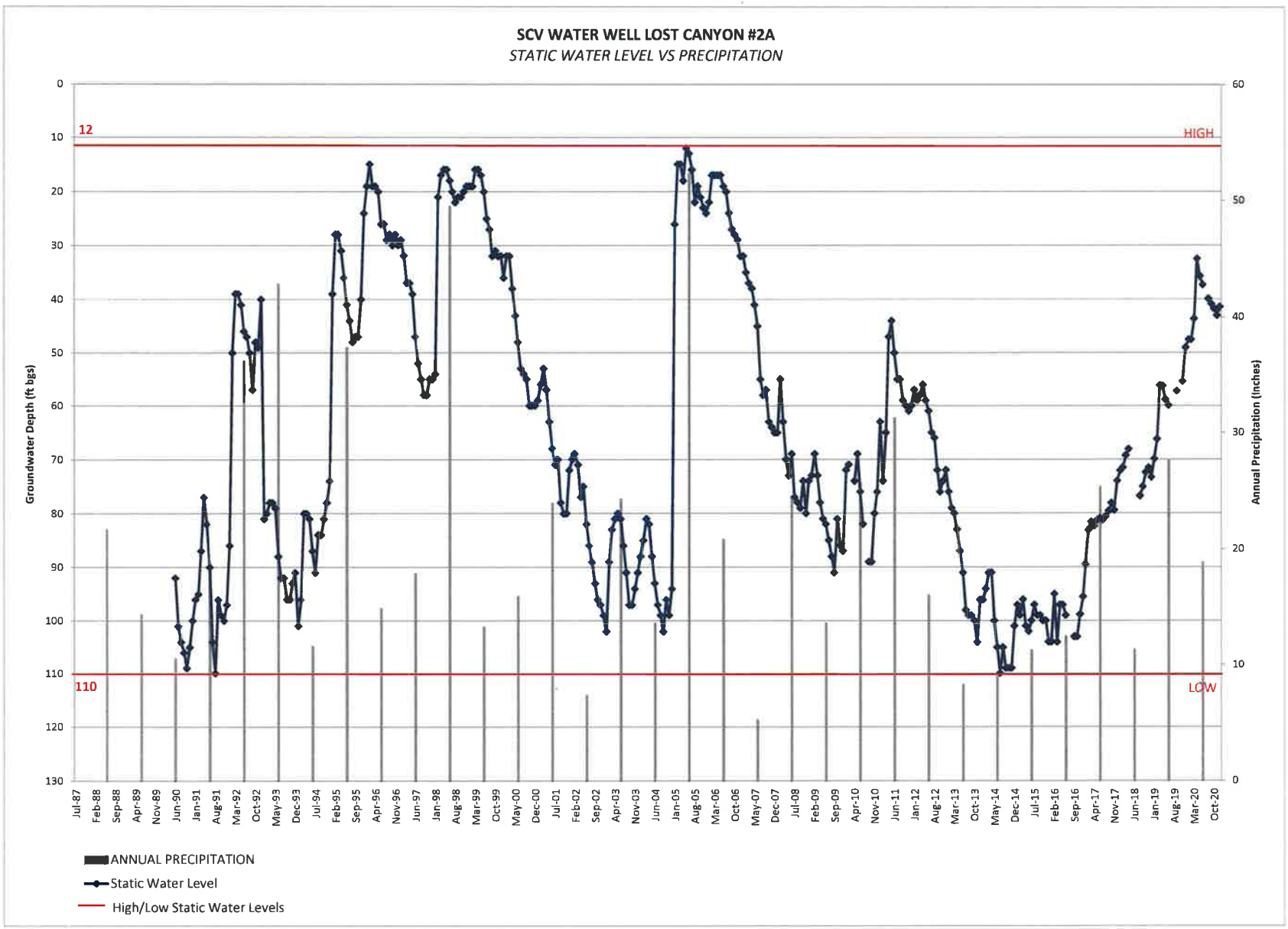
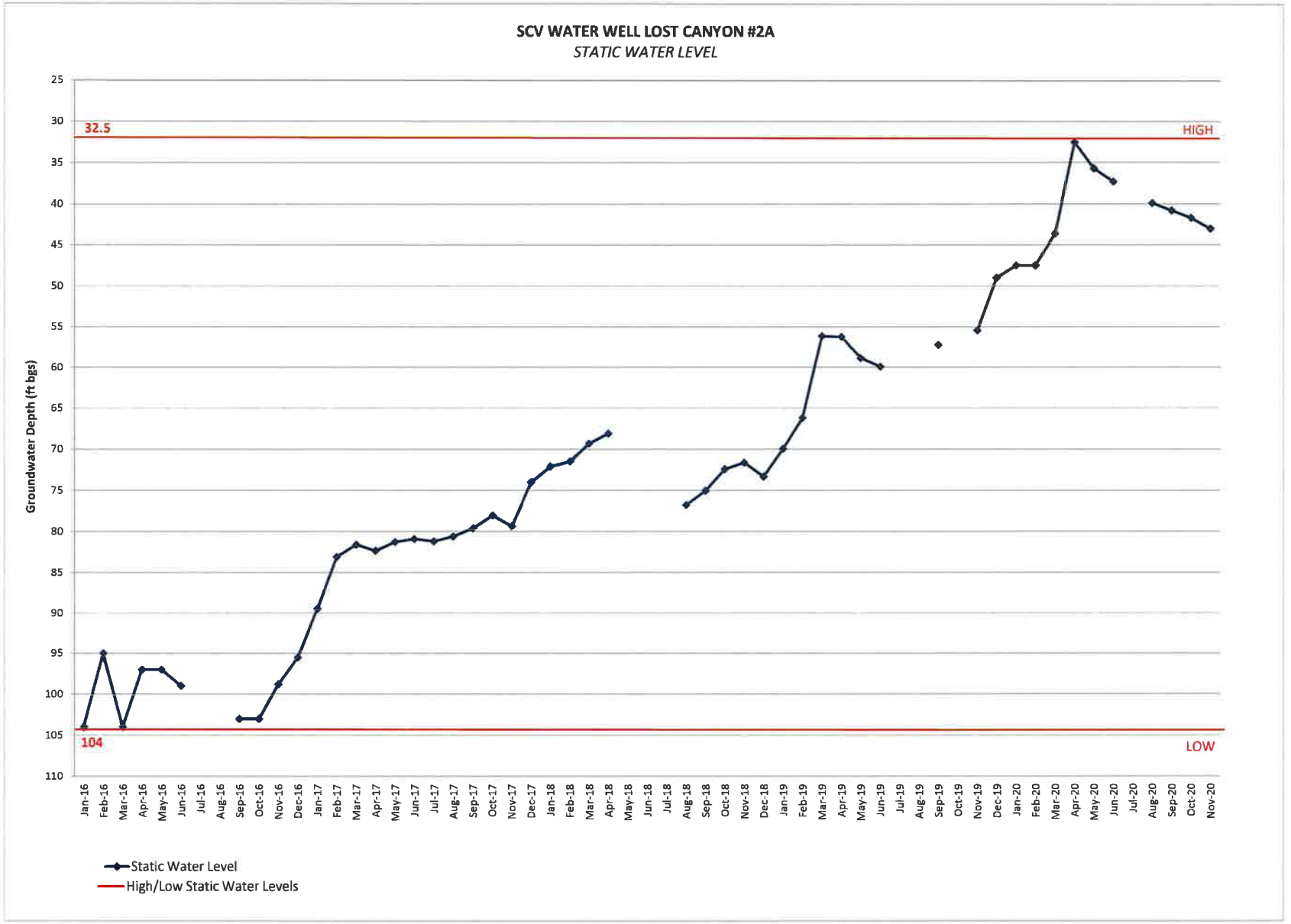
Oct-20
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL MITCHELL #5B
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
40.4
HIGH
97
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL SAND CANYON #3
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
9
HIGH
106
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL SAND CANYON #3
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
31.3
HIGH
101.6
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL LOST CANYON #2A
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
12
HIGH
110
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL LOST CANYON #2A
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
32.5
HIGH
104
LOW
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Feb-16
Mar-16
Apr-16
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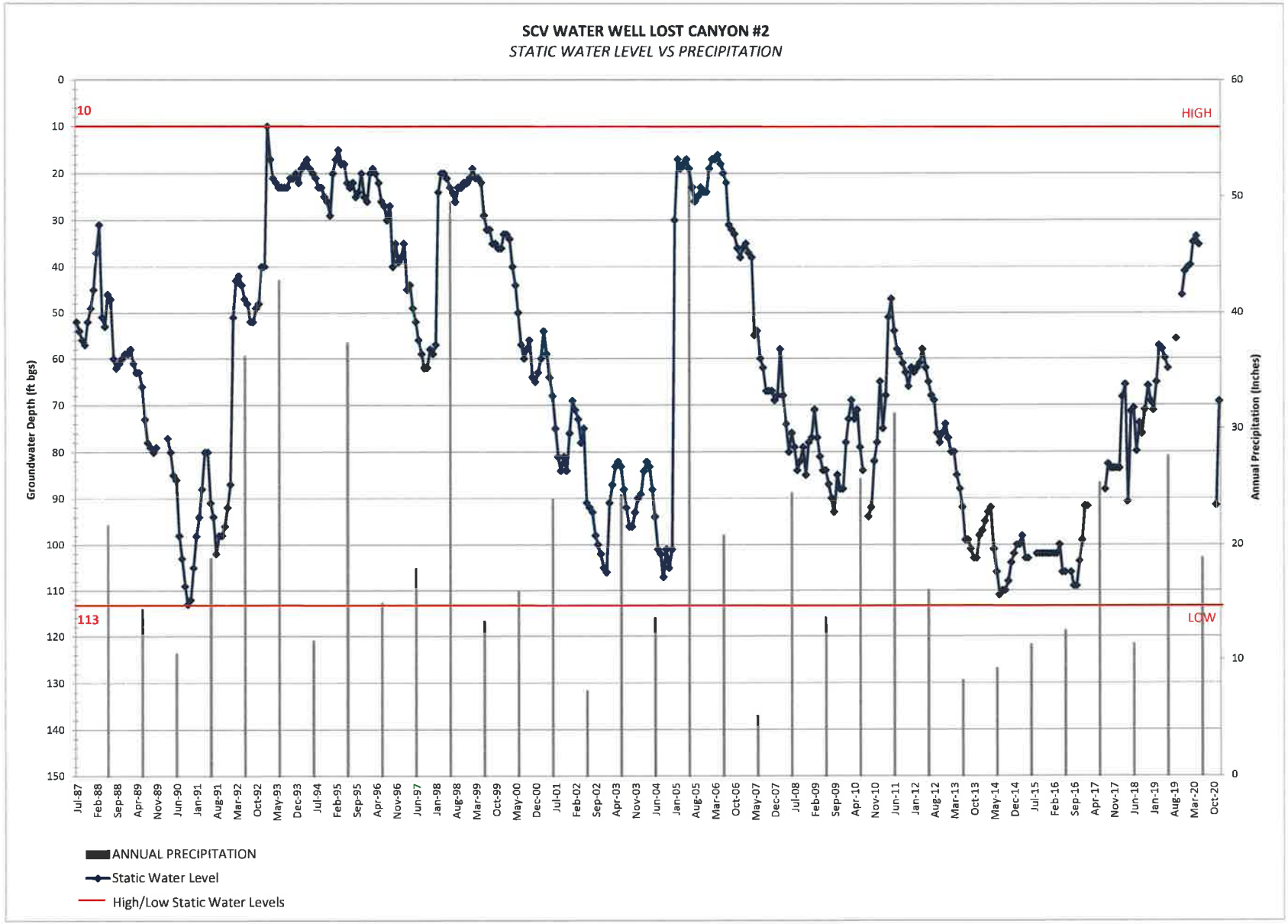
Oct-20
Nov-20
Static Water Level
High/Low Static Water Levels


SCV WATER WELL LOST CANYON #2
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (inches)
10
HIGH
113
LOW
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
0
10
20
30
40
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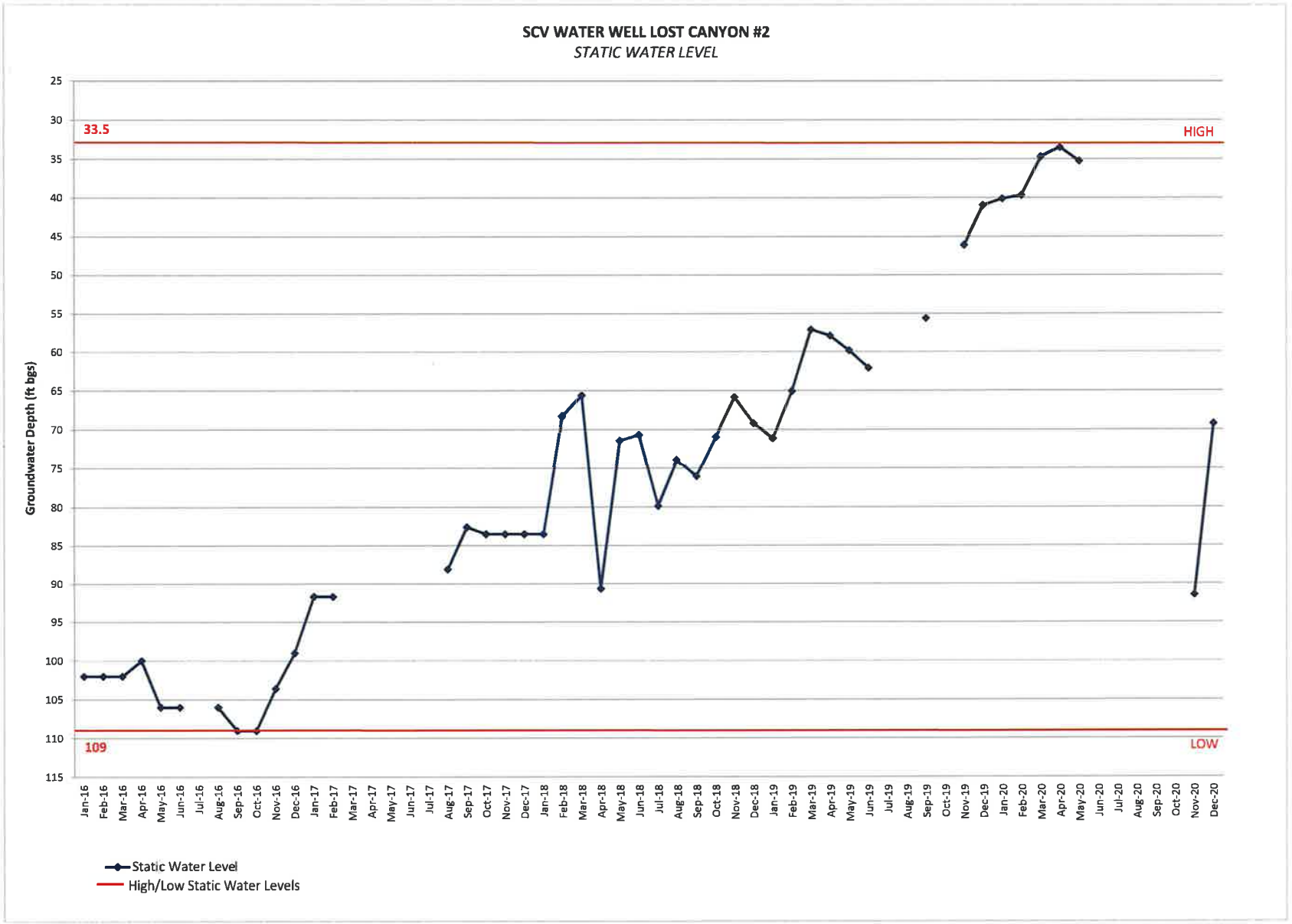
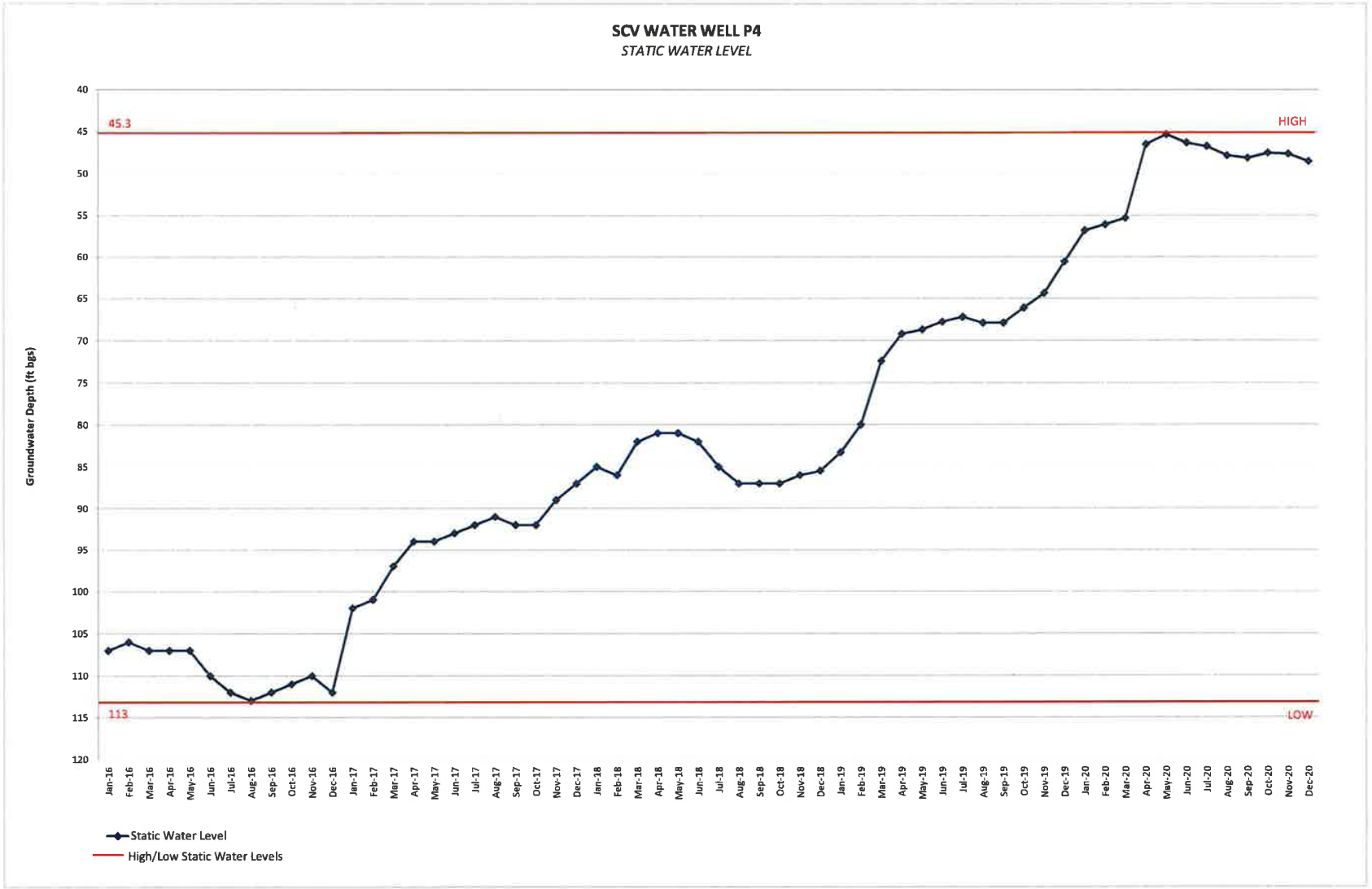
Oct-20
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels

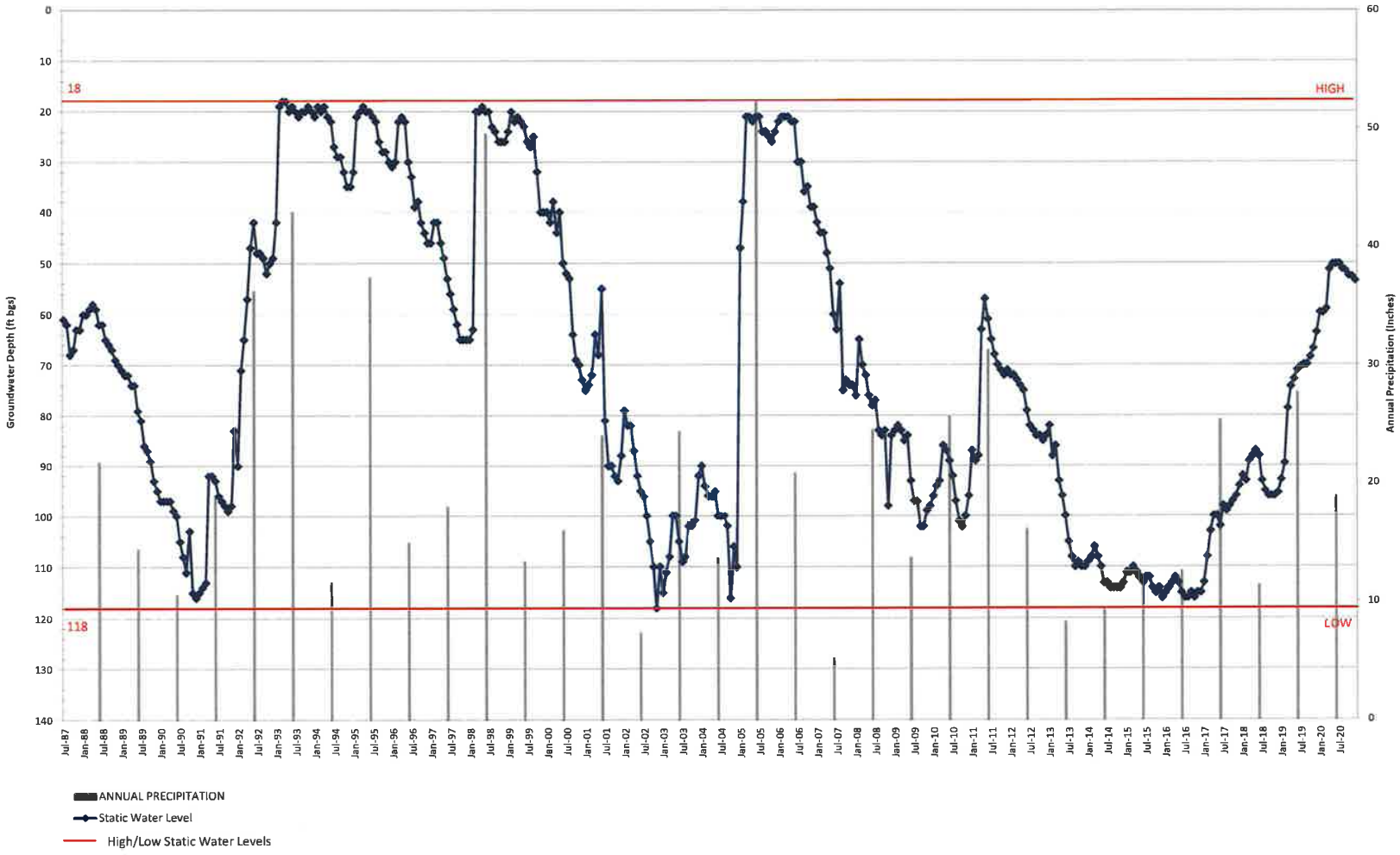

SCV WATER WELL LOST CANYON #2
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
33.5
HIGH
109
LOW
Static Water Level
High/Low Static Water Levels

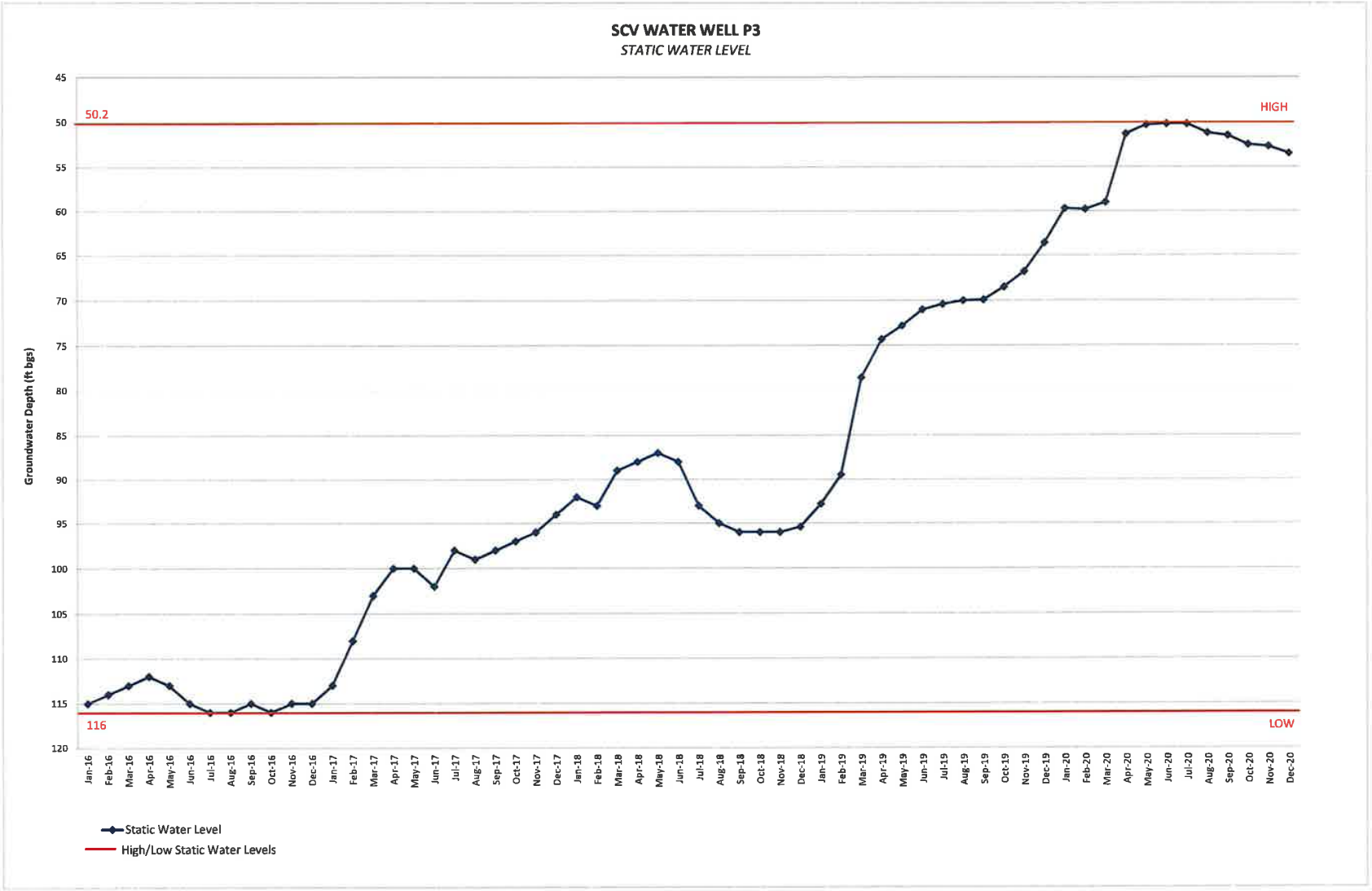

SCV WATER WELL P4
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
16
HIGH
113
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels

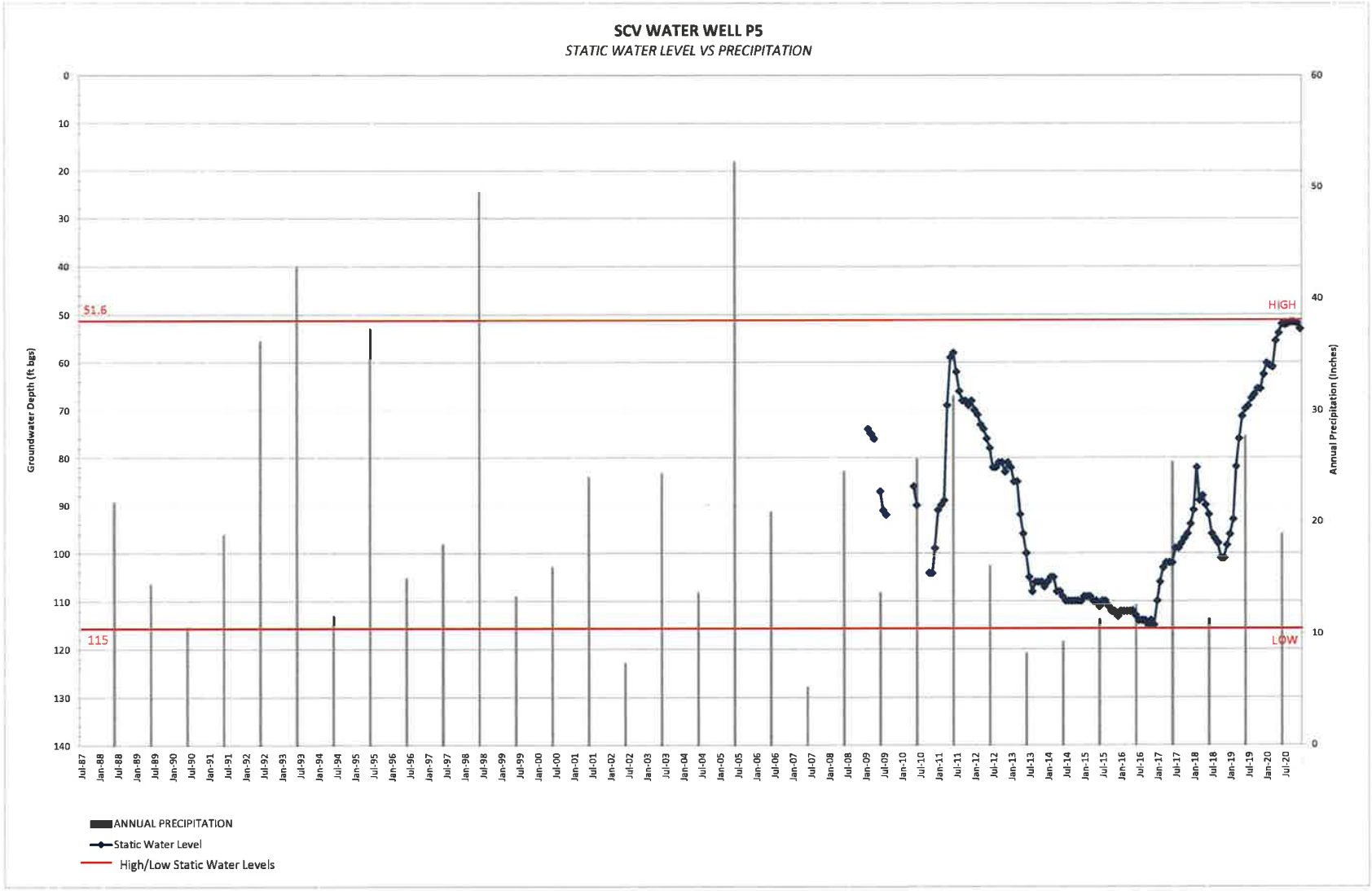

SCV WATER WELL P4
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
45.3
HIGH
113
LOW
Static Water Level
High/Low Static Water Levels

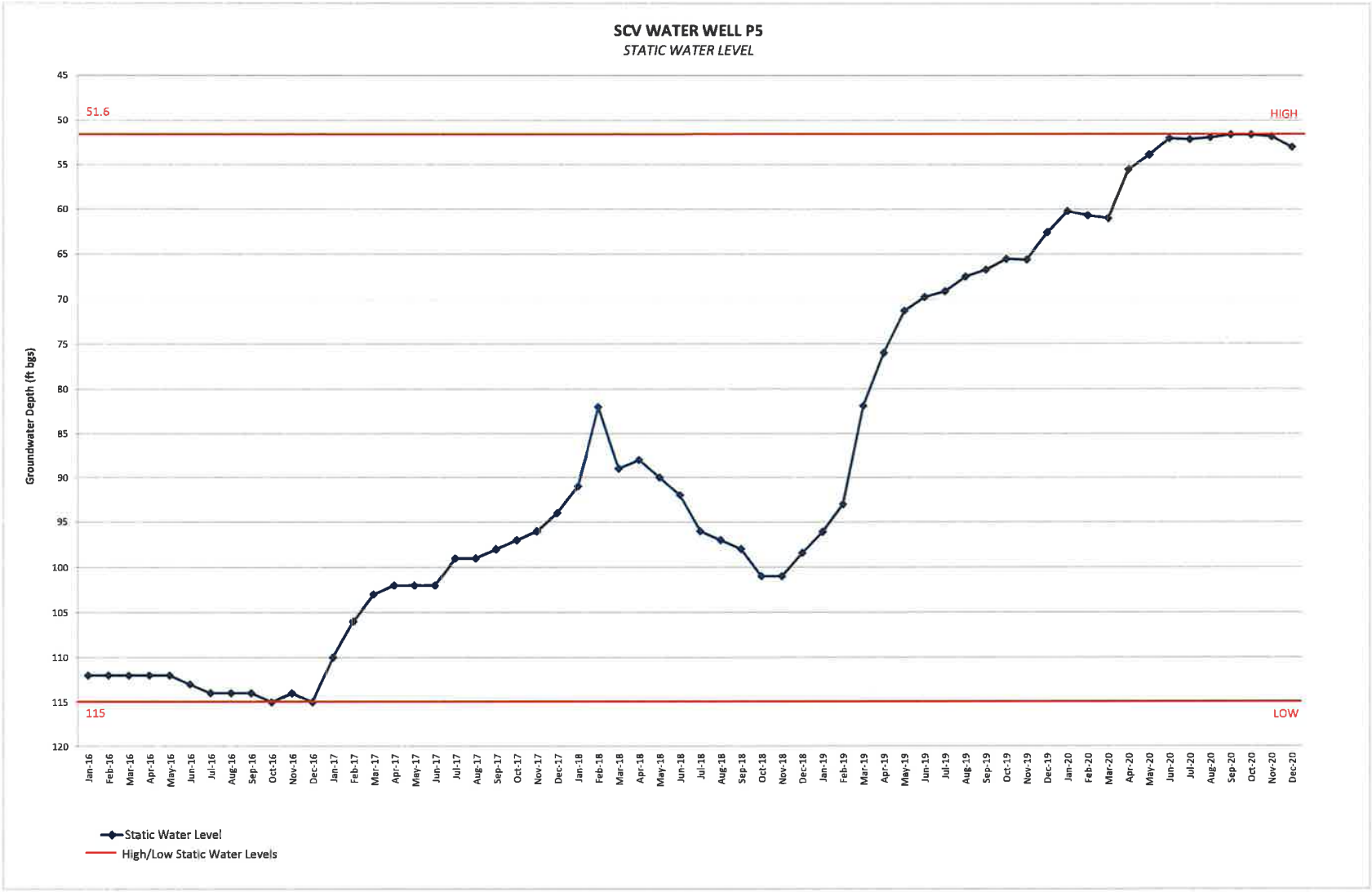
SCV WATER WELL P3

STATIC WATER LEVEL VS PRECIPITATION

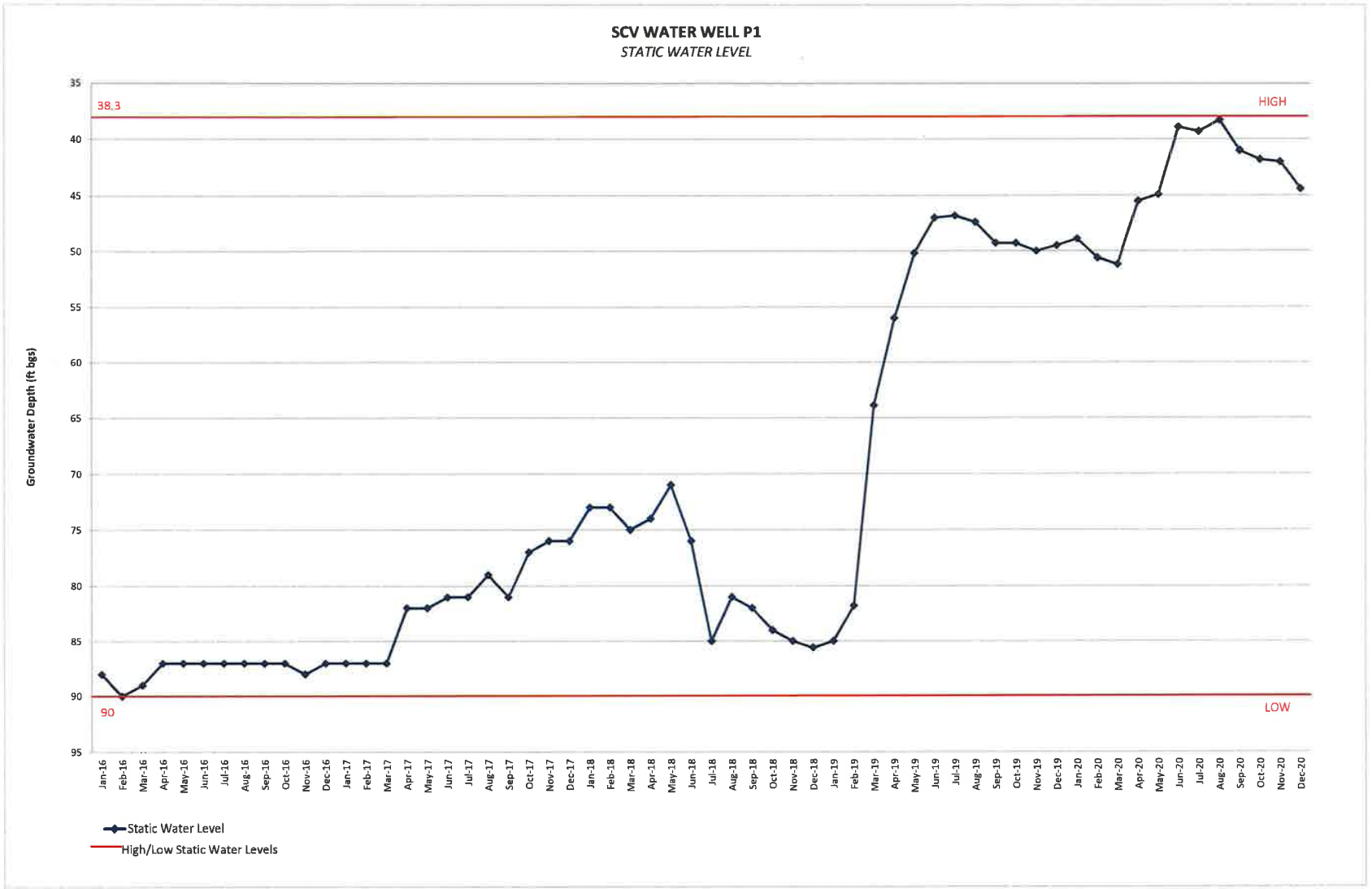



SCV WATER WELL P3
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
50.2
HIGH
116
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL P5
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
51.6
HIGH
115
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL P5
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
51.6
HIGH
115
LOW
Static Water Level
High/Low Static Water Levels


SCV WATER WELL P1
STATIC WATER LEVEL VS PRECIPITATION
Groundwater Depth (ft bgs)
Annual Precipitation (Inches)
15
HIGH
90
LOW
ANNUAL PRECIPITATION
Static Water Level
High/Low Static Water Levels


SCV WATER WELL P1
STATIC WATER LEVEL
Groundwater Depth (ft bgs)
35
40
45
50
55
60
65
70
75
80
85
90
95
38.3
HIGH
90
LOW
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
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Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Static Water Level
High/Low Static Water Levels

ITEM NO. 6

Santa Clarita Valley Water Agency
Capital Improvement Projects (CIP) Construction Status Report
As of January 15, 2021

Project	Contractor	Original Contract Amount	Change Orders to Date	% Change Orders	Current Contract Amount	Scheduled Completion	Estimated % of Work Completed	Status
West Ranch Recycled Water Main Extension (Phase 2D)	Cedro Construction Inc.	$3,112,332	$126,950.53	4.1%	$3,239,282.53	March 1, 2021	95%	Construction is in progress.
Westridge Recycled Tank Upgrades Potable Make-up Above Ground Piping	W.A. Rasic Construction Company, Inc.	$475,810	$0	0%	$475,8810	March 1, 2021	25%	Construction is in progress.
N Wells and Well Q2 Vessel Purchase	Evoqua Water Technologies, LLC.	$1,727,960	$18,337.65	1.1%	$1,746,297.65	March 1, 2021	95%	N Wells startup is in progress. Well Q2 construction is in progress.
N Wells and Well Q2 Site Construction	Pacific Hydrotech Corporation	$4,515,000	$178,920.30	4.0%	$4,693,920.30	March 1, 2021	95%	N Wells startup is in progress. Well Q2 construction is in progress.
Magic Mountain Pipeline Phase 4	FivePoint / Toro Enterprises	$3,084,725	$302,116.72	9.8%	$3,386,841.72	April 1, 2021	90%	Construction is in progress.
Magic Mountain Pipeline Phase 5	FivePoint / Toro Enterprises	$3,269,978.85	$0	0%	$3,269,978.85	April 1, 2021	90%	Construction is in progress.

Project	Contractor	Original Contract Amount	Change Orders to Date	% Change Orders	Current Contract Amount	Scheduled Completion	Estimated % of Work Completed	Status
RVWTP Chlorine Scrubber Replacement	GSE Construction Company, Inc.	$214,300	$0	0%	$214,300	April 15, 2021	5%	Construction is in progress.
Valley Center Well Material Purchase	Evoqua Water Technologies, LLC.	$512,802	$0	0%	$512,802	June 5, 2021	1%	Material submittals are in progress.
Magic Mountain Pipeline Phase 6A	FivePoint / Toro Enterprises	$7,168,844.85	$0	0%	$7,168,844.85	June 30, 2021	20%	Pipe fabrication is in progress.
Commerce Center Drive Pipeline	FivePoint / Blois Construction, Inc.	$891,139.70	$0	0%	$891,139.70	June 30, 2021	5%	Construction submittals are in progress.
Vista Canyon Recycled Water Main Extension (Phase 2B)	Ferreira Construction Co, Inc.	$2,752,982	($168,872)	(6.1%)	$2,584,110	July 22, 2021	45%	Revised scope to remove piping from tank access road and a portion within HOA. Construction activities are planned to restart in late January 2021.
Replacement (Saugus 3 & 4) Wells	Best Drilling & Pump, Inc.	$5,615,052	$0	0%	$5,615,052	July 28, 2021	5%	Construction activities are on hold.
Magic Mountain Pipeline Phase 6B	FivePoint / Leatherwood Construction	$4,568,687.07	$0	0%	$4,568,687.07	December 31, 2021	5%	Construction submittals are in progress.

ITEM NO. 7

Santa Clarita Valley Water Agency
Engineering Services Section
Third Party Funded Agreements Quarterly Report
As of January 15, 2021

Project	Third Party Funding Source	Planning, Design, Construction	Contractor/Consultant	Construction Amount	SCV Water Deposit Amount	Status
Active Agreements:						
22004 Placerita Canyon Road	Intertex	Design	SCV Water	TBD	$5,000	Design 100% complete
27918 Franklin Parkway – Water Meters	Logix	Construction	Gall Brothers	$30,000	$3,000	Construction is 95% complete.
76 Gas Station at 25048 Valencia Blvd.	Sahika Corporation	Construction	Karaki WS	$58,000	$5,800	Construction is 95% complete.
Aidlin Tract 52796 – Pipeline	Lennar Homes	Design	SCV Water	N/A	$65,000	Project on–hold by Developer. Design is 30% complete.
Aidlin Tract 52796 – Pump Station	Lennar Homes	Design	TBD	TBD	$97,000	Project on–hold by Developer. Design deposit pending.
Aidlin Tract 52796 – Tanks	Lennar Homes	Design	TBD	TBD	$156,000	Project on–hold by Developer. Design deposit pending.
Alderbrook Ave/Cindy Lne	Norris Whitmore	Design	Stylo Group	TBD	$10,565	Design 95% complete
Calgrove Storage	TWB Clarita Storage	Construction	D.M. Sanborn Pipeline	$90,000	$9,000	Construction in progress. 95% done.
Castaic RV Storage	RCMI A/A/F	Design	SCV Water	N/A	$21,000	Design in progress.
Chiquita Canyon Landfill	Chiquita Cajnyon Landfill, LLC	Planning	Jensen	N/A	$20,000	Waiting for check
Commerce Center Drive Bridge Potable and Recycled Pipelines	FivePoint	Design	FivePoint	N/A	$85,000	Design in progress.
Demineralization Facility – Fire Hydrant	FivePoint	Construction	FivePoint	N/A	$80,000	Construction on-hold.
Excel Buena Park II, L.P. (Residence Inn and Springhill Suites)	Excel Group LLC	Construction	T. Morrissey Corporation	$86,848	$13,027	Construction in progress.
Friendly Station Mart	Fayad Takla	Construction	StormCon	$45,000	$11,000	Construction is 85% complete.
Hancock Commerce Center (PM 26363, Parcel 6)	S.D. Herman	Construction	SCV Water/TBD	$174,000	$23,000	Pending insurance certificates and preconstruction meeting and submittals.
Magic Mountain Tank No. 2	FivePoint	Construction	FivePoint	N/A	$449,560	Construction in progress.
Mission Village - DS542 Potable Water Pipelines	FivePoint	Construction	FivePoint	N/A	$175,000	Construction in progress.
Mission Village - DS542 Recycled Water Pipelines	FivePoint	Construction	FivePoint	N/A	$97,000	Construction in progress.

Santa Clarita Valley Water Agency
Engineering Services Section
Third Party Funded Agreements Quarterly Report
As of January 15, 2021

Project	Third Party Funding Source	Planning, Design, Construction	Contractor/Consultant	Construction Amount	SCV Water Deposit Amount	Status
Mission Village - Petersen Booster Stations-PW & RW Design Services	FivePoint	Design	FivePoint	N/A	$350,000	Design on hold.
Mission Village – Petersen Tanks	FivePoint	Design	FivePoint	N/A	$350,000	Design on hold.
Mission Village - Phase All Phases Design Review	FivePoint	Design	FivePoint	N/A	$300,000	Design review in progress.
Mission Village - Tract 61105 –1A Potable and Recycled Water	FivePoint	Construction	FivePoint	N/A	$175,000	Construction near completion. Less than 1,000 LF remaining.
Mission Village - Tract 61105 –1C Potable and Recycled Water	FivePoint	Construction	FivePoint	N/A	$260,000	Construction near completion. Less than 1,000 LF remaining.
Mission Village - Well 206/207 Pipeline	FivePoint	Construction	FivePoint	N/A	$52,000	Construction is on-hold until winter 2020.
Mitchell Well 5A Replacement	JSB Development	Design	Richard C. Slade & Associates LLC	TBD	$58,000	Reviewing alternate sites for replacement well.
Needham Ranch Phase 2- Onsite Water Plans Newhall Ranch Road	Lion-TCC Development II, LLC	Design	Alliance Engineering	N/A	$25,000	Design is 60% complete. First Agency Design review complete.
Orchard Village Medical Building	OVMB LLC (Intertex)	Construction	Groundwork Engineering Inc.	$50,000	$18,000	Construction is 95% complete.
Parcel Map 19163 Parcel 1 – Homewood Suites/Hampton Inn,	Prince Hospitality LLC	Construction	Tron Construction	$60,000	$28,000	Pending construction. Waiting on insurance certificates, pre–construction meeting and submittals.
Parcel Map 62646 Water Pipeline Facilities on Railroad Avenue / Oakridge Drive	Saugus Holdings, LLC, and TMC Hollis	Planning & Design	SCV Water	$412,000	$41,000	Third Party Agreement executed.
Plum Canyon Tract 46018–11 Pump Station (Civil/Mechanical)	Pardee & Toll Brothers	Construction	Staats Construction	$648,597	$61,000	Construction is complete. Conducting final inspections and punch list.
Plum Canyon Tract 46018–11 Pump Station (Electrical)	Pardee & Toll Brothers	Construction	Coleman–Pacific	$467,000	$46,700	Construction is complete. Conducting final inspections and punch list.
Plum Canyon Tract 73858 Lot 1	Toll Brothers	Construction	Staats	$856,000	$114,600	Construction is 90% complete. Conducting final inspections and punch list. Developer to provide easement.

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Engineering Services Section
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Project	Third Party Funding Source	Planning, Design, Construction	Contractor/Consultant	Construction Amount	SCV Water Deposit Amount	Status
Sheriff Station – 16" Water Main Extension in Golden Valley Road	City of Santa Clarita	Construction	Mesa Engineering	$1,347,745	$137,700	Construction is complete. Coordinating with contractor on contract closeout.
Skyline Pump Station No. 2	Pardee Homes	Design	Cannon	TBD	$150,000	Design is in progress.
Skyline Ranch Road Bridge Crossing 16" and 20" Water Mains	Pardee Homes	Construction	Mesa Engineering	$214,359	$21,436	Construction is 90% complete. Pending tie-ins.
Skyline Ranch Tract 609022–02 Vertex Way Pipelines	Pardee Homes	Construction	Mesa Engineering	$480,488	$48,000	Construction is 90% complete.
Skyline Ranch Tract 60922 – Sierra Highway 16-inch Deane Zone Pipeline	Pardee Homes	Construction	Mesa Engineering	$1,428,000	$142,800	Construction is 30% complete.
Skyline Ranch Tract 60922 – Sierra Highway 20-inch North Oaks Pipeline	Pardee Homes	Construction	Mesa Engineering	$723,194	$72,319	Construction is 90% complete. Pending tie-ins.
Skyline Ranch Tract 60922 – Site Improvements for Two 0.87 MG Tanks	Pardee Homes	Construction	Mesa Engineering, Coleman-Pacific, Tejon Constructions	$538,477	$53,137	Construction is 90% complete.
Skyline Ranch Tract 60922 – Two 0.87 MG Tanks (Skyline Ranch Zone)	Pardee Homes	Construction	Paso Robles	$1,879,001	$187,900	Tank construction is 90% complete. Pending testing.
Skyline Ranch Tract 60922–01 Backbone Pipelines	Pardee Homes	Construction	Mesa Engineering	$1,417,928	$142,000	Construction is complete. Conducting final inspections and punch list.
Skyline Ranch Tract 60922–01 Paseo	Pardee Homes	Construction	Mesa Engineering.	$68,159	Included in PA–01	Construction is complete. Conducting final inspections and punch list.
Skyline Ranch Tract 60922–01 Planning Areas A & B & PA–01	Pardee Homes	Construction	Mesa Engineering	$675,824	$67,600	Construction is complete. Conducting final inspections and punch list.
Skyline Ranch Tract 60922–01 Planning Areas C & D	Pardee Homes	Construction	Staats Construction	$533,300	$53,330	Construction is complete. Conducting final inspections and punch list
Skyline Ranch Tract 60922–01 Planning Areas E1 & F	Pardee Homes	Construction	Mesa Engineering	$707,700	$70,700	Construction is complete. Conducting final inspections and punch list

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Skyline Ranch Tract 60922–01 Stratus Street	Pardee Homes	Construction	Mesa Engineering	$817,031	$81,703	Construction is complete. Conducting final inspections and punch list
Skyline Ranch Tract 60922–01 Stratus Street Gap Section	Pardee Homes	Construction	Mesa Engineering	$93,141	$9,314	Construction is complete. Conducting final inspections and punch list
Skyline Ranch Tract 60922–02 Planning Area G	Pardee Homes	Design	Civiltec	TBD	$65,000	Design is 100% complete.
Skyline Ranch Tract 60922–02 Planning Area H	Pardee Homes	Design	Civiltec	TBD	$75,000	Design is 100% complete.
Skyline Ranch Tract 60922–04 Planning Area E–2	Pardee Homes	Construction	Staats	$369,597	$36,960	Construction is complete. Conducting final inspections and punch list
Skyline Ranch Tract 60922–04 Planning Area L	Pardee Homes	Construction	Staats	$323,751	$32,375	Construction is 50% complete.
Skyline Ranch Tract 60922-04 Planning Areas M1	Pardee Homes	Construction	Mesa Engineering	$273,208	$27,321	Construction 95% complete.
Skyline Ranch Tract 60922-04 Planning Areas M2	Pardee Homes	Construction	TBD	$396,981	$39,698	Design is 100% complete
Sierra Highway/Avalon Waterline Relocation	Pardee Homes	Design & Construction	Blois Construction	$75,000	$10,000	Construction 95% complete.
Skyline Ranch Tract 60922–05 Planning Area 02	Pardee Homes	Construction	Mesa Engineering	$762,300	$76,230	Construction is 95% complete.
Tesoro del Valle – Pump Station	BLC Tesoro LLC	Design	Civiltec	TBD	$30,000	Design is 30% complete.
Tesoro del Valle – Two 1.2 MG Tanks	BLC Tesoro LLC	Design	Civiltec	TBD	$40,000	Design is 30% complete.
Tesoro del Valle – Water Line Distribution	BLC Tesoro LLC	Design	Fuscoe Engineering	TBD	$50,000	Fourth plan check is pending.
Tract 74718 Dockweiler	Dockweiler 21 LLC	Design	Forma Engineering	TBD	$5,000	Plans Approved. DDW approval pending
Tract AVT 52455–16	Ashdon Development	Construction	Intertex General Contractors, Inc.	$85,043	$17,000	Construction is 95% complete.
Valencia Town Center Square – Phase 2	VTC Square Investors, LLC	Construction	Staats Construction	$80,000	$22,010	Construction is substantially complete.

Santa Clarita Valley Water Agency
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Project	Third Party Funding Source	Planning, Design, Construction	Contractor/Consultant	Construction Amount	SCV Water Deposit Amount	Status
Vista Canyon Apartments	JPI	Construction	Tejon Constructions	$60,000	$6,000	First phase of construction is complete. Operations is looking for location to place 3" meter vaults in Mitchell Dr. Easement cover sheet is in review process for client to sign.
Vista Canyon Multi-Modal Rail Center - 48" Steel Casing	CIty of Santa Clarita	Construction	Icon West, Inc.	TBD	$50,000	Kenndy Jenks is CM, FIlippin is Inspector. Construction is underway.
Vista Canyon Tract 69164-KB Homes	KB Homes	Construction	Boudreau Pipeline	$57,000	$5,600	First phase construction is substantially complete.
Vista Canyon Tract 69164 Phase 1A Potable and Recycled Pipelines	Vista Canyon LLC	Construction	Mesa Engineering	$673,532	$67,400	Construction is complete. Conducting final inspections and punch list.
Vista Canyon Tract 69164 Phase 2 – Portion 1 – Potable Pipelines	Vista Canyon LLC	Construction	Mesa Engineering	$241,112	$24,100	Construction is complete. Conducting final inspections and punch list.
Vista Canyon Tract 69164 Phase 2 – Portion 2 – Potable and Recycled Pipelines	Vista Canyon LLC	Construction	Mesa Engineering	$392,693	$39,269	Construction is complete. Conducting final inspections and punch list.
Vista Canyon Tract 69164 Phase 2 – Portion 3 – Potable Water	Vista Canyon LLC	Construction	Mesa Engineering	$376,259	$37,626	Construction is 90% complete. Pending tie-in at La Veda Blvd.
Vista Canyon Tract 69164 Phase 2 – Portion 3 – Recycled Water	Vista Canyon LLC	Construction	Mesa Engineering	$261,252	$26,125	Construction is complete. Conducting final inspections and punch list.
Westside Communities Potable Water Infrastructure Plan	FivePoint	Planning	FivePoint	N/A	$94,000	FivePoint is revising the Potable Water Infrastructure Plan.
Westside Communities Recycled Water Infrastructure Plan	FivePoint	Planning	FivePoint	N/A	$65,000	Recycled Water Infrastructure Plan on hold.

Santa Clarita Valley Water Agency
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Project	Third Party Funding Source	Planning, Design, Construction	Contractor/Consultant	Construction Amount	SCV Water Deposit Amount	Status
Closed Agreements:						
College of the Canyons Valencia Campus Parking Structure – Water Line Improvements	Santa Clarita Community College District	Design & Construction	R.C. Becker & Son	$370,575	$129,000	Construction is complete. Easement documents are pending.
Concord Development Tract 53425 –01	Lennar	Design	Turf Construction	$100,000	$10,000	Released Bonds.
Parcel Map 26363 Parcels 3 & 4 at 27736 – 27788 Hancock Parkway	Intertex	Construction	Blois Construction	$35,000	$3,500	Construction is complete. Preparation of as–built drawings are pending.
Parcel Map 60030, Parcels 1–8< Chase Place.	Krusinski/IAC	Construction	J.A. Salazar Construction & Supply Corp.	$79,500	$19,950	Construction is complete. As-builts pending.
Skyline Ranch Plaza Tract 46018–11A	Intertex	Construction	Groundbreakers Construction	$288,314	$28,832	Construction is complete.
25333 Railroad Avenue (Storage Facility) – Fire Service	Norris Construction	Construction	Mesa Engineering	$21,000	$2,100	Construction is complete. Installation of backflow by developer is pending

ITEM NO. 8

Engineering and Operations Committee
Planning Calendar
FY 2020/21

	Item	PowerPoint Presentation (Y/N/Length)	Jul 1 Comm	Jul 7 Board	Aug 4 Board	Aug 6 Comm	Aug 18 Board	Sep 1 Board	Sep 3 Comm	Sep 15 Board	Oct 1 Comm	Oct 6 Board	Oct 20 Board	Nov 4 Board	Nov 5 Comm	Nov 17 Board	Dec 1 Board	Dec 3 Comm - CANCELLED	Jan 5 Board	Jan 7 Comm	Feb 2 Board	Feb 4 Comm	Feb 16 Board	Mar 2 Board	Mar 4 Comm	Mar 16 Board	Apr 1 Comm	Apr 6 Board	May 4 Board	May 10 Comm	Jun 1 Board	Jun 3 Comm	Jul 6 Board
1	Monthly Committee Planning Calendar	None	C			C			C		C				C					C		P			P		P			P		P	
2	CIP Construction Status Report	None	C			C			C		C				C					C		P			P		P			P		P	
3	Monthly Operations and Production Report	None	C			C			C		C				C					C		P			P		P			P		P	
4	Third Party Funded Agreements Quarterly Report	None				C									C							P								P			
5	Quarterly Safety Program Presentation	Yes 15 min				C									C							P								P			
6	Annual Safety Program Update (FY 19-20)	Yes 15 min						C																									
7	Recommend Approval of a Resolution Awarding a Construction Contract, a Purchase Order for Construction Management and Inspection Services, and a Purchase Order for Consultant Services for Replacement Wells Construction	Yes 10 min	C		C																											
8	Recommend Approval of a Resolution Awarding a Purchase Order for Design Services for the Replacement Wells On-Site Pipeline/Infrastructure	Yes 10 min	C		C																											
9	Recommend Approval of a Resolution Awarding a Construction Contract for the Recycled Water Tank Aboveground Piping Potable Make-Up Line Project	Yes 10 min	C		C																											
10	Recommend Approval of a Purchase Order for Final Design Services for Valley Center Well PFAS Groundwater Treatment	Yes 10 min	C		C																											
11	Recommend Approval of Purchase of Replacement Clarifier Media at Earl Schmidt Filtration Plant	Yes 10 min				C	C																									
12	Laboratory PFAS Analytical Equipment Purchase	None				C	C																									
13	Recommend Approval of a Purchase Order for Final Design Services for Recycled Water Tank at an Alternate Site for Recycled Water Vista Canyon (Phase 2B) Project	Yes 10 min				C	C																									
14	Recommend that the Board of Directors Reject all Bids Associated with the Santa Clarita Valley Water Agency Slurry Seal and Asphalt Installation Project for the Rio Vista Treatment Plant Location	None							C	C																						
15	Recommend Approval of the Installation of Approximately 400 feet of 30" Diameter Pipeline Along Ridge Route Road	None							C	C																						
16	Recommend Approval of the installation of Approximately 1,500 feet of 14" Diameter Pipeline Along Decoro Drive	None							C	C																						
17	Recommend Approval of the Installation of Approximately 1,500 feet of 12" Diameter Pipeline Along The Old Road	None							C	C																						
18	Recommend Approval of the Installation of Approximately 130 feet of 18" Diameter Pipeline Along Honby Avenue	None							C	C																						
19	Recommend Approval of a Purchase Order for Final Design Services for Santa Clara and Honby Wells PFAS Groundwater Treatment Improvements	Yes 10 min							C	C																						

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P = Planned Item

Engineering and Operations Committee
Planning Calendar
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20	Recommend Approval of the General Manager to execute construction change orders up to seven percent (7%) of the original construction contract for the West Ranch Recycled Water Main Extension (Phase 2D)	Yes 10 min							C	C																						
21	Recommend Approval of Construction Contract Funding and a Purchase Order for Inspection Services for Replacement Wells Commerce Center Drive Pipeline	Yes 10 min										C																				
22	Recommend Approval of a Resolution Awarding a Material Purchase Contract for Valley Center Well	Yes 10 min									C		C																			
23	Recommend Approval of a Resolution Awarding a Construction Contract to GSE Construction Company, Inc., for the Rio Vista Water Treatment Plant Chlorine Scrubber Replacement Project	Yes 10 min													C	C																
24	Recommend Approval of a Resolution Awarding a Contract for Newhall Tank No. 2 Interior Recoat and Repair	Yes 10 min													C		C															
25	Approve the General Manager to execute a construction change order to the original construction contract for the N Wells PFAS Groundwater Treatment and Well Q2 Perchlorate Removal Facility Project	Yes 10 Min																	C													
26	Recommend Approval of a Purchase Order for Final Design Services for the new Deane Zone Tank, Disinfection Facility, Pump Station and Cost Sharing Agreement at Skyline Ranch	Yes 10 Min																		C	P												
27	Recommend Approval of the Interconnection between the NWD and SCWD systems and the VWD and SCWD systems in the area referred to as West Newhall	None																				P	P									
28	Recommend Approval of a Resolution Adopting the Final Supplemental Initial Study- Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program Under the California Environmental Quality Act for the Vista Canyon Recycled Water (Phase 2B) Project	Yes 10 Min																				P		P									
29	Recommend Approval of Resolution Awarding Construction Contract and Purchase Orders for Construction Management and Inspection Services and Engineering Services During Construction for Valley Center Well PFAS Groundwater Treatment Project	Yes 10 min																							P	P						
30	Recommend Approval of Resolution Awarding Construction Contract and Purchase Order for Construction Management and Inspection Services and Engineering Services During Construction to TBD for Recycled Water Vista Canyon (Phase 2B) Tank Project.	TBD																							P			P				

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Engineering and Operations Committee
Planning Calendar
FY 2020/21

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31	Recommend Approval of Resolution Awarding Contract to TBD for Smyth PVC Replacement Underground Facility Locating	TBD																							P			P				
32	Recommend Approval of Resolution Awarding Construction Contract to TBD for Storage Tank Stair Retrofit	TBD																								P		P				
33	Recommend Approval of Resolution Authorizing SCV Water to Apply for Funds from Drinking Water State Revolving Fund on Behalf of Lily of the Valley Mobile Home Park	TBD																								P		P				
34	Recommend Approval of Construction of New Sand Canyon Plaza (Deane Zone) Pump Station and Cost Sharing Agreement with Developer	TBD																											P	P		
35	Recommend Approval of Resolution Awarding Construction Contract and Purchase Orders for Construction Management and Inspection Services and Engineering Services During Construction for ESFP Washwater Return and Sludge Systems Project	TBD																											P	P		
36	Recommend Approval of a Resolution Awarding a Purchase Order for Final Design Services for Well 205 Groundwater Treatment Improvements	Yes 10 min																													P	P
37	Recommend Approval of Resolution Authorizing SCV Water to Execute Water Service Agreement with State Water Resources Control Board and Los Angeles Residential Community	TBD																													P	P
38	Recommend Approval of Resolution Awarding Construction Contract for Pipeline to the Los Angeles Residential Community	TBD																													P	P
39	Recommend Approval of Construction of Pipeline in Sierra Highway from Dockweiler to Newhall Avenue	TBD																													~~P~~	~~P~~
40	Recommend Approval of Construction of a New Skyline Ranch (Deane Zone) Pump Station and Cost Sharing Agreement with Developer	TBD																													~~P~~	~~P~~
41	Recommend Approval of Construction of New Skyline Ranch 2.1 MG Tanks (Deane Zone) and Cost Sharing Agreement with Developer	TBD																													~~P~~	~~P~~
42	Recommend Approval of Construction of New Sand Canyon Plaza 1.5 MG Tank (Deane Zone) and Cost Sharing Agreement with Developer	TBD																													~~P~~	~~P~~

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