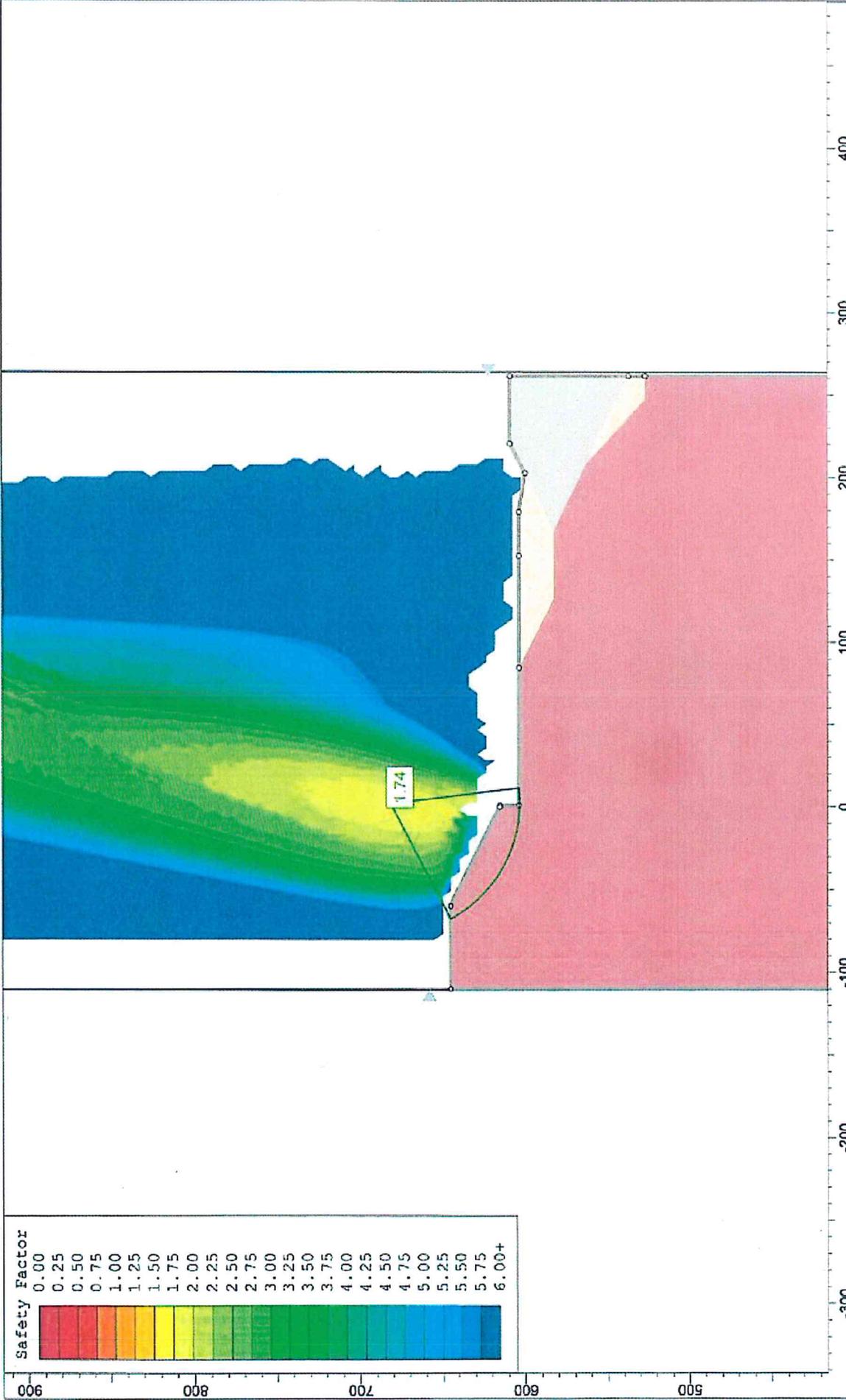
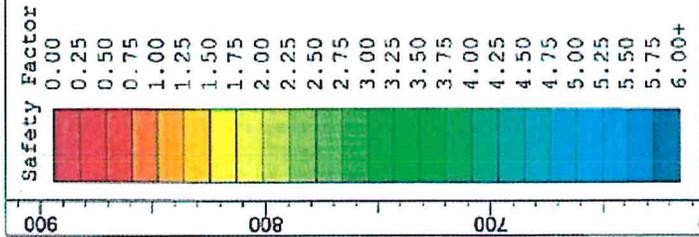


APPENDIX D

Results of Slope Stability Analyses



| | | | |
|----------------------|-------------|--|-------|
| Project | | VT-24980-04 Tajiguas Landfill | |
| Analysis Description | | 2H:1V Cut Slope Above ADF - Static, Circular | |
| Drawn By | Meng Wei Lu | Scale | 1:967 |
| Company | | Earth Systems Southern California | |
| Date | | 4/27/2017, 12:39:07 PM | |
| File Name | | VT-24980-04 Tajiguas Landfill - Static, Circular.slm | |

Slide Analysis Information

VT-24980-04 Tajiguas Landfill

Project Summary

- File Name: VT-24980-04 Tajiguas Landfill - Static, Circular
- Slide Modeler Version: 6.039
- Project Title: VT-24980-04 Tajiguas Landfill
- Analysis: 2H:1V Cut Slope Above ADF - Static, Circular
- Author: Meng Wei Lu
- Company: Earth Systems Southern California
- Date Created: 4/27/2017, 12:39:07 PM

General Settings

- Units of Measurement: Imperial Units
- Time Units: days
- Permeability Units: feet/second
- Failure Direction: Left to Right
- Data Output: Standard
- Maximum Material Properties: 20
- Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

- Spencer
- Number of slices: 25
- Tolerance: 0.005
- Maximum number of iterations: 50
- Check $\alpha < 0.2$: Yes
- Initial trial value of FS: 1
- Steffensen Iteration: Yes

Groundwater Analysis

- Groundwater Method: Water Surfaces
- Pore Fluid Unit Weight: 62.4 lbs/ft³
- 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: Grid Search
- Radius Increment: 10
- Composite Surfaces: Disabled
- Reverse Curvature: Invalid Surfaces
- Minimum Elevation: Not Defined
- Minimum Depth: Not Defined

Material Properties

| Property | Documented Fill | MSW | Retaining Wall | Tsp |
|-----------------------|--|--|---|--|
| Color |  |  |  |  |
| Strength Type | Mohr-Coulomb | Mohr-Coulomb | Infinite strength | Mohr-Coulomb |
| Unit Weight [lbs/ft3] | 125 | 70 | 150 | 130 |
| Cohesion [psf] | 360 | 250 | | 400 |
| Friction Angle [deg] | 32 | 22 | | 27 |
| Water Surface | None | None | None | None |
| Ru Value | 0 | 0 | 0 | 0 |

Global Minimums

Method: spencer

- FS: 1.739930
- Center: 2.019, 681.541
- Radius: 78.790
- Left Slip Surface Endpoint: -67.785, 645.000
- Right Slip Surface Endpoint: 11.551, 603.330
- Resisting Moment=8.54468e+006 lb-ft
- Driving Moment=4.91094e+006 lb-ft
- Resisting Horizontal Force=93975.9 lb
- Driving Horizontal Force=54011.4 lb
- Total Slice Area=1132.91 ft²

Slice Data

• Global Minimum Query (spencer) - Safety Factor: 1.73993

| Slice Number | Width [ft] | Weight [lbs] | 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] |
|--------------|------------|--------------|---------------|---------------------|-------------------------------|--------------------|----------------------|--------------------------|---------------------|-------------------------------|
| 1 | 3.17343 | 1136.37 | Tsp | 400 | 27 | 233.864 | 406.907 | 13.5555 | 0 | 13.5555 |
| 2 | 3.17343 | 3232.21 | Tsp | 400 | 27 | 349.124 | 607.451 | 407.144 | 0 | 407.144 |
| 3 | 3.17343 | 4925.18 | Tsp | 400 | 27 | 454.593 | 790.96 | 767.303 | 0 | 767.303 |
| 4 | 3.17343 | 5900.94 | Tsp | 400 | 27 | 528.501 | 919.554 | 1019.68 | 0 | 1019.68 |
| 5 | 3.17343 | 6628.81 | Tsp | 400 | 27 | 591.959 | 1029.97 | 1236.38 | 0 | 1236.38 |
| 6 | 3.17343 | 7207.24 | Tsp | 400 | 27 | 649.046 | 1129.3 | 1431.32 | 0 | 1431.32 |
| 7 | 3.17343 | 7658.2 | Tsp | 400 | 27 | 700.117 | 1218.15 | 1605.72 | 0 | 1605.72 |
| 8 | 3.17343 | 7997.81 | Tsp | 400 | 27 | 745.412 | 1296.97 | 1760.39 | 0 | 1760.39 |
| 9 | 3.17343 | 8238.33 | Tsp | 400 | 27 | 785.094 | 1366.01 | 1895.9 | 0 | 1895.9 |
| 10 | 3.17343 | 8389.27 | Tsp | 400 | 27 | 819.257 | 1425.45 | 2012.57 | 0 | 2012.57 |
| 11 | 3.17343 | 8458.18 | Tsp | 400 | 27 | 847.959 | 1475.39 | 2110.57 | 0 | 2110.57 |
| 12 | 3.17343 | 8451.14 | Tsp | 400 | 27 | 871.196 | 1515.82 | 2189.92 | 0 | 2189.92 |
| 13 | 3.17343 | 8373.06 | Tsp | 400 | 27 | 888.938 | 1546.69 | 2250.5 | 0 | 2250.5 |
| 14 | 3.17343 | 8227.98 | Tsp | 400 | 27 | 901.105 | 1567.86 | 2292.06 | 0 | 2292.06 |
| 15 | 3.17343 | 8019.22 | Tsp | 400 | 27 | 907.588 | 1579.14 | 2314.19 | 0 | 2314.19 |
| 16 | 3.17343 | 7749.49 | Tsp | 400 | 27 | 908.226 | 1580.25 | 2316.36 | 0 | 2316.36 |
| 17 | 3.17343 | 7421.03 | Tsp | 400 | 27 | 902.818 | 1570.84 | 2297.91 | 0 | 2297.91 |
| 18 | 3.17343 | 7035.64 | Tsp | 400 | 27 | 891.128 | 1550.5 | 2257.97 | 0 | 2257.97 |
| 19 | 3.17343 | 6594.74 | Tsp | 400 | 27 | 872.84 | 1518.68 | 2195.53 | 0 | 2195.53 |
| 20 | 3.17343 | 6099.44 | Tsp | 400 | 27 | 847.592 | 1474.75 | 2109.31 | 0 | 2109.31 |
| 21 | 3.17343 | 5550.54 | Tsp | 400 | 27 | 814.947 | 1417.95 | 1997.84 | 0 | 1997.84 |
| 22 | 3.17343 | 3753.28 | Tsp | 400 | 27 | 650.322 | 1131.51 | 1435.68 | 0 | 1435.68 |
| 23 | 3.17343 | 225.456 | Tsp | 400 | 27 | 289.017 | 502.869 | 201.891 | 0 | 201.891 |
| 24 | 3.17343 | 172.447 | Tsp | 400 | 27 | 288.296 | 501.614 | 199.429 | 0 | 199.429 |
| 25 | 3.17343 | 66.3609 | Tsp | 400 | 27 | 280.888 | 488.725 | 174.133 | 0 | 174.133 |

Interslice Data

• Global Minimum Query (spencer) - Safety Factor: 1.73993

| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|--------------|-------------------|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 1 | -67.7853 | 645 | 0 | 0 | 0 |
| 2 | -64.6119 | 639.491 | -666.304 | -287.175 | 23.3159 |

| | | | | | |
|----|----------|---------|---------|---------|---------|
| 3 | -61.4384 | 634.84 | 121.329 | 52.2925 | 23.3159 |
| 4 | -58.265 | 630.809 | 1773.41 | 764.334 | 23.3159 |
| 5 | -55.0916 | 627.262 | 3716.34 | 1601.73 | 23.3159 |
| 6 | -51.9181 | 624.107 | 5740.91 | 2474.32 | 23.3159 |
| 7 | -48.7447 | 621.284 | 7725.27 | 3329.57 | 23.3159 |
| 8 | -45.5713 | 618.748 | 9579.89 | 4128.9 | 23.3159 |
| 9 | -42.3978 | 616.464 | 11237.7 | 4843.43 | 23.316 |
| 10 | -39.2244 | 614.408 | 12648.3 | 5451.39 | 23.3159 |
| 11 | -36.0509 | 612.559 | 13774 | 5936.57 | 23.316 |
| 12 | -32.8775 | 610.901 | 14587.5 | 6287.18 | 23.3159 |
| 13 | -29.7041 | 609.42 | 15070.2 | 6495.2 | 23.3159 |
| 14 | -26.5306 | 608.106 | 15210.9 | 6555.85 | 23.3159 |
| 15 | -23.3572 | 606.95 | 15005.5 | 6467.35 | 23.316 |
| 16 | -20.1838 | 605.944 | 14456.4 | 6230.67 | 23.3159 |
| 17 | -17.0103 | 605.084 | 13572 | 5849.51 | 23.316 |
| 18 | -13.8369 | 604.363 | 12367.3 | 5330.27 | 23.3159 |
| 19 | -10.6635 | 603.779 | 10863.6 | 4682.18 | 23.3159 |
| 20 | -7.49004 | 603.327 | 9089.33 | 3917.48 | 23.3159 |
| 21 | -4.31661 | 603.006 | 7080.39 | 3051.63 | 23.3159 |
| 22 | -1.14317 | 602.815 | 4881.16 | 2103.77 | 23.3159 |
| 23 | 2.03026 | 602.751 | 2911.78 | 1254.97 | 23.3159 |
| 24 | 5.2037 | 602.816 | 1983.05 | 854.69 | 23.3159 |
| 25 | 8.37713 | 603.008 | 1031.2 | 444.444 | 23.3159 |
| 26 | 11.5506 | 603.33 | 0 | 0 | 0 |

List of Coordinates

External Boundary

| X | Y |
|--------|---------|
| -110 | 400 |
| 261.52 | 400 |
| 261.52 | 526.328 |
| 261.52 | 536.446 |
| 261.52 | 608.52 |
| 220.42 | 608.52 |
| 202.62 | 599.44 |
| 179.06 | 603.33 |
| 152.62 | 603.33 |
| 84.55 | 603.33 |
| 1 | 603.33 |

| | |
|------|-----|
| 1 | 615 |
| 0 | 615 |
| -60 | 645 |
| -110 | 645 |

Material Boundary

| X | Y |
|---------|---------|
| 84.55 | 603.33 |
| 126.435 | 582.589 |

Material Boundary

| X | Y |
|---------|---------|
| 126.435 | 582.589 |
| 167.273 | 582.589 |

Material Boundary

| X | Y |
|---------|---------|
| 167.273 | 582.589 |
| 202.62 | 599.44 |

Material Boundary

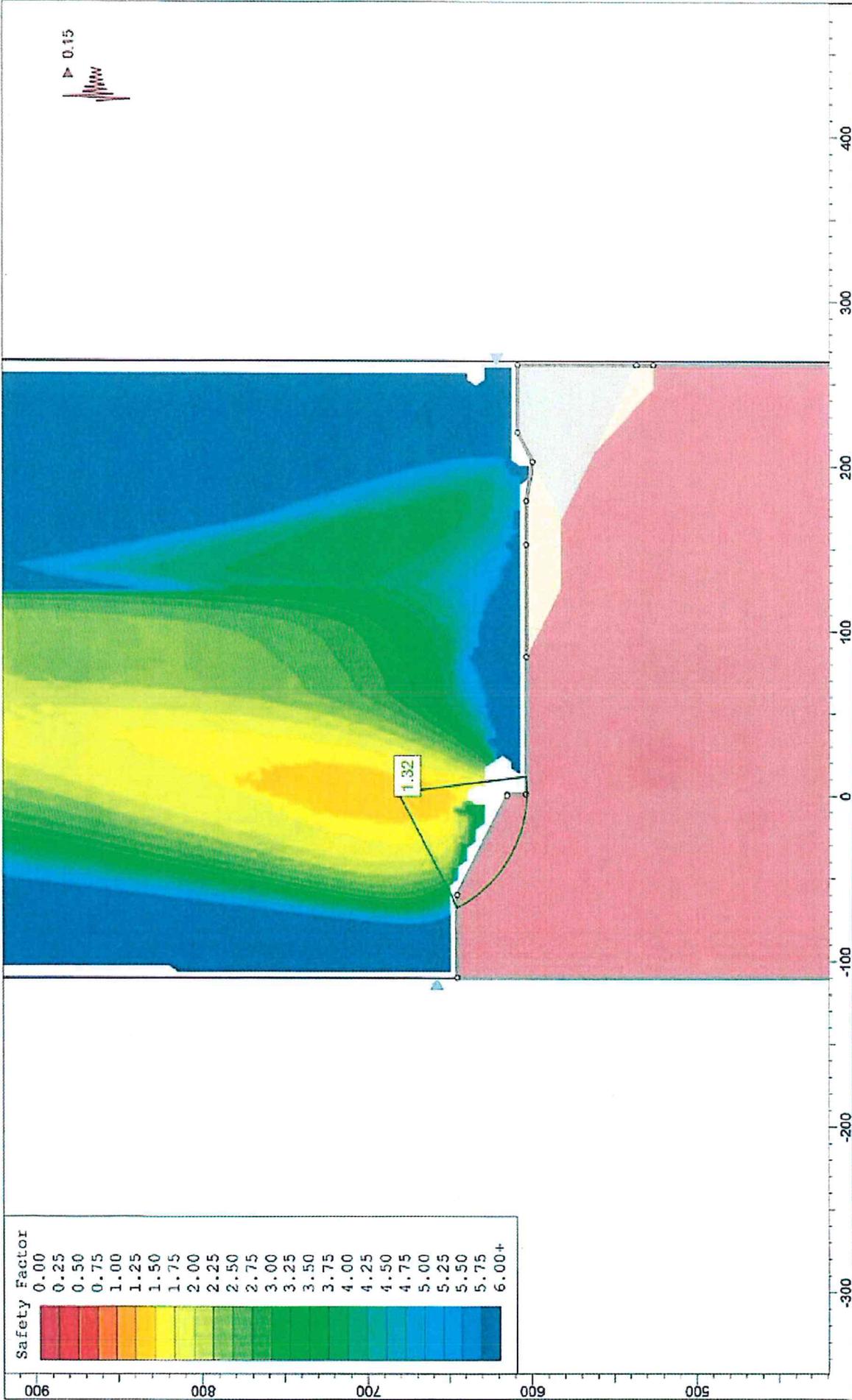
| X | Y |
|---------|---------|
| 167.273 | 582.589 |
| 208.62 | 562.345 |
| 261.52 | 536.446 |

Material Boundary

| X | Y |
|---------|---------|
| 208.62 | 562.345 |
| 247.122 | 526.328 |
| 261.52 | 526.328 |

Material Boundary

| X | Y |
|---|---------|
| 0 | 615 |
| 0 | 603.295 |
| 1 | 603.33 |



| | | | |
|----------------------|-------------|--|-------|
| Project | | VT-24980-04 Tajiguas Landfill | |
| Analysis Description | | 2H:1V Cut Slope Above ADF - Seismic, Circular | |
| Drawn By | Meng Wei Lu | Scale | 1:967 |
| Company | | Earth Systems Southern California | |
| Date | | 4/27/2017, 12:39:07 PM | |
| File Name | | VT-24980-04 Tajiguas Landfill - Seismic, Circular.slim | |

Slide Analysis Information

VT-24980-04 Tajiguas Landfill

Project Summary

- File Name: VT-24980-04 Tajiguas Landfill - Seismic, Circular
- Slide Modeler Version: 6.039
- Project Title: VT-24980-04 Tajiguas Landfill
- Analysis: 2H:1V Cut Slope Above ADF - Seismic, Circular
- Author: Meng Wei Lu
- Company: Earth Systems Southern California
- Date Created: 4/27/2017, 12:39:07 PM

General Settings

- Units of Measurement: Imperial Units
- Time Units: days
- Permeability Units: feet/second
- Failure Direction: Left to Right
- Data Output: Standard
- Maximum Material Properties: 20
- Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

- Spencer
- Number of slices: 25
- Tolerance: 0.005
- Maximum number of iterations: 50
- Check $m\alpha < 0.2$: Yes
- Initial trial value of FS: 1
- Steffensen Iteration: Yes

Groundwater Analysis

- Groundwater Method: Water Surfaces
- Pore Fluid Unit Weight: 62.4 lbs/ft³
- 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: Grid Search
- Radius Increment: 10
- Composite Surfaces: Disabled
- Reverse Curvature: Invalid Surfaces
- Minimum Elevation: Not Defined
- Minimum Depth: Not Defined

Loading

- Seismic Load Coefficient (Horizontal): 0.15

Material Properties

| Property | Documented Fill | MSW | Retaining Wall | Tsp |
|------------------------------------|---|---|--|---|
| Color |  |  |  |  |
| Strength Type | Mohr-Coulomb | Mohr-Coulomb | Infinite strength | Mohr-Coulomb |
| Unit Weight [lbs/ft ³] | 125 | 70 | 150 | 130 |
| Cohesion [psf] | 720 | 250 | | 400 |
| Friction Angle [deg] | 31 | 22 | | 27 |
| Water Surface | None | None | None | None |
| Ru Value | 0 | 0 | 0 | 0 |

Global Minimums

Method: spencer

- FS: 1.319910
- Center: 2.019, 681.541
- Radius: 78.790
- Left Slip Surface Endpoint: -67.785, 645.000
- Right Slip Surface Endpoint: 11.551, 603.330
- Resisting Moment=8.22766e+006 lb-ft
- Driving Moment=6.23352e+006 lb-ft

- Resisting Horizontal Force=91212.6 lb
- Driving Horizontal Force=69105.4 lb
- Total Slice Area=1132.91 ft²

Slice Data

- Global Minimum Query (spencer) - Safety Factor: 1.31991

| Slice Number | Width [ft] | Weight [lbs] | 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] |
|--------------|------------|--------------|---------------|---------------------|-------------------------------|--------------------|----------------------|--------------------------|---------------------|-------------------------------|
| 1 | 3.17343 | 1136.37 | Tsp | 400 | 27 | 311.566 | 411.239 | 22.0572 | 0 | 22.0572 |
| 2 | 3.17343 | 3232.21 | Tsp | 400 | 27 | 416.2 | 549.347 | 293.11 | 0 | 293.11 |
| 3 | 3.17343 | 4925.18 | Tsp | 400 | 27 | 524.726 | 692.591 | 574.242 | 0 | 574.242 |
| 4 | 3.17343 | 5900.94 | Tsp | 400 | 27 | 608.514 | 803.184 | 791.294 | 0 | 791.294 |
| 5 | 3.17343 | 6628.81 | Tsp | 400 | 27 | 684.257 | 903.157 | 987.502 | 0 | 987.502 |
| 6 | 3.17343 | 7207.24 | Tsp | 400 | 27 | 754.964 | 996.484 | 1170.67 | 0 | 1170.67 |
| 7 | 3.17343 | 7658.2 | Tsp | 400 | 27 | 820.523 | 1083.02 | 1340.49 | 0 | 1340.49 |
| 8 | 3.17343 | 7997.81 | Tsp | 400 | 27 | 880.924 | 1162.74 | 1496.96 | 0 | 1496.96 |
| 9 | 3.17343 | 8238.33 | Tsp | 400 | 27 | 936.186 | 1235.68 | 1640.12 | 0 | 1640.12 |
| 10 | 3.17343 | 8389.27 | Tsp | 400 | 27 | 986.309 | 1301.84 | 1769.96 | 0 | 1769.96 |
| 11 | 3.17343 | 8458.18 | Tsp | 400 | 27 | 1031.27 | 1361.18 | 1886.42 | 0 | 1886.42 |
| 12 | 3.17343 | 8451.14 | Tsp | 400 | 27 | 1070.98 | 1413.6 | 1989.31 | 0 | 1989.31 |
| 13 | 3.17343 | 8373.06 | Tsp | 400 | 27 | 1105.34 | 1458.95 | 2078.31 | 0 | 2078.31 |
| 14 | 3.17343 | 8227.98 | Tsp | 400 | 27 | 1134.15 | 1496.98 | 2152.95 | 0 | 2152.95 |
| 15 | 3.17343 | 8019.22 | Tsp | 400 | 27 | 1157.18 | 1527.37 | 2212.59 | 0 | 2212.59 |
| 16 | 3.17343 | 7749.49 | Tsp | 400 | 27 | 1174.08 | 1549.68 | 2256.37 | 0 | 2256.37 |
| 17 | 3.17343 | 7421.03 | Tsp | 400 | 27 | 1184.43 | 1563.34 | 2283.18 | 0 | 2283.18 |
| 18 | 3.17343 | 7035.64 | Tsp | 400 | 27 | 1187.7 | 1567.66 | 2291.66 | 0 | 2291.66 |
| 19 | 3.17343 | 6594.74 | Tsp | 400 | 27 | 1183.22 | 1561.75 | 2280.07 | 0 | 2280.07 |
| 20 | 3.17343 | 6099.44 | Tsp | 400 | 27 | 1170.16 | 1544.51 | 2246.23 | 0 | 2246.23 |
| 21 | 3.17343 | 5550.54 | Tsp | 400 | 27 | 1147.46 | 1514.55 | 2187.42 | 0 | 2187.42 |
| 22 | 3.17343 | 3753.28 | Tsp | 400 | 27 | 942.116 | 1243.51 | 1655.48 | 0 | 1655.48 |
| 23 | 3.17343 | 225.456 | Tsp | 400 | 27 | 449.184 | 592.883 | 378.553 | 0 | 378.553 |
| 24 | 3.17343 | 172.447 | Tsp | 400 | 27 | 455.952 | 601.816 | 396.087 | 0 | 396.087 |
| 25 | 3.17343 | 66.3609 | Tsp | 400 | 27 | 458.737 | 605.492 | 403.301 | 0 | 403.301 |

Interslice Data

• Global Minimum Query (spencer) - Safety Factor: 1.31991

| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|--------------|-------------------|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 1 | -67.7853 | 645 | 0 | 0 | 0 |
| 2 | -64.6119 | 639.491 | -697.291 | -471.401 | 34.0605 |
| 3 | -61.4384 | 634.84 | -170.568 | -115.312 | 34.0605 |
| 4 | -58.265 | 630.809 | 1216.48 | 822.398 | 34.0606 |
| 5 | -55.0916 | 627.262 | 2976.72 | 2012.4 | 34.0605 |
| 6 | -51.9181 | 624.107 | 4913.51 | 3321.76 | 34.0605 |
| 7 | -48.7447 | 621.284 | 6902.45 | 4666.37 | 34.0605 |
| 8 | -45.5713 | 618.748 | 8846.06 | 5980.35 | 34.0605 |
| 9 | -42.3978 | 616.464 | 10666.8 | 7211.25 | 34.0605 |
| 10 | -39.2244 | 614.408 | 12302.3 | 8316.89 | 34.0604 |
| 11 | -36.0509 | 612.559 | 13701.9 | 9263.09 | 34.0604 |
| 12 | -32.8775 | 610.901 | 14824.6 | 10022.1 | 34.0605 |
| 13 | -29.7041 | 609.42 | 15637.7 | 10571.8 | 34.0605 |
| 14 | -26.5306 | 608.106 | 16115 | 10894.5 | 34.0605 |
| 15 | -23.3572 | 606.95 | 16237.1 | 10977 | 34.0604 |
| 16 | -20.1838 | 605.944 | 15990.1 | 10810.1 | 34.0606 |
| 17 | -17.0103 | 605.084 | 15366.4 | 10388.4 | 34.0605 |
| 18 | -13.8369 | 604.363 | 14364 | 9710.71 | 34.0605 |
| 19 | -10.6635 | 603.779 | 12987.7 | 8780.28 | 34.0605 |
| 20 | -7.49004 | 603.327 | 11249.4 | 7605.13 | 34.0606 |
| 21 | -4.31661 | 603.006 | 9169.44 | 6198.97 | 34.0605 |
| 22 | -1.14317 | 602.815 | 6777.9 | 4582.17 | 34.0605 |
| 23 | 2.03026 | 602.751 | 4454.62 | 3011.53 | 34.0605 |
| 24 | 5.2037 | 602.816 | 3037.85 | 2053.72 | 34.0604 |
| 25 | 8.37713 | 603.008 | 1539.73 | 1040.93 | 34.0605 |
| 26 | 11.5506 | 603.33 | 0 | 0 | 0 |

List of Coordinates

External Boundary

| X | Y |
|--------|---------|
| -110 | 400 |
| 261.52 | 400 |
| 261.52 | 526.328 |

| | |
|--------|---------|
| 261.52 | 536.446 |
| 261.52 | 608.52 |
| 220.42 | 608.52 |
| 202.62 | 599.44 |
| 179.06 | 603.33 |
| 152.62 | 603.33 |
| 84.55 | 603.33 |
| 1 | 603.33 |
| 1 | 615 |
| 0 | 615 |
| -60 | 645 |
| -110 | 645 |

Material Boundary

| X | Y |
|---------|---------|
| 84.55 | 603.33 |
| 126.435 | 582.589 |

Material Boundary

| X | Y |
|---------|---------|
| 126.435 | 582.589 |
| 167.273 | 582.589 |

Material Boundary

| X | Y |
|---------|---------|
| 167.273 | 582.589 |
| 202.62 | 599.44 |

Material Boundary

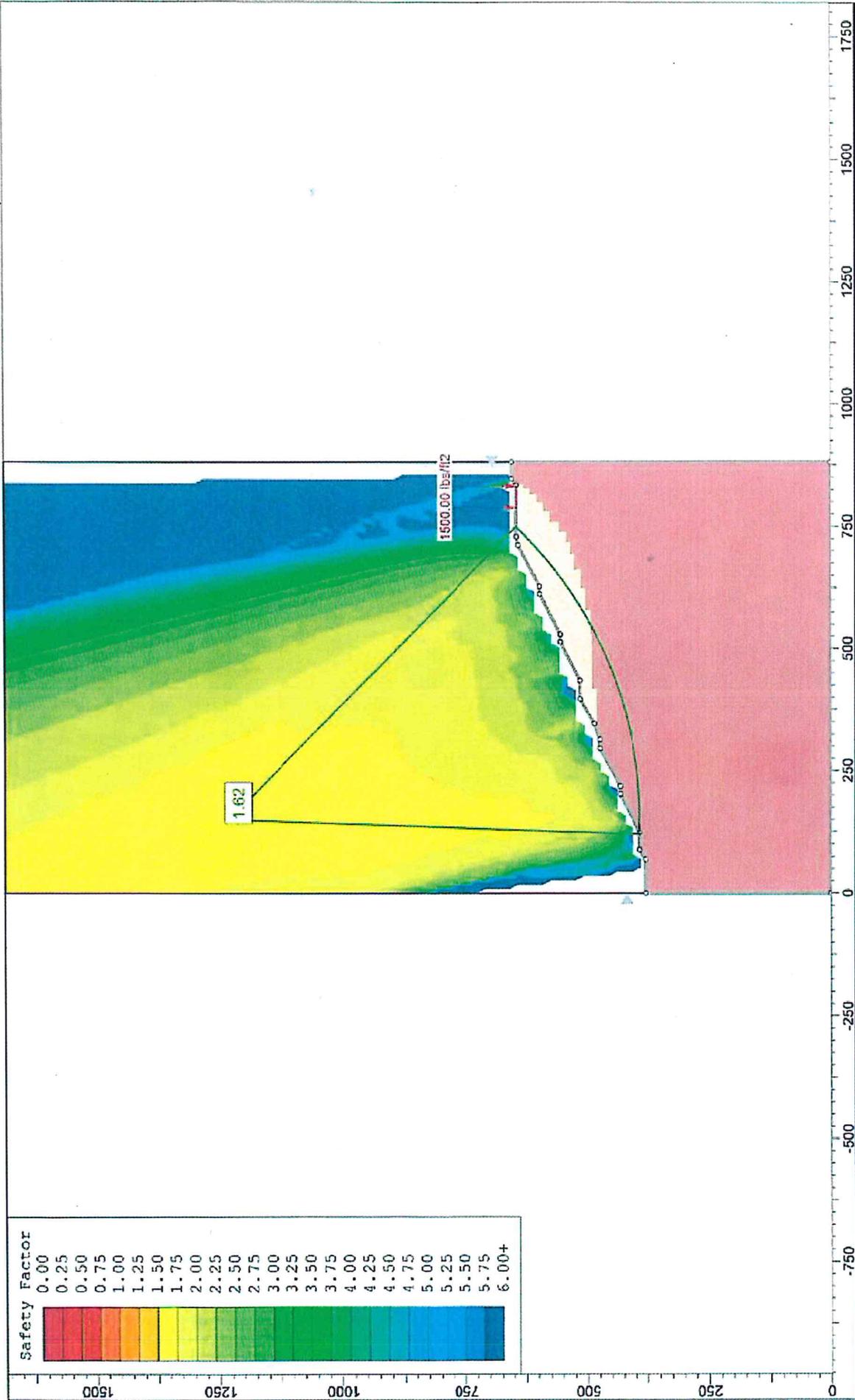
| X | Y |
|---------|---------|
| 167.273 | 582.589 |
| 208.62 | 562.345 |
| 261.52 | 536.446 |

Material Boundary

| X | Y |
|---------|---------|
| 208.62 | 562.345 |
| 247.122 | 526.328 |
| 261.52 | 526.328 |

Material Boundary

| X | Y |
|---|---------|
| 0 | 615 |
| 0 | 603.295 |
| 1 | 603.33 |



| | | | |
|-----------------------------|-------------|---|--------|
| Project | | VT-24980-04 Tajiguas Landfill | |
| Analysis Description | | West Slope of Pad 7 - Static, Circular | |
| Drawn By | Meng Wei Lu | Scale | 1:3256 |
| Date | | 4/27/2017, 12:39:07 PM | |
| Company | | Earth Systems Southern California | |
| File Name | | VT-24980-04 Tajiguas Landfill - Static, Circular.slim | |

Slide Analysis Information

VT-24980-04 Tajiguas Landfill

Project Summary

- File Name: VT-24980-04 Tajiguas Landfill - Static, Circular
- Slide Modeler Version: 6.039
- Project Title: VT-24980-04 Tajiguas Landfill
- Analysis: West Slope of Pad 7 - Static, Circular
- Author: Meng Wei Lu
- Company: Earth Systems Southern California
- Date Created: 4/27/2017, 12:39:07 PM

General Settings

- Units of Measurement: Imperial Units
- Time Units: days
- Permeability Units: feet/second
- Failure Direction: Right to Left
- Data Output: Standard
- Maximum Material Properties: 20
- Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

- Spencer
- Number of slices: 25
- Tolerance: 0.005
- Maximum number of iterations: 50
- Check $\alpha < 0.2$: Yes
- Initial trial value of FS: 1
- Steffensen Iteration: Yes

Groundwater Analysis

- Groundwater Method: Water Surfaces
- Pore Fluid Unit Weight: 62.4 lbs/ft³
- 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: Grid Search
- Radius Increment: 10
- Composite Surfaces: Disabled
- Reverse Curvature: Invalid Surfaces
- Minimum Elevation: Not Defined
- Minimum Depth: Not Defined

Loading

- 1 Distributed Load present

Distributed Load 1

- Distribution: Constant
- Magnitude [psf]: 1500
- Orientation: Normal to boundary

Material Properties

| Property | Documented Fill | Tsp |
|------------------------------------|---|---|
| Color |  |  |
| Strength Type | Mohr-Coulomb | Mohr-Coulomb |
| Unit Weight [lbs/ft ³] | 125 | 130 |
| Cohesion [psf] | 360 | 400 |
| Friction Angle [deg] | 32 | 27 |
| Water Surface | None | None |
| Ru Value | 0 | 0 |

Global Minimums

Method: spencer

- FS: 1.624080
- Center: 149.835, 1229.118
- Radius: 839.003
- Left Slip Surface Endpoint: 120.156, 390.640
- Right Slip Surface Endpoint: 750.210, 643.050
- Resisting Moment=2.18775e+009 lb-ft
- Driving Moment=1.34707e+009 lb-ft
- Resisting Horizontal Force=2.39196e+006 lb
- Driving Horizontal Force=1.47281e+006 lb
- Total Slice Area=35930 ft²

Slice Data

• Global Minimum Query (spencer) - Safety Factor: 1.62408

| Slice Number | Width [ft] | Weight [lbs] | 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] |
|--------------|------------|--------------|-----------------|---------------------|-------------------------------|--------------------|----------------------|--------------------------|---------------------|-------------------------------|
| 1 | 25.4001 | 17896.1 | Tsp | 400 | 27 | 530.129 | 860.972 | 904.71 | 0 | 904.71 |
| 2 | 25.4001 | 61980.5 | Tsp | 400 | 27 | 1127.67 | 1831.42 | 2809.32 | 0 | 2809.32 |
| 3 | 25.4001 | 103838 | Tsp | 400 | 27 | 1669.38 | 2711.2 | 4535.98 | 0 | 4535.98 |
| 4 | 25.4001 | 130136 | Tsp | 400 | 27 | 1982.98 | 3220.52 | 5535.59 | 0 | 5535.59 |
| 5 | 25.4001 | 151996 | Tsp | 400 | 27 | 2225.88 | 3615 | 6309.8 | 0 | 6309.8 |
| 6 | 25.4001 | 187243 | Tsp | 400 | 27 | 2627.21 | 4266.8 | 7589.01 | 0 | 7589.01 |
| 7 | 25.4001 | 219632 | Tsp | 400 | 27 | 2975.99 | 4833.25 | 8700.76 | 0 | 8700.76 |
| 8 | 25.4001 | 224871 | Tsp | 400 | 27 | 2980.79 | 4841.04 | 8716.05 | 0 | 8716.05 |
| 9 | 25.4001 | 232409 | Tsp | 400 | 27 | 3011.53 | 4890.97 | 8814.01 | 0 | 8814.01 |
| 10 | 25.4001 | 251449 | Tsp | 400 | 27 | 3173.31 | 5153.71 | 9329.69 | 0 | 9329.69 |
| 11 | 25.4001 | 273707 | Tsp | 400 | 27 | 3363.51 | 5462.61 | 9935.93 | 0 | 9935.93 |
| 12 | 25.4001 | 265278 | Tsp | 400 | 27 | 3202.23 | 5200.68 | 9421.85 | 0 | 9421.85 |
| 13 | 25.4001 | 245072 | Tsp | 400 | 27 | 2917.21 | 4737.79 | 8513.39 | 0 | 8513.39 |
| 14 | 25.4001 | 251044 | Tsp | 400 | 27 | 2921.44 | 4744.66 | 8526.88 | 0 | 8526.88 |
| 15 | 25.4001 | 256627 | Tsp | 400 | 27 | 2919.13 | 4740.9 | 8519.48 | 0 | 8519.48 |
| 16 | 25.4001 | 253657 | Tsp | 400 | 27 | 2827.03 | 4591.33 | 8225.94 | 0 | 8225.94 |
| 17 | 25.4001 | 233385 | Tsp | 400 | 27 | 2563.59 | 4163.47 | 7386.23 | 0 | 7386.23 |
| 18 | 24.7815 | 223170 | Documented Fill | 360 | 32 | 2907.31 | 4721.71 | 6980.2 | 0 | 6980.2 |
| 19 | 24.7815 | 216148 | Documented Fill | 360 | 32 | 2752.33 | 4470.01 | 6577.37 | 0 | 6577.37 |

| | | | | | | | | | | |
|----|---------|---------|--------------------|-----|----|---------|---------|---------|---|---------|
| 20 | 24.7815 | 198614 | Documented Fill | 360 | 32 | 2480.49 | 4028.51 | 5870.85 | 0 | 5870.85 |
| 21 | 24.7815 | 167269 | Documented Fill | 360 | 32 | 2064.82 | 3353.44 | 4790.5 | 0 | 4790.5 |
| 22 | 24.7815 | 150534 | Documented Fill | 360 | 32 | 1826.54 | 2966.45 | 4171.2 | 0 | 4171.2 |
| 23 | 24.7815 | 129234 | Documented Fill | 360 | 32 | 1550.11 | 2517.5 | 3452.72 | 0 | 3452.72 |
| 24 | 24.7815 | 98694.4 | Documented Fill | 360 | 32 | 1192.79 | 1937.18 | 2524.01 | 0 | 2524.01 |
| 25 | 24.7815 | 37581.2 | Documented Fill | 360 | 32 | 564.704 | 917.125 | 891.586 | 0 | 891.586 |

Interslice Data

• Global Minimum Query (spencer) - Safety Factor: 1.62408

| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|-----------------|-------------------------|----------------------------------|-------------------------------------|------------------------------------|--|
| 1 | 120.156 | 390.64 | 0 | 0 | 0 |
| 2 | 145.557 | 390.126 | 13929.2 | 4864.39 | 19.2504 |
| 3 | 170.957 | 390.381 | 41852.9 | 14616 | 19.2504 |
| 4 | 196.357 | 391.406 | 79602.3 | 27798.9 | 19.2503 |
| 5 | 221.757 | 393.203 | 120015 | 41911.8 | 19.2503 |
| 6 | 247.157 | 395.779 | 160297 | 55979.4 | 19.2504 |
| 7 | 272.557 | 399.139 | 201521 | 70375.8 | 19.2504 |
| 8 | 297.957 | 403.294 | 240955 | 84146.9 | 19.2503 |
| 9 | 323.357 | 408.255 | 273417 | 95483.3 | 19.2503 |
| 10 | 348.757 | 414.038 | 298934 | 104395 | 19.2504 |
| 11 | 374.157 | 420.659 | 317751 | 110966 | 19.2504 |
| 12 | 399.557 | 428.141 | 328842 | 114839 | 19.2503 |
| 13 | 424.957 | 436.506 | 331353 | 115716 | 19.2504 |
| 14 | 450.357 | 445.784 | 326457 | 114006 | 19.2503 |
| 15 | 475.757 | 456.007 | 313484 | 109476 | 19.2504 |
| 16 | 501.158 | 467.214 | 292149 | 102025 | 19.2503 |
| 17 | 526.558 | 479.447 | 263314 | 91955.2 | 19.2504 |
| 18 | 551.958 | 492.76 | 230094 | 80354.1 | 19.2504 |
| 19 | 576.739 | 506.845 | 203820 | 71178.6 | 19.2504 |
| 20 | 601.521 | 522.078 | 171827 | 60005.9 | 19.2504 |
| 21 | 626.302 | 538.535 | 136673 | 47729.4 | 19.2504 |
| 22 | 651.084 | 556.306 | 102704 | 35866.7 | 19.2504 |
| 23 | 675.865 | 575.499 | 67909 | 23715.3 | 19.2503 |
| 24 | 700.647 | 596.242 | 34699.5 | 12117.8 | 19.2503 |

| | | | | | |
|----|---------|---------|---------|--------|---------|
| 25 | 725.428 | 618.694 | 7587.73 | 2649.8 | 19.2503 |
| 26 | 750.21 | 643.05 | 0 | 0 | 0 |

List of Coordinates

Distributed Load

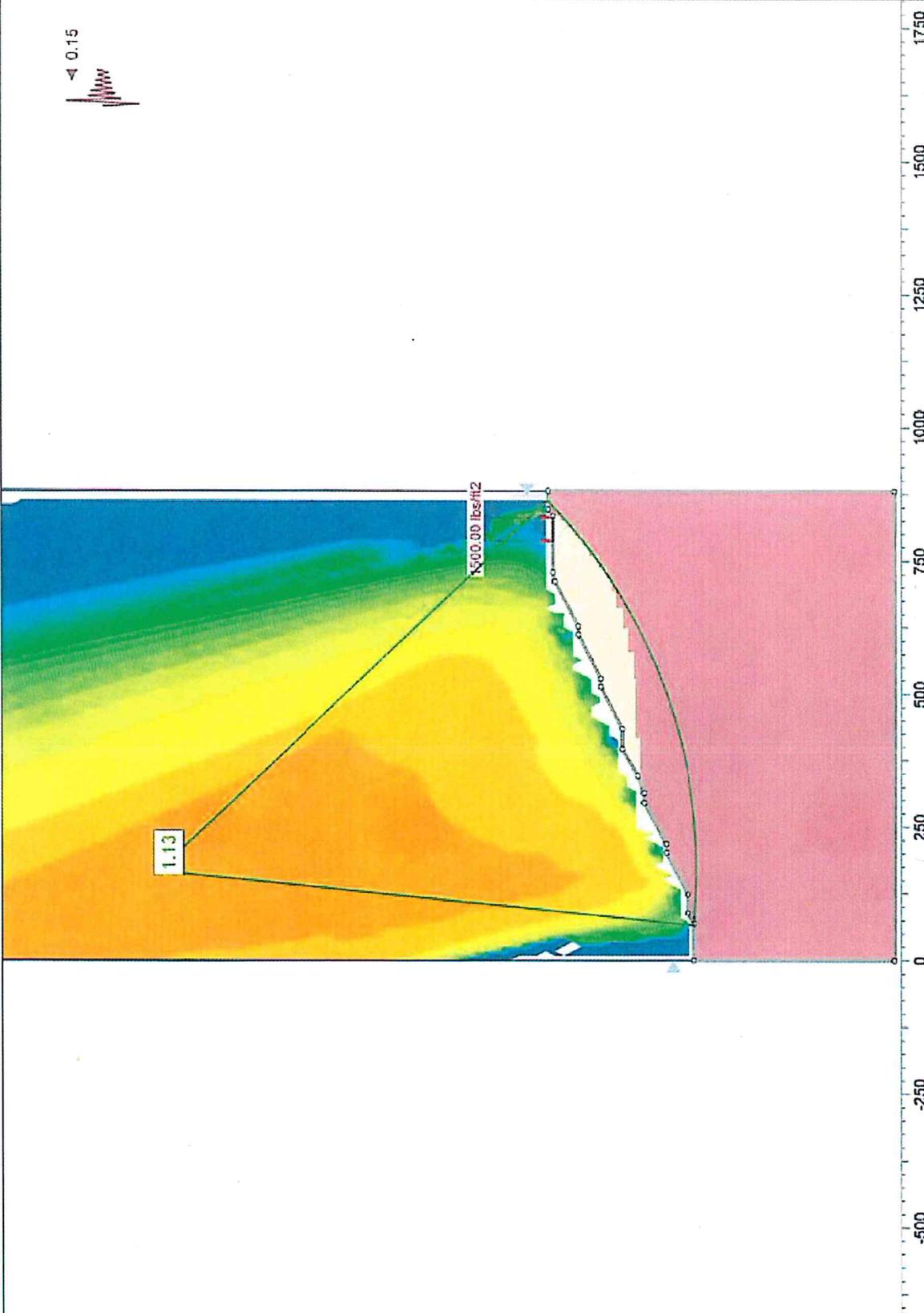
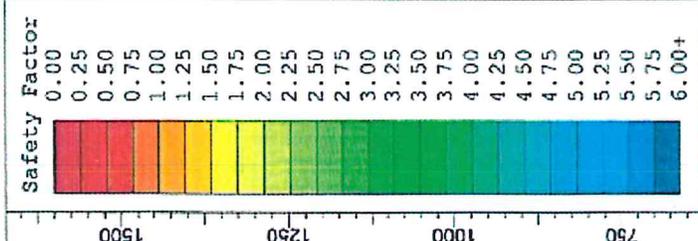
| X | Y |
|---------|--------|
| 830.865 | 643.05 |
| 786.591 | 643.05 |

External Boundary

| X | Y |
|--------|--------|
| 881.38 | 652.58 |
| 846.46 | 652.58 |
| 833.76 | 643.05 |
| 728.98 | 643.05 |
| 711.52 | 639.88 |
| 627.38 | 595.43 |
| 611.51 | 595.43 |
| 528.96 | 554.15 |
| 513.72 | 554.15 |
| 434.34 | 513.83 |
| 396.24 | 513.83 |
| 346.08 | 485.26 |
| 313.69 | 473.19 |
| 295.28 | 473.19 |
| 218.44 | 431.92 |
| 201.93 | 431.92 |
| 123.19 | 390.64 |
| 88.27 | 390.64 |
| 69.22 | 378.58 |
| 0 | 378.58 |
| 0 | 0 |
| 881.38 | 0 |

Material Boundary

| X | Y |
|---------|---------|
| 346.08 | 485.26 |
| 346.08 | 480.509 |
| 416.706 | 480.509 |
| 416.706 | 489.589 |
| 528.96 | 489.589 |
| 528.96 | 492.76 |
| 578.187 | 492.76 |
| 578.187 | 503.855 |
| 622.854 | 503.855 |
| 622.854 | 512.551 |
| 661.197 | 512.551 |
| 661.197 | 525.991 |
| 692.82 | 525.991 |
| 692.82 | 533.897 |
| 716.933 | 533.897 |
| 716.933 | 542.593 |
| 738.26 | 542.593 |
| 738.26 | 556.921 |
| 758.284 | 556.921 |
| 758.284 | 575.075 |
| 779.81 | 575.075 |
| 779.81 | 588.82 |
| 797.445 | 588.82 |
| 797.445 | 602.047 |
| 813.784 | 602.047 |
| 813.784 | 616.311 |
| 825.974 | 616.311 |
| 825.974 | 628.76 |
| 833.76 | 628.76 |
| 833.76 | 643.05 |



| | | | |
|----------------------|-------------|---|---|
| Project | | VT-24980-04 Tajiguas Landfill | |
| Analysis Description | | West Slope of Pad 7 - Seismic, Circular | |
| Drawn By | Meng Wei Lu | Scale | 1:3256 |
| Date | | Company | Earth Systems Southern California |
| | | File Name | VT-24980-04 Tajiguas Landfill - Seismic, Circular.slm |

Global Minimums

Method: spencer

- FS: 1.133080
- Center: 167.462, 1380.653
- Radius: 1007.198
- Left Slip Surface Endpoint: 65.989, 378.580
- Right Slip Surface Endpoint: 863.420, 652.580
- Resisting Moment=4.29358e+009 lb-ft
- Driving Moment=3.78931e+009 lb-ft
- Resisting Horizontal Force=3.97416e+006 lb
- Driving Horizontal Force=3.50741e+006 lb
- Total Slice Area=64040.3 ft²

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.13308

| Slice Number | Width [ft] | Weight [lbs] | 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] |
|--------------|------------|--------------|-----------------|---------------------|-------------------------------|--------------------|----------------------|--------------------------|---------------------|-------------------------------|
| 1 | 58.8058 | 88417 | Tsp | 400 | 27 | 1342.75 | 1521.44 | 2200.96 | 0 | 2200.96 |
| 2 | 58.8058 | 251696 | Tsp | 400 | 27 | 2765.24 | 3133.24 | 5364.27 | 0 | 5364.27 |
| 3 | 58.8058 | 444385 | Tsp | 400 | 27 | 4257.91 | 4824.55 | 8683.66 | 0 | 8683.66 |
| 4 | 58.8058 | 620082 | Tsp | 400 | 27 | 5426.63 | 6148.81 | 11282.7 | 0 | 11282.7 |
| 5 | 58.8058 | 711207 | Tsp | 400 | 27 | 5806.81 | 6579.58 | 12128.1 | 0 | 12128.1 |
| 6 | 58.8058 | 823893 | Tsp | 400 | 27 | 6284.98 | 7121.38 | 13191.4 | 0 | 13191.4 |
| 7 | 58.8058 | 816580 | Tsp | 400 | 27 | 5884.32 | 6667.41 | 12300.5 | 0 | 12300.5 |
| 8 | 58.8058 | 868169 | Tsp | 400 | 27 | 5883.89 | 6666.92 | 12299.5 | 0 | 12299.5 |
| 9 | 58.8058 | 867692 | Tsp | 400 | 27 | 5550.01 | 6288.61 | 11557 | 0 | 11557 |
| 10 | 58.8058 | 843011 | Tsp | 400 | 27 | 5092.98 | 5770.75 | 10540.7 | 0 | 10540.7 |
| 11 | 58.8058 | 802189 | Tsp | 400 | 27 | 4576.41 | 5185.44 | 9391.96 | 0 | 9391.96 |
| 12 | 4.07979 | 53687.3 | Documented Fill | 720 | 31 | 5208.85 | 5902.04 | 8624.35 | 0 | 8624.35 |
| 13 | 9.19056 | 117469 | Tsp | 400 | 27 | 4138.79 | 4689.58 | 8418.78 | 0 | 8418.78 |
| 14 | 12.1364 | 146072 | Documented Fill | 720 | 31 | 4719.5 | 5347.57 | 7701.55 | 0 | 7701.55 |
| 15 | 8.78193 | 98034.8 | Tsp | 400 | 27 | 3573.55 | 4049.12 | 7161.79 | 0 | 7161.79 |
| 16 | 11.2421 | 115394 | Documented Fill | 720 | 31 | 4014.65 | 4548.92 | 6372.39 | 0 | 6372.39 |
| 17 | 13.7368 | 125764 | Tsp | 400 | 27 | 2916.4 | 3304.51 | 5700.42 | 0 | 5700.42 |
| 18 | 7.78916 | 63308.9 | Documented Fill | 720 | 31 | 3211.28 | 3638.64 | 4857.44 | 0 | 4857.44 |

| | | | | | | | | | | |
|----|---------|---------|--------------------|-----|----|---------|---------|---------|---|---------|
| 19 | 10.1051 | 73649.3 | Tsp | 400 | 27 | 2483.02 | 2813.46 | 4736.68 | 0 | 4736.68 |
| 20 | 7.52994 | 48230.4 | Documented Fill | 720 | 31 | 3110.09 | 3523.98 | 4666.61 | 0 | 4666.61 |
| 21 | 8.93797 | 50022.1 | Tsp | 400 | 27 | 2270.54 | 2572.7 | 4264.17 | 0 | 4264.17 |
| 22 | 7.40103 | 35096.3 | Documented Fill | 720 | 31 | 2532.41 | 2869.42 | 3577.24 | 0 | 3577.24 |
| 23 | 9.59615 | 37145.9 | Tsp | 400 | 27 | 1769.26 | 2004.71 | 3149.41 | 0 | 3149.41 |
| 24 | 2.59385 | 8307.51 | Documented Fill | 720 | 31 | 2019.76 | 2288.55 | 2610.5 | 0 | 2610.5 |
| 25 | 37.4456 | 64771.7 | Tsp | 400 | 27 | 809.119 | 916.796 | 1014.27 | 0 | 1014.27 |

Interslice Data

• Global Minimum Query (spencer) - Safety Factor: 1.13308

| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|--------------|-------------------|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 1 | 65.9889 | 378.58 | 0 | 0 | 0 |
| 2 | 124.795 | 374.359 | 75233.2 | 37009.5 | 26.194 |
| 3 | 183.601 | 373.585 | 204753 | 100724 | 26.1939 |
| 4 | 242.406 | 376.247 | 366139 | 180115 | 26.194 |
| 5 | 301.212 | 382.375 | 524096 | 257818 | 26.1939 |
| 6 | 360.018 | 392.033 | 642821 | 316223 | 26.194 |
| 7 | 418.824 | 405.325 | 714636 | 351551 | 26.194 |
| 8 | 477.63 | 422.403 | 729192 | 358711 | 26.1939 |
| 9 | 536.436 | 443.473 | 686892 | 337903 | 26.194 |
| 10 | 595.242 | 468.813 | 591273 | 290865 | 26.194 |
| 11 | 654.047 | 498.79 | 449269 | 221009 | 26.194 |
| 12 | 712.853 | 533.897 | 269175 | 132415 | 26.1939 |
| 13 | 716.933 | 536.539 | 259655 | 127732 | 26.1939 |
| 14 | 726.124 | 542.593 | 229221 | 112761 | 26.194 |
| 15 | 738.26 | 550.811 | 201471 | 99109.6 | 26.194 |
| 16 | 747.042 | 556.921 | 174491 | 85837.3 | 26.1939 |
| 17 | 758.284 | 564.947 | 151312 | 74434.7 | 26.1939 |
| 18 | 772.021 | 575.075 | 114898 | 56521.9 | 26.194 |
| 19 | 779.81 | 580.98 | 101811 | 50083.7 | 26.1939 |
| 20 | 789.915 | 588.82 | 78795.7 | 38762 | 26.194 |
| 21 | 797.445 | 594.798 | 67157.7 | 33036.9 | 26.194 |
| 22 | 806.383 | 602.047 | 49098.7 | 24153.1 | 26.1939 |
| 23 | 813.784 | 608.18 | 40697.2 | 20020.2 | 26.194 |
| 24 | 823.38 | 616.311 | 26546.8 | 13059.2 | 26.194 |
| 25 | 825.974 | 618.545 | 24725.2 | 12163.1 | 26.194 |

| | | | | | |
|----|--------|--------|---|---|---|
| 26 | 863.42 | 652.58 | 0 | 0 | 0 |
|----|--------|--------|---|---|---|

List of Coordinates

Distributed Load

| X | Y |
|---------|--------|
| 830.865 | 643.05 |
| 786.591 | 643.05 |

External Boundary

| X | Y |
|--------|--------|
| 881.38 | 652.58 |
| 846.46 | 652.58 |
| 833.76 | 643.05 |
| 728.98 | 643.05 |
| 711.52 | 639.88 |
| 627.38 | 595.43 |
| 611.51 | 595.43 |
| 528.96 | 554.15 |
| 513.72 | 554.15 |
| 434.34 | 513.83 |
| 396.24 | 513.83 |
| 346.08 | 485.26 |
| 313.69 | 473.19 |
| 295.28 | 473.19 |
| 218.44 | 431.92 |
| 201.93 | 431.92 |
| 123.19 | 390.64 |
| 88.27 | 390.64 |
| 69.22 | 378.58 |
| 0 | 378.58 |
| 0 | 0 |
| 881.38 | 0 |

Material Boundary

| X | Y |
|---------|---------|
| 346.08 | 485.26 |
| 346.08 | 480.509 |
| 416.706 | 480.509 |
| 416.706 | 489.589 |
| 528.96 | 489.589 |
| 528.96 | 492.76 |
| 578.187 | 492.76 |
| 578.187 | 503.855 |
| 622.854 | 503.855 |
| 622.854 | 512.551 |
| 661.197 | 512.551 |
| 661.197 | 525.991 |
| 692.82 | 525.991 |
| 692.82 | 533.897 |
| 716.933 | 533.897 |
| 716.933 | 542.593 |
| 738.26 | 542.593 |
| 738.26 | 556.921 |
| 758.284 | 556.921 |
| 758.284 | 575.075 |
| 779.81 | 575.075 |
| 779.81 | 588.82 |
| 797.445 | 588.82 |
| 797.445 | 602.047 |
| 813.784 | 602.047 |
| 813.784 | 616.311 |
| 825.974 | 616.311 |
| 825.974 | 628.76 |
| 833.76 | 628.76 |
| 833.76 | 643.05 |

Slide Analysis Information

VT-24980-04 Tajiguas Landfill

Project Summary

- File Name: VT-24980-04 Tajiguas Landfill - Seismic, Circular
- Slide Modeler Version: 6.039
- Project Title: VT-24980-04 Tajiguas Landfill
- Analysis: West Slope of Pad 7 - Seismic, Circular
- Author: Meng Wei Lu
- Company: Earth Systems Southern California
- Date Created: 4/27/2017, 12:39:07 PM

General Settings

- Units of Measurement: Imperial Units
- Time Units: days
- Permeability Units: feet/second
- Failure Direction: Right to Left
- Data Output: Standard
- Maximum Material Properties: 20
- Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

- Spencer
- Number of slices: 25
- Tolerance: 0.005
- Maximum number of iterations: 50
- Check $\alpha < 0.2$: Yes
- Initial trial value of FS: 1
- Steffensen Iteration: Yes

Groundwater Analysis

- Groundwater Method: Water Surfaces
- Pore Fluid Unit Weight: 62.4 lbs/ft³
- 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: Grid Search
- Radius Increment: 10
- Composite Surfaces: Disabled
- Reverse Curvature: Invalid Surfaces
- Minimum Elevation: Not Defined
- Minimum Depth: Not Defined

Loading

- Seismic Load Coefficient (Horizontal): 0.15
- 1 Distributed Load present

Distributed Load 1

- Distribution: Constant
- Magnitude [psf]: 1500
- Orientation: Normal to boundary

Material Properties

| Property | Documented Fill | Tsp |
|------------------------------------|---|---|
| Color |  |  |
| Strength Type | Mohr-Coulomb | Mohr-Coulomb |
| Unit Weight [lbs/ft ³] | 125 | 130 |
| Cohesion [psf] | 720 | 400 |
| Friction Angle [deg] | 31 | 27 |
| Water Surface | None | None |
| Ru Value | 0 | 0 |

Appendix C

Tajiguas Resource Recovery Project Revised Hydrology



TAJIGUAS RESOURCE RECOVERY PROJECT REVISED HYDROLOGY

June 16, 2017

Reviewed by: Mark Seits, P.E.

Prepared by: Jacob Hyles, P.E.

Executive Summary

The purpose of this Technical Memorandum is to document the results of the revised hydrologic analysis of the Tajiguas Resource Recovery Project (TRRP) prepared by HDR in September 2013. The revisions to the 2013 hydrologic analysis are required to reflect the new location for the proposed Anaerobic Digestion Facility (ADF) on the east side of the landfill (adjacent to the Composting Area). Moving the ADF from the west side to the east side impacted three subbasins within the hydrologic model. The hydrologic parameters for Subbasin PC0301 (west side) were revised to reflect the removal of the ADF (Curve Number adjusted) and Subbasins PC0203 and PC0305 (east side) were revised to reflect the addition of the ADF (Curve Numbers and drainage areas adjusted). Both the Interim Condition with TRRP and Ultimate Condition with TRRP parameters were revised in the 2013 HEC-HMS model and rerun to reflect the changes. A comparison between the previous 2013 and revised 2017 hydrologic analysis results is provided in the table below. The 100-year peak flow rates are provided for the specific subbasins impacted, as well as the cumulative flow in the storm drain at the specified locations (i.e. nodes) within the impacted reach. The subbasins and nodes are shown on the Interim and Ultimate Condition Hydrology Maps from the 2013 report (Figures 3 and 5, respectively) and are included in the Appendix.

| Type | Element | 100yr Peak Q (cfs) - With TRRP Conditions | | | |
|----------|---------------|---|-------|----------|-------|
| | | Interim | | Ultimate | |
| | | 2013 | 2017 | 2013 | 2017 |
| Subbasin | PC0203 | 112.6 | 113.7 | 112.6 | 113.7 |
| | PC0301 | 43.4 | 43.1 | 43.4 | 43.1 |
| | PC0305 | 94.7 | 93.5 | 94.7 | 93.5 |
| Nodes | Pacific Ocean | 490.2 | 489.2 | 447.7 | 447.7 |
| | N10 | 487.6 | 486.6 | 445.0 | 443.8 |
| | N15 | 446.3 | 445.3 | 402.6 | 401.4 |
| | N20 | 403.7 | 402.6 | 356.6 | 355.4 |
| | N25 | 424.5 | 423.3 | 365.5 | 364.2 |
| | N30 | 390.7 | 389.5 | 331.1 | 330.1 |
| | N35 | 252.3 | 252.1 | 204.9 | 205.0 |
| | N70 | 235.7 | 235.5 | 196.6 | 196.8 |
| | N80 | 199.5 | 199.7 | 181.4 | 181.7 |



Based on the table, it is apparent that the change in location for the ADF has an insignificant impact on the peak flows within and leaving the site. There is a less than 1% increase in flow from Subbasin PC0203 and a less than 0.2% increase in the flow within the storm drain between Nodes N35 and N80 (see highlighted numbers in the table). Both are primarily due to a small increase in area within PC0203 (currently drains to PC0305). These flows are still below the pre-landfill and existing condition flows as identified in the 2013 report. No revisions to the 2013 hydraulic models were required due to the little to no change in peak flows in the storm drain.



Hydrologic Assessment

An HEC-HMS model was prepared for the Hydrologic and Hydraulic Analysis Report completed by HDR in September 2013. Five separate models were prepared for the 2013 report - three Without TRRP Conditions (Pre-landfill, Existing and Ultimate) and two With TRRP Conditions (Existing and Ultimate). There were no changes to the Without TRRP Condition models, but the new ADF site impacts three subbasins within the With TRRP Condition HEC-HMS models (Interim and Ultimate). The hydrologic parameters for Subbasin PC0301 (west side) were revised to reflect the removal of the ADF (Curve Number adjusted) and Subbasins PC0203 and PC0305 (east side) were revised to reflect the addition of the ADF (Curve Numbers and drainage areas adjusted). The subbasins and nodes are shown on the Interim and Ultimate Condition Hydrology Maps from the 2013 report (Figures 3 and 5, respectively) and are included in the Appendix.

A draft report prepared by John Kular Consulting (dated May 3, 2017) was used to identify the areas impacted by the new site plan (see Appendix A). The drainage areas were confirmed and/or adjusted as needed to meet the new site plan. The main difference with the new site plan is the regrading of approximately 0.55 acres from Subbasin PC0305 to Subbasin PC0203. New area-averaged curve numbers (CN) were calculated based on the areas and land use. There is very little difference in CNs between the ADF (93) and the landfill (94), so the change in area-averaged CNs was minimal. There were no other changes to the hydrologic parameters identified.

A comparison of the drainage areas and CN's for the Interim and Ultimate Conditions is provided in the tables below.

Interim with TRRP conditions

| Hydrologic Element | 2013 | | 2017 | |
|--------------------|-----------------------|-------|-----------------------|-------|
| | Drainage Area (sq mi) | CN | Drainage Area (sq mi) | CN |
| PC0104 | 0.0311 | 90.29 | 0.0311 | 90.29 |
| PC0203 | 0.0868 | 94.00 | 0.0876 | 93.97 |
| PC0301 | 0.0336 | 86.03 | 0.0336 | 85.50 |
| PC0305 | 0.0724 | 94.09 | 0.0715 | 94.06 |

Ultimate with TRRP conditions

| Hydrologic Element | 2013 | | 2017 | |
|--------------------|-----------------------|-------|-----------------------|-------|
| | Drainage Area (sq mi) | CN | Drainage Area (sq mi) | CN |
| PC0104 | 0.0337 | 91.05 | 0.0337 | 91.05 |
| PC0203 | 0.0868 | 94 | 0.0876 | 93.97 |
| PC0301 | 0.0336 | 86.03 | 0.0336 | 85.50 |
| PC0305 | 0.0724 | 94.09 | 0.0715 | 94.06 |

Both the Interim Condition with TRRP and Ultimate Condition with TRRP models (100-year) were revised to reflect the 2017 parameter changes. The results of the 2017 model are summarized in the table below.



| | | 100yr Peak Q (cfs) - With Project Conditions | | | |
|---------------|----------------------|--|--------------|---------------|---------------|
| Type | Element | Interim 2013 | Interim 2017 | Ultimate 2013 | Ultimate 2017 |
| Subwatersheds | PC0101 | 103.9 | 103.9 | 103.9 | 103.9 |
| | PC0102 | 40.5 | 40.5 | 40.5 | 40.5 |
| | PC0103 | 55.9 | 55.9 | 52.4 | 52.4 |
| | PC0104 | 43.7 | 43.7 | 48.3 | 48.3 |
| | PC0201 | 62.6 | 62.6 | 62.6 | 62.6 |
| | PC0202 | 65.0 | 65.0 | 65.0 | 65.0 |
| | PC0203 | 112.6 | 113.7 | 112.6 | 113.7 |
| | PC0204 | 6.0 | 6.0 | 6.0 | 6.0 |
| | PC0301 | 43.4 | 43.1 | 43.4 | 43.1 |
| | PC0302 | 20.1 | 20.1 | 20.1 | 20.1 |
| | PC0303 | 27.9 | 27.9 | 27.9 | 27.9 |
| | PC0304 | 8.3 | 8.3 | 8.3 | 8.3 |
| | PC0305 | 94.7 | 93.5 | 94.7 | 93.5 |
| | PC0306 | 18.5 | 18.5 | 18.5 | 18.5 |
| | PC0401 | 35.8 | 35.8 | 35.8 | 35.8 |
| | PC0402 | 52.6 | 52.6 | 52.6 | 52.6 |
| | PC0403 | 34.7 | 34.7 | 34.7 | 34.7 |
| | PC0404 | 13.4 | 13.4 | 13.4 | 13.4 |
| | PC0405 | 3.7 | 3.7 | 3.7 | 3.7 |
| | CA | | 13.4 | 13.4 | 13.4 |
| Storage Areas | B1 | 150.7 | 149.9 | 150.7 | 149.9 |
| | Interim Basin/SA-ULT | 180.1 | 180.2 | 181.4 | 181.7 |
| | B4 | 234.6 | 235.7 | 184.0 | 185.6 |
| | SA1 | 403.7 | 402.6 | 356.6 | 355.4 |
| | SA2 | 446.3 | 445.3 | 402.6 | 401.4 |
| | SA3 | 487.6 | 486.6 | 445.0 | 443.8 |
| Nodes | N10 | 487.6 | 486.6 | 445.0 | 443.8 |
| | N100 | 378.2 | 379.2 | 144.4 | 144.4 |
| | N120 | 245.3 | 246.4 | 245.3 | 246.4 |
| | N15 | 446.3 | 445.3 | 402.6 | 401.4 |
| | N20 | 403.7 | 402.6 | 356.6 | 355.4 |
| | N25 | 424.5 | 423.3 | 365.5 | 364.2 |
| | N30 | 390.7 | 389.5 | 331.1 | 330.1 |
| | N35 | 252.3 | 252.1 | 204.9 | 205.0 |
| | N40 | 150.5 | 149.4 | 150.5 | 149.4 |
| | N45 | 48.0 | 48.0 | 56.3 | 56.3 |
| | N50 | 27.9 | 27.9 | 27.9 | 27.9 |
| | N70 | 235.7 | 235.5 | 196.6 | 196.8 |
| | N80 | 199.5 | 199.7 | 181.4 | 181.7 |
| | N95 | 432.2 | 433.4 | 353.0 | 355.1 |

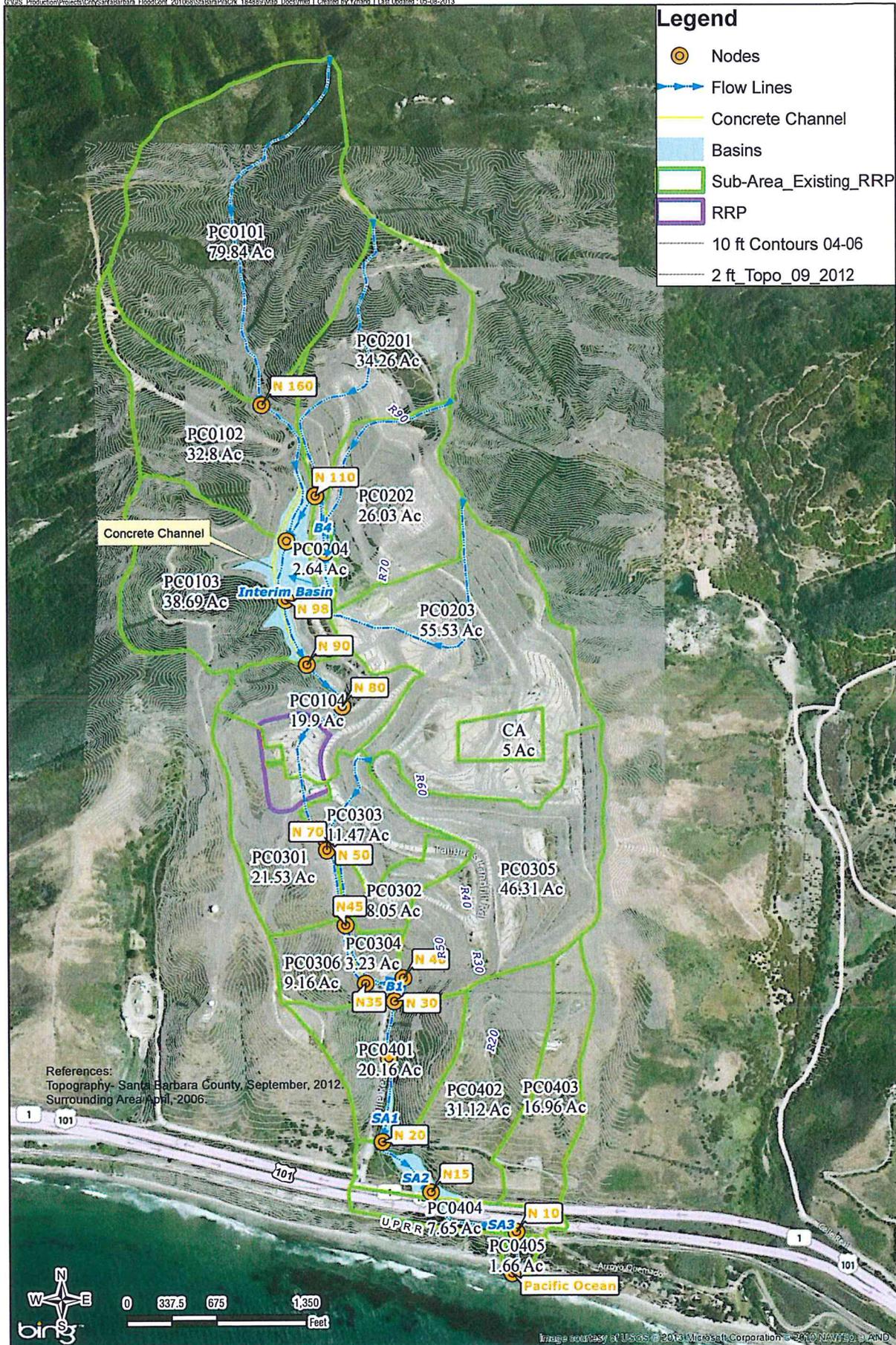


Table continued

| Type | Element | 100yr Peak Q (cfs) - With Project Conditions | | | |
|-----------------|---------------|--|--------------|---------------|---------------|
| | | Interim 2013 | Interim 2017 | Ultimate 2013 | Ultimate 2017 |
| Routing Reaches | R20 | 390.6 | 389.4 | 331.0 | 330.0 |
| | R30 | 48.0 | 48.0 | 56.3 | 56.3 |
| | R40 | 27.9 | 27.9 | 27.9 | 27.9 |
| | R50 | 235.7 | 235.4 | 196.6 | 196.8 |
| | R60 | 199.5 | 199.7 | 181.4 | 181.7 |
| | R70 | 377.9 | 379.0 | 144.3 | 144.3 |
| | R80 | 234.6 | 235.7 | - | - |
| | R90 | 103.9 | 103.9 | 103.9 | 103.9 |
| Sinks | Pacific Ocean | 490.2 | 489.2 | 447.7 | 447.7 |

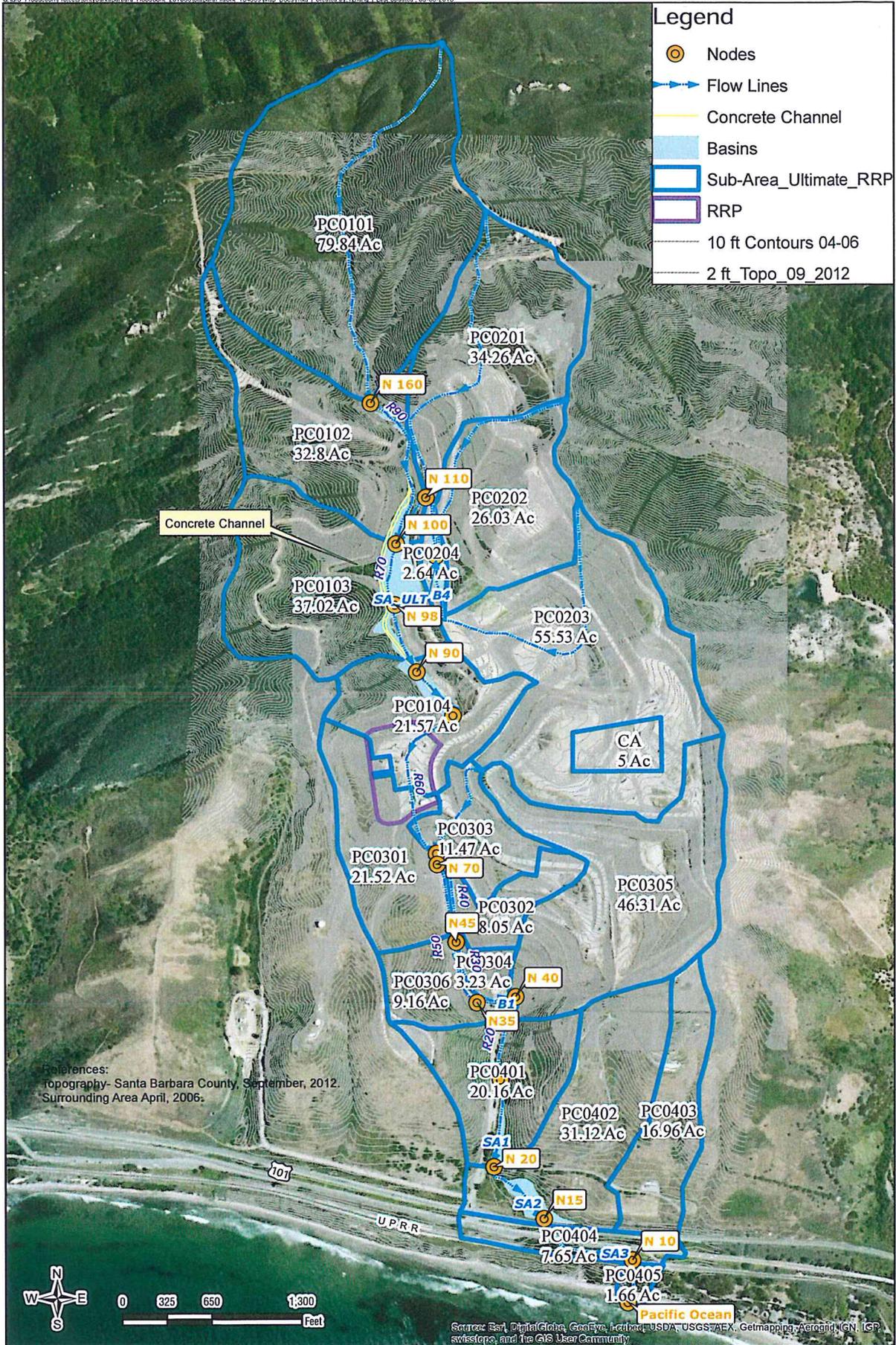


Appendix

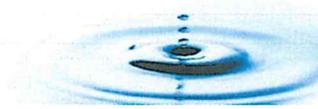


References:
 Topography- Santa Barbara County, September, 2012.
 Surrounding Area April, 2006.

Image courtesy of USGS © 2010 Microsoft Corporation © 2010 NAVTEQ AND



JOHN KULAR CONSULTING



May 3, 2017

John Dewey, CEO
Mustang Renewable Power Ventures, LLC
750 Pismo St.
San Luis Obispo, CA 93401

DRAFT

Dear Sir:

**RE: Tajiguas Resource Recovery Project
Drainage Report – ADF/MRF/CMU Areas**

1.0 Introduction

The Tajiguas Resource Recovery Project (TRRP) is located at the Tajiguas Landfill, approximately 26 miles north of the City of Santa Barbara along US 101. The landfill is located between two parallel ridges which form the Canada de la Pila. This 400-acre valley is drained by Pila Creek.

The Tajiguas Landfill Master Drainage Plan was prepared by HDR in 2008. This document has been supplemented by several technical memos as the landfill phases have been constructed. For convenience, this report uses the same location reference points as the HDR studies. See HDR Figure 5.

The Tajiguas Resource Recovery Project consists of two main geographic areas. The Materials Recovery Facility (MRF) is located on the west side of the landfill and the Anaerobic Digestions Facility (ADF) and Compost Management Unit (CMU) are located on the east side of the landfill

The MRF area is located within HDR drainage areas PC0104 and PC0301. The Materials Recovery Facility consists of a 65,000 SF main building plus several smaller buildings as well as associated driveways and parking comprising approximately 5.8 acres in total. Pila Creek passes under the MRF area parking lots conveyed by two 48-inch diameter HDPE storm drains.

Pre-development runoff from the site flows northeastward to the inlet (Node 80) of the existing 48-inch diameter HDPE storm drains. Post-development runoff from the MRF Drainage Area will be conveyed through a system of HDPE storm drain pipes and concrete swales to the inlet (Node 80) of the existing 48-inch diameter HDPE storm drains.

The ADF area is located within HDR drainage area PC0203 and PC0305. Predevelopment runoff from PC0203 flows northward through a series of landfill drainage swales and pipes into the north landfill sediment basin (Node N95) where it is drained into Pila Creek. Predevelopment runoff from PC0305 flows

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southward through a series of landfill drainage swales and pipes into the south landfill sediment basin (Node N40) where it is drained into Pila Creek. The Anaerobic Digester Facility (ADF, 63,000 SF) and associated driveways comprise 3.9 acres. The CMU area is 4.92 acres and the associated Densimetric Table pad is 0.5 acres.

2.0 Methodology

2.1 RRP Peak Flow Calculation

Peak flows were calculated for the 10, 25, 50 and 100-year return periods using Santa Barbara Flood Control's Rational XL spreadsheet. The times of concentration (T_c) for the pre-development drainage areas were calculated using *Time of Concentration of Small Drainage Basins, Santa Barbara Department of Public Works, Road Division*. Pre-development runoff coefficient C was based on agricultural land cover. The rainfall intensities were derived from the South Coast rainfall curves.

The post development drainage areas are very small, so the minimum time of concentration allowed by the Rational XL spreadsheet of 12 minutes was used as the T_c . The post-development runoff coefficient C for the developed area was based upon commercial land use.

3.0 Flow Calculations and Results

The pre-development flow calculations for the MRF, ADF and CMU drainage areas are summarized in Table 1. Refer to Exhibit 1 for pre-development drainage areas at the MRF.

The post-development flow calculations for the MRF, ADF and CMU areas are summarized in Table 2. Refer to Exhibit 2 for post development drainage areas at the MRF and Exhibit 3 for the post development area at the ADF. The differences between pre-development and post development flows is shown in Table 3. The increases are considered negligible.

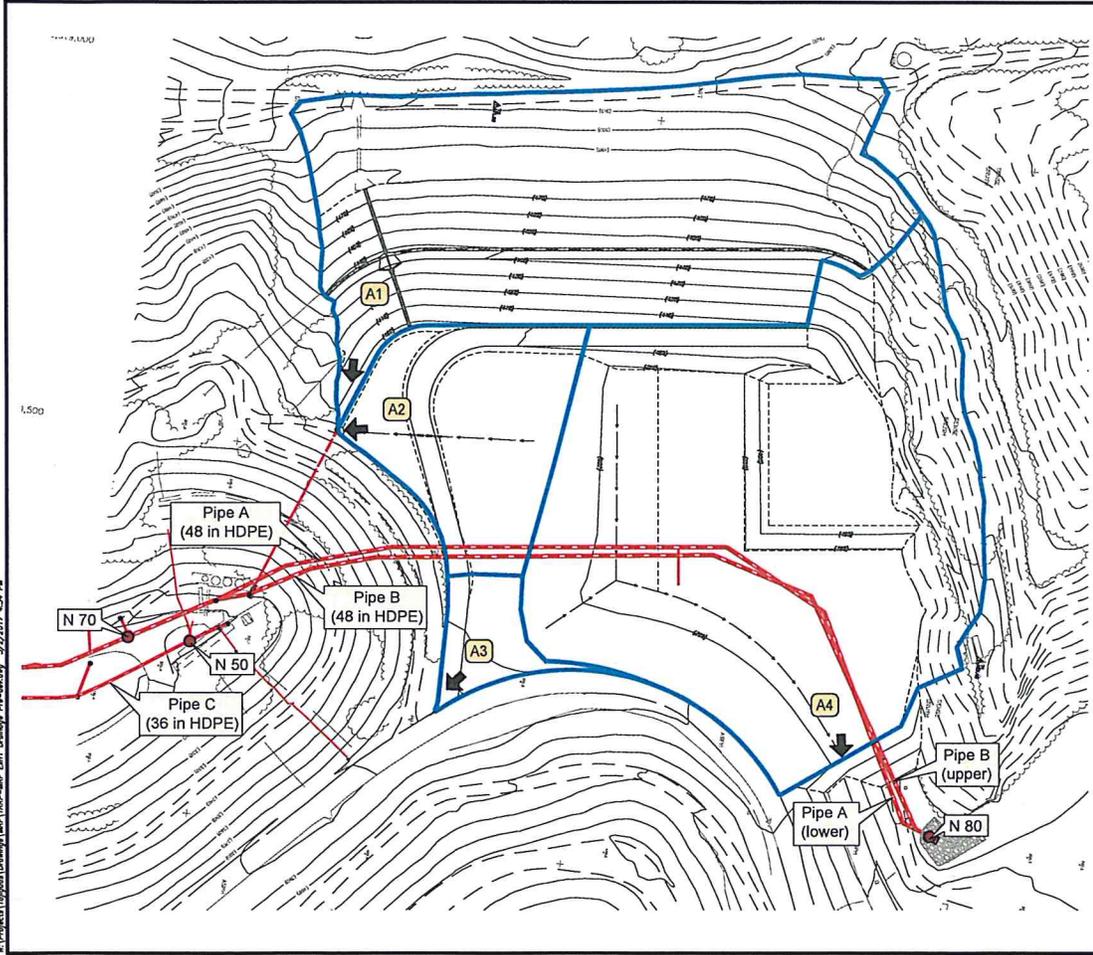
CMU stormwater runoff is considered to occur only when the compost piles are covered with tarpaulins. When the compost piles are exposed to rainfall the entire CMU area runoff is considered to be leachate under State Water Quality Control Board (SWQCB) regulations. See Section 5.0 for a discussion of how the leachate runoff is intercepted, retained and re-used.

4.0 Stormwater Quality Mitigation

4.1 ADF and MRF Areas

Stormwater quality in the ADF and MRF Areas will be addressed by several means:

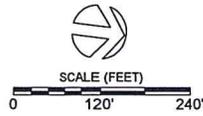
1. All waste-related activities at the MRF and ADF will be conducted indoors.
2. The hillsides above the MRF will be hydroseeded and planted with shrubs to retain the soil. The planted area will be irrigated to ensure establishment of vegetative cover.



- Legend**
- 1 → Drainage Area ID & Point of Concentration
 - Drainage Areas
 - - - - - Waste Footprint (2006)
 - - - - - Existing Stormdrain System

| Drainage Areas | | | |
|----------------|------------|------------|--------------|
| | Pervious | Impervious | Area (acres) |
| A1 | 5.49 | 0 | 5.49 |
| A2 | 1.68 | 0 | 1.68 |
| A3 | 0.40 | 0 | 0.40 |
| A4 | 7.10 | 0 | 7.10 |
| | Total Area | | 14.67 |

Prepared by:
John Kular Consulting
 12107 Bedfordshire Drive, Bakersfield, CA 93311
 661-302-1292 kularconsult.com



Tajiguas Resource Recovery Project
Exhibit 1
 Pre-Development Drainage

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Table 1 - Pre-development Runoff

| Drainage Area | Area | Classification | C10 | C25 | C50 | C100 | I10 | I25 | I50 | I100 | Q10 | Q25 | Q50 | Q100 |
|---------------|-------|----------------|------|------|------|------|-------|-------|-------|-------|-----|------|------|------|
| | acres | | | | | | in/hr | in/hr | in/hr | in/hr | cfs | cfs | cfs | cfs |
| ADF North | 1.15 | Agricultural | 0.62 | 0.68 | 0.72 | 0.74 | 2.61 | 3.18 | 3.68 | 4.03 | 1.9 | 2.5 | 3.0 | 3.4 |
| ADF South | 1.58 | Agricultural | 0.62 | 0.68 | 0.72 | 0.74 | 2.61 | 3.18 | 3.68 | 4.03 | 2.6 | 3.4 | 4.2 | 4.7 |
| CMU | 4.92 | Agricultural | 0.62 | 0.68 | 0.72 | 0.74 | 2.61 | 3.18 | 3.68 | 4.03 | 8.0 | 10.6 | 13.0 | 14.7 |
| MRF | 5.80 | Agricultural | 0.62 | 0.68 | 0.72 | 0.74 | 2.61 | 3.18 | 3.68 | 4.03 | 9.4 | 12.5 | 15.4 | 17.3 |

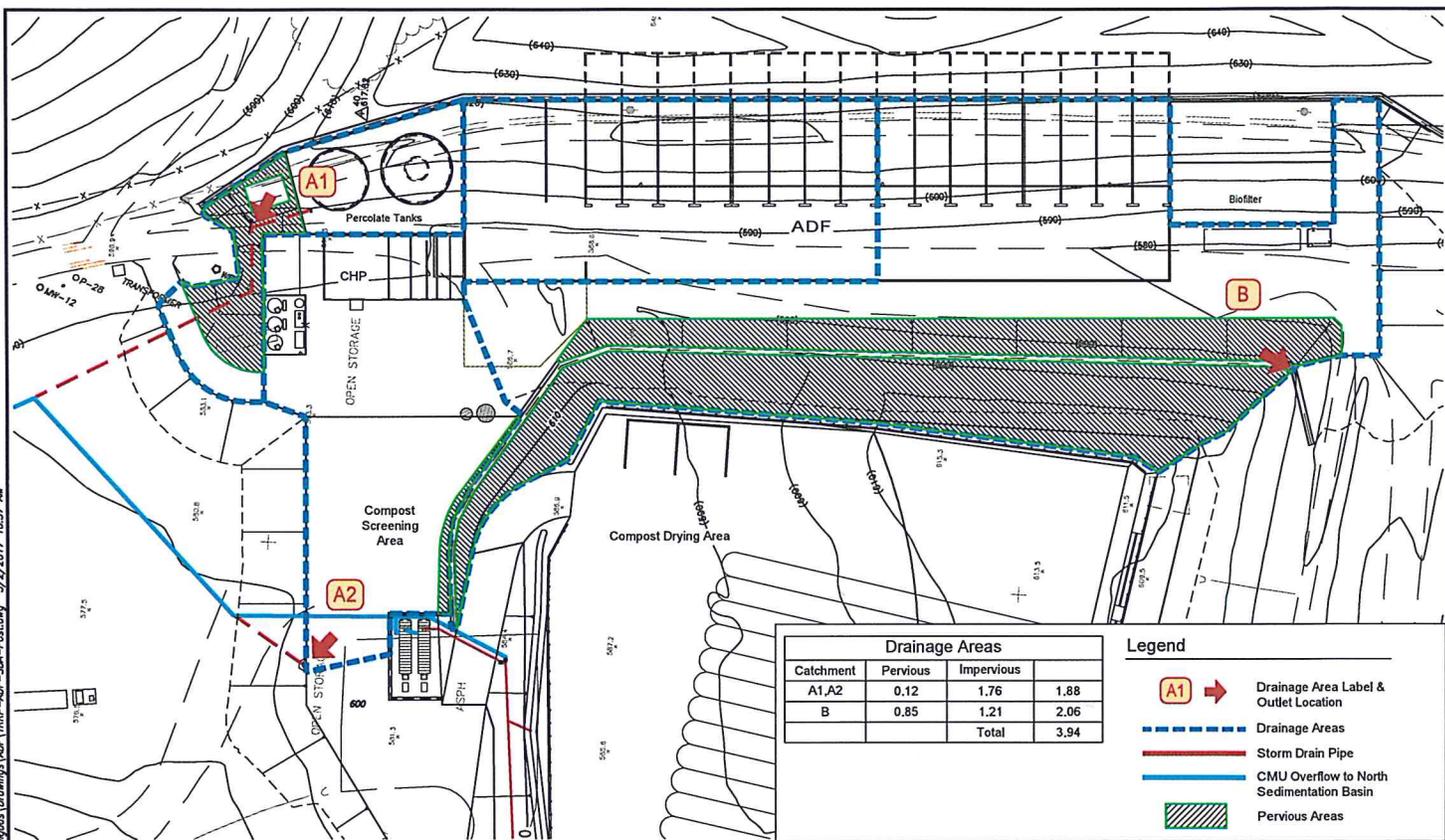
Table 2 - Post Development Runoff

| Drainage Area | Area | Classification | C10 | C25 | C50 | C100 | I10 | I25 | I50 | I100 | Q10 | Q25 | Q50 | Q100 |
|---------------|-------|----------------|------|------|------|------|-------|-------|-------|-------|------|------|------|------|
| | acres | | | | | | in/hr | in/hr | in/hr | in/hr | cfs | cfs | cfs | cfs |
| ADF North | 1.15 | Commercial | 0.73 | 0.76 | 0.79 | 0.8 | 2.61 | 3.18 | 3.68 | 4.03 | 2.2 | 2.8 | 3.3 | 3.7 |
| ADF South | 1.58 | Commercial | 0.73 | 0.76 | 0.79 | 0.8 | 2.61 | 3.18 | 3.68 | 4.03 | 3.0 | 3.8 | 4.6 | 5.1 |
| CMU | 4.92 | Commercial | 0.73 | 0.76 | 0.79 | 0.8 | 2.61 | 3.18 | 3.68 | 4.03 | 9.4 | 11.9 | 14.3 | 15.9 |
| MRF | 5.80 | Commercial | 0.73 | 0.76 | 0.79 | 0.8 | 2.61 | 3.18 | 3.68 | 4.03 | 11.1 | 14.0 | 16.9 | 18.7 |

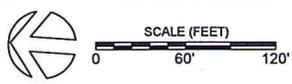
Table 3 - Increase in Runoff Due to Project

| Drainage Area | Area | Q10 | Q25 | Q50 | Q100 |
|---------------|-------|-----|-----|-----|------|
| | acres | cfs | cfs | cfs | cfs |
| ADF North | 1.15 | 0.3 | 0.3 | 0.3 | 0.3 |
| ADF South | 1.58 | 0.5 | 0.4 | 0.4 | 0.4 |
| CMU | 4.92 | 1.4 | 1.3 | 1.3 | 1.2 |
| MRF | 5.80 | 1.7 | 1.5 | 1.5 | 1.4 |

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Tajiguas Resource Recovery Project
Exhibit xx
 ADF Post-Development Drainage

3. The concrete swales located on the slope terraces will contain intermittent sediment traps to intercept sediment which may wash off the hillsides until the vegetation is well-established.
4. A Hydrodynamic separator will intercept drainage from building roofs and paved area at the MRFs, trapping any oily residue, trash or sediments. Contech Stormwater Quality White Papers demonstrating the efficacy of the devices are included in Appendix C. The laboratory tests were conducted with these Particle Size Distributions (PSDs) because they are representative of rooftop and parking lot sediment loads in first flush of stormwater runoff. The parking lots and driveways will be swept regularly by a commercial sweeper, so the project runoff sediments should correlate very well with the PSDs considered in the Contech CDS design criteria.
5. FloGard Plus catchbasin filter inserts will be used to intercept drainage from building roofs and paved area at the Densimetric Table and ADF, trapping any oily residue, trash or sediments. The ADF parking lots and driveways will be swept regularly by a commercial sweeper

The water quality flow rates to be treated by items 4 and 5 above were calculated based upon the criteria found in the Santa Barbara County Stormwater Technical Guide Appendix C. This rate is based upon runoff generated by a constant rainfall intensity of 0.2 inches per hour. This is the same standard cited in the landfill's industrial stormwater discharge permit, IGP-2014-0057-DWQ. The flows generated by this method are shown in Table 4.

5.0 CMU Area Leachate Runoff

When the compost piles are exposed to rainfall the entire CMU area runoff is considered to be leachate under State Water Quality Control Board (SWQCB) regulations. The CMU pad runoff collection system is directed to two Baker tanks equipped with interior baffles to trap sediments. The tanks are pumped to the CMU Runoff Collection Tank. The combined tank capacity is sufficient to retain the 25-year, 24-hour storm runoff. The collected runoff is filtered and used to water the compost piles to maintain the optimum moisture range (50-65%) for efficient composting.

When a large storm is forecast and/or the CMU Runoff Collection Tank is at a high level, water resistant tarpaulins are deployed to cover the compost piles and the aisles between piles are swept. The storm drainage collection system is diverted with control valves to send the storm water runoff to the north landfill sediment pond.

HydroCAD software was used to model the 25-year, 24-hour storm to size the tanks, pumps and forcemain for the storm event. The SCS Method with Type 1 hydrograph curve and Antecedent Moisture Condition 2 was used. The total rainfall depth of 6.78 inches was based upon Santa Barbara South Coast Station. The HydroCAD results are shown in Appendix B.

Table 4

TRRP - MRF/ADF SWQ Calculations

Revised 04/27/17

Updated SBC Method
 Q=CIA

| Area Name | C | I (in/hr) | A (acres) | Q (cfs) | Manufacturer/Type | Model | Rated Treatment Capacity (cfs) |
|-----------|------|--------------|--------------|------------|--------------------------------|-------------|-----------------------------------|
| MRF | 0.73 | 0.20 | 5.80 | 0.847 | Contech/Hydrodynamic Separator | CDS2020 | 1.10 |
| ADF North | 0.73 | 0.20 | 1.15 | 0.168 | Flogard Plus/CB Insert | FGP-1836G08 | 0.90 |
| ADF South | 0.73 | 0.20 | 1.58 | 0.231 | Flogard Plus/CB Insert | FGP-1836G08 | 0.90 |

Closing

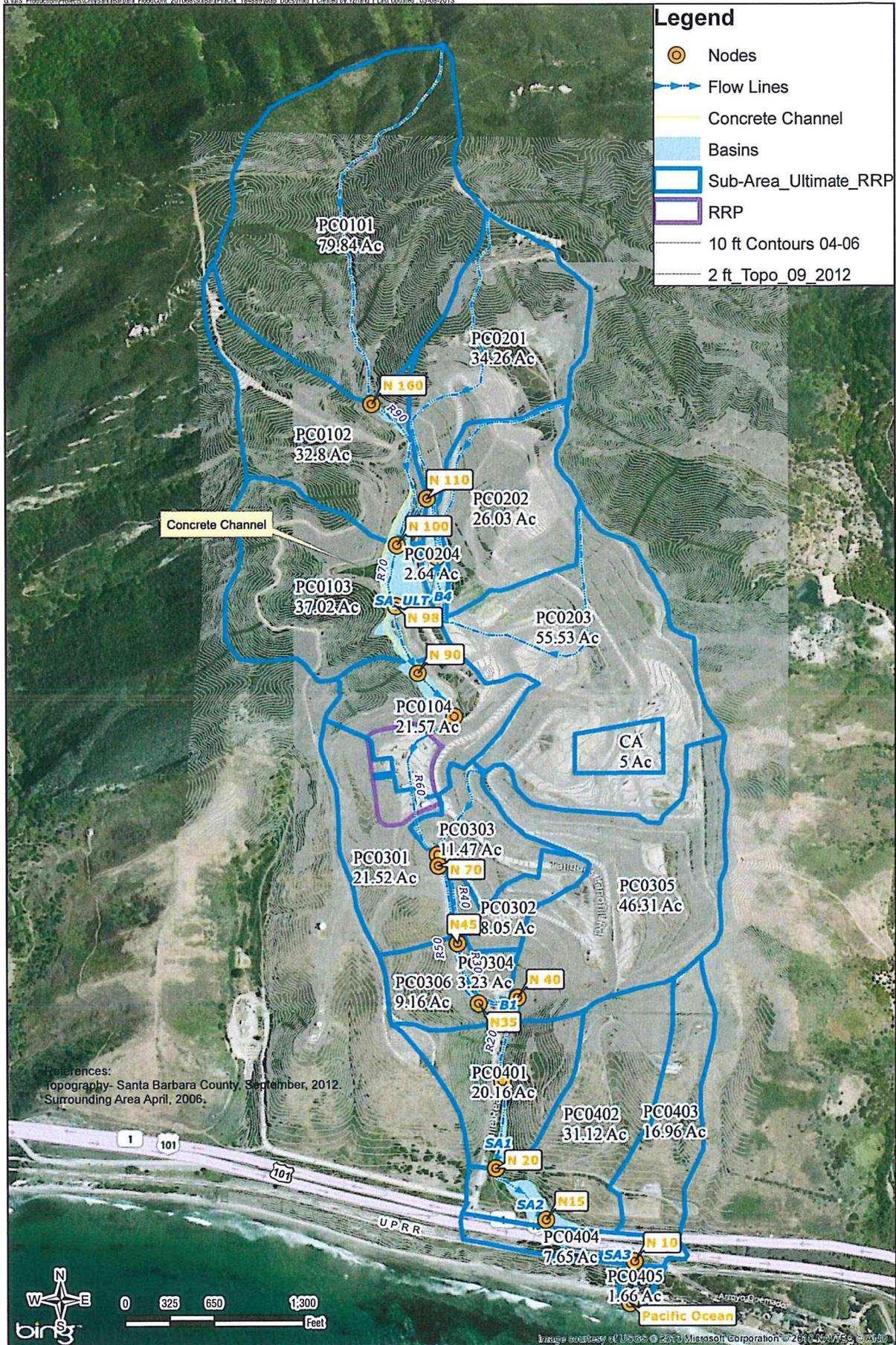
This analysis was performed based upon preliminary site design and may be updated if there are significant changes in the final site design. Thank you for the opportunity to be of service to Mustang Renewable Power Ventures LLC. If you have any questions, please contact the undersigned at 661-302-1292 or john@kularconsult.com

Sincerely,

John Kular, RCE 64920
President
John Kular Consulting

APPENDIX A

EXCERPT FROM HDR MASTER DRAINAGE PLAN



APPENDIX B

HYDROCAD MODEL RESULTS

TRRP CFA 7 new layout new tank location

Type I 24-hr 25 YEAR Rainfall=6.71"

Prepared by John Kular Consulting

Printed 4/28/2017

HydroCAD® 10.00-19 s/n 07434 © 2016 HydroCAD Software Solutions LLC

Page 1

Summary for Subcatchment 4S: CMU pad

Runoff = 9.36 cfs @ 10.04 hrs, Volume= 1.221 af, Depth= 2.98"

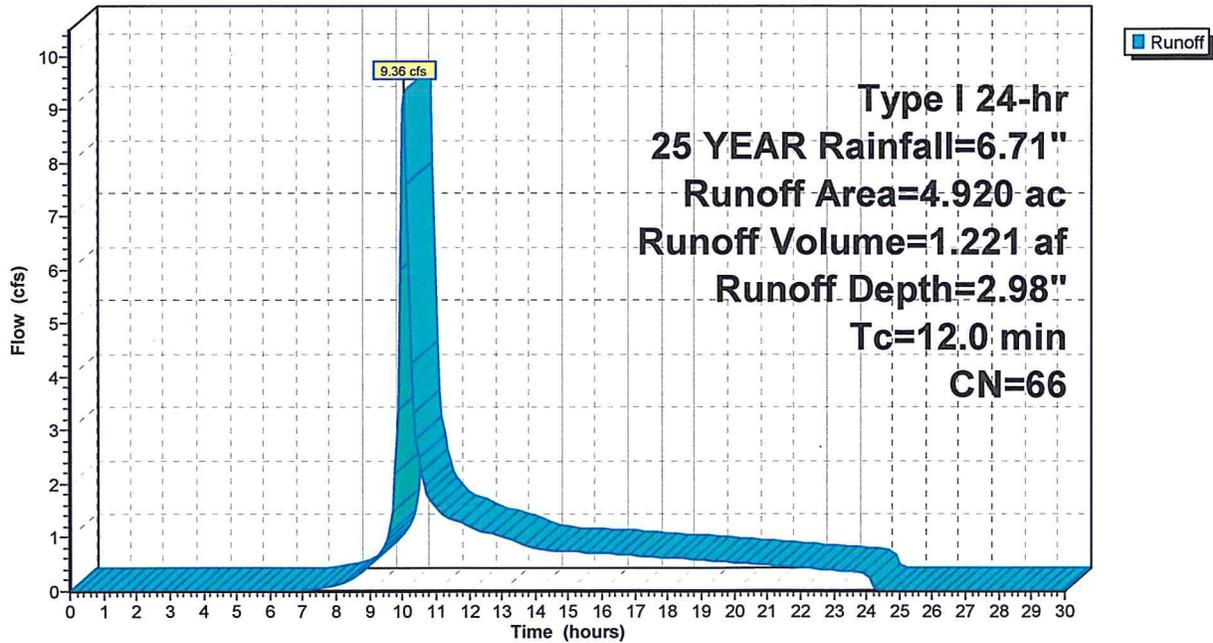
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.08 hrs
Type I 24-hr 25 YEAR Rainfall=6.71"

| Area (ac) | CN | Description |
|-----------|----|------------------------|
| * 2.400 | 98 | AC aisles |
| * 2.520 | 36 | compost piles |
| 4.920 | 66 | Weighted Average |
| 2.520 | | 51.22% Pervious Area |
| 2.400 | | 48.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 4S: CMU pad

Hydrograph



APPENDIX C

CONTECH WHITE PAPERS
FLOGUARD SPECIFICATION SHEETS

Available Models

| | CDS Model | Typical Internal MH Diameter or Equivalent ID ¹ | | Typical Depth ² Below Pipe Invert | | Water Quality Flow ³ 125 μ m | | Screen Diameter/Height | | Typical Sump Capacity | |
|---------------|--------------|--|-------|--|-------|---|-----------|------------------------|-------------|-----------------------|----------------|
| | | ft | m | ft | m | cfs | L/s | ft | m | yd ³ | m ³ |
| Precast** | CDS2015-4 | 4 | 1.2 | 3.5 | 1.1 | 0.7 | 19.8 | 2.0/1.5 | 0.6/0.5 | 0.5 | 0.4 |
| | CDS2015 | 5 | 1.5 | 5.2 | 1.6 | 0.7 | 19.8 | 2.0/1.5 | 0.6/0.5 | 1.3 | 1.0 |
| | CDS2020 | 5 | 1.5 | 5.7 | 1.7 | 1.1 | 31.2 | 2.0/2.0 | 0.6/0.6 | 1.3 | 1.0 |
| | CDS2025 | 5 | 1.5 | 6.0 | 1.8 | 1.6 | 45.3 | 2.0/2.5 | 0.6/0.8 | 1.3 | 1.0 |
| | CDS3020 | 6 | 1.8 | 6.2 | 1.9 | 2.0 | 56.6 | 3.0/2.0 | 0.9/0.6 | 2.1 | 1.6 |
| | CDS3030 | 6 | 1.8 | 7.1 | 2.2 | 3.0 | 85.0 | 3.0/3.0 | 0.9/0.9 | 2.1 | 1.6 |
| | CDS3035 | 6 | 1.8 | 7.6 | 2.3 | 3.8 | 106.2 | 3.0/3.5 | 0.9/1.1 | 2.1 | 1.6 |
| | CDS4030 | 8 | 2.4 | 8.6 | 2.6 | 4.5 | 127.4 | 4.0/3.0 | 1.2/0.9 | 5.6 | 4.3 |
| | CDS4040 | 8 | 2.4 | 9.7 | 3.0 | 6.0 | 169.9 | 4.0/4.0 | 1.2/1.2 | 5.6 | 4.3 |
| | CDS4045 | 8 | 2.4 | 10.3 | 3.1 | 7.5 | 212.4 | 4.0/4.5 | 1.2/1.4 | 5.6 | 4.3 |
| | CDS3020-D | 6 | 1.8 | 6.2 | 1.9 | 2.0 | 56.6 | 3.0/2.0 | 0.9/0.6 | 2.1 | 1.6 |
| | CDS3030-DV | 6 | 1.8 | 6.9 | 2.1 | 3.0 | 85.0 | 3.0/3.0 | 0.9/0.9 | 2.1 | 1.6 |
| | CDS3030-D | 6 | 1.8 | 7.1 | 2.2 | 3.0 | 85.0 | 3.0/3.0 | 0.9/0.9 | 2.1 | 1.6 |
| | CDS3035-D | 6 | 1.8 | 8.7 | 2.6 | 3.8 | 106.2 | 3.0/3.5 | 0.9/1.1 | 2.1 | 1.6 |
| | CDS4030-D | 7 | 2.1 | 8.6 | 2.6 | 4.5 | 127.4 | 4.0/3.0 | 1.2/0.9 | 4.3 | 3.3 |
| | CDS4040-D | 7 | 2.1 | 9.6 | 2.9 | 6.0 | 169.9 | 4.0/4.0 | 1.2/1.2 | 4.3 | 3.3 |
| | CDS4045-D | 7 | 2.1 | 10.1 | 3.1 | 7.5 | 212.4 | 4.0/4.5 | 1.2/1.4 | 4.3 | 3.3 |
| | CDS5042-DV | 9.5 | 2.9 | 9.6 | 2.9 | 9.0 | 254.9 | 5.0/4.2 | 1.5/1.3 | 1.9 | 1.5 |
| | CDS5640-D | 8 | 2.4 | 9.5 | 2.9 | 9.0 | 254.9 | 5.6/4.0 | 1.7/1.2 | 5.6 | 4.3 |
| CDS5050-DV | 9.5 | 2.9 | 10.3 | 3.1 | 11 | 311.5 | 5.0/5.0 | 1.5/1.5 | 1.9 | 1.5 | |
| CDS5653-D | 8 | 2.4 | 10.9 | 3.3 | 14 | 396.5 | 5.6/5.3 | 1.7/1.6 | 5.6 | 4.3 | |
| CDS5668-D | 8 | 2.4 | 12.4 | 3.8 | 19 | 538.1 | 5.6/6.8 | 1.7/2.1 | 5.6 | 4.3 | |
| CDS5678-D | 8 | 2.4 | 13.4 | 4.1 | 25 | 708.0 | 5.6/7.8 | 1.7/2.4 | 5.6 | 4.3 | |
| CDS7070-DV | 12 | 3.7 | 14 | 4.3 | 26 | 736.3 | 7.0/7.0 | 2.1/2.1 | 3.3 | 2.5 | |
| CDS10060-DV | 17.5 | 5.3 | 12 | 3.7 | 30 | 849.6 | 10.0/6.0 | 3.0/1.8 | 5.0 or 10.2 | 3.8 or 7.8 | |
| CDS10080-DV | 17.5 | 5.3 | 14 | 4.3 | 50 | 1416.0 | 10.0/8.0 | 3.0/2.4 | 5.0 or 10.2 | 3.8 or 7.8 | |
| CDS100100-DV | 17.5 | 5.3 | 16 | 4.9 | 64 | 1812.5 | 10.0/10.0 | 3.0/3.0 | 5.0 or 10.2 | 3.8 or 7.8 | |
| Cast In Place | CDS150134-DC | 22 | 6.7** | 22 | 6.7** | 148 | 4191.4 | 15.0/13.4 | 4.6/4.1 | 20.4 | 15.6 |
| | CDS200164-DC | 26 | 7.9** | 26 | 7.9** | 270 | 7646.6 | 20.0/16.4 | 6.1/5.0 | 20.4 | 15.6 |
| | CDS240160-DC | 32 | 9.8** | 25 | 7.6** | 300 | 8496.2 | 24.0/16.0 | 7.3/4.9 | 20.4 | 15.6 |

** Sump Capacities and Depth Below Pipe Invert can vary due to specific site design

1. Structure diameter represents the typical inside dimension of the concrete structure. Offline systems will require additional concrete diversion components.
2. Depth Below Pipe and Sump Capacities can vary to accommodate specific site design.
3. Water Quality Flow is based on 80% removal of a Particle Size Distribution (PSD) having a mean particle size: $d_{50}=125\text{-}\mu\text{m}$, which is a typical PSD gradation characterizing particulate matter (TSS/SSC) in urban rainfall runoff.

Water Quality Flow, Particle Size & Performance Notes:

- 80% removal ($Re=80\%$) performance forecasts of the PSD having a $d_{50}=125\text{-}\mu\text{m}$ is derived from controlled tests of a unit equipped with $2400\text{-}\mu\text{m}$ screen. Performance forecasts for specific particle size gradations or $d_{50}s=50, 75, 125, 150 \text{ \& } 200\text{-}\mu\text{m}$ are also available. Removal forecasts based on unit evaluations conducted in accordance with the Technology Assessment Protocol - Ecology (TAPE) protocols, Washington Department of Ecology (WASDOE).
 - Units can be sized to achieve specific Re performance for peak flow rates for specific Water Quality Flows, over the hydrograph of a Water Quality Storm Event or sized to meet a specific removal on an average basis using accepted probabilistic methods. When sizing based on a specific water quality flow rate, the required flow to be treated should be equal to or less than the listed water quality flow for the selected system.
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FloGard +Plus is a catch basin insert filter designed to remove sediment, gross solids, trash, and petroleum hydrocarbons from stormwater runoff. FloGard +Plus is ideally suited for removal of primary pollutants from paved surfaces in commercial and residential areas. Rated filter flow capacities are designed to exceed the required "first flush" treatment flow rate, and the unique dual-bypass design typically exceeds catch basin inlet capacity.

Economical Treatment

Quick, easy, and cost-effective to install, inspect, and maintain.

Efficient Performance

Removes pollutants at the inlet where they are easiest to catch.

Versatile Applications

Appropriate and easy to use on new construction or retrofit projects.

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Built to last and withstand the loads from captured pollutants.

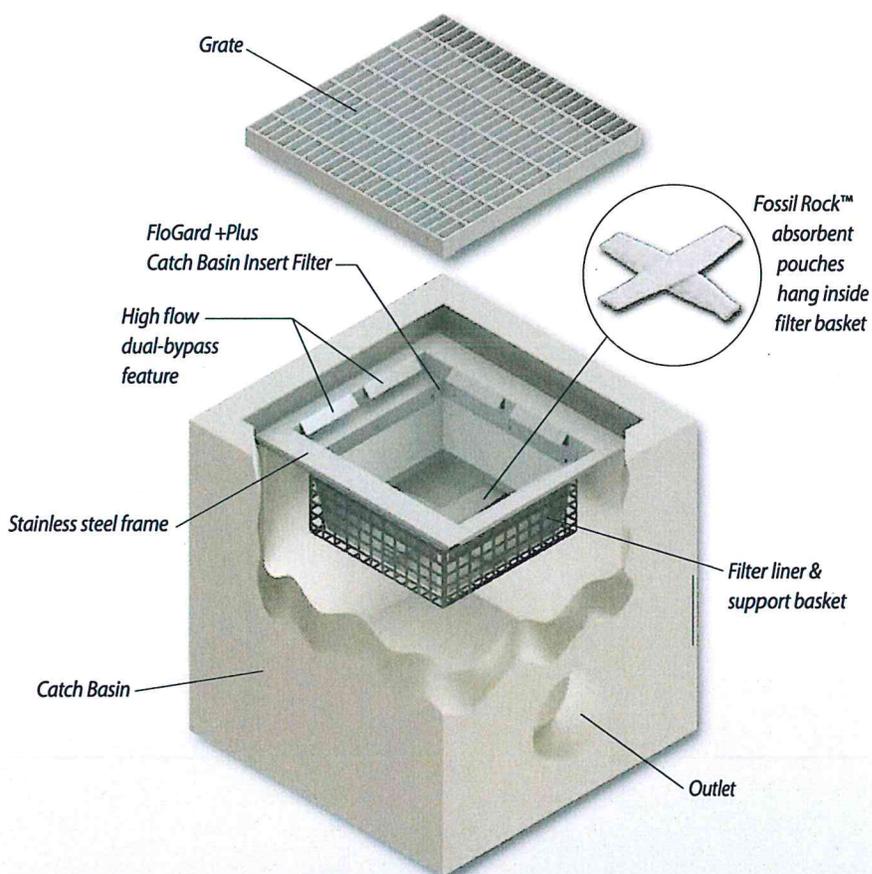
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No standing water minimizes vector, bacteria, and odor problems.

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Field and laboratory tested with up to 86%¹ removal of TSS and 80%² removal of oils and grease.

1. University of Auckland laboratory testing of local street sweep material.
2. UCLA laboratory study.



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Flows entering the unit pass through the filter liner basket for removal of sediment, trash, and debris. Optional Fossil Rock™ sorbent pouches installed in the basket effect hydrocarbon capture. As the storm flow exceeds the treatment flow rate, treatment will continue and excess flows will pass through the dual-bypass openings near the top of the unit.



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| FloGard Combination Inlet | | | | | | | | |
|-----------------------------|---|--|---|--------------------------------------|-----------------------------------|----------------------------|--------------------------------------|-----------------------------------|
| SPECIFIER CHART | | | | | | | | |
| MODEL NO. STANDARD DEPTH | STANDARD & SHALLOW DEPTH <small>(Data in these columns is the same for both STANDARD & SHALLOW versions)</small> | | | STANDARD DEPTH -20 Inches- | | MODEL NO. SHALLOW DEPTH | SHALLOW DEPTH -12 Inches- | |
| | INLET ID Inside Dimension (inch x inch) | GRATE OD Outside Dimension (inch x inch) | TOTAL BYPASS CAPACITY (cu. ft. / sec.) | SOLIDS STORAGE CAPACITY (cu. ft.) | FILTERED FLOW (cu. ft. / sec.) | | SOLIDS STORAGE CAPACITY (cu. ft.) | FILTERED FLOW (cu. ft. / sec.) |
| FGP-1633FGO | 16 X 33 | 18 X 36 | 7.0 | 2.5 | 1.7 | FGP-1633FGO8 | 1.4 | 1.1 |
| FGP-1836FGO | 18 X 36 | 18 X 40 | 6.9 | 2.3 | 1.6 | FGP-1836FGO8 | 1.3 | .9 |
| FGP-2234FGO | 22 X 34 | 24 X 36 | 8.1 | 3.6 | 2.1 | FGP-2234FGO8 | 2.1 | 1.4 |
| FGP-2436FGO | 24 X 36 | 24 X 40 | 8.0 | 3.4 | 2.0 | FGP-2436FGO8 | 1.95 | 1.15 |



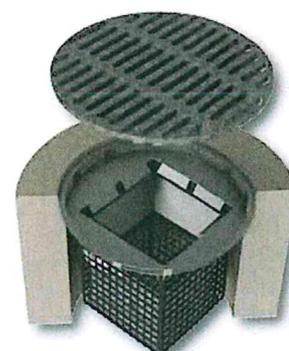
Combination Inlet

| FloGard Flat Grated Inlet | | | | | | | | |
|-----------------------------|---|--|---|--------------------------------------|-----------------------------------|----------------------------|--------------------------------------|-----------------------------------|
| SPECIFIER CHART | | | | | | | | |
| MODEL NO. STANDARD DEPTH | STANDARD & SHALLOW DEPTH <small>(Data in these columns is the same for both STANDARD & SHALLOW versions)</small> | | | STANDARD DEPTH -20 Inches- | | MODEL NO. SHALLOW DEPTH | SHALLOW DEPTH -12 Inches- | |
| | INLET ID Inside Dimension (inch x inch) | GRATE OD Outside Dimension (inch x inch) | TOTAL BYPASS CAPACITY (cu. ft. / sec.) | SOLIDS STORAGE CAPACITY (cu. ft.) | FILTERED FLOW (cu. ft. / sec.) | | SOLIDS STORAGE CAPACITY (cu. ft.) | FILTERED FLOW (cu. ft. / sec.) |
| FGP-12F | 12 X 12 | 12 X 14 | 2.8 | 0.3 | 0.4 | FGP-12F8 | .15 | .25 |
| FGP-16F | 16 X 16 | 16 X 19 | 4.7 | 0.8 | 0.7 | FGP-16F8 | .45 | .4 |
| FGP-18F | 18 X 18 | 18 X 20 | 4.7 | 0.8 | 0.7 | FGP-18F8 | .45 | .4 |
| FGP-1836F | 18 X 36 | 18 X 40 | 6.9 | 2.3 | 1.6 | FGP-1836F8 | 1.3 | .9 |
| FGP-21F | 22 X 22 | 22 X 24 | 6.1 | 2.2 | 1.5 | FGP-21F8 | 1.25 | .85 |
| FGP-24F | 24 X 24 | 24 X 27 | 6.1 | 2.2 | 1.5 | FGP-24F8 | 1.25 | .85 |
| FGP-2436F | 24 X 36 | 24 X 40 | 8.0 | 3.4 | 2.0 | FGP-2436F8 | 1.95 | 1.15 |
| FGP-2448F | 24 X 48 | 24 X 48 | 9.3 | 4.4 | 2.4 | FGP-2448F8 | 2.5 | 1.35 |
| FGP-32F-TN | 28 X 28 | 32 X 32 | 6.3 | 2.2 | 1.5 | FGP-32F8-TN | 1.25 | .85 |
| FGP-30F | 30 X 30 | 30 X 34 | 8.1 | 3.6 | 2.0 | FGP-30F8 | 2.05 | 1.15 |
| FGP-36F | 36 X 36 | 36 X 40 | 9.1 | 4.6 | 2.4 | FGP-36F8 | 2.65 | 1.35 |
| FGP-3648F | 36 X 48 | 40 X 48 | 11.5 | 6.8 | 3.2 | FGP-3648F8 | 3.9 | 1.85 |
| FGP-48F | 48 X 48 | 48 X 54 | 13.2 | 9.5 | 3.9 | FGP-48F8 | 5.45 | 2.25 |
| FGP-1633F | 16 X 34 | 18 X 36 | 6.9 | 2.3 | 1.6 | FGP-1633F8 | 1.3 | .9 |
| FGP-2234F | 22 X 34 | 24 X 36 | 8.0 | 3.4 | 2.0 | FGP-2234F8 | 1.95 | 1.15 |



Flat Grated Inlet

| FloGard Circular Grated Inlet | | | | | |
|-------------------------------|------------------------|------------------------|------------------------------------|------------------------|--------------------------------|
| SPECIFIER CHART | | | | | |
| MODEL NUMBER | INLET ID (Ø INCHES) | GRATE OD (Ø INCHES) | SOLIDS STORAGE CAPACITY (CU FT) | FILTERED FLOW (CFS) | TOTAL BYPASS CAPACITY (CFS) |
| FGP-RF15F | 15 | 18 | 0.3 | 0.4 | 2.8 |
| FGP-RF18F | 18 | 20 | 0.8 | 0.7 | 4.7 |
| FGP-RF20F | 20 | 23 | 0.8 | 0.7 | 4.7 |
| FGP-RF21F | 21 | 23.5 | 0.8 | 0.7 | 4.7 |
| FGP-RF22F | 22 | 24 | 0.8 | 0.7 | 4.7 |
| FGP-RF24F | 24 | 26 | 0.8 | 0.7 | 4.7 |
| FGP-RF30F | 30 | 32 | 2.2 | 1.5 | 6.1 |
| FGP-RF36F | 36 | 39 | 3.6 | 2.0 | 8.1 |



Circular Frame Catch Basin

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Appendix D

Tajiguas Resource Recovery Project Revised Hydrogeologic and Water Supply Impact Analysis Report

Prepared for:

Santa Barbara County,
Department of Public Works
Resource Recovery & Waste Management Division
130 East Victoria Street, Suite 100
Santa Barbara, CA 93101

Tajiguas Resource Recovery Project
REVISED HYDROGEOLOGIC AND
WATER SUPPLY IMPACT ANALYSIS
REPORT

Santa Barbara County
California

Prepared by:

Geosyntec 
consultants

engineers | scientists | innovators

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Project Number: SB0653

Revised June 2, 2017

**TAJIGUAS RESOURCE RECOVERY PROJECT
REVISED HYDROGEOLOGIC AND WATER SUPPLY
IMPACT ANALYSIS REPORT**

SANTA BARBARA COUNTY, CALIFORNIA

Prepared on behalf of the:

County of Santa Barbara

Revised June 2, 2017

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1.0 INTRODUCTION

Geosyntec Consultants (Geosyntec) is providing Santa Barbara County Public Works Department, Resource Recovery and Waste Management Division (RRWMD) with this revised report that updates the assessment of hydrogeologic and water supply impacts associated with the proposed Tajiguas Resource Recovery Project (Project) originally submitted October 4, 2013. The revision was requested by RRWMD as a result of a revised project layout. The revised report has been prepared to support the analysis of project impacts to water resources based on updated project information as required under the California Environmental Quality Act (CEQA). The proposed Project includes the construction and operation of a Material Recovery Facility (MRF), Anaerobic Digestion Facility (ADF), and Composting Area that would process municipal solid waste that is currently disposed of at the county-owned and operated Tajiguas Landfill to recover additional recyclable material and generate green energy. The proposed location of the Project is at the Tajiguas Landfill, as shown on **Figure 1**.

This revised hydrogeologic impact analysis for the Project includes a summary of the baseline hydrogeologic and water supply conditions along with analysis of the potential impacts to groundwater resources from the Project and project alternatives. For the purposes of this evaluation we have assumed that the baseline hydrogeologic conditions are those that exist at the time of preparation of this revised report and include the existing landfill operations. These conditions differ from those previously analyzed in prior EIRs for the landfill because several major landfill construction projects have been completed and phased closure (Phase 1) of a portion of the landfill has occurred which has reduced the overall landfill water demand. The current permitted Tajiguas Landfill Expansion Project was analyzed in an Environmental Impact Report (01-EIR-05) dated July 2002 and approved in 2002. A reconfiguration of the approved landfill footprint was analyzed in a Subsequent EIR (08EIR-00000-00007) dated March 2009 and approved in May 2009. Potential impacts for the Project are evaluated similarly to those previously identified in 01-EIR-05 and 08EIR-00000-00007, where, an environmental impact is defined as a project-induced change in the status of physical conditions. In accordance with the 01-EIR-05 and 08EIR-00000-00007, the significance of the hydrogeologic impact for this evaluation was based on State and County CEQA guidelines, requirements of CCR Title 27, and County of Santa Barbara Environmental Thresholds and Guidelines Manual.

In addition to the proposed project, to meet CEQA requirements several Project alternatives have been identified through the CEQA public scoping process and are evaluated in this revised report. The Project alternatives that were analyzed include:

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1. No Project – Assumes similar waste management practices with the Tajiguas Landfill reaching capacity in the year 2026,
2. Two alternative urban sites for the MRF with the ADF and Composting Area located at the Tajiguas Landfill,
3. MRF located at Tajiguas Landfill and an Aerobic Composting Facility located at Engel and Gray in Santa Maria,
4. Tajiguas Landfill expansion to meet demand up to the year 2036, and
5. Waste exportation after the year 2026 including exportation to the Simi Valley Landfill and the proposed Santa Maria Integrated Waste Management Facility.

2.0 SUMMARY OF PROJECT DESCRIPTION

The County of Santa Barbara RRWMD proposes to develop a Resource Recovery Project that would process municipal solid waste from the communities currently served by the Tajiguas Landfill. The Project will be designed and constructed to process various waste streams delivered to the Tajiguas Landfill from unincorporated areas of the South Coast of Santa Barbara, the Cities of Santa Barbara, Goleta, Buellton, and Solvang as well as the unincorporated Santa Ynez and Cuyama Valley. The Project will be built and operated by Mustang Power Ventures of San Luis Obispo, California.

The waste stream, anticipated to be delivered to the Project site for processing, is municipal solid waste. As an optional project element, co-mingled source separated recyclables (CSSR) could also be brought to the Project for consolidated processing. The Project would be located at the Tajiguas Landfill (**Figure 2**) and would include a MRF to recover recyclable materials, an ADF to process organic waste into biogas and digestate, and an Energy Facility that would use the biogas from the ADF to produce electricity. The digestate would be further cured in outdoor windrows (Composting Area) at the landfill to create compost and soil amendments. Residual waste (residue) from the processing would be disposed of in the landfill. No change in the landfill's permitted capacity is proposed.

The total estimated water demand for the Project including the MRF, ADF, and compost area is 11.5 Acre Feet per Year (AFY). Further breakdown of the project's water budget summary, provided by John Kular Consulting, is included in a spreadsheet (**Appendix A**) which summarizes the revised water balance based on a reconfigured project layout. The Project proposes to use water primarily pumped from existing Well #5 and from Well #6 completed in the Sespe-Alegria Formation (**Figure 3**) as a part of the project. Well #5 is completed in the Vaqueros Formation and is currently used by the landfill as a water source. Well #5 replaced Well #2, which was located on the operations deck and was also completed in the Vaqueros Formation. Well #6 is considered a replacement well for Well #4 which was historically used for landfill operations and was properly destroyed in 2012 as part of the recent landfill reconfiguration project. Well #6 will supply water to the MRF (wash down, domestic, and biofilter use) component of the Project. It is estimated that water use at the MRF will be approximately 6.77 AFY (**Appendix A**). Well #5 will supply water to the ADF (wash down, domestic use, and biofilter use) component of the Project. It is estimated that water use at the ADF will be approximately 3.56 AFY. In addition, approximately 1.17 AFY of water to be applied to the Composting Area will be supplied collectively from Wells #5 and #6.

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3.0 HYDROGEOLOGIC AND WATER SUPPLY BASELINE CONDITIONS

3.1 Hydrogeology

The regional setting and existing hydrogeologic conditions for the Tajiguas Landfill were analyzed in detail in 01-EIR-05 including information regarding the landfill water demand and supply for the Landfill Expansion Project. Water demand and supply was re-evaluated in the 08EIR-00000-00007 for the Tajiguas Landfill Reconfiguration Project due to the proposed removal of Well #4, removal of two in-channel sedimentation basins, concrete lining of upper Pila Creek, and additional modification of the waste footprint.

The Tajiguas Landfill and proposed Project are located on the southern slope of the Santa Ynez Mountains. The project area is underlain by moderately to steeply south-dipping sections of consolidated sedimentary units including from oldest to youngest: Gaviota Formation, Sespe-Alegria Formation, Vaqueros Formation, Rincon Formation, and Monterey Formation (**Figures 3 and 4**). The Gaviota and Vaqueros Formation are consolidated sandstone units, the Sespe-Alegria is an interbedded sandstone and siltstone/claystone unit, and the Rincon and Monterey Formations generally consist of mudstones and shales. A thorough description of these formations is provided in the 01-EIR-05. A water supply well for the project, Well #6, was constructed in the Sespe-Alegria Formation in November 2016.

Most of the groundwater in these formations is believed to occur in fractures but some intergranular groundwater is also likely to occur in the sandstone units. Groundwater flow direction is generally to the southwest in the landfill area, although local flow deviations likely occur due to the fractured nature of the aquifer units and the fact that the finer-grained formations, such as the Rincon and Monterey, act as hydraulic boundaries.

Locally, the Vaqueros and Gaviota Formations are generally considered to be important groundwater sources. The groundwater yield and quality (dissolved general minerals) is generally higher in these sandstone units compared to the finer-grained Sespe-Alegria, Rincon, and Monterey units. However, the Sespe-Alegria Formation has previously been an important water source at the Landfill (former Well #4) and some of the water wells at the adjacent Baron Ranch are also completed in the Sespe-Alegria Formation. The Monterey Formation is also a water source for the landfill (Well #3) and the community of Arroyo Quemada located south of the landfill along the coastline. The water quality in the Monterey Formation is generally considered poor. The Total

Dissolved Solids (TDS) in Well #3 was measured at 2,500 milligrams per liter (mg/L) in May 2012.

3.2 Tajiguas Landfill Water Supply

The landfill currently uses a mixture of pumped groundwater, groundwater extracted from a groundwater leachate collection recovery system (GLCRS) Interceptor Trench, and water from the leachate collection systems for its water supply (**Table 1**). Groundwater supplies currently consist of a Vaqueros Formation well (Aera Well) located in Cañada de la Huerta (canyon directly west of the landfill), Well #3 completed in the Monterey Formation southwest of the landfill, and Well #5 completed in the Vaqueros Formation on the east side of the Landfill. Well #5 is currently the only Vaqueros Formation well located in the Landfill watershed area. Landfill collection systems that currently provide a water supply to the landfill include the GLCRS Interceptor Trench, the Groundwater Collection System North of the Landfill (Pila Creek in-channel sump pump [ICSP]), and leachate collection systems which include the Horizontal Well Dewatering System (HWDS), the Leachate Collection Recovery System #5, and various dewatering wells. These landfill collection systems are not suitable for domestic water uses due to elevated levels of total dissolved solids (TDS), volatile organic compounds (VOCs), metals and minerals.

As noted above, two prior Landfill water supply wells (Wells #2 and #4) were properly destroyed. Well #2 was completed in the Vaqueros Formation and Well #4 was completed in the Sespe-Alegria Formation. These wells were destroyed as a result of stockpiling activity or Landfill reconfiguration activities in the vicinity of the former wells.

The current baseline water use and supply of the Landfill is summarized below and in **Table 1**. The water demand has been updated from the 01-EIR-05 and 08EIR-00000-00007 based on actual recorded use during 2012. Based on information obtained from 2012 Landfill operations data, an estimated 31 AF of water was required for construction (i.e., liner construction), landfill operation (i.e., dust control), and domestic use in 2012, while a total water supply of 36.5 AF was available for use. Of the available water supply, approximately 29.5 AF are available for landfill operations and construction projects while 7 AF are available for domestic water supply. The available domestic supplies include the Aera Well and Well #5. It should be noted that water supply from the Aera Well is not always reliable. The difference in overall water supply and water use results in an estimated surplus of 5.5 AFY available for usage at the landfill (baseline).

Based on conversations with Santa Barbara County RRWMD personnel, the annual water use for year 2012 represents the expected worst case water demand through closure of the Landfill. In future years, some reduction in Landfill demand may occur since remaining construction projects are smaller and are anticipated to generate a reduced demand and as the phased closure of the Landfill occurs, less water will be required for dust control.

4.0 PROJECT IMPACT ANALYSIS

The proposed Project is located on the Gaviota Coast of Santa Barbara County, California. Previous assessments of the aquifers located beneath the proposed Project are included in Environmental Impact Reports 01-EIR-05 and 08EIR-00000-00007. The aquifers located beneath the proposed Project are composed of consolidated bedrock. The County's Environmental Thresholds and Guidelines Manual (Groundwater Thresholds Manual) states the threshold of significance for consolidated rock aquifers is considered the amount of new pumpage by a proposed project which would place the aquifer in a state of overdraft. In addition, environmental concerns associated with these aquifers include degradation of water quality, long-term loss of well yield, well interference and effects on biological resources, i.e. spring and base flow. In general accordance with CEQA, CCR Title 27, and the Groundwater Thresholds Manual, the water demands of the Project were evaluated to determine the potential impacts on the following:

- Landfill water supply
- Groundwater overdraft (safe yield¹) in the pumping aquifer,
- Groundwater quality,
- Well interference from utilization of groundwater in the proposed new supply well on water levels in existing site wells,
- Well pumping impacts on springs, and
- Landfill gas migration.

4.1 Landfill Water Supply

The water supply of the landfill has been described in Section 3.2. An analysis of available water supply information along with projected landfill usage is provided in **Table 1**. The water supply for the landfill includes several groundwater wells, water from ground water collection systems, and leachate collection systems (**Table 1**).

¹ The County of Santa Barbara Groundwater Thresholds Manual defines safe yield as potential average annual recharge.

The total water demand for the Project is estimated to be 11.5 AFY and includes cumulative totals of domestic, wash-down, biofilter, and compost finishing area usage. It is estimated that well water use will be approximately 6.77 AFY at the MRF, 3.56 AFY at the ADF, and 1.17 AFY at the compost finishing area. The water demand for the MRF is planned to be derived from Well #6 installed in the Sespe-Alegria Formation, located approximately 1,200 feet north of the MRF site (**Figures 2 and 3**). Well #6 replaces former Well #4 which was destroyed during the landfill reconfiguration project and is not included in the baseline landfill water supply estimate (**Table 1**). The water demand for the ADF is planned to be derived from existing Well #5 installed in the Vaqueros Formation and located on the east side of the landfill in close proximity to the planned ADF (**Figures 2 and 3**). Water demand for the composting operations would primarily be provided from the reuse of runoff collected within the Composting Area (Kular, 2013). This water would be collected and stored in a proposed 456,000 gallon Composting Area runoff collection tank. During the summer months, some supplemental water may be required and the estimated additional water demand for the Composting Area (1.17 AFY) is proposed to be derived from Wells #5 and #6.

The estimated total Project water demand (11.5 AFY) is more than the baseline water supply surplus for the landfill (5.5 AFY) as presented in **Table 1**. With the additional volume of water to be provided mostly from Well #6 (presented in **Table 2** as a range between 6.3 - 20 AFY)², the estimated water demand for the Project and the landfill is less than the estimated water supply.

4.2 Groundwater Overdraft

Water demand of 6.77 AFY for use at the MRF and approximately 0.72 AFY for use at the compost finishing area is to be derived from a new supply well (Well #6). The new well is installed in the Sespe-Alegria Formation, located approximately 1,200 feet north of the MRF site (**Figure 2**) and replaces former Well #4. Former Well #4 was installed in the Sespe-Alegria Formation near the location of the proposed new supply well. Well yield for the Sespe-Alegria Formation Well #4 was estimated by the RRWMD to be 20 AFY (**Table 2**). Well #4 was in operation for approximately 6 years and available pumping and water level data (i.e., water level data collected during pumping) indicate

² A 24-hour duration pump test conducted in December 2016 on Well #6 estimated that Well #6 will have a yield within this range (16.5 AFY).

that between 2006 and 2011 the well was pumped at an average annual rate of 6.3 AFY with no significant changes in groundwater pumping levels. Consequently, Well #6, as a replacement well for Well #4, will have a similar yield (20 AFY as previously estimated by the RRWMD of which 6.3 AFY was actually pumped between 2006 and 2011) with preliminary testing indicating a yield of 16.5 AFY. It is expected that the groundwater level response from pumping will be similar, i.e., no significant change in groundwater pumping level.

The Sespe-Alegria Formation is generally not considered an important water-bearing source in the area. Because Well #6 is a replacement well and the Project has a relatively short duration (20-year life), a quantitative evaluation of the safe yield was not considered. Rather, the environmental impacts associated with pumping were analyzed separately (Sections 4.3 to 4.6). Once the well is operated, a safe-yield analysis for the well using methods outlined in the Groundwater Thresholds Manual could be completed or, as a more appropriate alternative, long-term pumping and water level data could be collected and used with other scientifically accepted methods such as the “Pumpage versus Change in Storage” method³ to calculate a long-term safe pumping rate (i.e., safe-yield). At this time, based on the water demand of 7.49 AFY at the MRF and compost finishing area, the estimated range in yield of the former Sespe-Alegria Well #4, and short-duration pump test data indicating that Well #6 will yield 16.5 AFY, it is assumed that a single well completed in the Sespe-Alegria aquifer will be capable of meeting the project’s water demand. However, for planning purposes a recommendation for siting a second Sespe-Alegria well and for monitoring of water levels and pumping volumes is presented in Section 5.0. It should be noted that the possible addition of a second well in the Sespe-Alegria would not change conclusions reached in the following environmental impact analyses (Sections 4.2 through 4.6).

Water demand of 3.56 AFY for use at the ADF is to be derived from Well #5 which is completed in the Vaqueros Formation. The Vaqueros is considered an important water source in the area. As estimated in Geosyntec’s *Hydrogeologic Report on the Tajiguas Landfill Reconfiguration and Baron Ranch Restoration Project*, dated October 23, 2008, a safe yield value of 4 AFY was calculated for the Vaqueros Formation⁴ located

³ Changes and trends in storage are estimated by comparing the changing water levels in the aquifer to the total volume of water extracted from the aquifer over a long period of pumping. This method requires collecting long-term water level data from the aquifer as well as maintaining long-term pumping records.

⁴ Assumed that recharge in the Vaqueros Formation occurred as direct recharge. 01-EIR-05 estimated that 11.5% of average rainfall recharged the Vaqueros aquifer over approximately 33 acres. A revised SB0653\TajiguasTRRP_HydrogeoWaterSupplyAnalysisReport_revised draft_2017.06.02.doc

within the landfill watershed. This safe yield value was calculated based on the Groundwater Thresholds Manual methodology in TRC's *Tajiguas Expansion Water Use Versus Supply Memorandum*, dated September 26, 2001 (TRC, 2001). It is estimated that 1.17 AFY of additional water will be required at the Composting Area of which approximately 0.44 AFY will be supplied by Well #5 and the remainder (0.72 AFY) supplied by Well #6 as mentioned above. Since the water demand for the ADF (3.56 AFY) plus a portion of the compost area (0.44 AFY) equals the 4 AFY safe yield for the Vaqueros Formation in the watershed, and the landfill will have a water supply surplus, no potential significant impacts are expected associated with the groundwater pumping from Well #5.

It should be noted that Well #5 is located on the eastern ridge of the Landfill. The Groundwater Thresholds Manual states that a well located within 800 feet of a watershed boundary will access the yield attributable to the adjacent watershed (Baron Ranch). The exposed Vaqueros Formation within Baron Ranch is approximately 2 times larger in area than the exposed Tajiguas Landfill Vaqueros Formation, and the Baron Ranch watershed is more than 5 times larger in area than the Tajiguas Landfill watershed. Based on the area of the Vaqueros Formation exposed within Baron Ranch (approximately 50 acres), the safe yield for the Vaqueros Formation could be on the order of an additional 10 AFY, assuming that the Vaqueros Formation is not used for water supply at the neighboring Baron Ranch. No Vaqueros wells are known to be active on the Baron Ranch property (EMCON, 1994; and Rick Hoffman, personal communication, 2013).

4.3 Groundwater Quality

Groundwater pumping can potentially degrade groundwater quality if wells are over pumped or if safe yields are exceeded. Over pumping an aquifer can potentially produce groundwater level declines (head loss in the aquifer) that cause deeper saline waters to intrude into fresher portions of the aquifer and, in the case of the Gaviota Coast, sea water intrusion. Due to the relatively low amount of water projected to be pumped from Wells #5 and #6 to meet the water supply demands for the Project, it is not expected that over pumping will occur.

safe yield used EIR methodology and calculated recharge over 22 acres based on landfill reconfiguration and low permeability material placement.

Available water quality data, although limited, for Well #4 (previous Sespe-Alegria well) and Well #5 indicate that the salinity or TDS concentrations did not increase significantly during initial pumping of these wells. Available water quality data for Well #4 indicate that TDS in the well rose slightly (80 mg/L) after pumping started in the well: TDS was measured at 628 mg/L in September 2005 when the well was installed and then at 708 mg/L in January 2007 after a year of pumping in the well. Available water quality data for Well #5 indicate TDS did not rise in the groundwater after pumping began in early 2011: TDS was measured at 640 mg/L in March 2011 when the well was installed and at 630 mg/L in May 2012 after approximately ½ year of pumping. Furthermore, sea water intrusion into the bedrock aquifers is highly unlikely because the Vaqueros and Sespe-Alegria Formations are not hydraulically connected to the ocean as the formations lie stratigraphically below the Rincon and Monterey Formations which are shale formations and act as hydraulic boundaries to ocean water intrusion. Consequently, the potential for pumping to significantly impact groundwater quality is considered low and impacts would not be significant.

4.4 Well Interference

Groundwater pumping in a well has the potential to drawdown groundwater levels in neighboring wells. If the drawdown is large then there is potential to significantly increase pumping costs (i.e, electrical consumption) or even dry up a well. For this analysis the potential well interference was evaluated for proposed pumping in Well #5 and proposed Well #6. Hydraulic connection between the bedrock aquifers beneath the Project area is generally considered low because of the interlayered shale, mudstone, and claystone layers in the bedrock formations. These interbedded shale and claystone/mudstone layers act as hydraulic boundaries. Wells completed in one bedrock formation or bedrock aquifer should not significantly impact groundwater levels in other adjacent formations or aquifers. That is, pumping in the new Well #6, completed in the Sespe-Alegria Formation, should not significantly impact groundwater levels in the adjacent Vaqueros Formation (Well #5) and Monterey Formation (Well #3) and vice versa. A geologic cross-section schematically showing the well locations is presented on **Figure 4**.

The highest potential for well interference in the Project area is for pumping in any one well to impact groundwater levels in a well installed in the same bedrock aquifer. The bedrock formations/aquifers beneath the Project area are all steeply dipping to the south with east-west strikes (**Figure 4**). The potential for pumping in Well #5 and Well #6 to impact wells located along strike, or to the east and west is discussed below.

Well Interference within the Vaqueros Formation

Pumping in Well #5 to meet Project demand is estimated at 4.0 AFY. Should additional pumping from Well #5 for compost area water be necessary, for instance the additional 0.72 AFY planned to be derived from Well #6, this would equate to an additional 0.45 gallons per minute (gpm) of pumping to achieve the additional volume. The nearest neighboring wells to the east of Well #5 are wells located on Baron Ranch. No known active Vaqueros wells are located on the Baron Ranch (EMCON, 1994; Rick Hoffman, personal communication, 2013). The nearest Vaqueros well to the west is the Aera Well located in Cañada de la Huerta canyon. The Aera Well is located approximately 2,500 feet west of Well #5 (**Figure 3**) and in another watershed. The Groundwater Thresholds Manual indicates that a reasonable radius of influence for a Vaqueros Formation well is 800 feet. Based on 1) the low estimated demand for the project (potentially an additional 0.72 AFY or 0.45 gpm), 2) the potential for a much higher safe yield due to the large area of exposed Vaqueros Formation within Baron Ranch (discussed in Section 4.2), and 3) the fact that the closest neighboring well is located at least 2,500 feet away from Well #5 and beyond the reasonable radius of influence, well interference from proposed additional pumping in Well #5 is not considered significant.

Well Interference within the Sespe-Alegria Formation

Proposed pumping in new Well #6 completed in the Sespe-Alegria Formation is estimated at 7.49 AFY. This equates to a long-term pumping rate of approximately 4.64 gpm. The nearest neighboring Sespe-Alegria wells to the east of Well #6 are located within Baron Ranch and are approximately 3,500 feet away (Wells A and C). Based on EMCON (1994) and a file review of neighboring properties on June 3, 2013, at the Santa Barbara County Department of Environmental Health Services, no active Sespe-Alegria wells are known to be located west of Well #6 within a mile of the proposed location of Well #6 (EMCON, 1994).

The Groundwater Thresholds Manual does not indicate a reasonable radius of influence for the Sespe-Alegria Formation. To estimate the potential well interference of the planned Well #6 on the Baron Ranch wells, drawdown was estimated using the Theis Equation. No specific transmissivity and hydraulic conductivity values derived from aquifer testing on Tajiguas Landfill water supply wells installed in the Sespe-Alegria are available. However, Hoffman (2002) completed aquifer tests on two wells completed in the Sespe-Alegria Formation on the adjacent Baron Ranch. Transmissivity was reported at 4.5 ft²/day and 23.9 ft²/day. Assuming that the screen interval of the wells (450 feet) is equivalent to aquifer thickness and averaging the two transmissivity values, a

hydraulic conductivity of 0.032 ft/day is derived.⁵ Using the Theis Equation, and based on the average hydraulic conductivity (0.032 ft/day), a long term pumping rate of 4.64 gpm, and a screen interval or aquifer thickness of 350 feet at the planned Well #6 location, it is estimated that after 20 years of pumping, groundwater level drawdown (well interference) would be approximately 4 ½ feet at the Baron Ranch well locations. Wells A and C are 585 and 561 feet deep, respectively and have 411 and 226 feet of water column above the reported pump depths, respectively (Hoffman, 2002). Therefore, the estimated drawdown from the pumping of proposed Well #6 would not significantly impact the water column in the Baron Ranch Sespe-Alegria wells. Consequently, the estimated drawdown of 4 ½ feet indicates that potential for significant well interference is low. Well interference from the planned pumping in the proposed well #6 is not considered significant.

4.5 Well Pumping Impacts on Springs and Streamflow

Former seeps located within Pila Creek were covered with low permeability material and a subdrain was installed to collect this water during the Landfill Reconfiguration Project. The low permeability material was placed over the entire Vaqueros Formation within Pila Creek and portions of the Sespe-Alegria Formation. No additional seeps or springs are known to exist in Pila Creek within the Vaqueros or Sespe-Alegria Formations. Therefore, groundwater pumping in these formations will not significantly impact spring flow or stream baseflow in the watershed area.

Pumpage from Well #6 is also not expected to significantly impact springs or stream baseflow on the Baron Ranch because: 1) there are no reported springs in the Sespe Alegria Formation on the Baron Ranch (Anikouchine, 1991), 2) the bedded nature of the Sespe Alegria Formation will impede the vertical communication of groundwater and surface water, and 3) a low amount of drawdown is predicted (i.e., potentiometric head reduction) in the area of Baron Ranch, as discussed in Section 4.4.

4.6 Landfill Gas Migration

The potential for construction and operation of the new Well #6 to enable landfill gas migration to the groundwater table was evaluated. Landfill gas migration can potentially degrade the groundwater quality of an aquifer via two possible routes: (1) landfill gas diffusing through the vadose zone could interact with the groundwater at the

⁵ Hydraulic conductivity of a formation is derived by dividing the transmissivity by the aquifer thickness.

capillary fringe (top of groundwater), causing gas constituents to dissolve, and (2) landfill gas migration from the landfilled waste could occur within the casing of a groundwater well in the event that the top of the well screen is above the water table or within the well borehole annulus where sand filter pack occurs (i.e., the well provides a conduit for landfill gas migration to the groundwater). The potential for the construction and operation of Well #6 to enable landfill gas migration and degrade groundwater quality is considered low based on the following rationale:

- The proposed location of Well #6, **Figure 3**, is situated approximately 115 feet to the west of a lined portion of the landfill and approximately 1,000 feet north of an unlined portion of the landfill. The landfill liner, where applicable, and landfill gas collection system will reduce the potential for landfill gas to migrate westward to the proposed well location.
- Groundwater pumping in the well will decrease groundwater levels, thus increasing the distance from the bottom of the landfill to the top of the groundwater table. Regulation requires a minimum of five feet distance between a landfill liner system and the highest predicted groundwater levels. The increased distance between the groundwater table and the bottom of the landfill will reduce the potential for landfill gas to interact with groundwater.

In order to further reduce the potential for proposed Well #6 to act as a conduit for landfill gas migration to the groundwater, the screened portion of the well was installed below the top of the groundwater table, as is common construction practice for a water supply well, and below the base of the landfill liner system adjacent to the well. In addition, the well sanitary seal that is required per California Well Standards (CDWR, 1991), was installed through the unsaturated portion of the formation (vadose zone) and below the top of groundwater (see Section 5.0). With implementation of these well construction measures along with the low potential for Well #6 to provide a landfill gas conduit, the potential impacts of the project on downward landfill gas migration is considered less than significant.

5.0 RECOMMENDATIONS / MITIGATION MEASURES

The following standard well construction/design measures would reduce the potential for proposed Well #6 to act as a conduit for landfill gas migration to the groundwater:

- Well #6 was constructed so the well screen is sufficiently below the top of the groundwater table so that the well screen is not exposed due to declining water levels from pumping. The anticipated pumping levels should be taken into account so that the groundwater level does not drop below the top of the well screen. This is common water well construction practice. Additionally, the sanitary seal of Well #6 shall be constructed so it extends to at least the top of the static groundwater table.

The following measures are not required for mitigation purposes but are recommended for planning purposes to better manage groundwater resources:

- In order to better define the groundwater yield of the Sespe-Alegria aquifer, it is recommended that a groundwater monitoring program be established in order to monitor static and pumping groundwater levels along with pumping rates and volumes after installation of Well #6. Standard hydrogeologic methods should be used to analyze the data and manage the groundwater resources.
- Groundwater levels and pumping volumes should continue to be monitored in the Vaqueros Formation Well #5 to manage the groundwater resources.

An additional Sespe-Alegria well could be preliminarily sited for planning purposes. The well would only be installed if Well #6 does not meet the Project's water demand.

6.0 CUMULATIVE IMPACT ANALYSIS

Groundwater in the Sespe-Alegria Formation is generally considered to be localized and, subsequently, the Sespe-Alegria is not considered to be an important groundwater bearing source. There are no cumulative projects listed (**Appendix B**) that are located in the Pila Creek watershed where the project's Well #6 is located. In addition, based on the location and project descriptions, no cumulative projects listed within a three-mile radius of Well #6 will likely derive water from the Sespe-Alegria bedrock source. The Vaqueros Formation; however, is considered an important water source in the area. Well #5, installed in the Vaqueros Formation will provide water to the project but will not exceed the safe yield for the formation. Additionally, there are no wells installed in the Vaqueros Formation in the immediately adjacent watershed nor any cumulative projects listed (**Appendix B**) that would draw water from the Vaqueros Formation. Consequently, cumulative groundwater supply impacts and other associated groundwater pumping impacts are considered to be less than significant.

7.0 PROJECT ALTERNATIVE ANALYSIS

To meet the requirements of the California Environmental Quality Act (CEQA), seven potential alternatives have been identified. These seven alternatives include the following:

1. No Project – Assumes existing waste management practices with the Tajiguas Landfill reaching capacity in the year 2026;
2. Urban area MRF Alternative 1 – MRF at property owned by MarBorg Industries in the City of Santa Barbara and the ADF, Composting Area, and residual waste disposal would remain at the Tajiguas Landfill;
3. Urban area MRF Alternative 2 – MRF at the South Coast Recycling and Transfer Station (SCRSTS) and the ADF, Composting Area and residual waste disposal would remain at the Tajiguas Landfill;
4. MRF located at Tajiguas Landfill and an Aerobic Composting of organics at the existing Engel and Gray Composting Facility in Santa Maria;
5. Tajiguas Landfill expansion to provide an equivalent disposal capacity to meet demand up to approximately the year 2036;
6. Waste exportation after the closure of the Tajiguas Landfill in approximately year 2026 to the proposed Simi Valley Landfill and Recycling Center Expansion Project (Simi Valley Landfill RCEP); and
7. Waste exportation after the closure of the Tajiguas Landfill in approximately year 2026 to the proposed Santa Maria Integrated Waste Management Facility (Santa Maria IWMF).

7.1 No Project

Under the ‘No Project’ alternative waste disposal activities would continue at the Tajiguas Landfill as currently conducted and no additional recovery of recyclables or organics from the municipal solid wastes (MSW) would occur. Overall landfill capacity would be reached in approximately the year 2026. No increase in water demand (or groundwater demand) is expected through 2026 at the landfill for the ‘No Project’ alternative (water supply and demand for the current landfill operations are provided in **Table 1**). Thus, no additional water supply impacts and associated groundwater impacts at the landfill through 2026 are expected under the ‘No Project’ alternative. Under the ‘No Project’ Alternative, to meet the continued need for waste disposal services, the Tajiguas landfill would either need to be expanded or waste would need to be exported to and disposed of at another landfill after 2026. These alternatives are described in sections 7.4 and 7.5.

7.2 Alternative MRF Locations

Two urban sites are proposed as alternative locations for the MRF while the ADF, Composting Area and residual waste disposal would remain at the Tajiguas Landfill. With the reduction of facilities located at the Tajiguas Landfill, the water demand (4.73 AFY for the ADF and Composting Area) will be reduced and less than the baseline water supply identified in section 4.1. The alternative MRF locations are:

1. Within the City of Santa Barbara at the MarBorg property located at 620 Quinientos Street, and
2. The South Coast Recycling and Transfer Station (SCRSTS) located on the south coast of Santa Barbara County.

7.2.1 MarBorg MRF Alternative

If the MRF was constructed at the MarBorg property, an estimated 2,600 gallons per day (gpd) would be used domestically and an additional 200 gpd would be used for misting operations (MarBorg Industries, 2013). The total amount of water usage, for the MarBorg Alternative MRF is estimated to be 2.68 AFY. The City of Santa Barbara's water supply comes primarily from the following sources, with the actual share of each determined by availability and level of customer demand: Lake Cachuma and Tecolote Tunnel; Gibraltar Reservoir, Devils Canyon and Mission Tunnel; groundwater; State Water Project Table A allotment; desalination; and recycled water. Conservation and efficiency improvements are projected to contribute to the supply by offsetting demand that would otherwise have to be supplied by additional sources. On June 14, 2011, based on the comprehensive review of the City's water supply, the City Council approved the Long Term Water Supply Program (LTWSP) for the planning period 2011-2030. The LTWSP outlines a strategy to use the above sources to meet the City's estimated system demand (potable plus recycled water) of 14,000 AFY, plus a 10% safety margin equal to 1,400 AFY, for a total water supply target of 15,400 AFY. The LTWSP concludes that the City's water supply is adequate to serve the anticipated demand plus safety margin during the planning period. Additionally, based on personal communications with City of Santa Barbara Water Resources Manager Rebecca Bjork (January 18, 2013), the water requirements of the MRF located at the MarBorg property would not have a significant impact on the City of Santa Barbara's water supply. It was noted by the water resources manager that recycled water would be the preferred source where applicable.

7.2.2 SCRTS MRF Alternative

If the MRF was constructed at the SCRTS property, an estimated 10 AFY of water would be required for domestic and operational purposes⁶. The SCRTS site is served by the Goleta Water District (GWD). The GWD receives supplies from Lake Cachuma, groundwater, the State Water Project and some limited supplies of reclaimed water. Based on personal communications with Carrie Bennet, a Goleta Water District Associate Water Resources Analyst, on June 17, 2013, the water requirements of the MRF at the SCRTS property (9.97 AFY) are within the Goleta Water District's annual water allotment for new projects. Therefore, the MRF project would not have a significant impact on the Goleta Water District's water supply.

7.3 Aerobic Composting at Off-Site Location

This alternative entails constructing the MRF and disposing of residual materials at the Tajiguas Landfill and transporting and processing the recovered organic material through aerobic composting at the existing Engel and Gray Compositing Facility (Engel and Gray) in Santa Maria, California. Up to an additional 240 tons/day or 73,600 tons/year of organic waste would be transported from the MRF at Tajiguas to Engel and Gray for composting. Based on the estimated rate of 240 tons/day or 370 cubic yards/day⁷ coming from Tajiguas, the Engel and Gray facility would receive an additional 113,230 cubic yards/year. The composting facility water supply is an agricultural well which is completed in the Santa Maria Groundwater Basin. Engel and Gray estimates that approximately 90 gallons of water is required per cubic yard of compost at their facility (Engel and Gray, September 2009). Using this estimate, the proposed additional volume of composting material (113,230 cubic yards) will require approximately 31 AFY of additional water use. It is assumed that the additional material would be processed within the existing permitted capacity [400,000 cubic yards (Solid Waste Facility Permit 42-AA-0053)] of the Engel and Gray facility which was analyzed in prior environmental documents (Conditional Negative Declaration SP-94 28 & E94-56 and CEQA Section 15164 (Addendum) to SP-94-28 (City of Santa Maria,

⁶ Note that the significant difference is estimated demand between construction of the MRF at the MarBorg Alternative site as compared to the SCRTS Alternative site is associated with the proposed air quality treatment systems. The MarBorg MRF Alternative includes use of an activated carbon filtration system along with misting whereas the SCRTS MRF Alternative includes the use of biofilters.

⁷ Based on an estimated density for compost of 0.65 tons per cubic yard provided by Mustang Energy.

June 1995 and July 2008). These documents did not identify significant water supply/groundwater impacts associated with operation of the composting facility.

As noted above, under this alternative the MRF would be constructed at the Tajiguas Landfill. With the elimination of the ADF and the Composting Area the revised water demand for the MRF would be 6.77 AFY. With the reduction of facilities located at the Tajiguas Landfill and the additional volume of water to be provided from proposed Well #6, the water demand is less than the estimated water supply identified in section 4.1.

7.4 Landfill Expansion

Under the Landfill Expansion Alternative, the Tajiguas Landfill would be expanded horizontally and vertically to provide additional disposal capacity to meet the community's disposal needs to approximately the year 2036 with no further recovery of recyclable materials or organics from the MSW. Implementation of this alternative would require water for additional landfill cell and groundwater protection system construction, operations, and dust control. The water demand would be similar to existing landfill operations and the water balance of the landfill would remain roughly the same as outlined in **Table 1**. Consequently, this alternative would not significantly affect the landfill water supply or groundwater conditions.

7.5 Waste Exportation

Under the Waste Exportation Alternatives, after closure of the Tajiguas Landfill in approximately 2026, the community's waste disposal needs would be met by exporting waste to either the proposed Simi Valley Landfill Expansion or the proposed Santa Maria Integrated Waste Management Facility (Santa Maria IWMF) with no further recovery of recyclable materials or organics from the MSW.

7.5.1 Export to the Proposed Simi Valley Landfill

The source of water for operations at the Simi Valley Landfill is the Calleguas Municipal Water District (CMWD) which receives its main source of water from the State Water Project. According to *The Simi Valley Landfill and Recycling Center Expansion Project Final EIR (Ventura County, December 2010)*, estimated water demand for overall construction and operation of the Simi Landfill is 174 AFY. The EIR identifies that because the project would be served by the CMWD, water supply impacts would be less than significant.

7.5.2 Export to the Proposed Santa Maria IWMF

The source of water for the proposed Santa Maria IWMF is the Santa Maria Groundwater Basin. Based on the *Santa Maria Integrated Waste Management Facility Project – Final Environmental Impact Report (City of Santa Maria April 2010)*, the projected water demand for construction and operation of the Santa Maria IWMF is estimated at 35.2 AFY to be extracted from the Santa Maria Groundwater Basin through an existing on-site well. The EIR identified impacts due to water demand and groundwater recharge to be less than significant.

8.0 REFERENCES

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TABLES

TABLE 1
YEAR 2012 BASELINE AVERAGE ANNUAL WATER USE AND SUPPLY ESTIMATES
TAJIGUAS LANDFILL OPERATIONS AND CONSTRUCTION

| Category | Estimated Quantity (AF/Y) |
|---|---------------------------|
| Projected Water Use | |
| Landfill Domestic ¹ | 3 |
| Landfill Operation ¹ | 18 |
| Landfill Construction ² | 10 |
| Total Estimated Water Use | 31 |
| Projected Water Supply | |
| GLCRS Interceptor Trench ³ | 11* |
| Canada de la Huerta (Aera Well) ¹ | 3 |
| Groundwater Collection System North of LF (ICSP) ¹ | 1* |
| Well No. 3 in Monterey formation ⁴ | 16* |
| Well #5 ⁵ | 4 |
| HWDS,LCRS#5,DW-Wells ⁶ | 1.5* |
| Total Estimated Water Supply | 36.5 |
| Estimated Water Balance (Water Supply minus Water Use) | 5.5 |

¹Based on 2012 landfill operations water use per Tajiguas Landfill Operations Data.

²From estimate provided by SWT Civil Engineering and County of Santa Barbara, June 2012

³Based on annual totals from RWQCB Reports relative to median rainfall totals generated by Santa Barbara Flood Control District Rainfall Records.

⁴Reported by Moore and Taber, February 17, 1998, indicates a potential 20-25 gpm long-term sustainable pumping rate based on a short-term aquifer test. Conservatively reduced to 10 gpm for this analysis (i.e., 16 AF/Y)

⁵Hydrogeologic Report on the Tajiguas Landfill Reconfiguration and Baron Ranch Restoration Project. Geosyntec Consultants. October 23, 2008.

⁶Based on annual totals from RWQCB Reports. This supply to be used on landfill footprint only per RWQCB.

*Water supply available for operation and construction, not suitable for domestic supply.

TABLE 2
YEAR 2012 BASELINE + PROJECT AVERAGE ANNUAL WATER USE AND SUPPLY ESTIMATES
TAJIGUAS LANDFILL OPERATIONS AND CONSTRUCTION

| Category | Estimated Quantity (AF/Y) |
|---|---------------------------|
| Projected Water Use | |
| Landfill Domestic ¹ | 3 |
| Landfill Operation ¹ | 18 |
| Landfill Construction ² | 10 |
| Resource and Recovery Project | 11.5 |
| Total Estimated Water Use | 42.5 |
| Projected Water Supply | |
| GLCRS Interceptor Trench ³ | 11* |
| Canada de la Huerta (Aera Well) ¹ | 3 |
| Groundwater Collection System North of LF (ICSP) ¹ | 1* |
| Well No. 3 in Monterey formation ⁴ | 16* |
| Well #5 ⁵ | 4 |
| HWDS,LCRS#5,DW-Wells ⁶ | 1.5* |
| Replacement well for Well No. 4 in Sespe-Alegria Formation (Well #6) ⁷ | 6.3-20 ⁷ |
| Total Estimated Water Supply | 42.8 - 56.5 |
| Estimated Water Balance (Water Supply minus Water Use) | 0.3 - 14 |

¹Based on 2012 landfill operations water use per Tajiguas Landfill Operations Data.

²From estimate provided by SWT Civil Engineering and County of Santa Barbara, June 2012

³Based on annual totals from RWQCB Reports relative to median rainfall totals generated by Santa Barbara Flood Control District Rainfall Records.

⁴Reported by Moore and Taber, February 17, 1998, indicates a potential 20-25 gpm long-term sustainable pumping rate based on a short-term aquifer test. Conservatively reduced to 10 gpm for this analysis (i.e.,16 AF/Y)

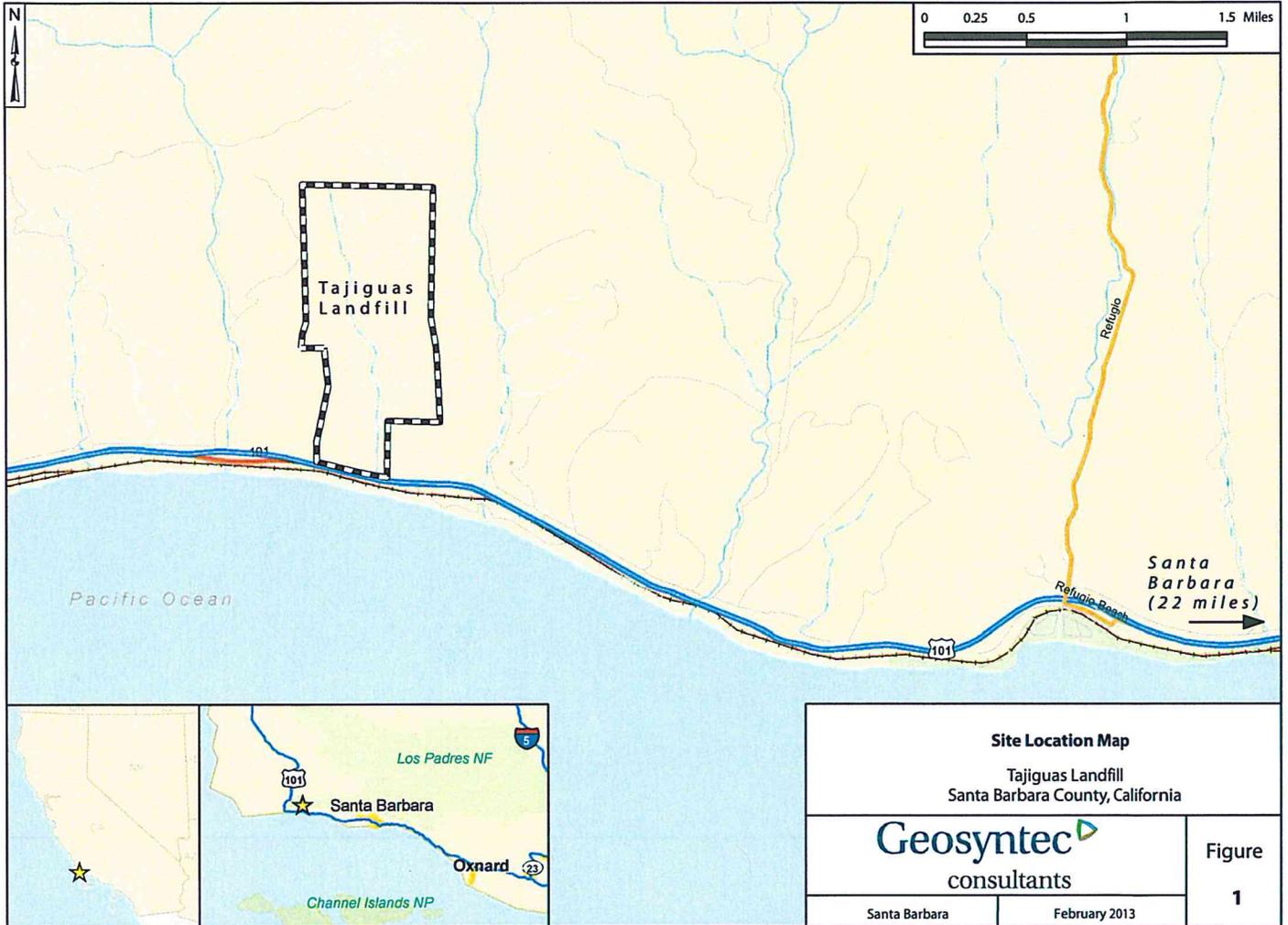
⁵Hydrogeologic Report on the Tajiguas Landfill Reconfiguration and Baron Ranch Restoration Project. Geosyntec Consultants. October 23, 2008.

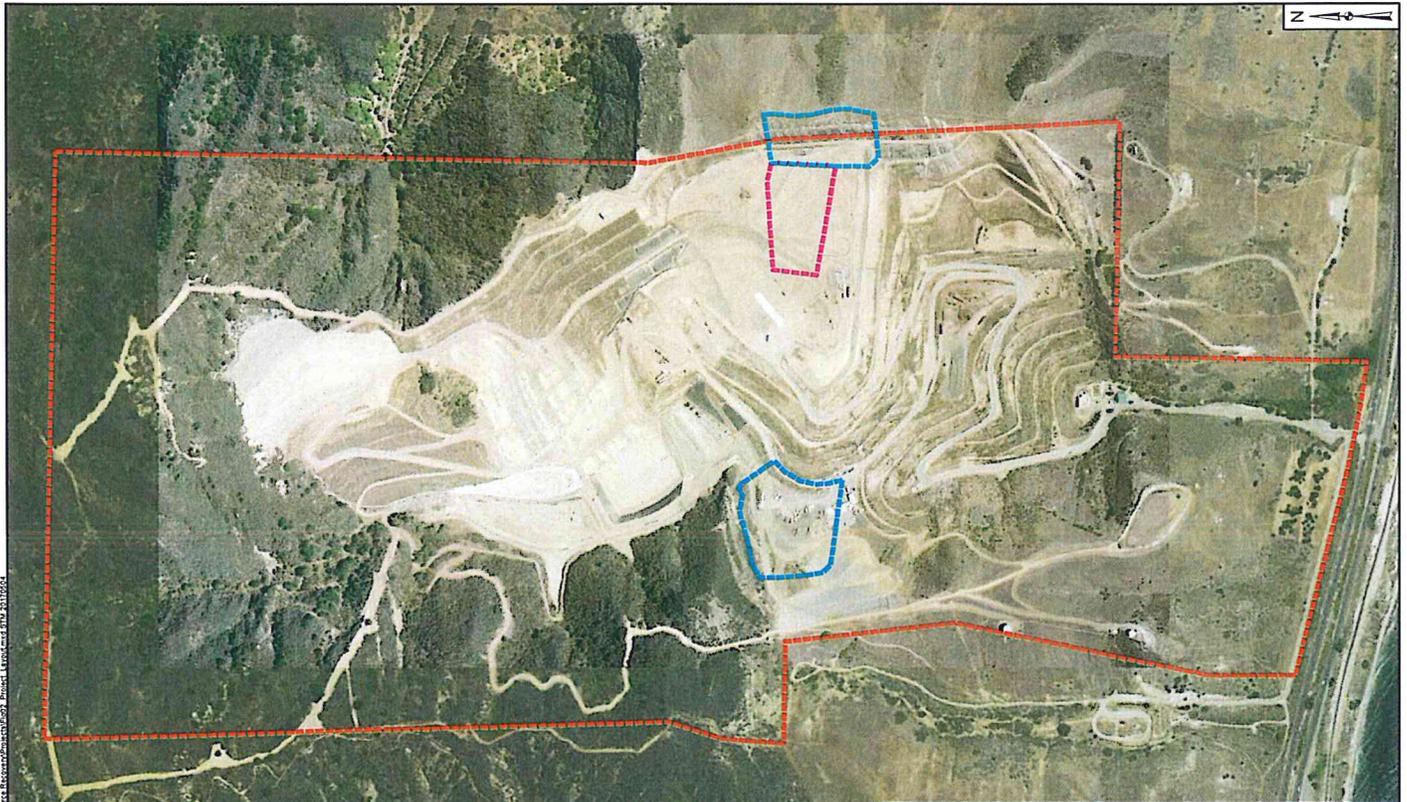
⁶Based on annual totals from RWQCB Reports. This supply to be used on landfill footprint only per RWQCB.

⁷Well No.6 was completed in the Sespe-Alegria formation and replaces destroyed Well No.4. County of Santa Barbara reports that Well No.4 was completed in the Sespe-Alegria formation and had been pumping at a rate of approximately 25 gpm over long periods of time. The reported long-term sustainable supply estimate of 20 AF/Y for Well No.4 is based on half of this pumping rate (12½ gpm). The lower range value of 6.3 AF/Y is an average of the actual pumping data for years 2006 through 2011. A 24-hour duration pump test conducted in December 2016 on Well #6 estimated that Well #6 will have a yield within this range (~16.5 AF/Y).

*Water supply available for operation and construction, not suitable for domestic supply.

FIGURES





- Legend**
- Anaerobic Digestion Facility
 - Composting Area
 - Materials Recovery Facility
 - Landfill Property Boundary



Revised Project Layout

Tajiguas Landfill
Santa Barbara County, California

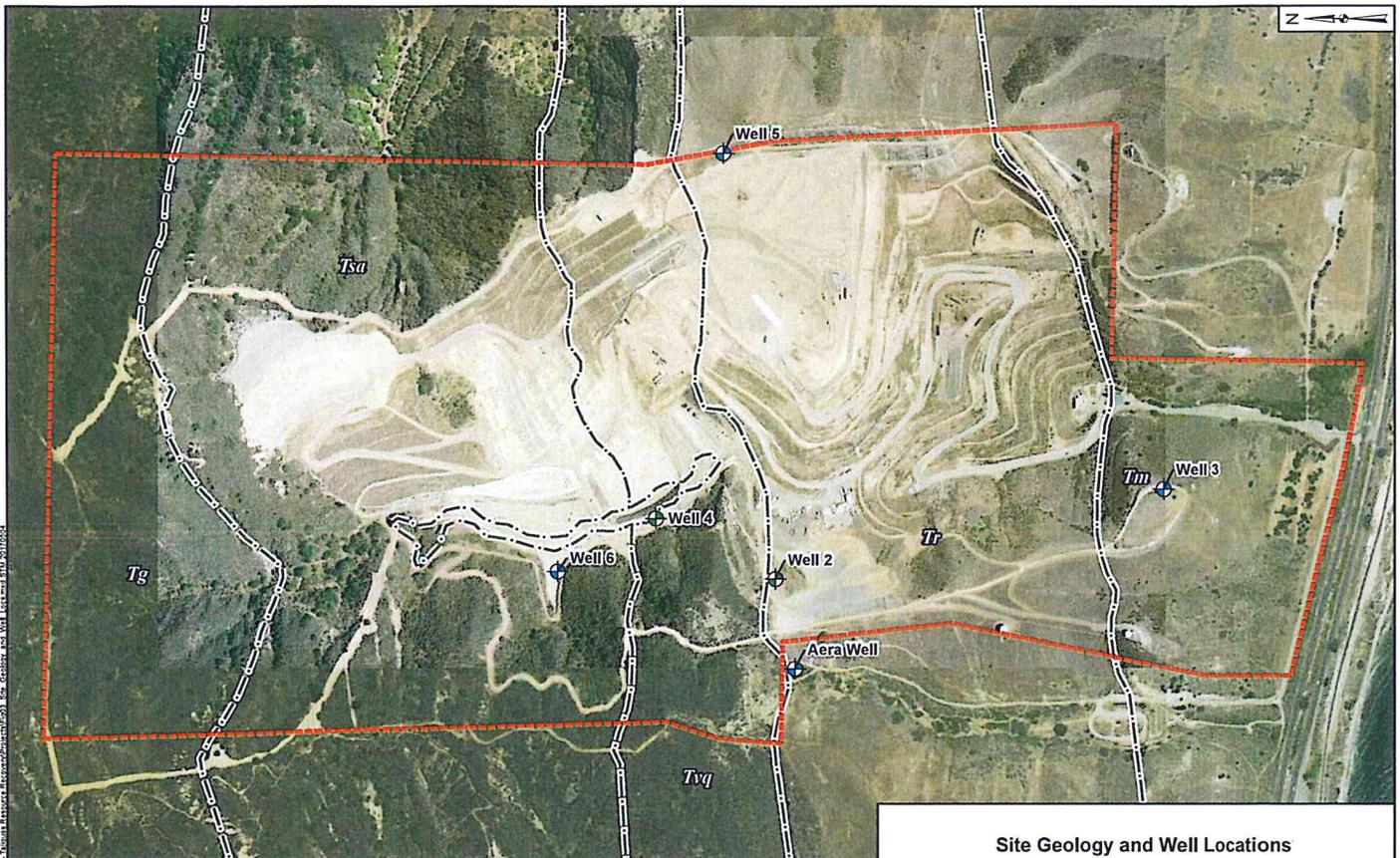
Geosyntec
consultants

Santa Barbara

May 2017

Figure

2



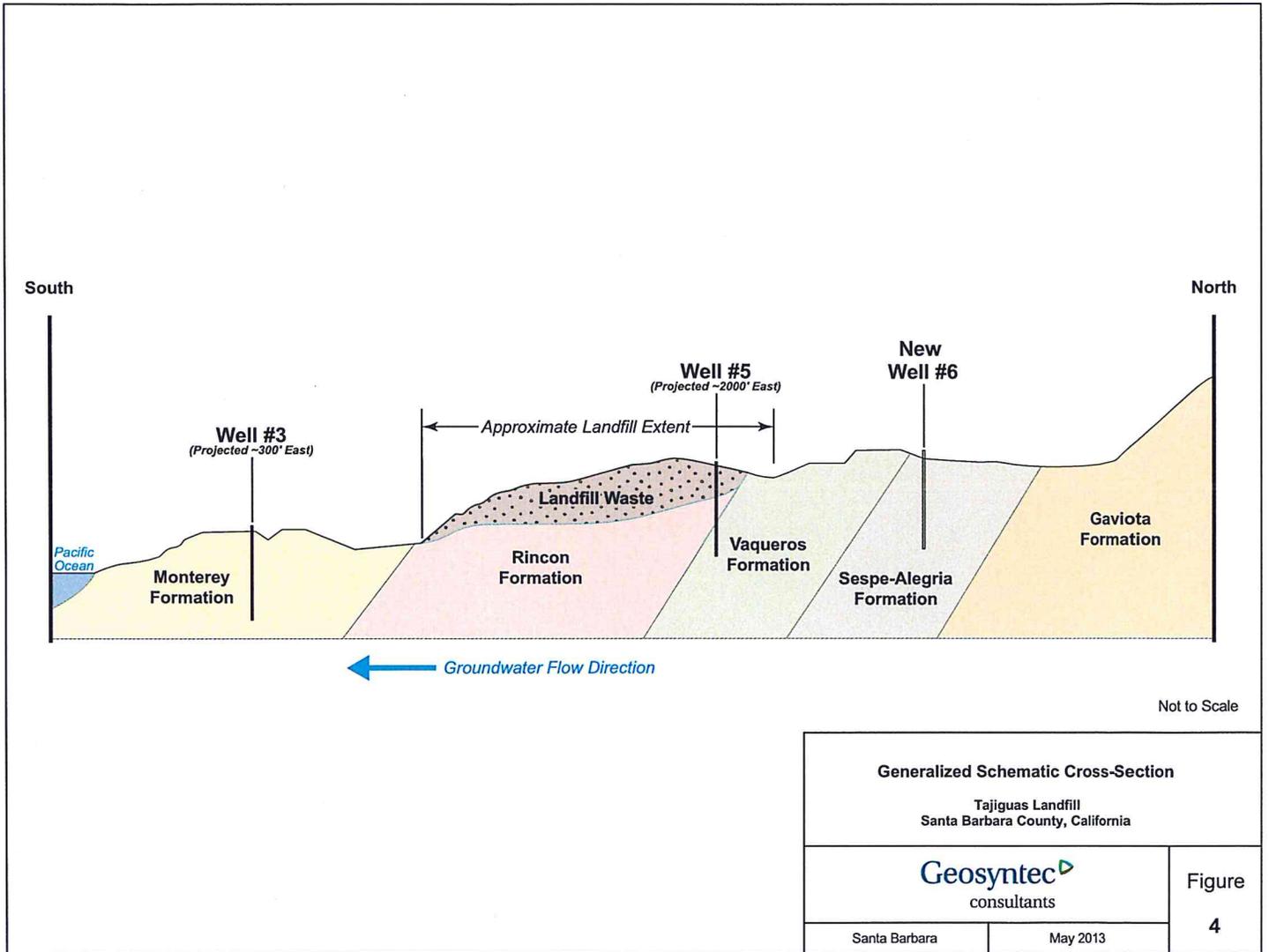
Legend

- Existing Well
- Former Well
- Landfill Property Boundary
- Contact Between Geologic Formations

800 400 0 800 Feet

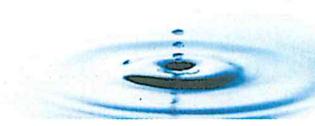
Tm: Monterey Shale
 Tr: Rincon Shale
 Tvq: Vaqueros Formation
 Tsa: Sespe and Alegria Formation
 Tg: Gaviota Formation

| | |
|---|----------|
| Site Geology and Well Locations Tajiguas Landfill Santa Barbara County, California | |
| | |
| Santa Barbara | May 2017 |
| Figure 3 | |



APPENDIX A

JOHN KULAR CONSULTING



May 24, 2013

John Dewey
CEO
Mustang Renewable Power Ventures, LLC
750 Pismo St.
San Luis Obispo, CA 93401

Dear John:

RE: Tajiguas Resource Recovery Project – Preliminary Water Supply, Storage, Transmission and Distribution, Revision 1

This revision adds biofilter water consumption as well as updates to landscape irrigation and composting area water storage and re-use.

1.0 Water Supply and Treatment

There are two operating wells and two closed wells on the Tajiguas Landfill site. Table 1 summarizes key features of these wells. All of the wells have relatively low yields and the landfill has had challenges in meeting its own water needs during dry years. Therefore, Tajiguas Resource Recovery Project (TRRP) will require its own well to supply the MRF and ADF.

Table -1 Existing Landfill Water Wells

| Well # | Distance to site (ft.) | Aquifer Name | Yield (GPM) | Water Table Elevation (ft.) |
|------------|------------------------|----------------|-------------|-----------------------------|
| 2 (closed) | On-site | Vaqueros | 20 | 250 |
| 3 | 1700 ft. S | Monterey | 12 | 210 |
| 4 (closed) | 850 ft. NE | Sespe Allegría | 30 | 250 |
| 5 | 2200 ft. E | Vaqueros | 15 | 434 |

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The project site overlies the Vaqueros formation aquifer. Vaqueros aquifer waters typically contain elevated Total Dissolved Solids (TDS), sulphates and chlorides due to the presence of ancient marine shale. The well quality records for Well 4 and Well 5 exhibit similarly elevated TDS, sulphates and chloride levels although they are within California and EPA drinking water standards. Well # 3 has significantly higher sulphate and chloride levels, with TDS levels more than twice as high. In addition, Well #3 has very elevated iron levels. Prior studies have identified safe yield constraints on the Vaqueros supply and the landfill currently uses Well 5, a Vaqueros well.

Therefore it is recommended that the proposed MRF and ADF supply well be located north-east of the proposed water tank (Well 6), roughly 1200 feet north of the TRRP site. This well will draw water from the Sespe Allegría formation. Exhibit W-1 shows the proposed water storage and distribution system.

Anticipated well yield is approximately 10-20 GPM. Careful planning will be required to stage the initial filling of the water storage tank and percolate tanks.

Chlorine disinfection may be required to keep the treated water potable and to inhibit algae growth within the storage tank and water mains.

1.1 Fire Protection

The fire flows and fire flow storage were calculated in accordance with the California 2010 Fire Code, Title 24, Chapter 9 and Table B.105.

Table – 2 Fire Protection Requirements

| Building/ Type | Building Area (SF) | Fire Flow (GPM) | Sprinkler Credit | Adjusted Building Area (SF) | Fire Duration | Fire storage (Gallons) |
|-------------------|-----------------------|--------------------|---------------------|-----------------------------------|------------------|------------------------------|
| ADF, Type IA | 63400 | 2750 | 50% | 1375 | 2 | 165,000 |
| MRF, Type IIA | 58800 | 3500 | 50% | 1750 | 2 | 210,000 |

The MRF has the higher fire flow requirement, so 210,000 gallons of fire storage will be provided.

1.2 Process Water

The MRF has no process water requirements other than wash-down of some work areas. Daily wash down is estimated as 500 GPD.

The ADF has an estimated daily wash down requirement of 500 GPD. The digestion process utilizes three storage tanks of percolate with a combined volume of 300,000 gallons. The digestion process is a closed loop system. All percolate is recovered and recycled.

1.3 Domestic Water

Based on the CalGreen 2010 Building Code, estimated domestic water consumption is 1745 GPD. This represents a 28.5% reduction from the 2006 Uniform Plumbing Code and incorporates water saving devices such as low flush toilets and aerating faucets. California environmental health regulations dictate that all domestic water meets the standards for human consumption, even if the water is used for flushing toilets or showers.

1.5 Biofilter Water Use

The biofilters which remove odors from the MRF and ADF air streams before discharging the air to the atmosphere also consume water to keep the biofilter media moist and functioning. The biofilters consume 6964 GPD (7.801 acre-ft/yr). 85% of this water is lost to the atmosphere as evaporation. 15% is collected as condensate. Clean condensate from the humidifier is recycled through the biofilter. Dirty condensate from the biofilter is conveyed to the wastewater treatment system. In order to minimize water use and wastewater disposal, domestic wastewater can be treated and re-used for humidification of the biofilter. These recycling measures will reduce biofilter net water consumption by approximately 32% to 4736 GPD or 5.30 acre-feet/year.

1.6 Compost Process Water Requirements

The compost finishing process is estimated to require up to 2200GPD (0.60 acre-ft/yr) to replace water lost to evaporation during the driest months of the year. The source of this water will be Well #5. The Composting Area will also be a source of water (storm water runoff) following rainfall events. 2.90 acre-feet of runoff will be used for compost watering in an average year. A more comprehensive discussion of the runoff collection, treatment, storage and reuse is found in *Tajiguas Resource Recovery Project – Composting Area*, John Kular Consulting, October, 2012.

Table 1 – Summary of Average Net Water Consumption

| Component | MRF GPD/Acre-Ft/Yr. | ADF GPD/Acre-Ft/Yr. | Composting Acre-Ft/Yr. |
|------------------|--------------------------------|--------------------------------|-----------------------------------|
| Domestic Use | 1645/1.84 | 100/0.11 | N/A |
| Wash Down | 500/0.61 | 500/0.61 | N/A |
| Biofilter* | 3818/4.28 | 918/1.02 | N/A |
| Compost Watering | N/A | N/A | 0.60 |

* Net consumption after wastewater and condensate recycling.

2.0 Water storage

2.1 Water Storage (MRF & ADF)

Water for consumption and fire protection will be stored in a 220,000 gallon tank adjacent to the proposed well on a ridge to the north and west of the TRRP facilities. The tank site is located at an elevation of 610 feet above mean sea level. The tank capacity provides the equivalent volume of the fire flow plus four days of water consumption. The tank will be 50 feet in diameter and 15 feet tall to minimize the visual impact.

2.2 Water Storage (Landscape Irrigation)

Approximately 1.8 acres of landscaped area surrounding the MFR and ADF buildings will be irrigated with recycled water (treated waste water from the MRF and ADF buildings). Annual recycled water re-use is anticipated to be 2.02 acre-feet/year.

2.3 Water Storage and Treatment (Composting Area)

Composting Area pad runoff will be stored in a 325,000 gallon storage tank (See Exhibit CFA-) located on a pad approximately 800 feet northeast of the Composting Area. Storm water runoff from the Composting Area pad will be collected via asphalt swales and into a baffled Baker tank, and then pumped into the Composting Area Runoff Collection Tank. The RWQCB requires that composting operations capture and treat the 1:25-year storm runoff. The 25 year runoff volume is projected to be 220,000 gallons. The possibility of successive large storm events led to sizing the Composting Area Runoff Collection Tank for 325,000 gallon capacity.

When the runoff is re-used to water the compost it will be pumped through a bag filtration system and into a 5000 gallon polyplastic tank beside the Baker tank. A portable sprayer and 500 gallon trailer mounted tank will be used to spray the filtered runoff onto the compost piles to keep them moist.

3.0 Water Transmission

Well water will be transmitted from the storage tank to the TRRP distribution network via an 8" PVC, C900, Class 200 or equivalent HDPE transmission main. The size of the transmission and distribution mains has been verified for the projected fire flow using EPANET software. Due to the difference in elevation between the water tank and the TRRP site, pressure class 200 psi equivalent pipes will be required.

4.0 Water Distribution

The MRF and ADF water distribution network consists of a single 8" diameter main encircling the ADF and MRF facilities. Fire hydrants will be located opposite the exterior building faces. Fire hydrant leads will be 6" diameter. The building sprinkler systems will be fed with 6" leads. The domestic water systems will be fed from the 8" distribution main but will be protected by double check valve assemblies.

This analysis was performed based upon conceptual site design. The analysis should be re-visited when more detailed plans are available. Thank you for the opportunity to be of service to Mustang Renewable Power Ventures. If you have any questions, please contact the undersigned at 661-663-7732 or john@kularconsult.com

Sincerely,

John Kular, RCE 64920
President
John Kular Consulting

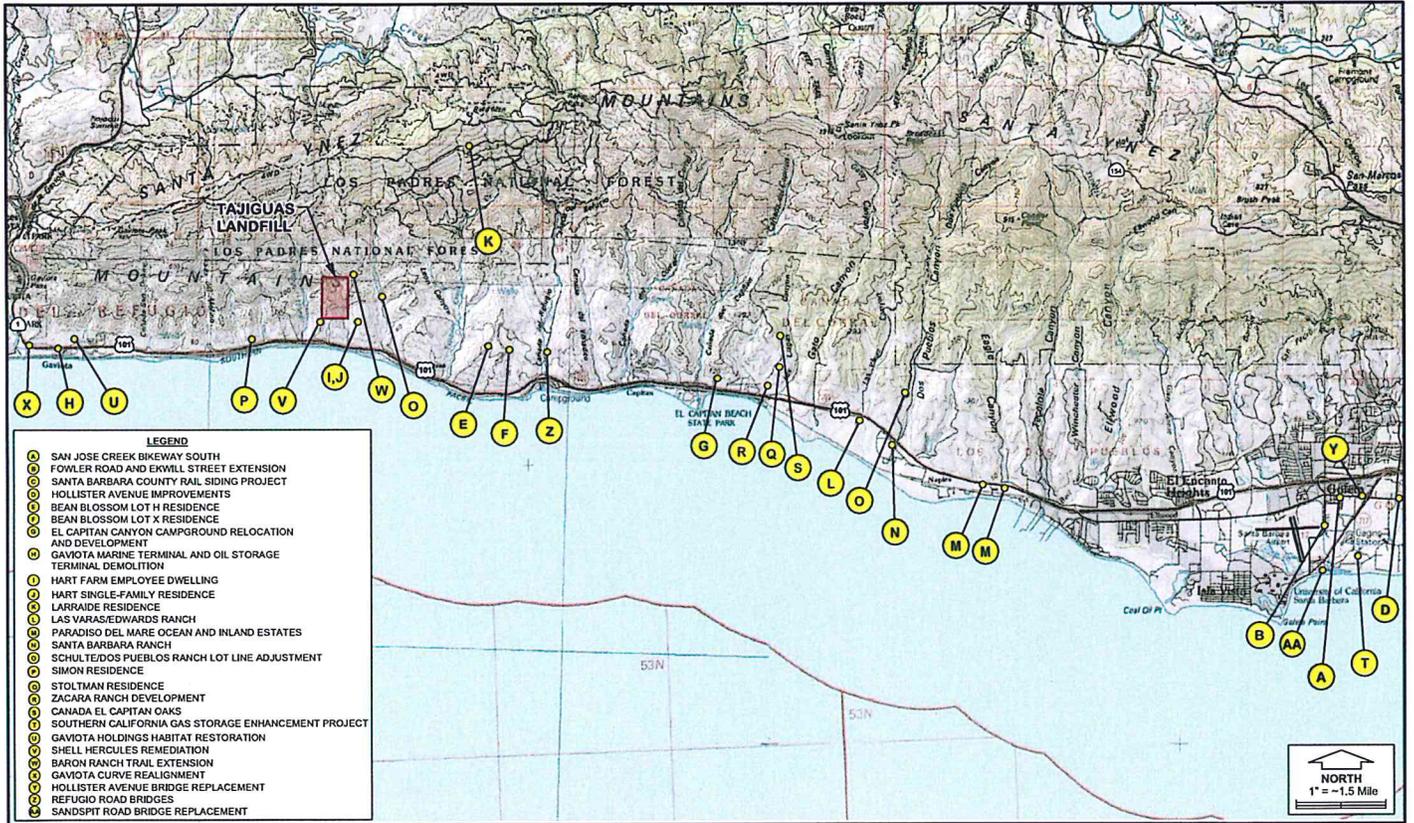
| Table 1 -TRRP MRF Net Water Consumption | | | | | 2017 Updated Estimate |
|---|------|-------------------|-------|--------------|---|
| Water Supply | GPM | Operating Hrs/day | GPD | Acre-ft/year | |
| Well # 6 | 10.2 | 24 | 14688 | 16.52 | Per 2016 Well pump test |
| Water Uses | | | | | |
| MRF washdown | | | 100 | 0.11 | |
| Domestic | | | 1800 | 2.02 | |
| Flare scrubber | | | 54 | 0.06 | |
| Biofilters | | | 4069 | 4.58 | |
| Subtotal Uses | | | 6023 | 6.77 | MRF Uses |
| Net water balance | | | 8665 | 9.75 | Available for other purposes |
| Waste water generated | | | | | |
| MRF washdown | | | 0 | 0.00 | Classified as leachate must divert to landfill dust control |
| Domestic | | | 1800 | 2.02 | |
| Flare scrubber | | | 9 | 0.01 | Condensate recovery |
| Biofilters | | | 610 | 0.69 | Estimated 15% condensate recovery |
| Subtotal wastewater | | | 2419 | 2.72 | Treatment and disposal |

| Table 2 -TRRP ADF Net Water Consumption | | | | | 2017 Updated Estimate |
|---|------|-------------------|------|--------------|--|
| Water Supply | GPM | Operating Hrs/day | GPD | Acre-ft/year | |
| Well # 5 | 2.47 | 24 | 3557 | 4.00 | Source of info: Geosysntec SEIR report |
| Water Uses | | | | | |
| ADF washdown | | | 100 | 0.11 | |
| Domestic | | | 112 | 0.13 | |
| Flare scrubber | | | 54 | 0.06 | |
| Biofilters | | | 2895 | 3.26 | |
| Subtotal Uses | | | 3161 | 3.56 | |
| Net water balance | | | 396 | 0.45 | Available for other uses |
| Waste water generated | | | | | |
| ADF washdown | | | 0 | 0.00 | Classified as leachate, divert to perc tanks |
| Domestic | | | 112 | 0.13 | |
| Flare scrubber | | | 9 | 0.01 | Condensate recovery |
| Biofilters | | | 434 | 0.49 | Estimated 15% condensate recovery |
| Subtotal wastewater | | | 555 | 0.62 | Available for CMU watering |

| Table 3 - TRRP CMU Water Consumption | | | | |
|--------------------------------------|--|--|--|--------------|
| Sources: | | | | Acre-ft/year |
| ADF recycled water | | | | 0.62 |
| CMU collected rainwater runoff | | | | 3.77 |
| Well # 5 water | | | | 0.45 |
| subtotal | | | | 4.84 |
| Uses: | | | | |
| Compost watering requirement | | | | 5.56 |
| Supplementary water required | | | | 0.72 |
| subtotal | | | | 4.84 |

| Table 4- Net TRRP Well Water Use (ADF, MRF and CMU) | | | | |
|---|--|--|--|--------------|
| | | | | Acre-ft/year |
| ADF | | | | 3.56 |
| MRF | | | | 6.77 |
| CMU | | | | 1.17 |
| Total TRRP | | | | 11.50 |

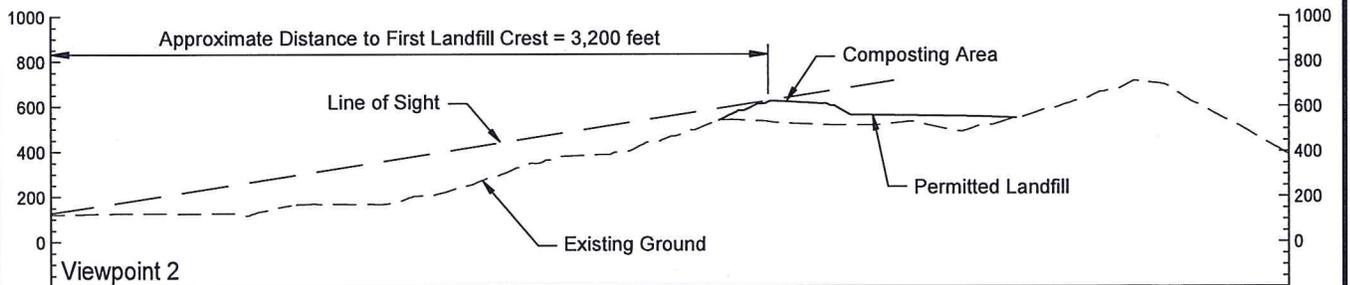
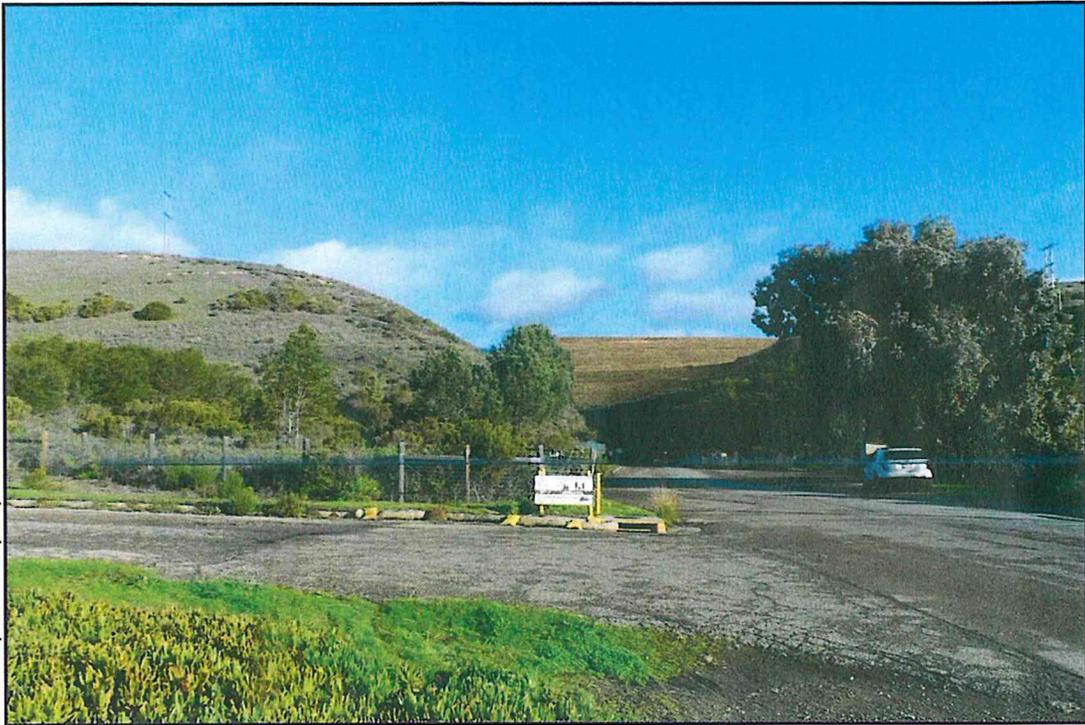
APPENDIX B



Appendix E

Updated Line-of-Sight Profiles: Views 2, 3, 4 and 5

Date of photo: 12/17/2012



Line of Sight Profile



Viewpoint 2

Landfill Entrance

CERTIFIED EIR and AMENDED PROJECT CONDITIONS

Prepared by:

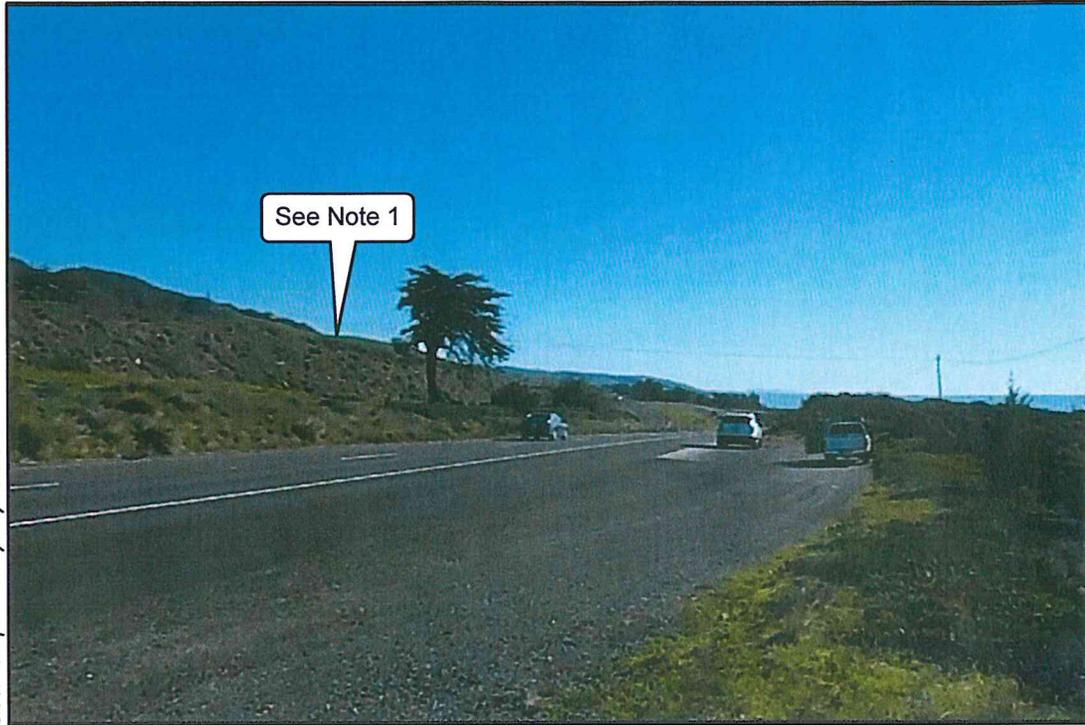
John Kular Consulting

12107 Bedfordshire Drive, Bakersfield, CA 93311
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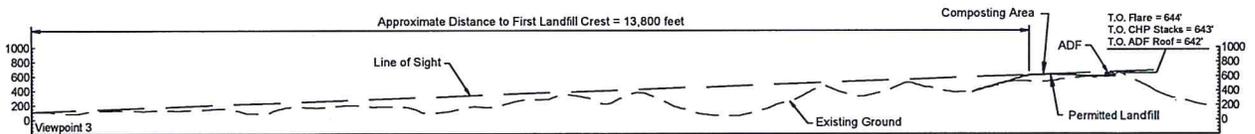
Tajiguas Resource Recovery Project

Figure 2.2a

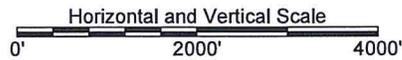
Date of photo: 2/19/2013



Note 1 - Line of sight to existing operations deck and proposed TRRP buildings obscured by intervening topography and vegetation.



Line of Sight Profile



Viewpoint 3

Hwy 101 Southbound

CERTIFIED EIR and AMENDED PROJECT CONDITIONS

Prepared by:

John Kular Consulting

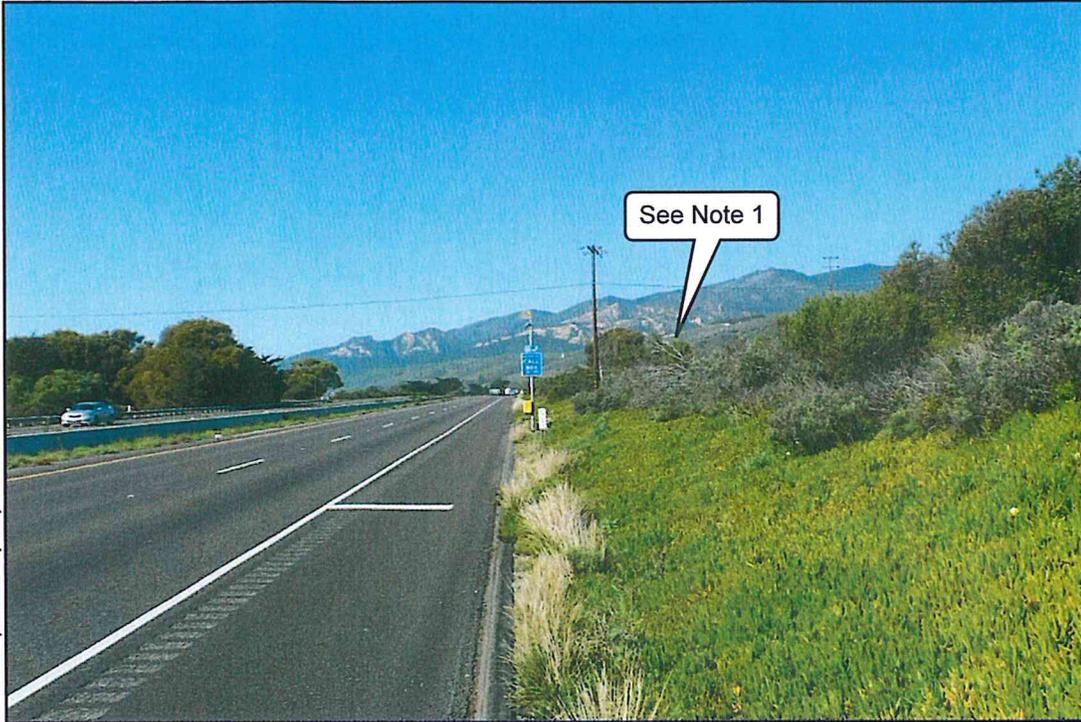
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Tajiguas Resource Recovery Project

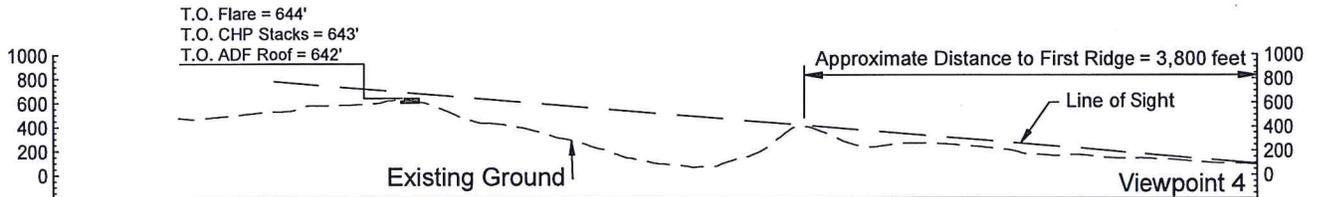
Figure 2.3a

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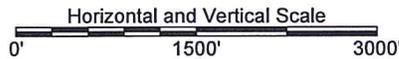
Date of photo: 2/06/2013



Note 1 - Line of sight to existing operations deck and proposed TRRP buildings obscured by intervening topography and vegetation.



Line of Sight Profile



Viewpoint 4

Hwy 101 Northbound

CERTIFIED EIR and AMENDED PROJECT CONDITIONS

Prepared by:

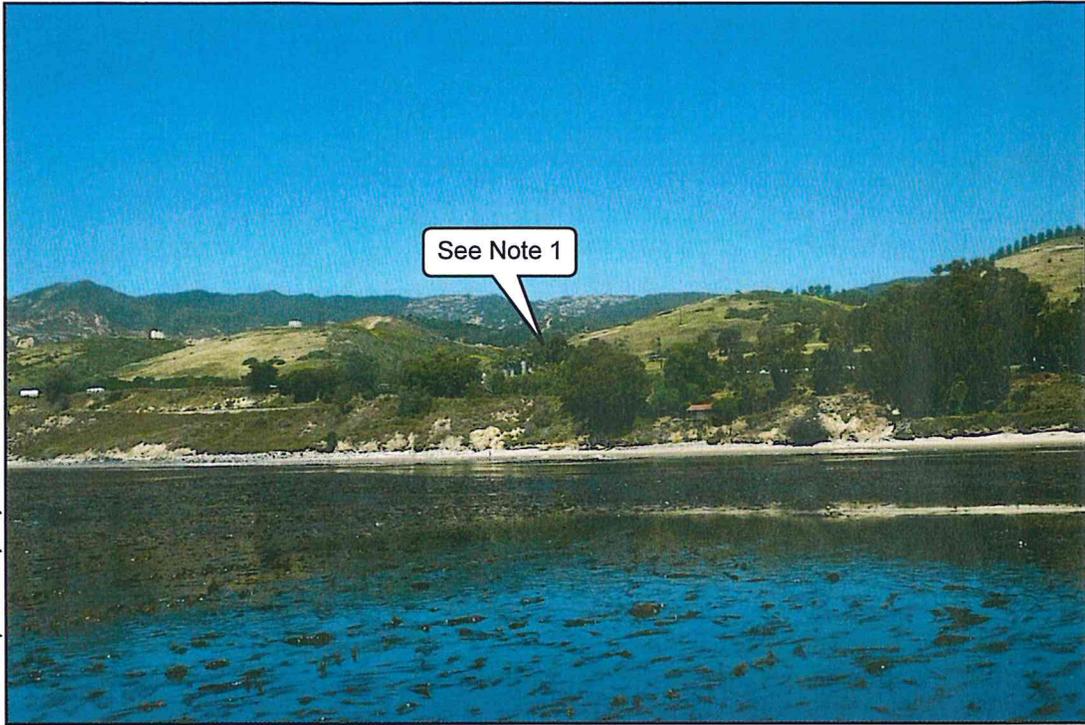
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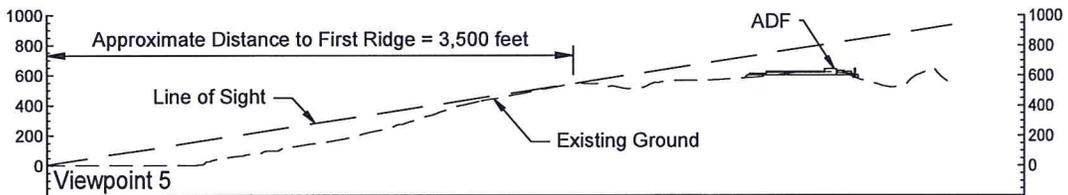
Tajiguas Resource Recovery Project

Figure 2.4a

Date of photo: 4/19/2013



Note 1 - Line of sight to existing operations deck and proposed TRRP buildings obscured by intervening topography and vegetation.



Line of Sight Profile



Viewpoint 5

Offshore

CERTIFIED EIR and AMENDED PROJECT CONDITIONS

Prepared by:

John Kular Consulting

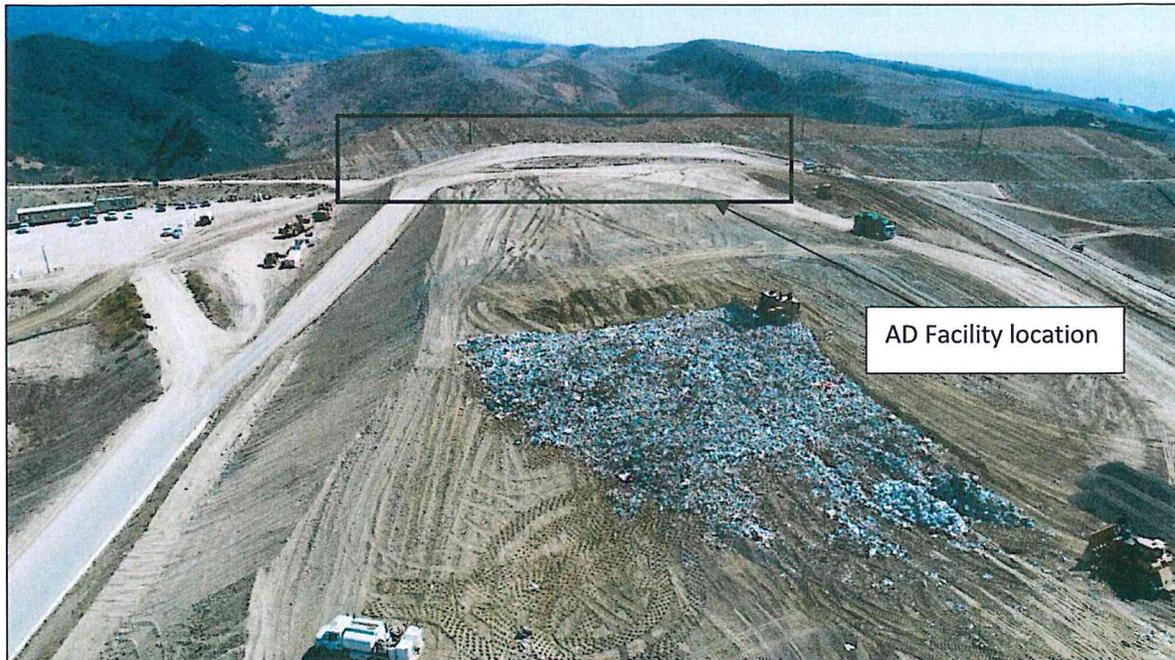
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Tajiguas Resource Recovery Project

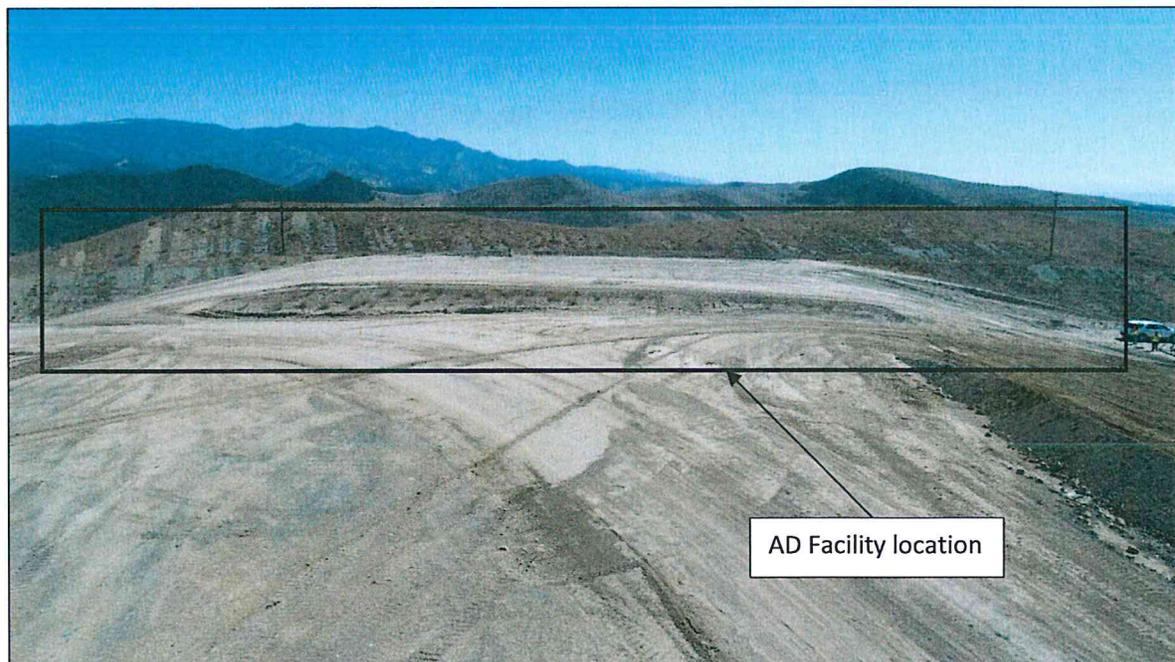
Figure 2.5a

Appendix F

Photographs of the Anaerobic Digestion Facility Site



a. View of the active disposal area (photo center) with the 4.48-acre Comprehensive Plan Amendment Area/AD Facility site in the background (photo date 9/26/17)



b. View of the 4.48-acre Comprehensive Plan Amendment Area/AD Facility site, facing east (photo date 9/26/17)

Appendix G

Aerial Photograph of the Area to be Removed from the Waste Disposal Facility Overlay



a. Oblique aerial view of the 55.55-acre area to be removed from the Waste Disposal Facility Overlay (photo date 9/26/17)

**AERIAL PHOTOGRAPH OF THE AREA TO BE REMOVED FROM THE WASTE DISPOSAL FACILITY OVERLAY
APPENDIX G**

Appendix H

Excerpts from the Tajiguas Landfill Expansion Project EIR (01-EIR-05)

- **Page 2-5**
- **Figure 2-2: Conceptual Grading Plan**
- **Figure 2-4: Existing and Proposed Areas of Disturbance**

Notations and emphasis added in red lines and text

Sections 2.2 and 2.3. A summary of site acreage and disturbance for existing operations and the two configurations that comprise the proposed project is shown in Table 2-2.

2.2 FRONT CANYON CONFIGURATION

2.2.1 SITE PLAN AND DEVELOPMENT PHASING

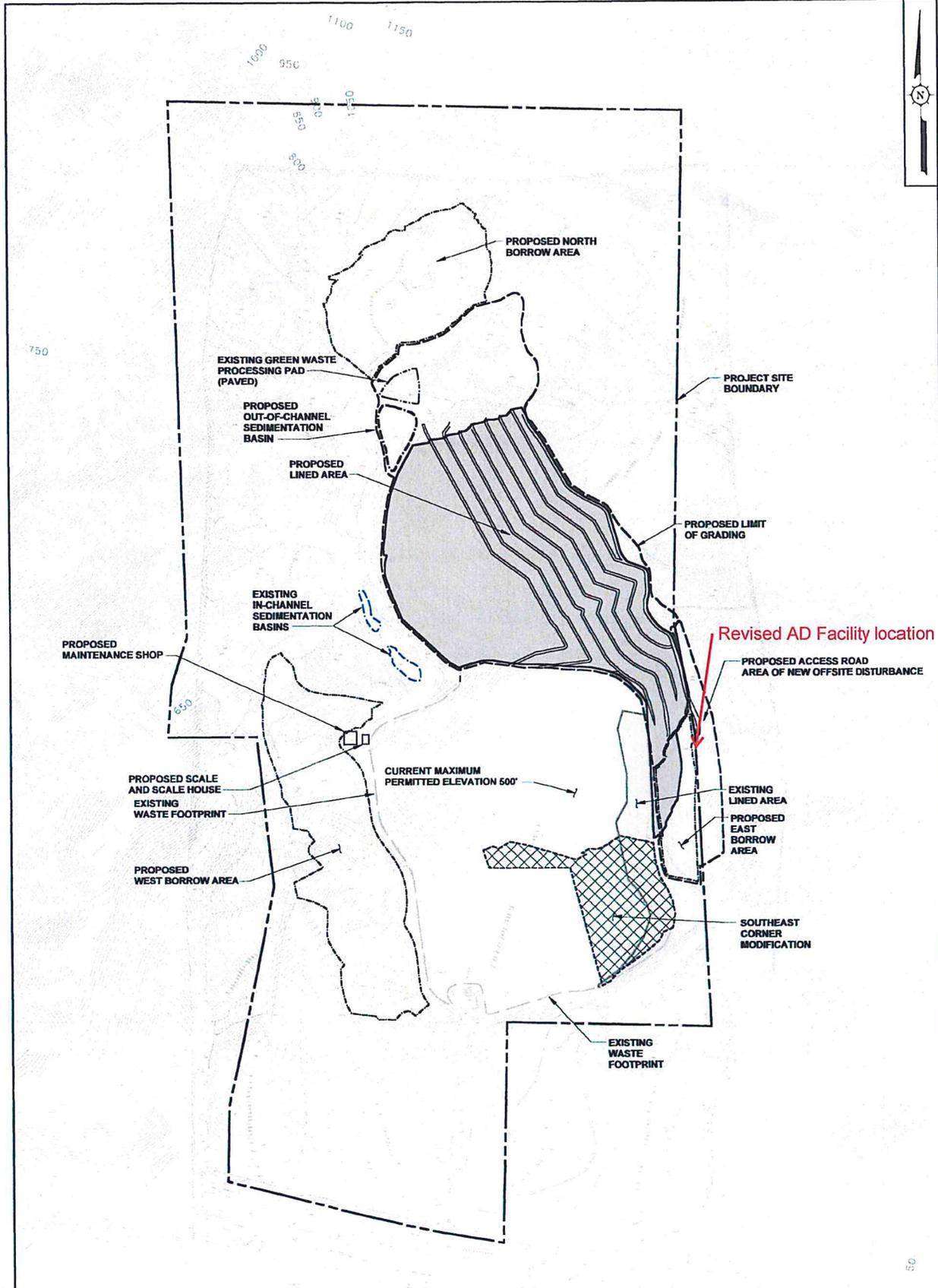
The Front Canyon configuration would create a total landfill footprint (existing landfill plus expansion) of 134 acres (see Table 2-2 and Figures 2-2, 2-3 and 2-4). This configuration would consist of 27 acres on the existing landfill, 41 acres within previously disturbed areas and 15 acres of new disturbance. The Front Canyon configuration expansion waste footprint would be 83 acres (see Table 2-2). With this configuration, the total landfill footprint would increase from the existing 78 acres to approximately 134 acres.

In addition, there would be 26 acres of disturbance for the West Slope Borrow Area and 18 acres of disturbance for the North Slope Borrow Area. There would be no disturbance from the East Slope Borrow Area, as it is entirely within the existing area of disturbance. As a result, the Front Canyon configuration would involve a total 70 acres of new disturbance (15 acres + 26 acres + 18 acres) within the 497-acre project site. Also, grading may occur over an area of approximately 5 acres on the adjacent County-owned Baron Ranch property east of the site to accommodate landfill perimeter access road and drainage system construction. No waste would be placed in this area.

Vertical expansion would increase the maximum elevation from 500 to 660 feet above mean sea level (msl).

Grading would be conducted to facilitate a composite liner. A conceptual grading plan is shown in Figure 2-2. The ridge located north of the northeast portion of the existing landfill, plus portions of the eastern slope, which forms the eastern edge of the landfill, would be graded to a maximum overall slope of approximately 2.4:1 horizontal:vertical. The slope would be constructed with benches approximately every 40 to 50 vertical feet, with slopes between benches of 2:1. Some fill would be placed in low areas and to maintain safe waste fill slope orientation. The area to be lined is shown in Figure 2-2.

An extension of the existing landfill access road would be constructed, with a minimum width of 20 feet, to meet County Fire Department requirements. The final decision regarding the specific alignment would be made during final project design.

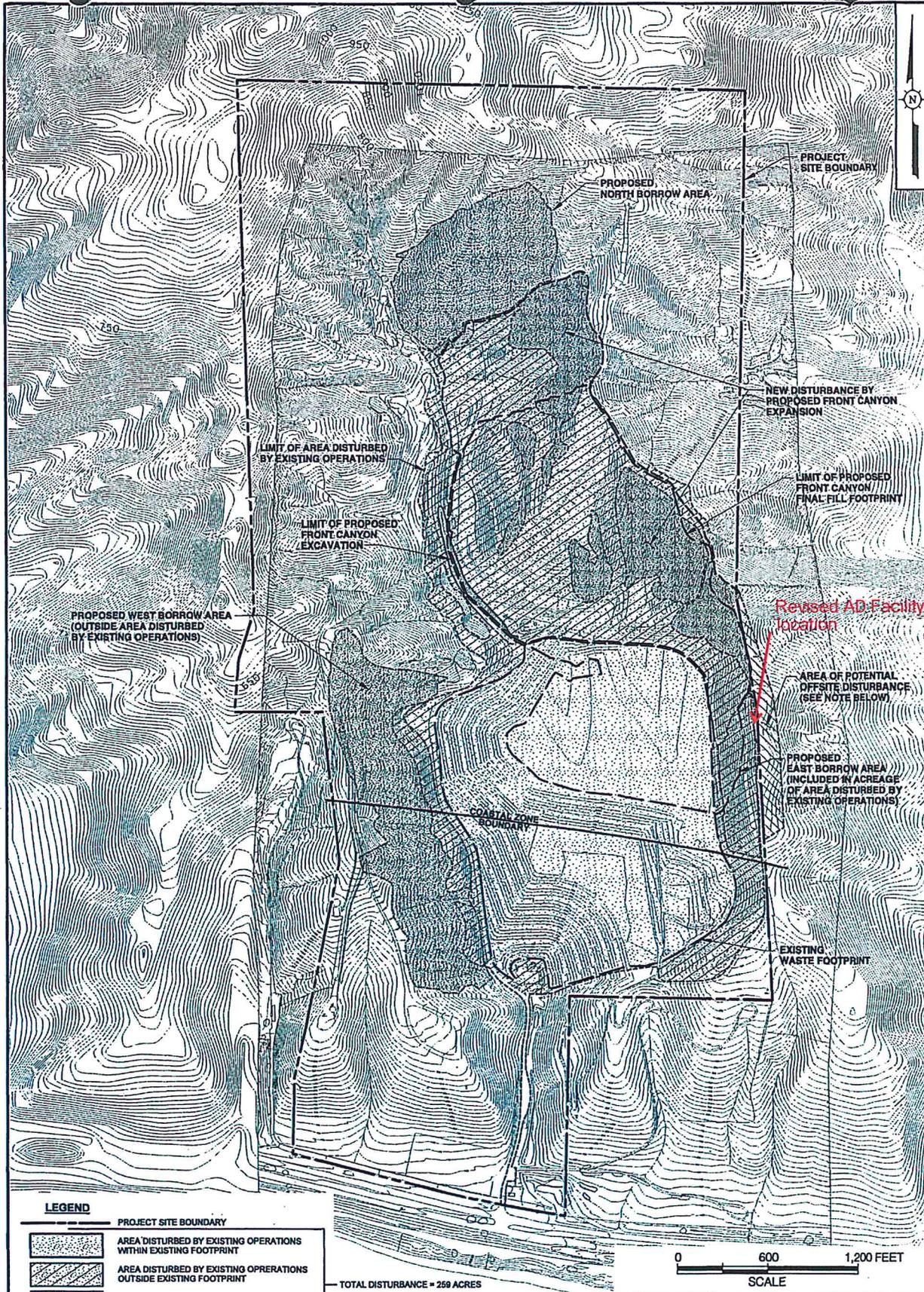


2-7

**CONCEPTUAL GRADING PLAN
FRONT CANYON CONFIGURATION**

TAJIGUAS LANDFILL EXPANSION
SANTA BARBARA, CALIFORNIA

TRC **FIGURE 2-2**



LEGEND

- PROJECT SITE BOUNDARY
- AREA DISTURBED BY EXISTING OPERATIONS WITHIN EXISTING FOOTPRINT
- AREA DISTURBED BY EXISTING OPERATIONS OUTSIDE EXISTING FOOTPRINT
- NEW DISTURBANCE BY PROPOSED OPERATIONS
- PROPOSED ACCESS ROAD AREA OF 5-ACRE OFFSITE DISTURBANCE
- EXISTING LANDFILL WASTE FOOTPRINT
- LIMIT OF FRONT CANYON EXCAVATION
- LIMIT OF PROPOSED FRONT CANYON FINAL FILL FOOTPRINT
- LIMIT OF PROPOSED BORROW AREAS

TOTAL DISTURBANCE = 259 ACRES



EXISTING AND PROPOSED AREAS OF DISTURBANCE FRONT CANYON CONFIGURATION

TAJIGUAS LANDFILL EXPANSION
SANTA BARBARA, CALIFORNIA



REVISED FIGURE 2-4

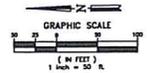
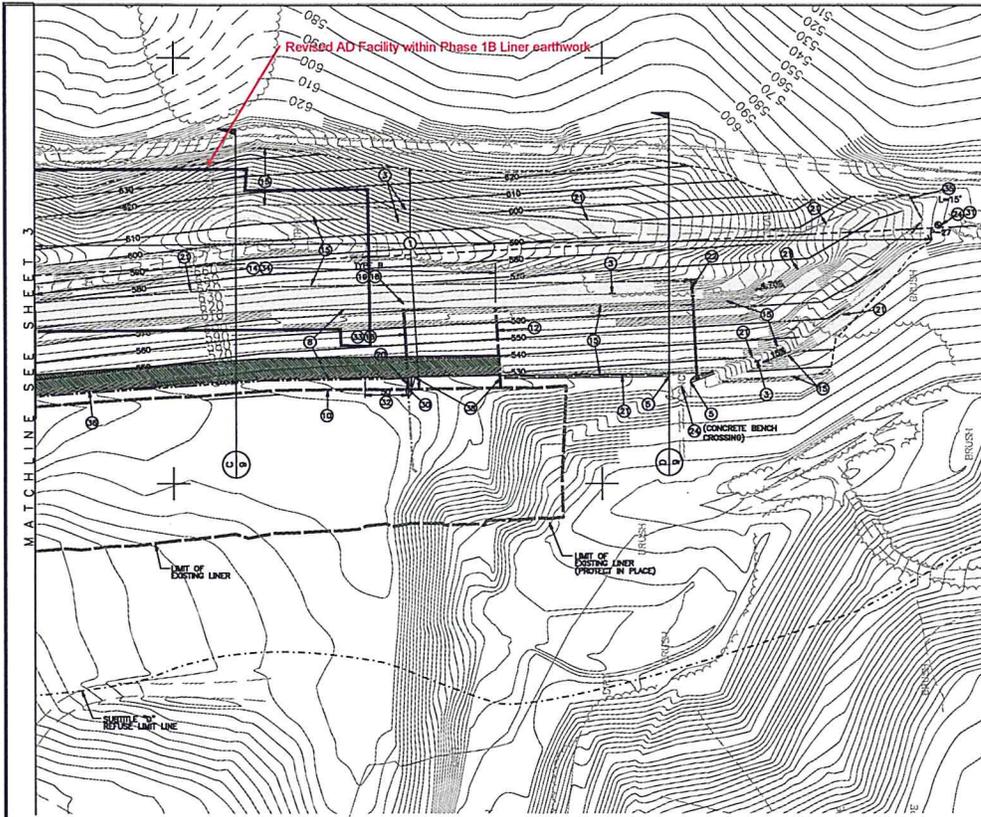
NOTE:
THIS FIGURE WAS REVISED BASED ON COMMENT
NUMBERS 18-3 AND 18-4.

Appendix I

Phase 1A and 1B Liner Plans (Earthwork)

- **Phase 1A Liner Site Map**
- **Phase 1B Liner Subgrade Plan (Southern Portion)**
- **Phase 1B Liner Subgrade Plan (Northern Portion)**
- **Phase 1B Liner Groundwater Protection Sections**

Notations and emphasis added in red lines and text



CONSTRUCTION NOTES

- ① EXCAVATE TO FINISHED SUBGRADE ELEVATIONS
- ② CONSTRUCT INTERMEDIATE BENCH/ACCESS ROAD
- ③ CONNECT V-GUTCH TO EXISTING CONCRETE BENCH CROSSING
- ④ CONSTRUCT SLOPE LINER
- ⑤ CONSTRUCT BENCH/SLOPE LINER JOIN TO EXISTING LINER
- ⑥ CONSTRUCT SLOPE LINER TERMINATION
- ⑦ INSTALL CLASS 1 FLEXIBLE POST DELINEATOR IN ANCHOR TRENCH PER CALTRANS STANDARD PLAN NO. A736 @ 50' O.C.
- ⑧ PLACE HYDROSEED PER PROJECT SPECIFICATIONS
- ⑨ CONSTRUCT LERS BENCH
- ⑩ CONSTRUCT LERS RISER TERMINATION
- ⑪ INSTALL LERS PIPE END CAP
- ⑫ CONSTRUCT LERS BENCH CROSSING AND BENCH
- ⑬ CONSTRUCT CONCRETE V-GUTCH
- ⑭ CONSTRUCT 24" CORRUGATED HDPE SMOOTH WALLED DOWN DRAIN
- ⑮ PROTECT IN PLACE
- ⑯ CONNECT TO EXISTING LERS AND SUBURBAN PIPES
- ⑰ LOWER PVC WELL AND INSTALL TRAFFIC RATED VAULT
- ⑱ CONSTRUCT WRAPPED GRAVEL ON BENCH
- ⑲ CONSTRUCT SUBURBAN RISER PIPE
- ⑳ CONSTRUCT ACCESS ROAD LINER TERMINATION
- ㉑ CONSTRUCT SPLASH WALL
- ㉒ CONSTRUCT LERS BENCH COLLECTOR AND SUBURBAN
- ㉓ CONSTRUCT TILTED BENCH SECTION

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING CONTOUR
- FINISHED CONTOUR
- DAYLIGHT LINE
- FENCE
- SUBTITLE D REFUSE LIMIT
- SUBURBAN PIPE
- LERS RISER/SOLID BASE LINER
- LINER ANCHOR TRENCH/LINER LIMIT
- EXISTING ANCHOR TRENCH/LINER LIMIT
- LERS HDPE PIPE
- EXISTING LERS HDPE PIPE/SUBURBAN
- TOP OR TOE OF SLOPE/DRAVE BREAK
- DIRECTION AND RATE OF SLOPE
- ① DETAIL NUMBER
- ⑦ SHEET SHOWN ON
- BENCH
- PCS SLOPE AREA
- HORIZONTAL/VERTICAL CONTROL (HVC)

MATCHLINE SEE SHEET 11

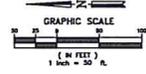
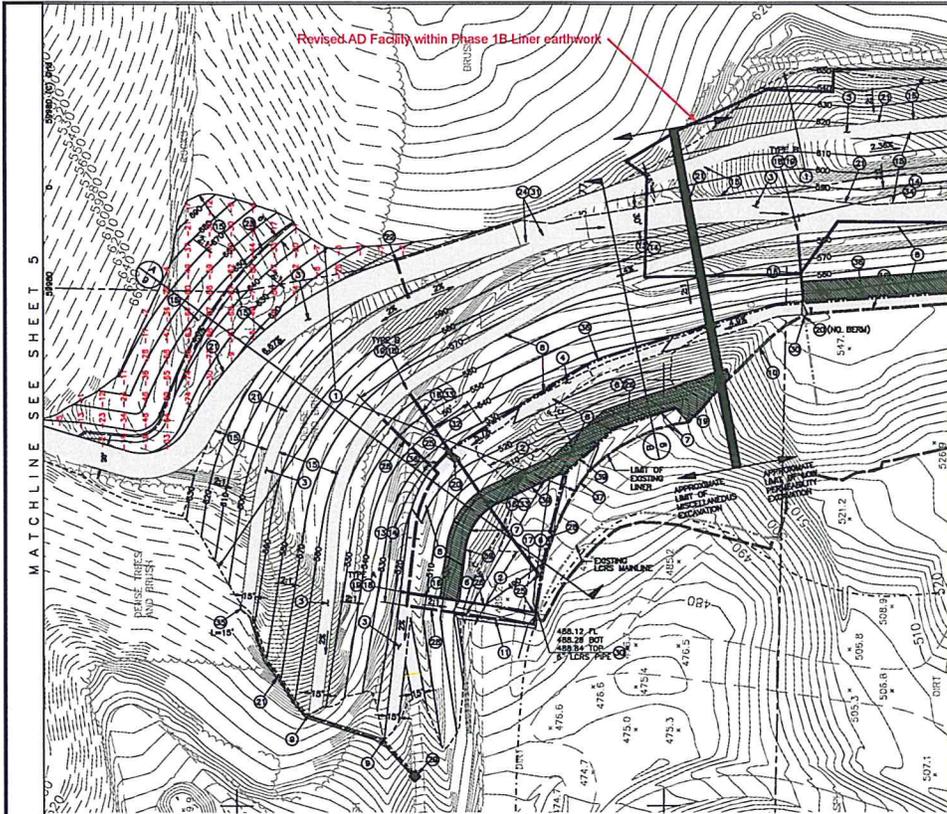
| NO. | REVISION DESCRIPTION | DATE |
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| | | |
| | | |

APPROVAL RECOMMENDED _____ DATE _____

RAS
 BRIAN A. STURAT & ASSOCIATES
 CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
 1300 E. VALLEY VIEW DRIVE
 DRAVING, CALIFORNIA 91785
 (909) 880-7777



RESOURCE RECOVERY AND WASTE MANAGEMENT
PHASE 1B GROUNDWATER PROTECTION SUBGRADE PLAN
 DESIGNED BY: CHAL. SCALE: AS SHOWN PROJ NO: 803340
 DRAWN BY: J.P.A. / S.C.A. DATE: 12-2008 FILE NO: 803340-02
 CHECKED BY: M.A.C. DATE: 12-2008
 APPROVED BY: M.A.C. DATE: 12-2008 SHEET 4 OF 11



- ### CONSTRUCTION NOTES
- 1) EXCAVATE TO FINISHED SUBGRADE ELEVATIONS
 - 2) CONSTRUCT ENGINEERED FILL TO FINISHED SUBGRADE ELEVATIONS
 - 3) CONSTRUCT INTERMEDIATE BENCH/ACCESS ROAD (1/8)
 - 4) CONSTRUCT INTERMEDIATE LINED BENCH (1/7)
 - 5) CONSTRUCT BASE LINER SUBDRAIN (1/8)
 - 6) CONSTRUCT BASE LINER (1/8)
 - 7) CONSTRUCT SLOPE LINER (1/8)
 - 8) CONSTRUCT V-DITCH INLET (1/7)
 - 9) CONSTRUCT BENCH/SLOPE LINER JOIN TO EXISTING LINER (1/8)
 - 10) CONSTRUCT BASE LINER TERMINATION (1/7)
 - 11) CONSTRUCT BENCH LINER TERMINATION (1/7)
 - 12) INSTALL CLASS 1 FLEXIBLE POST DELINEATOR IN ANCHOR TRENCH PER CALTRANS STANDARD PLAN NO. A736 @ 50' O.C.
 - 13) PLACE HYDROSEED PER PROJECT SPECIFICATIONS
 - 14) CONSTRUCT LOSER RISER (1/8)
 - 15) CONSTRUCT SOLID HOPE MAINLINE PIPE (1/8)
 - 16) CONSTRUCT LOSER RISER TERMINATION (1/8)
 - 17) INSTALL LOSER PIPE ODD CAP
 - 18) CONSTRUCT LOSER BENCH CROSSING AND BERM (1/8)
 - 19) CONSTRUCT CONCRETE V-DITCH (1/7)
 - 20) CONSTRUCT 24" CORRUGATED HOPE SMOOTH WALLED DOWN DRAIN (1/7)
 - 21) CONSTRUCT CONCRETE TRENCH DRAIN (1/7)
 - 22) PROTECT IN PLACE
 - 23) CONSTRUCT LOSER JOIN WYE (1/7)
 - 24) CONSTRUCT 8" SLOTTED HOPE LOSER MAINLINE PIPE (1/8)
 - 25) CONSTRUCT TEMPORARY SLOPE LINER TERMINATION (1/8)
 - 26) CONSTRUCT RP RAP PAD (1/7)
 - 27) CONNECT TO EXISTING LOSER AND SUBDRAIN PIPES
 - 28) LOWER PVC WELL AND INSTALL TRAFFIC RATED VAULT
 - 29) CONSTRUCT WRAPPED GRAVEL ON BENCH (1/8)
 - 30) CONSTRUCT SUBDRAIN RISER PIPE (1/8)
 - 31) CONSTRUCT ACCESS ROAD LINER TERMINATION (1/8)
 - 32) CONSTRUCT SPASH WALL (1/7)
 - 33) CONSTRUCT LOSER BENCH COLLECTOR AND SUBDRAIN (1/8)
 - 34) CONSTRUCT BASE LINER JOIN TO EXISTING LINER (1/8)
 - 35) CONSTRUCT BASE LINER TO SLOPE TRANSITION (1/8)
- *CONTRACTOR SHALL VERIFY PIPE LOCATION AND ELEVATIONS PRIOR TO CONSTRUCTION

- ### LEGEND
- 450— FINISHED CONTOUR
 - - - - DAYLIGHT LINE
 - FENCE
 - - - - SUBTILE D REFUSE LIMIT
 - SOLID HOPE LOSER RISER OR BASE MAINLINE PIPE
 - LINER ANCHOR TRENCH/LINER LIMIT
 - - - - EXISTING ANCHOR TRENCH/LINER LIMIT
 - - - - LOSER HOPE PIPE/SUBDRAIN (SUBDRAIN PER PLAN)
 - - - - EXISTING LOSER HOPE PIPE/SUBDRAIN
 - - - - TOP/TOE OF SLOPE, GRADE BREAK, OR DAYLIGHT
 - 5%— DIRECTION AND RATE OF SLOPE
 - (1/7) DETAIL NUMBER
 - (1/7) SHEET SHOWN ON
 - BENCH
 - PCS SLOPE AREA
 - +1A HORIZONTAL/VERTICAL CONTROL (HYC)

MATCHLINE SEE SHEET 5

MATCHLINE SEE SHEET 4

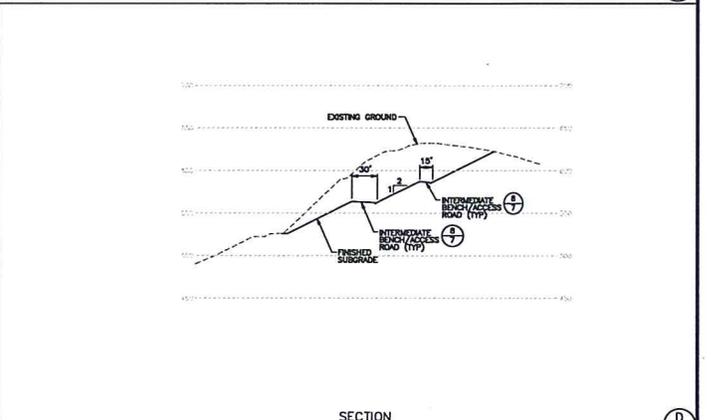
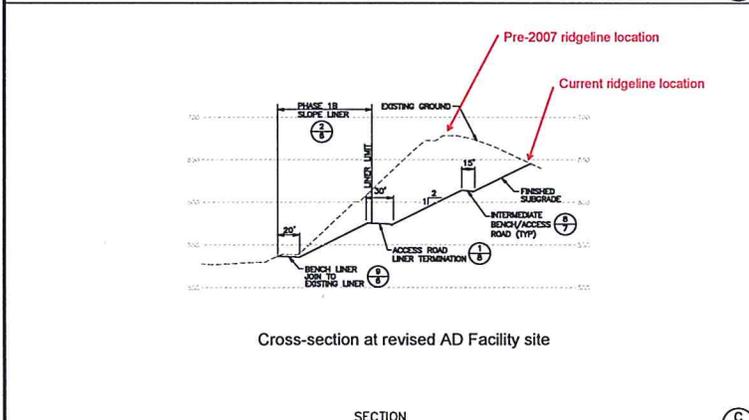
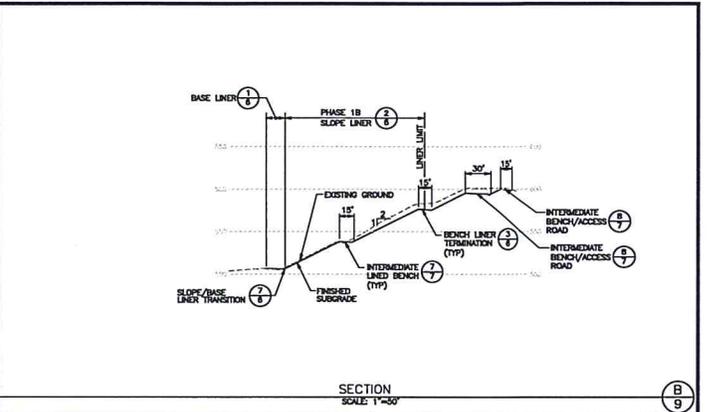
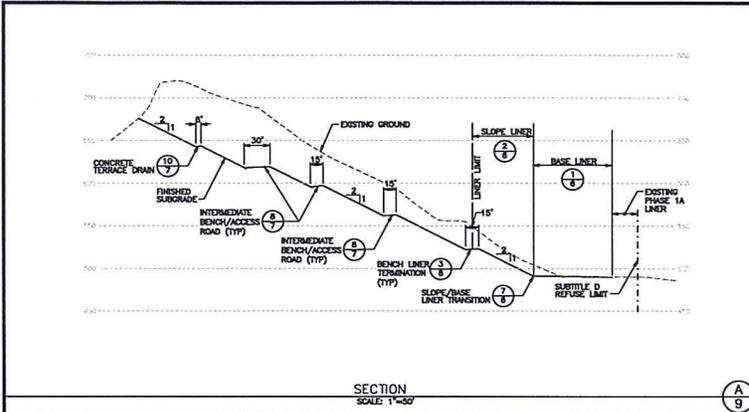
| NO. | REVISION DESCRIPTION | DATE |
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APPROVAL RECOMMENDED _____ DATE _____

BAS
 BRYAN A. STRAIT & ASSOCIATES
 CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
 1380 E. VALLEY VIEW DRIVE
 DIAMOND BAR, CALIFORNIA 91765
 (909) 860-1777



RESOURCE RESERVORY AND BASIN MANAGEMENT
 TANGULAS LANDFILL
**PHASE 1B GROUNDWATER PROTECTION
 SUBGRADE PLAN**
 DESIGNED BY: C.M.H. SCALE: 1/8" = 1'-0"
 DRAWN BY: J.P.A. / B.C.R. DATE: 12-2008 FILE NO.: 26A342620
 CHECKED BY: M.A.G. DATE: 12-2008
 APPROVED BY: M.A.G. DATE: 12-2008 SHEET 3 OF 11



| NO. | REVISION DESCRIPTION | DATE |
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APPROVAL RECOMMENDED _____ DATE _____

BAS
BRYAN A. STURM & ASSOCIATES
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1300 E. WALLEY WITH DRIVE
DANFORD HILL, CALIFORNIA 91785
(909) 880-7777



| RESOURCE RECOVERY AND WASTE MANAGEMENT TANJUNG LANDFILL | | | |
|--|-----------------|--------------------|----------------------|
| PHASE 1B GROUNDWATER PROTECTION SECTIONS | | | |
| DESIGNED BY: CAK | SCALE: AS SHOWN | PROJ. NO.: 082830 | FILE NO.: 082830.DWG |
| DRAWN BY: J.P.A. / S.C.A. | DATE: 12-2008 | CHECKED BY: M.A.C. | DATE: 12-2008 |
| APPROVED BY: M.A.C. | DATE: 12-2008 | SHEET 9 | OF 11 |