# - FINAL DRAFT -
# TOWN-WIDE STORM DRAINAGE AND FLOOD CONTROL STUDY
# PHASE 1

# APPENDICES

FOR

## TOWN OF CORTE MADERA

March 2007

ANWEST INC.
Civil and Structural Consulting Engineers

# APPENDIX A

# PRELIMINARY CONSTRUCTION COST ESTIMATES

# Recommended SD Improvements Summary

**Storm Drainage and Flood Control Study - Phase I**
**Engineer's Cost Estimate (2008 Prices)**



| ITEM NO. | ITEM DESCRIPTION | COST |
|---|---|---|
| 1 | Trib A | $ 72,000 |
| 2 | Trib B | $ 1,380,000 |
| 3 | Trib C | $ 53,000 |
| 4 | Trib D | $ 440,000 |
| 5 | Trib E | $ 101,000 |
| 6 | Trib F | $ 772,000 |
| 7 | Trib G | $ 280,000 |
| 8 | Trib H | $ 562,000 |
| 9 | Trib J | $ 148,000 |
| 10 | Trib K | $ 923,000 |
| 11 | Trib L | $ 501,000 |
| 12 | Trib M | $ 1,224,000 |
| 13 | Trib N | $ 508,000 |
| 14 | Trib P | $ 885,000 |
| 15 | Trib Q | $ 977,000 |
| 16 | Trib Paradise Drive | $ 330,000 |
| 17 | Trib South of Paradise Drive (Including Tribs R, S, T and Miscellaneous) | $ 565,000 |
| **RECOMMENDED STORM DRAINAGE IMPROVEMENTS GRAND TOTAL** | | **$ 9,721,000** |
| **RECOMMENDED STORM DRAINAGE IMPROVEMENTS ROUNDED TOTAL** | | **$ 9,800,000** |

# Recommended SD Improvements
## Trib A
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 2,754 | $ 2,754 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 2,754** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Curb, Gutter & Sidewalk | 340 | LF | $ 10 | $ 3,400 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 3,400** |
| | **TRIB A STORM DRAINAGE** | | | | |
| 3 | Concrete Curb & Gutter with Grated Line Drain | 340 | LF | $ 120 | $ 40,800 |
| 4 | Reconstruct Existing Sidewalk | 1,700 | SF | $ 5 | $ 8,500 |
| 5 | Reconstruct Existing AC Pavement | 340 | LF | $ 7 | $ 2,380 |
| | **TRIB A STORM DRAINAGE SUBTOTAL** | | | | **$ 51,680** |
| | **TOTAL** | | | | **$ 57,834** |
| | **Contingency** | | | **25%** | **$ 14,459** |
| | **GRAND TOTAL** | | | | **$ 72,293** |
| | **ROUNDED TOTAL** | | | | **$ 72,000** |

# Recommended SD Improvements
## Trib B
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 52,558 | $ 52,558 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 52,558** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 205 | LF | $ 10 | $ 2,050 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 2,400 | LF | $ 10 | $ 24,000 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 26,050** |
| | **TRIB B STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 450 | LF | $ 65 | $ 29,250 |
| 5 | 30" Dia. PVC Storm Drain Pipe | 10 | LF | $ 100 | $ 1,000 |
| 6 | Storm Drain Manholes | 4 | EA | $ 3,850 | $ 15,400 |
| 7 | Catch Basins | 7 | EA | $ 3,550 | $ 24,850 |
| 8 | Connect to Existing SD System | 9 | EA | $ 1,100 | $ 9,900 |
| 9 | Concrete Curb & Gutter with Grated Line Drain | 2,400 | LF | $ 120 | $ 288,000 |
| 10 | Reconstruct Existing Sidewalk | 12,000 | SF | $ 5 | $ 60,000 |
| 11 | Reconstruct Existing AC Pavement | 2,400 | LF | $ 7 | $ 16,800 |
| 12 | Pump Station | 1 | LS | $ 560,000 | $ 560,000 |
| 13 | Sliplining Existing 30" Outfall | 70 | LF | $ 70 | $ 4,900 |
| 14 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 15 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB B STORM DRAINAGE SUBTOTAL** | | | | **$ 1,025,100** |
| | | | | **TOTAL** | **$ 1,103,708** |
| | | | | **Contingency 25%** | **$ 275,927** |
| | | | | **GRAND TOTAL** | **$ 1,379,634** |
| | | | | **ROUNDED TOTAL** | **$ 1,380,000** |

# Recommended SD Improvements
## Trib C
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 2,004 | $ 2,004 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 2,004** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 75 | LF | $ 10 | $ 750 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 150 | LF | $ 10 | $ 1,500 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 2,250** |
| | **TRIB C STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 105 | LF | $ 65 | $ 6,825 |
| 5 | Catch Basins | 2 | EA | $ 3,550 | $ 7,100 |
| 6 | Connect to Existing SD System | 1 | EA | $ 1,100 | $ 1,100 |
| 7 | Concrete Curb & Gutter with Grated Line Drain | 150 | LF | $ 120 | $ 18,000 |
| 8 | Reconstruct Existing Sidewalk | 750 | SF | $ 5 | $ 3,750 |
| 9 | Reconstruct Existing AC Pavement | 150 | LF | $ 7 | $ 1,050 |
| | **TRIB C STORM DRAINAGE SUBTOTAL** | | | | **$ 37,825** |
| | **TOTAL** | | | | **$ 42,079** |
| | **Contingency** | | | **25%** | **$ 10,520** |
| | **GRAND TOTAL** | | | | **$ 52,598** |
| | **ROUNDED TOTAL** | | | | **$ 53,000** |

# Recommended SD Improvements
## Trib D
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 16,762 | $ 16,762 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 16,762** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 155 | LF | $ 10 | $ 1,550 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 270 | LF | $ 10 | $ 2,700 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 4,250** |
| | **TRIB D STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 170 | LF | $ 65 | $ 11,050 |
| 5 | Storm Drain Manholes | 1 | EA | $ 3,850 | $ 3,850 |
| 6 | Connect to Existing SD System | 3 | EA | $ 1,100 | $ 3,300 |
| 7 | Concrete Curb & Gutter with Grated Line Drain | 270 | LF | $ 120 | $ 32,400 |
| 8 | Reconstruct Existing Sidewalk | 1,350 | SF | $ 5 | $ 6,750 |
| 9 | Reconstruct Existing AC Pavement | 270 | LF | $ 7 | $ 1,890 |
| 10 | Pump Station | 1 | LS | $ 250,000 | $ 250,000 |
| 11 | Sliplining Existing 15" Outfall | 150 | LF | $ 45 | $ 6,750 |
| 12 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 13 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB D STORM DRAINAGE SUBTOTAL** | | | | **$ 330,990** |
| | | | **TOTAL** | | **$ 352,002** |
| | | | **Contingency** | **25%** | **$ 88,001** |
| | | | **GRAND TOTAL** | | **$ 440,003** |
| | | | **ROUNDED TOTAL** | | **$ 440,000** |

# Recommended SD Improvements
## Trib E
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 3,839 | $ 3,839 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 3,839** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 115 | LF | $ 10 | $ 1,150 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 460 | LF | $ 10 | $ 4,600 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 5,750** |
| | **TRIB E STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 90 | LF | $ 65 | $ 5,850 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 115 | LF | $ 75 | $ 8,625 |
| 6 | Connect to Existing SD System | 1 | EA | $ 1,100 | $ 1,100 |
| 7 | Concrete Curb & Gutter with Grated Line Drain | 460 | LF | $ 120 | $ 55,200 |
| 8 | Reconstruct Existing Sidewalk | 2,300 | SF | $ 5 | $ 11,500 |
| 9 | Reconstruct Existing AC Pavement | 460 | LF | $ 7 | $ 3,220 |
| | **TRIB E STORM DRAINAGE SUBTOTAL** | | | | **$ 71,020** |
| | **TOTAL** | | | | **$ 80,609** |
| | **Contingency** | | | **25%** | **$ 20,152** |
| | **GRAND TOTAL** | | | | **$ 100,761** |
| | **ROUNDED TOTAL** | | | | **$ 101,000** |

# Recommended SD Improvements
## Trib F
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 29,417 | $ 29,417 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 29,417** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 150 | LF | $ 10 | $ 1,500 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 770 | LF | $ 10 | $ 7,700 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 9,200** |
| | **TRIB F STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 290 | LF | $ 65 | $ 18,850 |
| 5 | 24" Dia. PVC Storm Drain Pipe | 20 | LF | $ 80 | $ 1,600 |
| 6 | Storm Drain Manholes | 3 | EA | $ 3,850 | $ 11,550 |
| 7 | Catch Basins | 2 | EA | $ 3,550 | $ 7,100 |
| 8 | Connect to Existing SD System | 9 | EA | $ 1,100 | $ 9,900 |
| 9 | Concrete Curb & Gutter with Grated Line Drain | 770 | LF | $ 120 | $ 92,400 |
| 10 | Reconstruct Existing Sidewalk | 3,850 | SF | $ 5 | $ 19,250 |
| 11 | Reconstruct Existing AC Pavement | 770 | LF | $ 7 | $ 5,390 |
| 12 | Pump Station | 1 | LS | $ 390,000 | $ 390,000 |
| 13 | Sliplining Existing 24" Outfall | 135 | LF | $ 60 | $ 8,100 |
| 14 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 15 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB F STORM DRAINAGE SUBTOTAL** | | | | **$ 579,140** |
| | | | | **TOTAL** | **$ 617,757** |
| | | | | **Contingency 25%** | **$ 154,439** |
| | | | | **GRAND TOTAL** | **$ 772,196** |
| | | | | **ROUNDED TOTAL** | **$ 772,000** |

# Recommended SD Improvements
## Trib G
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 10,662 | $ 10,662 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 10,662** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 475 | LF | $ 10 | $ 4,750 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 1,020 | LF | $ 10 | $ 10,200 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 14,950** |
| | **TRIB G STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 330 | LF | $ 65 | $ 21,450 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 170 | LF | $ 75 | $ 12,750 |
| 6 | Catch Basins | 1 | EA | $ 3,550 | $ 3,550 |
| 7 | Connect to Existing SD System | 5 | EA | $ 1,100 | $ 5,500 |
| 8 | Concrete Curb & Gutter with Grated Line Drain | 1,020 | LF | $ 120 | $ 122,400 |
| 9 | Reconstruct Existing Sidewalk | 5,100 | SF | $ 5 | $ 25,500 |
| 10 | Reconstruct Existing AC Pavement | 1,020 | LF | $ 7 | $ 7,140 |
| | **TRIB G STORM DRAINAGE SUBTOTAL** | | | | **$ 198,290** |
| | **TOTAL** | | | | **$ 223,902** |
| | **Contingency** | | | **25%** | **$ 55,976** |
| | **GRAND TOTAL** | | | | **$ 279,878** |
| | **ROUNDED TOTAL** | | | | **$ 280,000** |

# Recommended SD Improvements
## Trib H
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 21,425 | $ 21,425 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 21,425** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Curb, Gutter & Sidewalk | 2,050 | LF | $ 10 | $ 20,500 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 20,500** |
| | **TRIB H STORM DRAINAGE** | | | | |
| 3 | 12" Dia. PVC Storm Drain Pipe | 550 | LF | $ 65 | $ 35,750 |
| 4 | 18" Dia. PVC Storm Drain Pipe | 140 | LF | $ 75 | $ 10,500 |
| 5 | Storm Drain Manholes | 6 | EA | $ 3,850 | $ 23,100 |
| 6 | Catch Basins | 7 | EA | $ 3,550 | $ 24,850 |
| 7 | Connect to Existing SD System | 2 | EA | $ 1,100 | $ 2,200 |
| 8 | Concrete Curb & Gutter with Grated Line Drain | 2,050 | LF | $ 120 | $ 246,000 |
| 9 | Reconstruct Existing Sidewalk | 10,250 | SF | $ 5 | $ 51,250 |
| 10 | Reconstruct Existing AC Pavement | 2,050 | LF | $ 7 | $ 14,350 |
| | **TRIB H STORM DRAINAGE SUBTOTAL** | | | | **$ 408,000** |
| | **TOTAL** | | | | **$ 449,925** |
| | **Contingency** | | | **25%** | **$ 112,481** |
| | **GRAND TOTAL** | | | | **$ 562,406** |
| | **ROUNDED TOTAL** | | | | **$ 562,000** |

# Recommended SD Improvements
## Trib J
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 5,627 | $ 5,627 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 5,627** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 415 | LF | $ 10 | $ 4,150 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 460 | LF | $ 10 | $ 4,600 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 8,750** |
| | **TRIB J STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 165 | LF | $ 65 | $ 10,725 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 250 | LF | $ 75 | $ 18,750 |
| 6 | Connect to Existing SD System | 4 | EA | $ 1,100 | $ 4,400 |
| 7 | Concrete Curb & Gutter with Grated Line Drain | 460 | LF | $ 120 | $ 55,200 |
| 8 | Reconstruct Existing Sidewalk | 2,300 | SF | $ 5 | $ 11,500 |
| 9 | Reconstruct Existing AC Pavement | 460 | LF | $ 7 | $ 3,220 |
| | **TRIB J STORM DRAINAGE SUBTOTAL** | | | | **$ 103,795** |
| | **TOTAL** | | | | **$ 118,172** |
| | **Contingency** | | | **25%** | **$ 29,543** |
| | **GRAND TOTAL** | | | | **$ 147,715** |
| | **ROUNDED TOTAL** | | | | **$ 148,000** |

# Recommended SD Improvements
## Trib K
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 35,172 | $ 35,172 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 35,172** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 855 | LF | $ 10 | $ 8,550 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 1,440 | LF | $ 10 | $ 14,400 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 22,950** |
| | **TRIB K STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 1,425 | LF | $ 65 | $ 92,625 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 15 | LF | $ 75 | $ 1,125 |
| 6 | Storm Drain Manholes | 7 | EA | $ 3,850 | $ 26,950 |
| 7 | Catch Basins | 7 | EA | $ 3,550 | $ 24,850 |
| 8 | Connect to Existing SD System | 13 | EA | $ 1,100 | $ 14,300 |
| 9 | Concrete Curb & Gutter with Grated Line Drain | 1,440 | LF | $ 120 | $ 172,800 |
| 10 | Reconstruct Existing Sidewalk | 7,200 | SF | $ 5 | $ 36,000 |
| 11 | Reconstruct Existing AC Pavement | 1,440 | LF | $ 7 | $ 10,080 |
| 12 | Pump Station | 1 | LS | $ 280,000 | $ 280,000 |
| 13 | Sliplining Existing 15" Outfall | 150 | LF | $ 45 | $ 6,750 |
| 14 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 15 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB K STORM DRAINAGE SUBTOTAL** | | | | **$ 680,480** |
| | **TOTAL** | | | | **$ 738,602** |
| | **Contingency** | | **25%** | | **$ 184,650** |
| | **GRAND TOTAL** | | | | **$ 923,252** |
| | **ROUNDED TOTAL** | | | | **$ 923,000** |

# Recommended SD Improvements
## Trib L
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 19,095 | $ 19,095 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 19,095** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 540 | LF | $ 10 | $ 5,400 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 1,570 | LF | $ 10 | $ 15,700 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 21,100** |
| | **TRIB L STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 830 | LF | $ 65 | $ 53,950 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 270 | LF | $ 75 | $ 20,250 |
| 6 | 24" Dia. PVC Storm Drain Pipe | 140 | LF | $ 80 | $ 11,200 |
| 7 | Storm Drain Manholes | 3 | EA | $ 3,850 | $ 11,550 |
| 8 | Catch Basins | 4 | EA | $ 3,550 | $ 14,200 |
| 9 | Connect to Existing SD System | 10 | EA | $ 1,100 | $ 11,000 |
| 10 | Concrete Curb & Gutter with Grated Line Drain | 1,570 | LF | $ 120 | $ 188,400 |
| 11 | Reconstruct Existing Sidewalk | 7,850 | SF | $ 5 | $ 39,250 |
| 12 | Reconstruct Existing AC Pavement | 1,570 | LF | $ 7 | $ 10,990 |
| | **TRIB L STORM DRAINAGE SUBTOTAL** | | | | **$ 360,790** |
| | **TOTAL** | | | | **$ 400,985** |
| | **Contingency** | | **25%** | | **$ 100,246** |
| | **GRAND TOTAL** | | | | **$ 501,231** |
| | **ROUNDED TOTAL** | | | | **$ 501,000** |

# Recommended SD Improvements
## Trib M
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 46,641 | $ 46,641 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 46,641** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 790 | LF | $ 10 | $ 7,900 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 2,150 | LF | $ 10 | $ 21,500 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 29,400** |
| | **TRIB M STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 1,080 | LF | $ 65 | $ 70,200 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 555 | LF | $ 75 | $ 41,625 |
| 6 | 24" Dia. PVC Storm Drain Pipe | 15 | LF | $ 80 | $ 1,200 |
| 7 | Storm Drain Manholes | 4 | EA | $ 3,850 | $ 15,400 |
| 8 | Catch Basins | 6 | EA | $ 3,550 | $ 21,300 |
| 9 | Connect to Existing SD System | 12 | EA | $ 1,100 | $ 13,200 |
| 10 | Concrete Curb & Gutter with Grated Line Drain | 2,150 | LF | $ 120 | $ 258,000 |
| 11 | Reconstruct Existing Sidewalk | 10,750 | SF | $ 5 | $ 53,750 |
| 12 | Reconstruct Existing AC Pavement | 2,150 | LF | $ 7 | $ 15,050 |
| 13 | Pump Station | 1 | LS | $ 390,000 | $ 390,000 |
| 14 | Sliplining Existing 24" Outfall | 145 | LF | $ 60 | $ 8,700 |
| 15 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 16 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB M STORM DRAINAGE SUBTOTAL** | | | | **$ 903,425** |

| | | |
|---|---|---|
| **TOTAL** | | **$ 979,466** |
| **Contingency** | **25%** | **$ 244,867** |
| **GRAND TOTAL** | | **$ 1,224,333** |
| **ROUNDED TOTAL** | | **$ 1,224,000** |

# Recommended SD Improvements
## Trib N
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 19,370 | $ 19,370 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 19,370** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 250 | LF | $ 10 | $ 2,500 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 1,890 | LF | $ 10 | $ 18,900 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 21,400** |
| | **TRIB N STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 470 | LF | $ 65 | $ 30,550 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 55 | LF | $ 75 | $ 4,125 |
| 6 | 24" Dia. PVC Storm Drain Pipe | 150 | LF | $ 80 | $ 12,000 |
| 7 | Storm Drain Manholes | 2 | EA | $ 3,850 | $ 7,700 |
| 8 | Catch Basins | 5 | EA | $ 3,550 | $ 17,750 |
| 9 | Connect to Existing SD System | 6 | EA | $ 1,100 | $ 6,600 |
| 10 | Concrete Curb & Gutter with Grated Line Drain | 1,890 | LF | $ 120 | $ 226,800 |
| 11 | Reconstruct Existing Sidewalk | 9,450 | SF | $ 5 | $ 47,250 |
| 12 | Reconstruct Existing AC Pavement | 1,890 | LF | $ 7 | $ 13,230 |
| | **TRIB N STORM DRAINAGE SUBTOTAL** | | | | **$ 366,005** |
| | | | | **TOTAL** | **$ 406,775** |
| | | | | **Contingency 25%** | **$ 101,694** |
| | | | | **GRAND TOTAL** | **$ 508,469** |
| | | | | **ROUNDED TOTAL** | **$ 508,000** |

# Recommended SD Improvements
## Trib P
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 33,724 | $ 33,724 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 33,724** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 185 | LF | $ 10 | $ 1,850 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 1,430 | LF | $ 10 | $ 14,300 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 16,150** |
| | **TRIB P STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 1,220 | LF | $ 65 | $ 79,300 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 20 | LF | $ 75 | $ 1,500 |
| 6 | Storm Drain Manholes | 7 | EA | $ 3,850 | $ 26,950 |
| 7 | Catch Basins | 8 | EA | $ 3,550 | $ 28,400 |
| 8 | Connect to Existing SD System | 3 | EA | $ 1,100 | $ 3,300 |
| 9 | Concrete Curb & Gutter with Grated Line Drain | 1,430 | LF | $ 120 | $ 171,600 |
| 10 | Reconstruct Existing Sidewalk | 7,150 | SF | $ 5 | $ 35,750 |
| 11 | Reconstruct Existing AC Pavement | 1,430 | LF | $ 7 | $ 10,010 |
| 12 | Pump Station | 1 | LS | $ 280,000 | $ 280,000 |
| 13 | Sliplining Existing 15" Outfall | 145 | LF | $ 45 | $ 6,525 |
| 14 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 15 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB P STORM DRAINAGE SUBTOTAL** | | | | **$ 658,335** |
| | **TOTAL** | | | | **$ 708,209** |
| | **Contingency** | | **25%** | | **$ 177,052** |
| | **GRAND TOTAL** | | | | **$ 885,262** |
| | **ROUNDED TOTAL** | | | | **$ 885,000** |

# Recommended SD Improvements
## Trib Q
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 37,229 | $ 37,229 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 37,229** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 1,245 | LF | $ 10 | $ 12,450 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 915 | LF | $ 10 | $ 9,150 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 21,600** |
| | **TRIB Q STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 1,150 | LF | $ 65 | $ 74,750 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 200 | LF | $ 75 | $ 15,000 |
| 6 | 24" Dia. PVC Storm Drain Pipe | 280 | LF | $ 80 | $ 22,400 |
| 7 | 30" Dia. PVC Storm Drain Pipe | 170 | LF | $ 100 | $ 17,000 |
| 8 | Storm Drain Manholes | 3 | EA | $ 3,850 | $ 11,550 |
| 9 | Catch Basins | 2 | EA | $ 3,550 | $ 7,100 |
| 10 | Connect to Existing SD System | 19 | EA | $ 1,100 | $ 20,900 |
| 11 | Concrete Curb & Gutter with Grated Line Drain | 915 | LF | $ 120 | $ 109,800 |
| 12 | Reconstruct Existing Sidewalk | 4,575 | SF | $ 5 | $ 22,875 |
| 13 | Reconstruct Existing AC Pavement | 915 | LF | $ 7 | $ 6,405 |
| 14 | Pump Station | 1 | LS | $ 390,000 | $ 390,000 |
| 15 | Sliplining Existing 24" Outfall | 170 | LF | $ 60 | $ 10,200 |
| 16 | Discharge Box | 1 | LS | $ 5,000 | $ 5,000 |
| 17 | Gravity Bypass Manhole | 1 | LS | $ 10,000 | $ 10,000 |
| | **TRIB Q STORM DRAINAGE SUBTOTAL** | | | | **$ 722,980** |

| | | |
|---|---|---|
| **TOTAL** | | **$ 781,809** |
| **Contingency** | **25%** | **$ 195,452** |
| **GRAND TOTAL** | | **$ 977,261** |
| **ROUNDED TOTAL** | | **$ 977,000** |

# Recommended SD Improvements
## Trib Paradise Drive
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 12,560 | $ 12,560 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 12,560** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Curb, Gutter & Sidewalk | 1,300 | LF | $ 10 | $ 13,000 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 13,000** |
| | **TRIB B STORM DRAINAGE** | | | | |
| 3 | 8" Dia. PVC Storm Drain Pipe | 150 | LF | $ 40 | $ 6,000 |
| 4 | 12" Dia. PVC Storm Drain Pipe | 250 | LF | $ 65 | $ 16,250 |
| 5 | Catch Basins | 3 | EA | $ 3,550 | $ 10,650 |
| 6 | Connect to Existing SD System | 7 | EA | $ 1,100 | $ 7,700 |
| 7 | Concrete Curb & Gutter with Grated Line Drain | 1,300 | LF | $ 120 | $ 156,000 |
| 8 | Reconstruct Existing Sidewalk | 6,500 | SF | $ 5 | $ 32,500 |
| 9 | Reconstruct Existing AC Pavement | 1,300 | LF | $ 7 | $ 9,100 |
| | **TRIB B STORM DRAINAGE SUBTOTAL** | | | | **$ 238,200** |
| | **TOTAL** | | | | **$ 263,760** |
| | **Contingency** | | **25%** | | **$ 65,940** |
| | **GRAND TOTAL** | | | | **$ 329,700** |
| | **ROUNDED TOTAL** | | | | **$ 330,000** |

# Recommended SD Improvements
## Trib South of Paradise Drive
### Storm Drainage and Flood Control Study - Phase I
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **MOBILIZATION** | | | | |
| 1 | Mobilization (5%) | 1 | LS | $ 21,524 | $ 21,524 |
| | **MOBILIZATION SUBTOTAL** | | | | **$ 21,524** |
| | **DEMOLITION** | | | | |
| 2 | Remove Existing Pipe To Be Replaced | 1,775 | LF | $ 10 | $ 17,750 |
| 3 | Remove Existing Curb, Gutter & Sidewalk | 1,415 | LF | $ 10 | $ 14,150 |
| | **DEMOLITION SUBTOTAL** | | | | **$ 31,900** |
| | **TRIB B STORM DRAINAGE** | | | | |
| 4 | 12" Dia. PVC Storm Drain Pipe | 1,880 | LF | $ 65 | $ 122,200 |
| 5 | 18" Dia. PVC Storm Drain Pipe | 260 | LF | $ 75 | $ 19,500 |
| 6 | Storm Drain Manholes | 4 | EA | $ 3,850 | $ 15,400 |
| 7 | Connect to Existing SD System | 24 | EA | $ 1,100 | $ 26,400 |
| 8 | Concrete Curb & Gutter with Grated Line Drain | 1,415 | LF | $ 120 | $ 169,800 |
| 9 | Reconstruct Existing Sidewalk | 7,075 | SF | $ 5 | $ 35,375 |
| 10 | Reconstruct Existing AC Pavement | 1,415 | LF | $ 7 | $ 9,905 |
| | **TRIB B STORM DRAINAGE SUBTOTAL** | | | | **$ 398,580** |
| | **TOTAL** | | | | **$ 452,004** |
| | **Contingency** | | **25%** | | **$ 113,001** |
| | **GRAND TOTAL** | | | | **$ 565,005** |
| | **ROUNDED TOTAL** | | | | **$ 565,000** |

**A-N WEST, INC.**
*Consulting Engineers*

# Recommended Tidal Inundation Improvements
## Bay Side and Creek Side Top of Wall El. 8.0
### Engineer's Cost Estimate (2008 Prices)

3/15/2007

| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 10+00 TO STA 18+30)** | | | | |
| 1 | Mobilization | 1 | LS | $ 100,000 | $ 100,000 |
| 2 | Temporary Access | 1 | LS | $ 35,413 | $ 35,413 |
| 3 | **Steel** Sheet Piling | 31,540 | SF | $ 35 | $ 1,103,900 |
| 4 | Cap (Precast Concrete) | 830 | LF | $ 70 | $ 58,100 |
| 5 | Concrete Facing | 830 | LF | $ 100 | $ 83,000 |
| 6 | Drainage System | 830 | LF | $ 100 | $ 83,000 |
| 7 | Excavation & Backfill | 1,000 | CY | $ 30 | $ 30,000 |
| 8 | Stairways | 12 | EA | $ 2,500 | $ 30,000 |
| 9 | Dock Removal & Replacement | 1 | EA | $ 10,000 | $ 10,000 |
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 10+00 TO STA 18+30) SUBTOTAL** | | | | **$ 1,533,413** |
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 18+30 TO STA 34+08)** | | | | |
| 10 | Mobilization | 1 | LS | $ 200,000 | $ 200,000 |
| 11 | **Steel** Sheet Piling | 59,964 | SF | $ 27 | $ 1,619,028 |
| 12 | Cap (Precast Concrete) | 1,578 | LF | $ 70 | $ 110,460 |
| 13 | Concrete Facing | 1,578 | LF | $ 100 | $ 157,800 |
| 14 | Drainage System | 1,578 | LF | $ 100 | $ 157,800 |
| 15 | Stone | 748 | CY | $ 90 | $ 67,328 |
| 16 | Riprap | 1,031 | CY | $ 115 | $ 118,560 |
| 17 | Excavation & Backfill | 2,000 | CY | $ 30 | $ 60,000 |
| 18 | Stairways | 21 | EA | $ 2,500 | $ 52,500 |
| 19 | Dock Removal & Replacement | 12 | EA | $ 10,000 | $ 120,000 |
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 18+30 TO STA 34+08) SUBTOTAL** | | | | **$ 2,663,476** |

# Recommended Tidal Inundation Improvements
## Bay Side and Creek Side Top of Wall El. 8.0
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **CREEK SIDE - TOP OF WALL EL. 8.0 (STA 34+08 TO STA 124+70)** | | | | |
| 20 | Mobilization | 1 | LS | $ 400,000 | $ 400,000 |
| 21 | Temporary Access | 1 | LS | $ 386,645 | $ 386,645 |
| 22 | **Steel** Sheet Piling | 181,240 | SF | $ 25 | $ 4,531,000 |
| 23 | Cap (Precast Concrete) | 9,062 | LF | $ 70 | $ 634,340 |
| 24 | Concrete Facing | 9,062 | LF | $ 100 | $ 906,200 |
| 25 | Drainage System | 9,062 | LF | $ 90 | $ 815,580 |
| 26 | Excavation & Backfill | 10,000 | CY | $ 30 | $ 300,000 |
| 27 | Stairways | 97 | EA | $ 2,500 | $ 242,500 |
| 28 | Dock Removal & Replacement | 40 | EA | $ 10,000 | $ 400,000 |
| | **CREEK SIDE - TOP OF WALL EL. 8.0 (STA 34+08 TO STA 124+70) SUBTOTAL** | | | | **$ 8,616,265** |
| | **MARSH LEVEE - TOP OF LEVEE EL. 8.0** | | | | |
| 29 | Mobilization | 1 | LS | $ 20,000 | $ 20,000 |
| 30 | Clearing & Grubbing | 1 | AC | $ 4,000 | $ 4,000 |
| 31 | Imported Compacted Fill | 1,937 | CY | $ 30 | $ 58,110 |
| 32 | Geogrid Reinforcements | 32,680 | SF | $ 3 | $ 98,040 |
| | **MARSH LEVEE - TOP OF LEVEE EL. 8.0 SUBTOTAL** | | | | **$ 180,150** |

| | | |
|---|---|---|
| **TOTAL** | | **$ 12,993,305** |
| **Contingency** | **25%** | **$ 3,248,326** |
| **GRAND TOTAL** | | **$ 16,241,631** |
| **ROUNDED TOTAL** | | **$ 16,200,000** |

Note: The construction cost estimates do not include any cost for utility relocations, permanent or temporary construction easements, environmental studies, permitting, or engineering design services.

**A-N WEST, INC.**
*Consulting Engineers*

# Alt "A" Tidal Inundation Improvements
## Bay Side El. 11.0 / Creek Side El. 8.0
### Engineer's Cost Estimate (2008 Prices)

3/14/2007

| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **BAY SIDE - TOP OF WALL EL. 11.0 (STA 10+00 TO STA 18+30)** | | | | |
| 1 | Mobilization | 1 | LS | $ 100,000 | $ 100,000 |
| 2 | Temporary Access | 1 | LS | $ 35,400 | $ 35,400 |
| 3 | **Steel** Sheet Piling | 34,030 | SF | $ 35 | $ 1,191,050 |
| 4 | Cap (Precast Concrete) | 830 | LF | $ 70 | $ 58,100 |
| 5 | Concrete Facing | 830 | LF | $ 200 | $ 166,000 |
| 6 | Drainage System | 830 | LF | $ 100 | $ 83,000 |
| 7 | Excavation & Backfill | 1,000 | CY | $ 30 | $ 30,000 |
| 8 | Stairways | 12 | EA | $ 2,500 | $ 30,000 |
| 9 | Dock Removal & Replacement | 1 | EA | $ 10,000 | $ 10,000 |
| | **BAY SIDE - TOP OF WALL EL. 11.0 (STA 10+00 TO STA 18+30) SUBTOTAL** | | | | **$ 1,703,550** |
| | **BAY SIDE - TOP OF WALL EL. 11.0 (STA 18+30 TO STA 34+08)** | | | | |
| 10 | Mobilization | 1 | LS | $ 200,000 | $ 200,000 |
| 11 | **Steel** Sheet Piling | 64,698 | SF | $ 27 | $ 1,746,846 |
| 12 | Cap (Precast Concrete) | 1,578 | LF | $ 70 | $ 110,460 |
| 13 | Concrete Facing | 1,578 | LF | $ 200 | $ 315,600 |
| 14 | Drainage System | 1,578 | LF | $ 100 | $ 157,800 |
| 15 | Stone | 748 | CY | $ 90 | $ 67,328 |
| 16 | Riprap | 1,031 | CY | $ 115 | $ 118,560 |
| 17 | Excavation & Backfill | 2,000 | CY | $ 30 | $ 60,000 |
| 18 | Stairways | 21 | EA | $ 2,500 | $ 52,500 |
| 19 | Dock Removal & Replacement | 12 | EA | $ 10,000 | $ 120,000 |
| | **BAY SIDE - TOP OF WALL EL. 11.0 (STA 18+30 TO STA 34+08) SUBTOTAL** | | | | **$ 2,949,094** |

# Alt "A" Tidal Inundation Improvements
## Bay Side El. 11.0 / Creek Side El. 8.0
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **CREEK SIDE - TOP OF WALL EL. 8.0 (STA 34+08 TO STA 124+70)** | | | | |
| 20 | Mobilization | 1 | LS | $ 400,000 | $ 400,000 |
| 21 | Temporary Access | 1 | LS | $ 386,645 | $ 386,645 |
| 22 | **Steel** Sheet Piling | 181,240 | SF | $ 25 | $ 4,531,000 |
| 23 | Cap (Precast Concrete) | 9,062 | LF | $ 70 | $ 634,340 |
| 24 | Concrete Facing | 9,062 | LF | $ 100 | $ 906,200 |
| 25 | Drainage System | 9,062 | LF | $ 90 | $ 815,580 |
| 26 | Excavation & Backfill | 10,000 | CY | $ 30 | $ 300,000 |
| 27 | Stairways | 97 | EA | $ 2,500 | $ 242,500 |
| 28 | Dock Removal & Replacement | 40 | EA | $ 10,000 | $ 400,000 |
| | **CREEK SIDE - TOP OF WALL EL. 8.0 (STA 34+08 TO STA 124+70) SUBTOTAL** | | | | **$ 8,616,265** |
| | **MARSH LEVEE - TOP OF LEVEE EL. 8.0** | | | | |
| 29 | Mobilization | 1 | LS | $ 20,000 | $ 20,000 |
| 30 | Clearing & Grubbing | 1 | AC | $ 4,000 | $ 4,000 |
| 31 | Imported Compacted Fill | 1,937 | CY | $ 30 | $ 58,110 |
| 32 | Geogrid Reinforcements | 32,680 | SF | $ 3 | $ 98,040 |
| | **MARSH LEVEE - TOP OF LEVEE EL. 8.0 SUBTOTAL** | | | | **$ 180,150** |
| | **TOTAL** | | | | **$ 13,449,060** |
| | **Contingency** | | | **25%** | **$ 3,362,265** |
| | **GRAND TOTAL** | | | | **$ 16,811,325** |
| | **ROUNDED TOTAL** | | | | **$ 16,800,000** |

Note: The construction cost estimates do not include any cost for utility relocations, permanent or temporary construction easements, environmental studies, permitting, or engineering design services.

# Alt "B" Tidal Inundation Improvements
## Bay Side (Steel) and Creek Side (Vinyl) El. 8.0
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 10+00 TO STA 18+30)** | | | | |
| 1 | Mobilization | 1 | LS | $ 100,000 | $ 100,000 |
| 2 | Temporary Access | 1 | LS | $ 35,400 | $ 35,400 |
| 3 | **Steel** Sheet Piling | 31,540 | SF | $ 35 | $ 1,103,900 |
| 4 | Cap (Precast Concrete) | 830 | LF | $ 70 | $ 58,100 |
| 5 | Concrete Facing | 830 | LF | $ 100 | $ 83,000 |
| 6 | Drainage System | 830 | LF | $ 100 | $ 83,000 |
| 7 | Excavation & Backfill | 1,000 | CY | $ 30 | $ 30,000 |
| 8 | Stairways | 12 | EA | $ 2,500 | $ 30,000 |
| 9 | Dock Removal & Replacement | 1 | EA | $ 10,000 | $ 10,000 |
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 10+00 TO STA 18+30) SUBTOTAL** | | | | **$ 1,533,400** |
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 18+30 TO STA 34+08)** | | | | |
| 10 | Mobilization | 1 | LS | $ 200,000 | $ 200,000 |
| 11 | **Steel** Sheet Piling | 59,964 | SF | $ 27 | $ 1,619,028 |
| 12 | Cap (Precast Concrete) | 1,578 | LF | $ 70 | $ 110,460 |
| 13 | Concrete Facing | 1,578 | LF | $ 100 | $ 157,800 |
| 14 | Drainage System | 1,578 | LF | $ 100 | $ 157,800 |
| 15 | Stone | 748 | CY | $ 90 | $ 67,328 |
| 16 | Riprap | 1,031 | CY | $ 115 | $ 118,560 |
| 17 | Excavation & Backfill | 2,000 | CY | $ 30 | $ 60,000 |
| 18 | Stairways | 21 | EA | $ 2,500 | $ 52,500 |
| 19 | Dock Removal & Replacement | 12 | EA | $ 10,000 | $ 120,000 |
| | **BAY SIDE - TOP OF WALL EL. 8.0 (STA 18+30 TO STA 34+08) SUBTOTAL** | | | | **$ 2,663,476** |

# Alt "B" Tidal Inundation Improvements
## Bay Side (Steel) and Creek Side (Vinyl) El. 8.0
### Engineer's Cost Estimate (2008 Prices)



| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **CREEK SIDE - TOP OF WALL EL. 8.0 (STA 34+08 TO STA 124+70)** | | | | |
| 20 | Mobilization | 1 | LS | $ 400,000 | $ 400,000 |
| 21 | Temporary Access | 1 | LS | $ 386,645 | $ 386,645 |
| 22 | **Vinyl** Sheet Piling | 181,240 | SF | $ 20 | $ 3,624,800 |
| 23 | Cap (Precast Concrete) | 9,062 | LF | $ 70 | $ 634,340 |
| 24 | Drainage system | 9,062 | LF | $ 90 | $ 815,580 |
| 25 | Excavation & Backfill | 10,000 | CY | $ 30 | $ 300,000 |
| 26 | Stairways | 97 | EA | $ 2,500 | $ 242,500 |
| 27 | Dock Removal & Replacement | 40 | EA | $ 10,000 | $ 400,000 |
| | **CREEK SIDE - TOP OF WALL EL. 8.0 (STA 34+08 TO STA 124+70) SUBTOTAL** | | | | **$ 6,803,865** |
| | **MARSH LEVEE - TOP OF LEVEE EL. 8.0** | | | | |
| 28 | Mobilization | 1 | LS | $ 20,000 | $ 20,000 |
| 29 | Clearing & Grubbing | 1 | AC | $ 4,000 | $ 4,000 |
| 30 | Imported Compacted Fill | 1,937 | CY | $ 30 | $ 58,110 |
| 31 | Geogrid Reinforcements | 32,680 | SF | $ 3 | $ 98,040 |
| | **MARSH LEVEE - TOP OF LEVEE EL. 8.0 SUBTOTAL** | | | | **$ 180,150** |
| | | | | **TOTAL** | **$ 11,180,892** |
| | | | | **Contingency 25%** | **$ 2,795,223** |
| | | | | **GRAND TOTAL** | **$ 13,976,115** |
| | | | | **ROUNDED TOTAL** | **$ 14,000,000** |

Note: The construction cost estimates do not include any cost for utility relocations, permanent or temporary construction easements, environmental studies, permitting, or engineering design services.

**A-N WEST, INC.**
*Consulting Engineers*

# Wall Extensions for Recommended Tidal Inundation Improvements

**Engineer's Cost Estimate (2008 Prices)**

3/14/2007

| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **EXTENSION FROM +8.0 NGVD ON BAY SIDE TO +13.0 NGVD** | | | | |
| 1 | Mobilization | 1 | LS | $ 60,000 | $ 60,000 |
| 2 | Remove Existing Cap | 2,408 | LF | $ 25 | $ 60,200 |
| 3 | Reinforced Concrete Extension | 2,408 | LF | $ 280 | $ 674,240 |
| | **EXTENSION FROM +8.0 NGVD ON BAY SIDE TO +13.0 NGVD SUBTOTAL** | | | | **$ 794,440** |
| | **EXTENSION FROM +8.0 NGVD ON CREEK SIDE TO +10.0 NGVD** | | | | |
| 1 | Mobilization | 1 | LS | $ 120,000 | $ 120,000 |
| 2 | Remove Existing Cap | 9,062 | LF | $ 25 | $ 226,550 |
| 3 | Reinforced Concrete Extension | 9,062 | LF | $ 160 | $ 1,449,920 |
| | **EXTENSION FROM +8.0 NGVD ON CREEK SIDE TO +10.0 NGVD SUBTOTAL** | | | | **$ 1,796,470** |
| | | | | **TOTAL** | **$ 2,590,910** |
| | | | | **Contingency 25%** | **$ 647,728** |
| | | | | **GRAND TOTAL** | **$ 3,238,638** |
| | | | | **ROUNDED TOTAL** | **$ 3,239,000** |

Note: The construction cost estimates do not include any cost for utility relocations, permanent or temporary construction easements, environmental studies, permitting, or engineering design services.

**A-N WEST, INC.**
*Consulting Engineers*

# Wall Extensions for
# Alt "A" Tidal Inundation Improvements
## Engineer's Cost Estimate (2008 Prices)

3/14/2007

| ITEM NO. | ITEM DESCRIPTION | EST QUAN | UNIT | UNIT COST | COST |
|---|---|---|---|---|---|
| | **EXTENSION FROM +11.0 NGVD ON BAY SIDE TO +13.0 NGVD** | | | | |
| 1 | Mobilization | 1 | LS | $ 50,000 | $ 50,000 |
| 2 | Remove Existing Cap | 2,408 | LF | $ 25 | $ 60,200 |
| 3 | Reinforced Concrete Extension | 2,408 | LF | $ 200 | $ 481,600 |
| | **EXTENSION FROM +11.0 NGVD ON BAY SIDE TO +13.0 NGVD SUBTOTAL** | | | | **$ 591,800** |
| | **EXTENSION FROM +8.0 NGVD ON CREEK SIDE TO +10.0 NGVD** | | | | |
| 1 | Mobilization | 1 | LS | $ 120,000 | $ 120,000 |
| 2 | Remove Existing Cap | 9,062 | LF | $ 25 | $ 226,550 |
| 3 | Reinforced Concrete Extension | 9,062 | LF | $ 160 | $ 1,449,920 |
| | **EXTENSION FROM +8.0 NGVD ON CREEK SIDE TO +10.0 NGVD SUBTOTAL** | | | | **$ 1,796,470** |
| | | | | **TOTAL** | **$ 2,388,270** |
| | | | | **Contingency 25%** | **$ 597,068** |
| | | | | **GRAND TOTAL** | **$ 2,985,338** |
| | | | | **ROUNDED TOTAL** | **$ 2,985,000** |

Note: The construction cost estimates do not include any cost for utility relocations, permanent or temporary construction easements, environmental studies, permitting, or engineering design services.

# APPENDIX B

# DRAFT GEOTECHNICAL INVESTIGATION

# ( INCLUDING SETTLEMENT STUDY )

**Miller Pacific**
ENGINEERING GROUP

504 Redwood Blvd.
Suite 220
Novato, California 94947
T 415 / 382-3444
F 415 / 382-3450

# DRAFT GEOTECHNICAL INVESTIGATION
# CORTE MADERA STORM DRAINAGE & FLOOD CONTROL
# WATERSHEDS 5, 6 AND 7
# CORTE MADERA, CALIFORNIA

January 3, 2007

Project 285.06

Prepared For:
Town of Corte Madera
c/o AN West Inc.
3095 Richmond Parkway
Richmond, California 94806-5720

CERTIFICATION

This document is an instrument of service, prepared by or under the direction of the undersigned professionals, in accordance with the current ordinary standard of care. The service specifically excludes the investigation of radon, asbestos or other hazardous materials. The document is for the sole use of the client and consultants on this project. No other use is authorized. If the project changes, or more than two years have passed since issuance of this report, the findings and recommendations must be reviewed by the undersigned.

MILLER PACIFIC ENGINEERING GROUP
(a California corporation)

REVIEWED BY

Daisy Wheeler
Staff Geologist

Scott Stephens
Geotechnical Engineer 2398
(Expires 06/30/07)

DRAFT GEOTECHNICAL INVESTIGATION
CORTE MADERA STORM DRAINAGE & FLOOD CONTROL
WATERSHEDS 5, 6 AND 7
CORTE MADERA, CALIFORNIA

TABLE OF CONTENTS


| | | |
|---|---|---|
| EXECUTIVE SUMMARY | | Page 1 |
| I. | INTRODUCTION | 2 |
| II. | PROJECT DESCRIPTION | 3 |
| III. | SITE CONDITIONS | 3 |
| | A. Regional Geology | 3 |
| | B. Review of Reference Documents | 3 |
| | C. Surface Conditions | 5 |
| | D. Field Exploration and Laboratory Testing | 5 |
| | E. Subsurface Conditions | 5 |
| IV. | EVALUATION AND DISCUSSION | 6 |
| | A. General | 6 |
| | B. Refined Bay Mud Contours | 6 |
| | C. Consolidation and Settlement | 6 |
| V. | SUPPLEMENTAL SERVICES | 8 |
| LIST OF REFERENCES | | 9 |
| FIGURES | | |
| | Site Location Map | Figure 1 |
| | Bay Mud Contour Map | 2 |
| | 1946 Aerial Photograph | 3 |
| | 1950 Aerial Photograph | 4 |
| | 1958 Aerial Photograph | 5 |
| | 1966 Aerial Photograph | 6 |
| | 1970 Aerial Photograph | 7 |
| | 1975 Aerial Photograph | 8 |
| | 1980 Aerial Photograph | 9 |
| | 1986 Aerial Photograph | 10 |
| APPENDIX A, SUBSURFACE EXPLORATION AND LABORATORY TESTING | | |
| | Soil Classification Chart | Figure A-1 |
| | Boring Logs | A-2 to A-16 |
| | Consolidation Tests | A-17 to A-19 |

EXECUTIVE SUMMARY
CORTE MADERA STORM DRAINAGE & FLOOD CONTROL
WATERSHEDS 5, 6 AND 7
CORTE MADERA, CALIFORNIA

The project site is the Mariner Cove and Marina Village residential developments in Corte Madera, California. Based on the aerial photographs and subsurface borings, original site grading consisted of the placement of 8 to 9 feet of fill material in 1958 over the former marsh. The marsh deposits consist of soft, compressible, high plasticity, silty clay (CH) commonly referred to as bay mud. The thickness of the bay mud within the project area varies from about 0 to 110 feet.

The placement of fill material over bay mud causes consolidation of the bay mud and settlement of the ground surface. The amount and rate of settlement depends on the amount of surface loading, thickness of the bay mud, compression properties of the bay mud and subsurface drainage layers. In general, the bay mud consolidates quicker following the initial loading and slows over time. Our laboratory testing provides consolidation properties for the bay mud and indicates that the deeper portions of the bay mud are significantly under-consolidated (settlement not complete). Survey data from 1985 and 2006 was reviewed to correlate our settlement analyses. A summary of the calculated settlement to date and estimates of future settlements are presented in Table A. Actual settlements may vary from the predicted due to variations in the thickness of fill, interpreted bay mud thickness contours, bay mud consolidation characteristics, and subsurface drainage characteristics.

---

Table A
Calculated Current and Future Settlement
Corte Madera Storm Drainage and Flood Control Study
Watersheds 5, 6 and 7
Corte Madera, California

| Bay Mud Thickness (ft.) | Total Calculated Settlement (ft.) | Calculated Settlement to Date (2006) (ft.) | Estimated Future Settlement (feet) | | | |
|---|---|---|---|---|---|---|
| | | | 10 years | 30 years | 50 years | 100 years |
| 10 | 1.7 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| 20 | 3.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30 | 3.9 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| 40 | 4.7 | 4.5 | 0.1 | 0.2 | 0.2 | 0.2 |
| 50 | 5.3 | 4.6 | 0.3 | 0.5 | 0.6 | 0.7 |
| 60 | 5.7 | 4.3 | 0.3 | 0.8 | 1.0 | 1.2 |
| 70 | 6.1 | 4.1 | 0.4 | 0.9 | 1.3 | 1.8 |
| 80 | 6.4 | 3.9 | 0.3 | 1.0 | 1.4 | 2.0 |
| 90 | 6.7 | 3.5 | 0.5 | 0.9 | 1.5 | 2.2 |
| 100 | 6.9 | 3.2 | 0.7 | 1.0 | 1.5 | 2.3 |
| 110 | 7.0 | 3.1 | 0.2 | 0.8 | 1.3 | 2.2 |

Note: Settlement calculations based on 8.5 feet of fill placed in 1958, Compression Index Cc' of 0.32, Coefficient of Consolidation Cv of 10 ft2/yr, and double drainage conditions.

DRAFT GEOTECHNICAL INVESTIGATION
CORTE MADERA STORM DRAINAGE & FLOOD CONTROL
WATERSHEDS 5, 6 AND 7
CORTE MADERA, CALIFORNIA

## I. INTRODUCTION

This report presents the results of our geotechnical investigation for storm drainage and the flood control project in Corte Madera, California. This report is intended for the exclusive use of The town of Corte Madera, AN West and the design team for the project.

The project consists of determining probable settlement conditions in the Mariner Cove and Marina Village subdivisions in Corte Madera, California. The purpose of our services is to provide projected settlement information.

Our scope of services is described in our proposal dated January 11, 2006 and includes the following for geotechnical services:

- Research and review available geotechnical reference data.
- Obtain historical marsh surveys to determine the limits of the original marshes and extent of the underlying bay mud.
- Perform subsurface exploration with three borings/probes to obtain samples for laboratory testing and determine the subsurface conditions at locations where the data is lacking.
- Perform consolidation tests on undisturbed samples of bay mud to determine settlement properties and estimate the percent consolidation to date.
- Review previous survey data within the project area to determine amount of settlement that has occurred within the survey time frames.
- Expand and refine the existing bay mud contour maps (using data from above scope) to include documented bay mud areas within watersheds 5, 6 and 7.
- Perform settlement analyses to determine the estimated total settlement, rate of settlement data, approximate percent settlement complete to date, and future settlement within specified time frames (i.e. next 10, 30, 50 and 100 years).
- Documentation of our geotechnical findings in a written report.

## II. PROJECT DESCRIPTION

The project site includes the Mariner Cove and Marina Village subdivisions located north of Paradise Drive and south of Corte Madera Creek in Corte Madera, California. The project site location is shown on Figure 1. These subdivisions were constructed in the late 1950's by placement of fill material over the former marsh areas. This placement of fill material is causing consolidation of the underlying bay mud and settlement of the subdivisions. This has caused a reduce flood protection and localized flooding of the storm drainage system. The site conditions and current elevations are shown on Figure 2. The planned project will include improvements to the storm drainage system, including new pump stations and outlet pipes, to improvement drainage within the subdivisions and conceptual plans for new retaining structures to increase the flood protection for the subdivisions.

## III. SITE CONDITIONS

### A. Regional Geology

The site is located within the Coast Range Geomorphic Province of California. The regional bedrock geology consists of complexly folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock of the Jurassic-Cretaceous age (65-190 million years ago) Franciscan Complex.

Northwest-southeast trending mountain ridges and intervening valleys that were formed from tectonic activity between the North American Plate and the Pacific Plate characterize the regional topography. Extensive faulting during the Pliocene Age (1.8-7 million years ago) formed the uneven depression that is now the San Francisco Bay. More recent tectonic activity is concentrated along the San Andreas Fault zone, a complex group of generally parallel faults.

For the last 15,000 years, the sea level has continually risen (due to melting of glaciers from the Wisconsin glaciation) and flooded the lower topography. For the last 8,000 years, silt and clay particles carried in suspension in floodwater have been deposited in the San Francisco Bay to form the highly compressible "Bay mud." This process continues today. Regional geologic mapping by the California Division of Mines and Geology (CDMG) indicates that the project site consists of fill over Bay mud

### B. Review of Reference Documents

**Historic Aerial Photographs** - We reviewed historic aerial photographs available from Pacific Aerial Surveys of Oakland, California. We reviewed the photos on August 23, 2006 to obtain information about the history of the site vicinity. Most of the development in the project area occurred in the late 1950's and early 1960's with lesser levels of construction and other activity in the years before and after that period. The date, identification and notes of our aerial photograph review are summarized chronologically below and are shown on Figures 3 through 10.

September 6, 1946 (Scale 1:23,600 – AV 09-03-03)
The current alignment of Paradise Drive appears to have been recently constructed. An older roadway alignment is visible in the photograph. The area of interest, south of San Clemente Creek and north of Paradise Drive, is undeveloped at this time. Creeks and marsh areas with meandering drainages occupy most of the area.

November 8, 1950 (Scale 1:15,000 – AV 41-06-28)
Fill has been placed in two areas along the east end of Paradise Drive. No major changes are visible from the 1946 photo.

March 1, 1958 (Scale 1:36,000 – SF AREA-01-38)
Fill has been placed over the west side of the area from south of San Clemente Creek to north of Paradise Drive. Residential areas have been developed on Granada Drive, Harbor Drive and San Clemente Drive. Spindrift Passage has been built and has some development on the west end. The Railroad line has been built.

April 14, 1966 (Scale 1:36,000 – AV 710-04-21)
All current roads in the area of interest have been built and developed. Highway 101 has been built.

July 12, 1970 (Scale 1:12,000 – AV 957-06-23 )
No major changes from the 1966 photo are visible.

April 28, 1975 (Scale 1:12,000 – AV 1187-07-22)
No major changes from the 1970 photo are visible.

March 12, 1980 (Scale 1:12,000 – AV 1840-07-21)
No major changes from the 1975 photo are visible.

April 19, 1986 (Scale 1:12,000 – AV 2860-14-24)
No major changes from the 1980 photo are visible.

**Previous Geotechnical Reports** - We reviewed the following reports for relevant geotechnical data. These reports contained information regarding the thickness of bay mud at the project site. Actual boring logs were not included in the reports. The boring locations, approximate thickness of bay mud, and interpreted bay mud thickness contours from these report were utilized to supplement data from our borings and to update the bay mud thickness contours as shown on Figure 2.

- Converse Consultants, "Soil and Foundation Investigation Report, San Clemente Pump Station and Force Main", March 26, 1984, Boring Logs
- Dames and Moore, "Settlement Analysis, Mariner Cove Subdivision, Flood Control Project, City of Corte Madera, California", November 27, 1985, Appendix B
- Harding Lawson Associates, "Subsidence Study, San Clemente Creek Area, Corte Madera, California", January 8, 1991, Plate 1
- URS Corporation, "Corte Madera Tidal Protection Study", June 1988, Boring Logs

**Historical Marsh Survey** – An 1853 Marsh Survey (US Coast Survey, "San Francisco Bay Topographic Map", 1853) was reviewed to examine the limits of the former marsh area. This information was incorporated in our study to determine the approximate extent of underlying bay mud. The approximate marsh limits are shown on Figure 2.

**Previous Survey Data** - We reviewed previous survey data (Towill Inc.,1985 Topographic Map of Town of Corte Madera) within the project area to determine the amount of settlement that has occurred within the survey time frames. Combined with 2006 survey data and consolidation test results, we were able to estimate settlement to date and project future settlement rates. Spot locations with the 1985 and 2006 survey data are shown on Figure 2.

C. Surface Conditions

The site is a reclaimed marshland that was filled for residential development in the late 1950's. The surface within Mariner Cove is relatively level with an elevation roughly between 6 and 8 feet (NVGD). Within Marin a Village the surface elevations are lower at roughly between 3 and 5. Differential settlement has occurred within the subdivisions and has resulted in localized low spots that pond surface water. Currently, perimeter levees within an elevation of about 6 provide flood protection for the lower elevations of the subdivision. The site conditions and current elevations are shown on Figure 2.

D. Field Exploration and Laboratory Testing

We have utilized previous subsurface exploration and supplemented this data with three new borings to interpret subsurface conditions at the project site. The locations of previous and recent exploration are shown on Figure 2. Three exploratory borings were drilled on November 1 and 2, 2006. The soils encountered were logged and soil samples were obtained for laboratory testing. The borings were positioned where previous data was lacking. a Soil classification chart and the exploratory boring logs are presented on Figures A-1 through A-16. The subsurface exploration program is discussed in detail in Appendix A.

The laboratory testing program included moisture content, dry density, and consolidation tests. The results of the moisture content and dry density tests are presented on the boring logs. The consolidation tests are presented on Figures A-17 through A-19. The laboratory testing program is discussed in more detail in Appendix A.

E. Subsurface Conditions

The subsurface conditions are consistent with the mapped geology. The surface layer consists of about 8 to 9 feet of loose to medium dense, variable sand, clay, and gravel fill. Underlying the fill is medium stiff, silty clay that is the bay mud crust. Within a few feet, the bay mud crust transitions to saturated, soft, compressible bay mud extending to depths up to 110 feet below the fill layer. The bay mud contains minor amounts of shells, silt seams, and sand lenses. Beneath the soft bay mud is stiff old bay clays and dense clayey sands. Bedrock was not encountered in the ok borings.

## IV. EVALUATION AND DISCUSSION

### A. General

Based on our investigation, the subdivisions have undergone several feet of settlement due to consolidation of the underlying bay mud deposits. Significant settlement is expected in the future. This on-going settlement has caused localized storm drainage problems and the extent of the ponding of storm water is expected to increase in the future. Due to settlement, the current gravity flow storm drain system has a reduced capacity. New pump stations will likely be required provide adequate storm drainage during periods of high tide. In addition, the lowered elevation of the subdivision from settlement has reduced the flood protection at the site. Continued settlement, as well as, a rise in sea level will further reduce the remaining flood protection. New retaining structures will likely be required to improve flood protection without inducing new settlement at the project site. Additional discussions regarding our analyses are presented in the subsequent sections of this report.

### B. Refined Bay Mud Contours

Using the historic marsh limits, aerial photograph review, reference data, and information from our three recent soil borings, we have refined the bay mud contour maps presented in the previous geotechnical reports. The new contours also account for the topographic conditions of the surrounding hillsides. The interpreted bay mud contours are shown on Figure 2. These contours are based on widely spaced subsurface exploration, therefore and some variation from the interpreted thickness should be anticipated.

### C. Consolidation and Settlement

The project site is underlain by soft, compressible bay mud that varies in thickness from 0 to 110 feet. The fill material used to raise the original marsh elevation and develop the project site is consolidating the bay mud and causing settlement of the ground surface. We performed settlement analyses to determine the expected total settlement, approximate amount of settlement that has occurred to date, and anticipated future settlement within specified time frames (i.e. next 10, 30, 50 and 100 years).

The total amount of settlement depends on the amount of surface loading, thickness of the bay mud, and compression properties of the bay mud. Based on our borings, elevations of the undisturbed marsh areas, and known elevations in 1985. The average thickness of the fill material with the project site is 8 to 9 feet. Where previous sloughs within the marsh area were filled, the thickness of the fill material will be increased. Our laboratory testing provides consolidation properties for the bay mud and indicates that the upper 40 feet of the bay mud is normally consolidated (settlement mostly complete), but the deeper portions of the bay mud is significantly under-consolidated (settlement not complete). Based on the laboratory testing a Compression Index (Cc') of 0.32 was used in the analyses. The total calculated settlement for various thicknesses of bay mud with 8.5 feet of fill material is presented in Table A.

The rate at which settlement occurs depends on the thickness of the bay mud deposit, the distance to a drainage layer, and the vertical permeability of the bay mud. In general, the bay

mud consolidates quicker following the initial loading and slows over time. Consolidation settlement for deep bay mud often takes decades to complete. Following consolidation, secondary compression occurs but is generally a fraction of the total settlement and occurs over a much longer time. Aerial photographs were reviewed to determine that most of the fill placement at the site occurred in 1958. Using a coefficient of vertical consolidation (Cv) of 10 ft.$^2$/year, the drainage conditions were adjusted to provide a best fit for the survey data from 1985 and 2006. Double drainage conditions appear to have the best correlation with the survey data. The calculated settlement to date and expected settlement in the next 10, 30, 50 and 100 years for various thicknesses of bay mud is summarized in Table A.

Table A
Calculated Current and Future Settlement
Corte Madera Storm Drainage and Flood Control Study
Watersheds 5, 6 and 7
Corte Madera, California

| Bay Mud Thickness (feet) | Total Calculated Settlement (feet) | Calculated Settlement to Date (2006) (feet) | Estimated Future Settlement (feet) | | | |
|---|---|---|---|---|---|---|
| | | | 10 years | 30 years | 50 years | 100 years |
| 10 | 1.7 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| 20 | 3.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30 | 3.9 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| 40 | 4.7 | 4.5 | 0.1 | 0.2 | 0.2 | 0.2 |
| 50 | 5.3 | 4.6 | 0.3 | 0.5 | 0.6 | 0.7 |
| 60 | 5.7 | 4.3 | 0.3 | 0.8 | 1.0 | 1.2 |
| 70 | 6.1 | 4.1 | 0.4 | 0.9 | 1.3 | 1.8 |
| 80 | 6.4 | 3.9 | 0.3 | 1.0 | 1.4 | 2.0 |
| 90 | 6.7 | 3.5 | 0.5 | 0.9 | 1.5 | 2.2 |
| 100 | 6.9 | 3.2 | 0.7 | 1.0 | 1.5 | 2.3 |
| 110 | 7.0 | 3.1 | 0.2 | 0.8 | 1.3 | 2.2 |

Note: Settlement calculations based on 8.5 feet of fill placed in 1958, Compression Index Cc' of 0.32, Coefficient of Consolidation Cv of 10 ft2/yr, and double drainage conditions.

Actual settlements may vary from the predicted due to variations in the thickness of fill, interpreted bay mud thickness contours, bay mud consolidation characteristics, and subsurface drainage characteristics. These variations have caused differential settlement to occur within the subdivision as evidenced by the localized ponding of surface water in the streets. Additional differential settlement will likely occur in the future.

## V. SUPPLEMENTAL SERVICES

We should provide supplemental geotechnical consultion and investigation during the planning and design of the project. During the planning process we will be available to respond to geotechnical issues and attend project meetings as requested. During design, a geotechnical investigation should be performed to provide geotechnical recommendations and criteria for the design for the planned improvements. We should review the improvement plans and specifications when they are nearing completion to confirm that the intent of our recommendations has been incorporated.

During construction, geotechnical inspection and testing should be performed to confirm subsurface conditions are as expected and to confirm the geotechnical portions of the Contractors work is performed in accordance with the contract documents.

## LIST OF REFERENCES

American Society for Testing and Materials, "2000 Annual book of ASTM Standards, Section 4, Construction, Volume 4.08, Soil and Rock; Dimension Stone; Geosynthetics," ASTM, Philadelphia, 2000.

Bonaparte, M. and Mitchell, J.K. (1979), "The Properties of San Francisco Bay mud at Hamilton Air Force Base, California," Department of Civil Engineering Institute of Transportation and Traffic Engineering, University of California, Berkeley, April 1979.

California Department of Conservation, Division of Mines and Geology, "Geology for Planning: Central and Southeast Marin County, California," Open File Report 76-2, 1976.

California Division of Mines and Geology, "Geologic and Engineering Aspects of San Francisco Bay Fill," Special Report 97, Ferry Building, San Francisco, 1969.

California Department of Transportation (Caltrans), Standard Specifications, 2000.

Converse Consultants, "Soil and Foundation Investigation Report, San Clemente Pump Station and Force Main", March 26, 1984, Boring Logs

Dames and Moore, "Settlement Analysis, Mariner Cove Subdivision, Flood Control Project, City of Corte Madera, California", November 27, 1985, Appendix B

Harding Lawson Associates, "Subsidence Study, San Clemente Creek Area, Corte Madera, California", January 8, 1991, Plate 1

Miller Pacific Engineering Group, "Geotechnical Investigation, Highway 101 Sewer Undercrossing, Corte Madera, California," Project No. 217.02, August 28, 1991.

Miller Pacific Engineering Group, "Geotechnical Investigation, Marin Country Day School Improvements, Corte Madera, California," Project No. 278.01, February 23, 1993.

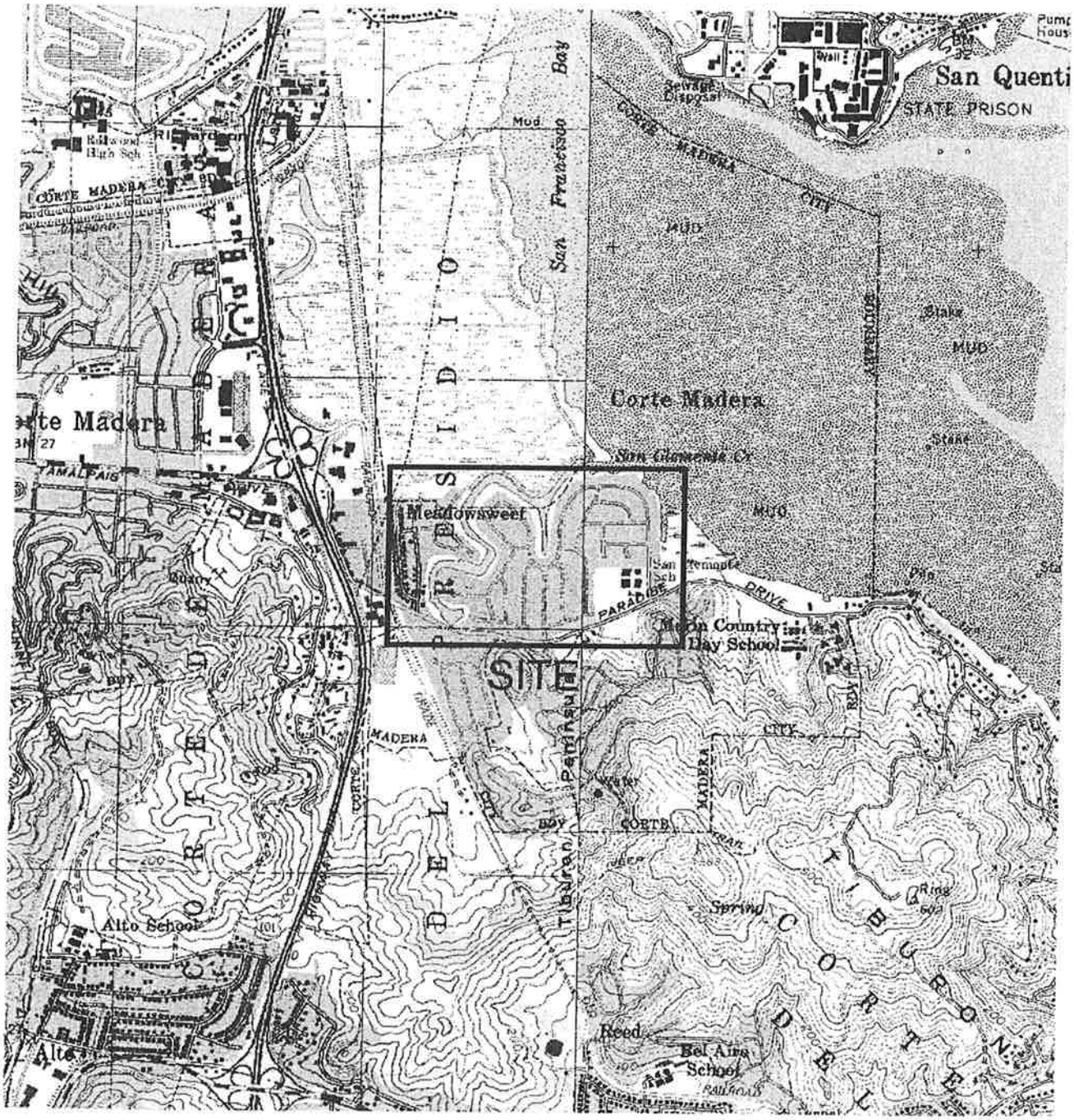
Miller Pacific Engineering Group, "Geotechnical Investigation, San Clemente Drive – Redwood Highway Force Main, Corte Madera, California," Project No. 217.04, January 19, 1993.

Miller Pacific Engineering Group, "Geotechnical Investigation, 801 Tamalpais Drive, Corte Madera, California," Project No. 343.01, April 9, 1996.

Pacific Aerial Survey, Aerial Photographs: AN 09-03-03 (1946), AN 41-06-28 (1950)...see report Towill Inc., Topographic Map of Town of Corte Madera, Sheets L, M, P & Q, 1985.

URS Corporation, "Corte Madera Tidal Protection Study", June 1988, Boring Logs

1853 Marsh Survey (US Coast Survey, "San Francisco Bay Topographic Map", 1853)




# SITE LOCATION

SCALE

0 1000 2000 4000 FEET

0 500 1000 METERS

NORTH

REFERENCE: DeLorme 3D TopoQuads, 1999



FILE: Site Map.dwg

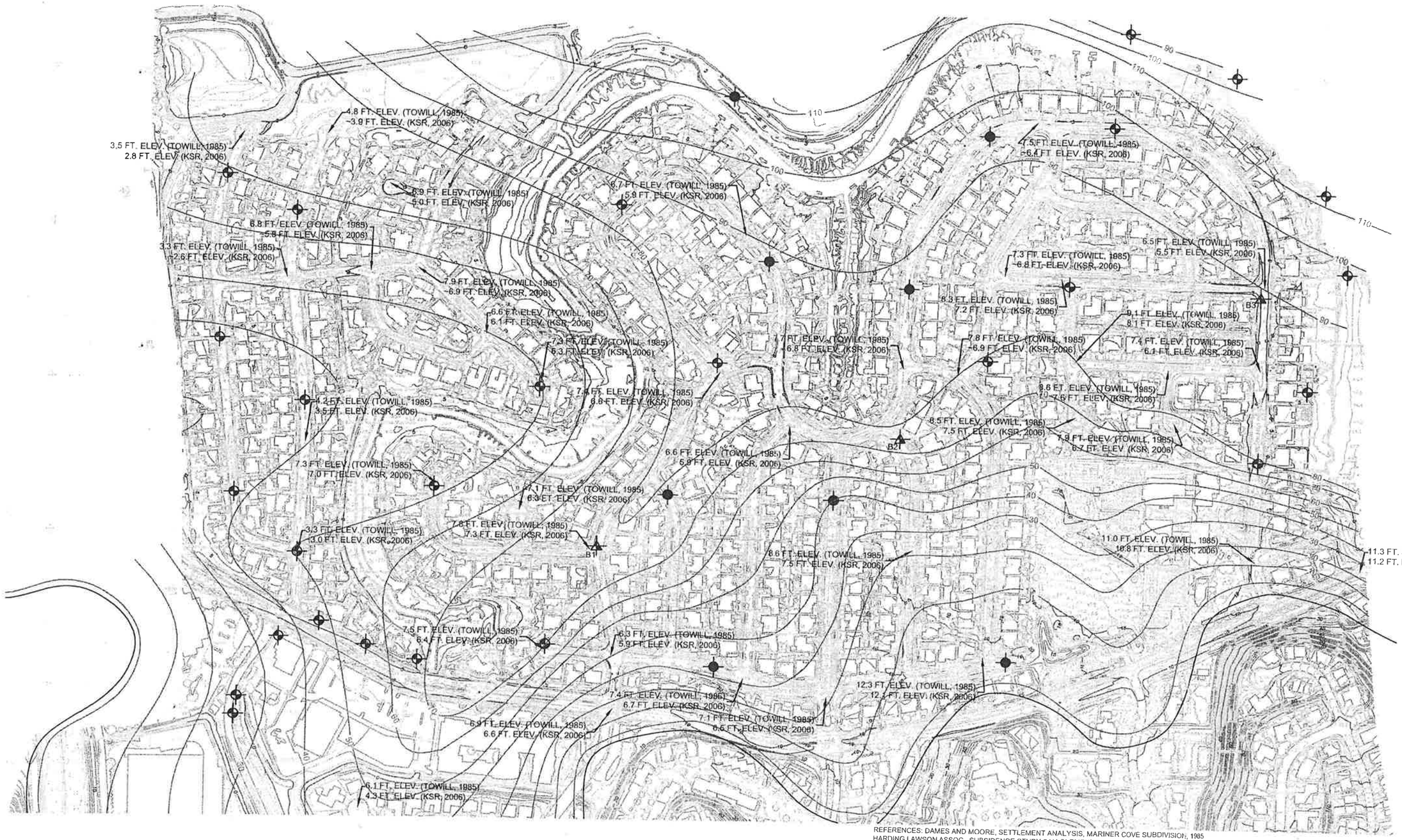
**Miller Pacific**
ENGINEERING GROUP

SITE LOCATION MAP
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

1

Project No. 285.06 Date 1/9/07 Approved By:

Figure




BORINGS BY MILLER PACIFIC, 2006

BORINGS BY OTHERS 1987 AND PRIOR

CONE PENETROMETER TESTS BY OTHERS, 1985 AND PRIOR

— 90 — ESTIMATED BAY MUD THICKNESS CONTOUR

1853 MARSH BOUNDARY

NORTH

SCALE

0 150 300 600 FEET

REFERENCES: DAMES AND MOORE, SETTLEMENT ANALYSIS, MARINER COVE SUBDIVISION, 1985
HARDING LAWSON ASSOC., SUBSIDENCE STUDY SAN CLEMENTE CREEK AREA, 1991
URS, CORTE MADERA TIDAL PROTECTION STUDY, 1988
TOWILL INC., TOPOGRAPHIC MAP OF TOWN OF CORTE MADERA, 1985


FILE: xxx.dwg

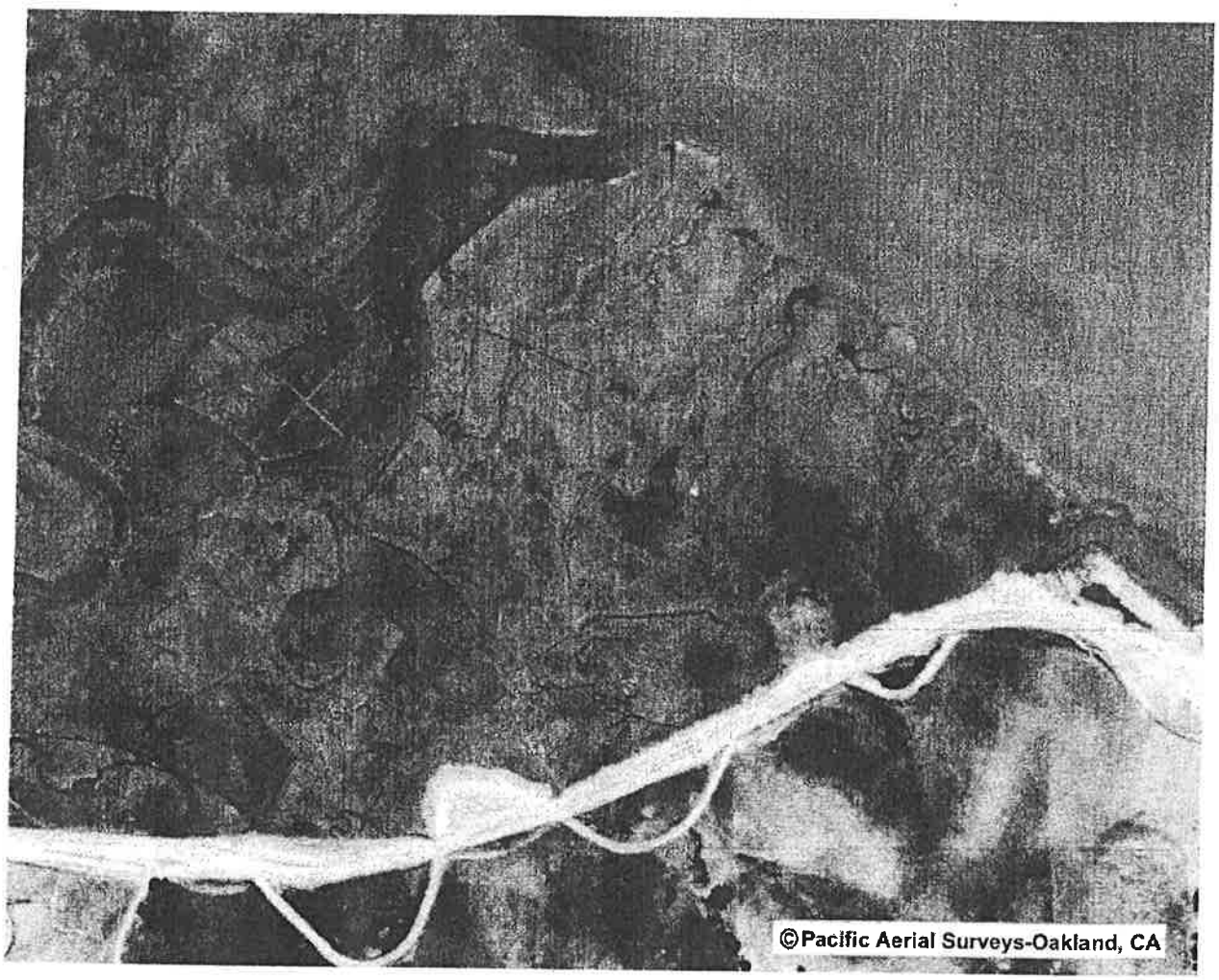
**Miller Pacific**
ENGINEERING GROUP

BAY MUD CONTOUR MAP
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

2

Project No. 285.06 | Date 1/9/07 | Approved By:

Figure





FILE: FILE: 285.06Fig3-10.dwg

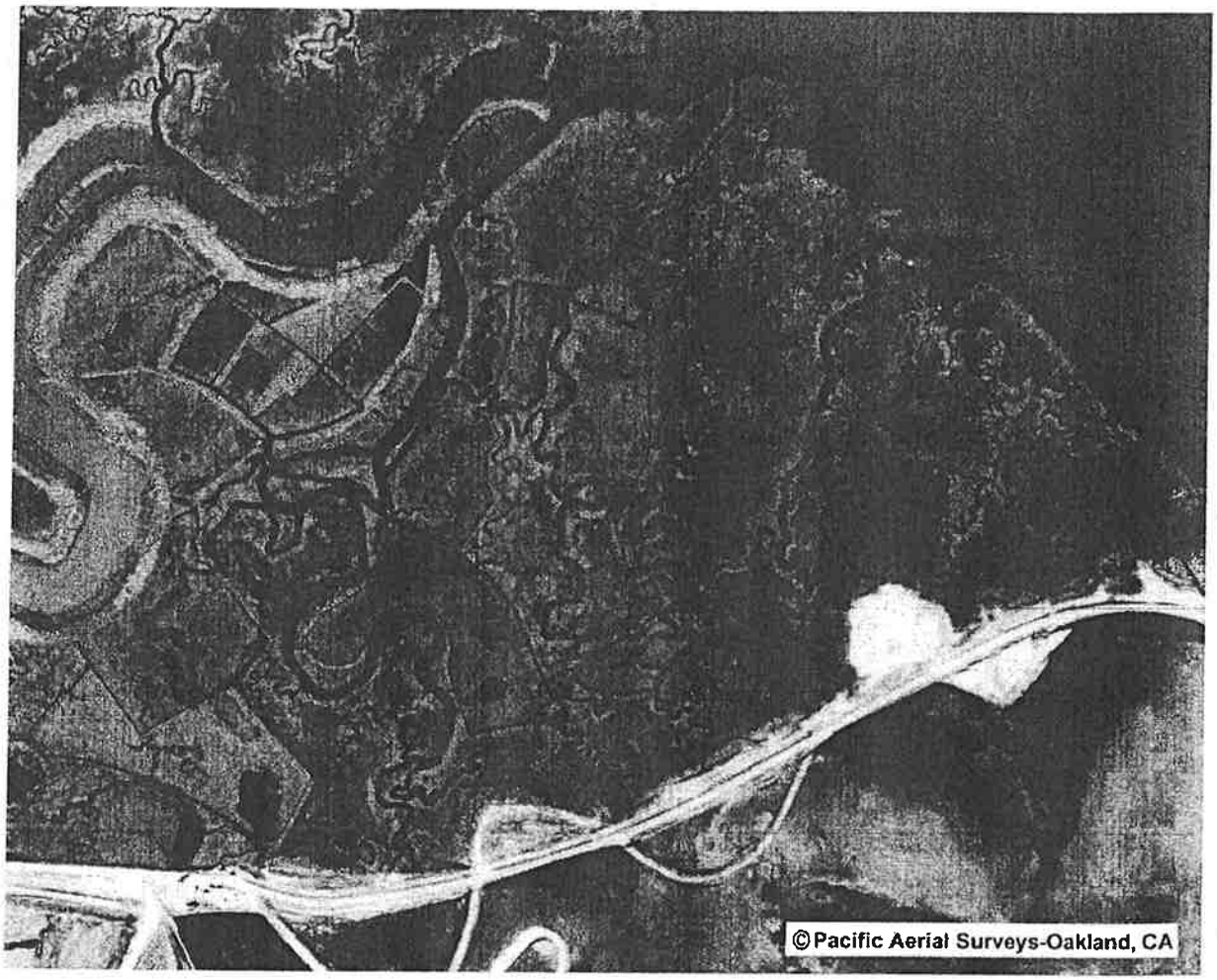
**Miller Pacific**
ENGINEERING GROUP

1946 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

3

Project No. 285.06 Date 1-8-06 Approved By:

Figure





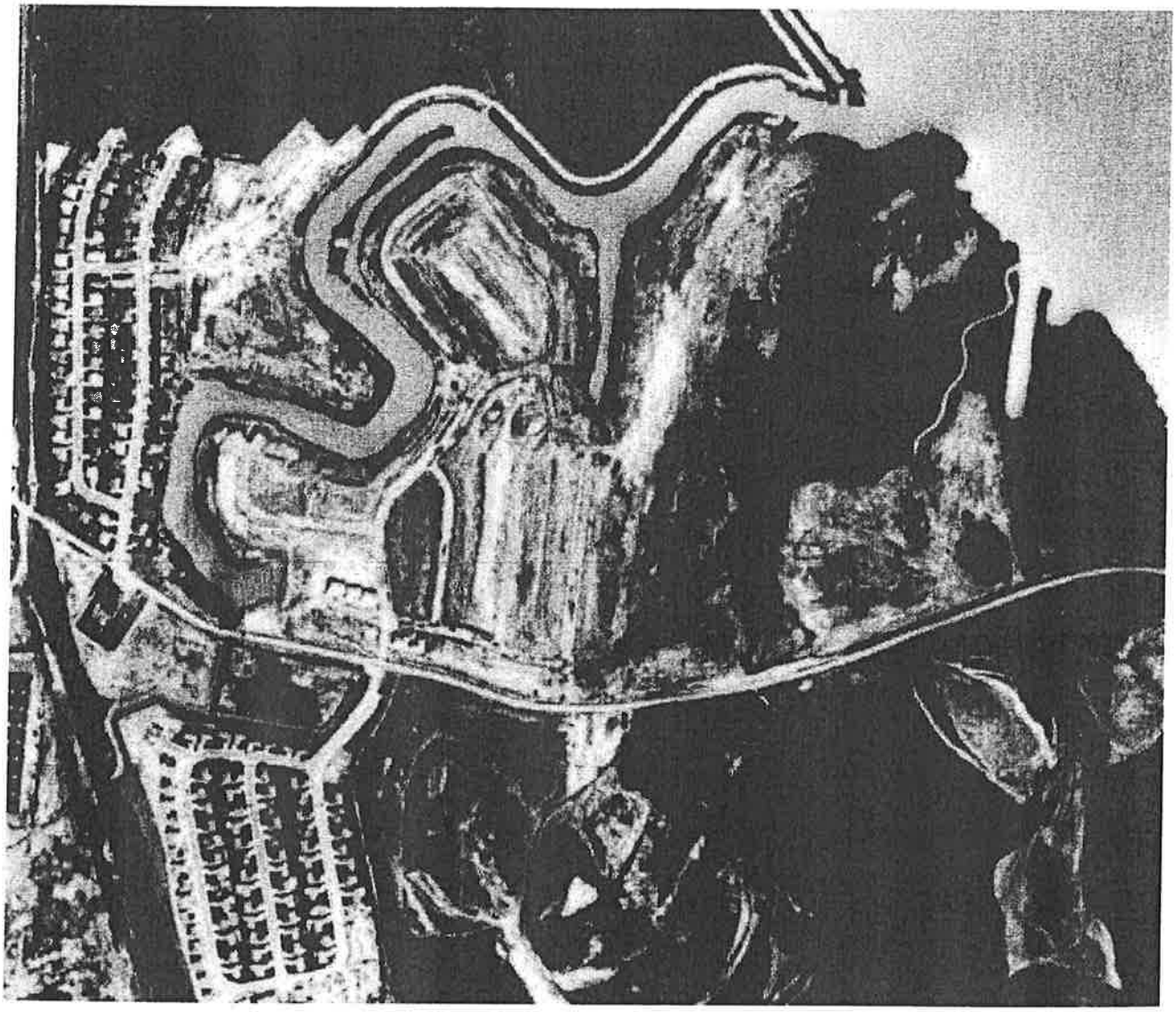
FILE: FILE: 285.06Fig3-10.dwg

**Miller Pacific**
ENGINEERING GROUP

1950 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

4

| Project No. | 285.06 | Date | 1-8-06 | Approved By: | Figure |
|---|---|---|---|---|---|




FILE: FILE: 285.06Fig3.dwg

**Miller Pacific**
ENGINEERING GROUP

1958 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

5

| Project No. | 285.06 | Date | 1-8-06 | Approved By: | Figure |
|---|---|---|---|---|---|



FILE: FILE: 285.06Fig3.dwg

**Miller Pacific**
ENGINEERING GROUP

1966 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

6

| Project No. | 285.06 | Date | 1-8-06 | Approved By: | Figure |
|---|---|---|---|---|---|



FILE: FILE: 285.06Fig3.dwg

**Miller Pacific**
ENGINEERING GROUP

1970 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

Project No. 285.06 Date 1-8-06 Approved By:



FILE: FILE: 285.06Fig3.dwg

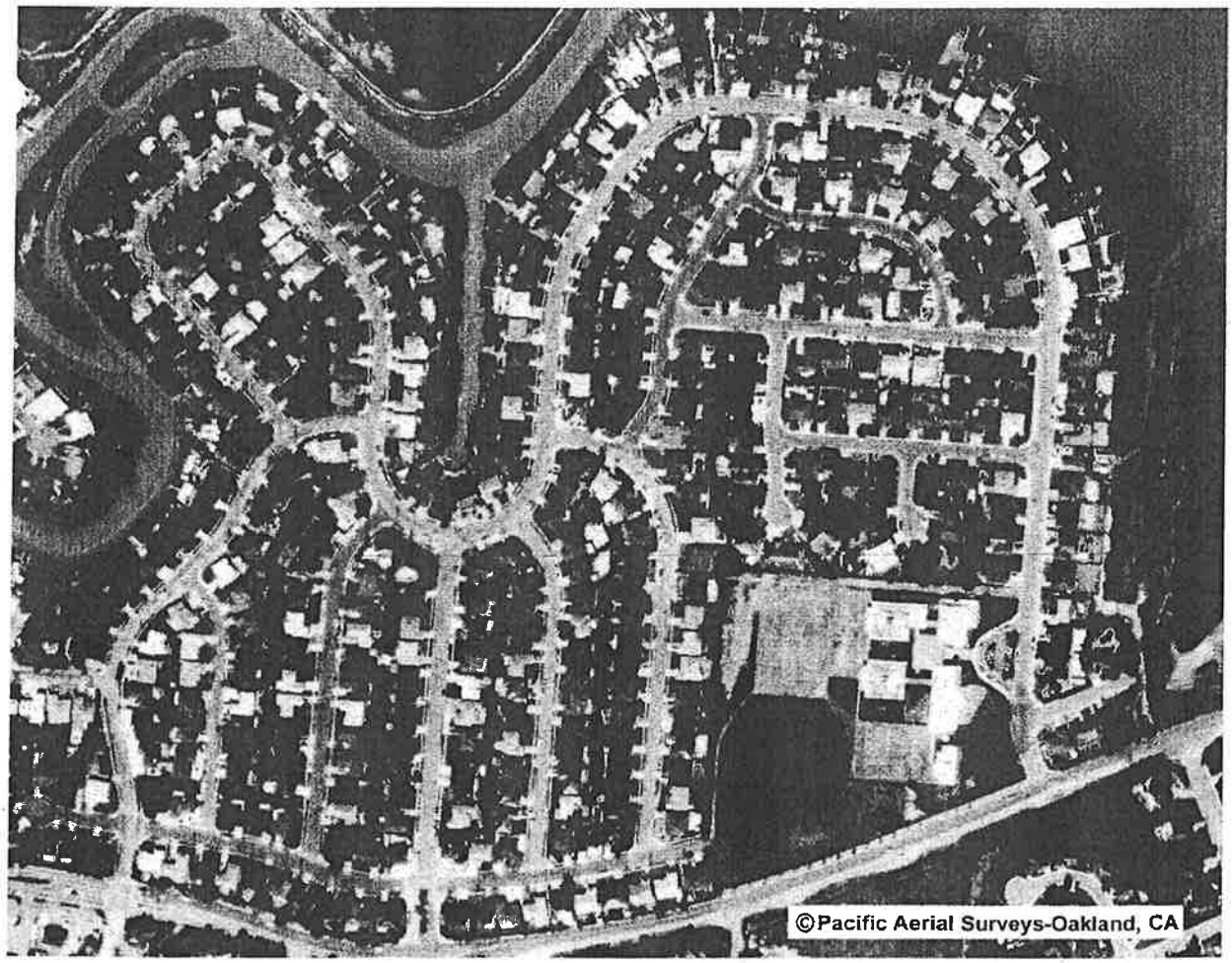
**Miller Pacific**
ENGINEERING GROUP

1975 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

8

Project No. 285.06 | Date 1-8-06 | Approved By:

Figure





FILE: FILE: 285.06Fig3.dwg

**Miller Pacific**
ENGINEERING GROUP

1980 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

9

| Project No. | 285.06 | Date | 1-8-06 | Approved By: | Figure |
|---|---|---|---|---|---|



FILE: FILE: 285.06Fig3.dwg

**Miller Pacific**
ENGINEERING GROUP

1986 Aerial Photograph
Corte Madera Storm Drainage and Flood Control
Corte Madera, California

10

| Project No. | 285.06 | Date | 1-8-06 | Approved By: | Figure |
|---|---|---|---|---|---|

# APPENDIX A

## SUBSURFACE EXPLORATION AND LABORATORY TESTING

### 1.0 SUBSURFACE EXPLORATION

We explored subsurface conditions at the site by drilling 3 exploratory borings on November 1 and 2, 2006 at the locations shown on Figure 2. Test borings were drilled to a depth between 86.5 and 96.5 feet using a hollow-stem auger with a diameter of 8 inches and rotary wash equipment.

The soils encountered were logged and identified by our Engineer in general accordance with ASTM Standard D 2487, "Field Identification and Description of Soils (Visual-Manual Procedure)." This standard is briefly explained on Figure A-1, Soil Classification Chart and Key to Log Symbols. The boring logs are presented on Figures A-2 to A-16.

We obtained "undisturbed" samples using a 3-inch diameter, split-barrel California sampler with 2.5 by 6-inch brass tube liners. The sampler was driven with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler 18 inches was recorded and is reported on the boring logs as blows per foot for the last 12 inches of driving. The samples obtained were examined in the field, sealed to prevent moisture loss, and transported to our laboratory.

In the soft bay mud we used a hydraulic shelby sampler. This sampler consists of a 3 inch diameter thin wall sample tube 36 inches long fitted to a movable piston head inside the sampler body. After the sampler is lowered to the bottom of the boring, pressure from the drilling fluid is used to eject the sample tube and press it into the undisturbed soil. The sample is taken without impact, rotation or other disturbance. After the sampler is withdrawn, the entire 36-inch thin-walled tube is sealed and transferred to the laboratory. Special care is taken with the samples during transport and storage to protect them from disturbance.

### 2.0 LABORATORY TESTING

We conducted laboratory tests on selected intact samples to verify field identifications and to evaluate engineering properties. The following laboratory tests were conducted in accordance with the ASTM standard test method cited:

- Unconfined Compressive Strength of Cohesive Soil, ASTM D 2166;
- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216;
- Density of Soil in Place by the Drive-Cylinder Method, ASTM D 2937;
- One-Dimensional Consolidation Properties of Soils, ASTM D 2435; and

The moisture content and dry density test results are shown on the exploratory boring logs, Figures A-2 through A-16. The consolidation tests are shown on Figures A-17 through A-19.

The exploratory boring logs, description of soils encountered and the laboratory test data reflect conditions only at the location of the test pit at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate and changes in surface and subsurface drainage.

# SOIL CLASSIFICATION CHART

| MAJOR DIVISIONS | | SYMBOL | | DESCRIPTION |
|---|---|---|---|---|
| COARSE GRAINED SOILS over 50% sand and gravel | CLEAN GRAVEL | GW | | Well-graded gravels or gravel-sand mixtures, little or no fines |
| | | GP | | Poorly-graded gravels or gravel-sand mixtures, little or no fines |
| | GRAVEL with fines | GM | | Silty gravels, gravel-sand-silt mixtures |
| | | GC | | Clayey gravels, gravel-sand-clay mixtures |
| | CLEAN SAND | SW | | Well-graded sands or gravely sands, little or no fines |
| | | SP | | Poorly-graded sands or gravely sands, little or no fines |
| | SAND with fines | SM | | Silty sands, sand-silt mixtures |
| | | SC | | Clayey sands, sand-clay mixtures |
| FINE GRAINED SOILS over 50% silt and clay | SILT AND CLAY liquid limit <50% | ML | | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity |
| | | CL | | Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays |
| | | OL | | Organic silts and organic silt-clays of low plasticity |
| | SILT AND CLAY liquid limit >50% | MH | | Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts |
| | | CH | | Inorganic clays of high plasticity, fat clays |
| | | OH | | Organic clays of medium to high plasticity |
| HIGHLY ORGANIC SOILS | | PT | | Peat, muck, and other highly organic soils |
| ROCK | | | | Undifferentiated as to type or composition |

# KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

| | |
|---|---|
| AL | ATTERBERG LIMITS TEST |
| SA | SIEVE ANALYSIS |
| HYD | HYDROMETER ANALYSIS |
| P200 | PERCENT PASSING NO. 200 SIEVE |
| P4 | PERCENT PASSING NO. 4 SIEVE |

STRENGTH TESTS

| | |
|---|---|
| TV | FIELD TORVANE (UNDRAINED SHEAR) |
| UC | LABORATORY UNCONFINED COMPRESSION |
| TXCU | CONSOLIDATED UNDRAINED TRIAXIAL |
| TXUU | UNCONSOLIDATED UNDRAINED TRIAXIAL |
| | UC, CU, UU = 1/2 Deviator Stress |

SAMPLER TYPE

UNDISTURBED CORE SAMPLE: MODIFIED CALIFORNIA OR HYDRAULIC PISTON SAMPLE

STANDARD PENETRATION TEST SAMPLE

X DISTURBED OR BULK SAMPLE

ROCK OR CORE SAMPLE

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in locations and with the passage of time. Lines defining interface between differing soil or rock description are approximate and may indicate a gradual transition.

FILE: SoilClass.dwg


**Miller Pacific**
ENGINEERING GROUP

SOIL CLASSIFICATION CHART
AN West Flood Control
Corte Madera, California

A-1

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# BORING 1

EQUIPMENT: B57 Rubber Tire Rig with 8-inch Hollow Stem Auger
DATE: 11-1-06
ELEVATION: 7.5-Feet*
*REFERENCE: AN West Topo Map used for Elevation

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters | DEPTH feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | 0 | | | 0 to 4 inches: AC |
| | | | | | | | | | SANDY GRAVEL WITH CLAY (GC) (FILL) brown to olive gray, moist, dense |
| | | 32 | 9.5 | 117 | 1 | | | | GRAVELLY SANDY SILT (ML) (FILL) olive gray, moist to wet, medium dense to dense, bay mud lenses, gravel to 3.5-in. |
| | | | | | | 5 | | | SANDY SILT WITH GRAVEL (ML) (FILL) blue-gray and black mottling, moist to wet, medium-stiff to stiff |
| | | | | | 2 | | | | |
| | | | | | 3 | 10 | | | SILTY CLAY (CH) (BAY MUD) blue-gray, wet, very soft to soft, organic odor, minor fine to medium-grained sand |
| | | | | | 4 | | | | |
| | | | | | | 15 | | | |
| | | | | | 5 | | | | |
| | | push | | | 6 | 20 | | | blue-gray, wet, soft, occasional shells, strong organic odor |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06BoringLogs.dwg


**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-2

Project No. 285.06 Date 11/10/06 Approved By:

Figure

# BORING 1 (CONTINUED)

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| consol | | push | 97.6 | 44.5 | 20 / 7 / 25 / 8 / 9 / 30 / 10 / 35 / 11 / 12 / 40 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft, occasional shells, strong organic odor |
| | | push | | | | | | |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY



**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-3

Project No. 285.06 Date 11/10/06 Approved By:

Figure

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | BORING 1 (CONTINUED) |
|---|---|---|---|---|---|---|---|---|
| consol | | push | 75.0 | 52 | 40<br>13<br>45<br>14<br>15<br>50<br>16<br>55<br>17<br>18<br>60 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft, strong organic odor |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06Boring Logs.dwg


**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-4

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# BORING 1 (CONTINUED)

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 60 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft, strong organic odor |
| | | | | | 19 | | | |
| | | | | | 65 | | | |
| | | | | | 20 | | | |
| | | push | 83.0 | 50 | | | | |
| | | | | | 21 | | | |
| | | | | | 70 | | | |
| | | | | | 22 | | | |
| | | | | | 75 | | | |
| | | | | | 23 | | | |
| | | | | | 24 | | | |
| | | | | | 80 | | | |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY



**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-5

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# BORING 1 (CONTINUED)

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 80 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft, strong organic odor |
| | | | | | 25 | | | |
| | | | | | 85<br>26 | | | SILTY CLAY (CH) (OLD BAY MUD)<br>greenish-gray, wet, stiff, high plasticity clay |
| | | 14 | 49.5 | | | | | |
| | | | | | 27 | | | Bottom of boring at 87.5 ft. |
| | | | | | 90 | | | |
| | | | | | 28 | | | |
| | | | | | 95<br>29 | | | |
| | | | | | 30 | | | |
| | | | | | 100 | | | |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY



**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-6

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# BORING 2

EQUIPMENT: B57 Rubber Tire Rig with 8-inch Hollow Stem Auger
DATE: 11-2-06
ELEVATION: 7.5-Feet*
*REFERENCE: AN West Topo Map used for Elevation

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 – 0 | | | 0 to 6 inches: AC |
| | | | | | | | | SANDY GRAVEL WITH CLAY (GC) (FILL) olive gray, moist, dense |
| | | | | | – 1 – 5 | | | SANDY GRAVEL (GC) (FILL) brown, wet, dense, gravel to 3.5 inches |
| | | | | | – 2 | | | |
| | | 6 | 156.1 | 31 | – 3 – 10 | | | SILTY CLAY (CH) (BAY MUD) dark gray to greenish gray, wet, soft, organic odor, occasional medium-grained sand, occasional peat lenses |
| | | | | | – 4 | | | |
| | | | | | 15 | | | |
| | | | | | – 5 | | | |
| | | push | | | – 6 – 20 | | | gray, wet, soft, organic odor |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06BoringLogs.dwg

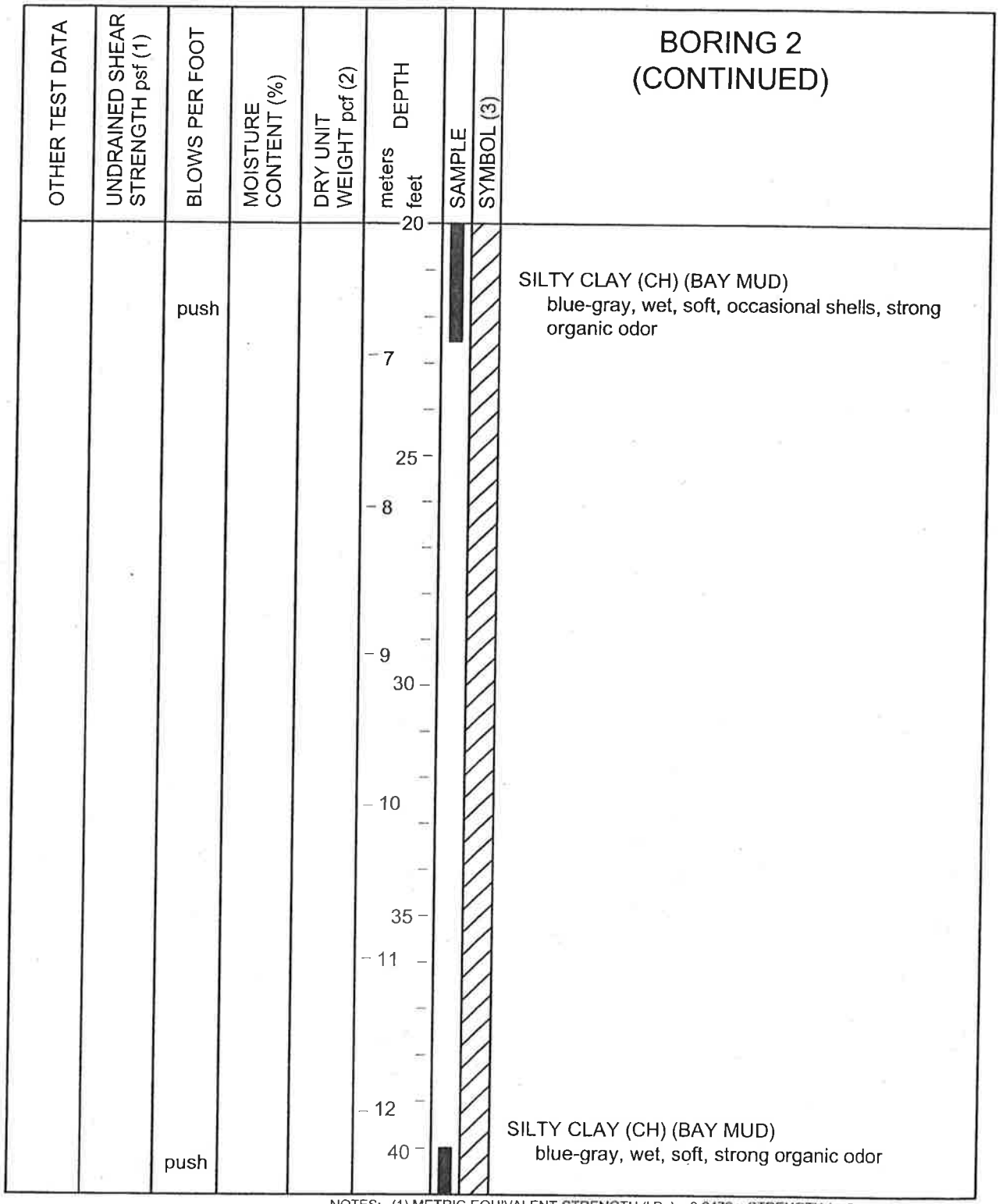

**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-7

Project No. 285.06 | Date 11/10/06 | Approved By:

Figure




NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06 BoringLogs.dwg


**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-8

Project No. 285.06 Date 11/10/06 Approved By:

Figure

# BORING 2 (CONTINUED)

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 40 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft-medium stiff, organic odor |
| | | push | | | 13 | | | |
| | | | | | 45 | | | |
| | | | | | 14 | | | |
| | | | | | 15 | | | |
| | | | | | 50 | | | Same as above |
| | | | | | 16 | | | |
| | | | | | 55 | | | |
| | | | | | 17 | | | |
| | | | | | 18 | | | |
| | | push | | | 60 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft-medium stiff, organic odor |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06Boring Logs.dwg


**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-9

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# BORING 2 (CONTINUED)

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | 5 | 73.7 | | 60 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft, strong organic odor |
| | | | | | 19 | | | |
| | | | | | 65<br>20 | | | |
| | | | | | 21 | | | Same as above |
| | | | | | 70 | | | |
| | | | | | 22 | | | |
| | | | | | 75<br>23 | | | |
| | | | | | 24 | | | |
| | | | | | 80 | | | SILTY CLAY (CH) (BAY MUD)<br>blue-gray, wet, soft, strong organic odor |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06Boring Logs.dwg

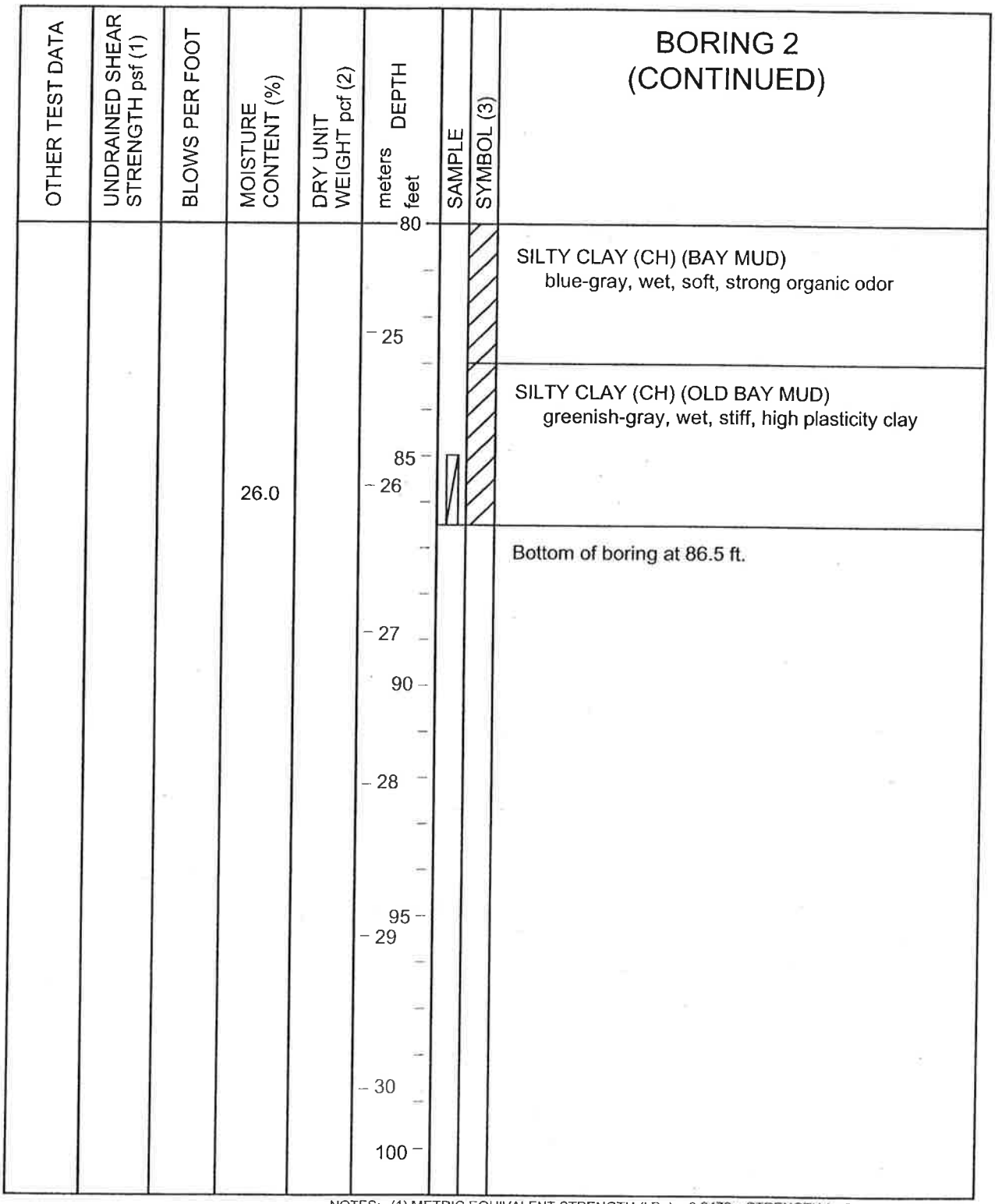

**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-10

Project No. 285.06 Date 11/13/06 Approved By:

Figure




NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06 Boring Logs.dwg


**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-11

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# BORING 3

EQUIPMENT: B57 Rubber Tire Rig with 8-inch Hollow Stem Auger
DATE: 11-2-06
ELEVATION: 7.5-Feet*
*REFERENCE: AN West Topo Map used for Elevation

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 – 0 | | | 0 to 6 inches: AC |
| | | 15 | 10.1 | 113 | – 1 | | | SANDY CLAYEY GRAVEL (GC) (FILL)<br>brown to gray, dry to moist, loose |
| | | | | | 5 | | | |
| | | | | | – 2 | | | Same as above |
| | | | | | – 3 10 | | | SILTY CLAY (CH) (BAY MUD)<br>dark to light gray, wet, soft, organic odor, occasional fine to medium-grained sand |
| | | | | | – 4 | | | |
| | | | | | 15 | | | |
| | | | | | – 5 | | | |
| | | | | | – 6 20 | | | Same as above |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m$^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06BoringLogs.dwg

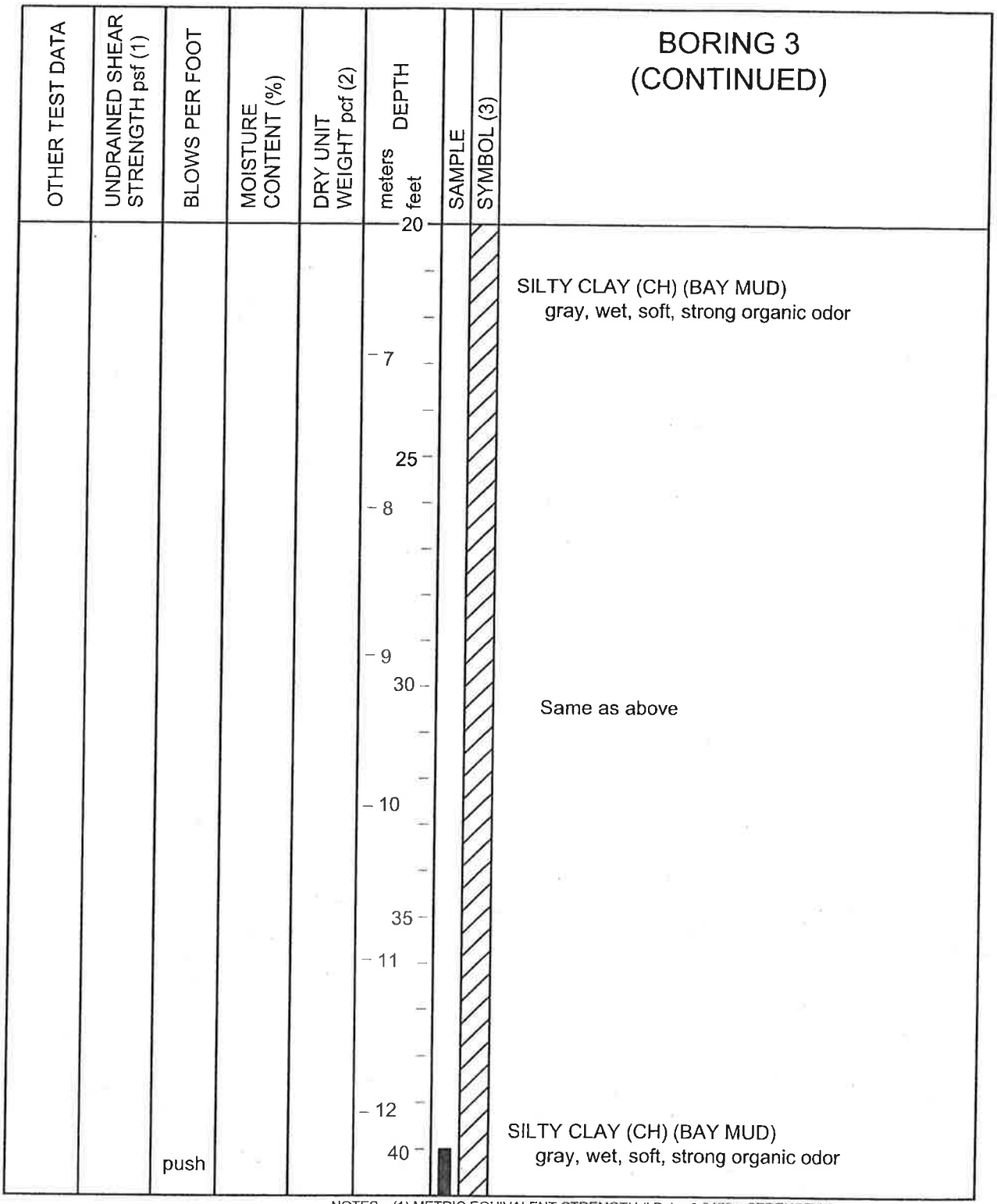

**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-12

Project No. 285.06 Date 11/10/06 Approved By:

Figure




NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY



**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-13

Project No. 285.06 Date 11/10/06 Approved By:

Figure

# BORING 3 (CONTINUED)

| OTHER TEST DATA | UNDRAINED SHEAR STRENGTH psf (1) | BLOWS PER FOOT | MOISTURE CONTENT (%) | DRY UNIT WEIGHT pcf (2) | DEPTH meters / feet | SAMPLE | SYMBOL (3) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 40 | | | SILTY CLAY (CH) (BAY MUD) gray, wet, soft, organic odor |
| | | push | | | 13 | | | |
| | | | | | 45 14 | | | |
| | | | | | 15 | | | |
| | | | | | 50 | | | Same as above |
| | | | | | 16 | | | |
| | | | | | 55 17 | | | |
| | | | | | 18 | | | |
| | | push | | | 60 | | | SILTY CLAY (CH) (BAY MUD) gray, wet, soft, organic odor |

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06Boring Logs.dwg

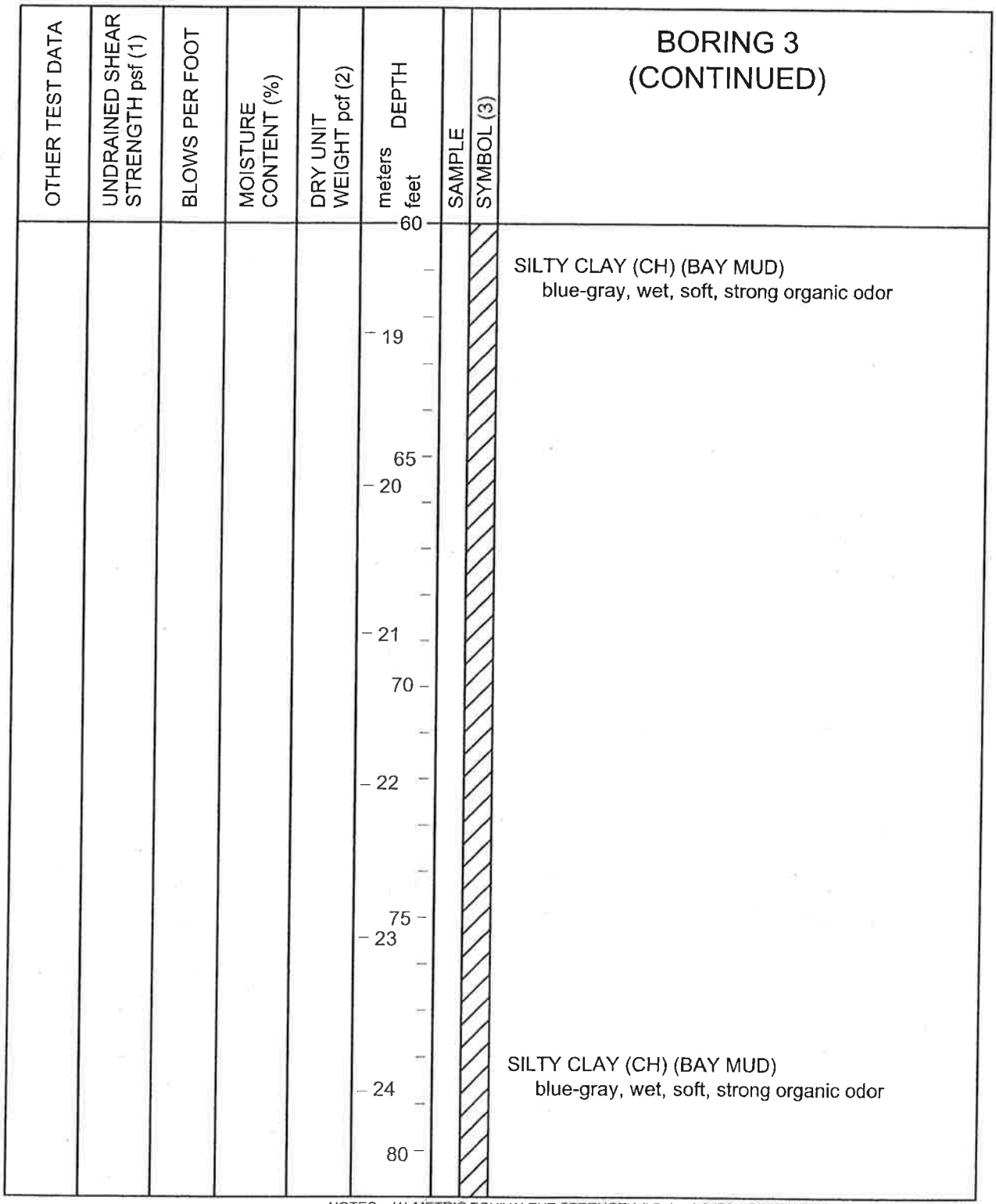

**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-14

Project No. 285.06 Date 11/13/06 Approved By:

Figure




NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06Boring Logs.dwg

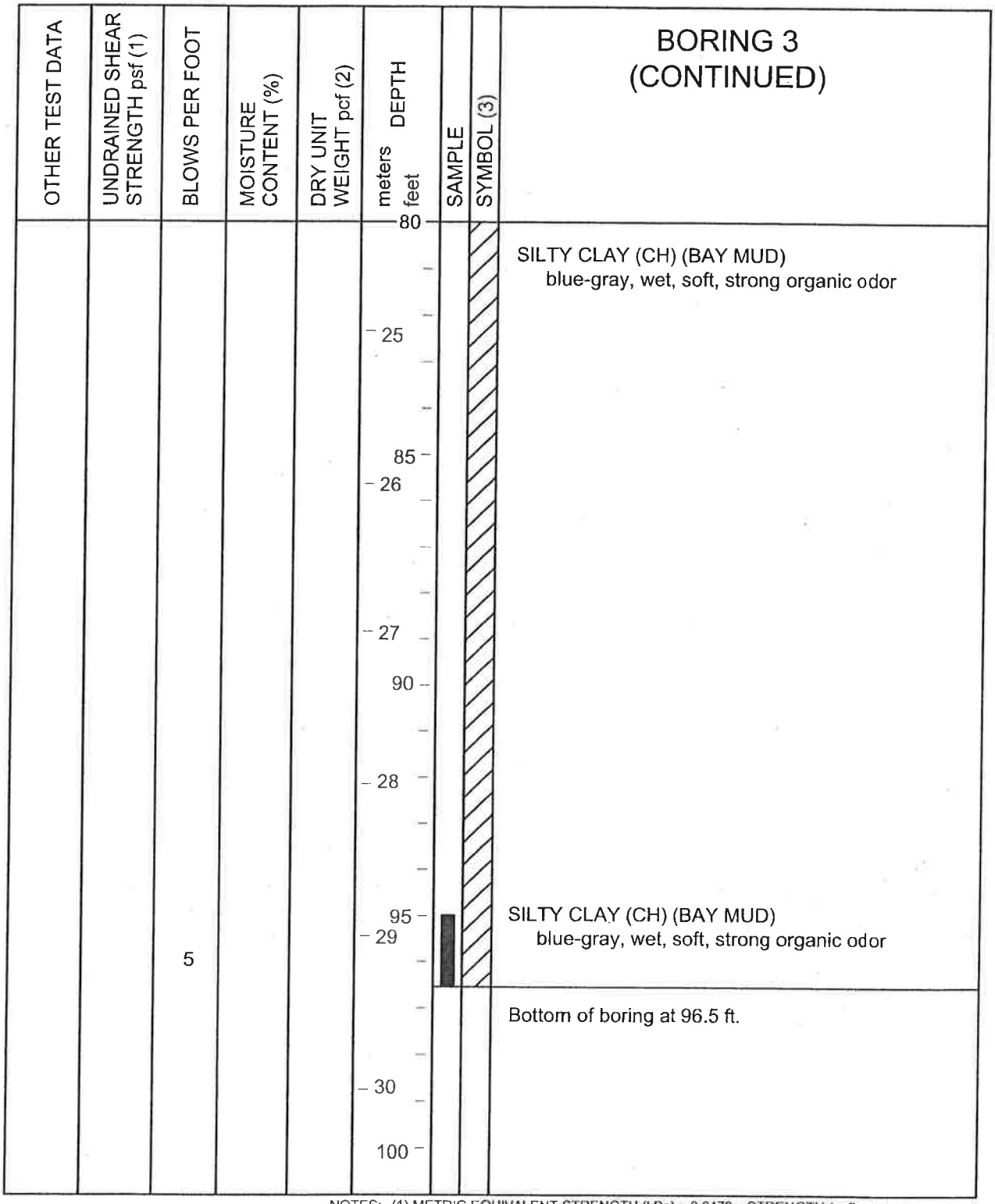

**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

A-15

Project No. 285.06 Date 11/13/06 Approved By:

Figure




NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $kN/m^3$ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: 285.06 Boring Logs.dwg


**Miller Pacific**
ENGINEERING GROUP

BORING LOG
AN West Flood Control
Corte Madera, California

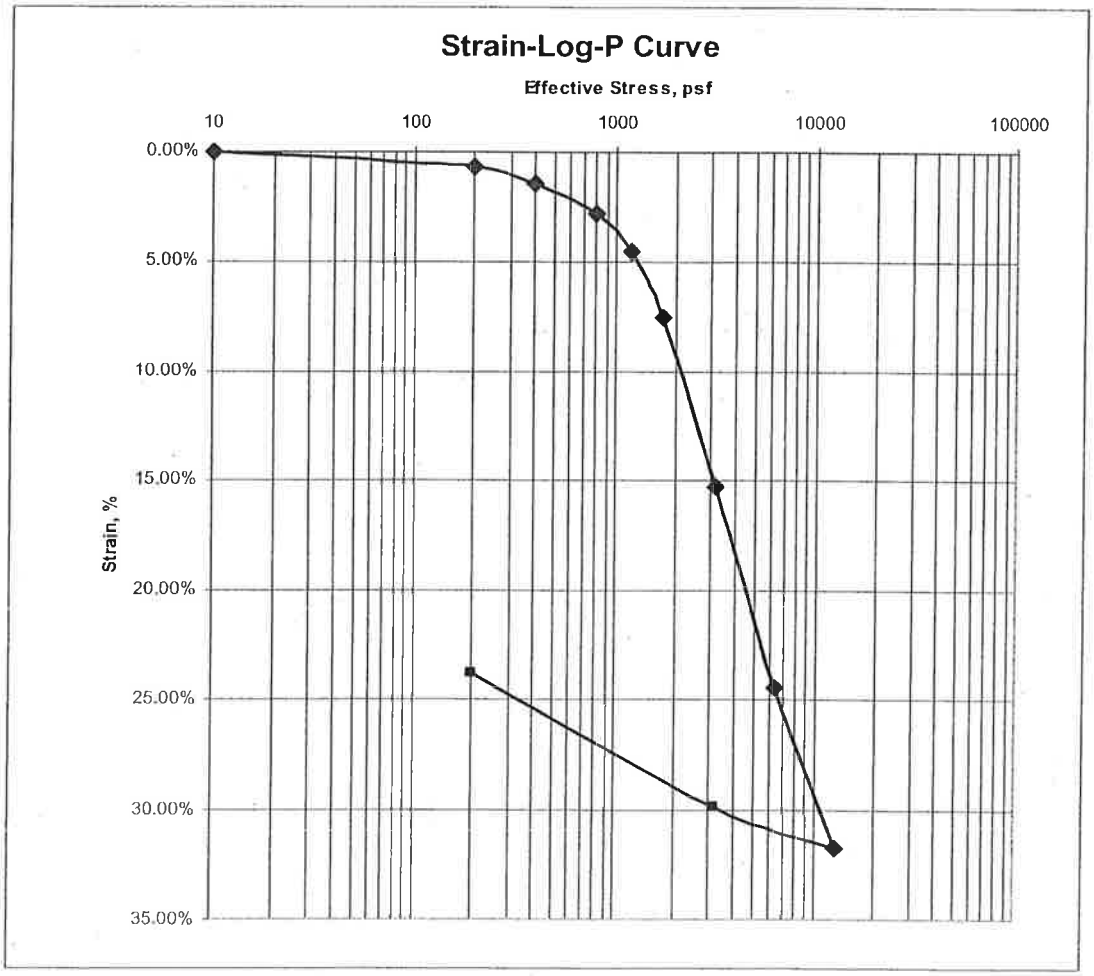
A-16

Project No. 285.06 Date 11/13/06 Approved By:

Figure

# Consolidation Test
## ASTM D2435

| | | | | | |
|---|---|---|---|---|---|
| **Job No.:** | 285.06 | **Boring:** | 1 | **Run By:** | kb |
| **Client:** | AN West | **Depth, ft.:** | 22 | **Reduced:** | sas |
| **Project:** | Corte Madera Flood Control | **Date:** | 11/7/2006 | **Checked:** | sas |
| **Soil Type:** | Gray Silty Clay (CH) (bay mud) | | | | |




| Ass. Gs = 2.68 | Initial | Final |
|---|---|---|
| **Moisture %:** | 97.6 | 63.5 |
| **Dry Density, pcf:** | 44.5 | 62.0 |
| **Void Ratio:** | 2.757 | 1.700 |
| **% Saturation:** | 94.9 | 100 |

**Remarks:**


FILE: 285.06 Fig16.dwg

**Miller Pacific**
ENGINEERING GROUP

Consolidation Test 1
Corte Madera Storm Drainage & Flood Control
Corte Madera, California

A-17

Project No. 285.06 | Date 1/9/07 | Approved By:

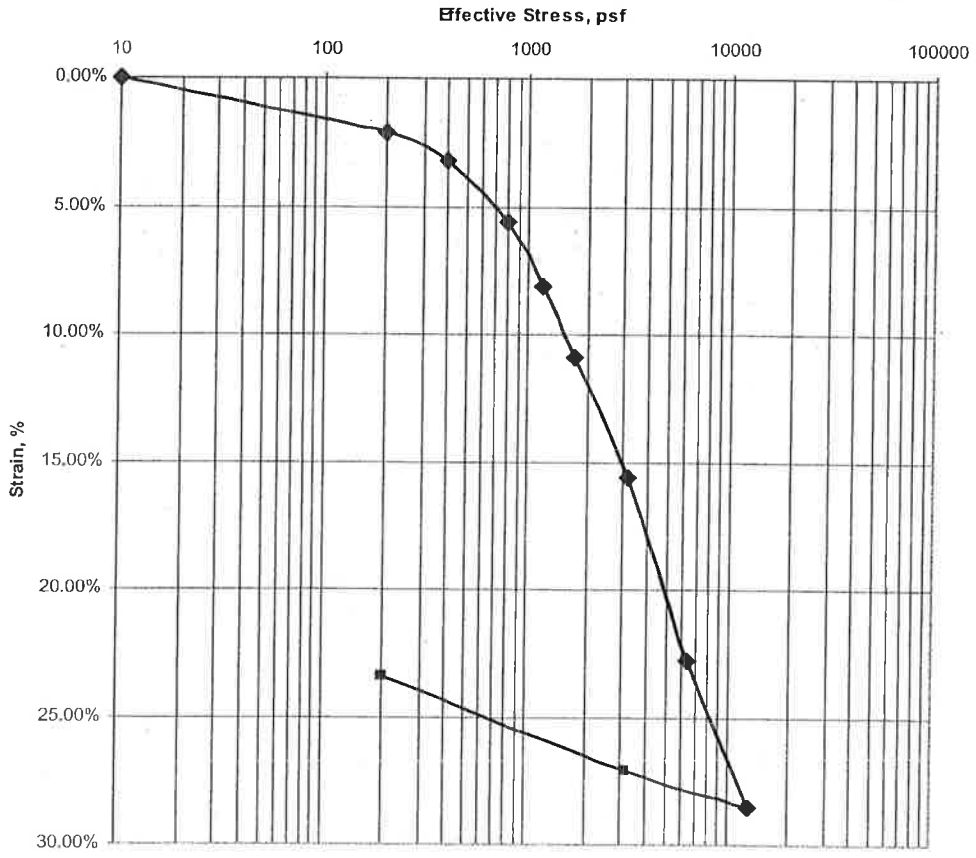
Figure

# Consolidation Test

**ASTM D2435**

| | | | | | |
|---|---|---|---|---|---|
| **Job No.:** | 285.06 | **Boring:** | 1 | **Run By:** | kb |
| **Client:** | AN West | **Depth, ft.:** | 41.5 | **Reduced:** | sas |
| **Project:** | Corte Madera Flood Control | **Date:** | 11/117/2005 | **Checked:** | sas |
| **Soil Type:** | Gray Silty Clay (CH) (bay mud) | | | | |

## Strain-Log-P Curve




| Ass. Gs = 2.68 | Initial | Final |
|---|---|---|
| **Moisture %:** | 75.2 | 51.2 |
| **Dry Density, pcf:** | 52.0 | 70.6 |
| **Void Ratio:** | 2.218 | 1.370 |
| **% Saturation:** | 90.8 | 100 |

**Remarks:**


FILE: 285.06 Fig16.dwg

**Miller Pacific**
ENGINEERING GROUP

Consolidation Test 2
Corte Madera Storm Drainage & Flood Control
Corte Madera, California

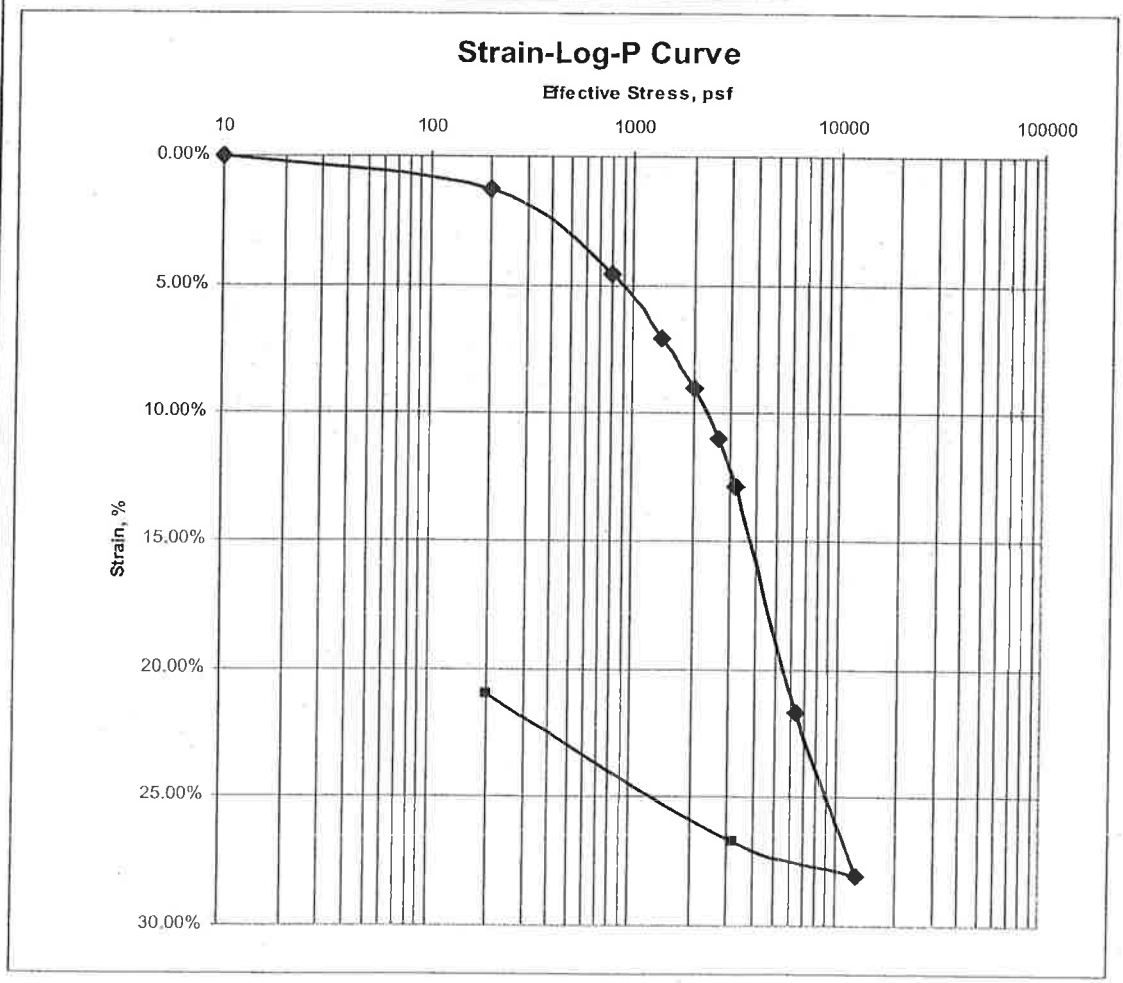
A-18

Project No. 285.06 | Date 1/9/07 | Approved By:

Figure

# Consolidation Test
## ASTM D2435

| | | | | | |
|---|---|---|---|---|---|
| **Job No.:** | 285.06 | **Boring:** | 1 | **Run By:** | kb |
| **Client:** | AN West | **Depth, ft.:** | 67 | **Reduced:** | sas |
| **Project:** | Corte Madera Flood Control | **Date:** | 11/27/2006 | **Checked:** | sas |
| **Soil Type:** | Gray Silty Clay (CH) (bay mud) | | | | |




| Ass. Gs = 2.68 | Initial | Final |
|---|---|---|
| **Moisture %:** | 83.2 | 60.4 |
| **Dry Density, pcf:** | 49.1 | 64.0 |
| **Void Ratio:** | 2.406 | 1.616 |
| **% Saturation:** | 92.7 | 100 |

**Remarks:**


FILE: 285.06 Fig16.dwg

**Miller Pacific**
ENGINEERING GROUP

Consolidation Test 3
Corte Madera Storm Drainage & Flood Control
Corte Madera, California

A-19

Project No. 285.06 Date 1/9/07 Approved By:

Figure

# APPENDIX C

# PRELIMINARY HYDROLOGIC AND HYDRAULIC CALCULATIONS

# SUB-WATERSHED TRIBUTARY AREAS

Corte Madera Flood Study, Phase I

| DI/CB # | Tributary # | Trib Area sf | Trib Area ac |
|---|---|---|---|
| OF A | A | 94519 | 2.17 |
| CB 1 | A1 | 48232 | 1.11 |
| CB 2 | A2 | 46287 | 1.06 |
| | | | |
| OF B | B | 706571 | 16.22 |
| CB 3 | B1 | 30385 | 0.70 |
| CB 5 | B2 | 16689 | 0.38 |
| CB 8 | B3 | 21453 | 0.49 |
| CB 10 | B4 | 59693 | 1.37 |
| CB 12 | B5 | 53963 | 1.24 |
| CB 13 | B6 | 17726 | 0.41 |
| CB 14 | B7 | 44996 | 1.03 |
| CB 15 | B8 | 54735 | 1.26 |
| CB 17 | B9 | 28147 | 0.65 |
| CB 18 | B10 | 46623 | 1.07 |
| CB 19 | B11 | 23175 | 0.53 |
| CB 22 | B12 | 30954 | 0.71 |
| CB 23 | B13 | 59887 | 1.37 |
| CB 24 | B14 | 61369 | 1.41 |
| CB 26 | B15 | 11594 | 0.27 |
| CB 28 | B16 | 33105 | 0.76 |
| CB 30 | B17 | 37248 | 0.86 |
| CB 31 | B18 | 31938 | 0.73 |
| CB 32 | B19 | 42918 | 0.99 |
| | | | |
| OF C | C | 52774 | 1.21 |
| | | | |
| OF D | D | 112643 | 2.59 |
| CB 1 | D1 | 31500 | 0.72 |
| CB 2 | D2 | 3395 | 0.08 |
| CB 3 | D3 | 34687 | 0.80 |
| CB 4 | D4 | 42881 | 0.98 |
| | | | |
| OF E | E | 199563 | 4.58 |
| CB 1 | E1 | 80174 | 1.84 |
| CB 2 | E2 | 44417 | 1.02 |
| CB 3 | E3 | 74972 | 1.72 |

# SUB-WATERSHED TRIBUTARY AREAS

Corte Madera Flood Study, Phase I

| DI/CB # | Tributary # | Trib Area sf | Trib Area ac |
|---|---|---|---|
| OF F | F | 579758 | 13.31 |
| CB 3 | F1 | 16254 | 0.37 |
| CB 4 | F2 | 19824 | 0.46 |
| CB 6 | F3 | 22422 | 0.51 |
| CB 9 | F4 | 3761 | 0.09 |
| CB 10 | F5 | 3778 | 0.09 |
| CB 11 | F6 | 30844 | 0.71 |
| CB 12 | F7 | 32432 | 0.74 |
| CB 13 | F8 | 29497 | 0.68 |
| CB 14 | F9 | 34285 | 0.79 |
| CB 15 | F10 | 31727 | 0.73 |
| CB 16 | F11 | 36320 | 0.83 |
| CB 17 | F12 | 16753 | 0.38 |
| CB 18 | F13 | 33047 | 0.76 |
| CB 19 | F14 | 15941 | 0.37 |
| CB 22 | F15 | 44983 | 1.03 |
| CB 23 | F16 | 41832 | 0.96 |
| CB 24 | F17 | 1483 | 0.03 |
| CB 25 | F18 | 76391 | 1.75 |
| CB 27 | F19 | 43350 | 1.00 |
| CB 28 | F20 | 35767 | 0.82 |
| CB 29 | F21 | 7469 | 0.17 |
| CB 30 | F22 | 1597 | 0.04 |
| | | | |
| OF G | G | 253444 | 5.82 |
| CB 1 | G1 | 40094 | 0.92 |
| CB 2 | G2 | 32083 | 0.74 |
| CB 3 | G3 | 40153 | 0.92 |
| CB 4 | G4 | 46807 | 1.07 |
| CB 5 | G5 | 29899 | 0.69 |
| CB 6 | G6 | 38306 | 0.88 |
| CB 7 | G7 | 26179 | 0.60 |
| | | | |
| OF H | H | 184174 | 4.23 |
| CB 1 | H1 | 42402 | 0.97 |
| CB 2 | H2 | 89028 | 2.04 |
| CB 3 | H3 | 52763 | 1.21 |
| | | | |
| OF J | J | 205477 | 4.72 |
| CB 1 | J1 | 25128 | 0.58 |
| CB 2 | J2 | 34959 | 0.80 |
| CB 3 | J3 | 18713 | 0.43 |
| CB 5 | J4 | 70686 | 1.62 |
| CB 6 | J5 | 55992 | 1.29 |

# SUB-WATERSHED TRIBUTARY AREAS

Corte Madera Flood Study, Phase I

| DI/CB # | Tributary # | Trib Area sf | Trib Area ac |
|---|---|---|---|
| OF K | K | 365807 | 8.40 |
| CB 1 | K1 | 30441 | 0.70 |
| CB 2 | K2 | 19635 | 0.45 |
| CB 3 | K3 | 106078 | 2.44 |
| CB 4 | K4 | 32015 | 0.73 |
| CB 6 | K5 | 11590 | 0.27 |
| CB 7 | K6 | 24637 | 0.57 |
| CB 8 | K7 | 16707 | 0.38 |
| CB 10 | K8 | 20826 | 0.48 |
| CB 12 | K9 | 43420 | 1.00 |
| CB 13 | K10 | 39203 | 0.90 |
| CB 14 | K11 | 21523 | 0.49 |
| | | | |
| OF L | L | 437025 | 10.03 |
| CB 1 | L1 | 43185 | 0.99 |
| CB 2 | L2 | 61830 | 1.42 |
| CB 3 | L3 | 51827 | 1.19 |
| CB 4 | L4 | 10465 | 0.24 |
| CB 5 | L5 | 68360 | 1.57 |
| CB 7 | L6 | 20842 | 0.48 |
| CB 9 | L7 | 62618 | 1.44 |
| CB 10 | L8 | 60962 | 1.40 |
| CB 11 | L9 | 56928 | 1.31 |
| | | | |
| OF M | M | 587476 | 13.49 |
| CB 1 | M1 | 48721 | 1.12 |
| CB 3 | M2 | 52330 | 1.20 |
| CB 4 | M3 | 32470 | 0.75 |
| CB 5 | M4 | 36304 | 0.83 |
| CB 6 | M5 | 32810 | 0.75 |
| CB 7 | M6 | 45643 | 1.05 |
| CB 8 | M7 | 29499 | 0.68 |
| CB 9 | M8 | 22719 | 0.52 |
| CB 10 | M9 | 26092 | 0.60 |
| CB 12 | M10 | 31829 | 0.73 |
| CB 13 | M11 | 20800 | 0.48 |
| CB 14 | M12 | 6964 | 0.16 |
| CB 16 | M13 | 22382 | 0.51 |
| CB 17 | M14 | 32994 | 0.76 |
| CB 19 | M15 | 39276 | 0.90 |
| CB 20 | M16 | 9618 | 0.22 |
| CB 21 | M17 | 23809 | 0.55 |
| CB 22 | M18 | 36627 | 0.84 |
| CB 23 | M19 | 14598 | 0.34 |
| CB 24 | M20 | 22000 | 0.51 |

## SUB-WATERSHED TRIBUTARY AREAS

Corte Madera Flood Study, Phase I

| DI/CB # | Tributary # | Trib Area sf | Trib Area ac |
|---|---|---|---|
| OF N | N | 292965 | 6.73 |
| CB 1 | N1 | 35347 | 0.81 |
| CB 3 | N2 | 31246 | 0.72 |
| CB 4 | N3 | 17827 | 0.41 |
| CB 5 | N4 | 122851 | 2.82 |
| CB 6 | N5 | 45498 | 1.04 |
| CB 7 | N6 | 40196 | 0.92 |
| | | | |
| OF P | P | 362936 | 8.33 |
| CB 1 | P1 | 108037 | 2.48 |
| CB 3 | P2 | 112328 | 2.58 |
| CB 4 | P3 | 49078 | 1.13 |
| CB 5 | P4 | 93475 | 2.15 |
| | | | |
| OF Q | Q | 656426 | 15.07 |
| CB 1 | Q1 | 43727 | 1.00 |
| CB 2 | Q2 | 35841 | 0.82 |
| CB 3 | Q3 | 11497 | 0.26 |
| CB 4 | Q4 | 59284 | 1.36 |
| CB 5 | Q5 | 4611 | 0.11 |
| CB 6 | Q6 | 10632 | 0.24 |
| CB 7 | Q7 | 78154 | 1.79 |
| CB 8 | Q8 | 8024 | 0.18 |
| CB 9 | Q9 | 56517 | 1.30 |
| CB 11 | Q10 | 7018 | 0.16 |
| CB 13 | Q11 | 19345 | 0.44 |
| CB 15 | Q12 | 7701 | 0.18 |
| CB 16 | Q13 | 9301 | 0.21 |
| CB 17 | Q14 | 26842 | 0.62 |
| CB 19 | Q15 | 11517 | 0.26 |
| CB 20 | Q16 | 21313 | 0.49 |
| CB 21 | Q17 | 24503 | 0.56 |
| CB 22 | Q18 | 84327 | 1.94 |
| CB 24 | Q19 | 39465 | 0.91 |
| CB 25 | Q20 | 96913 | 2.22 |

## SUB-WATERSHED TRIBUTARY AREAS

Corte Madera Flood Study, Phase I

| DI/CB # | Tributary # | Trib Area sf | Trib Area ac |
|---|---|---|---|
| OF R | R | 289488 | 6.65 |
| CB 1 | R1 | 29560 | 0.68 |
| CB 2 | R2 | 13486 | 0.31 |
| CB 4 | R3 | 14104 | 0.32 |
| CB 5 | R4 | 15117 | 0.35 |
| CB 6 | R5 | 13631 | 0.31 |
| CB 7 | R6 | 28932 | 0.66 |
| CB 8 | R7 | 29172 | 0.67 |
| CB 10 | R8 | 13931 | 0.32 |
| CB 12 | R9 | 33822 | 0.78 |
| CB 13 | R10 | 55271 | 1.27 |
| CB 14 | R11 | 8575 | 0.20 |
| CB 16 | R12 | 9237 | 0.21 |
| CB 17 | R13 | 24755 | 0.57 |
| | | | |
| OF S | S | 147546 | 3.39 |
| CB 1 | S1 | 9913 | 0.23 |
| CB 2 | S2 | 26992 | 0.62 |
| CB 3 | S3 | 51427 | 1.18 |
| CB 4 | S4 | 59209 | 1.36 |
| | | | |
| OF T | T | 85453 | 1.96 |
| CB 1 | T1 | 19671 | 0.45 |
| CB 2 | T2 | 14485 | 0.33 |
| CB 3 | T3 | 7549 | 0.17 |
| CB 4 | T4 | 7809 | 0.18 |
| CB 5 | T5 | 18729 | 0.43 |
| CB 6 | T6 | 17211 | 0.40 |

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF A | | 2.17 | 0.50 | 0 | 0 | 70 | 10.96 | 2.85 | 2.37 | 3.09 | 2.57 | | | | | | | OF A | 2.57 | | | | | | **0.00** | | |
| CB 1 | 1.11 | 2.17 | 0.50 | 120 | 360 | 0 | 10.67 | 2.90 | 2.41 | 3.15 | 2.61 | 12 | RCP | 0.015 | 0.79 | 70 | 3.32 | CB 1 | 2.61 | 0.25 | 0.0071 | 0.50 | 0.90 | 0.15 | 0.65 | 2.50 | **1.85** |
| CB 2 | 1.06 | 1.06 | 0.50 | 120 | 340 | 0 | 10.50 | 2.90 | 2.41 | 1.54 | 1.28 | 12 | RCP | 0.015 | 0.79 | 35 | 1.63 | CB 2 | 1.28 | 0.25 | 0.0017 | 0.06 | 0.05 | 0.00 | 0.71 | 2.50 | **1.79** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF B | | 16.22 | 0.50 | 0 | 0 | 65 | 15.58 | 2.40 | 1.99 | 19.47 | 16.16 | | | | | | | OF B | 16.16 | | | | | | **0.00** | | |
| MH 1 | | 16.22 | 0.50 | 0 | 0 | 215 | 15.31 | 2.45 | 2.03 | 19.87 | 16.49 | 30 | RCP | 0.015 | 4.91 | 65 | 3.36 | MH 1 | 16.49 | 0.63 | 0.0021 | 0.14 | 0.40 | 0.07 | 0.21 | 3.50 | **3.29** |
| CON 2 | | 16.22 | 0.50 | 0 | 0 | 50 | 14.42 | 2.50 | 2.08 | 20.28 | 16.83 | 30 | RCP | 0.015 | 4.91 | 215 | 3.43 | CON 2 | 16.83 | 0.63 | 0.0022 | 0.48 | 1.00 | 0.18 | 0.87 | 2.50 | **1.63** |
| CB 3 | 0.70 | 0.70 | 0.50 | 110 | 175 | 0 | 8.90 | 3.10 | 2.57 | 1.08 | 0.90 | 8 | PVC | 0.009 | 0.35 | 30 | 2.57 | CB 3 | 0.90 | 0.17 | 0.0026 | 0.08 | 0.05 | 0.01 | 0.96 | 2.50 | **1.54** |
| CON 4 | | 15.52 | 0.50 | 0 | 0 | 20 | 14.21 | 2.55 | 2.12 | 19.79 | 16.43 | 30 | RCP | 0.015 | 4.91 | 50 | 3.35 | CON 4 | 16.43 | 0.63 | 0.0021 | 0.11 | 1.00 | 0.17 | 1.15 | 3.00 | **1.85** |
| CB 5 | 0.38 | 0.38 | 0.50 | 100 | 100 | 0 | 8.06 | 3.20 | 2.66 | 0.61 | 0.51 | 8 | PVC | 0.009 | 0.35 | 20 | 1.46 | CB 5 | 0.51 | 0.17 | 0.0008 | 0.02 | 0.05 | 0.00 | 1.17 | 2.50 | **1.33** |
| MH 6 | | 15.14 | 0.50 | 0 | 0 | 110 | 14.13 | 2.55 | 2.12 | 19.30 | 16.02 | 30 | RCP | 0.015 | 4.91 | 30 | 3.26 | MH 6 | 16.02 | 0.63 | 0.0020 | 0.06 | 0.40 | 0.07 | 1.28 | 2.90 | **1.62** |
| CON 7 | | 15.14 | 0.50 | 0 | 0 | 30 | 13.67 | 2.60 | 2.16 | 19.68 | 16.34 | 30 | RCP | 0.015 | 4.91 | 110 | 3.33 | CON 7 | 16.34 | 0.63 | 0.0021 | 0.23 | 1.00 | 0.17 | 1.68 | 2.50 | **0.82** |
| CB 8 | 0.49 | 0.49 | 0.50 | 50 | 310 | 0 | 8.69 | 3.15 | 2.61 | 0.78 | 0.64 | 12 | RCP | 0.015 | 0.79 | 35 | 0.82 | CB 8 | 0.64 | 0.25 | 0.0004 | 0.02 | 0.05 | 0.00 | 1.70 | 2.50 | **0.80** |
| CON 9 | | 14.65 | 0.50 | 0 | 0 | 35 | 13.54 | 2.60 | 2.16 | 19.04 | 15.81 | 30 | RCP | 0.015 | 4.91 | 30 | 3.22 | CON 9 | 15.81 | 0.63 | 0.0020 | 0.06 | 1.00 | 0.16 | 1.90 | 2.30 | **0.40** |
| CB 10 | 1.37 | 1.37 | 0.50 | 120 | 480 | 0 | 11.67 | 2.75 | 2.28 | 1.88 | 1.56 | 12 | RCP | 0.015 | 0.79 | 20 | 1.99 | CB 10 | 1.56 | 0.25 | 0.0026 | 0.05 | 0.05 | 0.00 | 1.96 | 1.80 | **-0.16** |
| MH 11 | | 13.28 | 0.50 | 0 | 0 | 325 | 13.40 | 2.60 | 2.16 | 17.26 | 14.33 | 30 | RCP | 0.015 | 4.91 | 35 | 2.92 | MH 11 | 14.33 | 0.63 | 0.0016 | 0.06 | 1.50 | 0.20 | 2.16 | 2.20 | **0.04** |
| CB 12 | 1.24 | 2.68 | 0.50 | 110 | 380 | 0 | 10.61 | 2.90 | 2.41 | 3.88 | 3.22 | 18 | RCP | 0.015 | 1.77 | 45 | 1.82 | CB 12 | 3.22 | 0.38 | 0.0012 | 0.06 | 0.10 | 0.01 | 2.22 | 2.50 | **0.28** |
| CB 13 | 0.41 | 1.44 | 0.50 | 0 | 0 | 55 | 9.56 | 3.00 | 2.49 | 2.16 | 1.79 | 18 | RCP | 0.015 | 1.77 | 175 | 1.01 | CB 13 | 1.79 | 0.38 | 0.0004 | 0.07 | 0.10 | 0.00 | 2.29 | 2.80 | **0.51** |
| CB 14 | 1.03 | 1.03 | 0.50 | 120 | 200 | 0 | 9.33 | 3.00 | 2.49 | 1.55 | 1.29 | 12 | RCP | 0.015 | 0.79 | 55 | 1.64 | CB 14 | 1.29 | 0.25 | 0.0017 | 0.09 | 0.05 | 0.00 | 2.38 | 3.20 | **0.82** |
| CB 15 | 1.26 | 3.51 | 0.50 | 0 | 0 | 115 | 12.04 | 2.70 | 2.24 | 4.73 | 3.93 | 12 | RCP | 0.015 | 0.79 | 15 | 5.00 | CB 15 | 3.93 | 0.25 | 0.0161 | 0.24 | 0.10 | 0.04 | 2.44 | 1.80 | **-0.64** |
| MH 16 | | 2.25 | 0.50 | 0 | 0 | 15 | 11.56 | 2.80 | 2.32 | 3.15 | 2.61 | 12 | RCP | 0.015 | 0.79 | 115 | 3.33 | MH 16 | 2.61 | 0.25 | 0.0071 | 0.82 | 1.40 | 0.24 | 3.50 | 4.50 | **1.00** |
| CB 17 | 0.65 | 0.65 | 0.50 | 125 | 150 | 0 | 9.03 | 3.05 | 2.53 | 0.99 | 0.82 | 12 | RCP | 0.015 | 0.79 | 25 | 1.04 | CB 17 | 0.82 | 0.25 | 0.0007 | 0.02 | 0.05 | 0.00 | 3.51 | 3.80 | **0.29** |
| CB 18 | 1.07 | 1.60 | 0.50 | 180 | 300 | 0 | 11.50 | 2.80 | 2.32 | 2.24 | 1.86 | 12 | RCP | 0.015 | 0.79 | 15 | 2.37 | CB 18 | 1.86 | 0.25 | 0.0036 | 0.05 | 0.90 | 0.08 | 3.63 | 4.40 | **0.77** |
| CB 19 | 0.53 | 0.53 | 0.50 | 90 | 230 | 0 | 8.92 | 3.10 | 2.57 | 0.82 | 0.68 | 12 | RCP | 0.015 | 0.79 | 125 | 0.87 | CB 19 | 0.68 | 0.25 | 0.0005 | 0.06 | 0.05 | 0.00 | 3.69 | 5.50 | **1.81** |
| MH 20 | | 7.09 | 0.50 | 0 | 0 | 100 | 12.04 | 2.70 | 2.24 | 9.58 | 7.95 | 24 | RCP | 0.015 | 3.14 | 325 | 2.53 | MH 20 | 7.95 | 0.50 | 0.0016 | 0.53 | 0.10 | 0.01 | 2.70 | 3.20 | **0.50** |
| MH 21 | | 7.09 | 0.50 | 0 | 0 | 430 | 11.63 | 2.75 | 2.28 | 9.75 | 8.10 | 24 | RCP | 0.015 | 3.14 | 100 | 2.58 | MH 21 | 8.10 | 0.50 | 0.0017 | 0.17 | 1.50 | 0.15 | 3.02 | 3.50 | **0.48** |
| CB 22 | 0.71 | 3.76 | 0.50 | 0 | 0 | 210 | 11.44 | 2.80 | 2.32 | 5.26 | 4.37 | 15 | RCP | 0.015 | 1.23 | 20 | 3.56 | CB 22 | 4.37 | 0.31 | 0.0061 | 0.12 | 0.10 | 0.02 | 3.16 | 3.00 | **-0.16** |
| CB 23 | 1.37 | 3.05 | 0.50 | 0 | 0 | 35 | 10.56 | 2.90 | 2.41 | 4.42 | 3.67 | 15 | RCP | 0.015 | 1.23 | 210 | 2.99 | CB 23 | 3.67 | 0.31 | 0.0043 | 0.90 | 0.10 | 0.01 | 4.07 | 2.20 | **-1.87** |
| CB 24 | 1.41 | 1.68 | 0.50 | 120 | 330 | 0 | 10.42 | 2.90 | 2.41 | 2.43 | 2.02 | 12 | RCP | 0.015 | 0.79 | 35 | 2.57 | CB 24 | 2.02 | 0.25 | 0.0042 | 0.15 | 0.90 | 0.09 | 4.31 | 2.20 | **-2.11** |
| CON 25 | | 0.27 | 0.50 | 0 | 0 | 20 | 8.67 | 3.15 | 2.61 | 0.42 | 0.35 | 8 | RCP | 0.015 | 0.35 | 120 | 1.00 | CON 25 | 0.35 | 0.17 | 0.0011 | 0.13 | 1.00 | 0.02 | 4.46 | 2.80 | **-1.66** |
| CB 26 | 0.27 | 0.27 | 0.50 | 120 | 110 | 0 | 8.58 | 3.15 | 2.61 | 0.42 | 0.35 | 8 | RCP | 0.015 | 0.35 | 10 | 1.00 | CB 26 | 0.35 | 0.17 | 0.0011 | 0.01 | 0.05 | 0.00 | 4.47 | 2.50 | **-1.97** |
| ?? 27 | 0.00 | 0.00 | 0.50 | 0 | 0 | 0 | 5.00 | 4.10 | 3.40 | 0.00 | 0.00 | 8 | RCP | 0.015 | 0.35 | 20 | 0.00 | ?? 27 | 0.00 | 0.17 | 0.0000 | 0.00 | 0.05 | 0.00 | 4.46 | 3.00 | **-1.46** |
| CB 28 | 0.76 | 0.76 | 0.50 | 110 | 180 | 0 | 8.94 | 3.10 | 2.57 | 1.18 | 0.98 | 15 | RCP | 0.015 | 1.23 | 20 | 0.80 | CB 28 | 0.98 | 0.31 | 0.0003 | 0.01 | 0.05 | 0.00 | 3.03 | 3.00 | **-0.03** |
| MH 29 | | 2.57 | 0.50 | 0 | 0 | 45 | 9.83 | 2.95 | 2.45 | 3.80 | 3.15 | 18 | RCP | 0.015 | 1.77 | 430 | 1.78 | MH 29 | 3.15 | 0.38 | 0.0012 | 0.51 | 1.40 | 0.07 | 3.60 | 3.10 | **-0.50** |
| CB 30 | 0.86 | 1.59 | 0.50 | 0 | 0 | 35 | 9.65 | 3.00 | 2.49 | 2.38 | 1.98 | 12 | RCP | 0.015 | 0.79 | 45 | 2.52 | CB 30 | 1.98 | 0.25 | 0.0041 | 0.18 | 0.90 | 0.09 | 3.88 | 2.50 | **-1.38** |
| CB 31 | 0.73 | 0.73 | 0.50 | 120 | 220 | 0 | 9.50 | 3.00 | 2.49 | 1.10 | 0.91 | 12 | RCP | 0.015 | 0.79 | 35 | 1.16 | CB 31 | 0.91 | 0.25 | 0.0009 | 0.03 | 0.05 | 0.00 | 3.91 | 2.50 | **-1.41** |
| CB 32 | 0.99 | 0.99 | 0.50 | 110 | 240 | 0 | 9.44 | 3.00 | 2.49 | 1.48 | 1.23 | 12 | RCP | 0.015 | 0.79 | 20 | 1.56 | CB 32 | 1.23 | 0.25 | 0.0016 | 0.03 | 0.05 | 0.00 | 3.64 | 2.50 | **-1.14** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF C | | 1.21 | 0.50 | 0 | 0 | 75 | 9.23 | 3.05 | 2.53 | 1.85 | 1.53 | | | | | | | OF C | 1.53 | | | | | | **0.00** | | |
| CB 1 | 1.21 | 1.21 | 0.50 | 120 | 150 | 0 | 8.92 | 3.10 | 2.57 | 1.88 | 1.56 | 6 | PVC | 0.009 | 0.20 | 75 | 7.94 | CB 1 | 1.56 | 0.13 | 0.0368 | 2.76 | 0.05 | 0.05 | 2.81 | 4.50 | **1.69** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF D | | 2.58 | 0.50 | 0 | 0 | 150 | 11.78 | 2.75 | 2.28 | 3.55 | 2.95 | | | | | | | OF D | 2.95 | | | | | | **4.00** | | |
| CB 1 | 0.72 | 2.58 | 0.50 | 0 | 0 | 30 | 11.15 | 2.80 | 2.32 | 3.61 | 3.00 | 15 | RCP | 0.015 | 1.23 | 150 | 2.44 | CB 1 | 3.00 | 0.31 | 0.0029 | 0.43 | 0.10 | 0.01 | 4.44 | 5.00 | **0.56** |
| CB 2 | 0.08 | 1.86 | 0.50 | 0 | 0 | 140 | 11.03 | 2.85 | 2.37 | 2.65 | 2.20 | 12 | RCP | 0.015 | 0.79 | 30 | 2.80 | CB 2 | 2.20 | 0.25 | 0.0050 | 0.15 | 0.90 | 0.11 | 4.70 | 5.00 | **0.30** |
| CB 3 | 0.80 | 1.78 | 0.50 | 0 | 0 | 150 | 10.44 | 2.90 | 2.41 | 2.58 | 2.14 | 12 | RCP | 0.015 | 0.79 | 140 | 2.73 | CB 3 | 2.14 | 0.25 | 0.0048 | 0.67 | 0.90 | 0.10 | 5.47 | 5.50 | **0.03** |
| CB 4 | 0.98 | 0.98 | 0.50 | 185 | 85 | 0 | 9.82 | 2.95 | 2.45 | 1.45 | 1.21 | 6 | PVC | 0.009 | 0.20 | 150 | 6.14 | CB 4 | 1.21 | 0.13 | 0.0220 | 3.30 | 0.45 | 0.26 | 9.04 | 4.50 | **-4.54** |

Notes:

1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF E | | 4.58 | 0.50 | 0 | 0 | 115 | 11.98 | 2.75 | 2.28 | 6.30 | 5.23 | | | | | | | OF E | 5.23 | | | | | | **4.00** | | |
| CB 1 | 1.84 | 4.58 | 0.50 | 180 | 300 | 0 | 11.50 | 2.80 | 2.32 | 6.41 | 5.32 | 15 | CMP | 0.024 | 1.23 | 115 | 4.34 | CB 1 | 5.32 | 0.31 | 0.0230 | 2.65 | 0.10 | 0.03 | 6.68 | 5.50 | **-1.18** |
| CB 2 | 1.02 | 2.74 | 0.50 | 0 | 0 | 50 | 10.82 | 2.85 | 2.37 | 3.91 | 3.24 | 12 | CMP | 0.024 | 0.79 | 40 | 4.13 | CB 2 | 3.24 | 0.25 | 0.0281 | 1.12 | 0.90 | 0.24 | 8.04 | 5.50 | **-2.54** |
| CB 3 | 1.72 | 1.72 | 0.50 | 140 | 300 | 0 | 10.61 | 2.90 | 2.41 | 2.50 | 2.07 | 12 | CMP | 0.024 | 0.79 | 50 | 2.64 | CB 3 | 2.07 | 0.25 | 0.0115 | 0.57 | 0.05 | 0.01 | 8.62 | 5.50 | **-3.12** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF F | | 13.31 | 0.50 | 0 | 0 | 135 | 16.61 | 2.35 | 1.95 | 15.64 | 12.98 | | | | | | | OF F | 12.98 | | | | | | **4.00** | | |
| MH 1 | | 13.31 | 0.50 | 0 | 0 | 85 | 16.05 | 2.40 | 1.99 | 15.97 | 13.26 | 24 | PVC | 0.009 | 3.14 | 135 | 4.22 | MH 1 | 13.26 | 0.50 | 0.0016 | 0.22 | 0.40 | 0.11 | 4.33 | 6.00 | **1.67** |
| MH 2 | | 13.31 | 0.50 | 0 | 0 | 165 | 15.69 | 2.40 | 1.99 | 15.97 | 13.26 | 24 | PVC | 0.009 | 3.14 | 85 | 4.22 | MH 2 | 13.26 | 0.50 | 0.0016 | 0.14 | 1.40 | 0.39 | 4.86 | 6.50 | **1.64** |
| CB 3 | 0.37 | 0.37 | 0.50 | 150 | 30 | 0 | 8.58 | 3.15 | 2.61 | 0.59 | 0.49 | 12 | RCP | 0.015 | 0.79 | 25 | 0.62 | CB 3 | 0.49 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 4.86 | 5.60 | **0.74** |
| CB 4 | 0.46 | 0.46 | 0.50 | 120 | 60 | 0 | 8.17 | 3.20 | 2.66 | 0.73 | 0.60 | 12 | RCP | 0.015 | 0.79 | 40 | 0.77 | CB 4 | 0.60 | 0.25 | 0.0004 | 0.02 | 0.05 | 0.00 | 4.87 | 5.40 | **0.53** |
| MH 5 | | 12.48 | 0.50 | 0 | 0 | 190 | 15.01 | 2.45 | 2.03 | 15.29 | 12.69 | 24 | PVC | 0.009 | 3.14 | 165 | 4.04 | MH 5 | 12.69 | 0.50 | 0.0015 | 0.25 | 0.90 | 0.23 | 5.33 | 5.50 | **0.17** |
| CB 6 | 0.51 | 1.40 | 0.50 | 0 | 0 | 20 | 9.69 | 3.00 | 2.49 | 2.09 | 1.74 | 15 | RCP | 0.015 | 1.23 | 45 | 1.42 | CB 6 | 1.74 | 0.31 | 0.0010 | 0.04 | 0.40 | 0.01 | 5.39 | 4.80 | **-0.59** |
| CON 7 | | 0.88 | 0.50 | 0 | 0 | 40 | 9.61 | 3.00 | 2.49 | 1.32 | 1.10 | 12 | RCP | 0.015 | 0.79 | 20 | 1.40 | CON 7 | 1.10 | 0.25 | 0.0013 | 0.03 | 1.00 | 0.03 | 5.44 | 5.50 | **0.06** |
| CON 8 | | 0.17 | 0.50 | 0 | 0 | 20 | 6.08 | 3.70 | 3.07 | 0.32 | 0.27 | 12 | PVC | 0.009 | 0.79 | 80 | 0.34 | CON 8 | 0.27 | 0.25 | 0.0000 | 0.00 | 1.40 | 0.00 | 5.45 | 5.10 | **-0.35** |
| CB 9 | 0.09 | 0.09 | 0.50 | 15 | 70 | 0 | 5.92 | 3.70 | 3.07 | 0.16 | 0.13 | 8 | PVC | 0.009 | 0.35 | 10 | 0.38 | CB 9 | 0.13 | 0.17 | 0.0001 | 0.00 | 0.05 | 0.00 | 5.45 | 4.80 | **-0.65** |
| CB 10 | 0.09 | 0.09 | 0.50 | 15 | 80 | 0 | 6.00 | 3.70 | 3.07 | 0.16 | 0.13 | 8 | PVC | 0.009 | 0.35 | 20 | 0.38 | CB 10 | 0.13 | 0.17 | 0.0001 | 0.00 | 0.05 | 0.00 | 5.45 | 4.80 | **-0.65** |
| CB 11 | 0.71 | 0.71 | 0.50 | 110 | 240 | 0 | 9.44 | 3.00 | 2.49 | 1.06 | 0.88 | 12 | RCP | 0.015 | 0.79 | 40 | 1.12 | CB 11 | 0.88 | 0.25 | 0.0008 | 0.03 | 0.05 | 0.00 | 5.48 | 5.20 | **-0.28** |
| CB 12 | 0.74 | 1.42 | 0.50 | 0 | 0 | 45 | 10.35 | 2.90 | 2.41 | 2.06 | 1.71 | 18 | RCP | 0.015 | 1.77 | 30 | 0.97 | CB 12 | 1.71 | 0.38 | 0.0004 | 0.01 | 0.40 | 0.01 | 5.35 | 5.00 | **-0.35** |
| CB 13 | 0.68 | 0.68 | 0.50 | 120 | 300 | 0 | 10.17 | 2.95 | 2.45 | 1.00 | 0.83 | 12 | RCP | 0.015 | 0.79 | 45 | 1.06 | CB 13 | 0.83 | 0.25 | 0.0007 | 0.03 | 0.05 | 0.00 | 5.38 | 5.50 | **0.12** |
| CB 14 | 0.79 | 9.66 | 0.50 | 0 | 0 | 220 | 14.22 | 2.55 | 2.12 | 12.32 | 10.23 | 24 | PVC | 0.009 | 3.14 | 190 | 3.26 | CB 14 | 10.23 | 0.50 | 0.0010 | 0.19 | 0.90 | 0.15 | 5.67 | 5.80 | **0.13** |
| CB 15 | 0.73 | 0.73 | 0.50 | 110 | 280 | 0 | 9.78 | 3.00 | 2.49 | 1.09 | 0.91 | 6 | PVC | 0.009 | 0.20 | 60 | 4.62 | CB 15 | 0.91 | 0.13 | 0.0125 | 0.75 | 0.05 | 0.02 | 6.43 | 5.80 | **-0.63** |
| CB 16 | 0.83 | 8.15 | 0.50 | 0 | 0 | 135 | 13.30 | 2.60 | 2.16 | 10.59 | 8.79 | 24 | PVC | 0.009 | 3.14 | 220 | 2.80 | CB 16 | 8.79 | 0.50 | 0.0007 | 0.16 | 1.00 | 0.12 | 5.95 | 5.80 | **-0.15** |
| CB 17 | 0.38 | 0.38 | 0.50 | 120 | 65 | 0 | 8.21 | 3.20 | 2.66 | 0.62 | 0.51 | 8 | PVC | 0.009 | 0.35 | 30 | 1.46 | CB 17 | 0.51 | 0.17 | 0.0009 | 0.03 | 0.05 | 0.00 | 5.97 | 5.80 | **-0.17** |
| CB 18 | 0.76 | 6.93 | 0.50 | 0 | 0 | 50 | 12.74 | 2.65 | 2.20 | 9.18 | 7.62 | 24 | PVC | 0.009 | 3.14 | 135 | 2.43 | CB 18 | 7.62 | 0.50 | 0.0005 | 0.07 | 1.00 | 0.09 | 6.11 | 6.00 | **-0.11** |
| CB 19 | 0.37 | 0.37 | 0.50 | 120 | 80 | 0 | 8.33 | 3.20 | 2.66 | 0.59 | 0.49 | 8 | PVC | 0.009 | 0.35 | 30 | 1.39 | CB 19 | 0.49 | 0.17 | 0.0008 | 0.02 | 0.05 | 0.00 | 6.14 | 5.80 | **-0.34** |
| MH 20 | | 5.81 | 0.50 | 0 | 0 | 110 | 12.53 | 2.70 | 2.24 | 7.84 | 6.50 | 18 | PVC | 0.009 | 1.77 | 50 | 3.68 | MH 20 | 6.50 | 0.38 | 0.0018 | 0.09 | 0.40 | 0.08 | 6.29 | 6.70 | **0.41** |
| MH 21 | | 5.81 | 0.50 | 0 | 0 | 60 | 12.07 | 2.70 | 2.24 | 7.84 | 6.50 | 18 | PVC | 0.009 | 1.77 | 110 | 3.68 | MH 21 | 6.50 | 0.38 | 0.0018 | 0.20 | 1.50 | 0.32 | 6.80 | 6.50 | **-0.30** |
| CB 22 | 1.03 | 1.03 | 0.50 | 110 | 300 | 0 | 9.94 | 2.95 | 2.45 | 1.52 | 1.26 | 12 | RCP | 0.015 | 0.79 | 30 | 1.61 | CB 22 | 1.26 | 0.25 | 0.0017 | 0.05 | 0.05 | 0.00 | 6.86 | 5.50 | **-1.36** |
| CB 23 | 0.96 | 0.96 | 0.50 | 45 | 180 | 0 | 7.50 | 3.40 | 2.82 | 1.63 | 1.36 | 12 | RCP | 0.015 | 0.79 | 25 | 1.73 | CB 23 | 1.36 | 0.25 | 0.0019 | 0.05 | 0.05 | 0.00 | 6.85 | 5.80 | **-1.05** |
| CB 24 | 0.03 | 3.81 | 0.50 | 0 | 0 | 50 | 11.82 | 2.75 | 2.28 | 5.24 | 4.35 | 2-12 | RCP | 0.015 | 1.57 | 60 | 2.77 | CB 24 | 4.35 | 0.50 | 0.0020 | 0.12 | 0.90 | 0.11 | 7.03 | 6.00 | **-1.03** |
| CB 25 | 1.75 | 3.78 | 0.50 | 110 | 500 | 0 | 11.61 | 2.75 | 2.28 | 5.19 | 4.31 | 18 | RCP | 0.015 | 1.77 | 50 | 2.44 | CB 25 | 4.31 | 0.38 | 0.0022 | 0.11 | 0.40 | 0.04 | 7.18 | 5.50 | **-1.68** |
| CON 26 | | 2.02 | 0.50 | 0 | 0 | 115 | 9.87 | 2.95 | 2.45 | 2.99 | 2.48 | 12 | RCP | 0.015 | 0.79 | 25 | 3.16 | CON 26 | 2.48 | 0.25 | 0.0064 | 0.16 | 1.00 | 0.15 | 7.49 | 5.80 | **-1.69** |
| CB 27 | 1.00 | 1.00 | 0.50 | 105 | 290 | 0 | 9.75 | 3.00 | 2.49 | 1.49 | 1.24 | 12 | RCP | 0.015 | 0.79 | 25 | 1.58 | CB 27 | 1.24 | 0.25 | 0.0016 | 0.04 | 0.05 | 0.00 | 7.53 | 5.50 | **-2.03** |
| CB 28 | 0.82 | 1.03 | 0.50 | 70 | 340 | 0 | 9.39 | 3.00 | 2.49 | 1.54 | 1.28 | 12 | RCP | 0.015 | 0.79 | 115 | 1.63 | CB 28 | 1.28 | 0.25 | 0.0017 | 0.20 | 0.10 | 0.00 | 7.69 | 6.80 | **-0.89** |
| CB 29 | 0.17 | 0.21 | 0.50 | 110 | 60 | 0 | 7.94 | 3.30 | 2.74 | 0.34 | 0.29 | 12 | RCP | 0.015 | 0.79 | 175 | 0.36 | CB 29 | 0.29 | 0.25 | 0.0001 | 0.01 | 0.90 | 0.00 | 7.71 | 9.80 | **2.09** |
| CB 30 | 0.04 | 0.04 | 0.50 | 45 | 35 | 0 | 6.29 | 3.60 | 2.99 | 0.07 | 0.05 | 12 | RCP | 0.015 | 0.79 | 30 | 0.07 | CB 30 | 0.05 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 7.71 | 10.50 | **2.79** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF G | | 5.82 | 0.50 | 0 | 0 | 170 | 12.90 | 2.65 | 2.20 | 7.71 | 6.40 | | | | | | | OF G | 6.40 | | | | | | **4.00** | | |
| CB 1 | 0.92 | 5.82 | 0.50 | 0 | 0 | 30 | 12.19 | 2.70 | 2.24 | 7.86 | 6.52 | 12 | RCP | 0.015 | 0.79 | 170 | 8.30 | CB 1 | 6.52 | 0.25 | 0.0444 | 7.54 | 1.00 | 1.07 | 12.61 | 5.50 | **-7.11** |
| CB 2 | 0.74 | 1.66 | 0.50 | 0 | 0 | 160 | 10.53 | 2.90 | 2.41 | 2.40 | 2.00 | 6 | PVC | 0.009 | 0.20 | 65 | 10.16 | CB 2 | 2.00 | 0.13 | 0.0603 | 3.92 | 0.10 | 0.16 | 16.69 | 5.50 | **-11.19** |
| CB 3 | 0.92 | 0.92 | 0.50 | 140 | 210 | 0 | 9.86 | 2.95 | 2.45 | 1.36 | 1.13 | 6 | PVC | 0.009 | 0.20 | 160 | 5.75 | CB 3 | 1.13 | 0.13 | 0.0193 | 3.09 | 0.05 | 0.03 | 19.80 | 5.60 | **-14.20** |
| CB 4 | 1.07 | 3.24 | 0.50 | 0 | 0 | 75 | 12.06 | 2.70 | 2.24 | 4.38 | 3.63 | 12 | RCP | 0.015 | 0.79 | 30 | 4.62 | CB 4 | 3.63 | 0.25 | 0.0138 | 0.41 | 0.90 | 0.30 | 13.32 | 5.50 | **-7.82** |
| CB 5 | 0.69 | 2.17 | 0.50 | 0 | 0 | 20 | 11.75 | 2.75 | 2.28 | 2.98 | 2.47 | 6 | PVC | 0.009 | 0.20 | 75 | 12.59 | CB 5 | 2.47 | 0.13 | 0.0926 | 6.94 | 0.90 | 2.22 | 22.49 | 5.80 | **-16.69** |
| CB 6 | 0.88 | 1.48 | 0.50 | 120 | 480 | 0 | 11.67 | 2.75 | 2.28 | 2.04 | 1.69 | 6 | PVC | 0.009 | 0.20 | 20 | 8.60 | CB 6 | 1.69 | 0.13 | 0.0432 | 0.86 | 0.90 | 1.03 | 24.38 | 6.00 | **-18.38** |
| CB 7 | 0.60 | 0.60 | 0.50 | 125 | 50 | 0 | 8.19 | 3.20 | 2.66 | 0.96 | 0.80 | 6 | PVC | 0.009 | 0.20 | 50 | 4.06 | CB 7 | 0.80 | 0.13 | 0.0096 | 0.48 | 0.05 | 0.01 | 24.88 | 5.80 | **-19.08** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF H | | 4.23 | 0.50 | 0 | 0 | 140 | 11.13 | 2.80 | 2.32 | 5.92 | 4.91 | | | | | | | OF H | 4.91 | | | | | | **4.00** | | |
| CB 1 | 0.97 | 4.23 | 0.50 | 0 | 0 | 30 | 10.54 | 2.90 | 2.41 | 6.13 | 5.09 | 15 | RCP | 0.015 | 1.23 | 140 | 4.15 | CB 1 | 5.09 | 0.31 | 0.0082 | 1.15 | 0.10 | 0.03 | 5.18 | 5.50 | **0.32** |
| CB 2 | 2.04 | 3.26 | 0.50 | 105 | 370 | 0 | 10.42 | 2.90 | 2.41 | 4.72 | 3.92 | 12 | RCP | 0.015 | 0.79 | 30 | 4.99 | CB 2 | 3.92 | 0.25 | 0.0160 | 0.48 | 0.90 | 0.35 | 6.01 | 5.50 | **-0.51** |
| CB 3 | 1.21 | 1.21 | 0.50 | 100 | 340 | 0 | 10.06 | 2.95 | 2.45 | 1.79 | 1.48 | 12 | RCP | 0.015 | 0.79 | 65 | 1.89 | CB 3 | 1.48 | 0.25 | 0.0023 | 0.15 | 0.05 | 0.00 | 6.16 | 5.50 | **-0.66** |

Notes:

1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF J | | 4.72 | 0.50 | 0 | 0 | 140 | 12.71 | 2.65 | 2.20 | 6.25 | 5.19 | | | | | | | OF J | 5.19 | | | | | | **4.00** | | |
| CB 1 | 0.58 | 4.72 | 0.50 | 0 | 0 | 110 | 12.13 | 2.70 | 2.24 | 6.37 | 5.29 | 12 | RCP | 0.015 | 0.79 | 140 | 6.73 | CB 1 | 5.29 | 0.25 | 0.0291 | 4.08 | 1.00 | 0.70 | 8.78 | 5.50 | **-3.28** |
| CB 2 | 0.80 | 0.80 | 0.50 | 140 | 140 | 0 | 9.28 | 3.05 | 2.53 | 1.22 | 1.02 | 12 | RCP | 0.015 | 0.79 | 30 | 1.29 | CB 2 | 1.02 | 0.25 | 0.0011 | 0.03 | 0.05 | 0.00 | 8.82 | 5.50 | **-3.32** |
| CB 3 | 0.43 | 3.34 | 0.50 | 0 | 0 | 100 | 11.67 | 2.75 | 2.28 | 4.59 | 3.81 | 6 | PVC | 0.009 | 0.20 | 110 | 19.40 | CB 3 | 3.81 | 0.13 | 0.2197 | 24.17 | 0.10 | 0.58 | 33.54 | 5.50 | **-28.04** |
| CON 4 | | 2.91 | 0.50 | 0 | 0 | 40 | 11.25 | 2.80 | 2.32 | 4.07 | 3.38 | 6 | PVC | 0.009 | 0.20 | 100 | 17.21 | CON 4 | 3.38 | 0.13 | 0.1729 | 17.29 | 1.00 | 4.60 | 55.43 | 5.50 | **-49.93** |
| CB 5 | 1.62 | 1.62 | 0.50 | 165 | 210 | 0 | 10.42 | 2.90 | 2.41 | 2.35 | 1.95 | 6 | PVC | 0.009 | 0.20 | 25 | 9.95 | CB 5 | 1.95 | 0.13 | 0.0578 | 1.44 | 0.05 | 0.08 | 56.95 | 5.50 | **-51.45** |
| CB 6 | 1.29 | 1.29 | 0.50 | 150 | 330 | 0 | 11.08 | 2.85 | 2.37 | 1.83 | 1.52 | 6 | PVC | 0.009 | 0.20 | 40 | 7.74 | CB 6 | 1.52 | 0.13 | 0.0350 | 1.40 | 0.05 | 0.05 | 56.87 | 5.50 | **-51.37** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF K | | 8.40 | 0.50 | 0 | 0 | 150 | 14.93 | 2.50 | 2.08 | 10.50 | 8.72 | | | | | | | OF K | 8.72 | | | | | | **4.00** | | |
| CB 1 | 0.70 | 8.40 | 0.50 | 0 | 0 | 75 | 14.31 | 2.50 | 2.08 | 10.50 | 8.72 | 15 | RCP | 0.015 | 1.23 | 150 | 7.10 | CB 1 | 8.72 | 0.31 | 0.0241 | 3.62 | 1.50 | 1.18 | 8.79 | 4.80 | **-3.99** |
| CB 2 | 0.45 | 2.89 | 0.50 | 0 | 0 | 45 | 13.99 | 2.55 | 2.12 | 3.68 | 3.05 | 12 | RCP | 0.015 | 0.79 | 75 | 3.89 | CB 2 | 3.05 | 0.25 | 0.0097 | 0.73 | 0.90 | 0.21 | 9.74 | 4.80 | **-4.94** |
| CB 3 | 2.44 | 2.44 | 0.50 | 115 | 750 | 0 | 13.81 | 2.55 | 2.12 | 3.10 | 2.58 | 12 | RCP | 0.015 | 0.79 | 45 | 3.28 | CB 3 | 2.58 | 0.25 | 0.0069 | 0.31 | 0.05 | 0.01 | 10.06 | 4.80 | **-5.26** |
| CB 4 | 0.73 | 0.73 | 0.50 | 150 | 190 | 0 | 9.92 | 2.95 | 2.45 | 1.08 | 0.90 | 12 | RCP | 0.015 | 0.79 | 35 | 1.15 | CB 4 | 0.90 | 0.25 | 0.0008 | 0.03 | 0.05 | 0.00 | 8.83 | 4.80 | **-4.03** |
| CON 5 | | 4.08 | 0.50 | 0 | 0 | 30 | 11.86 | 2.75 | 2.28 | 5.62 | 4.66 | 6 | PVC | 0.009 | 0.20 | 265 | 23.74 | CON 5 | 4.66 | 0.13 | 0.3290 | 87.17 | 1.00 | 8.75 | 104.72 | 5.50 | **-99.22** |
| CB 6 | 0.27 | 0.27 | 0.50 | 160 | 50 | 0 | 8.97 | 3.10 | 2.57 | 0.41 | 0.34 | 6 | PVC | 0.009 | 0.20 | 30 | 1.74 | CB 6 | 0.34 | 0.13 | 0.0018 | 0.05 | 0.05 | 0.00 | 104.77 | 5.50 | **-99.27** |
| CB 7 | 0.57 | 3.82 | 0.50 | 0 | 0 | 80 | 11.74 | 2.75 | 2.28 | 5.25 | 4.36 | 6 | PVC | 0.009 | 0.20 | 30 | 22.19 | CB 7 | 4.36 | 0.13 | 0.2875 | 8.62 | 0.40 | 3.06 | 116.40 | 5.50 | **-110.90** |
| CB 8 | 0.38 | 3.25 | 0.50 | 0 | 0 | 20 | 11.40 | 2.80 | 2.32 | 4.55 | 3.78 | 6 | PVC | 0.009 | 0.20 | 80 | 19.25 | CB 8 | 3.78 | 0.13 | 0.2163 | 17.30 | 0.10 | 0.58 | 134.28 | 5.50 | **-128.78** |
| CON 9 | | 2.87 | 0.50 | 0 | 0 | 100 | 11.32 | 2.80 | 2.32 | 4.02 | 3.33 | 6 | PVC | 0.009 | 0.20 | 20 | 16.98 | CON 9 | 3.33 | 0.13 | 0.1683 | 3.37 | 1.00 | 4.48 | 142.12 | 5.50 | **-136.62** |
| CB 10 | 0.48 | 0.48 | 0.50 | 160 | 70 | 0 | 9.14 | 3.05 | 2.53 | 0.73 | 0.61 | 6 | PVC | 0.009 | 0.20 | 30 | 3.08 | CB 10 | 0.61 | 0.13 | 0.0055 | 0.17 | 0.05 | 0.01 | 142.30 | 5.50 | **-136.80** |
| CON 11 | | 2.39 | 0.50 | 0 | 0 | 10 | 10.90 | 2.85 | 2.37 | 3.41 | 2.83 | 6 | PVC | 0.009 | 0.20 | 100 | 14.40 | CON 11 | 2.83 | 0.13 | 0.1211 | 12.11 | 1.00 | 3.22 | 157.45 | 5.50 | **-151.95** |
| CB 12 | 1.00 | 1.00 | 0.50 | 110 | 330 | 0 | 10.19 | 2.95 | 2.45 | 1.47 | 1.22 | 6 | PVC | 0.009 | 0.20 | 30 | 6.22 | CB 12 | 1.22 | 0.13 | 0.0225 | 0.68 | 0.05 | 0.03 | 158.16 | 5.50 | **-152.66** |
| CB 13 | 0.90 | 1.39 | 0.50 | 170 | 250 | 0 | 10.86 | 2.85 | 2.37 | 1.99 | 1.65 | 6 | PVC | 0.009 | 0.20 | 10 | 8.40 | CB 13 | 1.65 | 0.13 | 0.0412 | 0.41 | 0.10 | 0.11 | 157.97 | 5.50 | **-152.47** |
| CB 14 | 0.49 | 0.49 | 0.50 | 170 | 70 | 0 | 9.36 | 3.00 | 2.49 | 0.74 | 0.62 | 6 | PVC | 0.009 | 0.20 | 315 | 3.13 | CB 14 | 0.62 | 0.13 | 0.0057 | 1.80 | 0.90 | 0.14 | 159.91 | 5.50 | **-154.41** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF L | | 10.03 | 0.50 | 0 | 0 | 140 | 14.26 | 2.55 | 2.12 | 12.79 | 10.62 | | | | | | | OF L | 10.62 | | | | | | **4.00** | | |
| CB 1 | 0.99 | 10.03 | 0.50 | 0 | 0 | 70 | 13.67 | 2.60 | 2.16 | 13.04 | 10.83 | 18 | RCP | 0.015 | 1.77 | 140 | 6.13 | CB 1 | 10.83 | 0.38 | 0.0141 | 1.97 | 1.00 | 0.58 | 6.55 | 5.00 | **-1.55** |
| CB 2 | 1.42 | 4.42 | 0.50 | 0 | 0 | 45 | 13.38 | 2.60 | 2.16 | 5.74 | 4.77 | 15 | RCP | 0.015 | 1.23 | 70 | 3.89 | CB 2 | 4.77 | 0.31 | 0.0072 | 0.50 | 0.90 | 0.21 | 7.27 | 5.50 | **-1.77** |
| CB 3 | 1.19 | 3.00 | 0.50 | 0 | 0 | 20 | 13.19 | 2.65 | 2.20 | 3.97 | 3.30 | 12 | RCP | 0.015 | 0.79 | 45 | 4.20 | CB 3 | 3.30 | 0.25 | 0.0114 | 0.51 | 0.90 | 0.25 | 8.02 | 5.50 | **-2.52** |
| CB 4 | 0.24 | 1.81 | 0.50 | 0 | 0 | 60 | 13.11 | 2.65 | 2.20 | 2.40 | 1.99 | 6 | CMP | 0.024 | 0.20 | 20 | 10.14 | CB 4 | 1.99 | 0.13 | 0.4264 | 8.53 | 0.90 | 1.44 | 17.99 | 5.50 | **-12.49** |
| CB 5 | 1.57 | 1.57 | 0.50 | 110 | 650 | 0 | 12.86 | 2.65 | 2.20 | 2.08 | 1.73 | 6 | CMP | 0.024 | 0.20 | 60 | 8.79 | CB 5 | 1.73 | 0.13 | 0.3207 | 19.24 | 0.25 | 0.30 | 37.53 | 5.50 | **-32.03** |
| MH 6 | | 4.62 | 0.50 | 0 | 0 | 110 | 12.78 | 2.65 | 2.20 | 6.12 | 5.08 | 15 | RCP | 0.015 | 1.23 | 40 | 4.14 | MH 6 | 5.08 | 0.31 | 0.0082 | 0.33 | 0.10 | 0.03 | 6.91 | 5.50 | **-1.41** |
| CB 7 | 0.48 | 4.62 | 0.50 | 0 | 0 | 20 | 12.33 | 2.70 | 2.24 | 6.24 | 5.18 | 15 | RCP | 0.015 | 1.23 | 110 | 4.22 | CB 7 | 5.18 | 0.31 | 0.0085 | 0.94 | 0.40 | 0.11 | 7.95 | 5.50 | **-2.45** |
| CON 8 | | 4.14 | 0.50 | 0 | 0 | 265 | 12.24 | 2.70 | 2.24 | 5.59 | 4.64 | 12 | RCP | 0.015 | 0.79 | 20 | 5.91 | CON 8 | 4.64 | 0.25 | 0.0225 | 0.45 | 1.00 | 0.54 | 8.95 | 5.50 | **-3.45** |
| CB 9 | 1.44 | 2.84 | 0.50 | 0 | 0 | 30 | 11.14 | 2.80 | 2.32 | 3.97 | 3.30 | 12 | RCP | 0.015 | 0.79 | 265 | 4.20 | CB 9 | 3.30 | 0.25 | 0.0113 | 3.00 | 0.90 | 0.25 | 12.20 | 6.50 | **-5.70** |
| CB 10 | 1.40 | 1.40 | 0.50 | 115 | 415 | 0 | 11.01 | 2.85 | 2.37 | 1.99 | 1.66 | 12 | RCP | 0.015 | 0.79 | 30 | 2.11 | CB 10 | 1.66 | 0.25 | 0.0029 | 0.09 | 0.05 | 0.00 | 12.29 | 6.50 | **-5.79** |
| CB 11 | 1.31 | 1.31 | 0.50 | 115 | 250 | 0 | 9.64 | 3.00 | 2.49 | 1.96 | 1.63 | 12 | RCP | 0.015 | 0.79 | 30 | 2.07 | CB 11 | 1.63 | 0.25 | 0.0028 | 0.08 | 0.05 | 0.00 | 9.03 | 5.50 | **-3.53** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF M | | 13.49 | 0.50 | 0 | 0 | 145 | 14.97 | 2.50 | 2.08 | 16.86 | 13.99 | | | | | | | OF M | 13.99 | | | | | | **4.00** | | |
| CB 1 | 1.12 | 13.49 | 0.50 | 0 | 0 | 45 | 14.36 | 2.50 | 2.08 | 16.86 | 13.99 | 24 | RCP | 0.015 | 3.14 | 145 | 4.45 | CB 1 | 13.99 | 0.50 | 0.0051 | 0.73 | 0.10 | 0.03 | 4.77 | 5.50 | **0.73** |
| CON 2 | | 12.37 | 0.50 | 0 | 0 | 5 | 14.17 | 2.55 | 2.12 | 15.77 | 13.09 | 24 | RCP | 0.015 | 3.14 | 45 | 4.17 | CON 2 | 13.09 | 0.50 | 0.0044 | 0.20 | 1.00 | 0.27 | 5.23 | 5.50 | **0.27** |
| CB 3 | 1.20 | 10.79 | 0.50 | 0 | 0 | 240 | 14.15 | 2.55 | 2.12 | 13.76 | 11.42 | 24 | RCP | 0.015 | 3.14 | 5 | 3.63 | CB 3 | 11.42 | 0.50 | 0.0034 | 0.02 | 0.40 | 0.08 | 5.33 | 5.50 | **0.17** |
| CB 4 | 0.75 | 1.58 | 0.50 | 0 | 0 | 60 | 9.47 | 3.00 | 2.49 | 2.37 | 1.97 | 12 | RCP | 0.015 | 0.79 | 225 | 2.50 | CB 4 | 1.97 | 0.25 | 0.0040 | 0.91 | 0.40 | 0.04 | 6.18 | 5.50 | **-0.68** |
| CB 5 | 0.83 | 0.83 | 0.50 | 130 | 160 | 0 | 9.22 | 3.05 | 2.53 | 1.27 | 1.05 | 12 | RCP | 0.015 | 0.79 | 60 | 1.34 | CB 5 | 1.05 | 0.25 | 0.0012 | 0.07 | 0.05 | 0.00 | 6.25 | 5.50 | **-0.75** |
| CB 6 | 0.75 | 9.59 | 0.50 | 0 | 0 | 165 | 13.15 | 2.65 | 2.20 | 12.70 | 10.54 | 24 | RCP | 0.015 | 3.14 | 240 | 3.36 | CB 6 | 10.54 | 0.50 | 0.0029 | 0.69 | 1.00 | 0.17 | 6.20 | 6.90 | **0.70** |
| CB 7 | 1.05 | 2.85 | 0.50 | 120 | 420 | 0 | 11.17 | 2.80 | 2.32 | 3.98 | 3.31 | 15 | RCP | 0.015 | 1.23 | 45 | 2.69 | CB 7 | 3.31 | 0.31 | 0.0035 | 0.16 | 0.90 | 0.10 | 6.46 | 5.80 | **-0.66** |
| CB 8 | 0.68 | 1.80 | 0.50 | 0 | 0 | 240 | 9.88 | 2.95 | 2.45 | 2.65 | 2.20 | 12 | RCP | 0.015 | 0.79 | 40 | 2.80 | CB 8 | 2.20 | 0.25 | 0.0051 | 0.20 | 1.40 | 0.17 | 6.83 | 5.80 | **-1.03** |
| CB 9 | 0.52 | 1.12 | 0.50 | 0 | 0 | 30 | 8.88 | 3.10 | 2.57 | 1.74 | 1.44 | 6 | PVC | 0.009 | 0.20 | 240 | 7.34 | CB 9 | 1.44 | 0.13 | 0.0315 | 7.55 | 1.40 | 1.17 | 15.55 | 6.50 | **-9.05** |
| CB 10 | 0.60 | 0.60 | 0.50 | 120 | 130 | 0 | 8.75 | 3.10 | 2.57 | 0.93 | 0.77 | 6 | RCP | 0.015 | 0.20 | 30 | 3.92 | CB 10 | 0.77 | 0.13 | 0.0250 | 0.75 | 0.05 | 0.01 | 16.31 | 6.50 | **-9.81** |
| MH 11 | | 5.99 | 0.50 | 0 | 0 | 120 | 12.47 | 2.70 | 2.24 | 8.09 | 6.71 | 15 | RCP | 0.015 | 1.23 | 165 | 5.47 | MH 11 | 6.71 | 0.31 | 0.0143 | 2.36 | 0.40 | 0.19 | 8.74 | 6.70 | **-2.04** |
| CB 12 | 0.73 | 5.99 | 0.50 | 0 | 0 | 30 | 11.97 | 2.75 | 2.28 | 8.24 | 6.84 | 15 | RCP | 0.015 | 1.23 | 120 | 5.57 | CB 12 | 6.84 | 0.31 | 0.0148 | 1.78 | 1.00 | 0.48 | 11.00 | 5.80 | **-5.20** |
| CB 13 | 0.48 | 0.64 | 0.50 | 110 | 220 | 0 | 9.28 | 3.05 | 2.53 | 0.97 | 0.81 | 12 | RCP | 0.015 | 0.79 | 40 | 1.03 | CB 13 | 0.81 | 0.25 | 0.0007 | 0.03 | 0.90 | 0.01 | 11.05 | 6.20 | **-4.85** |
| CB 14 | 0.16 | 0.16 | 0.50 | 85 | 40 | 0 | 7.22 | 3.40 | 2.82 | 0.27 | 0.23 | 6 | PVC | 0.009 | 0.20 | 50 | 1.15 | CB 14 | 0.23 | 0.13 | 0.0008 | 0.04 | 0.05 | 0.00 | 11.09 | 6.50 | **-4.59** |
| CON 15 | | 4.62 | 0.50 | 0 | 0 | 80 | 11.84 | 2.75 | 2.28 | 6.35 | 5.27 | 12 | RCP | 0.015 | 0.79 | 30 | 6.72 | CON 15 | 5.27 | 0.25 | 0.0290 | 0.87 | 1.00 | 0.70 | 12.57 | 6.90 | **-5.67** |
| CB 16 | 0.51 | 0.51 | 0.50 | 120 | 140 | 0 | 8.83 | 3.10 | 2.57 | 0.80 | 0.66 | 12 | RCP | 0.015 | 0.79 | 40 | 0.84 | CB 16 | 0.66 | 0.25 | 0.0005 | 0.02 | 0.05 | 0.00 | 12.59 | 5.80 | **-6.79** |
| CB 17 | 0.76 | 4.11 | 0.50 | 0 | 0 | 120 | 11.51 | 2.80 | 2.32 | 5.75 | 4.77 | 6 | PVC | 0.009 | 0.20 | 80 | 24.31 | CB 17 | 4.77 | 0.13 | 0.3449 | 27.59 | 0.10 | 0.92 | 41.09 | 6.50 | **-34.59** |
| CON 18 | | 3.35 | 0.50 | 0 | 0 | 70 | 11.01 | 2.85 | 2.37 | 4.77 | 3.96 | 6 | PVC | 0.009 | 0.20 | 120 | 20.18 | CON 18 | 3.96 | 0.13 | 0.2377 | 28.53 | 1.00 | 6.32 | 75.94 | 6.50 | **-69.44** |
| CB 19 | 0.90 | 0.90 | 0.50 | 110 | 300 | 0 | 9.94 | 2.95 | 2.45 | 1.33 | 1.10 | 6 | PVC | 0.009 | 0.20 | 30 | 5.62 | CB 19 | 1.10 | 0.13 | 0.0184 | 0.55 | 0.05 | 0.02 | 76.51 | 6.50 | **-70.01** |
| CB 20 | 0.22 | 2.45 | 0.50 | 0 | 0 | 35 | 10.72 | 2.85 | 2.37 | 3.49 | 2.90 | 12 | RCP | 0.015 | 0.79 | 70 | 3.69 | CB 20 | 2.90 | 0.25 | 0.0087 | 0.61 | 0.10 | 0.02 | 76.57 | 6.50 | **-70.07** |
| CB 21 | 0.55 | 2.23 | 0.50 | 0 | 0 | 230 | 10.57 | 2.90 | 2.41 | 3.23 | 2.68 | 12 | RCP | 0.015 | 0.79 | 35 | 3.41 | CB 21 | 2.68 | 0.25 | 0.0075 | 0.26 | 0.10 | 0.02 | 76.85 | 6.50 | **-70.35** |
| CB 22 | 0.84 | 1.68 | 0.50 | 110 | 260 | 0 | 9.61 | 3.00 | 2.49 | 2.52 | 2.09 | 12 | RCP | 0.015 | 0.79 | 230 | 2.66 | CB 22 | 2.09 | 0.25 | 0.0046 | 1.05 | 0.40 | 0.04 | 77.95 | 7.00 | **-70.95** |
| CB 23 | 0.34 | 0.84 | 0.50 | 0 | 0 | 100 | 9.03 | 3.05 | 2.53 | 1.28 | 1.06 | 6 | PVC | 0.009 | 0.20 | 35 | 5.42 | CB 23 | 1.06 | 0.13 | 0.0171 | 0.60 | 0.40 | 0.18 | 78.73 | 7.50 | **-71.23** |
| CB 24 | 0.51 | 0.51 | 0.50 | 110 | 140 | 0 | 8.61 | 3.15 | 2.61 | 0.80 | 0.66 | 6 | PVC | 0.009 | 0.20 | 100 | 3.36 | CB 24 | 0.66 | 0.13 | 0.0066 | 0.66 | 0.05 | 0.01 | 79.40 | 7.50 | **-71.90** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF N | | 6.73 | 0.50 | 0 | 0 | 150 | 12.22 | 2.70 | 2.24 | 9.08 | 7.54 | | | | | | | OF N | 7.54 | | | | | | **4.00** | | |
| CB 1 | 0.81 | 6.73 | 0.50 | 0 | 0 | 15 | 11.59 | 2.80 | 2.32 | 9.42 | 7.82 | 15 | RCP | 0.015 | 1.23 | 150 | 6.37 | CB 1 | 7.82 | 0.31 | 0.0194 | 2.91 | 0.40 | 0.25 | 7.16 | 4.80 | **-2.36** |
| CON 2 | | 5.91 | 0.50 | 0 | 0 | 40 | 11.53 | 2.80 | 2.32 | 8.28 | 6.87 | 12 | RCP | 0.015 | 0.79 | 15 | 8.75 | CON 2 | 6.87 | 0.25 | 0.0493 | 0.74 | 1.50 | 1.78 | 9.68 | 5.80 | **-3.88** |
| CB 3 | 0.72 | 1.13 | 0.50 | 130 | 165 | 0 | 9.26 | 3.05 | 2.53 | 1.72 | 1.43 | 12 | RCP | 0.015 | 0.79 | 175 | 1.82 | CB 3 | 1.43 | 0.25 | 0.0021 | 0.37 | 0.90 | 0.05 | 10.10 | 5.00 | **-5.10** |
| CB 4 | 0.41 | 0.41 | 0.50 | 110 | 150 | 0 | 8.69 | 3.15 | 2.61 | 0.64 | 0.53 | 6 | PVC | 0.009 | 0.20 | 45 | 2.72 | CB 4 | 0.53 | 0.13 | 0.0043 | 0.20 | 0.05 | 0.01 | 10.30 | 5.50 | **-4.80** |
| CB 5 | 2.82 | 3.86 | 0.50 | 110 | 470 | 0 | 11.36 | 2.80 | 2.32 | 5.41 | 4.49 | 12 | RCP | 0.015 | 0.79 | 40 | 5.72 | CB 5 | 4.49 | 0.25 | 0.0210 | 0.84 | 0.90 | 0.46 | 10.98 | 5.00 | **-5.98** |
| CB 6 | 1.04 | 1.04 | 0.50 | 110 | 340 | 0 | 10.28 | 2.90 | 2.41 | 1.51 | 1.26 | 12 | RCP | 0.015 | 0.79 | 45 | 1.60 | CB 6 | 1.26 | 0.25 | 0.0016 | 0.07 | 0.05 | 0.00 | 11.06 | 5.50 | **-5.56** |
| CB 7 | 0.92 | 0.92 | 0.50 | 130 | 200 | 0 | 9.56 | 3.00 | 2.49 | 1.38 | 1.15 | 12 | RCP | 0.015 | 0.79 | 265 | 1.46 | CB 7 | 1.15 | 0.25 | 0.0014 | 0.36 | 0.05 | 0.00 | 10.05 | 5.00 | **-5.05** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF P | | 8.33 | 0.50 | 0 | 0 | 140 | 12.88 | 2.65 | 2.20 | 11.04 | 9.16 | | | | | | | OF P | 9.16 | | | | | | **4.00** | | |
| CB 1 | 2.48 | 8.33 | 0.50 | 0 | 0 | 30 | 12.30 | 2.70 | 2.24 | 11.25 | 9.34 | 15 | RCP | 0.015 | 1.23 | 140 | 7.61 | CB 1 | 9.34 | 0.31 | 0.0277 | 3.87 | 0.40 | 0.36 | 8.23 | 3.50 | **-4.73** |
| CON 2 | | 5.85 | 0.50 | 0 | 0 | 25 | 12.17 | 2.70 | 2.24 | 7.90 | 6.56 | 15 | RCP | 0.015 | 1.23 | 30 | 5.34 | CON 2 | 6.56 | 0.31 | 0.0136 | 0.41 | 1.00 | 0.44 | 9.08 | 5.20 | **-3.88** |
| CB 3 | 2.58 | 4.72 | 0.50 | 110 | 555 | 0 | 12.07 | 2.70 | 2.24 | 6.38 | 5.29 | 15 | RCP | 0.015 | 1.23 | 25 | 4.31 | CB 3 | 5.29 | 0.31 | 0.0089 | 0.22 | 0.05 | 0.01 | 9.32 | 4.50 | **-4.82** |
| CB 4 | 1.13 | 1.13 | 0.50 | 115 | 400 | 0 | 10.89 | 2.85 | 2.37 | 1.61 | 1.33 | 6 | PVC | 0.009 | 0.20 | 185 | 6.79 | CB 4 | 1.33 | 0.13 | 0.0269 | 4.97 | 0.90 | 0.64 | 14.70 | 5.50 | **-9.20** |
| CB 5 | 2.15 | 2.15 | 0.50 | 120 | 450 | 0 | 11.42 | 2.80 | 2.32 | 3.00 | 2.49 | 12 | RCP | 0.015 | 0.79 | 50 | 3.17 | CB 5 | 2.49 | 0.25 | 0.0065 | 0.32 | 0.05 | 0.01 | 9.65 | 4.50 | **-5.15** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF Q | | 15.07 | 0.50 | 0 | 0 | 170 | 16.53 | 2.35 | 1.95 | 17.71 | 14.70 | | | | | | | OF Q | 14.70 | | | | | | **4.00** | | |
| CB 1 | 1.00 | 15.07 | 0.50 | 0 | 0 | 45 | 15.82 | 2.40 | 1.99 | 18.09 | 15.01 | 24 | CMP | 0.024 | 3.14 | 170 | 4.78 | CB 1 | 15.01 | 0.50 | 0.0149 | 2.54 | 1.00 | 0.35 | 6.89 | 4.70 | **-2.19** |
| CB 2 | 0.82 | 0.82 | 0.50 | 140 | 200 | 0 | 9.78 | 3.00 | 2.49 | 1.23 | 1.02 | 6 | PVC | 0.009 | 0.20 | 85 | 5.22 | CB 2 | 1.02 | 0.13 | 0.0159 | 1.35 | 0.05 | 0.02 | 8.26 | 3.50 | **-4.76** |
| CB 3 | 0.26 | 13.25 | 0.50 | 0 | 0 | 265 | 15.63 | 2.40 | 1.99 | 15.89 | 13.19 | 16"x25" | CMP | 0.024 | 2.78 | 45 | 4.75 | CB 3 | 13.19 | 6.83 | 0.0005 | 0.02 | 1.50 | 0.53 | 7.44 | 4.50 | **-2.94** |
| CB 4 | 1.36 | 1.36 | 0.50 | 110 | 470 | 0 | 11.36 | 2.80 | 2.32 | 1.91 | 1.58 | 6 | PVC | 0.009 | 0.20 | 65 | 8.05 | CB 4 | 1.58 | 0.13 | 0.0379 | 2.46 | 0.05 | 0.05 | 9.95 | 4.00 | **-5.95** |
| CB 5 | 0.11 | 2.14 | 0.50 | 0 | 0 | 90 | 12.10 | 2.70 | 2.24 | 2.89 | 2.40 | 12 | RCP | 0.015 | 0.79 | 40 | 3.06 | CB 5 | 2.40 | 0.25 | 0.0060 | 0.24 | 1.00 | 0.15 | 7.82 | 5.50 | **-2.32** |
| CB 6 | 0.24 | 0.24 | 0.50 | 125 | 0 | 0 | 7.78 | 3.30 | 2.74 | 0.40 | 0.33 | 12 | RCP | 0.015 | 0.79 | 120 | 0.43 | CB 6 | 0.33 | 0.25 | 0.0001 | 0.01 | 0.05 | 0.00 | 7.84 | 6.00 | **-1.84** |
| CB 7 | 1.79 | 1.79 | 0.50 | 250 | 140 | 0 | 11.72 | 2.75 | 2.28 | 2.47 | 2.05 | 12 | RCP | 0.015 | 0.79 | 90 | 2.61 | CB 7 | 2.05 | 0.25 | 0.0044 | 0.39 | 0.05 | 0.01 | 8.22 | 5.50 | **-2.72** |
| CB 8 | 0.18 | 9.48 | 0.50 | 0 | 0 | 150 | 14.53 | 2.50 | 2.08 | 11.85 | 9.83 | 21 | RCP | 0.015 | 2.41 | 265 | 4.09 | CB 8 | 9.83 | 0.44 | 0.0051 | 1.35 | 1.00 | 0.26 | 9.05 | 6.50 | **-2.55** |
| CB 9 | 1.30 | 2.91 | 0.50 | 0 | 0 | 60 | 10.15 | 2.95 | 2.45 | 4.29 | 3.56 | 15 | RCP | 0.015 | 1.23 | 115 | 2.90 | CB 9 | 3.56 | 0.31 | 0.0040 | 0.46 | 0.40 | 0.05 | 9.56 | 5.50 | **-4.06** |
| CON 10 | | 1.61 | 0.50 | 0 | 0 | 130 | 9.90 | 2.95 | 2.45 | 2.38 | 1.97 | 12 | RCP | 0.015 | 0.79 | 60 | 2.51 | CON 10 | 1.97 | 0.25 | 0.0041 | 0.24 | 1.00 | 0.10 | 9.91 | 5.50 | **-4.41** |
| CB 11 | 0.16 | 0.16 | 0.50 | 20 | 100 | 0 | 6.28 | 3.60 | 2.99 | 0.29 | 0.24 | 6 | PVC | 0.009 | 0.20 | 35 | 1.23 | CB 11 | 0.24 | 0.13 | 0.0009 | 0.03 | 0.05 | 0.00 | 9.94 | 5.50 | **-4.44** |
| CON 12 | | 1.45 | 0.50 | 0 | 0 | 15 | 9.35 | 3.00 | 2.49 | 2.18 | 1.81 | 12 | RCP | 0.015 | 0.79 | 130 | 2.30 | CON 12 | 1.81 | 0.25 | 0.0034 | 0.44 | 1.00 | 0.08 | 10.43 | 7.20 | **-3.23** |
| CB 13 | 0.44 | 0.44 | 0.50 | 125 | 100 | 0 | 8.61 | 3.15 | 2.61 | 0.70 | 0.58 | 6 | PVC | 0.009 | 0.20 | 75 | 2.96 | CB 13 | 0.58 | 0.13 | 0.0051 | 0.38 | 0.05 | 0.01 | 10.82 | 6.50 | **-4.32** |
| CON 14 | | 1.01 | 0.50 | 0 | 0 | 60 | 9.29 | 3.05 | 2.53 | 1.53 | 1.27 | 12 | RCP | 0.015 | 0.79 | 15 | 1.62 | CON 14 | 1.27 | 0.25 | 0.0017 | 0.03 | 1.00 | 0.04 | 10.50 | 7.50 | **-3.00** |
| CB 15 | 0.18 | 0.18 | 0.50 | 120 | 60 | 0 | 8.17 | 3.20 | 2.66 | 0.28 | 0.23 | 12 | RCP | 0.015 | 0.79 | 15 | 0.30 | CB 15 | 0.23 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 10.50 | 6.50 | **-4.00** |
| CB 16 | 0.21 | 0.83 | 0.50 | 0 | 0 | 130 | 9.04 | 3.05 | 2.53 | 1.27 | 1.05 | 6 | PVC | 0.009 | 0.20 | 60 | 5.35 | CB 16 | 1.05 | 0.13 | 0.0167 | 1.00 | 0.40 | 0.18 | 11.68 | 6.50 | **-5.18** |
| CB 17 | 0.62 | 0.62 | 0.50 | 120 | 100 | 0 | 8.50 | 3.15 | 2.61 | 0.97 | 0.81 | 6 | PVC | 0.009 | 0.20 | 130 | 4.10 | CB 17 | 0.81 | 0.13 | 0.0098 | 1.28 | 0.05 | 0.01 | 12.97 | 6.50 | **-6.47** |
| CON 18 | | 6.38 | 0.50 | 0 | 0 | 45 | 13.90 | 2.55 | 2.12 | 8.14 | 6.75 | 15 | RCP | 0.015 | 1.23 | 150 | 5.50 | CON 18 | 6.75 | 0.31 | 0.0145 | 2.17 | 1.00 | 0.47 | 11.69 | 6.50 | **-5.19** |
| CB 19 | 0.26 | 0.75 | 0.50 | 0 | 0 | 55 | 7.48 | 3.40 | 2.82 | 1.28 | 1.06 | 8 | RCP | 0.015 | 0.35 | 25 | 3.05 | CB 19 | 1.06 | 0.17 | 0.0103 | 0.26 | 0.90 | 0.13 | 12.08 | 6.30 | **-5.78** |
| CB 20 | 0.49 | 0.49 | 0.50 | 90 | 30 | 0 | 7.25 | 3.40 | 2.82 | 0.83 | 0.69 | 6 | PVC | 0.009 | 0.20 | 55 | 3.52 | CB 20 | 0.69 | 0.13 | 0.0072 | 0.40 | 0.05 | 0.01 | 12.48 | 6.10 | **-6.38** |
| CB 21 | 0.56 | 5.63 | 0.50 | 0 | 0 | 160 | 13.72 | 2.60 | 2.16 | 7.32 | 6.07 | 15 | RCP | 0.015 | 1.23 | 45 | 4.95 | CB 21 | 6.07 | 0.31 | 0.0117 | 0.53 | 1.40 | 0.53 | 12.75 | 5.80 | **-6.95** |
| CB 22 | 1.94 | 1.94 | 0.50 | 120 | 260 | 0 | 9.83 | 2.95 | 2.45 | 2.86 | 2.37 | 12 | RCP | 0.015 | 0.79 | 135 | 3.02 | CB 22 | 2.37 | 0.25 | 0.0059 | 0.79 | 0.05 | 0.01 | 13.55 | 5.50 | **-8.05** |
| CON 23 | | 3.13 | 0.50 | 0 | 0 | 65 | 13.05 | 2.65 | 2.20 | 4.15 | 3.44 | 12 | RCP | 0.015 | 0.79 | 160 | 4.38 | CON 23 | 3.44 | 0.25 | 0.0124 | 1.98 | 1.00 | 0.30 | 15.03 | 7.50 | **-7.53** |
| CB 24 | 0.91 | 0.91 | 0.50 | 175 | 0 | 0 | 8.89 | 3.10 | 2.57 | 1.40 | 1.17 | 8 | RCP | 0.015 | 0.35 | 75 | 3.34 | CB 24 | 1.17 | 0.17 | 0.0123 | 0.92 | 0.05 | 0.01 | 15.96 | 7.20 | **-8.76** |
| CB 25 | 2.22 | 2.22 | 0.50 | 575 | 0 | 0 | 12.78 | 2.65 | 2.20 | 2.95 | 2.45 | 12 | RCP | 0.015 | 0.79 | 65 | 3.12 | CB 25 | 2.45 | 0.25 | 0.0062 | 0.41 | 0.05 | 0.01 | 15.44 | 8.00 | **-7.44** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF R | | 6.65 | 0.50 | 0 | 0 | 115 | 12.17 | 2.70 | 2.24 | 8.97 | 7.45 | | | | | | | OF R | 7.45 | | | | | | **1.00** | | |
| CB 1 | 0.68 | 6.65 | 0.50 | 0 | 0 | 150 | 11.69 | 2.75 | 2.28 | 9.14 | 7.59 | 18 | RCP | 0.015 | 1.77 | 115 | 4.29 | CB 1 | 7.59 | 0.38 | 0.0069 | 0.79 | 1.00 | 0.29 | 2.08 | 3.50 | **1.42** |
| CB 2 | 0.31 | 2.63 | 0.50 | 0 | 0 | 45 | 10.16 | 2.95 | 2.45 | 3.88 | 3.22 | 15 | RCP | 0.015 | 1.23 | 40 | 2.62 | CB 2 | 3.22 | 0.31 | 0.0033 | 0.13 | 0.90 | 0.10 | 2.31 | 3.50 | **1.19** |
| CON 3 | | 2.32 | 0.50 | 0 | 0 | 160 | 9.97 | 2.95 | 2.45 | 3.42 | 2.84 | 15 | RCP | 0.015 | 1.23 | 45 | 2.31 | CON 3 | 2.84 | 6.83 | 0.0000 | 0.00 | 1.00 | 0.08 | 2.39 | 3.50 | **1.11** |
| CB 4 | 0.32 | 0.32 | 0.50 | 100 | 90 | 0 | 7.97 | 3.30 | 2.74 | 0.53 | 0.44 | 15 | RCP | 0.015 | 1.23 | 35 | 0.36 | CB 4 | 0.44 | 0.31 | 0.0001 | 0.00 | 0.05 | 0.00 | 2.40 | 3.50 | **1.10** |
| CB 5 | 0.35 | 1.99 | 0.50 | 0 | 0 | 190 | 9.31 | 3.00 | 2.49 | 2.99 | 2.48 | 8 | CMP | 0.024 | 0.35 | 160 | 7.11 | CB 5 | 2.48 | 0.17 | 0.1431 | 22.89 | 1.00 | 0.79 | 26.07 | 4.00 | **-22.07** |
| CB 6 | 0.31 | 0.31 | 0.50 | 100 | 60 | 0 | 7.72 | 3.30 | 2.74 | 0.52 | 0.43 | 8 | CMP | 0.024 | 0.35 | 30 | 1.23 | CB 6 | 0.43 | 0.17 | 0.0043 | 0.13 | 0.05 | 0.00 | 26.20 | 4.00 | **-22.20** |
| CB 7 | 0.66 | 1.33 | 0.50 | 0 | 0 | 30 | 8.51 | 3.15 | 2.61 | 2.10 | 1.74 | 8 | CMP | 0.024 | 0.35 | 190 | 5.00 | CB 7 | 1.74 | 0.17 | 0.0706 | 13.41 | 0.90 | 0.35 | 39.83 | 4.00 | **-35.83** |
| CB 8 | 0.67 | 0.67 | 0.50 | 100 | 140 | 0 | 8.39 | 3.20 | 2.66 | 1.07 | 0.89 | 8 | CMP | 0.024 | 0.35 | 30 | 2.55 | CB 8 | 0.89 | 0.17 | 0.0184 | 0.55 | 0.05 | 0.01 | 40.38 | 4.00 | **-36.38** |
| CON 9 | | 3.34 | 0.50 | 0 | 0 | 30 | 11.07 | 2.85 | 2.37 | 4.76 | 3.95 | 6 | PVC | 0.009 | 0.20 | 150 | 20.13 | CON 9 | 3.95 | 0.13 | 0.2366 | 35.49 | 1.00 | 6.29 | 43.87 | 3.50 | **-40.37** |
| CB 10 | 0.32 | 0.32 | 0.50 | 115 | 30 | 0 | 7.81 | 3.30 | 2.74 | 0.53 | 0.44 | 6 | PVC | 0.009 | 0.20 | 15 | 2.23 | CB 10 | 0.44 | 0.13 | 0.0029 | 0.04 | 0.05 | 0.00 | 43.92 | 3.50 | **-40.42** |
| CON 11 | | 3.02 | 0.50 | 0 | 0 | 15 | 10.94 | 2.85 | 2.37 | 4.31 | 3.57 | 6 | PVC | 0.009 | 0.20 | 30 | 18.21 | CON 11 | 3.57 | 0.13 | 0.1935 | 5.81 | 1.50 | 7.72 | 57.39 | 3.50 | **-53.89** |
| CB 12 | 0.78 | 2.05 | 0.50 | 0 | 0 | 65 | 10.88 | 2.85 | 2.37 | 2.91 | 2.42 | 6 | PVC | 0.009 | 0.20 | 15 | 12.32 | CB 12 | 2.42 | 0.13 | 0.0886 | 1.33 | 0.90 | 2.12 | 60.84 | 3.50 | **-57.34** |
| CB 13 | 1.27 | 1.27 | 0.50 | 140 | 300 | 0 | 10.61 | 2.90 | 2.41 | 1.84 | 1.53 | 6 | PVC | 0.009 | 0.20 | 65 | 7.78 | CB 13 | 1.53 | 0.13 | 0.0353 | 2.30 | 0.05 | 0.05 | 63.19 | 3.50 | **-59.69** |
| CB 14 | 0.20 | 0.20 | 0.50 | 110 | 75 | 0 | 8.07 | 3.20 | 2.66 | 0.31 | 0.26 | 6 | PVC | 0.009 | 0.20 | 15 | 1.33 | CB 14 | 0.26 | 0.13 | 0.0010 | 0.02 | 0.05 | 0.00 | 57.41 | 3.50 | **-53.91** |
| CON 15 | | 0.78 | 0.50 | 0 | 0 | 65 | 8.38 | 3.20 | 2.66 | 1.25 | 1.04 | 6 | PVC | 0.009 | 0.20 | 140 | 5.28 | CON 15 | 1.04 | 0.13 | 0.0163 | 2.28 | 1.00 | 0.43 | 60.10 | 4.00 | **-56.10** |
| CB 16 | 0.21 | 0.21 | 0.50 | 110 | 60 | 0 | 7.94 | 3.30 | 2.74 | 0.35 | 0.29 | 6 | PVC | 0.009 | 0.20 | 15 | 1.48 | CB 16 | 0.29 | 0.13 | 0.0013 | 0.02 | 0.05 | 0.00 | 60.12 | 4.00 | **-56.12** |
| CB 17 | 0.57 | 0.57 | 0.50 | 110 | 80 | 0 | 8.11 | 3.20 | 2.66 | 0.91 | 0.75 | 6 | PVC | 0.009 | 0.20 | 65 | 3.84 | CB 17 | 0.75 | 0.13 | 0.0086 | 0.56 | 0.05 | 0.01 | 60.67 | 4.00 | **-56.67** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by the existing San Clemente Creek Pump Station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $POC^1$ | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | $POC^1$ | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF S | | 3.39 | 0.50 | 0 | 0 | 35 | 11.97 | 2.75 | 2.28 | 4.66 | 3.87 | | | | | | | OF S | 3.87 | | | | | | **1.00** | | |
| CB 1 | 0.23 | 3.39 | 0.50 | 0 | 0 | 40 | 11.82 | 2.75 | 2.28 | 4.66 | 3.87 | 12 | RCP | 0.015 | 0.79 | 35 | 4.92 | CB 1 | 3.87 | 0.25 | 0.0156 | 0.55 | 0.10 | 0.04 | 1.58 | 4.00 | **2.42** |
| CB 2 | 0.62 | 3.16 | 0.50 | 0 | 0 | 120 | 11.65 | 2.75 | 2.28 | 4.34 | 3.61 | 12 | RCP | 0.015 | 0.79 | 40 | 4.59 | CB 2 | 3.61 | 0.25 | 0.0136 | 0.54 | 0.90 | 0.29 | 2.42 | 4.00 | **1.58** |
| CB 3 | 1.18 | 2.54 | 0.50 | 0 | 0 | 40 | 11.15 | 2.80 | 2.32 | 3.56 | 2.95 | 6 | PVC | 0.009 | 0.20 | 120 | 15.03 | CB 3 | 2.95 | 6.83 | 0.0006 | 0.08 | 0.90 | 3.16 | 5.65 | 4.00 | **-1.65** |
| CB 4 | 1.36 | 1.36 | 0.50 | 110 | 425 | 0 | 10.99 | 2.85 | 2.37 | 1.94 | 1.61 | 6 | PVC | 0.009 | 0.20 | 40 | 8.19 | CB 4 | 1.61 | 0.13 | 0.0391 | 1.57 | 0.05 | 0.05 | 7.27 | 4.00 | **-3.27** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by the existing San Clemente Creek Pump Station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF T1 | | 1.14 | 0.50 | 0 | 0 | 130 | 8.82 | 3.10 | 2.57 | 1.76 | 1.46 | | | | | | | OF T1 | 1.46 | | | | | | **1.00** | | |
| CB 1 | 0.45 | 1.14 | 0.50 | 0 | 0 | 30 | 8.28 | 3.20 | 2.66 | 1.82 | 1.51 | 6 | CMP | 0.024 | 0.20 | 130 | 7.69 | CB 1 | 1.51 | 0.13 | 0.2454 | 31.90 | 0.90 | 0.83 | 33.72 | 6.50 | **-27.22** |
| CB 2 | 0.33 | 0.69 | 0.50 | 0 | 0 | 40 | 8.15 | 3.20 | 2.66 | 1.10 | 0.91 | 6 | CMP | 0.024 | 0.20 | 30 | 4.63 | CB 2 | 0.91 | 0.13 | 0.0891 | 2.67 | 0.90 | 0.30 | 36.70 | 6.50 | **-30.20** |
| CB 3 | 0.17 | 0.35 | 0.50 | 0 | 0 | 50 | 7.99 | 3.30 | 2.74 | 0.58 | 0.48 | 6 | CMP | 0.024 | 0.20 | 40 | 2.46 | CB 3 | 0.48 | 6.83 | 0.0001 | 0.00 | 1.40 | 0.13 | 36.83 | 6.50 | **-30.33** |
| CB 4 | 0.18 | 0.18 | 0.50 | 110 | 40 | 0 | 7.78 | 3.30 | 2.74 | 0.30 | 0.25 | 6 | PVC | 0.009 | 0.20 | 50 | 1.25 | CB 4 | 0.25 | 0.13 | 0.0009 | 0.05 | 0.05 | 0.00 | 36.88 | 6.50 | **-30.38** |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OF T2 | | 1.18 | 0.50 | 0 | 0 | 145 | 9.47 | 3.00 | 2.49 | 1.77 | 1.47 | | | | | | | OF T2 | 1.47 | | | | | | **1.00** | | |
| CB 6 | 0.40 | 1.18 | 0.50 | 0 | 0 | 120 | 8.86 | 3.10 | 2.57 | 1.83 | 1.52 | 12 | CMP | 0.024 | 0.79 | 145 | 1.93 | CB 6 | 1.52 | 0.25 | 0.0061 | 0.89 | 0.90 | 0.05 | 1.94 | 6.50 | **4.56** |
| CB 5 | 0.43 | 0.78 | 0.50 | 0 | 0 | 90 | 8.36 | 3.20 | 2.66 | 1.25 | 1.04 | 8 | CMP | 0.024 | 0.35 | 120 | 2.98 | CB 5 | 1.04 | 0.17 | 0.0251 | 3.01 | 0.10 | 0.01 | 4.96 | 6.50 | **1.54** |
| CB 3 | 0.18 | 0.35 | 0.50 | 0 | 0 | 50 | 7.99 | 3.30 | 2.74 | 0.58 | 0.48 | 6 | PVC | 0.009 | 0.20 | 90 | 2.46 | CB 3 | 0.48 | 0.13 | 0.0035 | 0.32 | 1.00 | 0.09 | 5.37 | 6.50 | **1.13** |
| CB 4 | 0.17 | 0.17 | 0.50 | 110 | 40 | 0 | 7.78 | 3.30 | 2.74 | 0.29 | 0.24 | 6 | PVC | 0.009 | 0.20 | 50 | 1.21 | CB 4 | 0.24 | 0.13 | 0.0009 | 0.04 | 0.05 | 0.00 | 5.42 | 6.50 | **1.08** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by the existing San Clemente Creek Pump Station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF A | | 2.17 | 0.50 | 0 | 0 | 70 | 10.96 | 2.85 | 2.37 | 3.09 | 2.57 | | | | | | | OF A | 2.57 | | | | | | **0.00** | | |
| CB 1 | 1.11 | 2.17 | 0.50 | 120 | 360 | 0 | 10.67 | 2.90 | 2.41 | 3.15 | 2.61 | 12 | RCP | 0.015 | 0.79 | 70 | 3.32 | CB 1 | 2.61 | 0.25 | 0.0071 | 0.50 | 0.90 | 0.15 | 0.65 | 2.50 | **1.85** |
| CB 2 | 1.06 | 1.06 | 0.50 | 120 | 340 | 0 | 10.50 | 2.90 | 2.41 | 1.54 | 1.28 | 12 | RCP | 0.015 | 0.79 | 35 | 1.63 | CB 2 | 1.28 | 0.25 | 0.0017 | 0.06 | 0.05 | 0.00 | 0.71 | 2.50 | **1.79** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF B | | 16.22 | 0.50 | 0 | 0 | 65 | 15.58 | 2.40 | 1.99 | 19.47 | 16.16 | | | | | | | OF B | 16.16 | | | | | | **-3.00** | | |
| MH 1 | | 16.22 | 0.50 | 0 | 0 | 215 | 15.31 | 2.45 | 2.03 | 19.87 | 16.49 | 30 | RCP | 0.015 | 4.91 | 65 | 3.36 | MH 1 | 16.49 | 0.63 | 0.0021 | 0.14 | 0.40 | 0.07 | -2.79 | 3.50 | **6.29** |
| CON 2 | | 16.22 | 0.50 | 0 | 0 | 50 | 14.42 | 2.50 | 2.08 | 20.28 | 16.83 | 30 | RCP | 0.015 | 4.91 | 215 | 3.43 | CON 2 | 16.83 | 0.63 | 0.0022 | 0.48 | 1.00 | 0.18 | -2.13 | 2.50 | **4.63** |
| CB 3 | 0.70 | 0.70 | 0.50 | 110 | 175 | 0 | 8.90 | 3.10 | 2.57 | 1.08 | 0.90 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.14 | CB 3 | 0.90 | 0.25 | 0.0003 | 0.01 | 0.05 | 0.00 | -2.12 | 2.50 | **4.62** |
| CON 4 | | 15.52 | 0.50 | 0 | 0 | 20 | 14.21 | 2.55 | 2.12 | 19.79 | 16.43 | 30 | RCP | 0.015 | 4.91 | 50 | 3.35 | CON 4 | 16.43 | 0.63 | 0.0021 | 0.11 | 1.00 | 0.17 | -1.85 | 3.00 | **4.85** |
| CB 5 | 0.38 | 0.38 | 0.50 | 100 | 100 | 0 | 8.06 | 3.20 | 2.66 | 0.61 | 0.51 | **12** | **PVC** | 0.009 | 0.79 | 20 | 0.65 | CB 5 | 0.51 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | -1.85 | 2.50 | **4.35** |
| MH 6 | | 15.14 | 0.50 | 0 | 0 | 110 | 14.13 | 2.55 | 2.12 | 19.30 | 16.02 | 30 | RCP | 0.015 | 4.91 | 30 | 3.26 | MH 6 | 16.02 | 0.63 | 0.0020 | 0.06 | 0.40 | 0.07 | -1.72 | 2.90 | **4.62** |
| CON 7 | | 15.14 | 0.50 | 0 | 0 | 30 | 13.67 | 2.60 | 2.16 | 19.68 | 16.34 | 30 | RCP | 0.015 | 4.91 | 110 | 3.33 | CON 7 | 16.34 | 0.63 | 0.0021 | 0.23 | 1.00 | 0.17 | -1.32 | 2.50 | **3.82** |
| CB 8 | 0.49 | 0.49 | 0.50 | 50 | 310 | 0 | 8.69 | 3.15 | 2.61 | 0.78 | 0.64 | 12 | RCP | 0.015 | 0.79 | 35 | 0.82 | CB 8 | 0.64 | 0.25 | 0.0004 | 0.02 | 0.05 | 0.00 | -1.30 | 2.50 | **3.80** |
| CON 9 | | 14.65 | 0.50 | 0 | 0 | 35 | 13.54 | 2.60 | 2.16 | 19.04 | 15.81 | 30 | RCP | 0.015 | 4.91 | 30 | 3.22 | CON 9 | 15.81 | 0.63 | 0.0020 | 0.06 | 1.00 | 0.16 | -1.10 | 2.30 | **3.40** |
| CB 10 | 1.37 | 1.37 | 0.50 | 120 | 480 | 0 | 11.67 | 2.75 | 2.28 | 1.88 | 1.56 | 12 | RCP | 0.015 | 0.79 | 20 | 1.99 | CB 10 | 1.56 | 0.25 | 0.0026 | 0.05 | 0.05 | 0.00 | -1.04 | 1.80 | **2.84** |
| MH 11 | | 13.28 | 0.50 | 0 | 0 | 325 | 13.40 | 2.60 | 2.16 | 17.26 | 14.33 | 30 | RCP | 0.015 | 4.91 | 35 | 2.92 | MH 11 | 14.33 | 0.63 | 0.0016 | 0.06 | 1.50 | 0.20 | -0.84 | 2.20 | **3.04** |
| CB 12 | 1.24 | 2.68 | 0.50 | 110 | 380 | 0 | 10.61 | 2.90 | 2.41 | 3.88 | 3.22 | 18 | RCP | 0.015 | 1.77 | 45 | 1.82 | CB 12 | 3.22 | 0.38 | 0.0012 | 0.06 | 0.10 | 0.01 | -0.78 | 2.50 | **3.28** |
| CB 13 | 0.41 | 1.44 | 0.50 | 0 | 0 | 55 | 9.56 | 3.00 | 2.49 | 2.16 | 1.79 | 18 | RCP | 0.015 | 1.77 | 175 | 1.01 | CB 13 | 1.79 | 0.38 | 0.0004 | 0.07 | 0.10 | 0.00 | -0.71 | 2.80 | **3.51** |
| CB 14 | 1.03 | 1.03 | 0.50 | 120 | 200 | 0 | 9.33 | 3.00 | 2.49 | 1.55 | 1.29 | 12 | RCP | 0.015 | 0.79 | 55 | 1.64 | CB 14 | 1.29 | 0.25 | 0.0017 | 0.09 | 0.05 | 0.00 | -0.62 | 3.20 | **3.82** |
| CB 15 | 1.26 | 3.51 | 0.50 | 0 | 0 | 115 | 12.04 | 2.70 | 2.24 | 4.73 | 3.93 | 12 | RCP | 0.015 | 0.79 | 15 | 5.00 | CB 15 | 3.93 | 0.25 | 0.0161 | 0.24 | 0.10 | 0.04 | -0.56 | 1.80 | **2.36** |
| MH 16 | | 2.25 | 0.50 | 0 | 0 | 15 | 11.56 | 2.80 | 2.32 | 3.15 | 2.61 | 12 | RCP | 0.015 | 0.79 | 115 | 3.33 | MH 16 | 2.61 | 0.25 | 0.0071 | 0.82 | 1.40 | 0.24 | 0.50 | 4.50 | **4.00** |
| CB 17 | 0.65 | 0.65 | 0.50 | 125 | 150 | 0 | 9.03 | 3.05 | 2.53 | 0.99 | 0.82 | 12 | RCP | 0.015 | 0.79 | 25 | 1.04 | CB 17 | 0.82 | 0.25 | 0.0007 | 0.02 | 0.05 | 0.00 | 0.51 | 3.80 | **3.29** |
| CB 18 | 1.07 | 1.60 | 0.50 | 180 | 300 | 0 | 11.50 | 2.80 | 2.32 | 2.24 | 1.86 | 12 | RCP | 0.015 | 0.79 | 15 | 2.37 | CB 18 | 1.86 | 0.25 | 0.0036 | 0.05 | 0.90 | 0.08 | 0.63 | 4.40 | **3.77** |
| CB 19 | 0.53 | 0.53 | 0.50 | 90 | 230 | 0 | 8.92 | 3.10 | 2.57 | 0.82 | 0.68 | 12 | RCP | 0.015 | 0.79 | 125 | 0.87 | CB 19 | 0.68 | 0.25 | 0.0005 | 0.06 | 0.05 | 0.00 | 0.69 | 5.50 | **4.81** |
| MH 20 | | 7.09 | 0.50 | 0 | 0 | 100 | 12.04 | 2.70 | 2.24 | 9.58 | 7.95 | 24 | RCP | 0.015 | 3.14 | 325 | 2.53 | MH 20 | 7.95 | 0.50 | 0.0016 | 0.53 | 0.10 | 0.01 | -0.30 | 3.20 | **3.50** |
| MH 21 | | 7.09 | 0.50 | 0 | 0 | 430 | 11.63 | 2.75 | 2.28 | 9.75 | 8.10 | 24 | RCP | 0.015 | 3.14 | 100 | 2.58 | MH 21 | 8.10 | 0.50 | 0.0017 | 0.17 | 1.50 | 0.15 | 0.02 | 3.50 | **3.48** |
| CB 22 | 0.71 | 3.76 | 0.50 | 0 | 0 | 210 | 11.44 | 2.80 | 2.32 | 5.26 | 4.37 | 15 | RCP | 0.015 | 1.23 | 20 | 3.56 | CB 22 | 4.37 | 0.31 | 0.0061 | 0.12 | 0.10 | 0.02 | 0.16 | 3.00 | **2.84** |
| CB 23 | 1.37 | 3.05 | 0.50 | 0 | 0 | 35 | 10.56 | 2.90 | 2.41 | 4.42 | 3.67 | 15 | RCP | 0.015 | 1.23 | 210 | 2.99 | CB 23 | 3.67 | 0.31 | 0.0043 | 0.90 | 0.10 | 0.01 | 1.07 | 2.20 | **1.13** |
| CB 24 | 1.41 | 1.68 | 0.50 | 120 | 330 | 0 | 10.42 | 2.90 | 2.41 | 2.43 | 2.02 | 12 | RCP | 0.015 | 0.79 | 35 | 2.57 | CB 24 | 2.02 | 0.25 | 0.0042 | 0.15 | 0.90 | 0.09 | 1.31 | 2.20 | **0.89** |
| CON 25 | | 0.27 | 0.50 | 0 | 0 | 20 | 8.67 | 3.15 | 2.61 | 0.42 | 0.35 | **12** | **PVC** | 0.009 | 0.79 | 120 | 0.44 | CON 25 | 0.35 | 0.25 | 0.0000 | 0.01 | 1.00 | 0.00 | 1.32 | 2.80 | **1.48** |
| CB 26 | 0.27 | 0.27 | 0.50 | 120 | 110 | 0 | 8.58 | 3.15 | 2.61 | 0.42 | 0.35 | **12** | **PVC** | 0.009 | 0.79 | 10 | 0.44 | CB 26 | 0.35 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 1.32 | 2.50 | **1.18** |
| ?? 27 | 0.00 | 0.00 | 0.50 | 0 | 0 | 0 | 5.00 | 4.10 | 3.40 | 0.00 | 0.00 | **12** | **PVC** | 0.009 | 0.79 | 20 | 0.00 | ?? 27 | 0.00 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 1.32 | 3.00 | **1.68** |
| CB 28 | 0.76 | 0.76 | 0.50 | 110 | 180 | 0 | 8.94 | 3.10 | 2.57 | 1.18 | 0.98 | 15 | RCP | 0.015 | 1.23 | 20 | 0.80 | CB 28 | 0.98 | 0.31 | 0.0003 | 0.01 | 0.05 | 0.00 | 0.03 | 3.00 | **2.97** |
| MH 29 | | 2.57 | 0.50 | 0 | 0 | 45 | 9.83 | 2.95 | 2.45 | 3.80 | 3.15 | 18 | RCP | 0.015 | 1.77 | 430 | 1.78 | MH 29 | 3.15 | 0.38 | 0.0012 | 0.51 | 1.40 | 0.07 | 0.60 | 3.10 | **2.50** |
| CB 30 | 0.86 | 1.59 | 0.50 | 0 | 0 | 35 | 9.65 | 3.00 | 2.49 | 2.38 | 1.98 | 12 | RCP | 0.015 | 0.79 | 45 | 2.52 | CB 30 | 1.98 | 0.25 | 0.0041 | 0.18 | 0.90 | 0.09 | 0.88 | 2.50 | **1.62** |
| CB 31 | 0.73 | 0.73 | 0.50 | 120 | 220 | 0 | 9.50 | 3.00 | 2.49 | 1.10 | 0.91 | 12 | RCP | 0.015 | 0.79 | 35 | 1.16 | CB 31 | 0.91 | 0.25 | 0.0009 | 0.03 | 0.05 | 0.00 | 0.91 | 2.50 | **1.59** |
| CB 32 | 0.99 | 0.99 | 0.50 | 110 | 240 | 0 | 9.44 | 3.00 | 2.49 | 1.48 | 1.23 | 12 | RCP | 0.015 | 0.79 | 20 | 1.56 | CB 32 | 1.23 | 0.25 | 0.0016 | 0.03 | 0.05 | 0.00 | 0.64 | 2.50 | **1.86** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of -3.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF C | | 1.21 | 0.50 | 0 | 0 | 75 | 9.23 | 3.05 | 2.53 | 1.85 | 1.53 | | | | | | | OF C | 1.53 | | | | | | **0.00** | | |
| CB 1 | 1.21 | 1.21 | 0.50 | 120 | 150 | 0 | 8.92 | 3.10 | 2.57 | 1.88 | 1.56 | **12** | **PVC** | 0.009 | 0.79 | 75 | 1.98 | CB 1 | 1.56 | 0.25 | 0.0009 | 0.07 | 0.05 | 0.00 | 0.07 | 4.50 | **4.43** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF D | | 2.58 | 0.50 | 0 | 0 | 150 | 11.78 | 2.75 | 2.28 | 3.55 | 2.95 | | | | | | | OF D | 2.95 | | | | | | **1.00** | | |
| CB 1 | 0.72 | 2.58 | 0.50 | 0 | 0 | 30 | 11.15 | 2.80 | 2.32 | 3.61 | 3.00 | 15 | RCP | 0.015 | 1.23 | 150 | 2.44 | CB 1 | 3.00 | 0.31 | 0.0029 | 0.43 | 0.10 | 0.01 | 1.44 | 5.00 | **3.56** |
| CB 2 | 0.08 | 1.86 | 0.50 | 0 | 0 | 140 | 11.03 | 2.85 | 2.37 | 2.65 | 2.20 | 12 | RCP | 0.015 | 0.79 | 30 | 2.80 | CB 2 | 2.20 | 0.25 | 0.0050 | 0.15 | 0.90 | 0.11 | 1.70 | 5.00 | **3.30** |
| CB 3 | 0.80 | 1.78 | 0.50 | 0 | 0 | 150 | 10.44 | 2.90 | 2.41 | 2.58 | 2.14 | 12 | RCP | 0.015 | 0.79 | 140 | 2.73 | CB 3 | 2.14 | 0.25 | 0.0048 | 0.67 | 0.90 | 0.10 | 2.47 | 5.50 | **3.03** |
| CB 4 | 0.98 | 0.98 | 0.50 | 185 | 85 | 0 | 9.82 | 2.95 | 2.45 | 1.45 | 1.21 | **12** | **PVC** | 0.009 | 0.79 | 150 | 1.53 | CB 4 | 1.21 | 0.25 | 0.0005 | 0.08 | 0.45 | 0.02 | 2.57 | 4.50 | **1.93** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF E | | 4.58 | 0.50 | 0 | 0 | 115 | 11.98 | 2.75 | 2.28 | 6.30 | 5.23 | | | | | | | OF E | 5.23 | | | | | | **4.00** | | |
| CB 1 | 1.84 | 4.58 | 0.50 | 180 | 300 | 0 | 11.50 | 2.80 | 2.32 | 6.41 | 5.32 | **18** | **PVC** | 0.009 | 1.77 | 115 | 3.01 | CB 1 | 5.32 | 0.38 | 0.0012 | 0.14 | 0.10 | 0.01 | 4.15 | 5.50 | **1.35** |
| CB 2 | 1.02 | 2.74 | 0.50 | 0 | 0 | 50 | 10.82 | 2.85 | 2.37 | 3.91 | 3.24 | **12** | **PVC** | 0.009 | 0.79 | 40 | 4.13 | CB 2 | 3.24 | 0.25 | 0.0039 | 0.16 | 0.90 | 0.24 | 4.55 | 5.50 | **0.95** |
| CB 3 | 1.72 | 1.72 | 0.50 | 140 | 300 | 0 | 10.61 | 2.90 | 2.41 | 2.50 | 2.07 | **12** | **PVC** | 0.009 | 0.79 | 50 | 2.64 | CB 3 | 2.07 | 0.25 | 0.0016 | 0.08 | 0.05 | 0.01 | 4.64 | 5.50 | **0.86** |

Notes:

1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF F | | 13.31 | 0.50 | 0 | 0 | 135 | 16.61 | 2.35 | 1.95 | 15.64 | 12.98 | | | | | | | OF F | 12.98 | | | | | | **1.00** | | |
| MH 1 | | 13.31 | 0.50 | 0 | 0 | 85 | 16.05 | 2.40 | 1.99 | 15.97 | 13.26 | 24 | PVC | 0.009 | 3.14 | 135 | 4.22 | MH 1 | 13.26 | 0.50 | 0.0016 | 0.22 | 0.40 | 0.11 | 1.33 | 6.00 | **4.67** |
| MH 2 | | 13.31 | 0.50 | 0 | 0 | 165 | 15.69 | 2.40 | 1.99 | 15.97 | 13.26 | 24 | PVC | 0.009 | 3.14 | 85 | 4.22 | MH 2 | 13.26 | 0.50 | 0.0016 | 0.14 | 1.40 | 0.39 | 1.86 | 6.50 | **4.64** |
| CB 3 | 0.37 | 0.37 | 0.50 | 150 | 30 | 0 | 8.58 | 3.15 | 2.61 | 0.59 | 0.49 | 12 | RCP | 0.015 | 0.79 | 25 | 0.62 | CB 3 | 0.49 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 1.86 | 5.60 | **3.74** |
| CB 4 | 0.46 | 0.46 | 0.50 | 120 | 60 | 0 | 8.17 | 3.20 | 2.66 | 0.73 | 0.60 | 12 | RCP | 0.015 | 0.79 | 40 | 0.77 | CB 4 | 0.60 | 0.25 | 0.0004 | 0.02 | 0.05 | 0.00 | 1.87 | 5.40 | **3.53** |
| MH 5 | | 12.48 | 0.50 | 0 | 0 | 190 | 15.01 | 2.45 | 2.03 | 15.29 | 12.69 | 24 | PVC | 0.009 | 3.14 | 165 | 4.04 | MH 5 | 12.69 | 0.50 | 0.0015 | 0.25 | 0.90 | 0.23 | 2.33 | 5.50 | **3.17** |
| CB 6 | 0.51 | 1.40 | 0.50 | 0 | 0 | 20 | 9.69 | 3.00 | 2.49 | 2.09 | 1.74 | 15 | RCP | 0.015 | 1.23 | 45 | 1.42 | CB 6 | 1.74 | 0.31 | 0.0010 | 0.04 | 0.40 | 0.01 | 2.39 | 4.80 | **2.41** |
| CON 7 | | 0.88 | 0.50 | 0 | 0 | 40 | 9.61 | 3.00 | 2.49 | 1.32 | 1.10 | 12 | RCP | 0.015 | 0.79 | 20 | 1.40 | CON 7 | 1.10 | 0.25 | 0.0013 | 0.03 | 1.00 | 0.03 | 2.44 | 5.50 | **3.06** |
| CON 8 | | 0.17 | 0.50 | 0 | 0 | 20 | 6.08 | 3.70 | 3.07 | 0.32 | 0.27 | 12 | PVC | 0.009 | 0.79 | 80 | 0.34 | CON 8 | 0.27 | 0.25 | 0.0000 | 0.00 | 1.40 | 0.00 | 2.45 | 5.10 | **2.65** |
| CB 9 | 0.09 | 0.09 | 0.50 | 15 | 70 | 0 | 5.92 | 3.70 | 3.07 | 0.16 | 0.13 | **12** | **PVC** | 0.009 | 0.79 | 10 | 0.17 | CB 9 | 0.13 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.45 | 4.80 | **2.35** |
| CB 10 | 0.09 | 0.09 | 0.50 | 15 | 80 | 0 | 6.00 | 3.70 | 3.07 | 0.16 | 0.13 | **12** | **PVC** | 0.009 | 0.79 | 20 | 0.17 | CB 10 | 0.13 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.45 | 4.80 | **2.35** |
| CB 11 | 0.71 | 0.71 | 0.50 | 110 | 240 | 0 | 9.44 | 3.00 | 2.49 | 1.06 | 0.88 | 12 | RCP | 0.015 | 0.79 | 40 | 1.12 | CB 11 | 0.88 | 0.25 | 0.0008 | 0.03 | 0.05 | 0.00 | 2.48 | 5.20 | **2.72** |
| CB 12 | 0.74 | 1.42 | 0.50 | 0 | 0 | 45 | 10.35 | 2.90 | 2.41 | 2.06 | 1.71 | 18 | RCP | 0.015 | 1.77 | 30 | 0.97 | CB 12 | 1.71 | 0.38 | 0.0004 | 0.01 | 0.40 | 0.01 | 2.35 | 5.00 | **2.65** |
| CB 13 | 0.68 | 0.68 | 0.50 | 120 | 300 | 0 | 10.17 | 2.95 | 2.45 | 1.00 | 0.83 | 12 | RCP | 0.015 | 0.79 | 45 | 1.06 | CB 13 | 0.83 | 0.25 | 0.0007 | 0.03 | 0.05 | 0.00 | 2.38 | 5.50 | **3.12** |
| CB 14 | 0.79 | 9.66 | 0.50 | 0 | 0 | 220 | 14.22 | 2.55 | 2.12 | 12.32 | 10.23 | 24 | PVC | 0.009 | 3.14 | 190 | 3.26 | CB 14 | 10.23 | 0.50 | 0.0010 | 0.19 | 0.90 | 0.15 | 2.67 | 5.80 | **3.13** |
| CB 15 | 0.73 | 0.73 | 0.50 | 110 | 280 | 0 | 9.78 | 3.00 | 2.49 | 1.09 | 0.91 | **12** | **PVC** | 0.009 | 0.79 | 60 | 1.15 | CB 15 | 0.91 | 0.25 | 0.0003 | 0.02 | 0.05 | 0.00 | 2.69 | 5.80 | **3.11** |
| CB 16 | 0.83 | 8.15 | 0.50 | 0 | 0 | 135 | 13.30 | 2.60 | 2.16 | 10.59 | 8.79 | 24 | PVC | 0.009 | 3.14 | 220 | 2.80 | CB 16 | 8.79 | 0.50 | 0.0007 | 0.16 | 1.00 | 0.12 | 2.95 | 5.80 | **2.85** |
| CB 17 | 0.38 | 0.38 | 0.50 | 120 | 65 | 0 | 8.21 | 3.20 | 2.66 | 0.62 | 0.51 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.65 | CB 17 | 0.51 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 2.95 | 5.80 | **2.85** |
| CB 18 | 0.76 | 6.93 | 0.50 | 0 | 0 | 50 | 12.74 | 2.65 | 2.20 | 9.18 | 7.62 | 24 | PVC | 0.009 | 3.14 | 135 | 2.43 | CB 18 | 7.62 | 0.50 | 0.0005 | 0.07 | 1.00 | 0.09 | 3.11 | 6.00 | **2.89** |
| CB 19 | 0.37 | 0.37 | 0.50 | 120 | 80 | 0 | 8.33 | 3.20 | 2.66 | 0.59 | 0.49 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.62 | CB 19 | 0.49 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.11 | 5.80 | **2.69** |
| MH 20 | | 5.81 | 0.50 | 0 | 0 | 110 | 12.53 | 2.70 | 2.24 | 7.84 | 6.50 | 18 | PVC | 0.009 | 1.77 | 50 | 3.68 | MH 20 | 6.50 | 0.38 | 0.0018 | 0.09 | 0.40 | 0.08 | 3.29 | 6.70 | **3.41** |
| MH 21 | | 5.81 | 0.50 | 0 | 0 | 60 | 12.07 | 2.70 | 2.24 | 7.84 | 6.50 | 18 | PVC | 0.009 | 1.77 | 110 | 3.68 | MH 21 | 6.50 | 0.38 | 0.0018 | 0.20 | 1.50 | 0.32 | 3.80 | 6.50 | **2.70** |
| CB 22 | 1.03 | 1.03 | 0.50 | 110 | 300 | 0 | 9.94 | 2.95 | 2.45 | 1.52 | 1.26 | 12 | RCP | 0.015 | 0.79 | 30 | 1.61 | CB 22 | 1.26 | 0.25 | 0.0017 | 0.05 | 0.05 | 0.00 | 3.86 | 5.50 | **1.64** |
| CB 23 | 0.96 | 0.96 | 0.50 | 45 | 180 | 0 | 7.50 | 3.40 | 2.82 | 1.63 | 1.36 | 12 | RCP | 0.015 | 0.79 | 25 | 1.73 | CB 23 | 1.36 | 0.25 | 0.0019 | 0.05 | 0.05 | 0.00 | 3.85 | 5.80 | **1.95** |
| CB 24 | 0.03 | 3.81 | 0.50 | 0 | 0 | 50 | 11.82 | 2.75 | 2.28 | 5.24 | 4.35 | 2-12 | RCP | 0.015 | 1.57 | 60 | 2.77 | CB 24 | 4.35 | 0.50 | 0.0020 | 0.12 | 0.90 | 0.11 | 4.03 | 6.00 | **1.97** |
| CB 25 | 1.75 | 3.78 | 0.50 | 110 | 500 | 0 | 11.61 | 2.75 | 2.28 | 5.19 | 4.31 | 18 | RCP | 0.015 | 1.77 | 50 | 2.44 | CB 25 | 4.31 | 0.38 | 0.0022 | 0.11 | 0.40 | 0.04 | 4.18 | 5.50 | **1.32** |
| CON 26 | | 2.02 | 0.50 | 0 | 0 | 115 | 9.87 | 2.95 | 2.45 | 2.99 | 2.48 | 12 | RCP | 0.015 | 0.79 | 25 | 3.16 | CON 26 | 2.48 | 0.25 | 0.0064 | 0.16 | 1.00 | 0.15 | 4.49 | 5.80 | **1.31** |
| CB 27 | 1.00 | 1.00 | 0.50 | 105 | 290 | 0 | 9.75 | 3.00 | 2.49 | 1.49 | 1.24 | 12 | RCP | 0.015 | 0.79 | 25 | 1.58 | CB 27 | 1.24 | 0.25 | 0.0016 | 0.04 | 0.05 | 0.00 | 4.53 | 5.50 | **0.97** |
| CB 28 | 0.82 | 1.03 | 0.50 | 70 | 340 | 0 | 9.39 | 3.00 | 2.49 | 1.54 | 1.28 | 12 | RCP | 0.015 | 0.79 | 115 | 1.63 | CB 28 | 1.28 | 0.25 | 0.0017 | 0.20 | 0.10 | 0.00 | 4.69 | 6.80 | **2.11** |
| CB 29 | 0.17 | 0.21 | 0.50 | 110 | 60 | 0 | 7.94 | 3.30 | 2.74 | 0.34 | 0.29 | 12 | RCP | 0.015 | 0.79 | 175 | 0.36 | CB 29 | 0.29 | 0.25 | 0.0001 | 0.01 | 0.90 | 0.00 | 4.71 | 9.80 | **5.09** |
| CB 30 | 0.04 | 0.04 | 0.50 | 45 | 35 | 0 | 6.29 | 3.60 | 2.99 | 0.07 | 0.05 | 12 | RCP | 0.015 | 0.79 | 30 | 0.07 | CB 30 | 0.05 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 4.71 | 10.50 | **5.79** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF G | | 5.82 | 0.50 | 0 | 0 | 170 | 12.90 | 2.65 | 2.20 | 7.71 | 6.40 | | | | | | | OF G | 6.40 | | | | | | **4.00** | | |
| CB 1 | 0.92 | 5.82 | 0.50 | 0 | 0 | 30 | 12.19 | 2.70 | 2.24 | 7.86 | 6.52 | **18** | **PVC** | 0.009 | 1.77 | 170 | 3.69 | CB 1 | 6.52 | 0.38 | 0.0018 | 0.31 | 1.00 | 0.21 | 4.52 | 5.50 | **0.98** |
| CB 2 | 0.74 | 1.66 | 0.50 | 0 | 0 | 160 | 10.53 | 2.90 | 2.41 | 2.40 | 2.00 | **12** | **PVC** | 0.009 | 0.79 | 65 | 2.54 | CB 2 | 2.00 | 0.25 | 0.0015 | 0.10 | 0.10 | 0.01 | 4.63 | 5.50 | **0.87** |
| CB 3 | 0.92 | 0.92 | 0.50 | 140 | 210 | 0 | 9.86 | 2.95 | 2.45 | 1.36 | 1.13 | **12** | **PVC** | 0.009 | 0.79 | 160 | 1.44 | CB 3 | 1.13 | 0.25 | 0.0005 | 0.08 | 0.05 | 0.00 | 4.71 | 5.60 | **0.89** |
| CB 4 | 1.07 | 3.24 | 0.50 | 0 | 0 | 75 | 12.06 | 2.70 | 2.24 | 4.38 | 3.63 | 12 | RCP | 0.015 | 0.79 | 30 | 4.62 | CB 4 | 3.63 | 0.25 | 0.0138 | 0.41 | 0.90 | 0.30 | 5.24 | 5.50 | **0.26** |
| CB 5 | 0.69 | 2.17 | 0.50 | 0 | 0 | 20 | 11.75 | 2.75 | 2.28 | 2.98 | 2.47 | **12** | **PVC** | 0.009 | 0.79 | 75 | 3.15 | CB 5 | 2.47 | 0.25 | 0.0023 | 0.17 | 0.90 | 0.14 | 5.55 | 5.80 | **0.25** |
| CB 6 | 0.88 | 1.48 | 0.50 | 120 | 480 | 0 | 11.67 | 2.75 | 2.28 | 2.04 | 1.69 | **12** | **PVC** | 0.009 | 0.79 | 20 | 2.15 | CB 6 | 1.69 | 0.25 | 0.0011 | 0.02 | 0.90 | 0.06 | 5.63 | 6.00 | **0.37** |
| CB 7 | 0.60 | 0.60 | 0.50 | 125 | 50 | 0 | 8.19 | 3.20 | 2.66 | 0.96 | 0.80 | **12** | **PVC** | 0.009 | 0.79 | 50 | 1.02 | CB 7 | 0.80 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 5.65 | 5.80 | **0.15** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF H | | 4.23 | 0.50 | 0 | 0 | 140 | 11.13 | 2.80 | 2.32 | 5.92 | 4.91 | | | | | | | OF H | 4.91 | | | | | | **4.00** | | |
| CB 1 | 0.97 | 4.23 | 0.50 | 0 | 0 | 30 | 10.54 | 2.90 | 2.41 | 6.13 | 5.09 | **18** | **PVC** | 0.009 | 1.77 | 140 | 2.88 | CB 1 | 5.09 | 0.38 | 0.0011 | 0.16 | 0.10 | 0.01 | 4.17 | 5.50 | **1.33** |
| CB 2 | 2.04 | 3.26 | 0.50 | 105 | 370 | 0 | 10.42 | 2.90 | 2.41 | 4.72 | 3.92 | 12 | RCP | 0.015 | 0.79 | 30 | 4.99 | CB 2 | 3.92 | 0.25 | 0.0160 | 0.48 | 0.90 | 0.35 | 5.00 | 5.50 | **0.50** |
| CB 3 | 1.21 | 1.21 | 0.50 | 100 | 340 | 0 | 10.06 | 2.95 | 2.45 | 1.79 | 1.48 | 12 | RCP | 0.015 | 0.79 | 65 | 1.89 | CB 3 | 1.48 | 0.25 | 0.0023 | 0.15 | 0.05 | 0.00 | 5.15 | 5.50 | **0.35** |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. POC = Point of Concentration | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$. | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF J | | 4.72 | 0.50 | 0 | 0 | 140 | 12.71 | 2.65 | 2.20 | 6.25 | 5.19 | | | | | | | OF J | 5.19 | | | | | | **4.00** | | |
| CB 1 | 0.58 | 4.72 | 0.50 | 0 | 0 | 110 | 12.13 | 2.70 | 2.24 | 6.37 | 5.29 | **18** | **PVC** | 0.009 | 1.77 | 140 | 2.99 | CB 1 | 5.29 | 0.38 | 0.0012 | 0.17 | 1.00 | 0.14 | 4.31 | 5.50 | **1.19** |
| CB 2 | 0.80 | 0.80 | 0.50 | 140 | 140 | 0 | 9.28 | 3.05 | 2.53 | 1.22 | 1.02 | 12 | RCP | 0.015 | 0.79 | 30 | 1.29 | CB 2 | 1.02 | 0.25 | 0.0011 | 0.03 | 0.05 | 0.00 | 4.34 | 5.50 | **1.16** |
| CB 3 | 0.43 | 3.34 | 0.50 | 0 | 0 | 100 | 11.67 | 2.75 | 2.28 | 4.59 | 3.81 | **18** | **PVC** | 0.009 | 1.77 | 110 | 2.16 | CB 3 | 3.81 | 0.38 | 0.0006 | 0.07 | 0.10 | 0.01 | 4.38 | 5.50 | **1.12** |
| CON 4 | | 2.91 | 0.50 | 0 | 0 | 40 | 11.25 | 2.80 | 2.32 | 4.07 | 3.38 | **12** | **PVC** | 0.009 | 0.79 | 100 | 4.30 | CON 4 | 3.38 | 0.25 | 0.0043 | 0.43 | 1.00 | 0.29 | 5.10 | 5.50 | **0.40** |
| CB 5 | 1.62 | 1.62 | 0.50 | 165 | 210 | 0 | 10.42 | 2.90 | 2.41 | 2.35 | 1.95 | **12** | **PVC** | 0.009 | 0.79 | 25 | 2.49 | CB 5 | 1.95 | 0.25 | 0.0014 | 0.04 | 0.05 | 0.00 | 5.14 | 5.50 | **0.36** |
| CB 6 | 1.29 | 1.29 | 0.50 | 150 | 330 | 0 | 11.08 | 2.85 | 2.37 | 1.83 | 1.52 | **12** | **PVC** | 0.009 | 0.79 | 40 | 1.94 | CB 6 | 1.52 | 0.25 | 0.0009 | 0.03 | 0.05 | 0.00 | 5.14 | 5.50 | **0.36** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF K | | 8.40 | 0.50 | 0 | 0 | 150 | 14.93 | 2.50 | 2.08 | 10.50 | 8.72 | | | | | | | OF K | 8.72 | | | | | | **1.00** | | |
| CB 1 | 0.70 | 8.40 | 0.50 | 0 | 0 | 75 | 14.31 | 2.50 | 2.08 | 10.50 | 8.72 | **18** | **PVC** | 0.009 | 1.77 | 150 | 4.93 | CB 1 | 8.72 | 0.38 | 0.0033 | 0.49 | 1.50 | 0.57 | 2.06 | 4.80 | **2.74** |
| CB 2 | 0.45 | 2.89 | 0.50 | 0 | 0 | 45 | 13.99 | 2.55 | 2.12 | 3.68 | 3.05 | 12 | RCP | 0.015 | 0.79 | 75 | 3.89 | CB 2 | 3.05 | 0.25 | 0.0097 | 0.73 | 0.90 | 0.21 | 3.00 | 4.80 | **1.80** |
| CB 3 | 2.44 | 2.44 | 0.50 | 115 | 750 | 0 | 13.81 | 2.55 | 2.12 | 3.10 | 2.58 | 12 | RCP | 0.015 | 0.79 | 45 | 3.28 | CB 3 | 2.58 | 0.25 | 0.0069 | 0.31 | 0.05 | 0.01 | 3.32 | 4.80 | **1.48** |
| CB 4 | 0.73 | 0.73 | 0.50 | 150 | 190 | 0 | 9.92 | 2.95 | 2.45 | 1.08 | 0.90 | 12 | RCP | 0.015 | 0.79 | 35 | 1.15 | CB 4 | 0.90 | 0.25 | 0.0008 | 0.03 | 0.05 | 0.00 | 2.09 | 4.80 | **2.71** |
| CON 5 | | 4.08 | 0.50 | 0 | 0 | 30 | 11.86 | 2.75 | 2.28 | 5.62 | 4.66 | **18** | **PVC** | 0.009 | 1.77 | 265 | 2.64 | CON 5 | 4.66 | 0.38 | 0.0009 | 0.25 | 1.00 | 0.11 | 2.42 | 5.50 | **3.08** |
| CB 6 | 0.27 | 0.27 | 0.50 | 160 | 50 | 0 | 8.97 | 3.10 | 2.57 | 0.41 | 0.34 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.44 | CB 6 | 0.34 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.42 | 5.50 | **3.08** |
| CB 7 | 0.57 | 3.82 | 0.50 | 0 | 0 | 80 | 11.74 | 2.75 | 2.28 | 5.25 | 4.36 | **18** | **PVC** | 0.009 | 1.77 | 30 | 2.47 | CB 7 | 4.36 | 0.38 | 0.0008 | 0.02 | 0.40 | 0.04 | 2.48 | 5.50 | **3.02** |
| CB 8 | 0.38 | 3.25 | 0.50 | 0 | 0 | 20 | 11.40 | 2.80 | 2.32 | 4.55 | 3.78 | **12** | **PVC** | 0.009 | 0.79 | 80 | 4.81 | CB 8 | 3.78 | 0.25 | 0.0054 | 0.43 | 0.10 | 0.04 | 2.94 | 5.50 | **2.56** |
| CON 9 | | 2.87 | 0.50 | 0 | 0 | 100 | 11.32 | 2.80 | 2.32 | 4.02 | 3.33 | **12** | **PVC** | 0.009 | 0.79 | 20 | 4.24 | CON 9 | 3.33 | 0.25 | 0.0042 | 0.08 | 1.00 | 0.28 | 3.31 | 5.50 | **2.19** |
| CB 10 | 0.48 | 0.48 | 0.50 | 160 | 70 | 0 | 9.14 | 3.05 | 2.53 | 0.73 | 0.61 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.77 | CB 10 | 0.61 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.31 | 5.50 | **2.19** |
| CON 11 | | 2.39 | 0.50 | 0 | 0 | 10 | 10.90 | 2.85 | 2.37 | 3.41 | 2.83 | **12** | **PVC** | 0.009 | 0.79 | 100 | 3.60 | CON 11 | 2.83 | 0.25 | 0.0030 | 0.30 | 1.00 | 0.20 | 3.81 | 5.50 | **1.69** |
| CB 12 | 1.00 | 1.00 | 0.50 | 110 | 330 | 0 | 10.19 | 2.95 | 2.45 | 1.47 | 1.22 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.55 | CB 12 | 1.22 | 0.25 | 0.0006 | 0.02 | 0.05 | 0.00 | 3.83 | 5.50 | **1.67** |
| CB 13 | 0.90 | 1.39 | 0.50 | 170 | 250 | 0 | 10.86 | 2.85 | 2.37 | 1.99 | 1.65 | **12** | **PVC** | 0.009 | 0.79 | 10 | 2.10 | CB 13 | 1.65 | 0.25 | 0.0010 | 0.01 | 0.10 | 0.01 | 3.83 | 5.50 | **1.67** |
| CB 14 | 0.49 | 0.49 | 0.50 | 170 | 70 | 0 | 9.36 | 3.00 | 2.49 | 0.74 | 0.62 | **12** | **PVC** | 0.009 | 0.79 | 315 | 0.78 | CB 14 | 0.62 | 0.25 | 0.0001 | 0.04 | 0.90 | 0.01 | 3.88 | 5.50 | **1.62** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF L | | 10.03 | 0.50 | 0 | 0 | 140 | 14.26 | 2.55 | 2.12 | 12.79 | 10.62 | | | | | | | OF L | 10.62 | | | | | | **4.00** | | |
| CB 1 | 0.99 | 10.03 | 0.50 | 0 | 0 | 70 | 13.67 | 2.60 | 2.16 | 13.04 | 10.83 | **24** | **PVC** | 0.009 | 3.14 | 140 | 3.45 | CB 1 | 10.83 | 0.50 | 0.0011 | 0.15 | 1.00 | 0.18 | 4.34 | 5.00 | **0.66** |
| CB 2 | 1.42 | 4.42 | 0.50 | 0 | 0 | 45 | 13.38 | 2.60 | 2.16 | 5.74 | 4.77 | **18** | **PVC** | 0.009 | 1.77 | 70 | 2.70 | CB 2 | 4.77 | 0.38 | 0.0010 | 0.07 | 0.90 | 0.10 | 4.51 | 5.50 | **0.99** |
| CB 3 | 1.19 | 3.00 | 0.50 | 0 | 0 | 20 | 13.19 | 2.65 | 2.20 | 3.97 | 3.30 | 12 | RCP | 0.015 | 0.79 | 45 | 4.20 | CB 3 | 3.30 | 0.25 | 0.0114 | 0.51 | 0.90 | 0.25 | 5.26 | 5.50 | **0.24** |
| CB 4 | 0.24 | 1.81 | 0.50 | 0 | 0 | 60 | 13.11 | 2.65 | 2.20 | 2.40 | 1.99 | **12** | **PVC** | 0.009 | 0.79 | 20 | 2.53 | CB 4 | 1.99 | 0.25 | 0.0015 | 0.03 | 0.90 | 0.09 | 5.38 | 5.50 | **0.12** |
| CB 5 | 1.57 | 1.57 | 0.50 | 110 | 650 | 0 | 12.86 | 2.65 | 2.20 | 2.08 | 1.73 | **12** | **PVC** | 0.009 | 0.79 | 60 | 2.20 | CB 5 | 1.73 | 0.25 | 0.0011 | 0.07 | 0.25 | 0.02 | 5.47 | 5.50 | **0.03** |
| MH 6 | | 4.62 | 0.50 | 0 | 0 | 110 | 12.78 | 2.65 | 2.20 | 6.12 | 5.08 | **18** | **PVC** | 0.009 | 1.77 | 40 | 2.88 | MH 6 | 5.08 | 0.38 | 0.0011 | 0.04 | 0.10 | 0.01 | 4.39 | 5.50 | **1.11** |
| CB 7 | 0.48 | 4.62 | 0.50 | 0 | 0 | 20 | 12.33 | 2.70 | 2.24 | 6.24 | 5.18 | **18** | **PVC** | 0.009 | 1.77 | 110 | 2.93 | CB 7 | 5.18 | 0.38 | 0.0012 | 0.13 | 0.40 | 0.05 | 4.58 | 5.50 | **0.92** |
| CON 8 | | 4.14 | 0.50 | 0 | 0 | 265 | 12.24 | 2.70 | 2.24 | 5.59 | 4.64 | **18** | **PVC** | 0.009 | 1.77 | 20 | 2.63 | CON 8 | 4.64 | 0.38 | 0.0009 | 0.02 | 1.00 | 0.11 | 4.70 | 5.50 | **0.80** |
| CB 9 | 1.44 | 2.84 | 0.50 | 0 | 0 | 30 | 11.14 | 2.80 | 2.32 | 3.97 | 3.30 | **12** | **PVC** | 0.009 | 0.79 | 265 | 4.20 | CB 9 | 3.30 | 0.25 | 0.0041 | 1.08 | 0.90 | 0.25 | 6.03 | 6.50 | **0.47** |
| CB 10 | 1.40 | 1.40 | 0.50 | 115 | 415 | 0 | 11.01 | 2.85 | 2.37 | 1.99 | 1.66 | 12 | RCP | 0.015 | 0.79 | 30 | 2.11 | CB 10 | 1.66 | 0.25 | 0.0029 | 0.09 | 0.05 | 0.00 | 6.12 | 6.50 | **0.38** |
| CB 11 | 1.31 | 1.31 | 0.50 | 115 | 250 | 0 | 9.64 | 3.00 | 2.49 | 1.96 | 1.63 | **18** | **PVC** | 0.009 | 1.77 | 30 | 0.92 | CB 11 | 1.63 | 0.38 | 0.0001 | 0.00 | 0.05 | 0.00 | 4.71 | 5.50 | **0.79** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ ft³/s | $Q_{25}$ ft³/s | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ ft³/s | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF M | | 13.49 | 0.50 | 0 | 0 | 145 | 14.97 | 2.50 | 2.08 | 16.86 | 13.99 | | | | | | | OF M | 13.99 | | | | | | **1.00** | | |
| CB 1 | 1.12 | 13.49 | 0.50 | 0 | 0 | 45 | 14.36 | 2.50 | 2.08 | 16.86 | 13.99 | 24 | RCP | 0.015 | 3.14 | 145 | 4.45 | CB 1 | 13.99 | 0.50 | 0.0051 | 0.73 | 0.10 | 0.03 | 1.77 | 5.50 | **3.73** |
| CON 2 | | 12.37 | 0.50 | 0 | 0 | 5 | 14.17 | 2.55 | 2.12 | 15.77 | 13.09 | 24 | RCP | 0.015 | 3.14 | 45 | 4.17 | CON 2 | 13.09 | 0.50 | 0.0044 | 0.20 | 1.00 | 0.27 | 2.23 | 5.50 | **3.27** |
| CB 3 | 1.20 | 10.79 | 0.50 | 0 | 0 | 240 | 14.15 | 2.55 | 2.12 | 13.76 | 11.42 | 24 | RCP | 0.015 | 3.14 | 5 | 3.63 | CB 3 | 11.42 | 0.50 | 0.0034 | 0.02 | 0.40 | 0.08 | 2.33 | 5.50 | **3.17** |
| CB 4 | 0.75 | 1.58 | 0.50 | 0 | 0 | 60 | 9.47 | 3.00 | 2.49 | 2.37 | 1.97 | 12 | RCP | 0.015 | 0.79 | 225 | 2.50 | CB 4 | 1.97 | 0.25 | 0.0040 | 0.91 | 0.40 | 0.04 | 3.18 | 5.50 | **2.32** |
| CB 5 | 0.83 | 0.83 | 0.50 | 130 | 160 | 0 | 9.22 | 3.05 | 2.53 | 1.27 | 1.05 | 12 | RCP | 0.015 | 0.79 | 60 | 1.34 | CB 5 | 1.05 | 0.25 | 0.0012 | 0.07 | 0.05 | 0.00 | 3.25 | 5.50 | **2.25** |
| CB 6 | 0.75 | 9.59 | 0.50 | 0 | 0 | 165 | 13.15 | 2.65 | 2.20 | 12.70 | 10.54 | 24 | RCP | 0.015 | 3.14 | 240 | 3.36 | CB 6 | 10.54 | 0.50 | 0.0029 | 0.69 | 1.00 | 0.17 | 3.20 | 6.90 | **3.70** |
| CB 7 | 1.05 | 2.85 | 0.50 | 120 | 420 | 0 | 11.17 | 2.80 | 2.32 | 3.98 | 3.31 | 15 | RCP | 0.015 | 1.23 | 45 | 2.69 | CB 7 | 3.31 | 0.31 | 0.0035 | 0.16 | 0.90 | 0.10 | 3.46 | 5.80 | **2.34** |
| CB 8 | 0.68 | 1.80 | 0.50 | 0 | 0 | 240 | 9.88 | 2.95 | 2.45 | 2.65 | 2.20 | 12 | RCP | 0.015 | 0.79 | 40 | 2.80 | CB 8 | 2.20 | 0.25 | 0.0051 | 0.20 | 1.40 | 0.17 | 3.83 | 5.80 | **1.97** |
| CB 9 | 0.52 | 1.12 | 0.50 | 0 | 0 | 30 | 8.88 | 3.10 | 2.57 | 1.74 | 1.44 | **12** | **PVC** | 0.009 | 0.79 | 240 | 1.84 | CB 9 | 1.44 | 0.25 | 0.0008 | 0.19 | 1.40 | 0.07 | 4.09 | 6.50 | **2.41** |
| CB 10 | 0.60 | 0.60 | 0.50 | 120 | 130 | 0 | 8.75 | 3.10 | 2.57 | 0.93 | 0.77 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.98 | CB 10 | 0.77 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 4.10 | 6.50 | **2.40** |
| MH 11 | | 5.99 | 0.50 | 0 | 0 | 120 | 12.47 | 2.70 | 2.24 | 8.09 | 6.71 | **18** | **PVC** | 0.009 | 1.77 | 165 | 3.80 | MH 11 | 6.71 | 0.38 | 0.0019 | 0.32 | 0.40 | 0.09 | 3.61 | 6.70 | **3.09** |
| CB 12 | 0.73 | 5.99 | 0.50 | 0 | 0 | 30 | 11.97 | 2.75 | 2.28 | 8.24 | 6.84 | **18** | **PVC** | 0.009 | 1.77 | 120 | 3.87 | CB 12 | 6.84 | 0.38 | 0.0020 | 0.24 | 1.00 | 0.23 | 4.08 | 5.80 | **1.72** |
| CB 13 | 0.48 | 0.64 | 0.50 | 110 | 220 | 0 | 9.28 | 3.05 | 2.53 | 0.97 | 0.81 | 12 | RCP | 0.015 | 0.79 | 40 | 1.03 | CB 13 | 0.81 | 0.25 | 0.0007 | 0.03 | 0.90 | 0.01 | 4.13 | 6.20 | **2.07** |
| CB 14 | 0.16 | 0.16 | 0.50 | 85 | 40 | 0 | 7.22 | 3.40 | 2.82 | 0.27 | 0.23 | **12** | **PVC** | 0.009 | 0.79 | 50 | 0.29 | CB 14 | 0.23 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 4.13 | 6.50 | **2.37** |
| CON 15 | | 4.62 | 0.50 | 0 | 0 | 80 | 11.84 | 2.75 | 2.28 | 6.35 | 5.27 | **18** | **PVC** | 0.009 | 1.77 | 30 | 2.98 | CON 15 | 5.27 | 0.38 | 0.0012 | 0.04 | 1.00 | 0.14 | 4.26 | 6.90 | **2.64** |
| CB 16 | 0.51 | 0.51 | 0.50 | 120 | 140 | 0 | 8.83 | 3.10 | 2.57 | 0.80 | 0.66 | **18** | **PVC** | 0.009 | 1.77 | 40 | 0.37 | CB 16 | 0.66 | 0.38 | 0.0000 | 0.00 | 0.05 | 0.00 | 4.26 | 5.80 | **1.54** |
| CB 17 | 0.76 | 4.11 | 0.50 | 0 | 0 | 120 | 11.51 | 2.80 | 2.32 | 5.75 | 4.77 | **18** | **PVC** | 0.009 | 1.77 | 80 | 2.70 | CB 17 | 4.77 | 0.38 | 0.0010 | 0.08 | 0.10 | 0.01 | 4.35 | 6.50 | **2.15** |
| CON 18 | | 3.35 | 0.50 | 0 | 0 | 70 | 11.01 | 2.85 | 2.37 | 4.77 | 3.96 | **18** | **PVC** | 0.009 | 1.77 | 120 | 2.24 | CON 18 | 3.96 | 0.38 | 0.0007 | 0.08 | 1.00 | 0.08 | 4.51 | 6.50 | **1.99** |
| CB 19 | 0.90 | 0.90 | 0.50 | 110 | 300 | 0 | 9.94 | 2.95 | 2.45 | 1.33 | 1.10 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.41 | CB 19 | 1.10 | 0.25 | 0.0005 | 0.01 | 0.05 | 0.00 | 4.52 | 6.50 | **1.98** |
| CB 20 | 0.22 | 2.45 | 0.50 | 0 | 0 | 35 | 10.72 | 2.85 | 2.37 | 3.49 | 2.90 | **18** | **PVC** | 0.009 | 1.77 | 70 | 1.64 | CB 20 | 2.90 | 0.38 | 0.0004 | 0.03 | 0.10 | 0.00 | 4.54 | 6.50 | **1.96** |
| CB 21 | 0.55 | 2.23 | 0.50 | 0 | 0 | 230 | 10.57 | 2.90 | 2.41 | 3.23 | 2.68 | 12 | RCP | 0.015 | 0.79 | 35 | 3.41 | CB 21 | 2.68 | 0.25 | 0.0075 | 0.26 | 0.10 | 0.02 | 4.82 | 6.50 | **1.68** |
| CB 22 | 0.84 | 1.68 | 0.50 | 110 | 260 | 0 | 9.61 | 3.00 | 2.49 | 2.52 | 2.09 | 12 | RCP | 0.015 | 0.79 | 230 | 2.66 | CB 22 | 2.09 | 0.25 | 0.0046 | 1.05 | 0.40 | 0.04 | 5.91 | 7.00 | **1.09** |
| CB 23 | 0.34 | 0.84 | 0.50 | 0 | 0 | 100 | 9.03 | 3.05 | 2.53 | 1.28 | 1.06 | **12** | **PVC** | 0.009 | 0.79 | 35 | 1.35 | CB 23 | 1.06 | 0.25 | 0.0004 | 0.01 | 0.40 | 0.01 | 5.94 | 7.50 | **1.56** |
| CB 24 | 0.51 | 0.51 | 0.50 | 110 | 140 | 0 | 8.61 | 3.15 | 2.61 | 0.80 | 0.66 | **12** | **PVC** | 0.009 | 0.79 | 100 | 0.84 | CB 24 | 0.66 | 0.25 | 0.0002 | 0.02 | 0.05 | 0.00 | 5.96 | 7.50 | **1.54** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF N | | 6.73 | 0.50 | 0 | 0 | 150 | 12.22 | 2.70 | 2.24 | 9.08 | 7.54 | | | | | | | OF N | 7.54 | | | | | | **4.00** | | |
| CB 1 | 0.81 | 6.73 | 0.50 | 0 | 0 | 15 | 11.59 | 2.80 | 2.32 | 9.42 | 7.82 | **24** | **PVC** | 0.009 | 3.14 | 150 | 2.49 | CB 1 | 7.82 | 0.50 | 0.0006 | 0.09 | 0.40 | 0.04 | 4.12 | 4.80 | **0.68** |
| CON 2 | | 5.91 | 0.50 | 0 | 0 | 40 | 11.53 | 2.80 | 2.32 | 8.28 | 6.87 | **18** | **PVC** | 0.009 | 1.77 | 15 | 3.89 | CON 2 | 6.87 | 0.38 | 0.0020 | 0.03 | 1.50 | 0.35 | 4.51 | 5.80 | **1.29** |
| CB 3 | 0.72 | 1.13 | 0.50 | 130 | 165 | 0 | 9.26 | 3.05 | 2.53 | 1.72 | 1.43 | 12 | RCP | 0.015 | 0.79 | 175 | 1.82 | CB 3 | 1.43 | 0.25 | 0.0021 | 0.37 | 0.90 | 0.05 | 4.92 | 5.00 | **0.08** |
| CB 4 | 0.41 | 0.41 | 0.50 | 110 | 150 | 0 | 8.69 | 3.15 | 2.61 | 0.64 | 0.53 | **12** | **PVC** | 0.009 | 0.79 | 45 | 0.68 | CB 4 | 0.53 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 4.93 | 5.50 | **0.57** |
| CB 5 | 2.82 | 3.86 | 0.50 | 110 | 470 | 0 | 11.36 | 2.80 | 2.32 | 5.41 | 4.49 | **18** | **PVC** | 0.009 | 1.77 | 40 | 2.54 | CB 5 | 4.49 | 0.38 | 0.0009 | 0.03 | 0.90 | 0.09 | 4.63 | 5.00 | **0.37** |
| CB 6 | 1.04 | 1.04 | 0.50 | 110 | 340 | 0 | 10.28 | 2.90 | 2.41 | 1.51 | 1.26 | 12 | RCP | 0.015 | 0.79 | 45 | 1.60 | CB 6 | 1.26 | 0.25 | 0.0016 | 0.07 | 0.05 | 0.00 | 4.71 | 5.50 | **0.79** |
| CB 7 | 0.92 | 0.92 | 0.50 | 130 | 200 | 0 | 9.56 | 3.00 | 2.49 | 1.38 | 1.15 | 12 | RCP | 0.015 | 0.79 | 265 | 1.46 | CB 7 | 1.15 | 0.25 | 0.0014 | 0.36 | 0.05 | 0.00 | 4.87 | 5.00 | **0.13** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderately high starting water surface elevation of 4.00 NGVD (6.60 MLLW) coincident with $Q_{25}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF P | | 8.33 | 0.50 | 0 | 0 | 140 | 12.88 | 2.65 | 2.20 | 11.04 | 9.16 | | | | | | | OF P | 9.16 | | | | | | **1.00** | | |
| CB 1 | 2.48 | 8.33 | 0.50 | 0 | 0 | 30 | 12.30 | 2.70 | 2.24 | 11.25 | 9.34 | **18** | **PVC** | 0.009 | 1.77 | 140 | 5.28 | CB 1 | 9.34 | 0.38 | 0.0038 | 0.53 | 0.40 | 0.17 | 1.70 | 3.50 | **1.80** |
| CON 2 | | 5.85 | 0.50 | 0 | 0 | 25 | 12.17 | 2.70 | 2.24 | 7.90 | 6.56 | 15 | RCP | 0.015 | 1.23 | 30 | 5.34 | CON 2 | 6.56 | 0.31 | 0.0136 | 0.41 | 1.00 | 0.44 | 2.55 | 5.20 | **2.65** |
| CB 3 | 2.58 | 4.72 | 0.50 | 110 | 555 | 0 | 12.07 | 2.70 | 2.24 | 6.38 | 5.29 | 15 | RCP | 0.015 | 1.23 | 25 | 4.31 | CB 3 | 5.29 | 0.31 | 0.0089 | 0.22 | 0.05 | 0.01 | 2.79 | 4.50 | **1.71** |
| CB 4 | 1.13 | 1.13 | 0.50 | 115 | 400 | 0 | 10.89 | 2.85 | 2.37 | 1.61 | 1.33 | **12** | **PVC** | 0.009 | 0.79 | 185 | 1.70 | CB 4 | 1.33 | 0.25 | 0.0007 | 0.12 | 0.90 | 0.04 | 2.72 | 5.50 | **2.78** |
| CB 5 | 2.15 | 2.15 | 0.50 | 120 | 450 | 0 | 11.42 | 2.80 | 2.32 | 3.00 | 2.49 | 12 | RCP | 0.015 | 0.79 | 50 | 3.17 | CB 5 | 2.49 | 0.25 | 0.0065 | 0.32 | 0.05 | 0.01 | 3.12 | 4.50 | **1.38** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF Q | | 15.07 | 0.50 | 0 | 0 | 170 | 16.53 | 2.35 | 1.95 | 17.71 | 14.70 | | | | | | | OF Q | 14.70 | | | | | | **1.00** | | |
| CB 1 | 1.00 | 15.07 | 0.50 | 0 | 0 | 45 | 15.82 | 2.40 | 1.99 | 18.09 | 15.01 | **30** | **PVC** | 0.009 | 4.91 | 170 | 3.06 | CB 1 | 15.01 | 0.63 | 0.0006 | 0.11 | 1.00 | 0.15 | 1.25 | 4.70 | **3.45** |
| CB 2 | 0.82 | 0.82 | 0.50 | 140 | 200 | 0 | 9.78 | 3.00 | 2.49 | 1.23 | 1.02 | **12** | **PVC** | 0.009 | 0.79 | 85 | 1.30 | CB 2 | 1.02 | 0.25 | 0.0004 | 0.03 | 0.05 | 0.00 | 1.29 | 3.50 | **2.21** |
| CB 3 | 0.26 | 13.25 | 0.50 | 0 | 0 | 265 | 15.63 | 2.40 | 1.99 | 15.89 | 13.19 | 16"x25" | CMP | 0.024 | 2.78 | 45 | 4.75 | CB 3 | 13.19 | 6.83 | 0.0005 | 0.02 | 1.50 | 0.53 | 1.80 | 4.50 | **2.70** |
| CB 4 | 1.36 | 1.36 | 0.50 | 110 | 470 | 0 | 11.36 | 2.80 | 2.32 | 1.91 | 1.58 | **12** | **PVC** | 0.009 | 0.79 | 65 | 2.01 | CB 4 | 1.58 | 0.25 | 0.0009 | 0.06 | 0.05 | 0.00 | 1.86 | 4.00 | **2.14** |
| CB 5 | 0.11 | 2.14 | 0.50 | 0 | 0 | 90 | 12.10 | 2.70 | 2.24 | 2.89 | 2.40 | 12 | RCP | 0.015 | 0.79 | 40 | 3.06 | CB 5 | 2.40 | 0.25 | 0.0060 | 0.24 | 1.00 | 0.15 | 2.19 | 5.50 | **3.31** |
| CB 6 | 0.24 | 0.24 | 0.50 | 125 | 0 | 0 | 7.78 | 3.30 | 2.74 | 0.40 | 0.33 | 12 | RCP | 0.015 | 0.79 | 120 | 0.43 | CB 6 | 0.33 | 0.25 | 0.0001 | 0.01 | 0.05 | 0.00 | 2.20 | 6.00 | **3.80** |
| CB 7 | 1.79 | 1.79 | 0.50 | 250 | 140 | 0 | 11.72 | 2.75 | 2.28 | 2.47 | 2.05 | 12 | RCP | 0.015 | 0.79 | 90 | 2.61 | CB 7 | 2.05 | 0.25 | 0.0044 | 0.39 | 0.05 | 0.01 | 2.58 | 5.50 | **2.92** |
| CB 8 | 0.18 | 9.48 | 0.50 | 0 | 0 | 150 | 14.53 | 2.50 | 2.08 | 11.85 | 9.83 | **24** | **PVC** | 0.009 | 3.14 | 265 | 3.13 | CB 8 | 9.83 | 0.50 | 0.0009 | 0.24 | 1.00 | 0.15 | 2.19 | 6.50 | **4.31** |
| CB 9 | 1.30 | 2.91 | 0.50 | 0 | 0 | 60 | 10.15 | 2.95 | 2.45 | 4.29 | 3.56 | 15 | RCP | 0.015 | 1.23 | 115 | 2.90 | CB 9 | 3.56 | 0.31 | 0.0040 | 0.46 | 0.40 | 0.05 | 2.71 | 5.50 | **2.79** |
| CON 10 | | 1.61 | 0.50 | 0 | 0 | 130 | 9.90 | 2.95 | 2.45 | 2.38 | 1.97 | 12 | RCP | 0.015 | 0.79 | 60 | 2.51 | CON 10 | 1.97 | 0.25 | 0.0041 | 0.24 | 1.00 | 0.10 | 3.05 | 5.50 | **2.45** |
| CB 11 | 0.16 | 0.16 | 0.50 | 20 | 100 | 0 | 6.28 | 3.60 | 2.99 | 0.29 | 0.24 | **12** | **PVC** | 0.009 | 0.79 | 35 | 0.31 | CB 11 | 0.24 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.05 | 5.50 | **2.45** |
| CON 12 | | 1.45 | 0.50 | 0 | 0 | 15 | 9.35 | 3.00 | 2.49 | 2.18 | 1.81 | 12 | RCP | 0.015 | 0.79 | 130 | 2.30 | CON 12 | 1.81 | 0.25 | 0.0034 | 0.44 | 1.00 | 0.08 | 3.57 | 7.20 | **3.63** |
| CB 13 | 0.44 | 0.44 | 0.50 | 125 | 100 | 0 | 8.61 | 3.15 | 2.61 | 0.70 | 0.58 | **12** | **PVC** | 0.009 | 0.79 | 75 | 0.74 | CB 13 | 0.58 | 0.25 | 0.0001 | 0.01 | 0.05 | 0.00 | 3.58 | 6.50 | **2.92** |
| CON 14 | | 1.01 | 0.50 | 0 | 0 | 60 | 9.29 | 3.05 | 2.53 | 1.53 | 1.27 | 12 | RCP | 0.015 | 0.79 | 15 | 1.62 | CON 14 | 1.27 | 0.25 | 0.0017 | 0.03 | 1.00 | 0.04 | 3.64 | 7.50 | **3.86** |
| CB 15 | 0.18 | 0.18 | 0.50 | 120 | 60 | 0 | 8.17 | 3.20 | 2.66 | 0.28 | 0.23 | 12 | RCP | 0.015 | 0.79 | 15 | 0.30 | CB 15 | 0.23 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.64 | 6.50 | **2.86** |
| CB 16 | 0.21 | 0.83 | 0.50 | 0 | 0 | 130 | 9.04 | 3.05 | 2.53 | 1.27 | 1.05 | **12** | **PVC** | 0.009 | 0.79 | 60 | 1.34 | CB 16 | 1.05 | 0.25 | 0.0004 | 0.02 | 0.40 | 0.01 | 3.67 | 6.50 | **2.83** |
| CB 17 | 0.62 | 0.62 | 0.50 | 120 | 100 | 0 | 8.50 | 3.15 | 2.61 | 0.97 | 0.81 | **12** | **PVC** | 0.009 | 0.79 | 130 | 1.03 | CB 17 | 0.81 | 0.25 | 0.0002 | 0.03 | 0.05 | 0.00 | 3.71 | 6.50 | **2.79** |
| CON 18 | | 6.38 | 0.50 | 0 | 0 | 45 | 13.90 | 2.55 | 2.12 | 8.14 | 6.75 | **18** | **PVC** | 0.009 | 1.77 | 150 | 3.82 | CON 18 | 6.75 | 0.38 | 0.0020 | 0.30 | 1.00 | 0.23 | 2.71 | 6.50 | **3.79** |
| CB 19 | 0.26 | 0.75 | 0.50 | 0 | 0 | 55 | 7.48 | 3.40 | 2.82 | 1.28 | 1.06 | **12** | **PVC** | 0.009 | 0.79 | 25 | 1.35 | CB 19 | 1.06 | 0.25 | 0.0004 | 0.01 | 0.90 | 0.03 | 2.75 | 6.30 | **3.55** |
| CB 20 | 0.49 | 0.49 | 0.50 | 90 | 30 | 0 | 7.25 | 3.40 | 2.82 | 0.83 | 0.69 | **12** | **PVC** | 0.009 | 0.79 | 55 | 0.88 | CB 20 | 0.69 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 2.76 | 6.10 | **3.34** |
| CB 21 | 0.56 | 5.63 | 0.50 | 0 | 0 | 160 | 13.72 | 2.60 | 2.16 | 7.32 | 6.07 | **18** | **PVC** | 0.009 | 1.77 | 45 | 3.44 | CB 21 | 6.07 | 0.38 | 0.0016 | 0.07 | 1.40 | 0.26 | 3.04 | 5.80 | **2.76** |
| CB 22 | 1.94 | 1.94 | 0.50 | 120 | 260 | 0 | 9.83 | 2.95 | 2.45 | 2.86 | 2.37 | 12 | RCP | 0.015 | 0.79 | 135 | 3.02 | CB 22 | 2.37 | 0.25 | 0.0059 | 0.79 | 0.05 | 0.01 | 3.84 | 5.50 | **1.66** |
| CON 23 | | 3.13 | 0.50 | 0 | 0 | 65 | 13.05 | 2.65 | 2.20 | 4.15 | 3.44 | 12 | RCP | 0.015 | 0.79 | 160 | 4.38 | CON 23 | 3.44 | 0.25 | 0.0124 | 1.98 | 1.00 | 0.30 | 5.32 | 7.50 | **2.18** |
| CB 24 | 0.91 | 0.91 | 0.50 | 175 | 0 | 0 | 8.89 | 3.10 | 2.57 | 1.40 | 1.17 | **12** | **PVC** | 0.009 | 0.79 | 75 | 1.48 | CB 24 | 1.17 | 0.25 | 0.0005 | 0.04 | 0.05 | 0.00 | 5.36 | 7.20 | **1.84** |
| CB 25 | 2.22 | 2.22 | 0.50 | 575 | 0 | 0 | 12.78 | 2.65 | 2.20 | 2.95 | 2.45 | 12 | RCP | 0.015 | 0.79 | 65 | 3.12 | CB 25 | 2.45 | 0.25 | 0.0062 | 0.41 | 0.05 | 0.01 | 5.73 | 8.00 | **2.27** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF R | | 6.65 | 0.50 | 0 | 0 | 115 | 12.17 | 2.70 | 2.24 | 8.97 | 7.45 | | | | | | | OF R | 7.45 | | | | | | **1.00** | | |
| CB 1 | 0.68 | 6.65 | 0.50 | 0 | 0 | 150 | 11.69 | 2.75 | 2.28 | 9.14 | 7.59 | **18** | **PVC** | 0.009 | 1.77 | 115 | 4.29 | CB 1 | 7.59 | 0.38 | 0.0025 | 0.29 | 1.00 | 0.29 | 1.57 | 3.50 | **1.93** |
| CB 2 | 0.31 | 2.63 | 0.50 | 0 | 0 | 45 | 10.16 | 2.95 | 2.45 | 3.88 | 3.22 | 15 | RCP | 0.015 | 1.23 | 40 | 2.62 | CB 2 | 3.22 | 0.31 | 0.0033 | 0.13 | 0.90 | 0.10 | 1.80 | 3.50 | **1.70** |
| CON 3 | | 2.32 | 0.50 | 0 | 0 | 160 | 9.97 | 2.95 | 2.45 | 3.42 | 2.84 | 15 | RCP | 0.015 | 1.23 | 45 | 2.31 | CON 3 | 2.84 | 6.83 | 0.0000 | 0.00 | 1.00 | 0.08 | 1.88 | 3.50 | **1.62** |
| CB 4 | 0.32 | 0.32 | 0.50 | 100 | 90 | 0 | 7.97 | 3.30 | 2.74 | 0.53 | 0.44 | 15 | RCP | 0.015 | 1.23 | 35 | 0.36 | CB 4 | 0.44 | 0.31 | 0.0001 | 0.00 | 0.05 | 0.00 | 1.89 | 3.50 | **1.61** |
| CB 5 | 0.35 | 1.99 | 0.50 | 0 | 0 | 190 | 9.31 | 3.00 | 2.49 | 2.99 | 2.48 | **12** | **PVC** | 0.009 | 0.79 | 160 | 3.16 | CB 5 | 2.48 | 0.25 | 0.0023 | 0.37 | 1.00 | 0.16 | 2.41 | 4.00 | **1.59** |
| CB 6 | 0.31 | 0.31 | 0.50 | 100 | 60 | 0 | 7.72 | 3.30 | 2.74 | 0.52 | 0.43 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.55 | CB 6 | 0.43 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 2.41 | 4.00 | **1.59** |
| CB 7 | 0.66 | 1.33 | 0.50 | 0 | 0 | 30 | 8.51 | 3.15 | 2.61 | 2.10 | 1.74 | **12** | **PVC** | 0.009 | 0.79 | 190 | 2.22 | CB 7 | 1.74 | 0.25 | 0.0011 | 0.22 | 0.90 | 0.07 | 2.70 | 4.00 | **1.30** |
| CB 8 | 0.67 | 0.67 | 0.50 | 100 | 140 | 0 | 8.39 | 3.20 | 2.66 | 1.07 | 0.89 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.13 | CB 8 | 0.89 | 0.25 | 0.0003 | 0.01 | 0.05 | 0.00 | 2.71 | 4.00 | **1.29** |
| CON 9 | | 3.34 | 0.50 | 0 | 0 | 30 | 11.07 | 2.85 | 2.37 | 4.76 | 3.95 | **18** | **PVC** | 0.009 | 1.77 | 150 | 2.24 | CON 9 | 3.95 | 0.38 | 0.0007 | 0.10 | 1.00 | 0.08 | 1.75 | 3.50 | **1.75** |
| CB 10 | 0.32 | 0.32 | 0.50 | 115 | 30 | 0 | 7.81 | 3.30 | 2.74 | 0.53 | 0.44 | **12** | **PVC** | 0.009 | 0.79 | 15 | 0.56 | CB 10 | 0.44 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 1.75 | 3.50 | **1.75** |
| CON 11 | | 3.02 | 0.50 | 0 | 0 | 15 | 10.94 | 2.85 | 2.37 | 4.31 | 3.57 | **12** | **PVC** | 0.009 | 0.79 | 30 | 4.55 | CON 11 | 3.57 | 0.25 | 0.0048 | 0.14 | 1.50 | 0.48 | 2.38 | 3.50 | **1.12** |
| CB 12 | 0.78 | 2.05 | 0.50 | 0 | 0 | 65 | 10.88 | 2.85 | 2.37 | 2.91 | 2.42 | **12** | **PVC** | 0.009 | 0.79 | 15 | 3.08 | CB 12 | 2.42 | 0.25 | 0.0022 | 0.03 | 0.90 | 0.13 | 2.54 | 3.50 | **0.96** |
| CB 13 | 1.27 | 1.27 | 0.50 | 140 | 300 | 0 | 10.61 | 2.90 | 2.41 | 1.84 | 1.53 | **12** | **PVC** | 0.009 | 0.79 | 65 | 1.94 | CB 13 | 1.53 | 0.25 | 0.0009 | 0.06 | 0.05 | 0.00 | 2.60 | 3.50 | **0.90** |
| CB 14 | 0.20 | 0.20 | 0.50 | 110 | 75 | 0 | 8.07 | 3.20 | 2.66 | 0.31 | 0.26 | **12** | **PVC** | 0.009 | 0.79 | 15 | 0.33 | CB 14 | 0.26 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.38 | 3.50 | **1.12** |
| CON 15 | | 0.78 | 0.50 | 0 | 0 | 65 | 8.38 | 3.20 | 2.66 | 1.25 | 1.04 | **12** | **PVC** | 0.009 | 0.79 | 140 | 1.32 | CON 15 | 1.04 | 0.25 | 0.0004 | 0.06 | 1.00 | 0.03 | 2.46 | 4.00 | **1.54** |
| CB 16 | 0.21 | 0.21 | 0.50 | 110 | 60 | 0 | 7.94 | 3.30 | 2.74 | 0.35 | 0.29 | **12** | **PVC** | 0.009 | 0.79 | 15 | 0.37 | CB 16 | 0.29 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.46 | 4.00 | **1.54** |
| CB 17 | 0.57 | 0.57 | 0.50 | 110 | 80 | 0 | 8.11 | 3.20 | 2.66 | 0.91 | 0.75 | **12** | **PVC** | 0.009 | 0.79 | 65 | 0.96 | CB 17 | 0.75 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 2.48 | 4.00 | **1.52** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed starting water surface elevation of 1.00 NGVD controlled by existing San Clemente Creek Pump Station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{25}$ fps | Tributary POC[1] | $Q_{25}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF S | | 3.39 | 0.50 | 0 | 0 | 35 | 11.97 | 2.75 | 2.28 | 4.66 | 3.87 | | | | | | | OF S | 3.87 | | | | | | **1.00** | | |
| CB 1 | 0.23 | 3.39 | 0.50 | 0 | 0 | 40 | 11.82 | 2.75 | 2.28 | 4.66 | 3.87 | 12 | RCP | 0.015 | 0.79 | 35 | 4.92 | CB 1 | 3.87 | 0.25 | 0.0156 | 0.55 | 0.10 | 0.04 | 1.58 | 4.00 | **2.42** |
| CB 2 | 0.62 | 3.16 | 0.50 | 0 | 0 | 120 | 11.65 | 2.75 | 2.28 | 4.34 | 3.61 | 12 | RCP | 0.015 | 0.79 | 40 | 4.59 | CB 2 | 3.61 | 0.25 | 0.0136 | 0.54 | 0.90 | 0.29 | 2.42 | 4.00 | **1.58** |
| CB 3 | 1.18 | 2.54 | 0.50 | 0 | 0 | 40 | 11.15 | 2.80 | 2.32 | 3.56 | 2.95 | **12** | **PVC** | 0.009 | 0.79 | 120 | 3.76 | CB 3 | 2.95 | 6.83 | 0.0000 | 0.00 | 0.90 | 0.20 | 2.62 | 4.00 | **1.38** |
| CB 4 | 1.36 | 1.36 | 0.50 | 110 | 425 | 0 | 10.99 | 2.85 | 2.37 | 1.94 | 1.61 | **12** | **PVC** | 0.009 | 0.79 | 40 | 2.05 | CB 4 | 1.61 | 0.25 | 0.0010 | 0.04 | 0.05 | 0.00 | 2.66 | 4.00 | **1.34** |

Notes:

1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed starting water surface elevation of 1.00 NGVD controlled by existing San Clemente Creek Pump Station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{25}$ | Tributary | $Q_{25}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF T1 | | 1.14 | 0.50 | 0 | 0 | 130 | 8.82 | 3.10 | 2.57 | 1.76 | 1.46 | | | | | | | OF T1 | 1.46 | | | | | | **1.00** | | |
| CB 1 | 0.45 | 1.14 | 0.50 | 0 | 0 | 30 | 8.28 | 3.20 | 2.66 | 1.82 | 1.51 | **12** | **PVC** | 0.009 | 0.79 | 130 | 1.92 | CB 1 | 1.51 | 0.25 | 0.0009 | 0.11 | 0.90 | 0.05 | 1.16 | 6.50 | **5.34** |
| CB 2 | 0.33 | 0.69 | 0.50 | 0 | 0 | 40 | 8.15 | 3.20 | 2.66 | 1.10 | 0.91 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.16 | CB 2 | 0.91 | 0.25 | 0.0003 | 0.01 | 0.90 | 0.02 | 1.19 | 6.50 | **5.31** |
| CB 3 | 0.17 | 0.35 | 0.50 | 0 | 0 | 50 | 7.99 | 3.30 | 2.74 | 0.58 | 0.48 | **12** | **PVC** | 0.009 | 0.79 | 40 | 0.61 | CB 3 | 0.48 | 6.83 | 0.0000 | 0.00 | 1.40 | 0.01 | 1.20 | 6.50 | **5.30** |
| CB 4 | 0.18 | 0.18 | 0.50 | 110 | 40 | 0 | 7.78 | 3.30 | 2.74 | 0.30 | 0.25 | **12** | **PVC** | 0.009 | 0.79 | 50 | 0.31 | CB 4 | 0.25 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 1.20 | 6.50 | **5.30** |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OF T2 | | 1.18 | 0.50 | 0 | 0 | 145 | 9.47 | 3.00 | 2.49 | 1.77 | 1.47 | | | | | | | OF T2 | 1.47 | | | | | | **1.00** | | |
| CB 6 | 0.40 | 1.18 | 0.50 | 0 | 0 | 120 | 8.86 | 3.10 | 2.57 | 1.83 | 1.52 | 12 | CMP | 0.024 | 0.79 | 145 | 1.93 | CB 6 | 1.52 | 0.25 | 0.0061 | 0.89 | 0.90 | 0.05 | 1.94 | 6.50 | **4.56** |
| CB 5 | 0.43 | 0.78 | 0.50 | 0 | 0 | 90 | 8.36 | 3.20 | 2.66 | 1.25 | 1.04 | **12** | **PVC** | 0.009 | 0.79 | 120 | 1.32 | CB 5 | 1.04 | 0.25 | 0.0004 | 0.05 | 0.10 | 0.00 | 1.99 | 6.50 | **4.51** |
| CB 3 | 0.18 | 0.35 | 0.50 | 0 | 0 | 50 | 7.99 | 3.30 | 2.74 | 0.58 | 0.48 | **12** | **PVC** | 0.009 | 0.79 | 90 | 0.61 | CB 3 | 0.48 | 0.25 | 0.0001 | 0.01 | 1.00 | 0.01 | 2.01 | 6.50 | **4.49** |
| CB 4 | 0.17 | 0.17 | 0.50 | 110 | 40 | 0 | 7.78 | 3.30 | 2.74 | 0.29 | 0.24 | **12** | **PVC** | 0.009 | 0.79 | 50 | 0.30 | CB 4 | 0.24 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.01 | 6.50 | **4.49** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by existing San Clemente Creek Pump Station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF A | | 2.17 | 0.50 | 0 | 0 | 70 | 10.96 | 2.85 | 2.37 | 3.09 | 2.57 | | | | | | | OF A | 3.09 | | | | | | **0.00** | | |
| CB 1 | 1.11 | 2.17 | 0.50 | 120 | 360 | 0 | 10.67 | 2.90 | 2.41 | 3.15 | 2.61 | 12 | RCP | 0.015 | 0.79 | 70 | 4.01 | CB 1 | 3.15 | 0.25 | 0.0103 | 0.72 | 0.90 | 0.22 | 0.95 | 2.50 | **1.55** |
| CB 2 | 1.06 | 1.06 | 0.50 | 120 | 340 | 0 | 10.50 | 2.90 | 2.41 | 1.54 | 1.28 | 12 | RCP | 0.015 | 0.79 | 35 | 1.96 | CB 2 | 1.54 | 0.25 | 0.0025 | 0.09 | 0.05 | 0.00 | 1.04 | 2.50 | **1.46** |

Notes:

1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.

** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF B | | 16.22 | 0.50 | 0 | 0 | 65 | 15.58 | 2.40 | 1.99 | 19.47 | 16.16 | | | | | | | OF B | 19.47 | | | | | | **-3.00** | | |
| MH 1 | | 16.22 | 0.50 | 0 | 0 | 215 | 15.31 | 2.45 | 2.03 | 19.87 | 16.49 | 30 | RCP | 0.015 | 4.91 | 65 | 4.05 | MH 1 | 19.87 | 0.63 | 0.0031 | 0.20 | 0.40 | 0.10 | -2.70 | 3.50 | **6.20** |
| CON 2 | | 16.22 | 0.50 | 0 | 0 | 50 | 14.42 | 2.50 | 2.08 | 20.28 | 16.83 | 30 | RCP | 0.015 | 4.91 | 215 | 4.13 | CON 2 | 20.28 | 0.63 | 0.0032 | 0.70 | 1.00 | 0.26 | -1.74 | 2.50 | **4.24** |
| CB 3 | 0.70 | 0.70 | 0.50 | 110 | 175 | 0 | 8.90 | 3.10 | 2.57 | 1.08 | 0.90 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.38 | CB 3 | 1.08 | 0.25 | 0.0004 | 0.01 | 0.05 | 0.00 | -1.72 | 2.50 | **4.22** |
| CON 4 | | 15.52 | 0.50 | 0 | 0 | 20 | 14.21 | 2.55 | 2.12 | 19.79 | 16.43 | 30 | RCP | 0.015 | 4.91 | 50 | 4.03 | CON 4 | 19.79 | 0.63 | 0.0031 | 0.15 | 1.00 | 0.25 | -1.33 | 3.00 | **4.33** |
| CB 5 | 0.38 | 0.38 | 0.50 | 100 | 100 | 0 | 8.06 | 3.20 | 2.66 | 0.61 | 0.51 | **12** | **PVC** | 0.009 | 0.79 | 20 | 0.78 | CB 5 | 0.61 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | -1.33 | 2.50 | **3.83** |
| MH 6 | | 15.14 | 0.50 | 0 | 0 | 110 | 14.13 | 2.55 | 2.12 | 19.30 | 16.02 | 30 | RCP | 0.015 | 4.91 | 30 | 3.93 | MH 6 | 19.30 | 0.63 | 0.0029 | 0.09 | 0.40 | 0.10 | -1.14 | 2.90 | **4.04** |
| CON 7 | | 15.14 | 0.50 | 0 | 0 | 30 | 13.67 | 2.60 | 2.16 | 19.68 | 16.34 | 30 | RCP | 0.015 | 4.91 | 110 | 4.01 | CON 7 | 19.68 | 0.63 | 0.0030 | 0.34 | 1.00 | 0.25 | -0.56 | 2.50 | **3.06** |
| CB 8 | 0.49 | 0.49 | 0.50 | 50 | 310 | 0 | 8.69 | 3.15 | 2.61 | 0.78 | 0.64 | 12 | RCP | 0.015 | 0.79 | 35 | 0.99 | CB 8 | 0.78 | 0.25 | 0.0006 | 0.02 | 0.05 | 0.00 | -0.54 | 2.50 | **3.04** |
| CON 9 | | 14.65 | 0.50 | 0 | 0 | 35 | 13.54 | 2.60 | 2.16 | 19.04 | 15.81 | 30 | RCP | 0.015 | 4.91 | 30 | 3.88 | CON 9 | 19.04 | 0.63 | 0.0029 | 0.09 | 1.00 | 0.23 | -0.24 | 2.30 | **2.54** |
| CB 10 | 1.37 | 1.37 | 0.50 | 120 | 480 | 0 | 11.67 | 2.75 | 2.28 | 1.88 | 1.56 | 12 | RCP | 0.015 | 0.79 | 20 | 2.40 | CB 10 | 1.88 | 0.25 | 0.0037 | 0.07 | 0.05 | 0.00 | -0.16 | 1.80 | **1.96** |
| MH 11 | | 13.28 | 0.50 | 0 | 0 | 325 | 13.40 | 2.60 | 2.16 | 17.26 | 14.33 | 30 | RCP | 0.015 | 4.91 | 35 | 3.52 | MH 11 | 17.26 | 0.63 | 0.0023 | 0.08 | 1.50 | 0.29 | 0.13 | 2.20 | **2.07** |
| CB 12 | 1.24 | 2.68 | 0.50 | 110 | 380 | 0 | 10.61 | 2.90 | 2.41 | 3.88 | 3.22 | 18 | RCP | 0.015 | 1.77 | 45 | 2.20 | CB 12 | 3.88 | 0.38 | 0.0018 | 0.08 | 0.10 | 0.01 | 0.22 | 2.50 | **2.28** |
| CB 13 | 0.41 | 1.44 | 0.50 | 0 | 0 | 55 | 9.56 | 3.00 | 2.49 | 2.16 | 1.79 | 18 | RCP | 0.015 | 1.77 | 175 | 1.22 | CB 13 | 2.16 | 0.38 | 0.0006 | 0.10 | 0.10 | 0.00 | 0.32 | 2.80 | **2.48** |
| CB 14 | 1.03 | 1.03 | 0.50 | 120 | 200 | 0 | 9.33 | 3.00 | 2.49 | 1.55 | 1.29 | 12 | RCP | 0.015 | 0.79 | 55 | 1.97 | CB 14 | 1.55 | 0.25 | 0.0025 | 0.14 | 0.05 | 0.00 | 0.46 | 3.20 | **2.74** |
| CB 15 | 1.26 | 3.51 | 0.50 | 0 | 0 | 115 | 12.04 | 2.70 | 2.24 | 4.73 | 3.93 | 12 | RCP | 0.015 | 0.79 | 15 | 6.02 | CB 15 | 4.73 | 0.25 | 0.0234 | 0.35 | 0.10 | 0.06 | 0.54 | 1.80 | **1.26** |
| MH 16 | | 2.25 | 0.50 | 0 | 0 | 15 | 11.56 | 2.80 | 2.32 | 3.15 | 2.61 | 12 | RCP | 0.015 | 0.79 | 115 | 4.01 | MH 16 | 3.15 | 0.25 | 0.0103 | 1.19 | 1.40 | 0.35 | 2.07 | 4.50 | **2.43** |
| CB 17 | 0.65 | 0.65 | 0.50 | 125 | 150 | 0 | 9.03 | 3.05 | 2.53 | 0.99 | 0.82 | 12 | RCP | 0.015 | 0.79 | 25 | 1.25 | CB 17 | 0.99 | 0.25 | 0.0010 | 0.03 | 0.05 | 0.00 | 2.10 | 3.80 | **1.70** |
| CB 18 | 1.07 | 1.60 | 0.50 | 180 | 300 | 0 | 11.50 | 2.80 | 2.32 | 2.24 | 1.86 | 12 | RCP | 0.015 | 0.79 | 15 | 2.86 | CB 18 | 2.24 | 0.25 | 0.0052 | 0.08 | 0.90 | 0.11 | 2.27 | 4.40 | **2.13** |
| CB 19 | 0.53 | 0.53 | 0.50 | 90 | 230 | 0 | 8.92 | 3.10 | 2.57 | 0.82 | 0.68 | 12 | RCP | 0.015 | 0.79 | 125 | 1.05 | CB 19 | 0.82 | 0.25 | 0.0007 | 0.09 | 0.05 | 0.00 | 2.36 | 5.50 | **3.14** |
| MH 20 | | 7.09 | 0.50 | 0 | 0 | 100 | 12.04 | 2.70 | 2.24 | 9.58 | 7.95 | 24 | RCP | 0.015 | 3.14 | 325 | 3.05 | MH 20 | 9.58 | 0.50 | 0.0024 | 0.77 | 0.10 | 0.01 | 0.92 | 3.20 | **2.28** |
| MH 21 | | 7.09 | 0.50 | 0 | 0 | 430 | 11.63 | 2.75 | 2.28 | 9.75 | 8.10 | 24 | RCP | 0.015 | 3.14 | 100 | 3.10 | MH 21 | 9.75 | 0.50 | 0.0025 | 0.25 | 1.50 | 0.22 | 1.39 | 3.50 | **2.11** |
| CB 22 | 0.71 | 3.76 | 0.50 | 0 | 0 | 210 | 11.44 | 2.80 | 2.32 | 5.26 | 4.37 | 15 | RCP | 0.015 | 1.23 | 20 | 4.29 | CB 22 | 5.26 | 0.31 | 0.0088 | 0.18 | 0.10 | 0.03 | 1.59 | 3.00 | **1.41** |
| CB 23 | 1.37 | 3.05 | 0.50 | 0 | 0 | 35 | 10.56 | 2.90 | 2.41 | 4.42 | 3.67 | 15 | RCP | 0.015 | 1.23 | 210 | 3.60 | CB 23 | 4.42 | 0.31 | 0.0062 | 1.30 | 0.10 | 0.02 | 2.91 | 2.20 | **-0.71** |
| CB 24 | 1.41 | 1.68 | 0.50 | 120 | 330 | 0 | 10.42 | 2.90 | 2.41 | 2.43 | 2.02 | 12 | RCP | 0.015 | 0.79 | 35 | 3.09 | CB 24 | 2.43 | 0.25 | 0.0062 | 0.22 | 0.90 | 0.13 | 3.26 | 2.20 | **-1.06** |
| CON 25 | | 0.27 | 0.50 | 0 | 0 | 20 | 8.67 | 3.15 | 2.61 | 0.42 | 0.35 | **12** | **PVC** | 0.009 | 0.79 | 120 | 0.53 | CON 25 | 0.42 | 0.25 | 0.0001 | 0.01 | 1.00 | 0.00 | 3.28 | 2.80 | **-0.48** |
| CB 26 | 0.27 | 0.27 | 0.50 | 120 | 110 | 0 | 8.58 | 3.15 | 2.61 | 0.42 | 0.35 | **12** | **PVC** | 0.009 | 0.79 | 10 | 0.53 | CB 26 | 0.42 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.28 | 2.50 | **-0.78** |
| ?? 27 | 0.00 | 0.00 | 0.50 | 0 | 0 | 0 | 5.00 | 4.10 | 3.40 | 0.00 | 0.00 | **12** | **PVC** | 0.009 | 0.79 | 20 | 0.00 | ?? 27 | 0.00 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.28 | 3.00 | **-0.28** |
| CB 28 | 0.76 | 0.76 | 0.50 | 110 | 180 | 0 | 8.94 | 3.10 | 2.57 | 1.18 | 0.98 | 15 | RCP | 0.015 | 1.23 | 20 | 0.96 | CB 28 | 1.18 | 0.31 | 0.0004 | 0.01 | 0.05 | 0.00 | 1.40 | 3.00 | **1.60** |
| MH 29 | | 2.57 | 0.50 | 0 | 0 | 45 | 9.83 | 2.95 | 2.45 | 3.80 | 3.15 | 18 | RCP | 0.015 | 1.77 | 430 | 2.15 | MH 29 | 3.80 | 0.38 | 0.0017 | 0.74 | 1.40 | 0.10 | 2.23 | 3.10 | **0.87** |
| CB 30 | 0.86 | 1.59 | 0.50 | 0 | 0 | 35 | 9.65 | 3.00 | 2.49 | 2.38 | 1.98 | 12 | RCP | 0.015 | 0.79 | 45 | 3.03 | CB 30 | 2.38 | 0.25 | 0.0059 | 0.27 | 0.90 | 0.13 | 2.63 | 2.50 | **-0.13** |
| CB 31 | 0.73 | 0.73 | 0.50 | 120 | 220 | 0 | 9.50 | 3.00 | 2.49 | 1.10 | 0.91 | 12 | RCP | 0.015 | 0.79 | 35 | 1.40 | CB 31 | 1.10 | 0.25 | 0.0013 | 0.04 | 0.05 | 0.00 | 2.67 | 2.50 | **-0.17** |
| CB 32 | 0.99 | 0.99 | 0.50 | 110 | 240 | 0 | 9.44 | 3.00 | 2.49 | 1.48 | 1.23 | 12 | RCP | 0.015 | 0.79 | 20 | 1.88 | CB 32 | 1.48 | 0.25 | 0.0023 | 0.05 | 0.05 | 0.00 | 2.28 | 2.50 | **0.22** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of -3.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF C | | 1.21 | 0.50 | 0 | 0 | 75 | 9.23 | 3.05 | 2.53 | 1.85 | 1.53 | | | | | | | OF C | 1.85 | | | | | | **0.00** | | |
| CB 1 | 1.21 | 1.21 | 0.50 | 120 | 150 | 0 | 8.92 | 3.10 | 2.57 | 1.88 | 1.56 | **12** | **PVC** | 0.009 | 0.79 | 75 | 2.39 | CB 1 | 1.88 | 0.25 | 0.0013 | 0.10 | 0.05 | 0.00 | 0.10 | 4.50 | **4.40** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed Marsh starting water surface elevation of 0.00 NGVD.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $POC^1$ | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | $POC^1$ | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF D | | 2.58 | 0.50 | 0 | 0 | 150 | 11.78 | 2.75 | 2.28 | 3.55 | 2.95 | | | | | | | OF D | 3.55 | | | | | | **1.00** | | |
| CB 1 | 0.72 | 2.58 | 0.50 | 0 | 0 | 30 | 11.15 | 2.80 | 2.32 | 3.61 | 3.00 | 15 | RCP | 0.015 | 1.23 | 150 | 2.95 | CB 1 | 3.61 | 0.31 | 0.0041 | 0.62 | 0.10 | 0.01 | 1.64 | 5.00 | **3.36** |
| CB 2 | 0.08 | 1.86 | 0.50 | 0 | 0 | 140 | 11.03 | 2.85 | 2.37 | 2.65 | 2.20 | 12 | RCP | 0.015 | 0.79 | 30 | 3.37 | CB 2 | 2.65 | 0.25 | 0.0073 | 0.22 | 0.90 | 0.16 | 2.01 | 5.00 | **2.99** |
| CB 3 | 0.80 | 1.78 | 0.50 | 0 | 0 | 150 | 10.44 | 2.90 | 2.41 | 2.58 | 2.14 | 12 | RCP | 0.015 | 0.79 | 140 | 3.29 | CB 3 | 2.58 | 0.25 | 0.0070 | 0.97 | 0.90 | 0.15 | 3.14 | 5.50 | **2.36** |
| CB 4 | 0.98 | 0.98 | 0.50 | 185 | 85 | 0 | 9.82 | 2.95 | 2.45 | 1.45 | 1.21 | **12** | **PVC** | 0.009 | 0.79 | 150 | 1.85 | CB 4 | 1.45 | 0.25 | 0.0008 | 0.12 | 0.45 | 0.02 | 3.28 | 4.50 | **1.22** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF E | | 4.58 | 0.50 | 0 | 0 | 115 | 11.98 | 2.75 | 2.28 | 6.30 | 5.23 | | | | | | | OF E | 6.30 | | | | | | **2.00** | | |
| CB 1 | 1.84 | 4.58 | 0.50 | 180 | 300 | 0 | 11.50 | 2.80 | 2.32 | 6.41 | 5.32 | **18** | **PVC** | 0.009 | 1.77 | 115 | 3.63 | CB 1 | 6.41 | 0.38 | 0.0018 | 0.20 | 0.10 | 0.02 | 2.22 | 5.50 | **3.28** |
| CB 2 | 1.02 | 2.74 | 0.50 | 0 | 0 | 50 | 10.82 | 2.85 | 2.37 | 3.91 | 3.24 | **12** | **PVC** | 0.009 | 0.79 | 40 | 4.97 | CB 2 | 3.91 | 0.25 | 0.0057 | 0.23 | 0.90 | 0.35 | 2.80 | 5.50 | **2.70** |
| CB 3 | 1.72 | 1.72 | 0.50 | 140 | 300 | 0 | 10.61 | 2.90 | 2.41 | 2.50 | 2.07 | **12** | **PVC** | 0.009 | 0.79 | 50 | 3.18 | CB 3 | 2.50 | 0.25 | 0.0023 | 0.12 | 0.05 | 0.01 | 2.92 | 5.50 | **2.58** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderate starting water surface elevation of 2.00 NGVD (4.60 MLLW) coincident with $Q_{100}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF F | | 13.31 | 0.50 | 0 | 0 | 135 | 16.61 | 2.35 | 1.95 | 15.64 | 12.98 | | | | | | | OF F | 15.64 | | | | | | **1.00** | | |
| MH 1 | | 13.31 | 0.50 | 0 | 0 | 85 | 16.05 | 2.40 | 1.99 | 15.97 | 13.26 | 24 | PVC | 0.009 | 3.14 | 135 | 5.08 | MH 1 | 15.97 | 0.50 | 0.0024 | 0.32 | 0.40 | 0.16 | 1.48 | 6.00 | **4.52** |
| MH 2 | | 13.31 | 0.50 | 0 | 0 | 165 | 15.69 | 2.40 | 1.99 | 15.97 | 13.26 | 24 | PVC | 0.009 | 3.14 | 85 | 5.08 | MH 2 | 15.97 | 0.50 | 0.0024 | 0.20 | 1.40 | 0.56 | 2.25 | 6.50 | **4.25** |
| CB 3 | 0.37 | 0.37 | 0.50 | 150 | 30 | 0 | 8.58 | 3.15 | 2.61 | 0.59 | 0.49 | 12 | RCP | 0.015 | 0.79 | 25 | 0.75 | CB 3 | 0.59 | 0.25 | 0.0004 | 0.01 | 0.05 | 0.00 | 2.25 | 5.60 | **3.35** |
| CB 4 | 0.46 | 0.46 | 0.50 | 120 | 60 | 0 | 8.17 | 3.20 | 2.66 | 0.73 | 0.60 | 12 | RCP | 0.015 | 0.79 | 40 | 0.93 | CB 4 | 0.73 | 0.25 | 0.0006 | 0.02 | 0.05 | 0.00 | 2.27 | 5.40 | **3.13** |
| MH 5 | | 12.48 | 0.50 | 0 | 0 | 190 | 15.01 | 2.45 | 2.03 | 15.29 | 12.69 | 24 | PVC | 0.009 | 3.14 | 165 | 4.87 | MH 5 | 15.29 | 0.50 | 0.0022 | 0.36 | 0.90 | 0.33 | 2.94 | 5.50 | **2.56** |
| CB 6 | 0.51 | 1.40 | 0.50 | 0 | 0 | 20 | 9.69 | 3.00 | 2.49 | 2.09 | 1.74 | 15 | RCP | 0.015 | 1.23 | 45 | 1.71 | CB 6 | 2.09 | 0.31 | 0.0014 | 0.06 | 0.40 | 0.02 | 3.02 | 4.80 | **1.78** |
| CON 7 | | 0.88 | 0.50 | 0 | 0 | 40 | 9.61 | 3.00 | 2.49 | 1.32 | 1.10 | 12 | RCP | 0.015 | 0.79 | 20 | 1.68 | CON 7 | 1.32 | 0.25 | 0.0018 | 0.04 | 1.00 | 0.04 | 3.10 | 5.50 | **2.40** |
| CON 8 | | 0.17 | 0.50 | 0 | 0 | 20 | 6.08 | 3.70 | 3.07 | 0.32 | 0.27 | 12 | PVC | 0.009 | 0.79 | 80 | 0.41 | CON 8 | 0.32 | 0.25 | 0.0000 | 0.00 | 1.40 | 0.00 | 3.10 | 5.10 | **2.00** |
| CB 9 | 0.09 | 0.09 | 0.50 | 15 | 70 | 0 | 5.92 | 3.70 | 3.07 | 0.16 | 0.13 | **12** | **PVC** | 0.009 | 0.79 | 10 | 0.20 | CB 9 | 0.16 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.10 | 4.80 | **1.70** |
| CB 10 | 0.09 | 0.09 | 0.50 | 15 | 80 | 0 | 6.00 | 3.70 | 3.07 | 0.16 | 0.13 | **12** | **PVC** | 0.009 | 0.79 | 20 | 0.20 | CB 10 | 0.16 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.10 | 4.80 | **1.70** |
| CB 11 | 0.71 | 0.71 | 0.50 | 110 | 240 | 0 | 9.44 | 3.00 | 2.49 | 1.06 | 0.88 | 12 | RCP | 0.015 | 0.79 | 40 | 1.35 | CB 11 | 1.06 | 0.25 | 0.0012 | 0.05 | 0.05 | 0.00 | 3.15 | 5.20 | **2.05** |
| CB 12 | 0.74 | 1.42 | 0.50 | 0 | 0 | 45 | 10.35 | 2.90 | 2.41 | 2.06 | 1.71 | 18 | RCP | 0.015 | 1.77 | 30 | 1.17 | CB 12 | 2.06 | 0.38 | 0.0005 | 0.02 | 0.40 | 0.01 | 2.96 | 5.00 | **2.04** |
| CB 13 | 0.68 | 0.68 | 0.50 | 120 | 300 | 0 | 10.17 | 2.95 | 2.45 | 1.00 | 0.83 | 12 | RCP | 0.015 | 0.79 | 45 | 1.27 | CB 13 | 1.00 | 0.25 | 0.0010 | 0.05 | 0.05 | 0.00 | 3.01 | 5.50 | **2.49** |
| CB 14 | 0.79 | 9.66 | 0.50 | 0 | 0 | 220 | 14.22 | 2.55 | 2.12 | 12.32 | 10.23 | 24 | PVC | 0.009 | 3.14 | 190 | 3.92 | CB 14 | 12.32 | 0.50 | 0.0014 | 0.27 | 0.90 | 0.21 | 3.42 | 5.80 | **2.38** |
| CB 15 | 0.73 | 0.73 | 0.50 | 110 | 280 | 0 | 9.78 | 3.00 | 2.49 | 1.09 | 0.91 | **12** | **PVC** | 0.009 | 0.79 | 60 | 1.39 | CB 15 | 1.09 | 0.25 | 0.0004 | 0.03 | 0.05 | 0.00 | 3.45 | 5.80 | **2.35** |
| CB 16 | 0.83 | 8.15 | 0.50 | 0 | 0 | 135 | 13.30 | 2.60 | 2.16 | 10.59 | 8.79 | 24 | PVC | 0.009 | 3.14 | 220 | 3.37 | CB 16 | 10.59 | 0.50 | 0.0010 | 0.23 | 1.00 | 0.18 | 3.83 | 5.80 | **1.97** |
| CB 17 | 0.38 | 0.38 | 0.50 | 120 | 65 | 0 | 8.21 | 3.20 | 2.66 | 0.62 | 0.51 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.78 | CB 17 | 0.62 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.83 | 5.80 | **1.97** |
| CB 18 | 0.76 | 6.93 | 0.50 | 0 | 0 | 50 | 12.74 | 2.65 | 2.20 | 9.18 | 7.62 | 24 | PVC | 0.009 | 3.14 | 135 | 2.92 | CB 18 | 9.18 | 0.50 | 0.0008 | 0.11 | 1.00 | 0.13 | 4.06 | 6.00 | **1.94** |
| CB 19 | 0.37 | 0.37 | 0.50 | 120 | 80 | 0 | 8.33 | 3.20 | 2.66 | 0.59 | 0.49 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.75 | CB 19 | 0.59 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 4.07 | 5.80 | **1.73** |
| MH 20 | | 5.81 | 0.50 | 0 | 0 | 110 | 12.53 | 2.70 | 2.24 | 7.84 | 6.50 | 18 | PVC | 0.009 | 1.77 | 50 | 4.43 | MH 20 | 7.84 | 0.38 | 0.0027 | 0.13 | 0.40 | 0.12 | 4.32 | 6.70 | **2.38** |
| MH 21 | | 5.81 | 0.50 | 0 | 0 | 60 | 12.07 | 2.70 | 2.24 | 7.84 | 6.50 | 18 | PVC | 0.009 | 1.77 | 110 | 4.43 | MH 21 | 7.84 | 0.38 | 0.0027 | 0.29 | 1.50 | 0.46 | 5.07 | 6.50 | **1.43** |
| CB 22 | 1.03 | 1.03 | 0.50 | 110 | 300 | 0 | 9.94 | 2.95 | 2.45 | 1.52 | 1.26 | 12 | RCP | 0.015 | 0.79 | 30 | 1.94 | CB 22 | 1.52 | 0.25 | 0.0024 | 0.07 | 0.05 | 0.00 | 5.14 | 5.50 | **0.36** |
| CB 23 | 0.96 | 0.96 | 0.50 | 45 | 180 | 0 | 7.50 | 3.40 | 2.82 | 1.63 | 1.36 | 12 | RCP | 0.015 | 0.79 | 25 | 2.08 | CB 23 | 1.63 | 0.25 | 0.0028 | 0.07 | 0.05 | 0.00 | 5.14 | 5.80 | **0.66** |
| CB 24 | 0.03 | 3.81 | 0.50 | 0 | 0 | 50 | 11.82 | 2.75 | 2.28 | 5.24 | 4.35 | 2-12 | RCP | 0.015 | 1.57 | 60 | 3.34 | CB 24 | 5.24 | 0.50 | 0.0028 | 0.17 | 0.90 | 0.16 | 5.40 | 6.00 | **0.60** |
| CB 25 | 1.75 | 3.78 | 0.50 | 110 | 500 | 0 | 11.61 | 2.75 | 2.28 | 5.19 | 4.31 | 18 | RCP | 0.015 | 1.77 | 50 | 2.94 | CB 25 | 5.19 | 0.38 | 0.0032 | 0.16 | 0.40 | 0.05 | 5.61 | 5.50 | **-0.11** |
| CON 26 | | 2.02 | 0.50 | 0 | 0 | 115 | 9.87 | 2.95 | 2.45 | 2.99 | 2.48 | 12 | RCP | 0.015 | 0.79 | 25 | 3.80 | CON 26 | 2.99 | 0.25 | 0.0093 | 0.23 | 1.00 | 0.22 | 6.07 | 5.80 | **-0.27** |
| CB 27 | 1.00 | 1.00 | 0.50 | 105 | 290 | 0 | 9.75 | 3.00 | 2.49 | 1.49 | 1.24 | 12 | RCP | 0.015 | 0.79 | 25 | 1.90 | CB 27 | 1.49 | 0.25 | 0.0023 | 0.06 | 0.05 | 0.00 | 6.13 | 5.50 | **-0.63** |
| CB 28 | 0.82 | 1.03 | 0.50 | 70 | 340 | 0 | 9.39 | 3.00 | 2.49 | 1.54 | 1.28 | 12 | RCP | 0.015 | 0.79 | 115 | 1.97 | CB 28 | 1.54 | 0.25 | 0.0025 | 0.29 | 0.10 | 0.01 | 6.36 | 6.80 | **0.44** |
| CB 29 | 0.17 | 0.21 | 0.50 | 110 | 60 | 0 | 7.94 | 3.30 | 2.74 | 0.34 | 0.29 | 12 | RCP | 0.015 | 0.79 | 175 | 0.44 | CB 29 | 0.34 | 0.25 | 0.0001 | 0.02 | 0.90 | 0.00 | 6.38 | 9.80 | **3.42** |
| CB 30 | 0.04 | 0.04 | 0.50 | 45 | 35 | 0 | 6.29 | 3.60 | 2.99 | 0.07 | 0.05 | 12 | RCP | 0.015 | 0.79 | 30 | 0.08 | CB 30 | 0.07 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 6.38 | 10.50 | **4.12** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF G | | 5.82 | 0.50 | 0 | 0 | 170 | 12.90 | 2.65 | 2.20 | 7.71 | 6.40 | | | | | | | OF G | 7.71 | | | | | | **2.00** | | |
| CB 1 | 0.92 | 5.82 | 0.50 | 0 | 0 | 30 | 12.19 | 2.70 | 2.24 | 7.86 | 6.52 | **18** | **PVC** | 0.009 | 1.77 | 170 | 4.45 | CB 1 | 7.86 | 0.38 | 0.0027 | 0.45 | 1.00 | 0.31 | 2.76 | 5.50 | **2.74** |
| CB 2 | 0.74 | 1.66 | 0.50 | 0 | 0 | 160 | 10.53 | 2.90 | 2.41 | 2.40 | 2.00 | **12** | **PVC** | 0.009 | 0.79 | 65 | 3.06 | CB 2 | 2.40 | 0.25 | 0.0022 | 0.14 | 0.10 | 0.01 | 2.92 | 5.50 | **2.58** |
| CB 3 | 0.92 | 0.92 | 0.50 | 140 | 210 | 0 | 9.86 | 2.95 | 2.45 | 1.36 | 1.13 | **12** | **PVC** | 0.009 | 0.79 | 160 | 1.73 | CB 3 | 1.36 | 0.25 | 0.0007 | 0.11 | 0.05 | 0.00 | 3.03 | 5.60 | **2.57** |
| CB 4 | 1.07 | 3.24 | 0.50 | 0 | 0 | 75 | 12.06 | 2.70 | 2.24 | 4.38 | 3.63 | 12 | RCP | 0.015 | 0.79 | 30 | 5.57 | CB 4 | 4.38 | 0.25 | 0.0200 | 0.60 | 0.90 | 0.43 | 3.79 | 5.50 | **1.71** |
| CB 5 | 0.69 | 2.17 | 0.50 | 0 | 0 | 20 | 11.75 | 2.75 | 2.28 | 2.98 | 2.47 | **12** | **PVC** | 0.009 | 0.79 | 75 | 3.79 | CB 5 | 2.98 | 0.25 | 0.0033 | 0.25 | 0.90 | 0.20 | 4.24 | 5.80 | **1.56** |
| CB 6 | 0.88 | 1.48 | 0.50 | 120 | 480 | 0 | 11.67 | 2.75 | 2.28 | 2.04 | 1.69 | **12** | **PVC** | 0.009 | 0.79 | 20 | 2.59 | CB 6 | 2.04 | 0.25 | 0.0016 | 0.03 | 0.90 | 0.09 | 4.37 | 6.00 | **1.63** |
| CB 7 | 0.60 | 0.60 | 0.50 | 125 | 50 | 0 | 8.19 | 3.20 | 2.66 | 0.96 | 0.80 | **12** | **PVC** | 0.009 | 0.79 | 50 | 1.22 | CB 7 | 0.96 | 0.25 | 0.0003 | 0.02 | 0.05 | 0.00 | 4.39 | 5.80 | **1.41** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderate starting water surface elevation of 2.00 NGVD (4.60 MLLW) coincident with $Q_{100}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF H | | 4.23 | 0.50 | 0 | 0 | 140 | 11.13 | 2.80 | 2.32 | 5.92 | 4.91 | | | | | | | OF H | 5.92 | | | | | | **2.00** | | |
| CB 1 | 0.97 | 4.23 | 0.50 | 0 | 0 | 30 | 10.54 | 2.90 | 2.41 | 6.13 | 5.09 | **18** | **PVC** | 0.009 | 1.77 | 140 | 3.47 | CB 1 | 6.13 | 0.38 | 0.0016 | 0.23 | 0.10 | 0.02 | 2.25 | 5.50 | **3.25** |
| CB 2 | 2.04 | 3.26 | 0.50 | 105 | 370 | 0 | 10.42 | 2.90 | 2.41 | 4.72 | 3.92 | 12 | RCP | 0.015 | 0.79 | 30 | 6.01 | CB 2 | 4.72 | 0.25 | 0.0232 | 0.70 | 0.90 | 0.50 | 3.45 | 5.50 | **2.05** |
| CB 3 | 1.21 | 1.21 | 0.50 | 100 | 340 | 0 | 10.06 | 2.95 | 2.45 | 1.79 | 1.48 | 12 | RCP | 0.015 | 0.79 | 65 | 2.27 | CB 3 | 1.79 | 0.25 | 0.0033 | 0.22 | 0.05 | 0.00 | 3.67 | 5.50 | **1.83** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderate starting water surface elevation of 2.00 NGVD (4.60 MLLW) coincident with $Q_{100}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF J | | 4.72 | 0.50 | 0 | 0 | 140 | 12.71 | 2.65 | 2.20 | 6.25 | 5.19 | | | | | | | OF J | 6.25 | | | | | | **2.00** | | |
| CB 1 | 0.58 | 4.72 | 0.50 | 0 | 0 | 110 | 12.13 | 2.70 | 2.24 | 6.37 | 5.29 | **18** | **PVC** | 0.009 | 1.77 | 140 | 3.60 | CB 1 | 6.37 | 0.38 | 0.0018 | 0.25 | 1.00 | 0.20 | 2.45 | 5.50 | **3.05** |
| CB 2 | 0.80 | 0.80 | 0.50 | 140 | 140 | 0 | 9.28 | 3.05 | 2.53 | 1.22 | 1.02 | 12 | RCP | 0.015 | 0.79 | 30 | 1.56 | CB 2 | 1.22 | 0.25 | 0.0016 | 0.05 | 0.05 | 0.00 | 2.50 | 5.50 | **3.00** |
| CB 3 | 0.43 | 3.34 | 0.50 | 0 | 0 | 100 | 11.67 | 2.75 | 2.28 | 4.59 | 3.81 | **18** | **PVC** | 0.009 | 1.77 | 110 | 2.60 | CB 3 | 4.59 | 0.38 | 0.0009 | 0.10 | 0.10 | 0.01 | 2.56 | 5.50 | **2.94** |
| CON 4 | | 2.91 | 0.50 | 0 | 0 | 40 | 11.25 | 2.80 | 2.32 | 4.07 | 3.38 | **12** | **PVC** | 0.009 | 0.79 | 100 | 5.18 | CON 4 | 4.07 | 0.25 | 0.0062 | 0.62 | 1.00 | 0.42 | 3.60 | 5.50 | **1.90** |
| CB 5 | 1.62 | 1.62 | 0.50 | 165 | 210 | 0 | 10.42 | 2.90 | 2.41 | 2.35 | 1.95 | **12** | **PVC** | 0.009 | 0.79 | 25 | 3.00 | CB 5 | 2.35 | 0.25 | 0.0021 | 0.05 | 0.05 | 0.01 | 3.66 | 5.50 | **1.84** |
| CB 6 | 1.29 | 1.29 | 0.50 | 150 | 330 | 0 | 11.08 | 2.85 | 2.37 | 1.83 | 1.52 | **12** | **PVC** | 0.009 | 0.79 | 40 | 2.33 | CB 6 | 1.83 | 0.25 | 0.0013 | 0.05 | 0.05 | 0.00 | 3.65 | 5.50 | **1.85** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderate starting water surface elevation of 2.00 NGVD (4.60 MLLW) coincident with $Q_{100}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF K | | 8.40 | 0.50 | 0 | 0 | 150 | 14.93 | 2.50 | 2.08 | 10.50 | 8.72 | | | | | | | OF K | 10.50 | | | | | | **1.00** | | |
| CB 1 | 0.70 | 8.40 | 0.50 | 0 | 0 | 75 | 14.31 | 2.50 | 2.08 | 10.50 | 8.72 | **18** | **PVC** | 0.009 | 1.77 | 150 | 5.94 | CB 1 | 10.50 | 0.38 | 0.0048 | 0.72 | 1.50 | 0.82 | 2.54 | 4.80 | **2.26** |
| CB 2 | 0.45 | 2.89 | 0.50 | 0 | 0 | 45 | 13.99 | 2.55 | 2.12 | 3.68 | 3.05 | 12 | RCP | 0.015 | 0.79 | 75 | 4.69 | CB 2 | 3.68 | 0.25 | 0.0141 | 1.06 | 0.90 | 0.31 | 3.90 | 4.80 | **0.90** |
| CB 3 | 2.44 | 2.44 | 0.50 | 115 | 750 | 0 | 13.81 | 2.55 | 2.12 | 3.10 | 2.58 | 12 | RCP | 0.015 | 0.79 | 45 | 3.95 | CB 3 | 3.10 | 0.25 | 0.0101 | 0.45 | 0.05 | 0.01 | 4.37 | 4.80 | **0.43** |
| CB 4 | 0.73 | 0.73 | 0.50 | 150 | 190 | 0 | 9.92 | 2.95 | 2.45 | 1.08 | 0.90 | 12 | RCP | 0.015 | 0.79 | 35 | 1.38 | CB 4 | 1.08 | 0.25 | 0.0012 | 0.04 | 0.05 | 0.00 | 2.58 | 4.80 | **2.22** |
| CON 5 | | 4.08 | 0.50 | 0 | 0 | 30 | 11.86 | 2.75 | 2.28 | 5.62 | 4.66 | **18** | **PVC** | 0.009 | 1.77 | 265 | 3.18 | CON 5 | 5.62 | 0.38 | 0.0014 | 0.36 | 1.00 | 0.16 | 3.06 | 5.50 | **2.44** |
| CB 6 | 0.27 | 0.27 | 0.50 | 160 | 50 | 0 | 8.97 | 3.10 | 2.57 | 0.41 | 0.34 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.53 | CB 6 | 0.41 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.06 | 5.50 | **2.44** |
| CB 7 | 0.57 | 3.82 | 0.50 | 0 | 0 | 80 | 11.74 | 2.75 | 2.28 | 5.25 | 4.36 | **18** | **PVC** | 0.009 | 1.77 | 30 | 2.97 | CB 7 | 5.25 | 0.38 | 0.0012 | 0.04 | 0.40 | 0.05 | 3.15 | 5.50 | **2.35** |
| CB 8 | 0.38 | 3.25 | 0.50 | 0 | 0 | 20 | 11.40 | 2.80 | 2.32 | 4.55 | 3.78 | **12** | **PVC** | 0.009 | 0.79 | 80 | 5.80 | CB 8 | 4.55 | 0.25 | 0.0078 | 0.62 | 0.10 | 0.05 | 3.82 | 5.50 | **1.68** |
| CON 9 | | 2.87 | 0.50 | 0 | 0 | 100 | 11.32 | 2.80 | 2.32 | 4.02 | 3.33 | **12** | **PVC** | 0.009 | 0.79 | 20 | 5.11 | CON 9 | 4.02 | 0.25 | 0.0061 | 0.12 | 1.00 | 0.41 | 4.35 | 5.50 | **1.15** |
| CB 10 | 0.48 | 0.48 | 0.50 | 160 | 70 | 0 | 9.14 | 3.05 | 2.53 | 0.73 | 0.61 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.93 | CB 10 | 0.73 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 4.36 | 5.50 | **1.14** |
| CON 11 | | 2.39 | 0.50 | 0 | 0 | 10 | 10.90 | 2.85 | 2.37 | 3.41 | 2.83 | **12** | **PVC** | 0.009 | 0.79 | 100 | 4.34 | CON 11 | 3.41 | 0.25 | 0.0044 | 0.44 | 1.00 | 0.29 | 5.08 | 5.50 | **0.42** |
| CB 12 | 1.00 | 1.00 | 0.50 | 110 | 330 | 0 | 10.19 | 2.95 | 2.45 | 1.47 | 1.22 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.87 | CB 12 | 1.47 | 0.25 | 0.0008 | 0.02 | 0.05 | 0.00 | 5.10 | 5.50 | **0.40** |
| CB 13 | 0.90 | 1.39 | 0.50 | 170 | 250 | 0 | 10.86 | 2.85 | 2.37 | 1.99 | 1.65 | **12** | **PVC** | 0.009 | 0.79 | 10 | 2.53 | CB 13 | 1.99 | 0.25 | 0.0015 | 0.01 | 0.10 | 0.01 | 5.10 | 5.50 | **0.40** |
| CB 14 | 0.49 | 0.49 | 0.50 | 170 | 70 | 0 | 9.36 | 3.00 | 2.49 | 0.74 | 0.62 | **12** | **PVC** | 0.009 | 0.79 | 315 | 0.94 | CB 14 | 0.74 | 0.25 | 0.0002 | 0.06 | 0.90 | 0.01 | 5.18 | 5.50 | **0.32** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

**Trib L**
**PROPOSED IMPROVEMENTS (with $Q_{100}$)**

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF L | | 10.03 | 0.50 | 0 | 0 | 140 | 14.26 | 2.55 | 2.12 | 12.79 | 10.62 | | | | | | | OF L | 12.79 | | | | | | **2.00** | | |
| CB 1 | 0.99 | 10.03 | 0.50 | 0 | 0 | 70 | 13.67 | 2.60 | 2.16 | 13.04 | 10.83 | **24** | **PVC** | 0.009 | 3.14 | 140 | 4.15 | CB 1 | 13.04 | 0.50 | 0.0016 | 0.22 | 1.00 | 0.27 | 2.49 | 5.00 | **2.51** |
| CB 2 | 1.42 | 4.42 | 0.50 | 0 | 0 | 45 | 13.38 | 2.60 | 2.16 | 5.74 | 4.77 | **18** | **PVC** | 0.009 | 1.77 | 70 | 3.25 | CB 2 | 5.74 | 0.38 | 0.0014 | 0.10 | 0.90 | 0.15 | 2.74 | 5.50 | **2.76** |
| CB 3 | 1.19 | 3.00 | 0.50 | 0 | 0 | 20 | 13.19 | 2.65 | 2.20 | 3.97 | 3.30 | 12 | RCP | 0.015 | 0.79 | 45 | 5.06 | CB 3 | 3.97 | 0.25 | 0.0165 | 0.74 | 0.90 | 0.36 | 3.84 | 5.50 | **1.66** |
| CB 4 | 0.24 | 1.81 | 0.50 | 0 | 0 | 60 | 13.11 | 2.65 | 2.20 | 2.40 | 1.99 | **12** | **PVC** | 0.009 | 0.79 | 20 | 3.05 | CB 4 | 2.40 | 0.25 | 0.0022 | 0.04 | 0.90 | 0.13 | 4.01 | 5.50 | **1.49** |
| CB 5 | 1.57 | 1.57 | 0.50 | 110 | 650 | 0 | 12.86 | 2.65 | 2.20 | 2.08 | 1.73 | **12** | **PVC** | 0.009 | 0.79 | 60 | 2.65 | CB 5 | 2.08 | 0.25 | 0.0016 | 0.10 | 0.25 | 0.03 | 4.13 | 5.50 | **1.37** |
| MH 6 | | 4.62 | 0.50 | 0 | 0 | 110 | 12.78 | 2.65 | 2.20 | 6.12 | 5.08 | **18** | **PVC** | 0.009 | 1.77 | 40 | 3.47 | MH 6 | 6.12 | 0.38 | 0.0016 | 0.06 | 0.10 | 0.02 | 2.57 | 5.50 | **2.93** |
| CB 7 | 0.48 | 4.62 | 0.50 | 0 | 0 | 20 | 12.33 | 2.70 | 2.24 | 6.24 | 5.18 | **18** | **PVC** | 0.009 | 1.77 | 110 | 3.53 | CB 7 | 6.24 | 0.38 | 0.0017 | 0.19 | 0.40 | 0.08 | 2.84 | 5.50 | **2.66** |
| CON 8 | | 4.14 | 0.50 | 0 | 0 | 265 | 12.24 | 2.70 | 2.24 | 5.59 | 4.64 | **18** | **PVC** | 0.009 | 1.77 | 20 | 3.17 | CON 8 | 5.59 | 0.38 | 0.0014 | 0.03 | 1.00 | 0.16 | 3.02 | 5.50 | **2.48** |
| CB 9 | 1.44 | 2.84 | 0.50 | 0 | 0 | 30 | 11.14 | 2.80 | 2.32 | 3.97 | 3.30 | **12** | **PVC** | 0.009 | 0.79 | 265 | 5.06 | CB 9 | 3.97 | 0.25 | 0.0059 | 1.57 | 0.90 | 0.36 | 4.95 | 6.50 | **1.55** |
| CB 10 | 1.40 | 1.40 | 0.50 | 115 | 415 | 0 | 11.01 | 2.85 | 2.37 | 1.99 | 1.66 | 12 | RCP | 0.015 | 0.79 | 30 | 2.54 | CB 10 | 1.99 | 0.25 | 0.0041 | 0.12 | 0.05 | 0.01 | 5.07 | 6.50 | **1.43** |
| CB 11 | 1.31 | 1.31 | 0.50 | 115 | 250 | 0 | 9.64 | 3.00 | 2.49 | 1.96 | 1.63 | **18** | **PVC** | 0.009 | 1.77 | 30 | 1.11 | CB 11 | 1.96 | 0.38 | 0.0002 | 0.00 | 0.05 | 0.00 | 3.02 | 5.50 | **2.48** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderate starting water surface elevation of 2.00 NGVD (4.60 MLLW) coincident with $Q_{100}$.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF M | | 13.49 | 0.50 | 0 | 0 | 145 | 14.97 | 2.50 | 2.08 | 16.86 | 13.99 | | | | | | | OF M | 16.86 | | | | | | **1.00** | | |
| CB 1 | 1.12 | 13.49 | 0.50 | 0 | 0 | 45 | 14.36 | 2.50 | 2.08 | 16.86 | 13.99 | 24 | RCP | 0.015 | 3.14 | 145 | 5.37 | CB 1 | 16.86 | 0.50 | 0.0074 | 1.07 | 0.10 | 0.04 | 2.11 | 5.50 | **3.39** |
| CON 2 | | 12.37 | 0.50 | 0 | 0 | 5 | 14.17 | 2.55 | 2.12 | 15.77 | 13.09 | 24 | RCP | 0.015 | 3.14 | 45 | 5.02 | CON 2 | 15.77 | 0.50 | 0.0064 | 0.29 | 1.00 | 0.39 | 2.79 | 5.50 | **2.71** |
| CB 3 | 1.20 | 10.79 | 0.50 | 0 | 0 | 240 | 14.15 | 2.55 | 2.12 | 13.76 | 11.42 | 24 | RCP | 0.015 | 3.14 | 5 | 4.38 | CB 3 | 13.76 | 0.50 | 0.0049 | 0.02 | 0.40 | 0.12 | 2.94 | 5.50 | **2.56** |
| CB 4 | 0.75 | 1.58 | 0.50 | 0 | 0 | 60 | 9.47 | 3.00 | 2.49 | 2.37 | 1.97 | 12 | RCP | 0.015 | 0.79 | 225 | 3.02 | CB 4 | 2.37 | 0.25 | 0.0059 | 1.32 | 0.40 | 0.06 | 4.16 | 5.50 | **1.34** |
| CB 5 | 0.83 | 0.83 | 0.50 | 130 | 160 | 0 | 9.22 | 3.05 | 2.53 | 1.27 | 1.05 | 12 | RCP | 0.015 | 0.79 | 60 | 1.62 | CB 5 | 1.27 | 0.25 | 0.0017 | 0.10 | 0.05 | 0.00 | 4.27 | 5.50 | **1.23** |
| CB 6 | 0.75 | 9.59 | 0.50 | 0 | 0 | 165 | 13.15 | 2.65 | 2.20 | 12.70 | 10.54 | 24 | RCP | 0.015 | 3.14 | 240 | 4.04 | CB 6 | 12.70 | 0.50 | 0.0042 | 1.00 | 1.00 | 0.25 | 4.19 | 6.90 | **2.71** |
| CB 7 | 1.05 | 2.85 | 0.50 | 120 | 420 | 0 | 11.17 | 2.80 | 2.32 | 3.98 | 3.31 | 15 | RCP | 0.015 | 1.23 | 45 | 3.25 | CB 7 | 3.98 | 0.31 | 0.0050 | 0.23 | 0.90 | 0.15 | 4.57 | 5.80 | **1.23** |
| CB 8 | 0.68 | 1.80 | 0.50 | 0 | 0 | 240 | 9.88 | 2.95 | 2.45 | 2.65 | 2.20 | 12 | RCP | 0.015 | 0.79 | 40 | 3.38 | CB 8 | 2.65 | 0.25 | 0.0073 | 0.29 | 1.40 | 0.25 | 5.11 | 5.80 | **0.69** |
| CB 9 | 0.52 | 1.12 | 0.50 | 0 | 0 | 30 | 8.88 | 3.10 | 2.57 | 1.74 | 1.44 | **12** | **PVC** | 0.009 | 0.79 | 240 | 2.21 | CB 9 | 1.74 | 0.25 | 0.0011 | 0.27 | 1.40 | 0.11 | 5.49 | 6.50 | **1.01** |
| CB 10 | 0.60 | 0.60 | 0.50 | 120 | 130 | 0 | 8.75 | 3.10 | 2.57 | 0.93 | 0.77 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.18 | CB 10 | 0.93 | 0.25 | 0.0003 | 0.01 | 0.05 | 0.00 | 5.50 | 6.50 | **1.00** |
| MH 11 | | 5.99 | 0.50 | 0 | 0 | 120 | 12.47 | 2.70 | 2.24 | 8.09 | 6.71 | **18** | **PVC** | 0.009 | 1.77 | 165 | 4.58 | MH 11 | 8.09 | 0.38 | 0.0028 | 0.47 | 0.40 | 0.13 | 4.79 | 6.70 | **1.91** |
| CB 12 | 0.73 | 5.99 | 0.50 | 0 | 0 | 30 | 11.97 | 2.75 | 2.28 | 8.24 | 6.84 | **18** | **PVC** | 0.009 | 1.77 | 120 | 4.66 | CB 12 | 8.24 | 0.38 | 0.0029 | 0.35 | 1.00 | 0.34 | 5.48 | 5.80 | **0.32** |
| CB 13 | 0.48 | 0.64 | 0.50 | 110 | 220 | 0 | 9.28 | 3.05 | 2.53 | 0.97 | 0.81 | 12 | RCP | 0.015 | 0.79 | 40 | 1.24 | CB 13 | 0.97 | 0.25 | 0.0010 | 0.04 | 0.90 | 0.02 | 5.54 | 6.20 | **0.66** |
| CB 14 | 0.16 | 0.16 | 0.50 | 85 | 40 | 0 | 7.22 | 3.40 | 2.82 | 0.27 | 0.23 | **12** | **PVC** | 0.009 | 0.79 | 50 | 0.35 | CB 14 | 0.27 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 5.54 | 6.50 | **0.96** |
| CON 15 | | 4.62 | 0.50 | 0 | 0 | 80 | 11.84 | 2.75 | 2.28 | 6.35 | 5.27 | **18** | **PVC** | 0.009 | 1.77 | 30 | 3.60 | CON 15 | 6.35 | 0.38 | 0.0017 | 0.05 | 1.00 | 0.20 | 5.73 | 6.90 | **1.17** |
| CB 16 | 0.51 | 0.51 | 0.50 | 120 | 140 | 0 | 8.83 | 3.10 | 2.57 | 0.80 | 0.66 | **18** | **PVC** | 0.009 | 1.77 | 40 | 0.45 | CB 16 | 0.80 | 0.38 | 0.0000 | 0.00 | 0.05 | 0.00 | 5.73 | 5.80 | **0.07** |
| CB 17 | 0.76 | 4.11 | 0.50 | 0 | 0 | 120 | 11.51 | 2.80 | 2.32 | 5.75 | 4.77 | **18** | **PVC** | 0.009 | 1.77 | 80 | 3.25 | CB 17 | 5.75 | 0.38 | 0.0014 | 0.11 | 0.10 | 0.02 | 5.86 | 6.50 | **0.64** |
| CON 18 | | 3.35 | 0.50 | 0 | 0 | 70 | 11.01 | 2.85 | 2.37 | 4.77 | 3.96 | **18** | **PVC** | 0.009 | 1.77 | 120 | 2.70 | CON 18 | 4.77 | 0.38 | 0.0010 | 0.12 | 1.00 | 0.11 | 6.09 | 6.50 | **0.41** |
| CB 19 | 0.90 | 0.90 | 0.50 | 110 | 300 | 0 | 9.94 | 2.95 | 2.45 | 1.33 | 1.10 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.69 | CB 19 | 1.33 | 0.25 | 0.0007 | 0.02 | 0.05 | 0.00 | 6.11 | 6.50 | **0.39** |
| CB 20 | 0.22 | 2.45 | 0.50 | 0 | 0 | 35 | 10.72 | 2.85 | 2.37 | 3.49 | 2.90 | **18** | **PVC** | 0.009 | 1.77 | 70 | 1.97 | CB 20 | 3.49 | 0.38 | 0.0005 | 0.04 | 0.10 | 0.01 | 6.13 | 6.50 | **0.37** |
| CB 21 | 0.55 | 2.23 | 0.50 | 0 | 0 | 230 | 10.57 | 2.90 | 2.41 | 3.23 | 2.68 | 12 | RCP | 0.015 | 0.79 | 35 | 4.11 | CB 21 | 3.23 | 0.25 | 0.0109 | 0.38 | 0.10 | 0.03 | 6.54 | 6.50 | **-0.04** |
| CB 22 | 0.84 | 1.68 | 0.50 | 110 | 260 | 0 | 9.61 | 3.00 | 2.49 | 2.52 | 2.09 | 12 | RCP | 0.015 | 0.79 | 230 | 3.21 | CB 22 | 2.52 | 0.25 | 0.0066 | 1.53 | 0.40 | 0.06 | 8.13 | 7.00 | **-1.13** |
| CB 23 | 0.34 | 0.84 | 0.50 | 0 | 0 | 100 | 9.03 | 3.05 | 2.53 | 1.28 | 1.06 | **12** | **PVC** | 0.009 | 0.79 | 35 | 1.63 | CB 23 | 1.28 | 0.25 | 0.0006 | 0.02 | 0.40 | 0.02 | 8.17 | 7.50 | **-0.67** |
| CB 24 | 0.51 | 0.51 | 0.50 | 110 | 140 | 0 | 8.61 | 3.15 | 2.61 | 0.80 | 0.66 | **12** | **PVC** | 0.009 | 0.79 | 100 | 1.01 | CB 24 | 0.80 | 0.25 | 0.0002 | 0.02 | 0.05 | 0.00 | 8.19 | 7.50 | **-0.69** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF N | | 6.73 | 0.50 | 0 | 0 | 150 | 12.22 | 2.70 | 2.24 | 9.08 | 7.54 | | | | | | | OF N | 9.08 | | | | | | **2.00** | | |
| CB 1 | 0.81 | 6.73 | 0.50 | 0 | 0 | 15 | 11.59 | 2.80 | 2.32 | 9.42 | 7.82 | **24** | **PVC** | 0.009 | 3.14 | 150 | 3.00 | CB 1 | 9.42 | 0.50 | 0.0008 | 0.12 | 0.40 | 0.06 | 2.18 | 4.80 | **2.62** |
| CON 2 | | 5.91 | 0.50 | 0 | 0 | 40 | 11.53 | 2.80 | 2.32 | 8.28 | 6.87 | **18** | **PVC** | 0.009 | 1.77 | 15 | 4.69 | CON 2 | 8.28 | 0.38 | 0.0030 | 0.04 | 1.50 | 0.51 | 2.74 | 5.80 | **3.06** |
| CB 3 | 0.72 | 1.13 | 0.50 | 130 | 165 | 0 | 9.26 | 3.05 | 2.53 | 1.72 | 1.43 | 12 | RCP | 0.015 | 0.79 | 175 | 2.19 | CB 3 | 1.72 | 0.25 | 0.0031 | 0.54 | 0.90 | 0.07 | 3.34 | 5.00 | **1.66** |
| CB 4 | 0.41 | 0.41 | 0.50 | 110 | 150 | 0 | 8.69 | 3.15 | 2.61 | 0.64 | 0.53 | **12** | **PVC** | 0.009 | 0.79 | 45 | 0.82 | CB 4 | 0.64 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 3.35 | 5.50 | **2.15** |
| CB 5 | 2.82 | 3.86 | 0.50 | 110 | 470 | 0 | 11.36 | 2.80 | 2.32 | 5.41 | 4.49 | **18** | **PVC** | 0.009 | 1.77 | 40 | 3.06 | CB 5 | 5.41 | 0.38 | 0.0013 | 0.05 | 0.90 | 0.13 | 2.92 | 5.00 | **2.08** |
| CB 6 | 1.04 | 1.04 | 0.50 | 110 | 340 | 0 | 10.28 | 2.90 | 2.41 | 1.51 | 1.26 | 12 | RCP | 0.015 | 0.79 | 45 | 1.93 | CB 6 | 1.51 | 0.25 | 0.0024 | 0.11 | 0.05 | 0.00 | 3.03 | 5.50 | **2.47** |
| CB 7 | 0.92 | 0.92 | 0.50 | 130 | 200 | 0 | 9.56 | 3.00 | 2.49 | 1.38 | 1.15 | 12 | RCP | 0.015 | 0.79 | 265 | 1.76 | CB 7 | 1.38 | 0.25 | 0.0020 | 0.53 | 0.05 | 0.00 | 3.27 | 5.00 | **1.73** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed moderate starting water surface elevation of 2.00 NGVD (4.60 MLLW) coincident with $Q_{100}$.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}^2$ | $L_{paved}^2$ | $L_{pipe}^2$ | $t_c^3$ | $I_{100}^4$ | $I_{25}^4$ | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $POC^1$ | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | $POC^1$ | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF P | | 8.33 | 0.50 | 0 | 0 | 140 | 12.88 | 2.65 | 2.20 | 11.04 | 9.16 | | | | | | | OF P | 11.04 | | | | | | **1.00** | | |
| CB 1 | 2.48 | 8.33 | 0.50 | 0 | 0 | 30 | 12.30 | 2.70 | 2.24 | 11.25 | 9.34 | **18** | **PVC** | 0.009 | 1.77 | 140 | 6.36 | CB 1 | 11.25 | 0.38 | 0.0055 | 0.77 | 0.40 | 0.25 | 2.02 | 3.50 | **1.48** |
| CON 2 | | 5.85 | 0.50 | 0 | 0 | 25 | 12.17 | 2.70 | 2.24 | 7.90 | 6.56 | 15 | RCP | 0.015 | 1.23 | 30 | 6.44 | CON 2 | 7.90 | 0.31 | 0.0198 | 0.59 | 1.00 | 0.64 | 3.25 | 5.20 | **1.95** |
| CB 3 | 2.58 | 4.72 | 0.50 | 110 | 555 | 0 | 12.07 | 2.70 | 2.24 | 6.38 | 5.29 | 15 | RCP | 0.015 | 1.23 | 25 | 5.20 | CB 3 | 6.38 | 0.31 | 0.0129 | 0.32 | 0.05 | 0.02 | 3.60 | 4.50 | **0.90** |
| CB 4 | 1.13 | 1.13 | 0.50 | 115 | 400 | 0 | 10.89 | 2.85 | 2.37 | 1.61 | 1.33 | **12** | **PVC** | 0.009 | 0.79 | 185 | 2.04 | CB 4 | 1.61 | 0.25 | 0.0010 | 0.18 | 0.90 | 0.06 | 3.49 | 5.50 | **2.01** |
| CB 5 | 2.15 | 2.15 | 0.50 | 120 | 450 | 0 | 11.42 | 2.80 | 2.32 | 3.00 | 2.49 | 12 | RCP | 0.015 | 0.79 | 50 | 3.83 | CB 5 | 3.00 | 0.25 | 0.0094 | 0.47 | 0.05 | 0.01 | 4.08 | 4.50 | **0.42** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF Q | | 15.07 | 0.50 | 0 | 0 | 170 | 16.53 | 2.35 | 1.95 | 17.71 | 14.70 | | | | | | | OF Q | 17.71 | | | | | | **1.00** | | |
| CB 1 | 1.00 | 15.07 | 0.50 | 0 | 0 | 45 | 15.82 | 2.40 | 1.99 | 18.09 | 15.01 | **30** | **PVC** | 0.009 | 4.91 | 170 | 3.68 | CB 1 | 18.09 | 0.63 | 0.0009 | 0.16 | 1.00 | 0.21 | 1.37 | 4.70 | **3.33** |
| CB 2 | 0.82 | 0.82 | 0.50 | 140 | 200 | 0 | 9.78 | 3.00 | 2.49 | 1.23 | 1.02 | **12** | **PVC** | 0.009 | 0.79 | 85 | 1.57 | CB 2 | 1.23 | 0.25 | 0.0006 | 0.05 | 0.05 | 0.00 | 1.42 | 3.50 | **2.08** |
| CB 3 | 0.26 | 13.25 | 0.50 | 0 | 0 | 265 | 15.63 | 2.40 | 1.99 | 15.89 | 13.19 | 16"x25" | CMP | 0.024 | 2.78 | 45 | 5.72 | CB 3 | 15.89 | 6.83 | 0.0007 | 0.03 | 1.50 | 0.76 | 2.16 | 4.50 | **2.34** |
| CB 4 | 1.36 | 1.36 | 0.50 | 110 | 470 | 0 | 11.36 | 2.80 | 2.32 | 1.91 | 1.58 | **12** | **PVC** | 0.009 | 0.79 | 65 | 2.43 | CB 4 | 1.91 | 0.25 | 0.0014 | 0.09 | 0.05 | 0.00 | 2.25 | 4.00 | **1.75** |
| CB 5 | 0.11 | 2.14 | 0.50 | 0 | 0 | 90 | 12.10 | 2.70 | 2.24 | 2.89 | 2.40 | 12 | RCP | 0.015 | 0.79 | 40 | 3.69 | CB 5 | 2.89 | 0.25 | 0.0087 | 0.35 | 1.00 | 0.21 | 2.72 | 5.50 | **2.78** |
| CB 6 | 0.24 | 0.24 | 0.50 | 125 | 0 | 0 | 7.78 | 3.30 | 2.74 | 0.40 | 0.33 | 12 | RCP | 0.015 | 0.79 | 120 | 0.51 | CB 6 | 0.40 | 0.25 | 0.0002 | 0.02 | 0.05 | 0.00 | 2.74 | 6.00 | **3.26** |
| CB 7 | 1.79 | 1.79 | 0.50 | 250 | 140 | 0 | 11.72 | 2.75 | 2.28 | 2.47 | 2.05 | 12 | RCP | 0.015 | 0.79 | 90 | 3.14 | CB 7 | 2.47 | 0.25 | 0.0063 | 0.57 | 0.05 | 0.01 | 3.30 | 5.50 | **2.20** |
| CB 8 | 0.18 | 9.48 | 0.50 | 0 | 0 | 150 | 14.53 | 2.50 | 2.08 | 11.85 | 9.83 | **24** | **PVC** | 0.009 | 3.14 | 265 | 3.77 | CB 8 | 11.85 | 0.50 | 0.0013 | 0.35 | 1.00 | 0.22 | 2.73 | 6.50 | **3.77** |
| CB 9 | 1.30 | 2.91 | 0.50 | 0 | 0 | 60 | 10.15 | 2.95 | 2.45 | 4.29 | 3.56 | 15 | RCP | 0.015 | 1.23 | 115 | 3.50 | CB 9 | 4.29 | 0.31 | 0.0058 | 0.67 | 0.40 | 0.08 | 3.48 | 5.50 | **2.02** |
| CON 10 | | 1.61 | 0.50 | 0 | 0 | 130 | 9.90 | 2.95 | 2.45 | 2.38 | 1.97 | 12 | RCP | 0.015 | 0.79 | 60 | 3.03 | CON 10 | 2.38 | 0.25 | 0.0059 | 0.35 | 1.00 | 0.14 | 3.97 | 5.50 | **1.53** |
| CB 11 | 0.16 | 0.16 | 0.50 | 20 | 100 | 0 | 6.28 | 3.60 | 2.99 | 0.29 | 0.24 | **12** | **PVC** | 0.009 | 0.79 | 35 | 0.37 | CB 11 | 0.29 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.97 | 5.50 | **1.53** |
| CON 12 | | 1.45 | 0.50 | 0 | 0 | 15 | 9.35 | 3.00 | 2.49 | 2.18 | 1.81 | 12 | RCP | 0.015 | 0.79 | 130 | 2.77 | CON 12 | 2.18 | 0.25 | 0.0049 | 0.64 | 1.00 | 0.12 | 4.73 | 7.20 | **2.47** |
| CB 13 | 0.44 | 0.44 | 0.50 | 125 | 100 | 0 | 8.61 | 3.15 | 2.61 | 0.70 | 0.58 | **12** | **PVC** | 0.009 | 0.79 | 75 | 0.89 | CB 13 | 0.70 | 0.25 | 0.0002 | 0.01 | 0.05 | 0.00 | 4.75 | 6.50 | **1.75** |
| CON 14 | | 1.01 | 0.50 | 0 | 0 | 60 | 9.29 | 3.05 | 2.53 | 1.53 | 1.27 | 12 | RCP | 0.015 | 0.79 | 15 | 1.95 | CON 14 | 1.53 | 0.25 | 0.0025 | 0.04 | 1.00 | 0.06 | 4.83 | 7.50 | **2.67** |
| CB 15 | 0.18 | 0.18 | 0.50 | 120 | 60 | 0 | 8.17 | 3.20 | 2.66 | 0.28 | 0.23 | 12 | RCP | 0.015 | 0.79 | 15 | 0.36 | CB 15 | 0.28 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 4.83 | 6.50 | **1.67** |
| CB 16 | 0.21 | 0.83 | 0.50 | 0 | 0 | 130 | 9.04 | 3.05 | 2.53 | 1.27 | 1.05 | **12** | **PVC** | 0.009 | 0.79 | 60 | 1.61 | CB 16 | 1.27 | 0.25 | 0.0006 | 0.04 | 0.40 | 0.02 | 4.88 | 6.50 | **1.62** |
| CB 17 | 0.62 | 0.62 | 0.50 | 120 | 100 | 0 | 8.50 | 3.15 | 2.61 | 0.97 | 0.81 | **12** | **PVC** | 0.009 | 0.79 | 130 | 1.24 | CB 17 | 0.97 | 0.25 | 0.0004 | 0.05 | 0.05 | 0.00 | 4.93 | 6.50 | **1.57** |
| CON 18 | | 6.38 | 0.50 | 0 | 0 | 45 | 13.90 | 2.55 | 2.12 | 8.14 | 6.75 | **18** | **PVC** | 0.009 | 1.77 | 150 | 4.61 | CON 18 | 8.14 | 0.38 | 0.0029 | 0.43 | 1.00 | 0.33 | 3.49 | 6.50 | **3.01** |
| CB 19 | 0.26 | 0.75 | 0.50 | 0 | 0 | 55 | 7.48 | 3.40 | 2.82 | 1.28 | 1.06 | **12** | **PVC** | 0.009 | 0.79 | 25 | 1.63 | CB 19 | 1.28 | 0.25 | 0.0006 | 0.02 | 0.90 | 0.04 | 3.54 | 6.30 | **2.76** |
| CB 20 | 0.49 | 0.49 | 0.50 | 90 | 30 | 0 | 7.25 | 3.40 | 2.82 | 0.83 | 0.69 | **12** | **PVC** | 0.009 | 0.79 | 55 | 1.06 | CB 20 | 0.83 | 0.25 | 0.0003 | 0.01 | 0.05 | 0.00 | 3.55 | 6.10 | **2.55** |
| CB 21 | 0.56 | 5.63 | 0.50 | 0 | 0 | 160 | 13.72 | 2.60 | 2.16 | 7.32 | 6.07 | **18** | **PVC** | 0.009 | 1.77 | 45 | 4.14 | CB 21 | 7.32 | 0.38 | 0.0023 | 0.10 | 1.40 | 0.37 | 3.96 | 5.80 | **1.84** |
| CB 22 | 1.94 | 1.94 | 0.50 | 120 | 260 | 0 | 9.83 | 2.95 | 2.45 | 2.86 | 2.37 | 12 | RCP | 0.015 | 0.79 | 135 | 3.64 | CB 22 | 2.86 | 0.25 | 0.0085 | 1.15 | 0.05 | 0.01 | 5.12 | 5.50 | **0.38** |
| CON 23 | | 3.13 | 0.50 | 0 | 0 | 65 | 13.05 | 2.65 | 2.20 | 4.15 | 3.44 | 12 | RCP | 0.015 | 0.79 | 160 | 5.28 | CON 23 | 4.15 | 0.25 | 0.0180 | 2.87 | 1.00 | 0.43 | 7.27 | 7.50 | **0.23** |
| CB 24 | 0.91 | 0.91 | 0.50 | 175 | 0 | 0 | 8.89 | 3.10 | 2.57 | 1.40 | 1.17 | **12** | **PVC** | 0.009 | 0.79 | 75 | 1.79 | CB 24 | 1.40 | 0.25 | 0.0007 | 0.06 | 0.05 | 0.00 | 7.33 | 7.20 | **-0.13** |
| CB 25 | 2.22 | 2.22 | 0.50 | 575 | 0 | 0 | 12.78 | 2.65 | 2.20 | 2.95 | 2.45 | 12 | RCP | 0.015 | 0.79 | 65 | 3.75 | CB 25 | 2.95 | 0.25 | 0.0091 | 0.59 | 0.05 | 0.01 | 7.87 | 8.00 | **0.13** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by proposed pump station.

| Tributary POC[1] | Trib Area ac | Cumulative Area, ac | C Value | $L_{landscape}$[2] ft | $L_{paved}$[2] ft | $L_{pipe}$[2] ft | $t_c$[3] min | $I_{100}$[4] in/hr | $I_{25}$[4] in/hr | $Q_{100}$ $ft^3/s$ | $Q_{25}$ $ft^3/s$ | Diameter in | Pipe Material | n | Area sf | Length ft | $Velocity_{100}$ fps | Tributary POC[1] | $Q_{100}$ $ft^3/s$ | Hydraulic Radius | Hydraulic Slope | Friction Loss | k | Minor Loss | WS Elev** | Rim/Grate Elev | **Delta ft** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF R | | 6.65 | 0.50 | 0 | 0 | 115 | 12.17 | 2.70 | 2.24 | 8.97 | 7.45 | | | | | | | OF R | 8.97 | | | | | | **1.00** | | |
| CB 1 | 0.68 | 6.65 | 0.50 | 0 | 0 | 150 | 11.69 | 2.75 | 2.28 | 9.14 | 7.59 | **18** | **PVC** | 0.009 | 1.77 | 115 | 5.17 | CB 1 | 9.14 | 0.38 | 0.0036 | 0.42 | 1.00 | 0.42 | 1.83 | 3.50 | **1.67** |
| CB 2 | 0.31 | 2.63 | 0.50 | 0 | 0 | 45 | 10.16 | 2.95 | 2.45 | 3.88 | 3.22 | 15 | RCP | 0.015 | 1.23 | 40 | 3.16 | CB 2 | 3.88 | 0.31 | 0.0048 | 0.19 | 0.90 | 0.14 | 2.16 | 3.50 | **1.34** |
| CON 3 | | 2.32 | 0.50 | 0 | 0 | 160 | 9.97 | 2.95 | 2.45 | 3.42 | 2.84 | 15 | RCP | 0.015 | 1.23 | 45 | 2.79 | CON 3 | 3.42 | 6.83 | 0.0001 | 0.00 | 1.00 | 0.12 | 2.28 | 3.50 | **1.22** |
| CB 4 | 0.32 | 0.32 | 0.50 | 100 | 90 | 0 | 7.97 | 3.30 | 2.74 | 0.53 | 0.44 | 15 | RCP | 0.015 | 1.23 | 35 | 0.44 | CB 4 | 0.53 | 0.31 | 0.0001 | 0.00 | 0.05 | 0.00 | 2.29 | 3.50 | **1.21** |
| CB 5 | 0.35 | 1.99 | 0.50 | 0 | 0 | 190 | 9.31 | 3.00 | 2.49 | 2.99 | 2.48 | **12** | **PVC** | 0.009 | 0.79 | 160 | 3.81 | CB 5 | 2.99 | 0.25 | 0.0034 | 0.54 | 1.00 | 0.23 | 3.05 | 4.00 | **0.95** |
| CB 6 | 0.31 | 0.31 | 0.50 | 100 | 60 | 0 | 7.72 | 3.30 | 2.74 | 0.52 | 0.43 | **12** | **PVC** | 0.009 | 0.79 | 30 | 0.66 | CB 6 | 0.52 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 3.05 | 4.00 | **0.95** |
| CB 7 | 0.66 | 1.33 | 0.50 | 0 | 0 | 30 | 8.51 | 3.15 | 2.61 | 2.10 | 1.74 | **12** | **PVC** | 0.009 | 0.79 | 190 | 2.67 | CB 7 | 2.10 | 0.25 | 0.0017 | 0.31 | 0.90 | 0.10 | 3.46 | 4.00 | **0.54** |
| CB 8 | 0.67 | 0.67 | 0.50 | 100 | 140 | 0 | 8.39 | 3.20 | 2.66 | 1.07 | 0.89 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.36 | CB 8 | 1.07 | 0.25 | 0.0004 | 0.01 | 0.05 | 0.00 | 3.48 | 4.00 | **0.52** |
| CON 9 | | 3.34 | 0.50 | 0 | 0 | 30 | 11.07 | 2.85 | 2.37 | 4.76 | 3.95 | **18** | **PVC** | 0.009 | 1.77 | 150 | 2.70 | CON 9 | 4.76 | 0.38 | 0.0010 | 0.15 | 1.00 | 0.11 | 2.09 | 3.50 | **1.41** |
| CB 10 | 0.32 | 0.32 | 0.50 | 115 | 30 | 0 | 7.81 | 3.30 | 2.74 | 0.53 | 0.44 | **12** | **PVC** | 0.009 | 0.79 | 15 | 0.67 | CB 10 | 0.53 | 0.25 | 0.0001 | 0.00 | 0.05 | 0.00 | 2.09 | 3.50 | **1.41** |
| CON 11 | | 3.02 | 0.50 | 0 | 0 | 15 | 10.94 | 2.85 | 2.37 | 4.31 | 3.57 | **12** | **PVC** | 0.009 | 0.79 | 30 | 5.48 | CON 11 | 4.31 | 0.25 | 0.0070 | 0.21 | 1.50 | 0.70 | 3.00 | 3.50 | **0.50** |
| CB 12 | 0.78 | 2.05 | 0.50 | 0 | 0 | 65 | 10.88 | 2.85 | 2.37 | 2.91 | 2.42 | **12** | **PVC** | 0.009 | 0.79 | 15 | 3.71 | CB 12 | 2.91 | 0.25 | 0.0032 | 0.05 | 0.90 | 0.19 | 3.24 | 3.50 | **0.26** |
| CB 13 | 1.27 | 1.27 | 0.50 | 140 | 300 | 0 | 10.61 | 2.90 | 2.41 | 1.84 | 1.53 | **12** | **PVC** | 0.009 | 0.79 | 65 | 2.34 | CB 13 | 1.84 | 0.25 | 0.0013 | 0.08 | 0.05 | 0.00 | 3.33 | 3.50 | **0.17** |
| CB 14 | 0.20 | 0.20 | 0.50 | 110 | 75 | 0 | 8.07 | 3.20 | 2.66 | 0.31 | 0.26 | **12** | **PVC** | 0.009 | 0.79 | 15 | 0.40 | CB 14 | 0.31 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.00 | 3.50 | **0.50** |
| CON 15 | | 0.78 | 0.50 | 0 | 0 | 65 | 8.38 | 3.20 | 2.66 | 1.25 | 1.04 | **12** | **PVC** | 0.009 | 0.79 | 140 | 1.59 | CON 15 | 1.25 | 0.25 | 0.0006 | 0.08 | 1.00 | 0.04 | 3.12 | 4.00 | **0.88** |
| CB 16 | 0.21 | 0.21 | 0.50 | 110 | 60 | 0 | 7.94 | 3.30 | 2.74 | 0.35 | 0.29 | **12** | **PVC** | 0.009 | 0.79 | 15 | 0.45 | CB 16 | 0.35 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 3.12 | 4.00 | **0.88** |
| CB 17 | 0.57 | 0.57 | 0.50 | 110 | 80 | 0 | 8.11 | 3.20 | 2.66 | 0.91 | 0.75 | **12** | **PVC** | 0.009 | 0.79 | 65 | 1.16 | CB 17 | 0.91 | 0.25 | 0.0003 | 0.02 | 0.05 | 0.00 | 3.14 | 4.00 | **0.86** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by existing San Clemente Creek Pump Station.

**Trib S**
**PROPOSED IMPROVEMENTS (with $Q_{100}$)**

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$[2] | $L_{paved}$[2] | $L_{pipe}$[2] | $t_c$[3] | $I_{100}$[4] | $I_{25}$[4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF S | | 3.39 | 0.50 | 0 | 0 | 35 | 11.97 | 2.75 | 2.28 | 4.66 | 3.87 | | | | | | | OF S | 4.66 | | | | | | **1.00** | | |
| CB 1 | 0.23 | 3.39 | 0.50 | 0 | 0 | 40 | 11.82 | 2.75 | 2.28 | 4.66 | 3.87 | 12 | RCP | 0.015 | 0.79 | 35 | 5.93 | CB 1 | 4.66 | 0.25 | 0.0226 | 0.79 | 0.10 | 0.05 | 1.85 | 4.00 | **2.15** |
| CB 2 | 0.62 | 3.16 | 0.50 | 0 | 0 | 120 | 11.65 | 2.75 | 2.28 | 4.34 | 3.61 | 12 | RCP | 0.015 | 0.79 | 40 | 5.53 | CB 2 | 4.34 | 0.25 | 0.0197 | 0.79 | 0.90 | 0.43 | 3.06 | 4.00 | **0.94** |
| CB 3 | 1.18 | 2.54 | 0.50 | 0 | 0 | 40 | 11.15 | 2.80 | 2.32 | 3.56 | 2.95 | **12** | **PVC** | 0.009 | 0.79 | 120 | 4.53 | CB 3 | 3.56 | 6.83 | 0.0001 | 0.01 | 0.90 | 0.29 | 3.36 | 4.00 | **0.64** |
| CB 4 | 1.36 | 1.36 | 0.50 | 110 | 425 | 0 | 10.99 | 2.85 | 2.37 | 1.94 | 1.61 | **12** | **PVC** | 0.009 | 0.79 | 40 | 2.47 | CB 4 | 1.94 | 0.25 | 0.0014 | 0.06 | 0.05 | 0.00 | 3.42 | 4.00 | **0.58** |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by existing San Clemente Creek Pump Station.

| Tributary | Trib Area | Cumulative | C | $L_{landscape}$ [2] | $L_{paved}$ [2] | $L_{pipe}$ [2] | $t_c$ [3] | $I_{100}$ [4] | $I_{25}$ [4] | $Q_{100}$ | $Q_{25}$ | Diameter | Pipe | n | Area | Length | $Velocity_{100}$ | Tributary | $Q_{100}$ | Hydraulic | Hydraulic | Friction | k | Minor | WS | Rim/Grate | **Delta** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POC[1] | ac | Area, ac | Value | ft | ft | ft | min | in/hr | in/hr | $ft^3/s$ | $ft^3/s$ | in | Material | | sf | ft | fps | POC[1] | $ft^3/s$ | Radius | Slope | Loss | | Loss | Elev** | Elev | **ft** |
| OF T1 | | 1.14 | 0.50 | 0 | 0 | 130 | 8.82 | 3.10 | 2.57 | 1.76 | 1.46 | | | | | | | OF T1 | 1.76 | | | | | | **1.00** | | |
| CB 1 | 0.45 | 1.14 | 0.50 | 0 | 0 | 30 | 8.28 | 3.20 | 2.66 | 1.82 | 1.51 | **12** | **PVC** | 0.009 | 0.79 | 130 | 2.32 | CB 1 | 1.82 | 0.25 | 0.0012 | 0.16 | 0.90 | 0.07 | 1.24 | 6.50 | **5.26** |
| CB 2 | 0.33 | 0.69 | 0.50 | 0 | 0 | 40 | 8.15 | 3.20 | 2.66 | 1.10 | 0.91 | **12** | **PVC** | 0.009 | 0.79 | 30 | 1.40 | CB 2 | 1.10 | 0.25 | 0.0005 | 0.01 | 0.90 | 0.03 | 1.28 | 6.50 | **5.22** |
| CB 3 | 0.17 | 0.35 | 0.50 | 0 | 0 | 50 | 7.99 | 3.30 | 2.74 | 0.58 | 0.48 | **12** | **PVC** | 0.009 | 0.79 | 40 | 0.74 | CB 3 | 0.58 | 6.83 | 0.0000 | 0.00 | 1.40 | 0.01 | 1.29 | 6.50 | **5.21** |
| CB 4 | 0.18 | 0.18 | 0.50 | 110 | 40 | 0 | 7.78 | 3.30 | 2.74 | 0.30 | 0.25 | **12** | **PVC** | 0.009 | 0.79 | 50 | 0.38 | CB 4 | 0.30 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 1.29 | 6.50 | **5.21** |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OF T2 | | 1.18 | 0.50 | 0 | 0 | 145 | 9.47 | 3.00 | 2.49 | 1.77 | 1.47 | | | | | | | OF T2 | 1.77 | | | | | | **1.00** | | |
| CB 6 | 0.40 | 1.18 | 0.50 | 0 | 0 | 120 | 8.86 | 3.10 | 2.57 | 1.83 | 1.52 | 12 | CMP | 0.024 | 0.79 | 145 | 2.32 | CB 6 | 1.83 | 0.25 | 0.0089 | 1.29 | 0.90 | 0.08 | 2.37 | 6.50 | **4.13** |
| CB 5 | 0.43 | 0.78 | 0.50 | 0 | 0 | 90 | 8.36 | 3.20 | 2.66 | 1.25 | 1.04 | **12** | **PVC** | 0.009 | 0.79 | 120 | 1.59 | CB 5 | 1.25 | 0.25 | 0.0006 | 0.07 | 0.10 | 0.00 | 2.44 | 6.50 | **4.06** |
| CB 3 | 0.18 | 0.35 | 0.50 | 0 | 0 | 50 | 7.99 | 3.30 | 2.74 | 0.58 | 0.48 | **12** | **PVC** | 0.009 | 0.79 | 90 | 0.74 | CB 3 | 0.58 | 0.25 | 0.0001 | 0.01 | 1.00 | 0.01 | 2.46 | 6.50 | **4.04** |
| CB 4 | 0.17 | 0.17 | 0.50 | 110 | 40 | 0 | 7.78 | 3.30 | 2.74 | 0.29 | 0.24 | **12** | **PVC** | 0.009 | 0.79 | 50 | 0.36 | CB 4 | 0.29 | 0.25 | 0.0000 | 0.00 | 0.05 | 0.00 | 2.46 | 6.50 | **4.04** |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Notes:
1. POC = Point of Concentration
2. Average velocity: Landscape = 0.75 fps, Pavement = 2 fps, Pipe = 4 fps.
3. Initial Time of Concentration for Buildings = 5 minutes. 5 minutes minimum for all areas.
4. Intensity based on 25-Year and 100-Year Design Storm from Caltrans Intensity Curves.
** Assumed starting water surface elevation of 1.00 NGVD controlled by existing San Clemente Creek Pump Station.