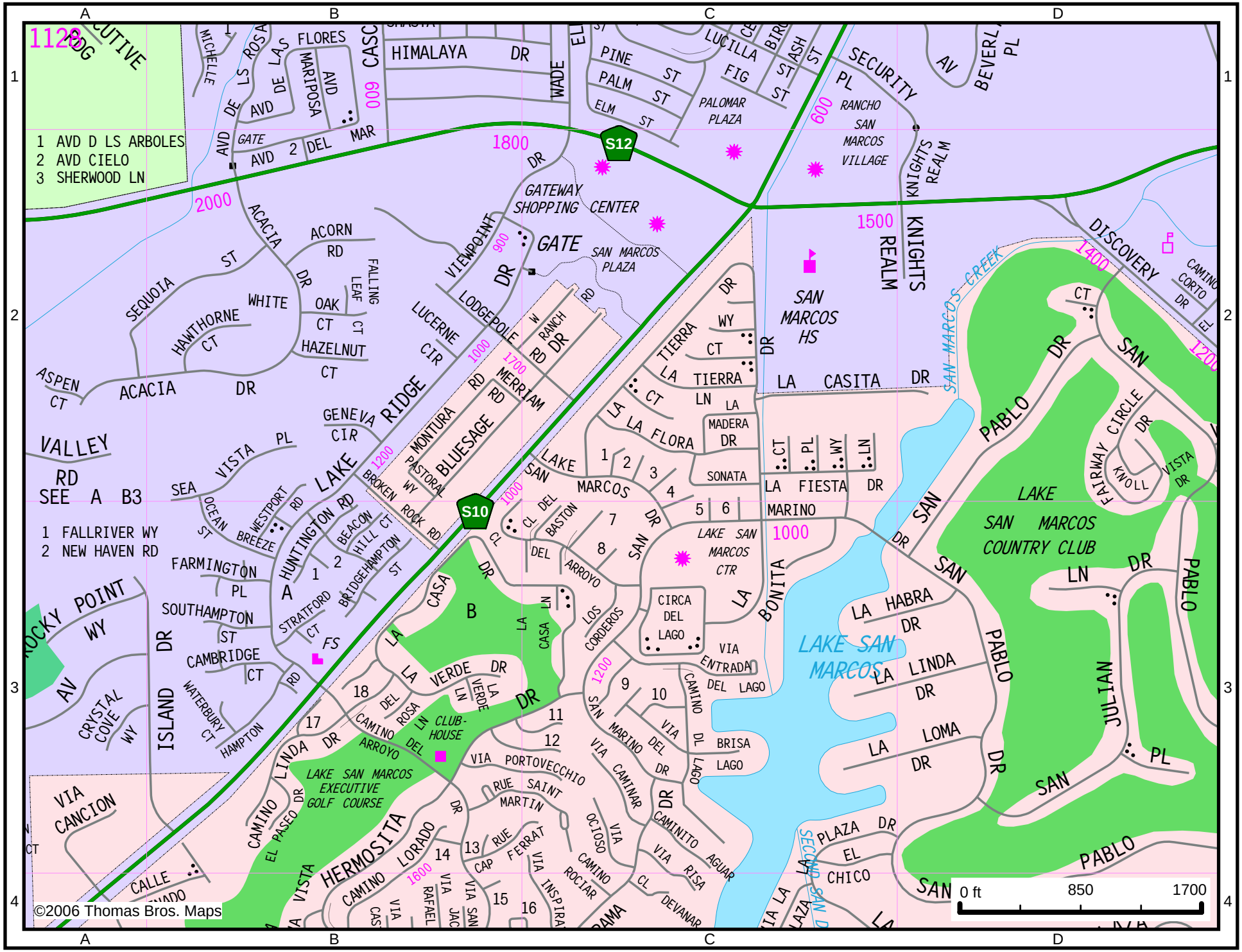
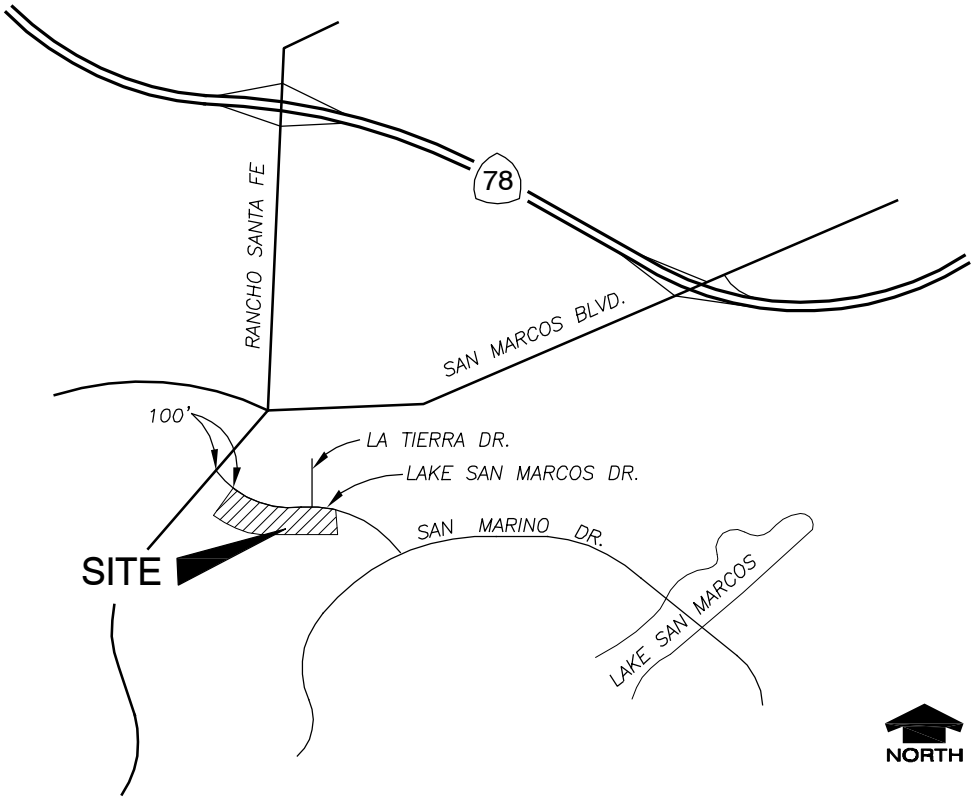


1 AVD D LS ARBOLES
2 AVD CIELO
3 SHERWOOD LN
1 FALLRIVER WY
2 NEW HAVEN RD
SEE A B3
S10
S12
GATEWAY SHOPPING CENTER
SAN MARCOS PLAZA
PALOMAR PLAZA
RANCHO SAN MARCOS VILLAGE
SAN MARCOS HS
LAKE SAN MARCOS CTR
LAKE SAN MARCOS COUNTRY CLUB
LAKE SAN MARCOS EXECUTIVE GOLF COURSE
CLUB-HOUSE
LAKE SAN MARCOS
SAN MARCOS CREEK
SECOND SAN D
0 ft
850
1700
©2006 Thomas Bros. Maps




## VICINITY MAP

NOT TO SCALE

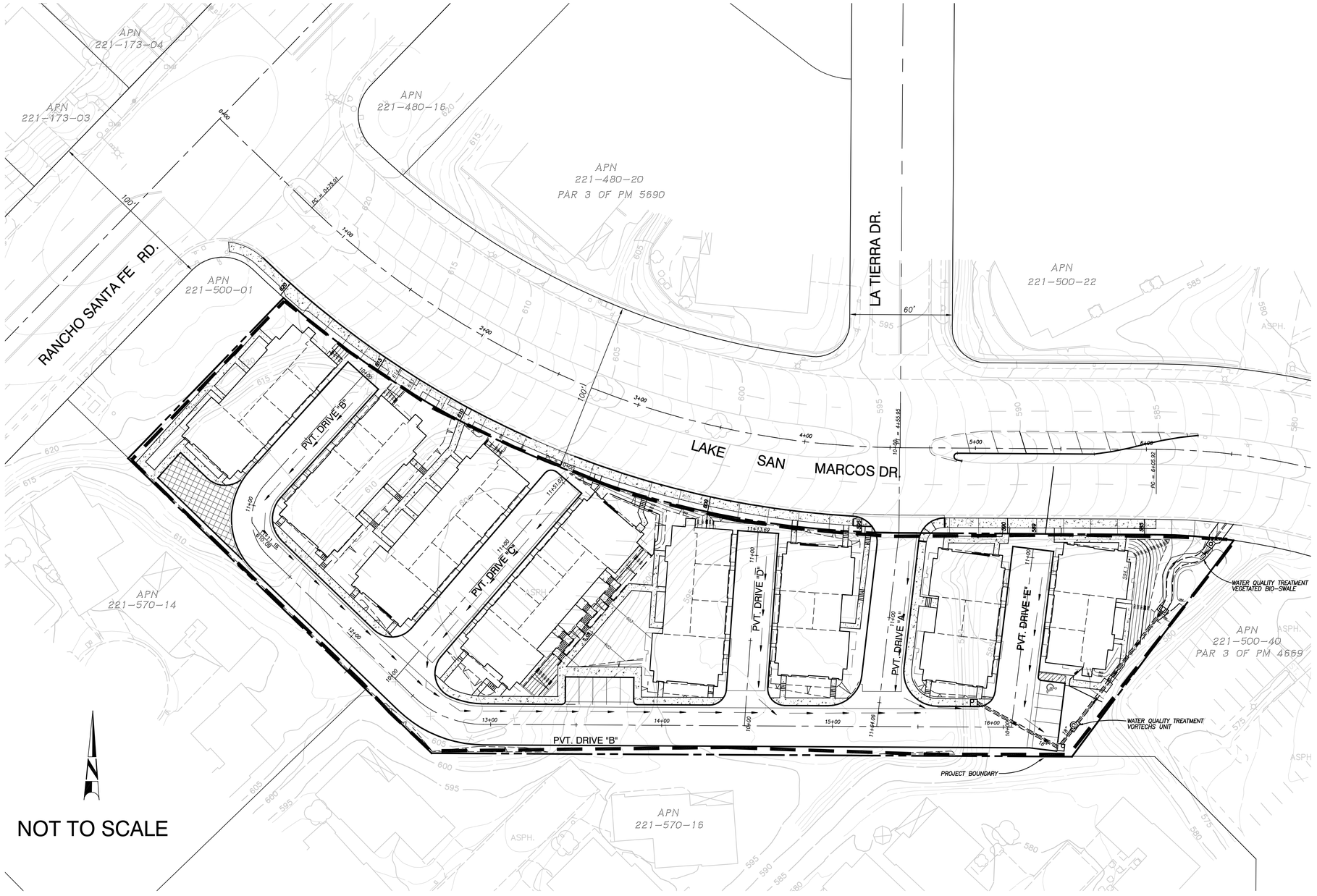
LAGO DE SAN MARCOS

# EXHIBIT A
# VICINITY MAP

Lundstrom +associates
| PLANNING | CIVIL ENGINEERING | LAND SURVEYING |
1764 San Diego Avenue, Suite 200, San Diego, CA 92110
Tel: 619.641.5900 Fax: 619.641.5910 www.lundstrom.cc

X:\PROJ\146-33\DWG\WATER RESOURCES\SWPPP\Vicinity_map02.DWG

# LAGO DE SAN MARCOS
# TREATMENT (BMP) LOCATION MAP




NOT TO SCALE

LEGEND

PROJECT BASIN LIMIT

FLOW PATH

VEGETATED SWALE TYPICAL CROSS-SECTION

NTS




TYPICAL LONGITUDINAL VEGETATED SWALE PROFILE

N.T.S.

*NOT FOR CONSTRUCTION*

## *ATTACHMENT D*

LAGO DE SAN MARCOS
BMP SITE MAP


PREPARED BY:

Lundstrom +associates

PLANNING | CIVIL ENGINEERING | LAND SURVEYING |

1764 San Diego Avenue, Suite 200
San Diego, CA 92110
Tel: 619.641.5900 Fax: 619.641.5910


J.N. (146-33)

X: \proj\146-33\dwg\Water Resources\14633bmp03.dwg

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated values derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| BIOFILTER – STRIPS and SWALES | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Height of vegetation | Average vegetation height exceeds 12 inches, emergence of trees, or woody vegetation | Visual inspection of vegetation throughout strip/swale | Once during wet season, once during dry season.(depending on growth) | Cut vegetation to an average height of 6 inches | Remove any trees, or woody vegetation. | 10 | 43.63 | 436.3 | one-ton truck & hydroseeder | 2 | 26.84 | 53.68 | string trimmer, rake, fork, bags, safety equipment | 50 | 539.98 | |
| Assess adequate vegetative cover | Less than 90 percent coverage in strip invert/swale or less than 70 percent on swale side slope | Visual inspection of strip/swale. Prepare a site schematic to record location and distribution of barren or browning spots to be restored. File the schematic for assessment of persistent problems. | Assess quantity needed in May each year late wet season and late dry season. | Reseed/revegetate barren spots by Nov. | | 8 | 43.63 | 349.04 | one-ton truck & hydroseeder | 1 | 48.15 | 48.15 | seed | 150 | 547.19 | |
| | | | | Scarify area to be restored, to a depth of 2-inches. Restore side slope coverage with hydroseed mixture. | | 0 | 43.63 | 0 | one-ton truck & hydroseeder | 0 | 26.84 | 0 | | | 0 | |
| | | | | If after 2 applications (2 seasons) of reseeding/revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas | | 0 | 43.63 | 0 | one-ton truck & hydroseeder | 0 | 26.84 | 0 | blanket | 0 | 0 | |
| Inspect for debris accumulation | Debris or litter present | Visual observation | During routine trashing, per Districts schedule. | Remove litter, and debris. | None | 0 | 0 | 0 | one-ton truck & hydroseeder | 0 | 0 | 0 | | | 0 | |
| Inspect for accumulated sediment | Sediment at or near vegetation height, channeling of flow, inhibited flow due to change in slope. | Visual observation | Annually | Remove sediment. If flow is channeled, determine cause and take corrective action. If sediment becomes deep enough to change the flow gradient, remove sediment during dry season, characterize and properly dispose of sediment, and revegetate. | | 16 | 43.63 | 698.08 | one-ton truck & hydroseeder | 1 | 48.15 | 48.15 | seed, testing and disposal of sediment | 300 | 1046.23 | once every three years |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| | | | | Notify engineer to determine if regrading is necessary. If necessary, regrade to design specification and revegetate swale/strip. If regrading is necessary, the process should start in May. Revegetate strip/swale in Nov. Target completion prior to wet season. | None | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |
| Inspect for burrows | Burrows, holes, mounds | Visual observation | Annually and after vegetation trimming. | Where burrows cause seepage, erosion and leakage, backfill firmly. | | 0 | 0 | 0 | one-ton truck & hydroseeder | 0 | 26.84 | 0 | | | 0 | |
| General Maintenance Inspection | Inlet structures, outlet structures, side slopes or other features damaged, significant erosion,emergence of trees, woody vegetation , fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season. | Corrective action prior to wet season. Consult engineer if an immediate solution is not evident. | Remove any trees, or woody vegetation. | 16 | 43.63 | 698.08 | one-ton truck & hydroseeder | 2 | 26.84 | 53.68 | | | 751.76 | |
| TOTAL BIO FILTER AND SWALES | | | | | | 52 | | 2268.76 | | | | 203.66 | | 500 | 2972.42 | |
| BIO STRIP WITH SPREADER DITCH | | | | | Includes all the above plus the following. | | | 0 | | | | 0 | | | 0 | |
| Inspect for standing water | Water accumulation in spreader ditch | Standing water in spreader ditch | Within 72 hours after a storm event 0.75 inches or greater. | De-water the spreader ditch to a depth of less than 0.25 inches. If sediment impedes the de-watering activity, then move or remove that portion of the sediment. Characterize and properly dispose. | | 3 | 43.63 | 130.89 | 0 | 0 | 0 | 0 | | | 130.89 | |
| | | | | De-water the spreader ditch to a depth of less than 0.25" by removing the bypass plug and allowing the water to drain into the infiltration trench. Use care to prevent sediment from discharging into the infiltration trench. Replace the bypass plug once the de-watering has been completed. | | 6 | 43.63 | 261.78 | 0 | 0 | 0 | 0 | | | 261.78 | |

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| | | | | At the end of the wet season, remove the bypass plug and allow the spreader ditch to drain. Use care to prevent sediment from discharging into the infiltration trench. Remove, characterize, and dispose of sediment from the spreader ditch. Replace the bypass plug before the beginning of the wet season. | | 2 | 43.63 | 87.26 | sedan | 1 | 21.28 | 21.28 | testing & disposal costs | 200 | 308.54 | |
| TOTAL BIO STRIP WITH SPREADER DITCH | | | | | | 55 | | 2399.65 | | | | 203.66 | | 500 | 3103.31 | |
| CONTINUOUS DEFLECTIVE SEPARATION (CDS) UNITS | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Inspect sump for accumulation of material. | | | | | | | | | | | | | | | | |
| | or | | | | | | | 0 | | | | 0 | | | 0 | |
| | When the sump is 50% full during two consecutive monthly inspections. | | | | | | | 0 | | | | 0 | | | 0 | |
| | or | | | | | | | | | | | | | | | |
| | Annually in May, effect cleaning within 15 days | | | Empty unit | | 72 | 43.63 | 3141.36 | one-ton truck & vactor | 3 | 198.75 | 596.25 | testing & disposal costs | 1800 | 5537.61 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| Inspect weir box for accumulation of material. | Presence of trash and debris | Visual observation | Monthly during the wet season | Remove trash and debris while onsite conducting inspection. | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | Hours accounted for during inspections |
| Inspect for standing water. ( Include with all of inspection) | Standing water in sump | Visual observation | Annually, 72 hours after target2 storm (0.75 in) | If standing water cannot be removed or remains through the wet season notify VCD. | None | | | | | | | | | | | |
| Inspect the screen for damage and to ensure that it is properly fastened. | Screen becomes clogged, damaged or loose | Visual observation | Annually before wet season. | Clean screen. | None | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Hours accounted for during inspections |
| Inspection for structural integrity | Holes in screen, large debris, damage to housing or weir box | Visual observation | Annually or after a cleanout. | Immediately consult with engineer and manufacturer's representative to develop a course of action, effect repairs prior to the wet season. | None | | | 0 | | | | 0 | | | 0 | Hours accounted for during inspections |
| TOTAL CDS UNITS | | | | | | 72 | | 3141.36 | | | | 596.25 | | 1800 | 5537.61 | |
| DRAIN INLET INSERTS – FOSSIL FILTER | | | | | | | | | | | | | | | | |

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Inspect for debris/trash | Sufficient debris/trash that could interfere with proper functioning of insert | Visual observation | During the wet season: | | | | 43.63 | 0 | | | | 0 | | | 0 | |
| □ Before and once during each target2 storm (0.25 in) event | | | | Remove and properly dispose of debris/trash. Target completion period while onsite conducting inspection. | | 18 | 43.63 | 785.34 | | | | 0 | | | 785.34 | |
| Oil and grease removal | Absorbent granules dark gray, or darker, or unit clogged with sediment. | Visual observation | □ At the end of each target2 storm (0.25 in) event | Replace Fossil FilterTM adsorbent within 10 working days. Characterize and properly dispose spent media prior to wet season. | | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |
| Inspection for structural integrity | Broken or otherwise damaged insert | Visual observation | Twice per year in October and May. | Replace insert or immediately consult vendor to develop course of action, effect repairs within 10 working days | None | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |
| Annual renewal of medium | End of wet season, April 30 | None | Annually, in May | Remove, characterize, and properly dispose of media a Replace media before Oct 1 | None | 2 | 43.63 | 87.26 | sedan | 1 | 21.28 | 21.28 | new adsorbent and testing & disposal costs | 115 | 223.54 | |
| TOTAL DRAIN INLET INSERTS-FOSSIL FILTERS | | | | | | 24 | | 1047.12 | | | | 21.28 | | 115 | 1183.4 | |
| DRAIN INLET INSERTS – STREAM GUARD | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Sediment removal | Sediment more than 6-inches | Visual inspection of sediment collected within insert | During the wet season: | Replace insert. Target completion while onsite conducting inspection. | | | | 0 | | | | 0 | | | 0 | |
| Inspect for debris/trash | Sufficient debris/trash that could interfere with proper functioning of insert | Visual observation | During the wet season | Remove and dispose of debris/trash. Target completion period while onsite conducting inspection. | | | | 0 | | | | 0 | | | 0 | |
| Oil and grease removal | When oil absorbent polymer becomes saturated with oil | Visual observation (absorbent polymer expansion indicates oil saturation) | Monthly | Within 10 working days, replace oil absorbent polymer | | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |
| Inspection for structural integrity | Signs of rips, gashes, and/or fallen media | Visual observation | Twice per year in October and May. | Replace insert or immediately consult vendor to develop a course of action, effect repairs within 10 working days | None | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Annual renewal of medium | End of wet season, April 30 | None | Annually, in May | Remove characterize, and properly dispose of media.. Replace media before Oct 1 | None | 2 | 43.63 | 87.26 | sedan | 1 | 21.28 | 21.28 | new adsorbent and testing & disposal costs | 195 | 303.54 | |
| TOTAL DRAIN INLET INSERTS-STREAM GUARDS | | | | | | 6 | | 261.78 | | | | 21.28 | | 195 | 478.06 | |
| EXTENDED DETENTION BASINS | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Basin side slope planted for erosion protection and planted invert | Average vegetation height greater than 12-inches, emergence of trees or woody vegetation, | Visual observation and random measurements through out the side slope area | Once during wet season, once during dry season. | Cut vegetation to an average height of 6-inches and remove trimmings. Remove any trees, or woody vegetation. | | 48 | 43.63 | 2094.24 | one-ton truck | 2 | 26.84 | 53.68 | string trimmer, rake, fork, bags, safety equipment | 50 | 2197.92 | |
| Slope stability | Evidence of erosion | Visual observation | October each year | Reseed/revegetate barren spots prior to wet season. | | 0 | 43.63 | 0 | one-ton truck & hydroseeder | 0 | 48.15 | 0 | seed | 150 | 150 | |
| | | | | Contact environmental or landscape architect for appropriate seed mix. | | | | | | | | | | | | |
| | | | | Scarify surface if needed. | | | | | | | | | | | | |
| | | | | If after two applications (2 seasons) of reseeding/revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas. No erosion blanket will be installed in the basin invert. | NOT AN ANNUAL COST | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | blanket | 0 | 0 | |
| Inspect for standing water. | Standing water for more than 72 hours | Visual observation | Annually, 72 hours after a target2 storm (0.75 in) event | □ Drain facility | None | | | | | | | | | | | |
| | | | | □ Check and unclog clogged orifice. | Should be Annual Mtce. | | | | | | | | | | | |
| | | | | Notify engineer, if immediate solution is not evident. | | | | | | | | | | | | |
| Inspection for trash and debris | Debris/trash present | Visual observation | During routine trashing, per Districts schedule. | Remove and dispose of trash and debris | None | | | | | | | | | | | |
| Inspection for sediment management and characterization of sediment for removal | □ Sediment depth exceeds marker on staff gage | □ Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth | Annually | Remove and properly dispose of sediment. Regrade if necessary. | | 16 | 43.63 | 698.08 | 4-yd dump truck, backhoe & trailer, one-ton truck & hydroseederse dan | 0.4 | 176.5 | 70.6 | testing and disposal | 460 | 1228.68 | once every 5 years |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspect for burrows | Burrows, holes, mounds | Visual observation | Annually and after vegetation trimming. | □ Where burrows cause seepage, erosion and leakage, backfill firmly. | | | | | | | | | | | | |
| General Maintenance Inspection | Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season Monthly | Corrective action prior to wet season. Consult engineers if immediate solution is not evident. | None | 16 | 43.63 | 698.08 | one-ton truck | 2 | 26.84 | 53.68 | | | 751.76 | |
| TOTAL EXTENDED BASIN | | | | | | 80 | | 3490.4 | | | | 177.96 | | 660 | 4328.36 | |
| INFILTRATION BASINS | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Vegetation of basin invert and side slopes | Vegetation height exceeds 12 inches, emergence of trees or woody vegetation, | Visual observation and random measurements through out the side slope and invert area | Once during wet season, once during dry season. | Cut vegetation to an average height of 6-inches. Remove any trees, or woody vegetation. | None | 48 | 43.63 | 2094.24 | two-ton truck | 2 | 50 | 100 | string trimmer, rake, fork, bags, safety equipment | 50 | 2244.24 | |
| Inspect for standing water. | Standing water for more than 72 hours | Visual observation | Annually, 72 hours after a target2 storm (0.75 in) event. | □ Drain facility, if possible. | | 16 | 43.63 | 698.08 | one-ton truck | 4 | 26.84 | 107.36 | | | 805.44 | |
| | | | | □ Notify engineer to consider: | | | | | | | | | | | | |
| | | | | □ Remove sediment, scarify invert, and regrade if necessary. | | | | 0 | | | | 0 | | | 0 | covered under sediment removal |
| | | | | □ If unable to achieve acceptable infiltration rate or implement alternative solution then move to decommission | | | | 0 | | | | 0 | | | 0 | |
| | | | | □ If standing water can not be removed then notify VCD. | None | | | | | | | | | | | |
| Inspection for trash and debris at inlet structures | Debris/trash present | Visual observation | During routine trashing, per Districts schedule. | Remove and dispose of trash and debris | None | | | | | | | | | | | |
| Inspection for sediment accumulation | Sediment depth exceeds marker on staff gage. | Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth | Annually | Remove, characterize and properly dispose of sediment. Regrade and revegetate bare areas. | None | 4 | 43.63 | 174.52 | 4-yd dump truck, loader & trailer, grader, sedan, one-ton truck & hydroseeder | 0.5 | 256.94 | 128.47 | seed, testing & disposal | 150 | 452.99 | once every 10 years |
| Slope stability | Evidence of erosion. | Visual observation | October each year. | Reseed/revegetate barren spots by Nov. Scarify surface if needed. | | 20 | 43.63 | 872.6 | one-ton truck & hydroseeder | 1 | 48.15 | 48.15 | seed | 275 | 1195.75 | |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| | | | | If after two applications (2 seasons) of reseeding/revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas. No erosion blanket will be installed in the basin invert | | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | blanket | 60 | 60 | |
| | | | | Contacet environmental or landscape architect for appropriate seed mix. | None | 0 | 43.63 | 0 | | | | 0 | | | 0 | |
| Inspect for burrows | Burrows, holes, mounds. | Visual observation | Annually and after vegetation trimming. | □ Where burrows cause seepage, erosion and leakage, backfill firmly. | None | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | | | 0 | |
| General Maintenance Inspection | Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season | Take corrective action prior to wet season. Consult engineer if immediate solution is not evident. | None | 20 | 43.63 | 872.6 | two-ton truck | 1 | 50 | 50 | | | 922.6 | |
| TOTAL INFILTRATION BASIN | | | | | | 108 | | 4712.04 | | | | 433.98 | | 535 | 5681.02 | |
| INFILTRATION TRENCHES | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Inspect for standing water | Standing surface water for more than 72 hours | Visual observation | Annually, 72 hours after a target2 storm (0.75 in) event | □ Drain facility | | 16 | 43.63 | 698.08 | one-ton truck | 2 | 26.84 | 53.68 | | | 751.76 | |
| | | | | □ Notify engineer to consider. | | 0 | 43.63 | 0 | | | | 0 | | | 0 | |
| | | | | □ Undertake investigation for course of action to achieve acceptable infiltration rate. If unable to achieve acceptable infiltration then BMP operations cease. | | | | 0 | | | | 0 | | | 0 | |
| | | | | □ If standing water can not be removed, notify VCD. | None | | | 0 | | | | 0 | | | 0 | Does not include Vector Control Agency costs |
| Inspection for trash and debris at inlet and outlet structures | Trash/debris present | Visual observation | During routine trashing per Districts schedule. | Remove and dispose of trash and debris. | None | 0 | 43.63 | 0 | | | | 0 | | 0 | 0 | |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated values derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspect for sediment accumulation | Visible sediment | Visual inspection of the stone aggregate, no sediment should be visible at the top of the trench due to sediment buildup from filter fabric. | Annually. | Remove top layer of trench, silt, filter fabric and stone, wash stone and reinstall fabric and stone into trench prior to wet season. | None | 8 | 43.63 | 349.04 | gradeall shovel, 10-yd dump trucks | 0.066 | 6000 | 396 | replacement stone and filter fabric | 1200 | 1945.04 | once every 15 years |
| General Maintenance Inspection | Inlet structures, outlet structures, filter fabric or other features damaged, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry seasonMonthly | Take corrective action, prior to wet season. Consult engineer if immediate solution is not evident. | None Remove any trees, or woody vegetation. | 8 | 43.63 | 349.04 | one-ton truck | 2 | 26.84 | 53.68 | | | 402.72 | |
| TOTAL INFILTRATION TRENCHES | | | | | | 32 | | 1396.16 | | | | 503.36 | | 1200 | 3099.52 | |
| MEDIA FILTERS – PERLITE/ZEOLITE | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| | | | | | | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | | | 0 | |
| Inspect for sediment accumulation in pre-treatment sedimentation chamber | Sediment occupies 10% of the filter chamber volume. | Measure with appropriate device | Annually in May. | | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | Remove sediment prior to wet season. Characterize sediment and properly dispose | None | 8 | 43.63 | 349.04 | sedan | 1 | 21.28 | 21.28 | testing & disposal costs | 600 | 970.32 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| Inspect for minor maintenance | Per manufacture's guidelines | None | Annually | Clean per manufacturer's guidelines. Prior to wet season. | None. | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| Manufacturer's recommended major maintenance | Per manufacture's guidelines | Per manufacture's guidelines | Annually | Consult with manufacturer regarding need for replacement of canisters. If manufacturer confirms need, replace canisters. Prior to wet season. When canisters are changed send canisters to manufacturer to determine remaining life of the media | None | 8 | 43.63 | 349.04 | one-ton truck | 1 | 26.84 | 26.84 | major maintenance | 5000 | 5375.88 | By Contract and oversite |
| Inspection for trash and debris at inlet and outlet structures and within vaults | Trash/debris present | Visual observation | During routine trashing, per Districts schedule. | Remove and dispose of trash and debris when on site conducting inspections. | None | 0 | 43.63 | 0 | | | | 0 | | | 0 | |
| Inspect for standing water | Water accumulation in any structure or other location within the filter | Standing water in any structure or other location within the filter | Annually, at end of wet season. | Gravity drain where possible. | | 0 | 43.63 | 0 | one-ton truck | 1 | 0 | 0 | | | 0 | |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| | | | | □ If standing water can not be removed or remains through wet season notify VCD. | None | | | 0 | | | | 0 | | | 0 | Does not include Vector Control Agency costs |
| General Maintenance Inspection | Inlet structures, outlet structures, vault, piping, or other features damaged and for graffiti or vandalism | Visual observation | Semi-Annually, late wet season and late dry season Monthly | Take corrective action prior to wet season. Consult engineer if immediate solution is not evident. | None | 8 | 43.63 | 349.04 | one-ton truck | 2 | 26.84 | 53.68 | | | 402.72 | |
| **TOTALMEDIA FILTERS – PERLITE/ZEOLITE** | | | | | | 32 | | 1396.16 | | | | 155.48 | | 5600 | 7151.64 | |
| **MEDIA FILTERS – SAND W/PUMP** | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Drain time of 48 hours | Drain time exceeds 72 hours | Determine drain time by visual observation | Annually, after one target2 storm (0.75 in) event during wet season | □ Remove sediment, trash and debris. | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | □ Check orifice | | | | 0 | | | | 0 | | | 0 | |
| | | | | □ Notify engineer to consider removing top 2 inches of media and dispose of sediment. Restore media depth to 18 inches when overall media depth drops to 12 inches. Complete prior to wet season. | Escondido MS Delaware SF – Remove and restore media depth to 12 inches. | 12 | 43.63 | 523.56 | boom truck | 0.5 | 74.94 | 37.47 | drums, shovel, rake, drum grappler, confined space equipment characterization and disposal | 1250 | 1811.03 | every 2 years |
| Inspect for sediment accumulation in sedimentation chamber | Sediment depth exceeds marker on staff gage. | Measure with appropriate device | Measure sediment depth annually. | Remove sediment prior to wet season. Characterize sediment and properly dispose. | | 12 | 43.63 | 523.56 | boom truck | 0.5 | 74.94 | 37.47 | drums, shovel, rake, drum grappler, confined space equipment characterization and disposal | 1250 | 1811.03 | every 2 years |
| Inspection for trash / debris | Trash and debris present | Visual observation | During routine trashing, per Districts schedule. | Remove and dispose of trash and debris during routine trashing. | None | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | confined space equipment | 0 | 0 | |
| Inspect pumps for proper functioning | Pump does not operate | Energize pump to see if water is discharged | After every storm. | Make assessment to determine if problem is electrical or mechanical. Take appropriate action. Replace pump if needed. | District 7 filters only | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | confined space equipment | 0 | 0 | |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated values derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspect pumps for serviceability and periodic maintenance | Per manufacture's guidelines | Per manufacture's guidelines | Per manufacture's guidelines | Per manufacture's guidelines | District 7 filters only | 0 | 55.7 | 0 | one-ton truck | 0 | 26.84 | 0 | pump or parts, confined space equipment | 0 | 0 | |
| Inspect for burrows | Burrows, holes, mounds. | Visual observation | Annual inspections after vegetation trimming. | □ Where burrows cause seepage, erosion and leakage, backfill firmly. | None | | | 0 | | | | 0 | | | 0 | |
| Inspect for standing water | Water accumulation in any structure or other location within the filter | Standing water in any structure or other location within the filter | Annually, 72 hours after a target2 storm (0.75 in) | □ Gravity drain where possible. | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | □ Notify engineer, if immediate solution is not evident. | | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |
| | | | | □ If standing water can not be removed or remains through wet season notify VCD. | None | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | Does not include Vector Control Agency costs |
| General Maintenance Inspection | Inlet structures, outlet structures, filter fabric or other features damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season Monthly | Within 30 working days, take corrective action. Consult engineer if immediate solution is not evident. | None | 8 | 43.63 | 349.04 | one-ton truck | 2 | 26.84 | 53.68 | | | 402.72 | |
| TOTAL MRDIA FILTER-SAND W/PUMP | | | | | | 44 | | 1919.72 | | | | 182.3 | | 2500 | 4602.02 | |
| MEDIA FILTERS – SAND WO/PUMP | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Drain time of 48 hours | Drain time exceeds 72 hours | Determine drain time by visual observation | Annually, after one target2 storm (0.75 in) event during wet season | □ Remove sediment, trash and debris. | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | □ Check orifice | | | | 0 | | | | 0 | | | 0 | |
| | | | | □ Notify engineer to consider removing top 2 inches of media and dispose of sediment. Restore media depth to 18 inches when overall media depth drops to 12 inches. Complete prior to wet season. | Escondido MS Delaware SF – Remove and restore media depth to 12 inches. | 8 | 43.63 | 349.04 | boom truck | 0.33 | 74.94 | 24.7302 | drums, shovel, rake, drum grappler, confined space equipment characterization and disposal | 833 | 1206.77 | every 3 years |

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspect for sediment accumulation in sedimentation chamber | Sediment depth exceeds marker on staff gage. | Measure with appropriate device | Measure sediment depth annually. | Remove sediment prior to wet season. Characterize sediment and properly dispose. | | 8 | 43.63 | 349.04 | boom truck | 0.33 | 74.94 | 24.7302 | drums, shovel, rake, drum grappler, confined space equipment characterization and disposal | 833 | 1206.77 | every 3 years |
| Inspection for trash / debris | Trash and debris present | Visual observation | During routine trashing, per Districts schedule. | Remove and dispose of trash and debris during routine trashing. | None | 24 | 43.63 | 1047.12 | one-ton truck | 2 | 26.84 | 53.68 | confined space equipment | 50 | 1150.8 | |
| Inspect for burrows | Burrows, holes, mounds. | Visual observation | Annual inspections after vegetation trimming. | □ Where burrows cause seepage, erosion and leakage, backfill firmly. | None | | | 0 | | | | 0 | | | 0 | |
| Inspect for standing water | Water accumulation in any structure or other location within the filter | Standing water in any structure or other location within the filter | Annually, 72 hours after a target2 storm (0.75 in) | □ Gravity drain where possible. | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | □ Notify engineer, if immediate solution is not evident. | | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | |
| | | | | □ If standing water can not be removed or remains through wet season notify VCD. | None | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | Does not include Vector Control Agency costs |
| General Maintenance Inspection | Inlet structures, outlet structures, filter fabric or other features damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season Monthly | Within 30 working days, take corrective action. Consult engineer if immediate solution is not evident. | None | 8 | 43.63 | 349.04 | one-ton truck | 2 | 26.84 | 53.68 | | | 402.72 | |
| TOTAL MRDIA FILTER-SAND W/O/PUMP | | | | | | 60 | | 2617.8 | | | | 210.5 | | 1716 | 4544.3 | |
| MULTI-CHAMBER TREATMENT TRAINS | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| Maximum filter drain time of 72 hrs for design and smaller storms | Drain time greater than 72 hours or sediment accumulation is greater than 0.1 inch over more than 50 percent of the fabric surface area. | Visual observation | After one target2 storm (0.75 in) event during wet season. | □ Remove and replace filter fabric blanket. | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | □ If problem persists, consult with engineer, the media may need to be replaced. Complete prior to wet season. | None | 2 | 43.63 | 87.26 | | 0 | 0 | 0 | | 0 | 87.26 | |

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspection for trash/ debris at inlet and outlet structures and the MCTT | Trash and debris present | Visual observation | During routine trashing per District schedule | Remove and dispose of trash and debris During routine trashings. | None | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | confined space equipment | 50 | 50 | |
| Inspection for sediment accumulation | Sediment accumulates 50% of the volume underneath the tube settlers. Maximum of 2-feet grit chamber | Measure with appropriate device | Remove tube settler, measure sediment depth annually | Remove sediment prior to wet season. Characterize sediment and properly dispose. | None | 36 | 43.63 | 1570.68 | one-ton truck | 1 | 26.84 | 26.84 | drums, shovel, rake, drum grappler, confined space equipment, characterization and disposal | 600 | 2197.52 | |
| | | | | | | | | | | | | | | | | |
| | | | | □ If standing water can not be removed or remains through the wet season notify VCD. | None | 2 | 43.63 | 87.26 | | | | 0 | | | 87.26 | Does not include Vector Control Agency costs |
| Replace filter media every 3 years per designer's specification | Operation greater than 3 years | Not applicable | Every 3 years | Remove and replace filter media. Characterize and properly dispose. | None | 8 | 43.63 | 349.04 | vactor and one-ton truck | 0.33 | 198.75 | 65.5875 | confined space equipment, characterization and disposal | 1200 | 1614.628 | every three yea |
| Inspect sorbent pillows in main settling chamber | Darkened by oily material | Visual Observation | Annually, in May. | Annually, renew sorbent pillows, or immediately if pillows are darkened by oily material, characterize and properly dispose. | None | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | sorbent pillow | 100 | 301.36 | |
| Inspect pumps for proper functioning | Pump does not operate | Energize pump to see if water is discharged | After every storm. | Make assessment to determine if problem is electrical or mechanical. Take appropriate action. Replace pump if needed. | None | 0 | 43.63 | 0 | one-ton truck | 0 | 26.84 | 0 | confined space equipment | 0 | 0 | |
| Inspect pumps for serviceability and periodic maintenance | Per manufacture's guidelines | Per manufacture's guidelines | Per manufacture's guidelines | Per manufacture's guidelines | None | 0 | 55.7 | 0 | one-ton truck | 0 | 26.84 | 0 | confined space equipment, pump or parts | 0 | 0 | |
| General Maintenance Inspection | Inlet structures, outlet structures, filter fabric, settling tubes or other features damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season | Within 30 working days, take corrective action. Consult engineer if immediate solution is not evident. | None | 8 | 43.63 | 349.04 | one-ton truck | 2 | 26.84 | 53.68 | | | 402.72 | |
| TOTAL MULTI-CHAMBER TREATMENT TRAINS | | | | | | 64 | | 2792.32 | | | | 199.788 | | 1950 | 4942.108 | |
| OIL-WATER SEPARATOR | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspect for sediment accumulation in the pre-separator and separator chamber | Greater than 12-inches | Measure with appropriate device | Annually | Prior to wet season, remove the accumulated material. Characterize and properly dispose. | None | 4 | 43.63 | 174.52 | | | | 0 | testing and disposal | 120 | 294.52 | every 5 years |
| Inspect for oil accumulation in oil chamber | Oil depth is not more than 50 percent of chamber volume | Gauge the level of oil/water with a wooden gauge stick | Annually | Prior to wet season remove and properly dispose of oil and grease. | None | 1 | 43.63 | 43.63 | | | | 0 | testing and disposal | 60 | 103.63 | every 5 years |
| Inspect coalescer for debris and gummy deposits | Debris or gummy deposits present | Visual observation | Annually | Wash the coalescer in an appropriate area with high-pressure hot water when needed. | None | 1 | 43.63 | 43.63 | | | | 0 | | | 43.63 | |
| Inspect water level in tank | Less than full | Visual observation | Annually | Fill with water prior to wet season. | None | 1 | 43.63 | 43.63 | | | | 0 | | | 43.63 | |
| Inspect for general mechanical integrity | Per manufacture's guidelines | Per manufacture's guidelines | Annually | Operate each mechanical component to ensure proper operation. Repair as needed | None | 4 | 43.63 | 174.52 | | | | 0 | | | 174.52 | |
| TOTAL OIL-WATER SEPARATOR | | | | | | 11 | | 479.93 | | | | 0 | | 180 | 659.93 | |
| WET BASIN | | | | | | | | | | | | | | | | |
| Preventive Maintenance and Routine Inspections | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DESIGN CRITERIA, | | | | | | | | | | | | | | | | |
| ROUTINE ACTIONS | MAINTENANCE INDICATOR | FIELD MEASUREMENT | MEASUREMENT FREQUENCY | MAINTENANCE ACTIVITY | SITE-SPECIFIC REQUIREMENTS | | | | | | | | | | | |
| 24-hour draw down measured between the rim of the outlet structure and invert of the WQ orifice in the outlet structure. | Drawdown greater than 25 hours or water is flowing over weir. | Evaluate drain time from inlet and outlet flow data loggers or observe 25 hours after target2 storm (0.75 in) Observation of water flowing over spillway | Once during wet season and after completion or modification of the facility. | If >25-hours: | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | □ Open gate to discharge water to permanent pool elevation, | | 2 | 43.63 | 87.26 | one-ton truck | 1 | 26.84 | 26.84 | | | 114.1 | |
| | | | | □ Clear outlet of debris. | | 2 | 43.63 | 87.26 | one-ton truck | 1 | 26.84 | 26.84 | | | 114.1 | |
| | | | | □ Consult engineer if needed. | | 2 | 43.63 | 87.26 | one-ton truck | 1 | 26.84 | 26.84 | | | 114.1 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| | | | | If water is spilling over weir, open canal gate until water level is at permanent pool elevation. Check/clear outlet of debris. | None | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| Inspect for burrows | Burrows, holes, mounds | Visual observation | Annually and after vegetation trimming. | Where burrows cause seepage, erosion and leakage, backfill firmly. | None | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| General Maintenance Inspection | Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, graffiti or vandalism, fence damage, etc. | Visual observation | Semi-Annually, late wet season and late dry season | Take corrective action, or restore to as-constructed condition prior to wet season. Consult engineers if immediate solution is not evident. | None | 8 | 43.63 | 349.04 | one-ton truck | 2 | 26.84 | 53.68 | | | 402.72 | |

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| Inspect Zone 1 4 for vegetation coverage and density to sustain vector abatement efficacy | | | | | | | | 0 | | | | 0 | | | 0 | |
| (See attachments for zone locations.) | Observable vegetation coverage/density | Visual, visible vegetation growth or emergent vegetation growth | Quarterly | 1. Have a biologist survey the Wet Basin to determine if any birds are nesting or other sensitive animals are present. If birds are nesting, with advice from the biologist, proceed with the maintenance. | | 8 | 70 | 560 | sedan | 1 | 21.28 | 21.28 | | | 581.28 | |
| | | | | 2. Lower and maintain the water level to expose the area to be maintained, do not completely drain basin | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |
| | | | | 3. Mechanically remove allCut plantsvegetation | | 56 | 43.63 | 2443.28 | one-ton truck | 3 | 26.84 | 80.52 | string trimmer, hand tools, bags, safety equipment | 100 | 2623.8 | |
| | | | | 4. Dispose of the vegetation material in a landfill or other appropriate disposal area. | | 24 | 43.63 | 1047.12 | packer | 3 | 53.44 | 160.32 | hand tools, safety equipment | 50 | 1257.44 | |
| | | | | 4.5. Restock mosquito fish as recommended by vector control agency. | None | 8 | 70 | 560 | sedan | 1 | 21.28 | 21.28 | | | 581.28 | |
| Inspect Zone 2 4 for vegetation coverage and density to sustain vector abatement efficacy | Vegetation density is such that mosquito fish cannot swim freely in the planted area. | Mosquito fish cannot be seen in the planted area, vegetation density approximately 80 to 100 percent | Quarterly | Annually, or at a special request of the local vector control agency | | | | 0 | | | | 0 | | | 0 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| | | | | 1. Have a biologist survey the Wet Basin to determine if any birds are nesting or other sensitive animals are present. If birds are nesting, with advice from the biologist, proceed with the maintenance. | | 8 | 70 | 560 | sedan | 1 | 21.28 | 21.28 | | | 581.28 | |
| | | | | 2. Lower and maintain the water level to expose the area to be maintained, do not completely drain basin | | 4 | 43.63 | 174.52 | one-ton truck | 1 | 26.84 | 26.84 | | | 201.36 | |

# APPENDIX H Estimated O & M Costs for BMP Project

Estimated vlaues derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| | | | | 3. Mechanically removeCut Typha sp. (cattail), Scirpus sp. (bulrush) to produce random vegetation clusters (2-5 plants) with clusters at approximately 0.5 meters on center4. An effort should be made to maintain a ratio of Scirpus to Typha of 2:1. If the vegetation is cut, cut the vegetation to below the permanent pool water surface. | | 56 | 43.63 | 2443.28 | one-ton | 3 | 26.84 | 80.52 | string trimmer, hand tools, bags, safety equipment | 100 | 2623.8 | |
| | | | | 4. Dispose of the vegetation material in a landfill or other appropriate disposal area. | | 24 | | 0 | packer | 3 | 53.44 | 160.32 | hand tools, safety equipment | 50 | 210.32 | |
| | | | | 5. Monitor vegetation density quarterly to determine grow back rate. | None | 4 | 43.63 | 174.52 | one-ton | 1 | 26.84 | 26.84 | | | 201.36 | |
| Maintain Vegetated Access Road to reduce fire hazard from contact with vehicle catalytic converters. | | | | | | | | 0 | | | | 0 | | | 0 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| Inspect for sediment accumulation in forebay and main pond | More than 2 inches in the forebay and 4 inches in the main pond, or | Sediment depth exceeds marker on staff gage. | | | | | | 0 | | | | 0 | | | 0 | life cycle |
| | | Measure in forebay by estimating depth using stationing along concrete maintenance ramp. In main pond by measuring down from water quality orifice and comparing to as-constructed grade. | When pond is drained for Zone 1 vegetation removal, or every 3 years. | Remove and properly dispose of sediment. By November, restore vegetation to the plan shown on the as-built drawings. | La Costa site only | | | 0 | | | | 0 | | | 0 | life cycle |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| | | | | | | | | 0 | | | | 0 | | | 0 | |
| TOTAL WET BASIN | | | | | | 222 | | 9271.62 | | | | 840.76 | | 300 | 10412.38 | |

NOTES:

1. The design storm event is a storm that has a one year, 24 hour recurrence frequency.
2. A target storm event is a storm greater than 0.7525 inches of rainfall. For drain inlet inserts, a target storm event is a storm with a prediction of greater than 0.25 inches of rainfall.
3. Woody wetland vegetation consists of: willows (Salix spp), mule fat (baccharis salicifolia), cottonwood (populus fremontii), and western sycamore (plantanus racemosa). Note, this criterion is not applicable to the wet basin.
4. Zone 1, open water area of the basin, average depth is about 3 feet. Zone 2, shallow water bench, depth of water 0 – 12 inches. Zone 3, periodic inundation is the temporary water storage volume impounded between the permanent pool and the overflow weir, i.e. the water quality storage. (See attachments for zone locations.) Zone A is the remaining upland slope between Zone 3 and the maintenance road.

This Maintenance Indicator Document has been developed using site-specific information gathered by specialists trained in the identification of threatened and endangered species and their habitat. Information contained in this document includes guidance for inspection for possible

# APPENDIX H Estimated O & M Costs for BMP Project

| Estimated values derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available. | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Labor | | | Equipment | | | | Materials | | Total | Comments |
| | | | | | | Per. Hrs | Rate | Cost | Type | Days | rate | Cost | Item | Cost | Cost | |
| threatened and endangered species harborage. Further, some of the maintenance recommendations are based on the requirements of specific plant species used in this Pilot Program. The recommendations provided in this document must be reassessed with respect to species and plant materials if the guidance contained herein is to be used for a separate project in another area. | | | | | | | | | | | | | | | | | |