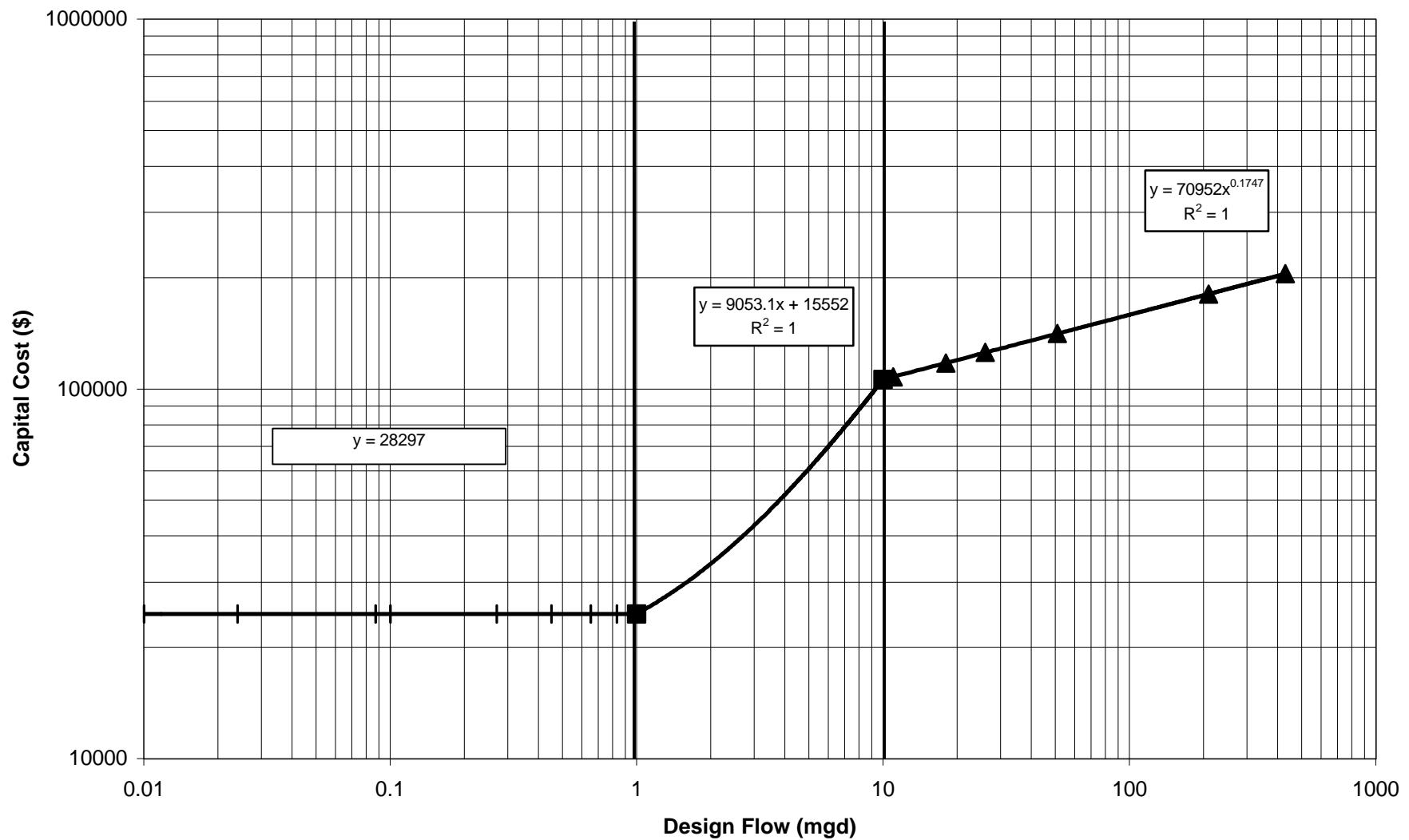
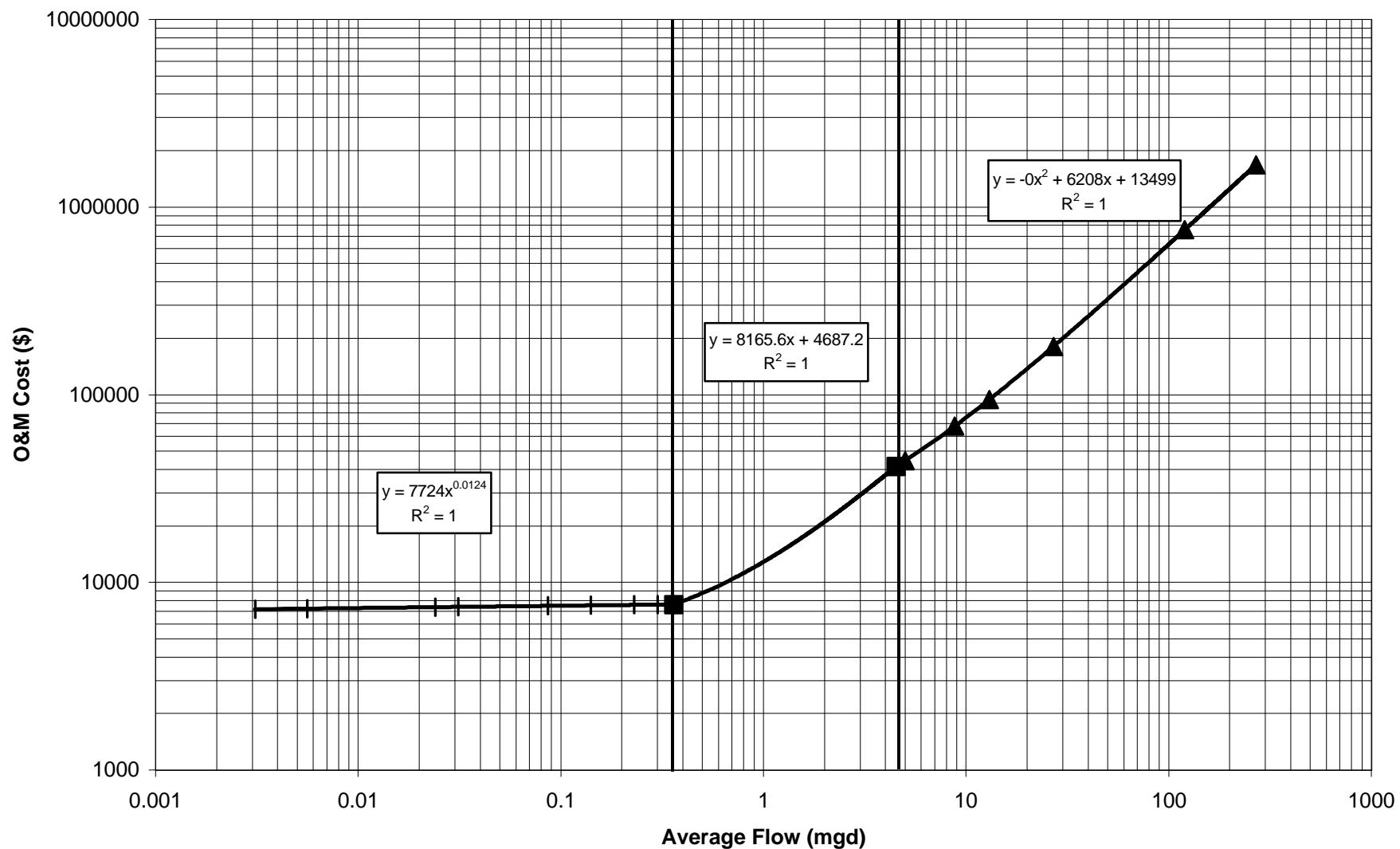


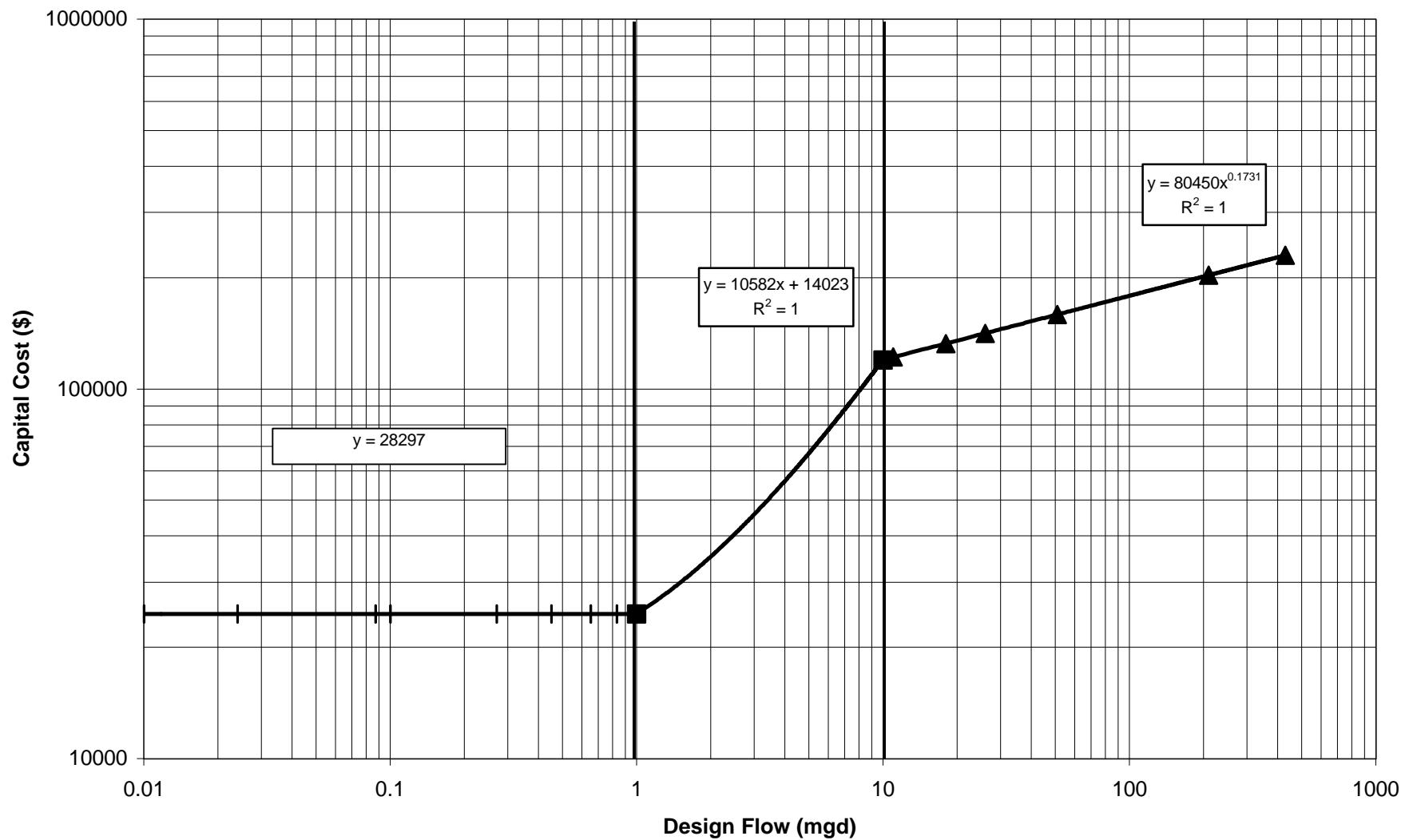
**Figure 3-1**  
**Preoxidation - 1.5 mg/L Permanganate**  
**Capital Costs**



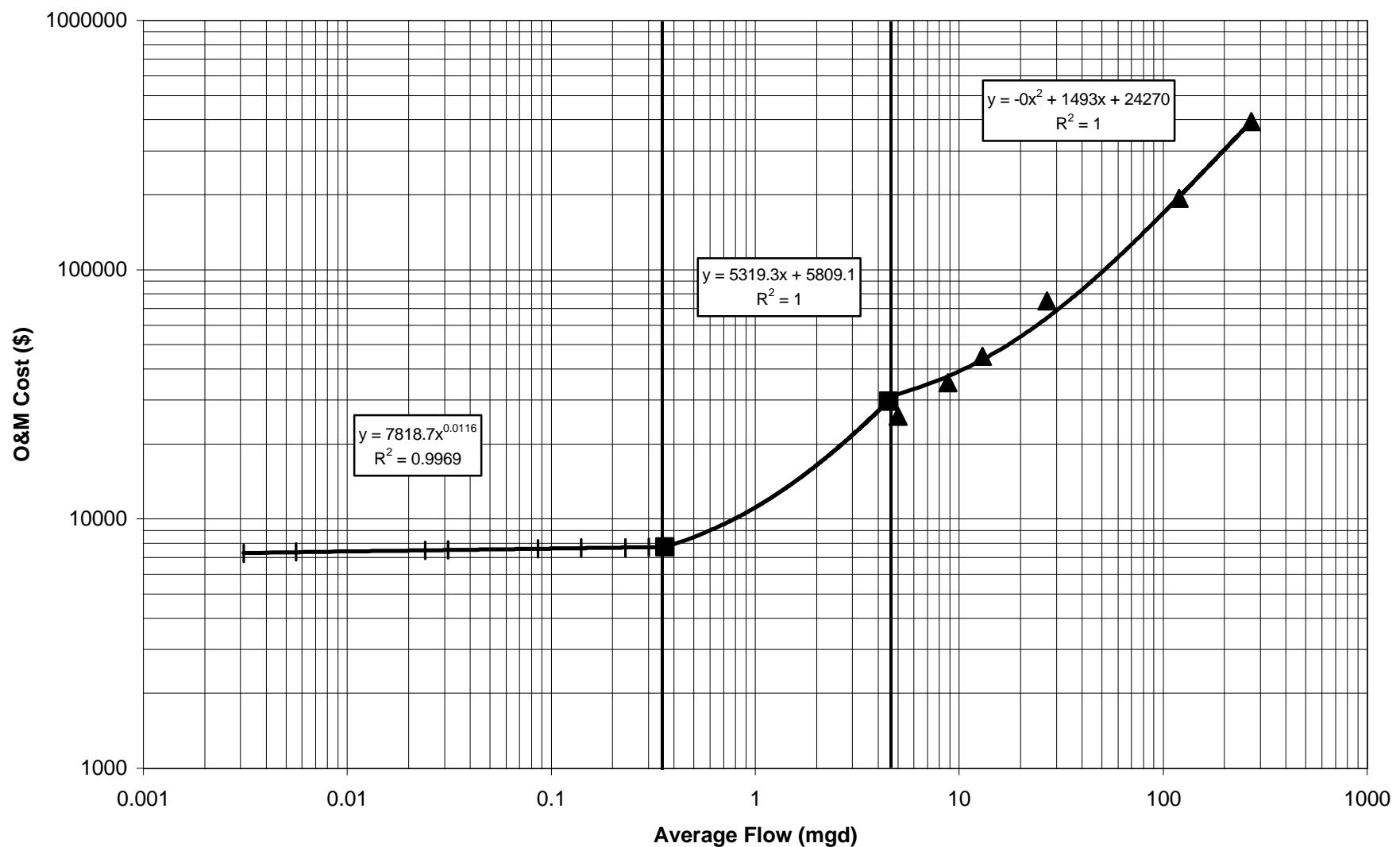
**Figure 3-2**  
**Preoxidation - 1.5 mg/L Permanganate**  
**O&M Costs**



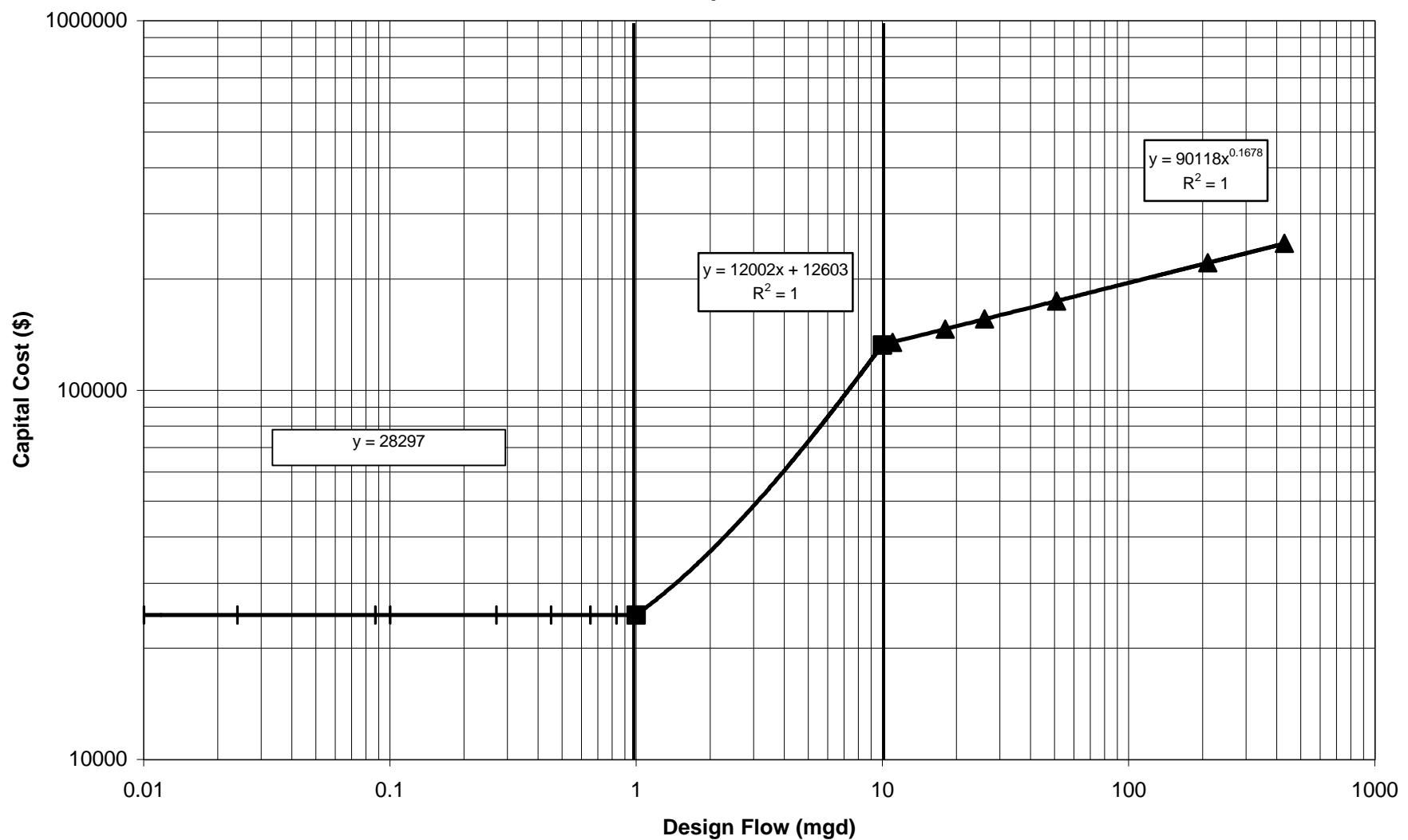
**Figure 3-3**  
**Preoxidation - 3.0 mg/L Permanganate**  
**Capital Costs**



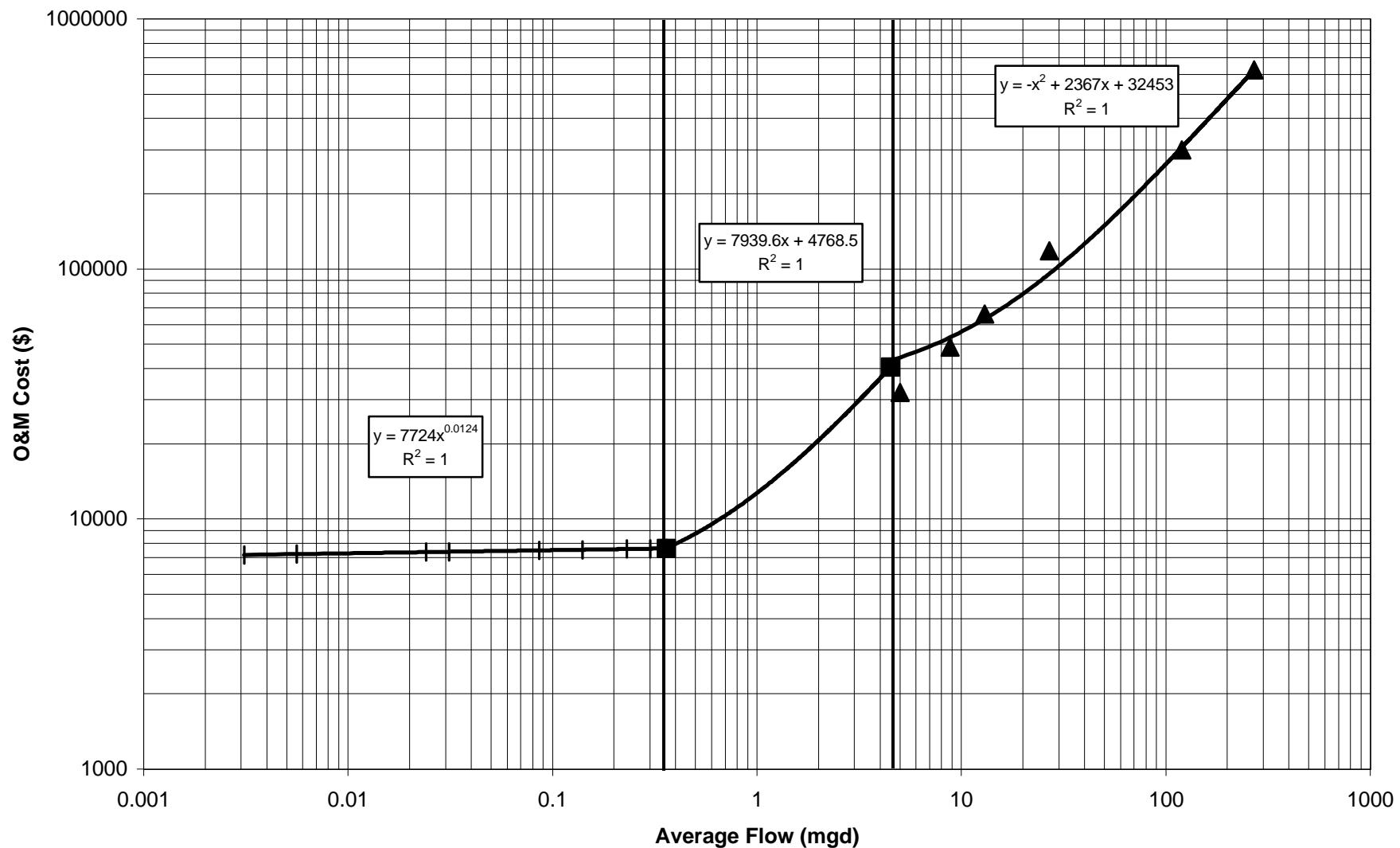
**Figure 3-4**  
**Preoxidation - 3.0 mg/L Permanganate**  
**O&M Costs**



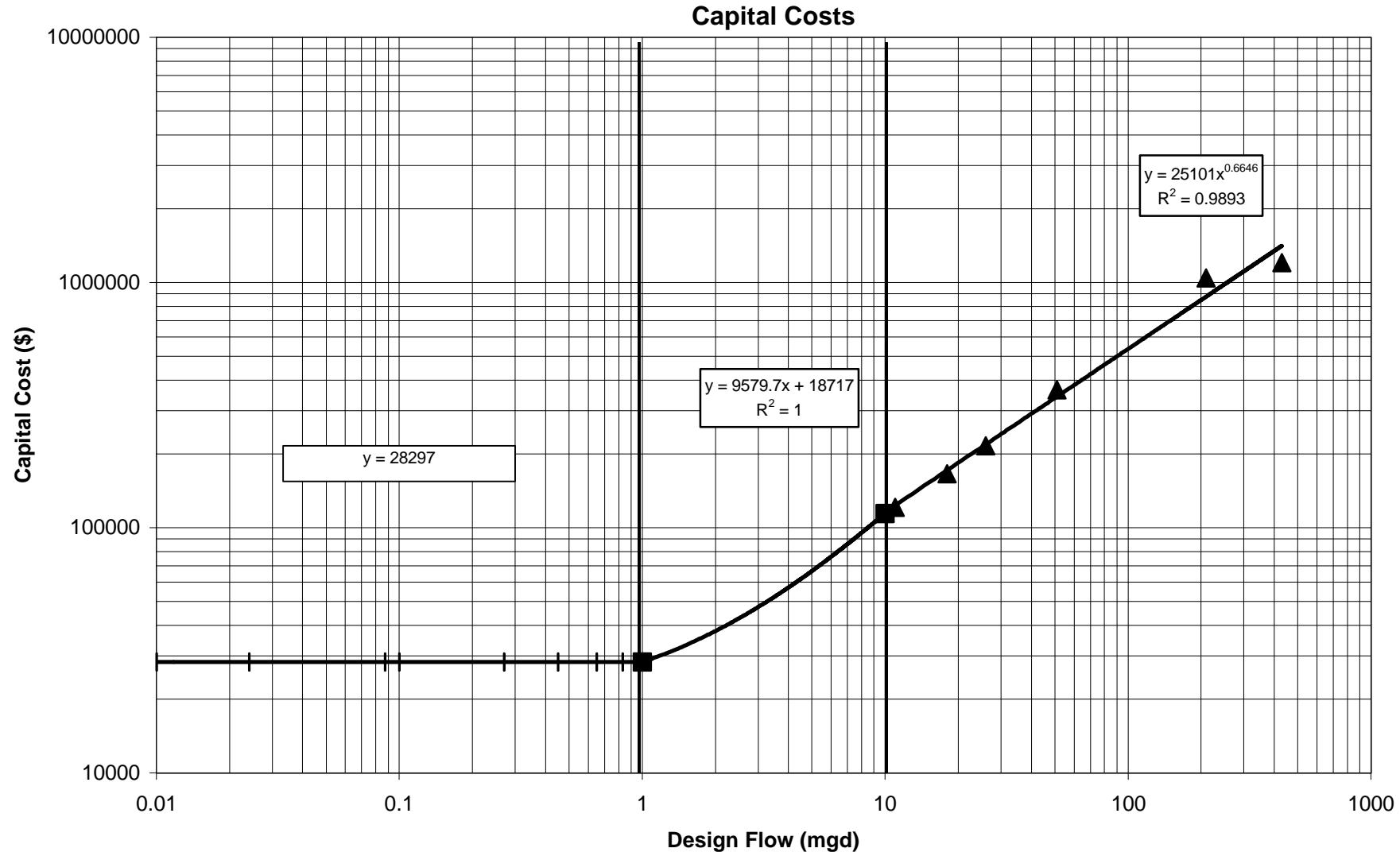
**Figure 3-5**  
**Preoxidation - 5.0 mg/L Permanganate**  
**Capital Costs**



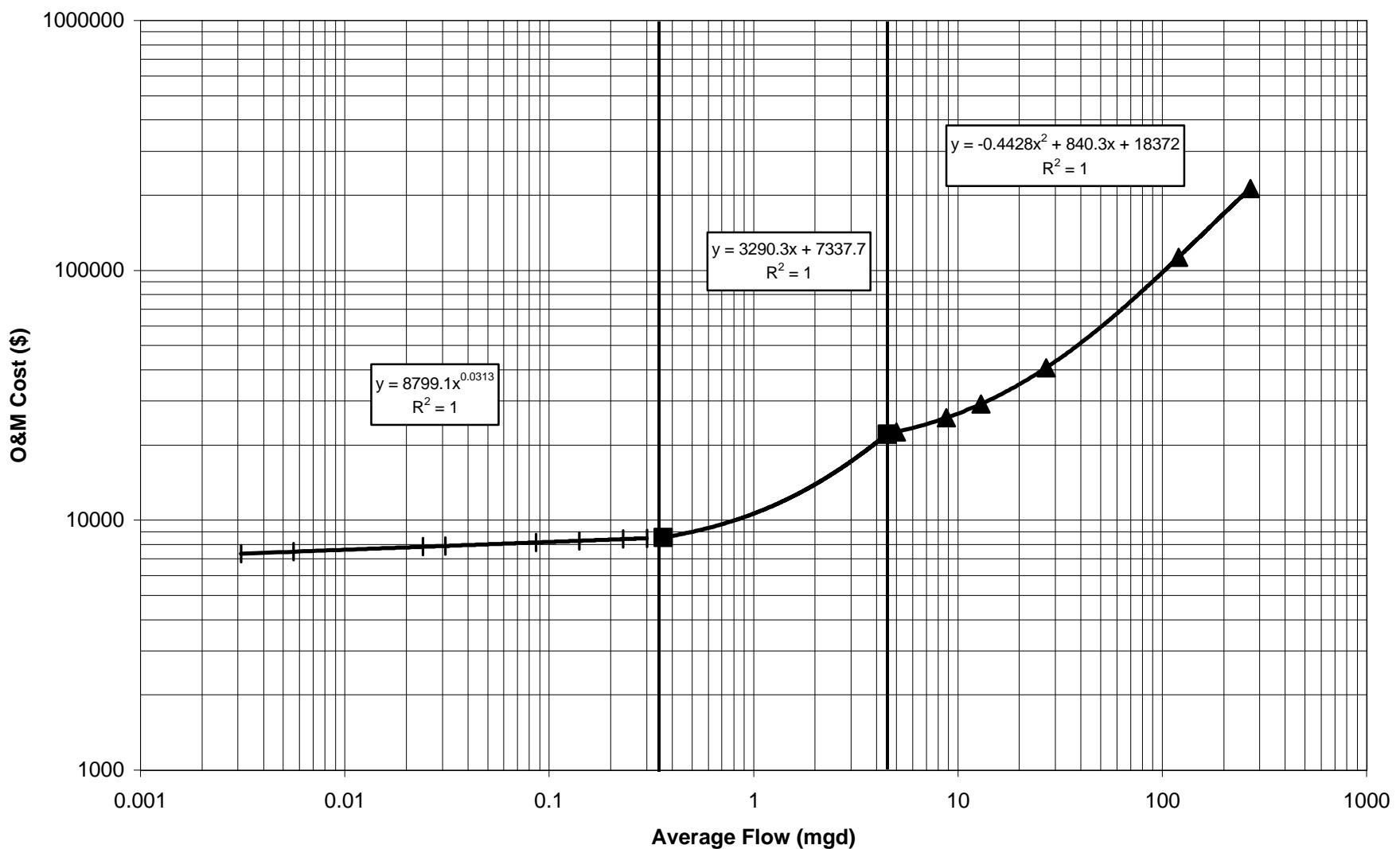
**Figure 3-6**  
**Preoxidation - 5.0 mg/L Permanganate**  
**O&M Costs**



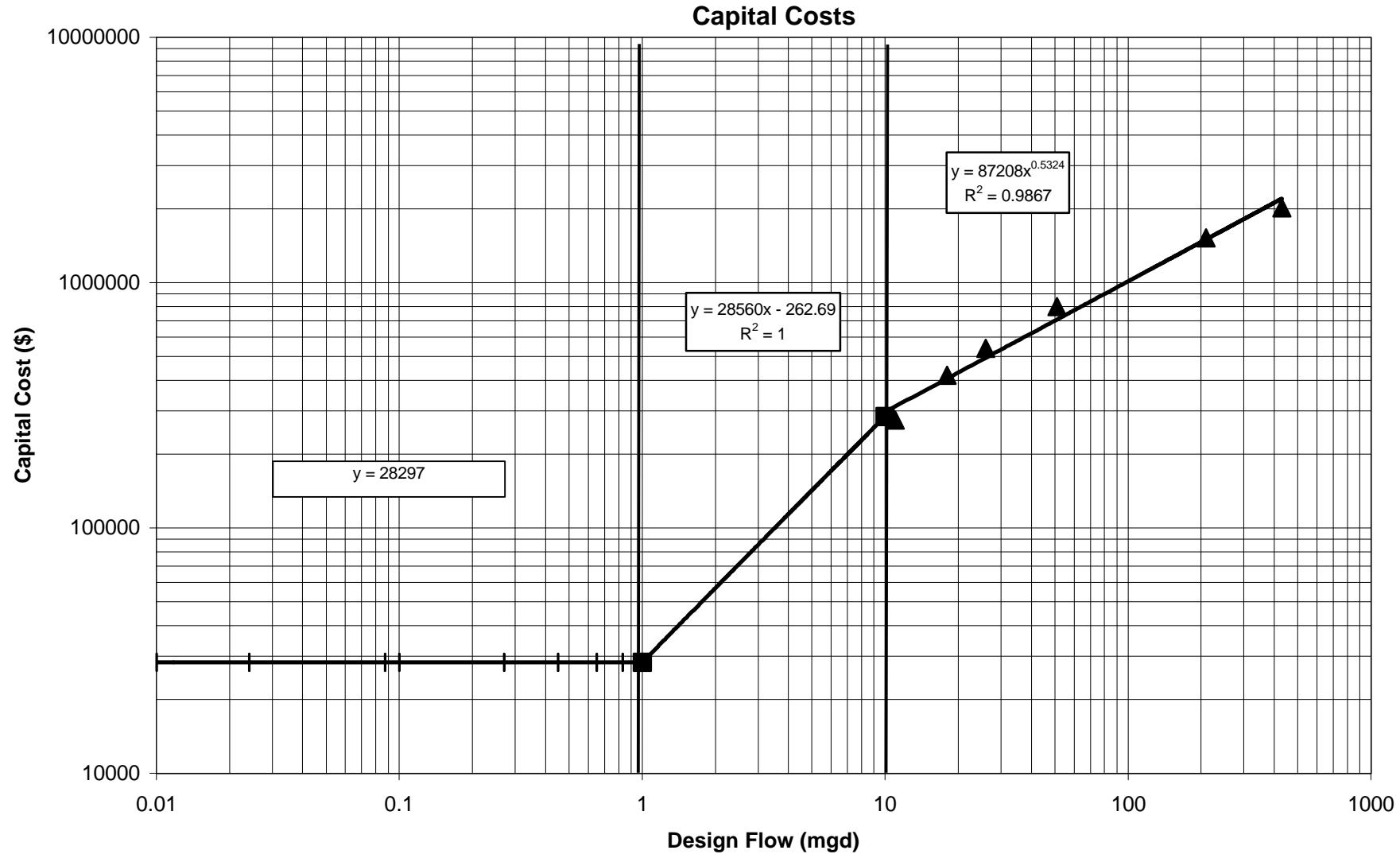
**Figure 3-7**  
**Preoxidation - 1.5 mg/L Chlorine**



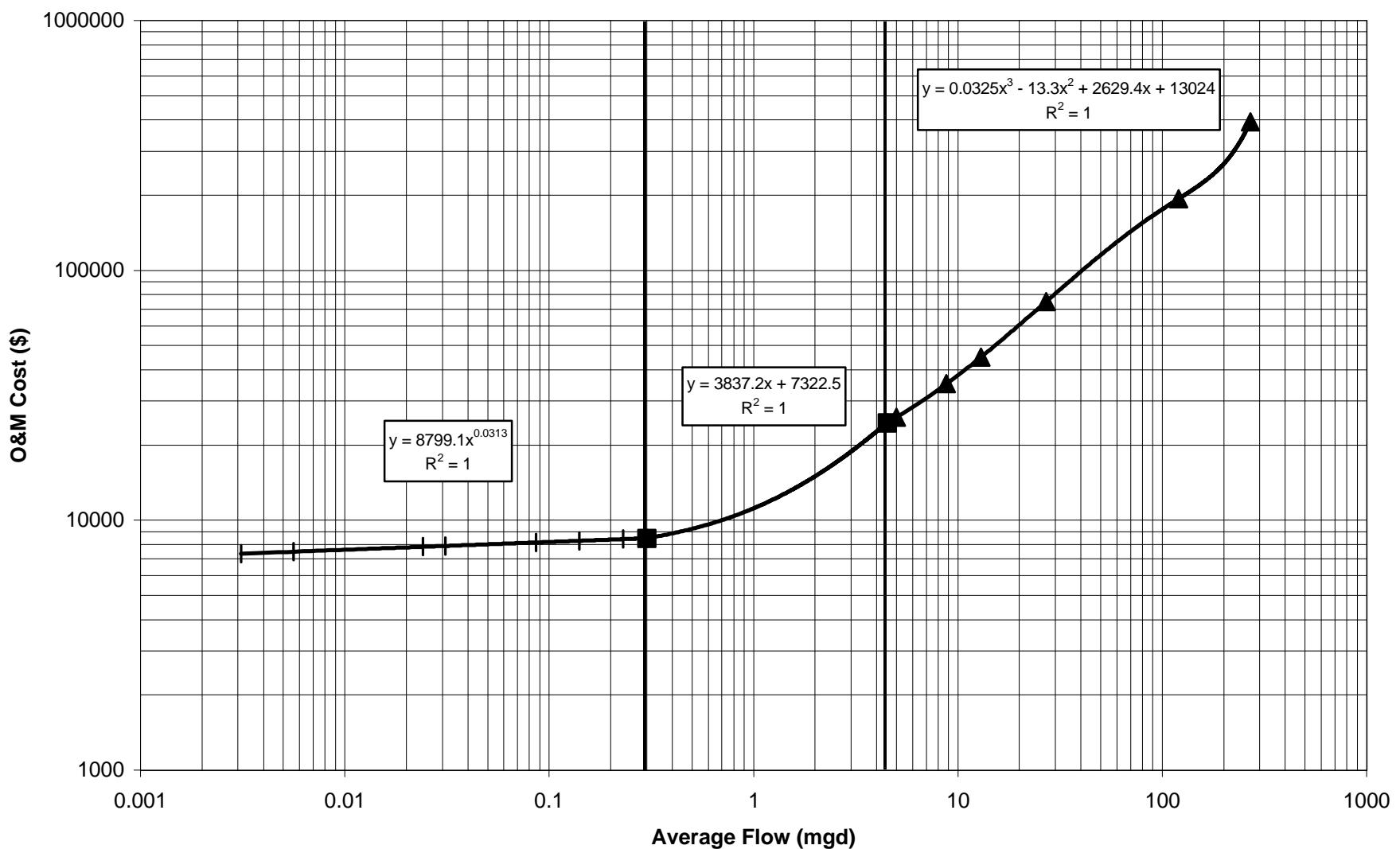
**Figure 3-8**  
**Preoxidation - 1.5 mg/L Chlorine**  
**O&M Costs**



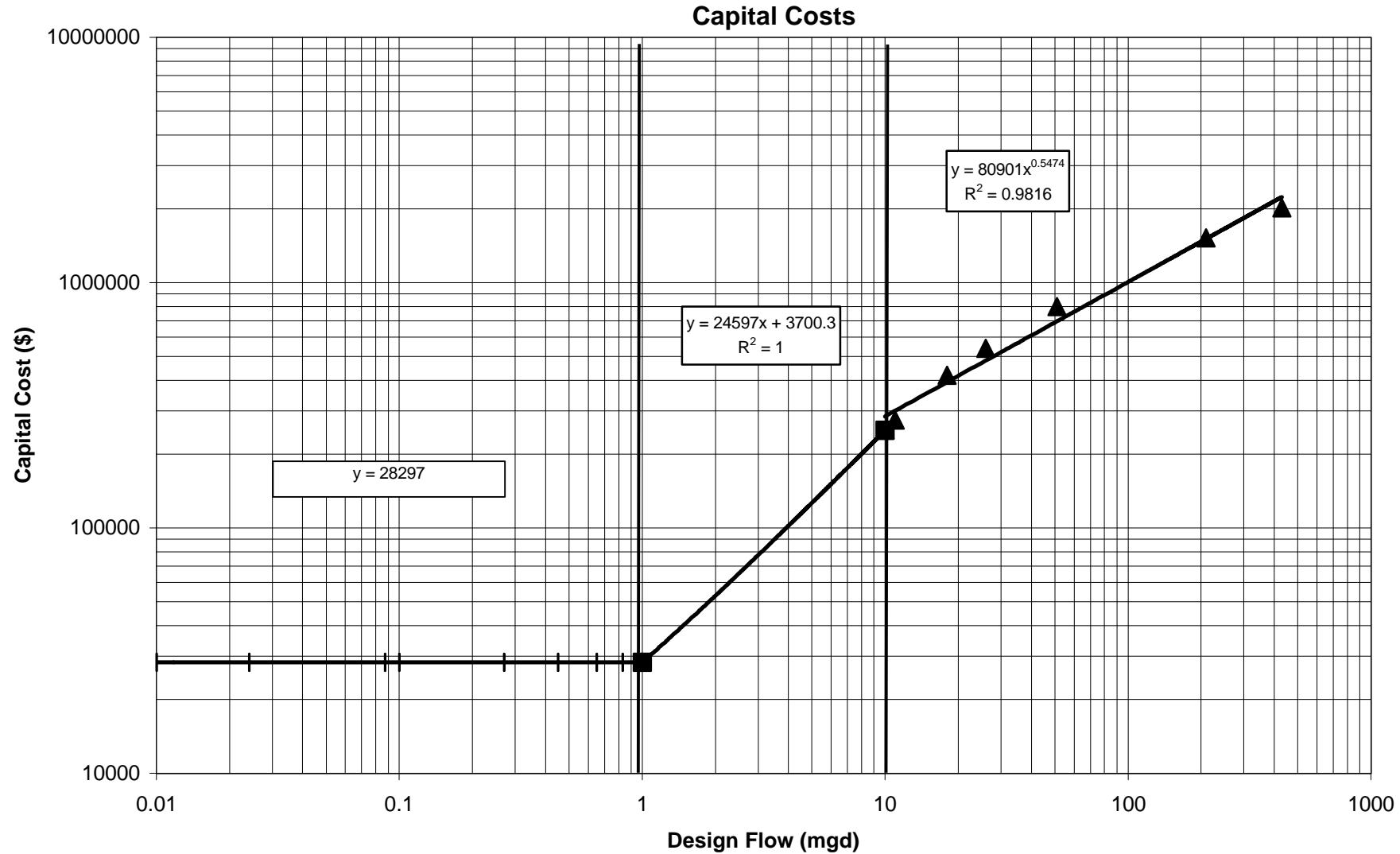
**Figure 3-9**  
**Preoxidation - 3.0 mg/L Chlorine**



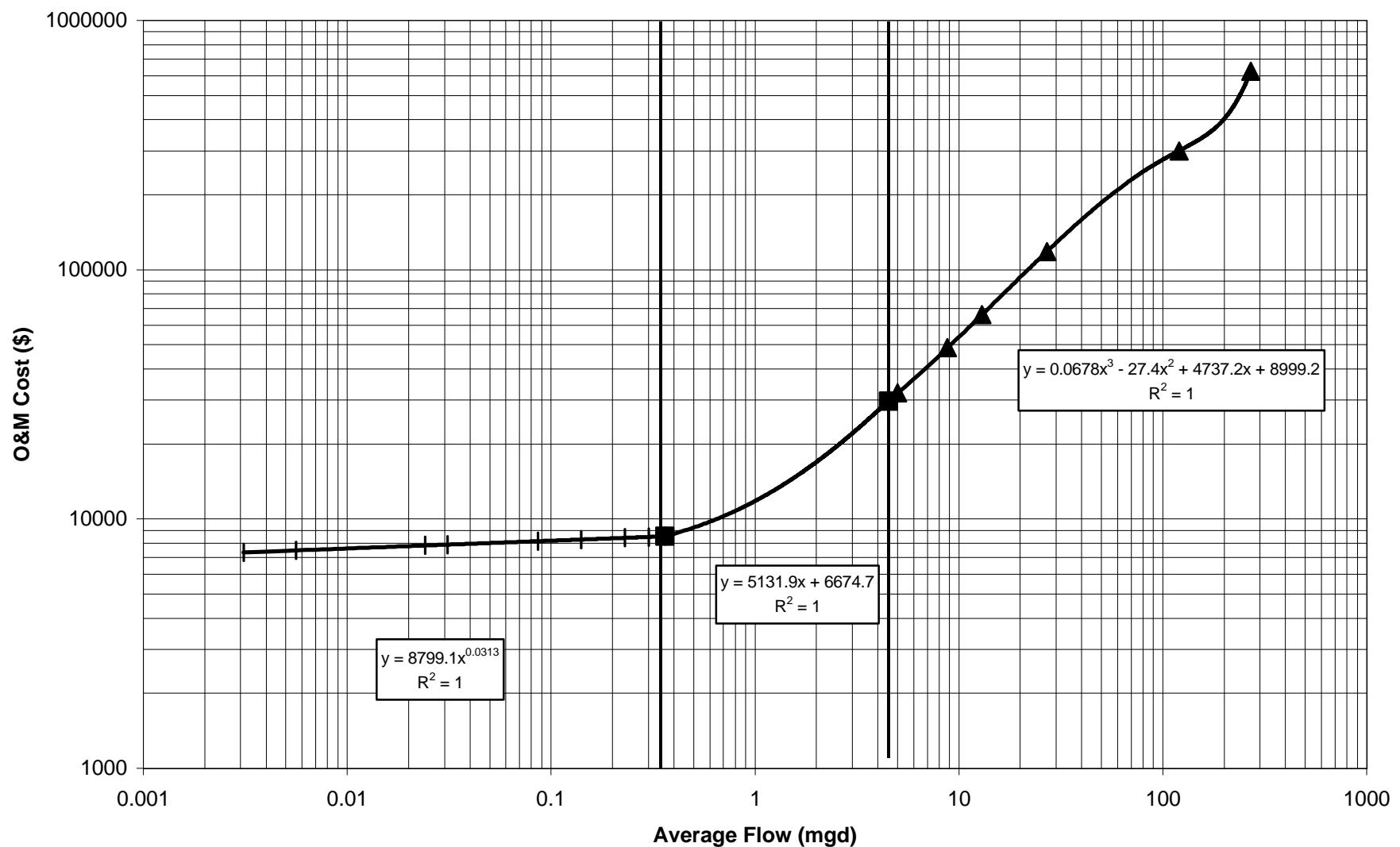
**Figure 3-10**  
**Preoxidation - 3.0 mg/L Chlorine**  
**O&M Costs**



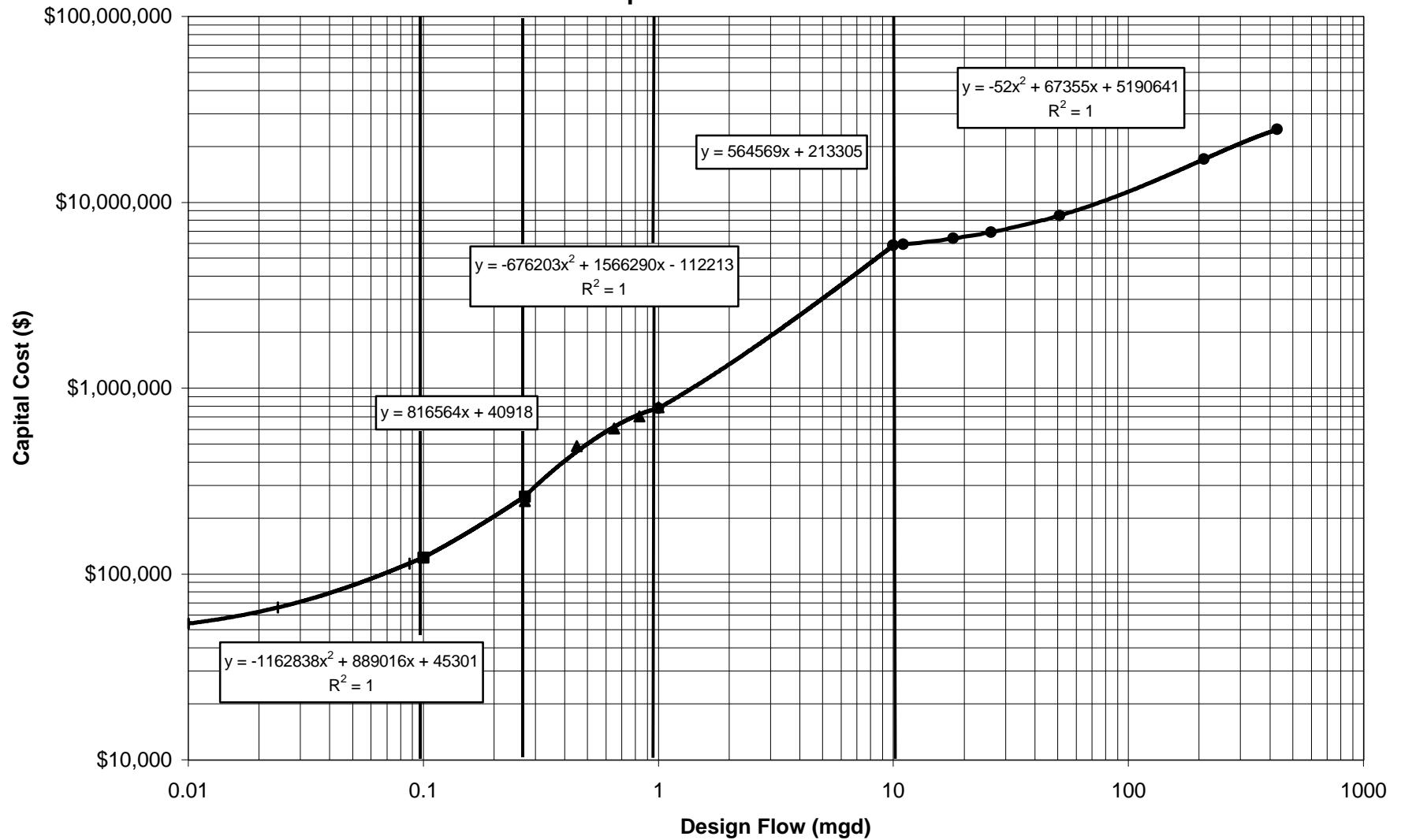
**Figure 3-11**  
**Preoxidation - 5.0 mg/L Chlorine**



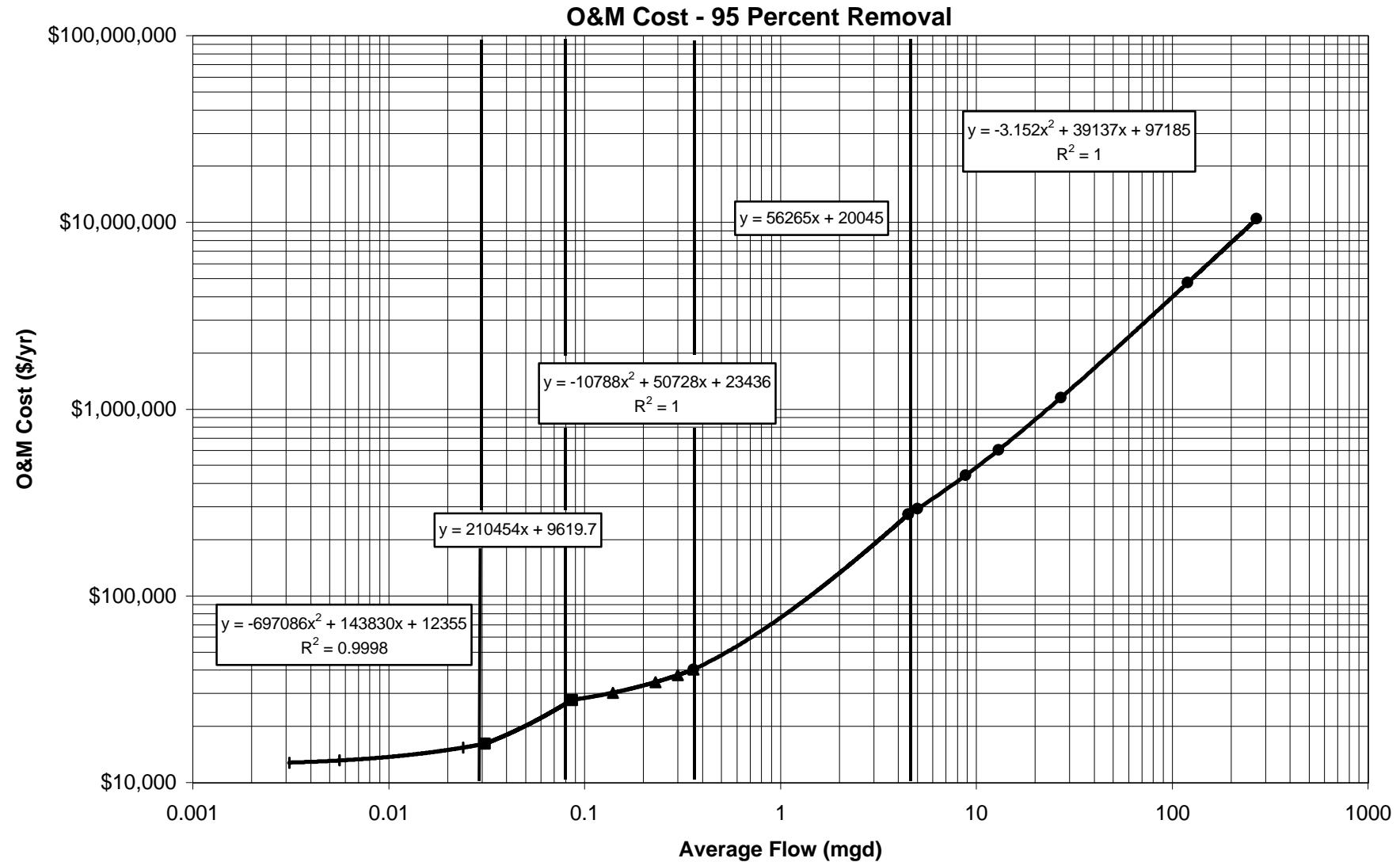
**Figure 3-12**  
**Preoxidation - 5.0 mg/L Chlorine**  
**O&M Costs**



**Figure 3-13**  
**Coagulation/Filtration**  
**Capital Cost - 95 Percent Removal**

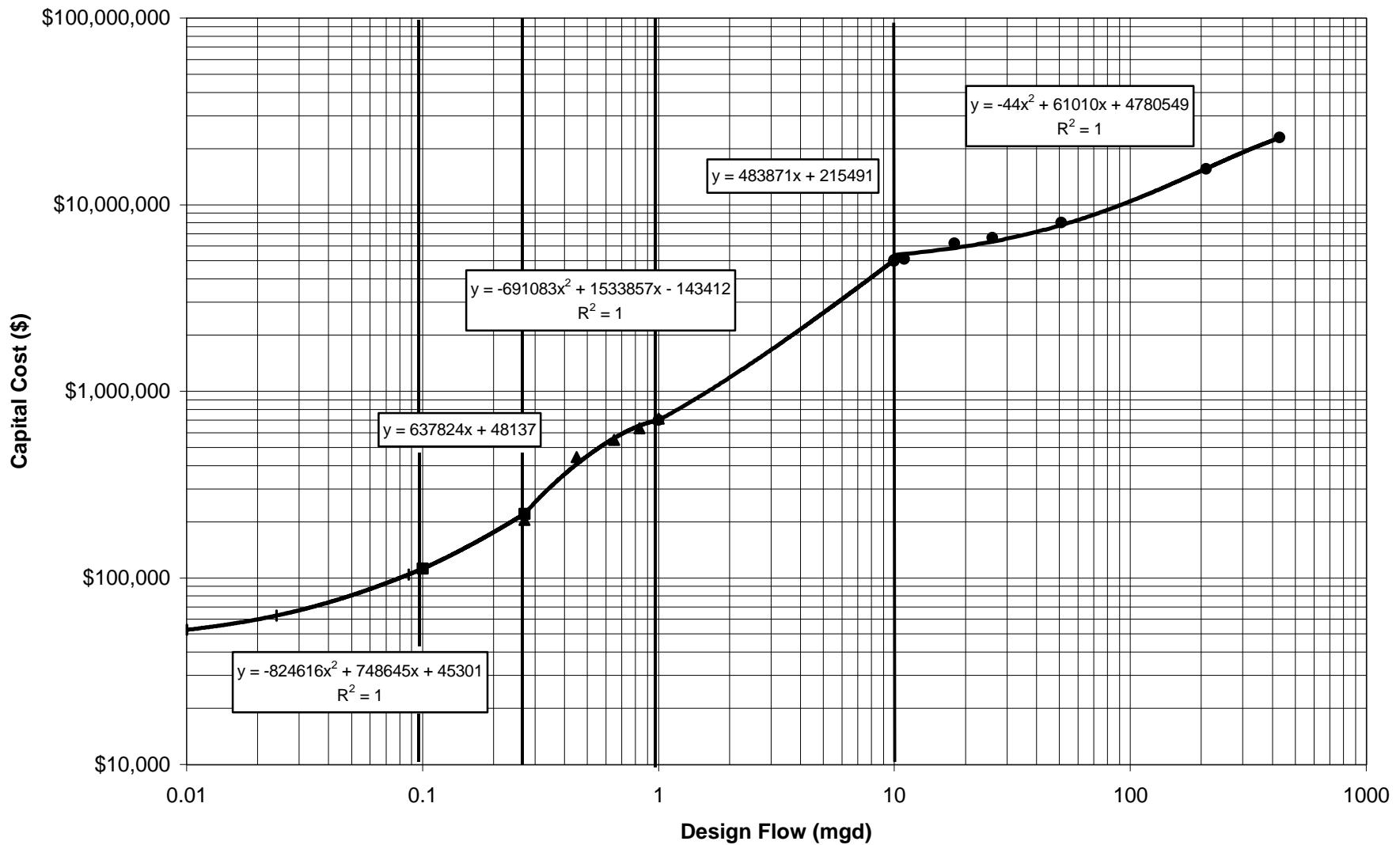


**Figure 3-14**  
**Coagulation/Filtration**

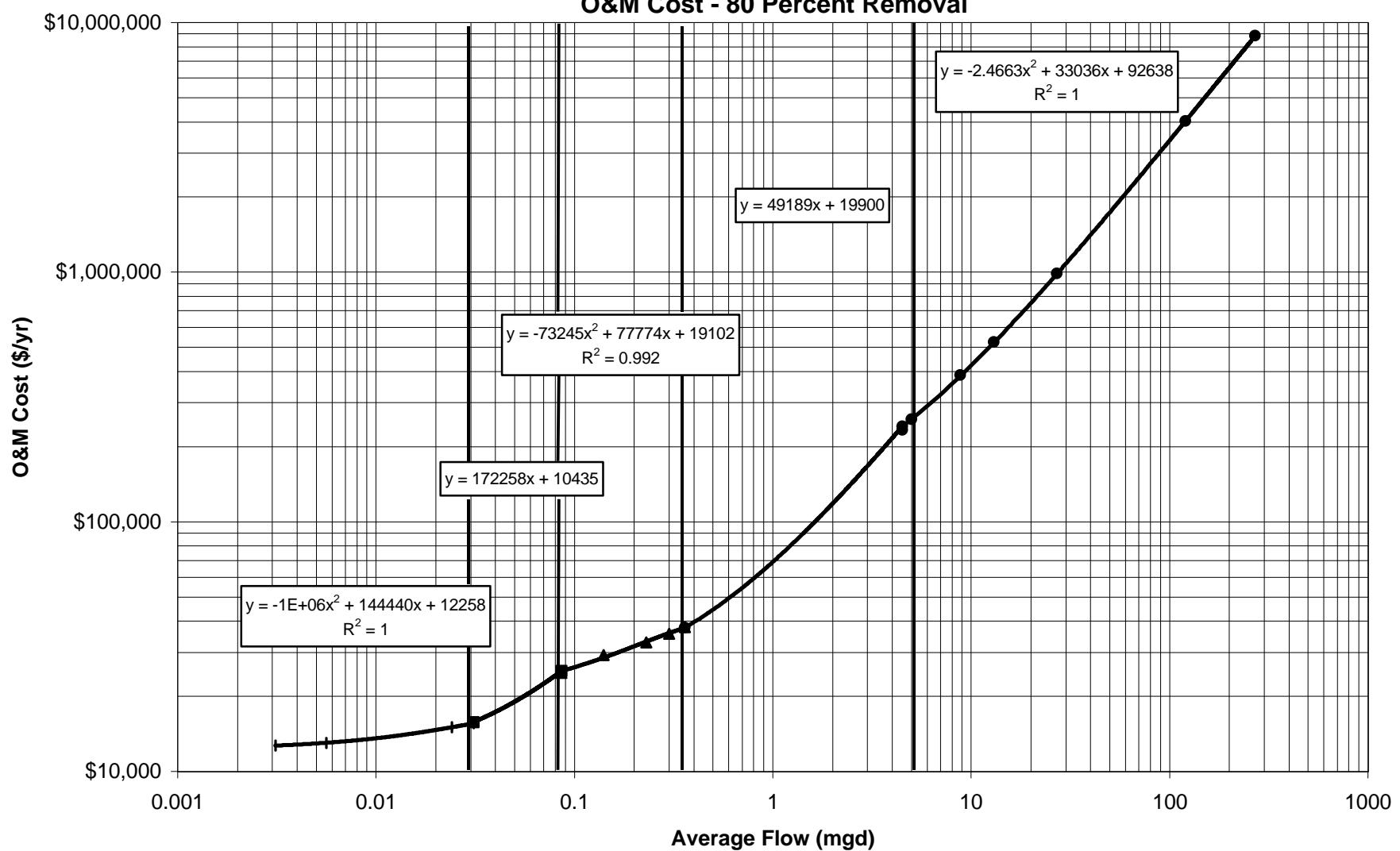


**Figure 3-15**

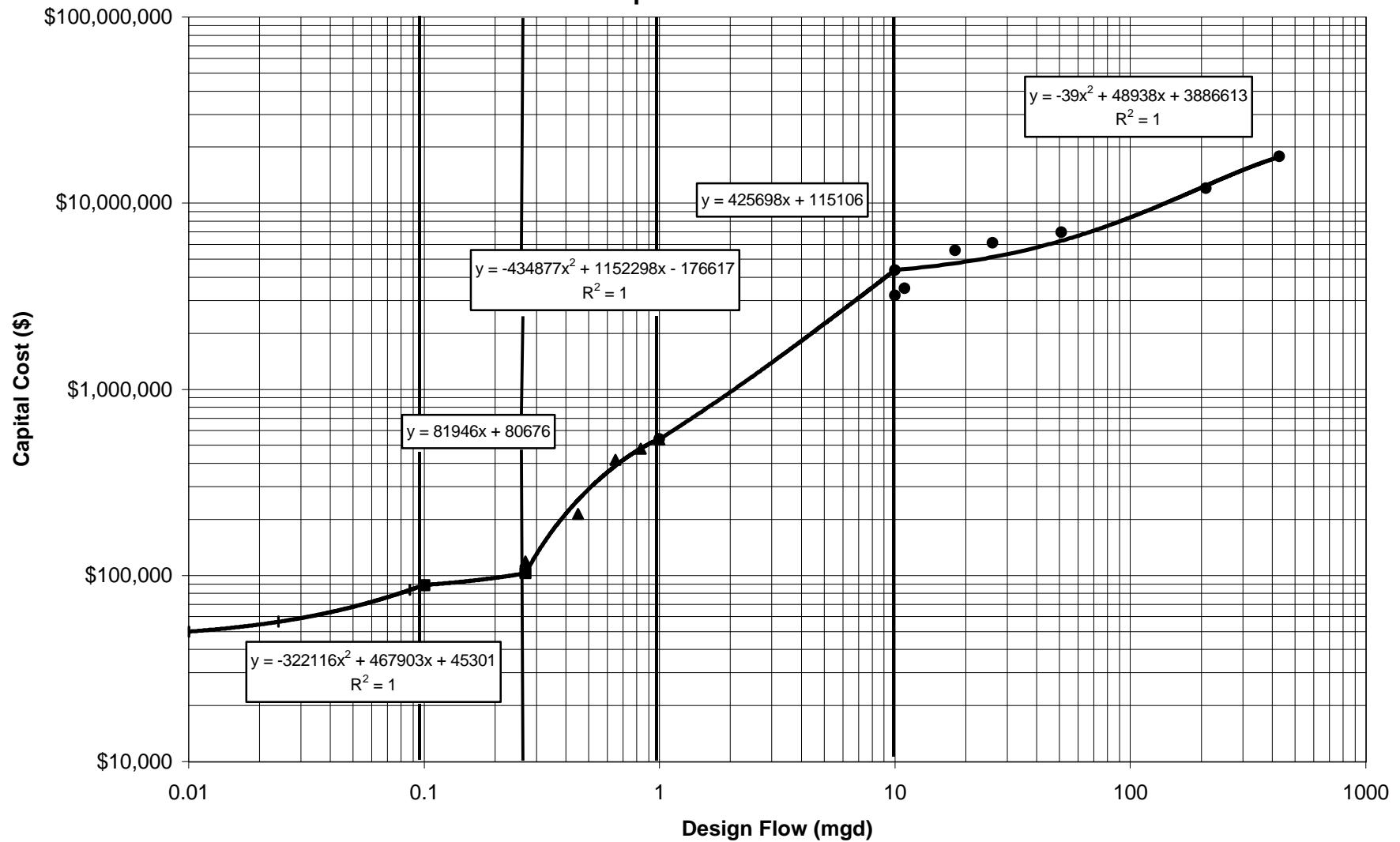
**Coagulation/Filtration  
Capital Cost - 80 Percent Removal**



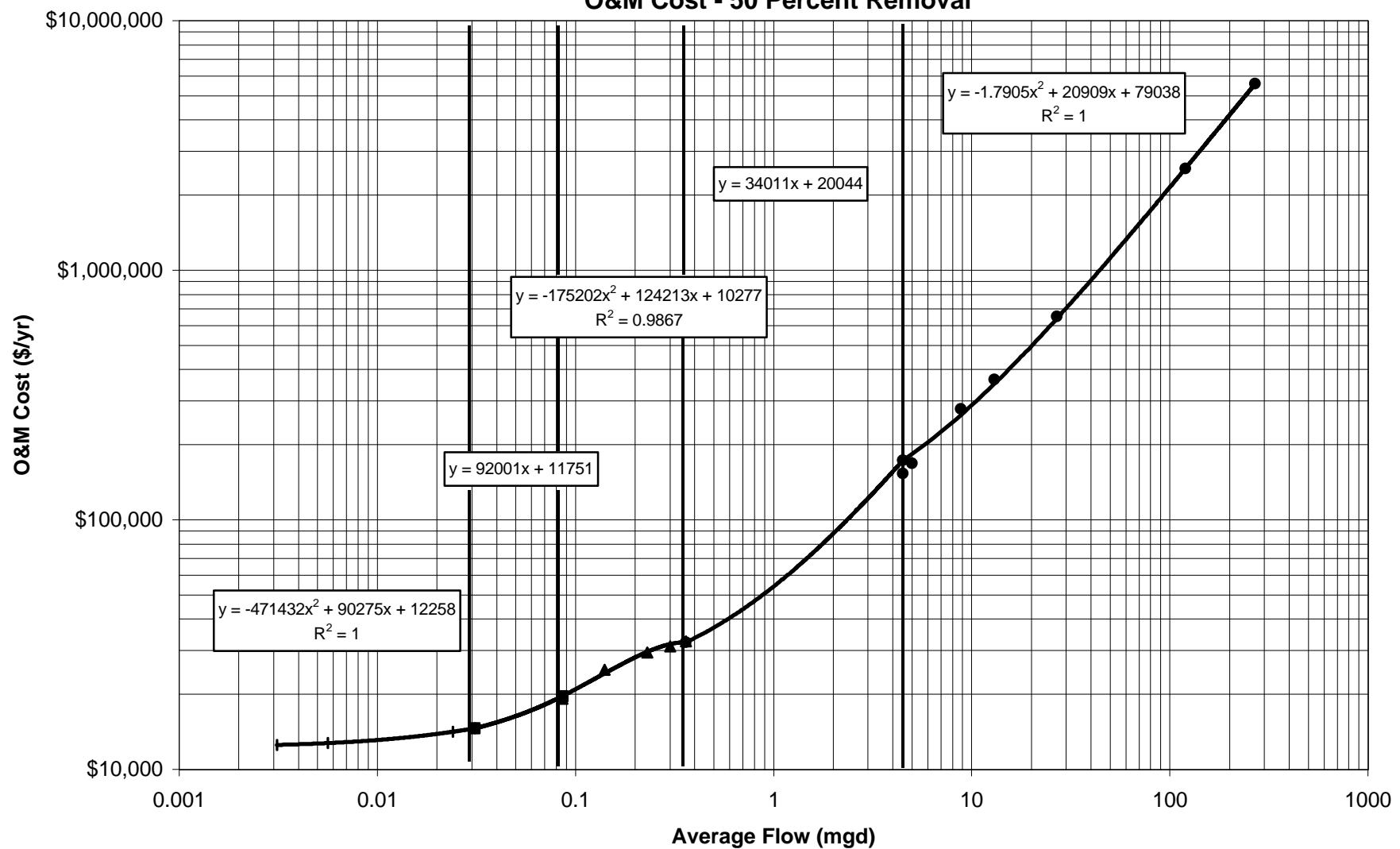
**Figure 3-16**  
**Coagulation/Filtration**  
**O&M Cost - 80 Percent Removal**



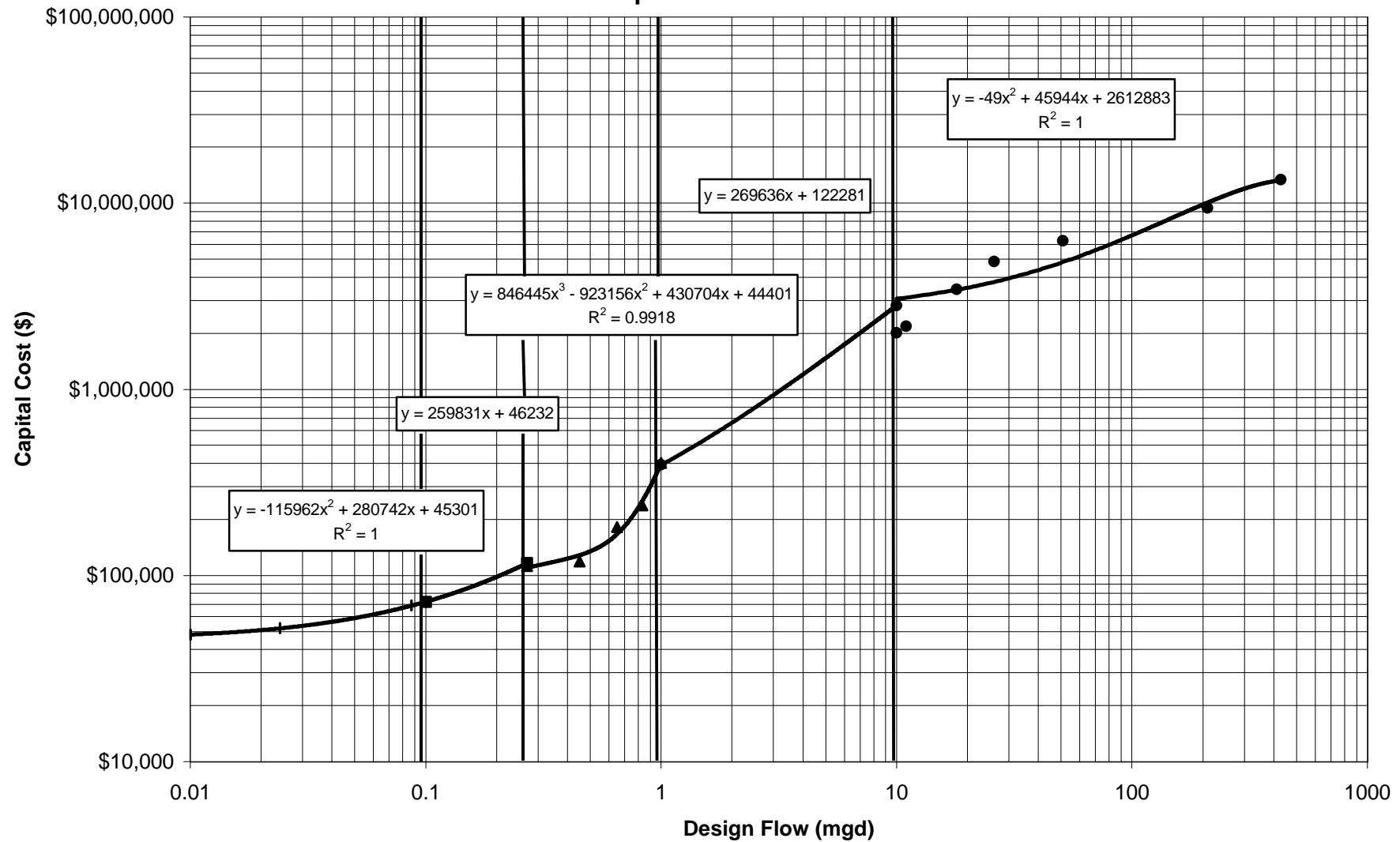
**Figure 3-17**  
**Coagulation/Filtration**  
**Capital Cost - 50 Percent Removal**



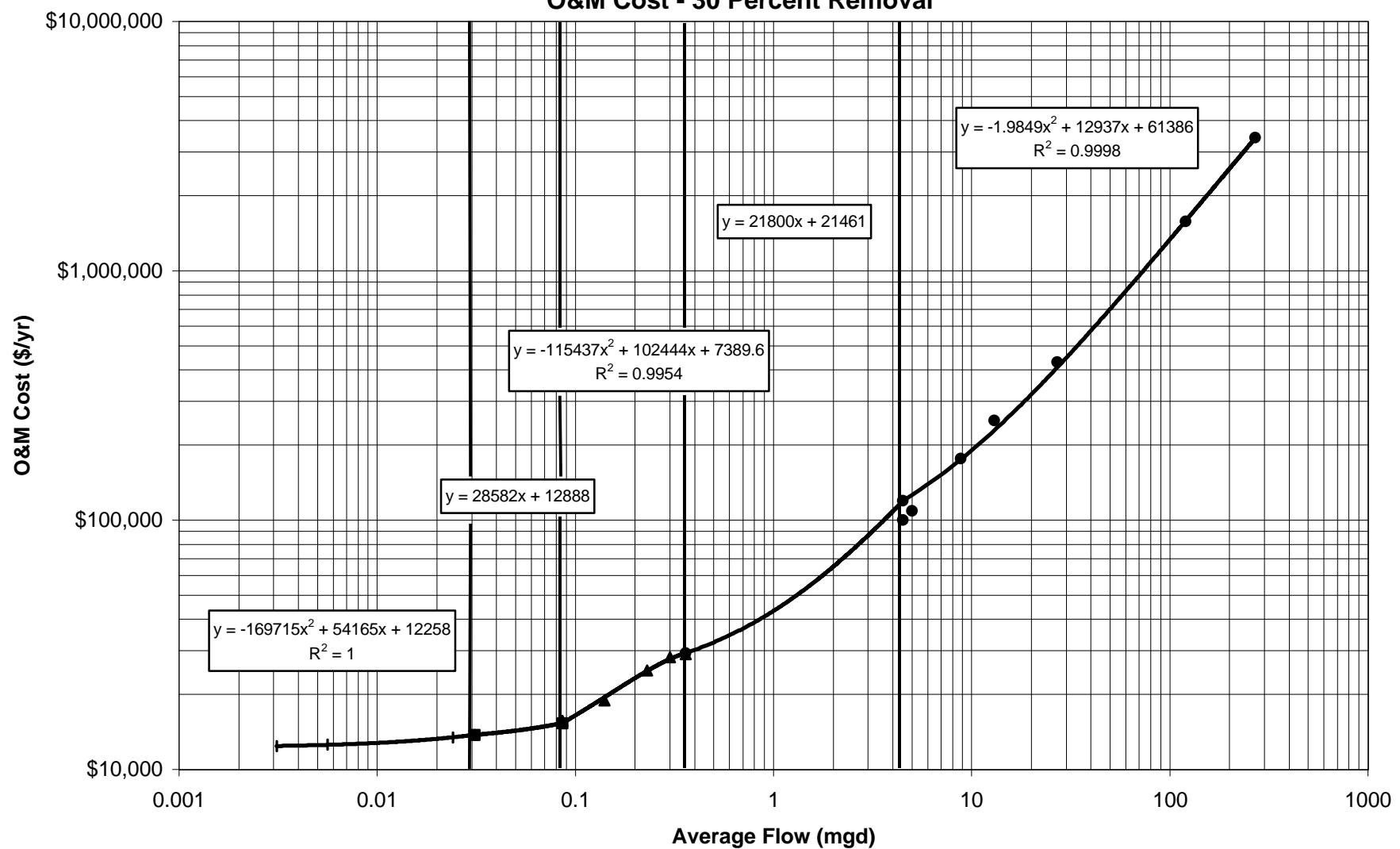
**Figure 3-18**  
**Coagulation/Filtration**  
**O&M Cost - 50 Percent Removal**



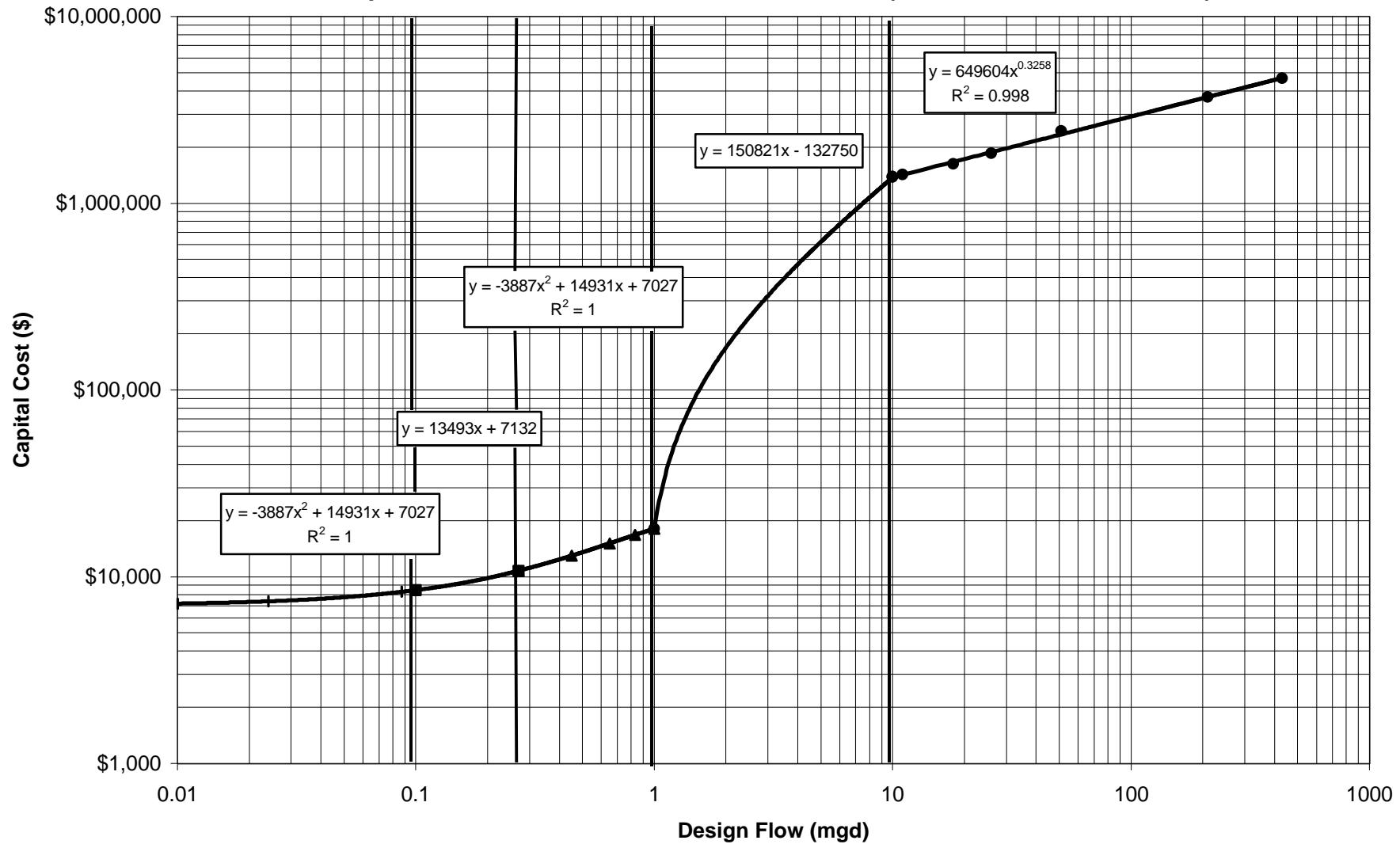
**Figure 3-19**  
**Coagulation/Filtration**  
**Capital Cost - 30 Percent Removal**



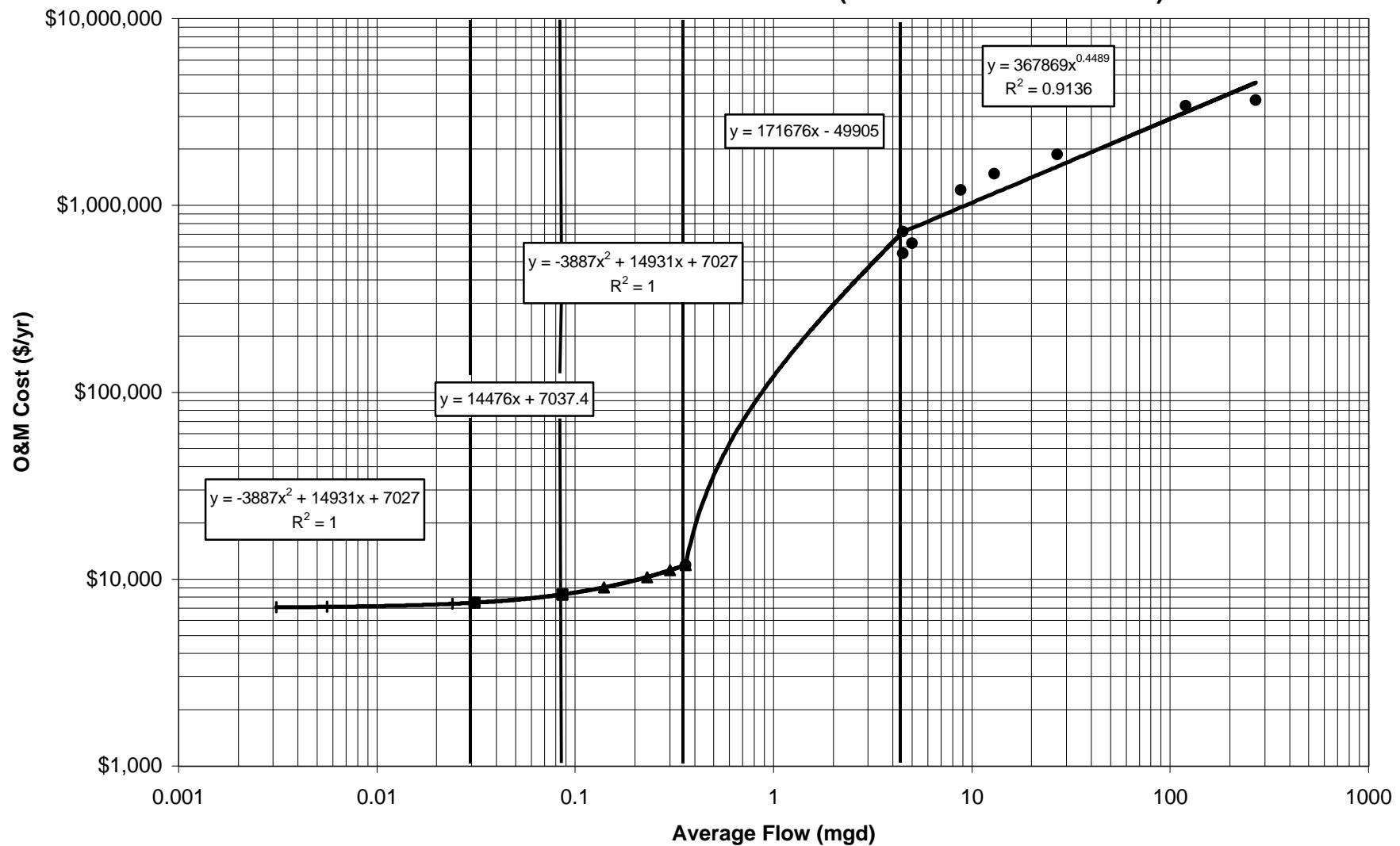
**Figure 3-20**  
**Coagulation/Filtration**  
**O&M Cost - 30 Percent Removal**



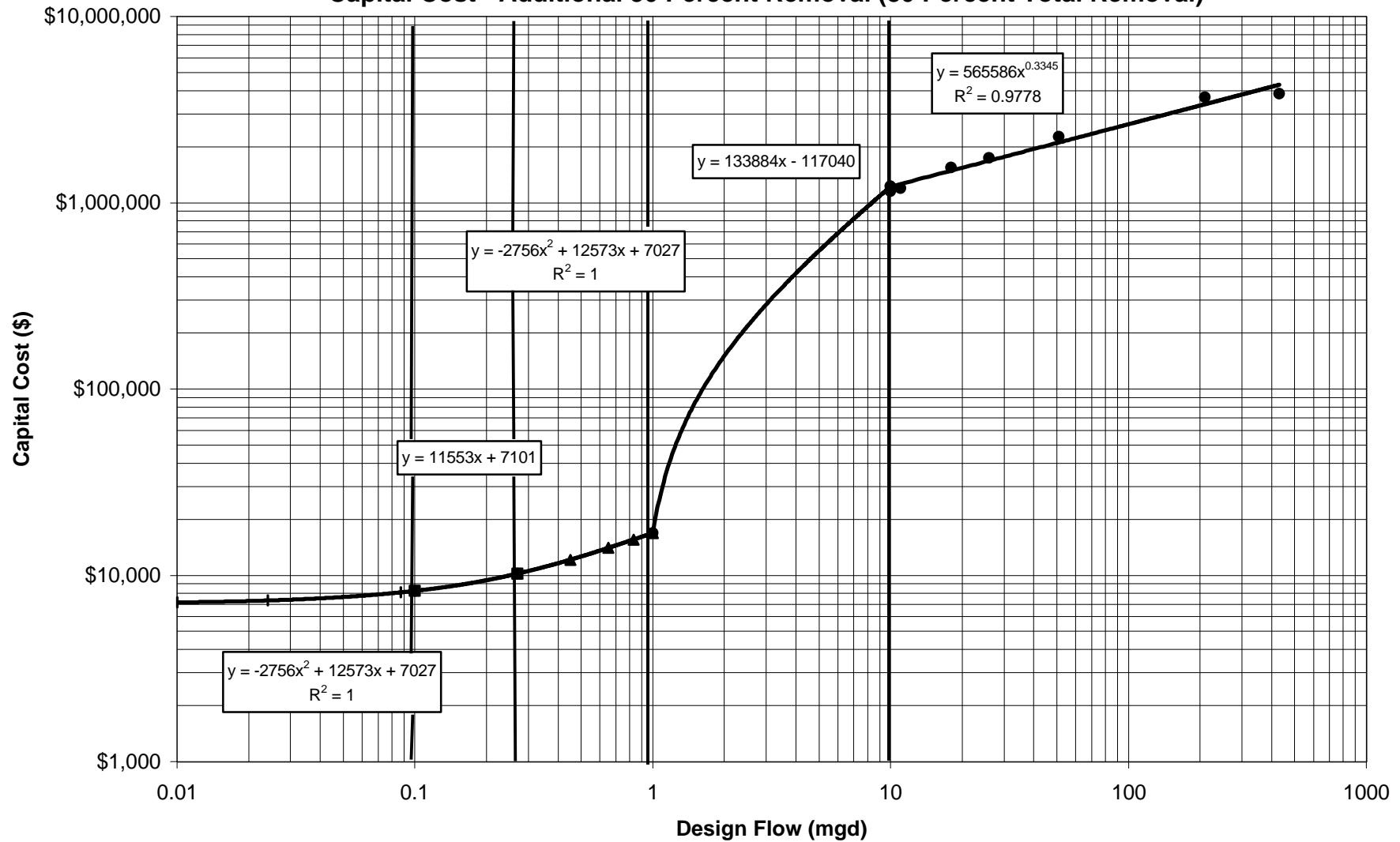
**Figure 3-21**  
**Enhanced Coagulation**  
**Capital Cost - Additional 45 Percent Removal (95 Percent Total Removal)**



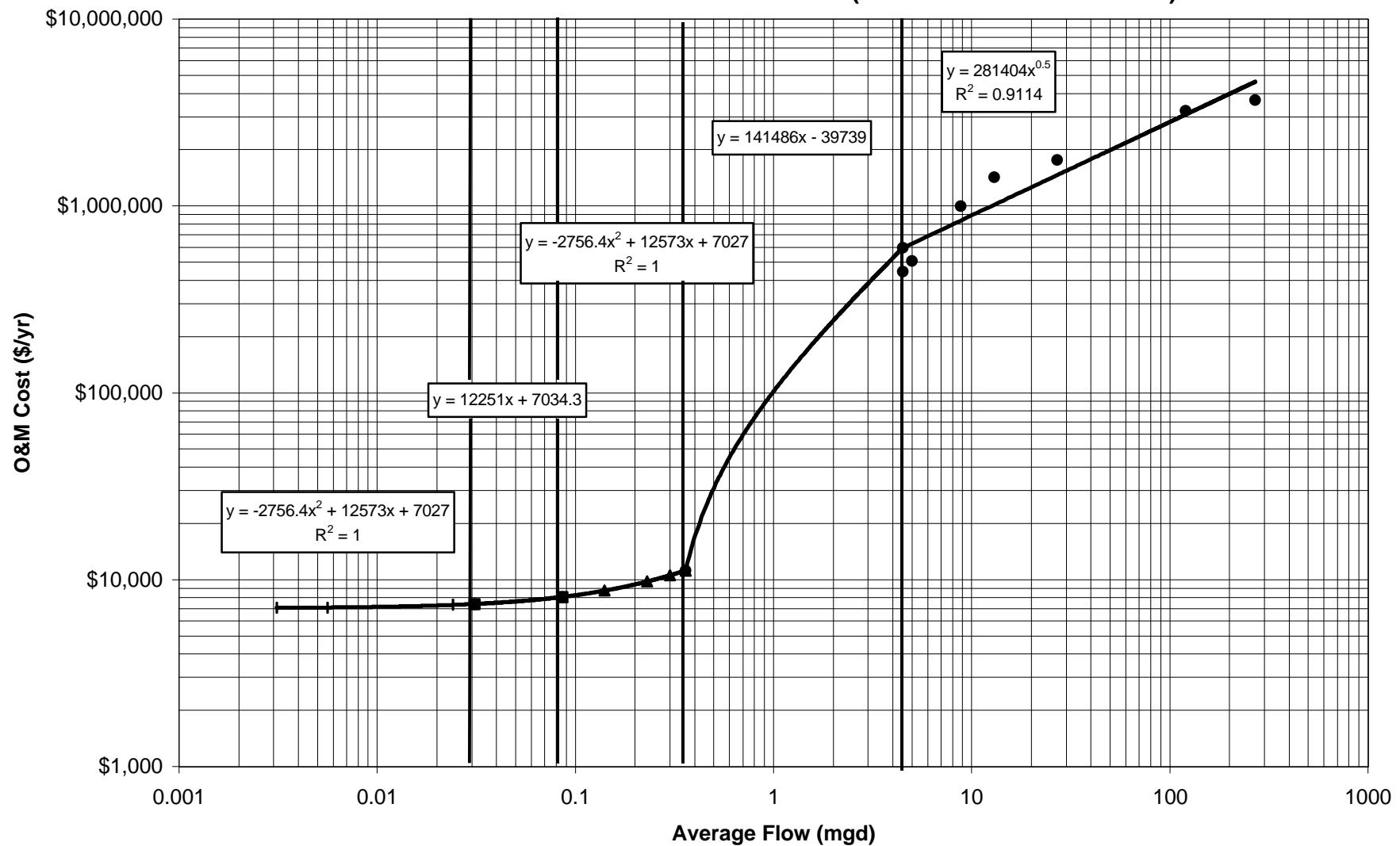
**Figure 3-22**  
**Enhanced Coagulation**  
**O&M - Additional 45 Percent Removal (95 Percent Total Removal)**



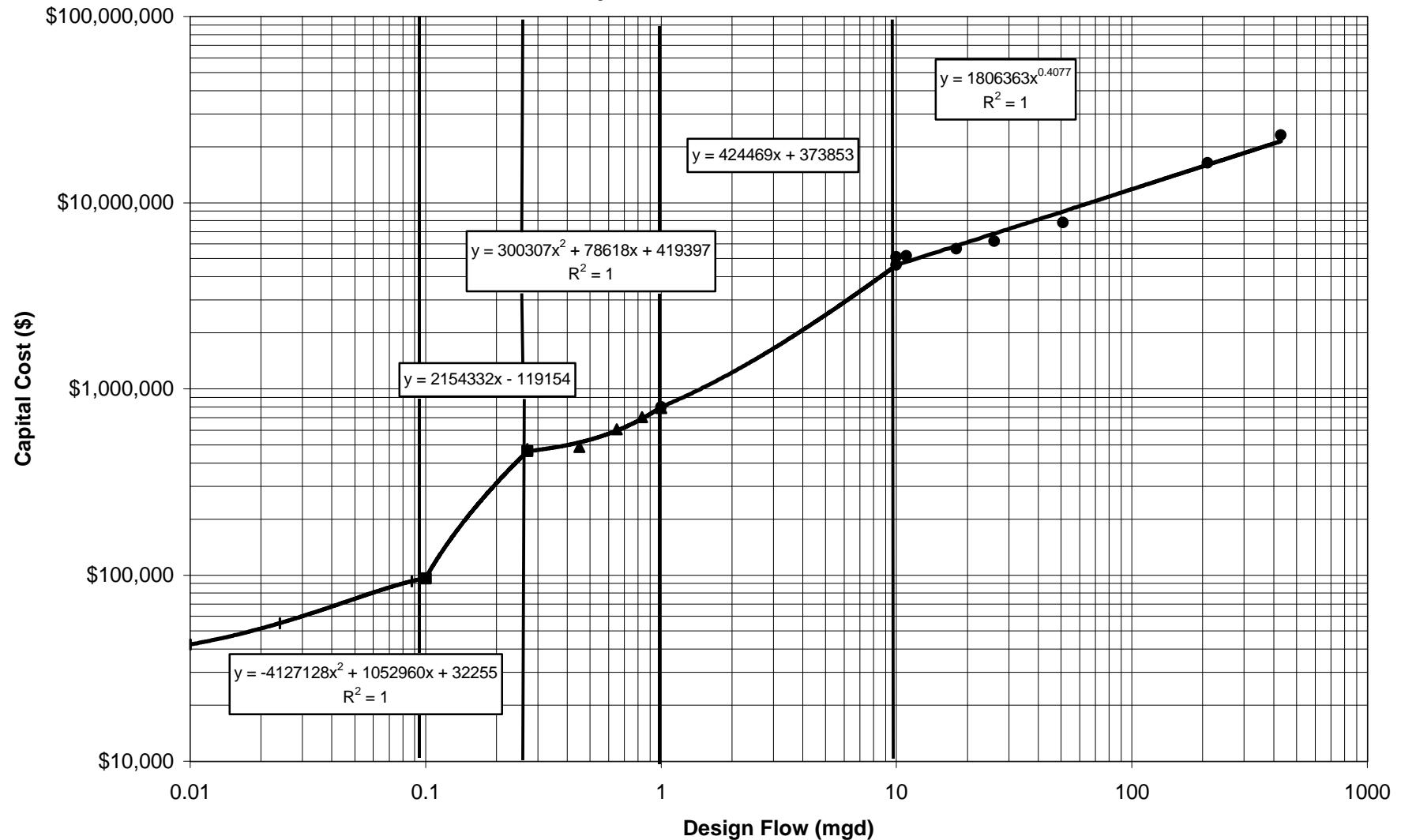
**Figure 3-23**  
**Enhanced Coagulation**  
**Capital Cost - Additional 30 Percent Removal (80 Percent Total Removal)**



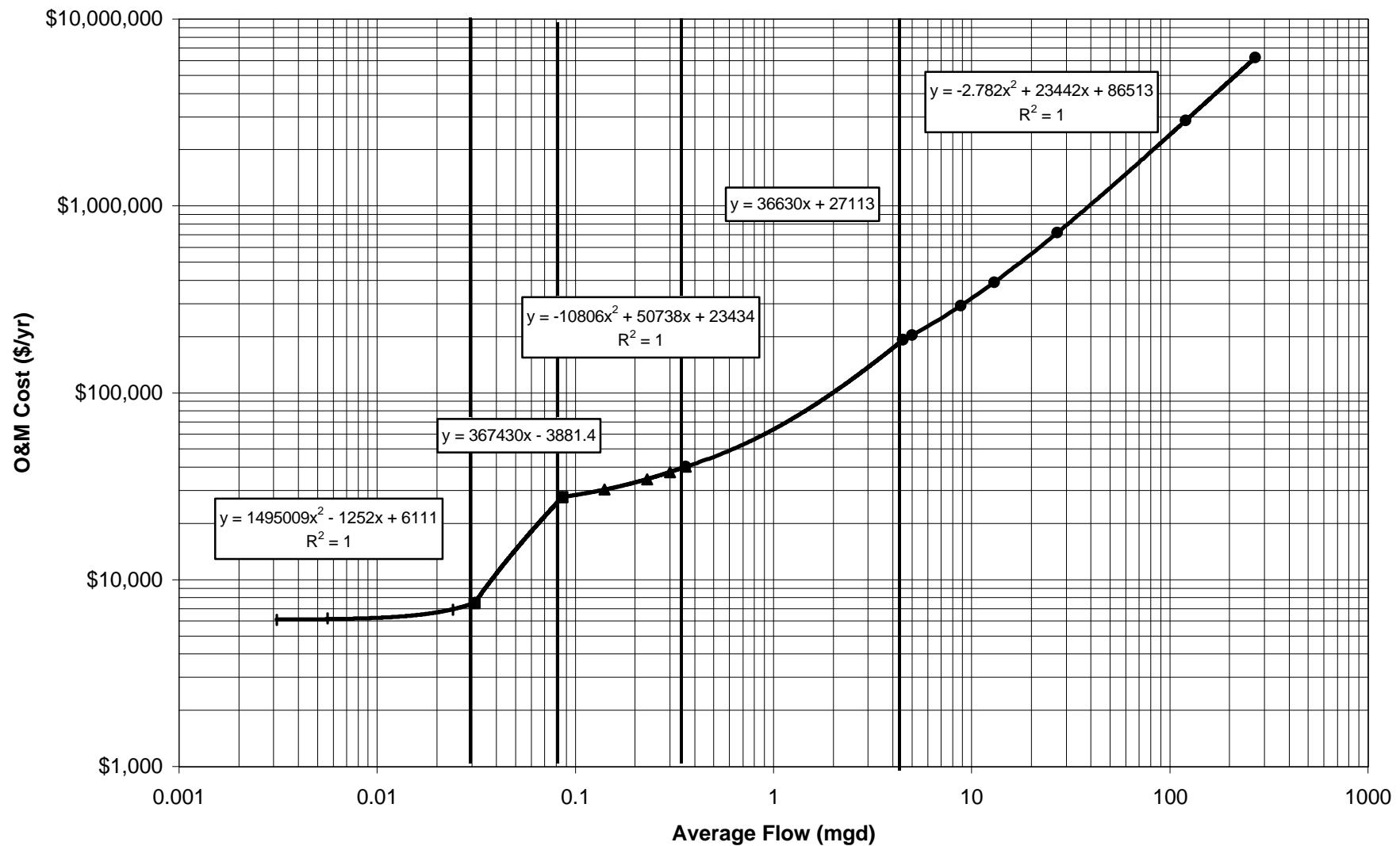
**Figure 3-24**  
**Enhanced Coagulation**  
**O&M - Additional 30 Percent Removal (80 Percent Total Removal)**



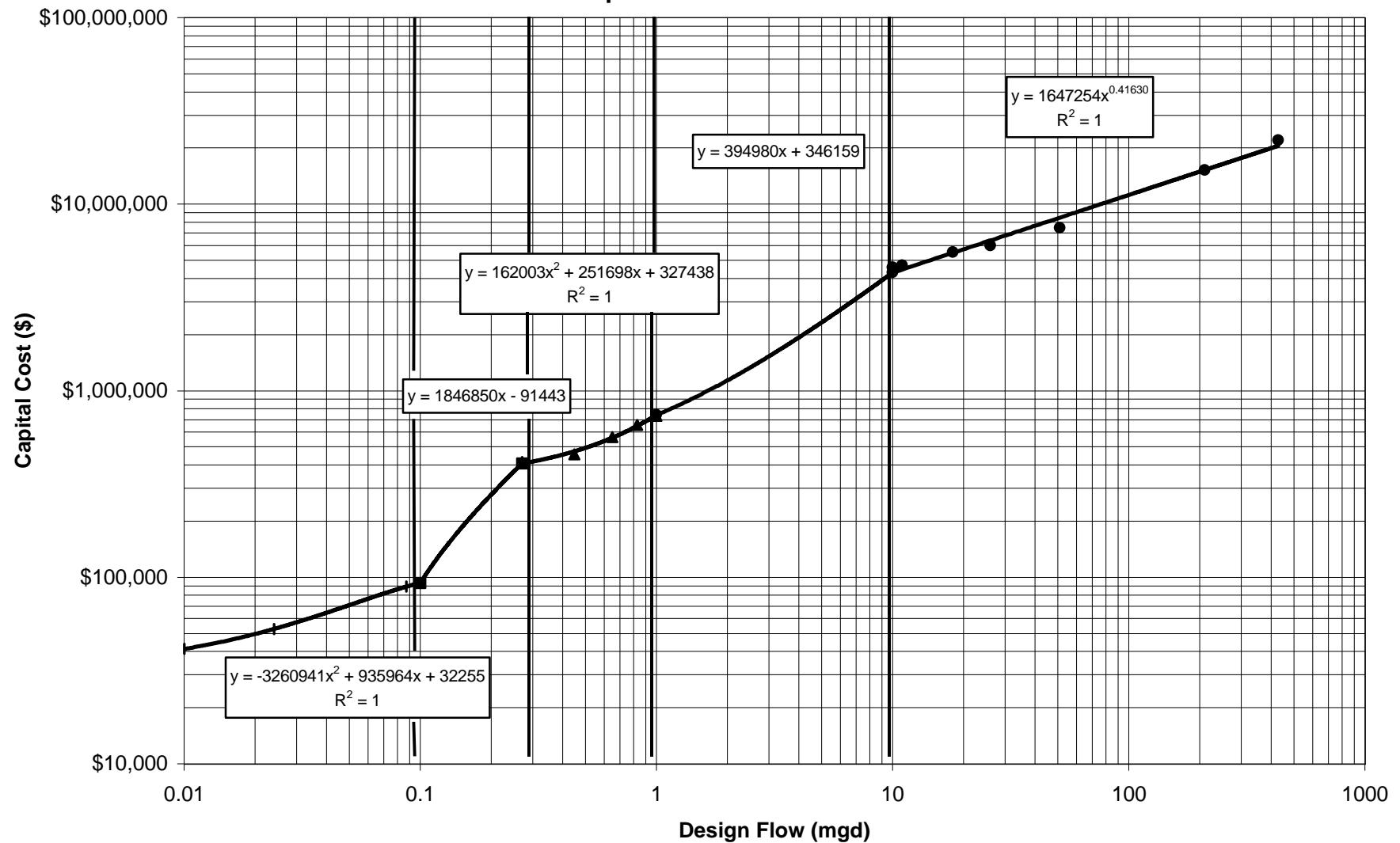
**Figure 3-25**  
**Direct Filtration**  
**Capital Cost - 90 Percent Removal**



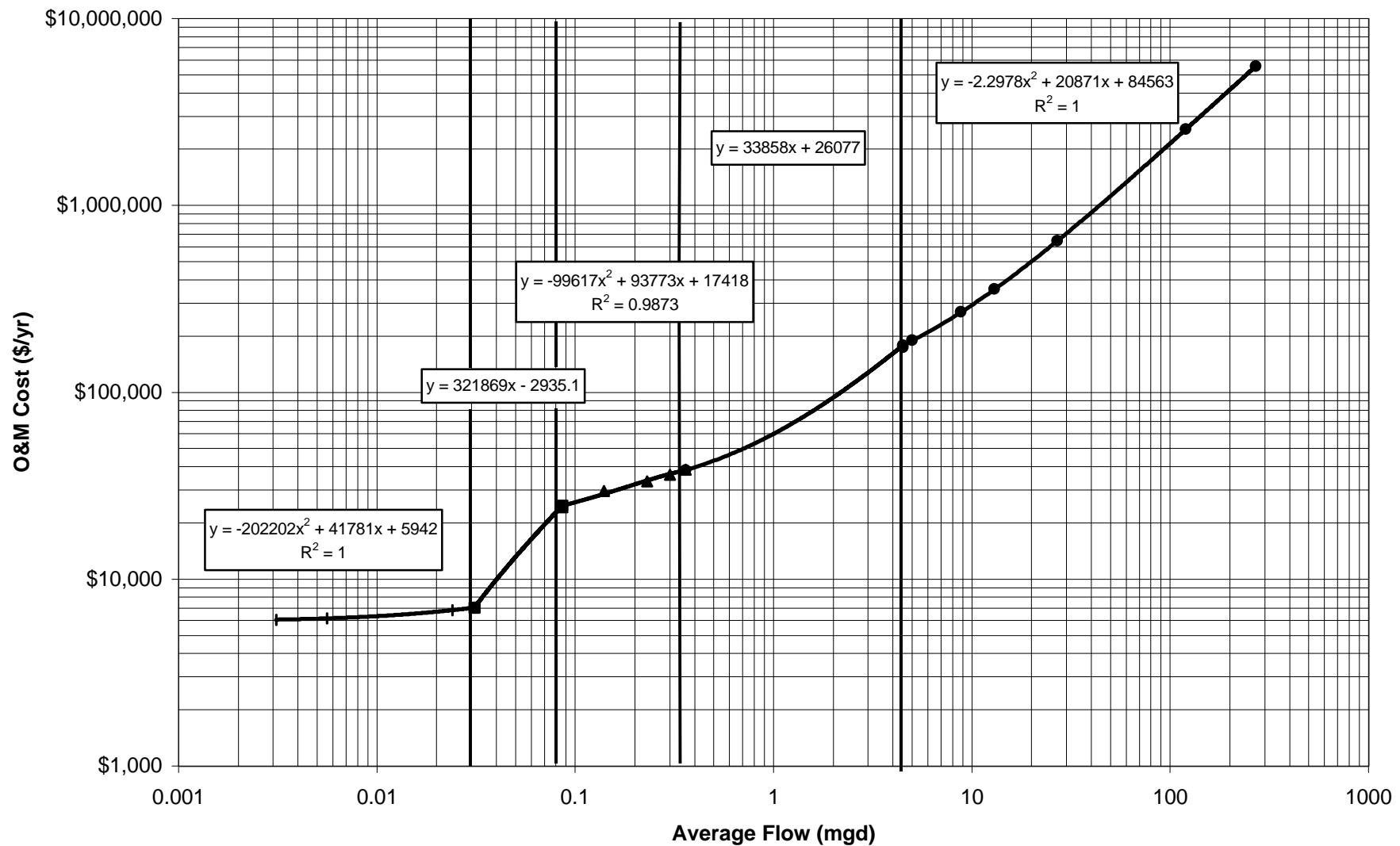
**Figure 3-26**  
**Direct Filtration**  
**O&M Cost - 90 Percent Removal**



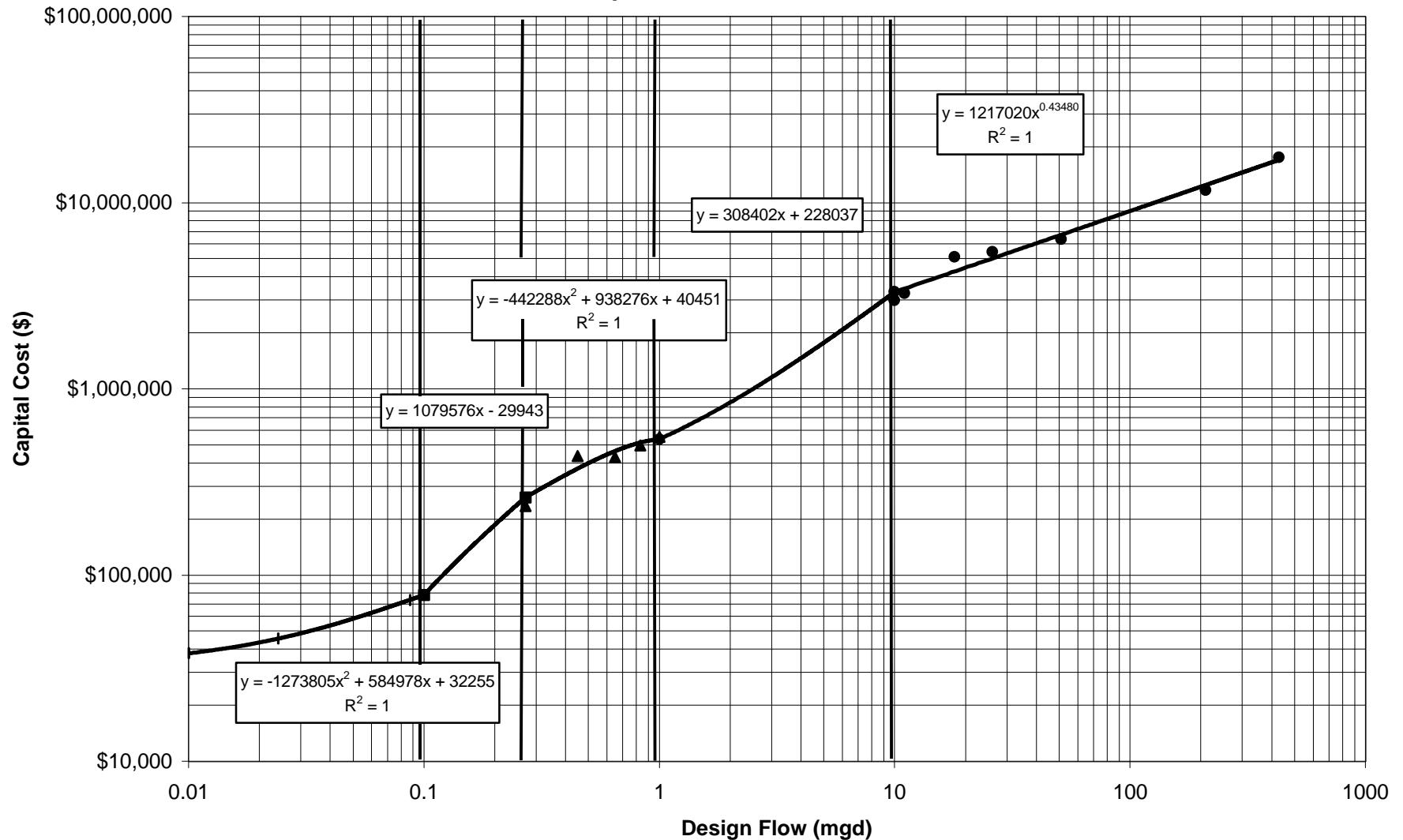
**Figure 3-27**  
**Direct Filtration**  
**Capital Cost - 80 Percent Removal**



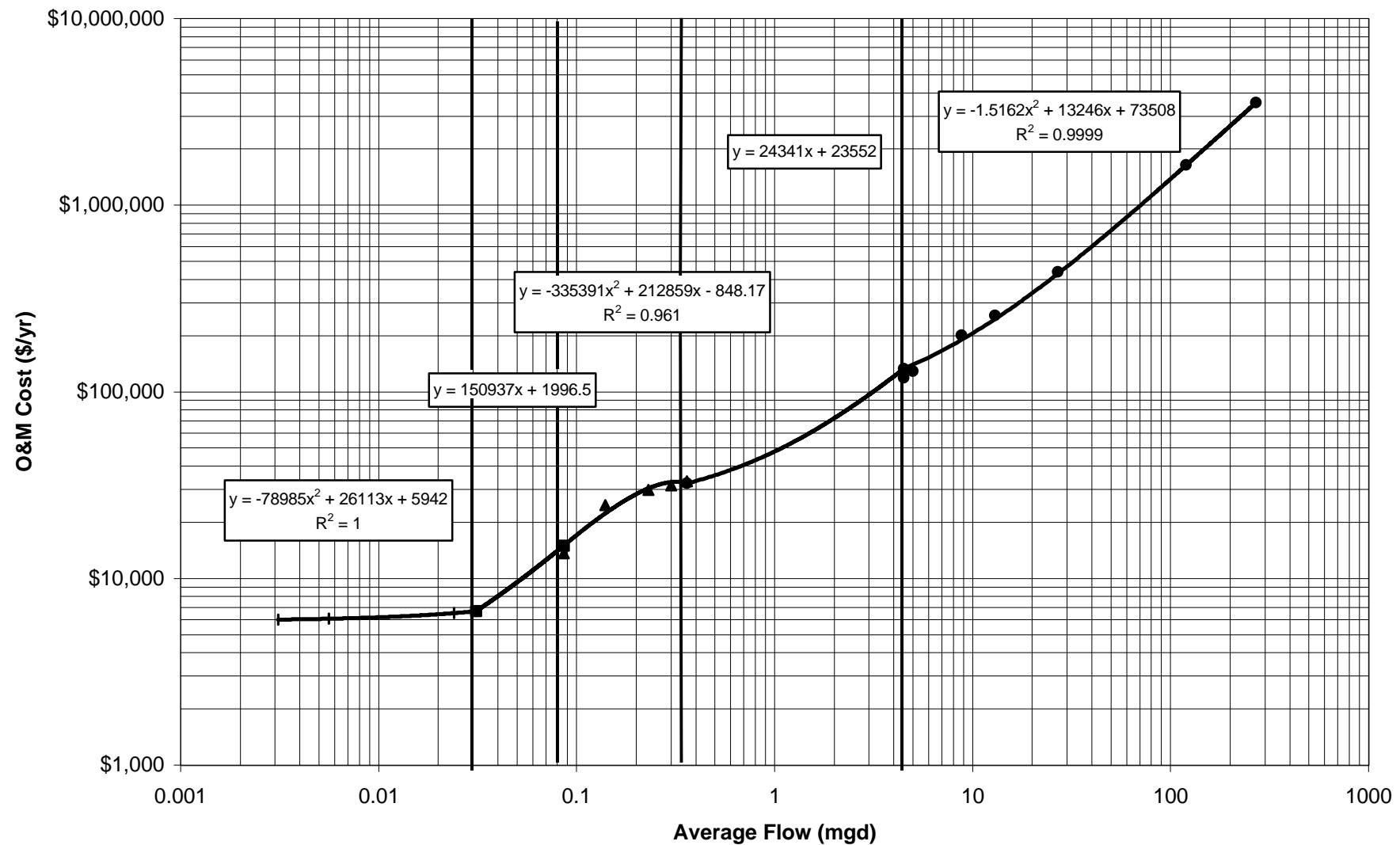
**Figure 3-28**  
**Direct Filtration**  
**O&M Cost - 80 Percent Removal**



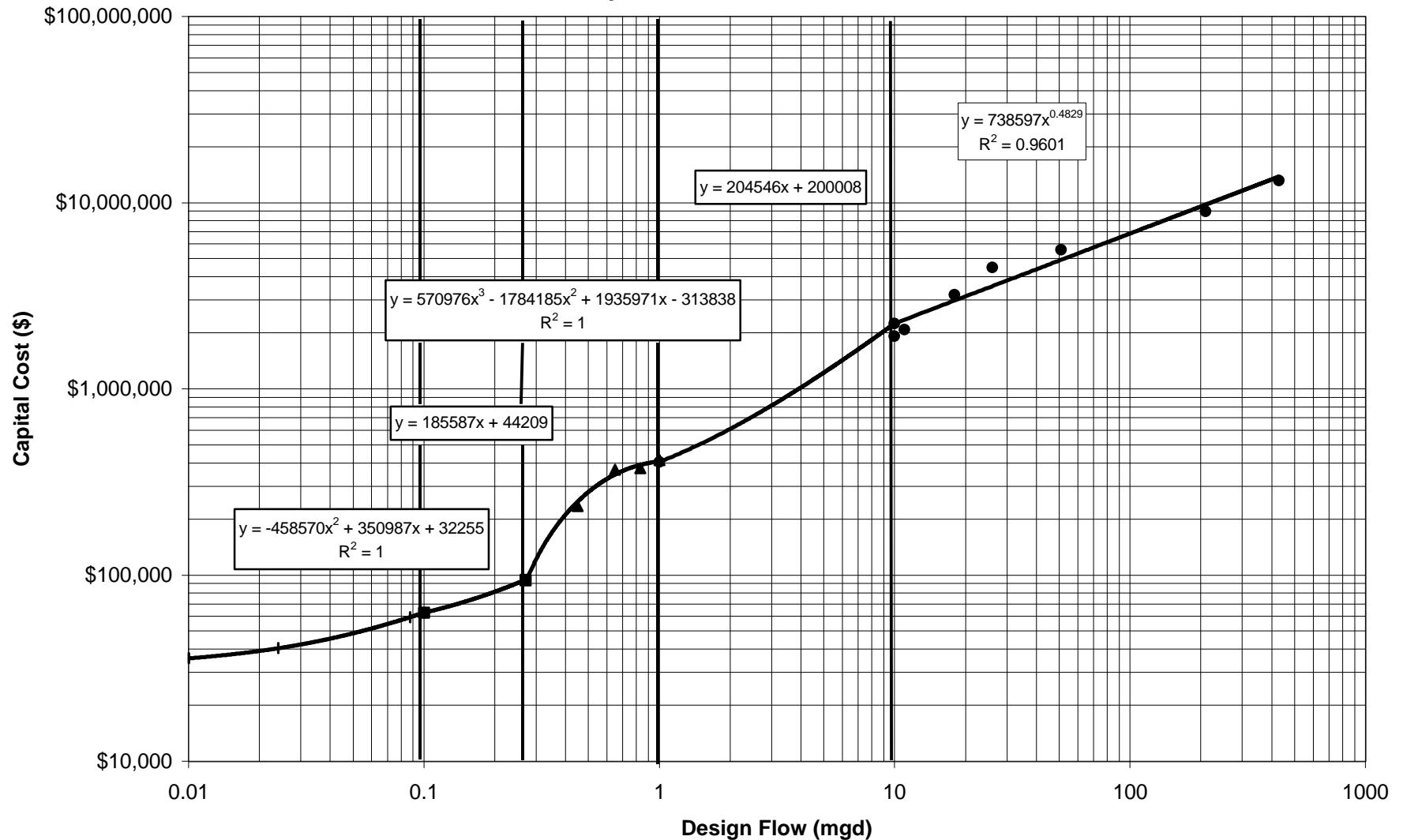
**Figure 3-29**  
**Direct Filtration**  
**Capital Cost - 50 Percent Removal**



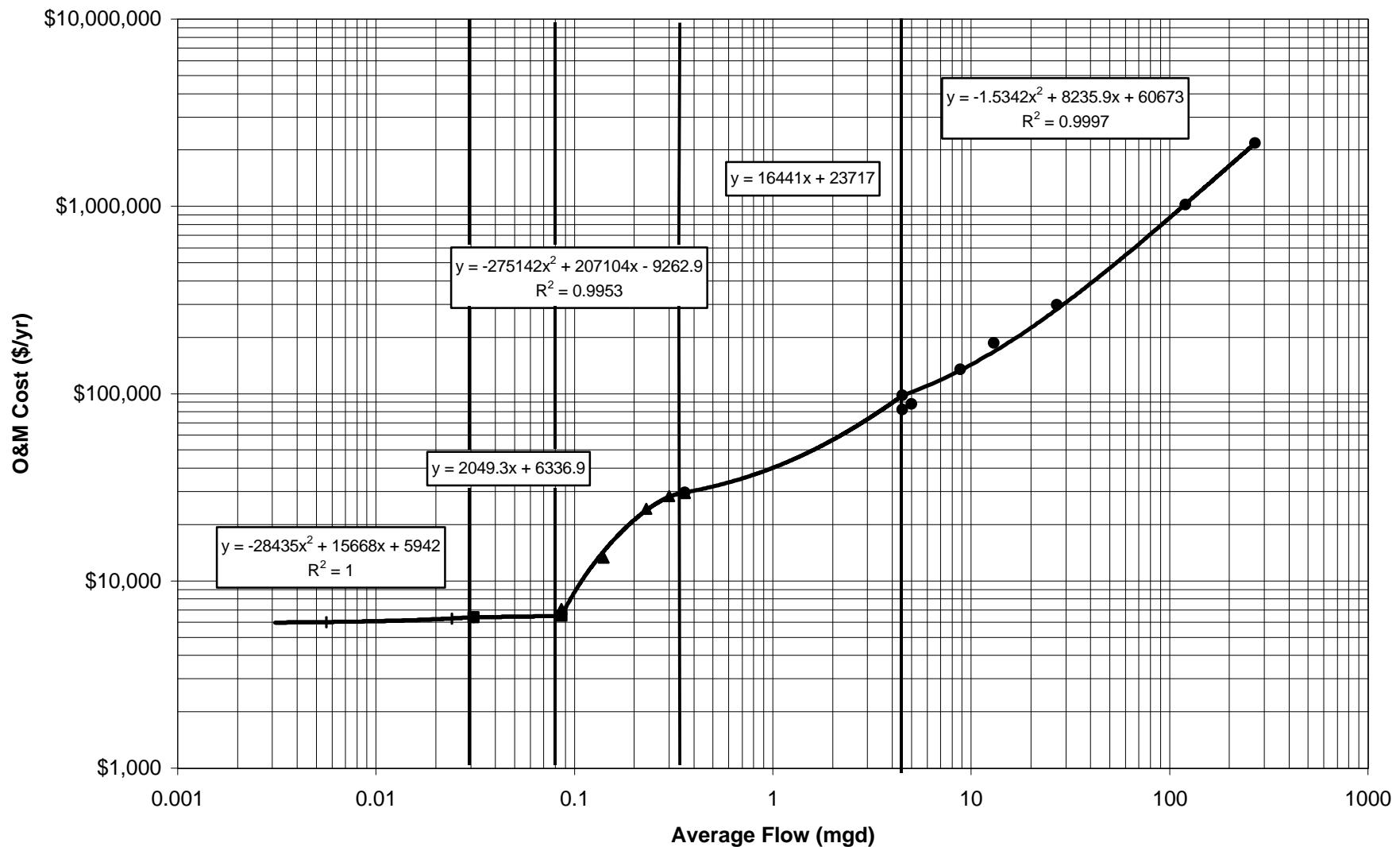
**Figure 3-30**  
**Direct Filtration**  
**O&M Cost - 50 Percent Removal**



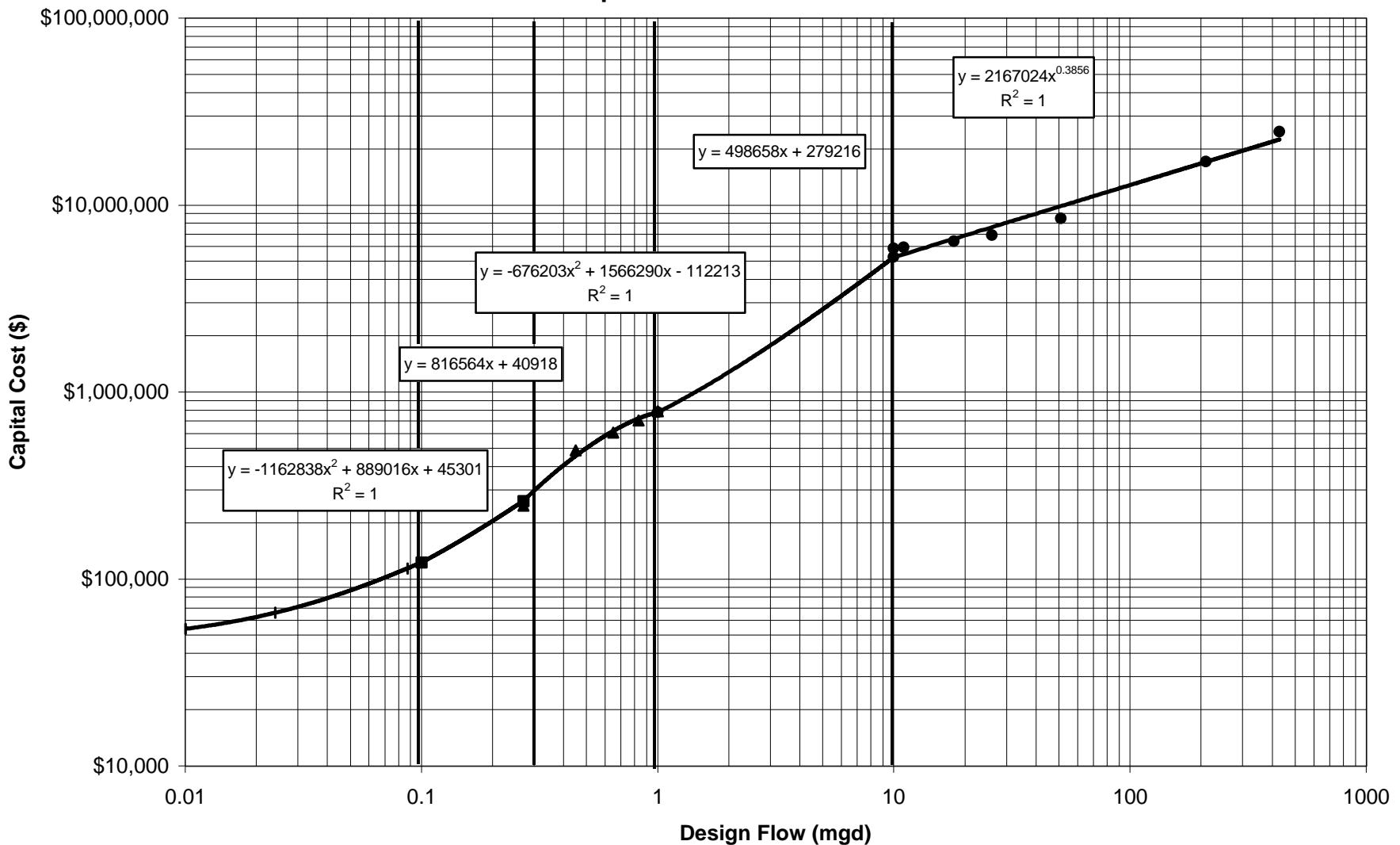
**Figure 3-31**  
**Direct Filtration**  
**Capital Cost - 30 Percent Removal**



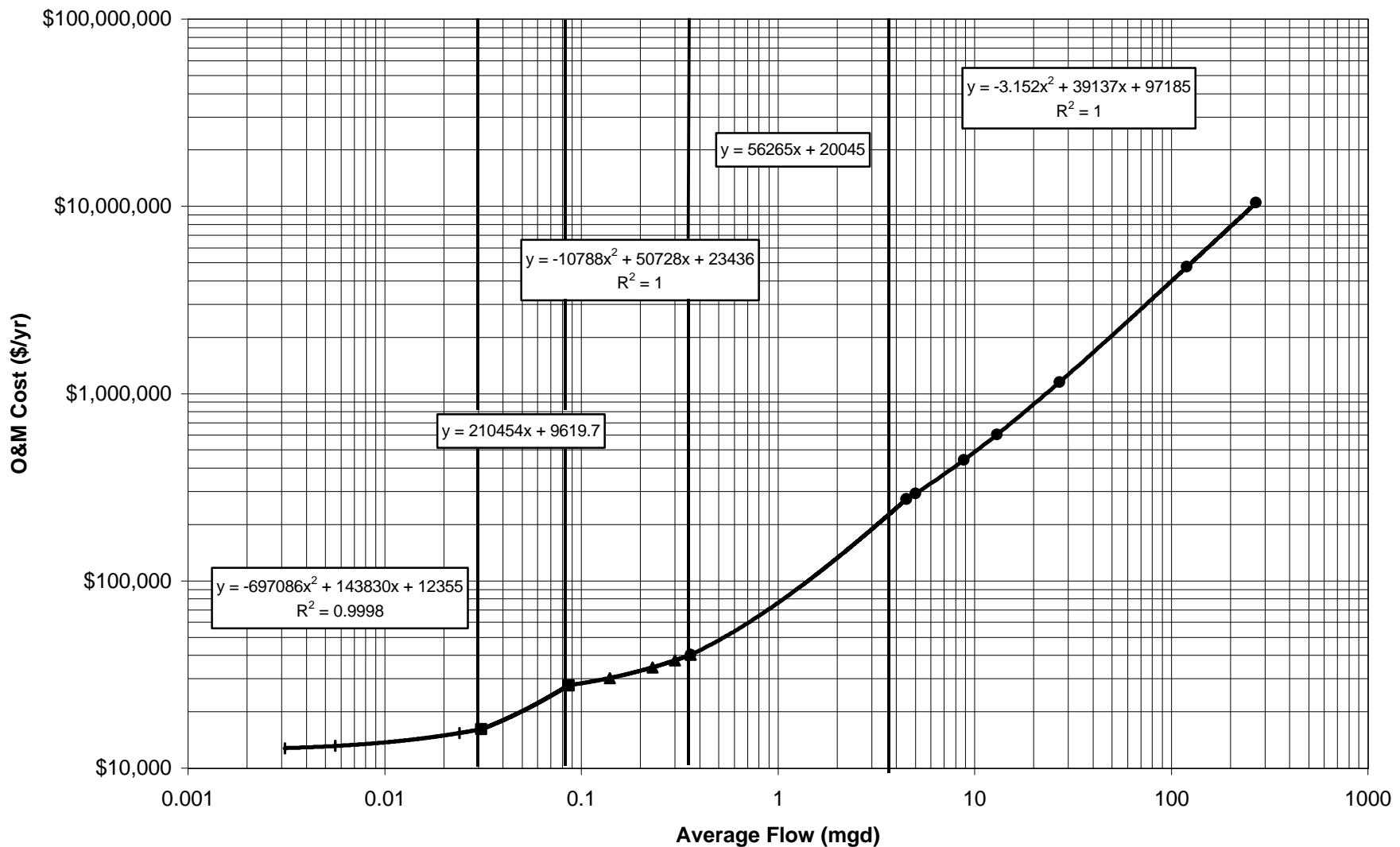
**Figure 3-32**  
**Direct Filtration**  
**O&M Cost - 30 Percent Removal**



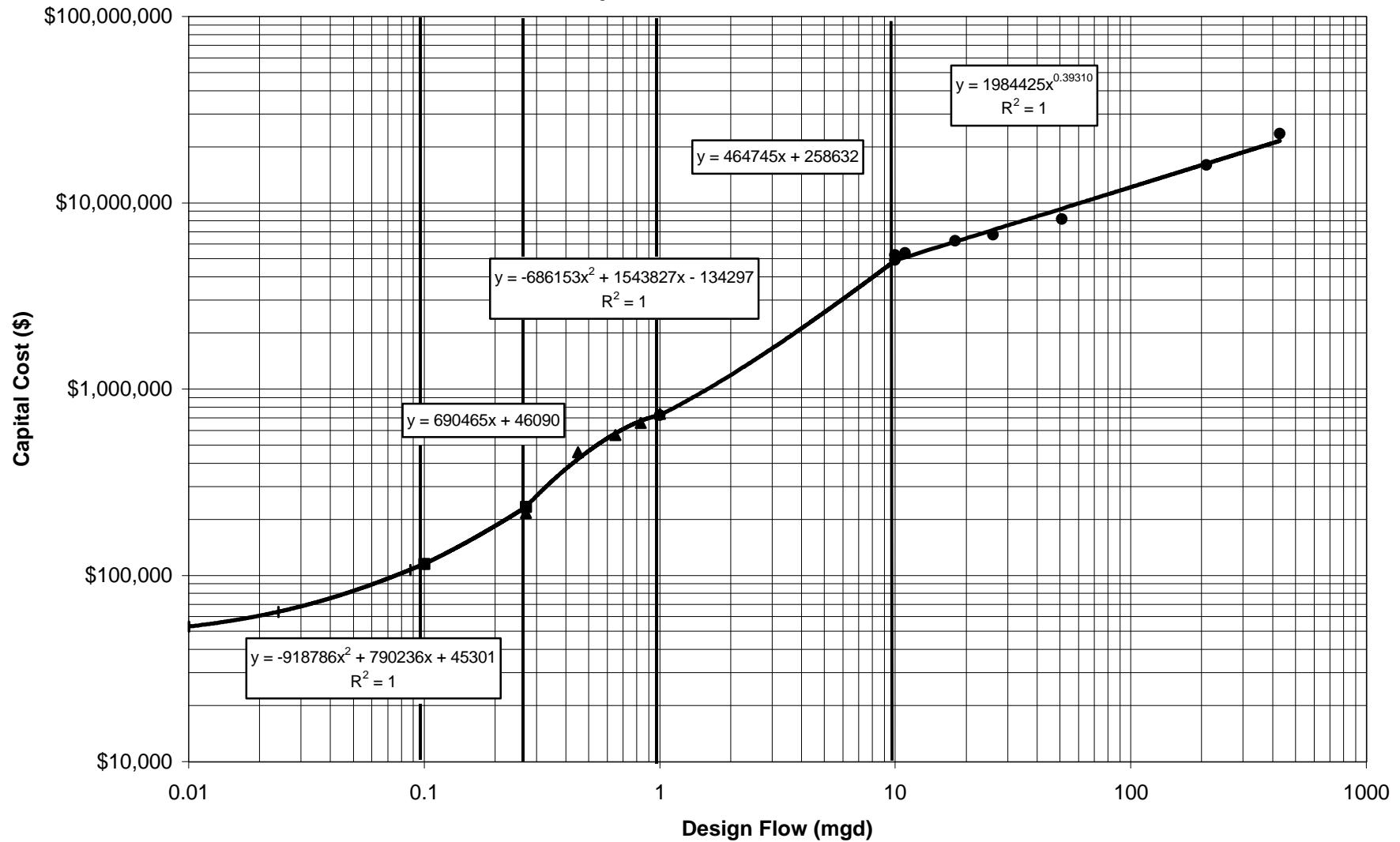
**Figure 3-33**  
**Coagulation Assisted Microfiltration**  
**Capital Cost - 90 Percent Removal**



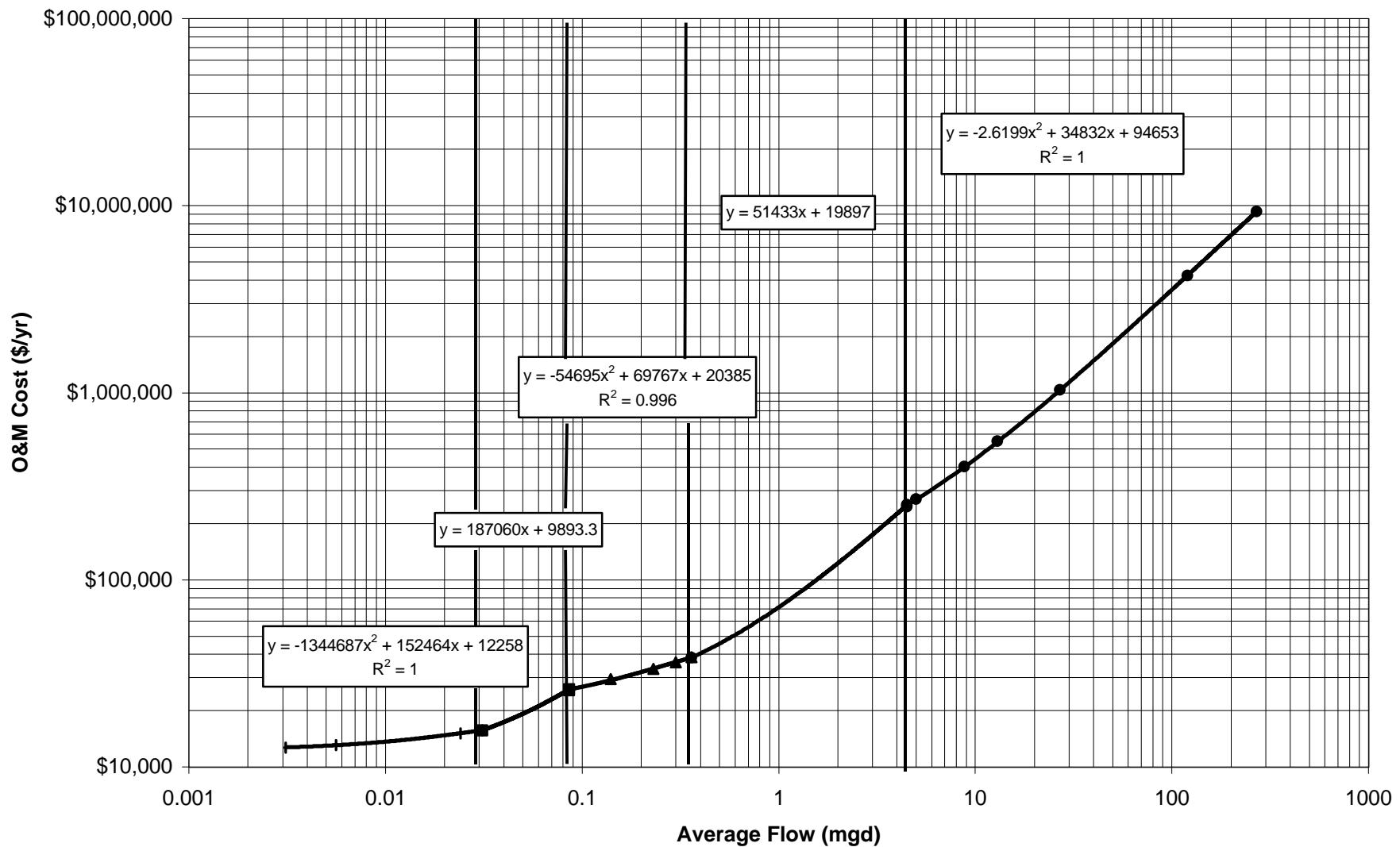
**Figure 3-34**  
**Coagulation Assisted Microfiltration**  
**O&M Cost - 90 Percent Removal**



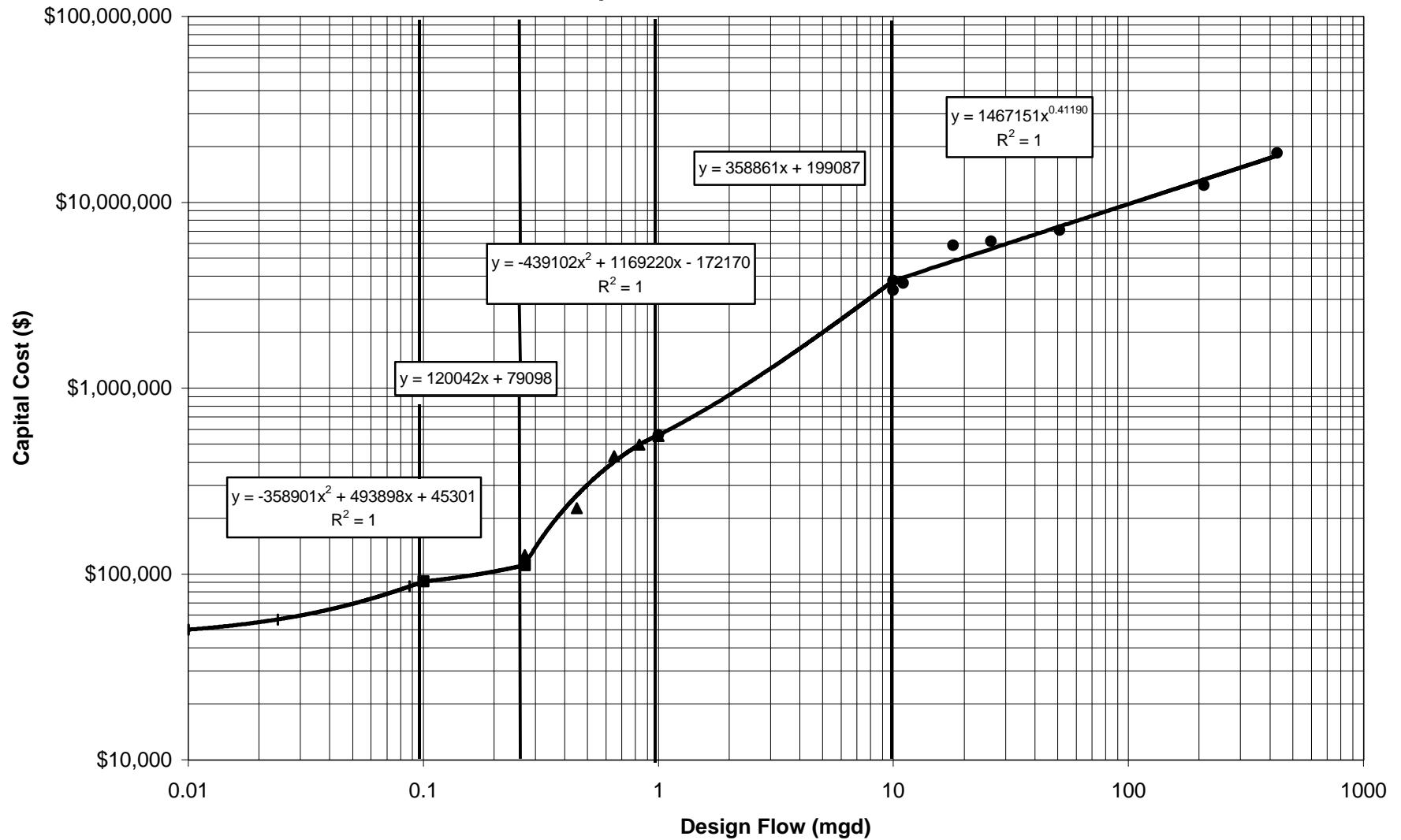
**Figure 3-35**  
**Coagulation Assisted Microfiltration**  
**Capital Cost - 80 Percent Removal**



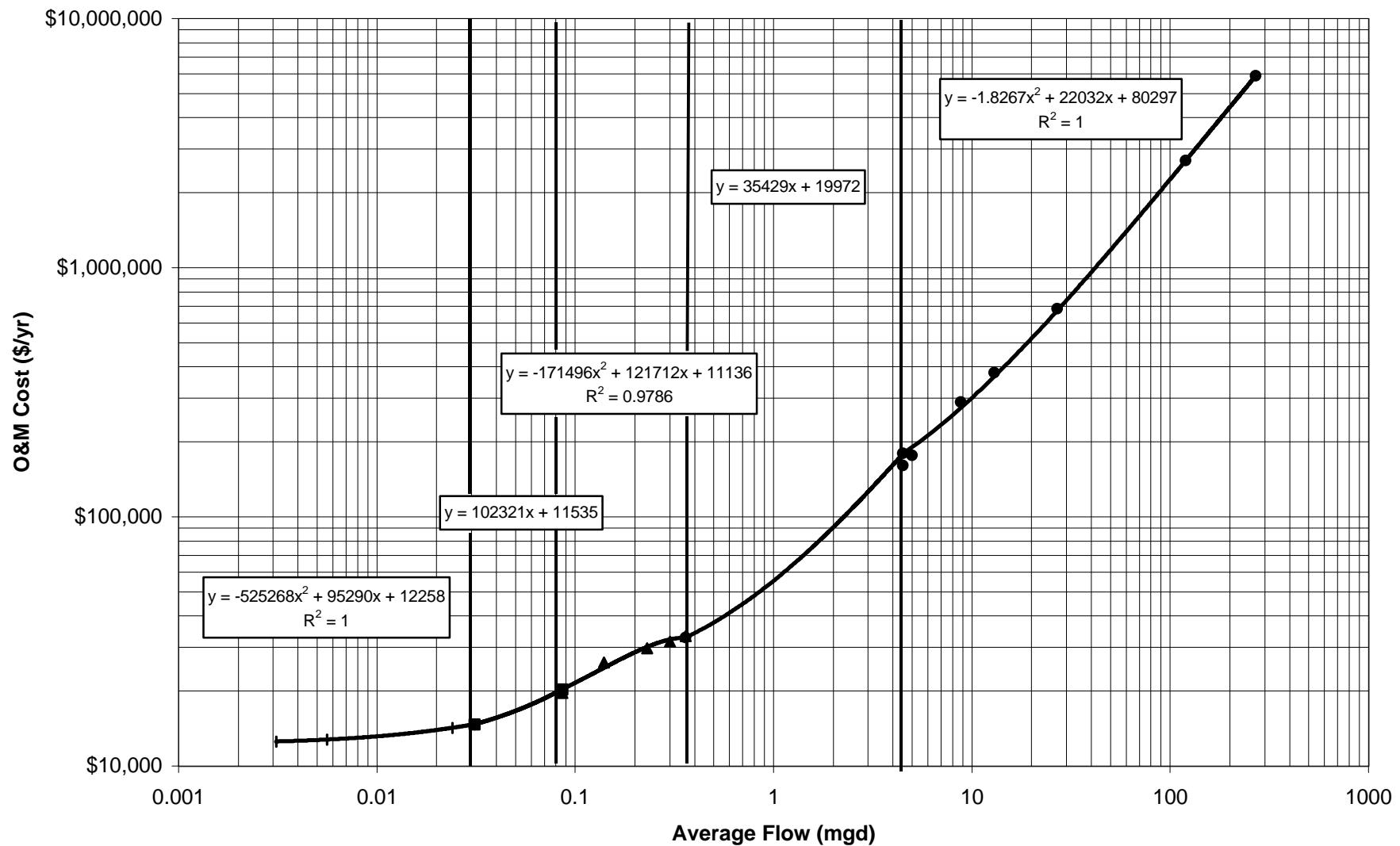
**Figure 3-36**  
**Coagulation Assisted Microfiltration**  
**O&M Cost - 80 Percent Removal**



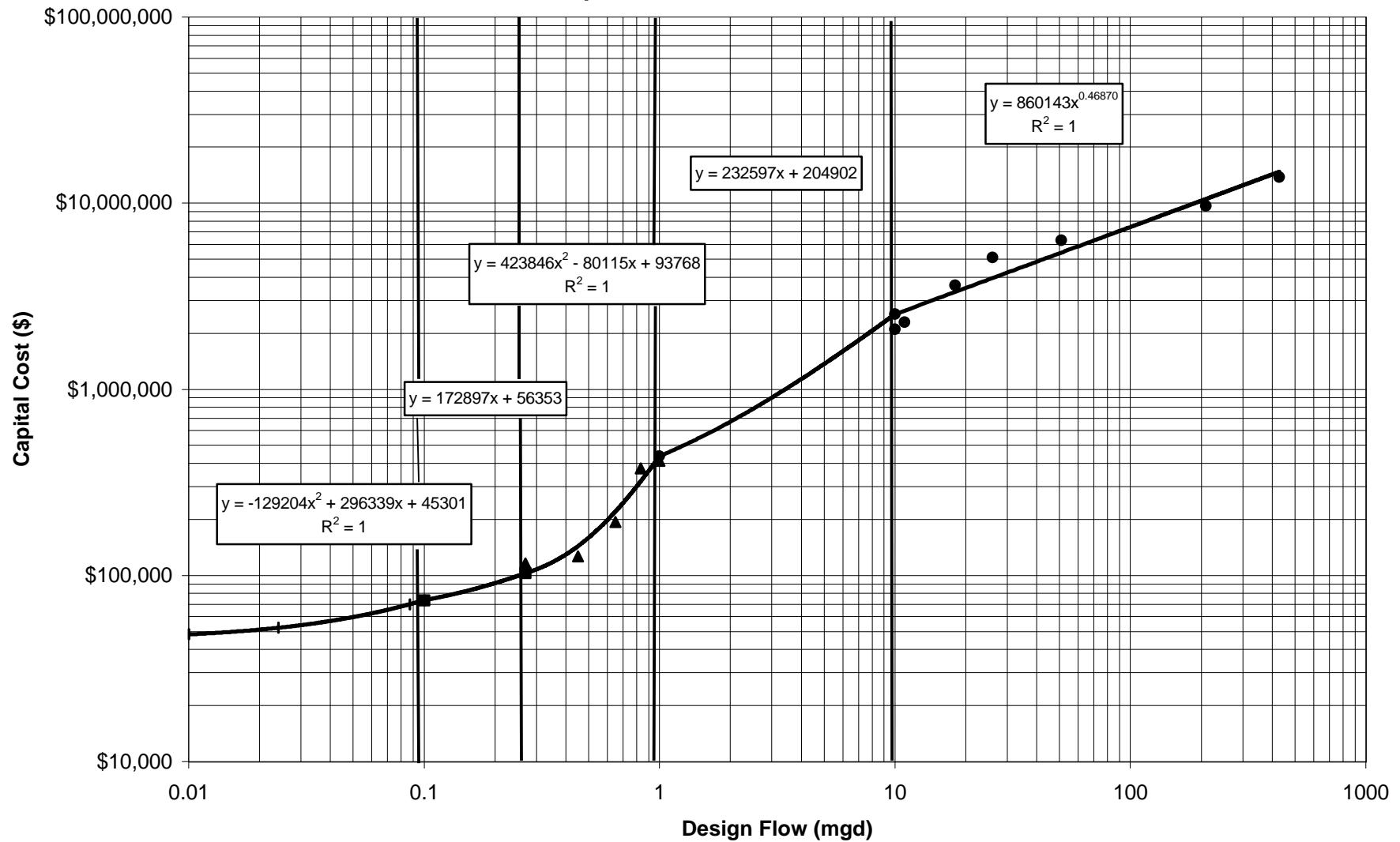
**Figure 3-37**  
**Coagulation Assisted Microfiltration**  
**Capital Cost - 50 Percent Removal**



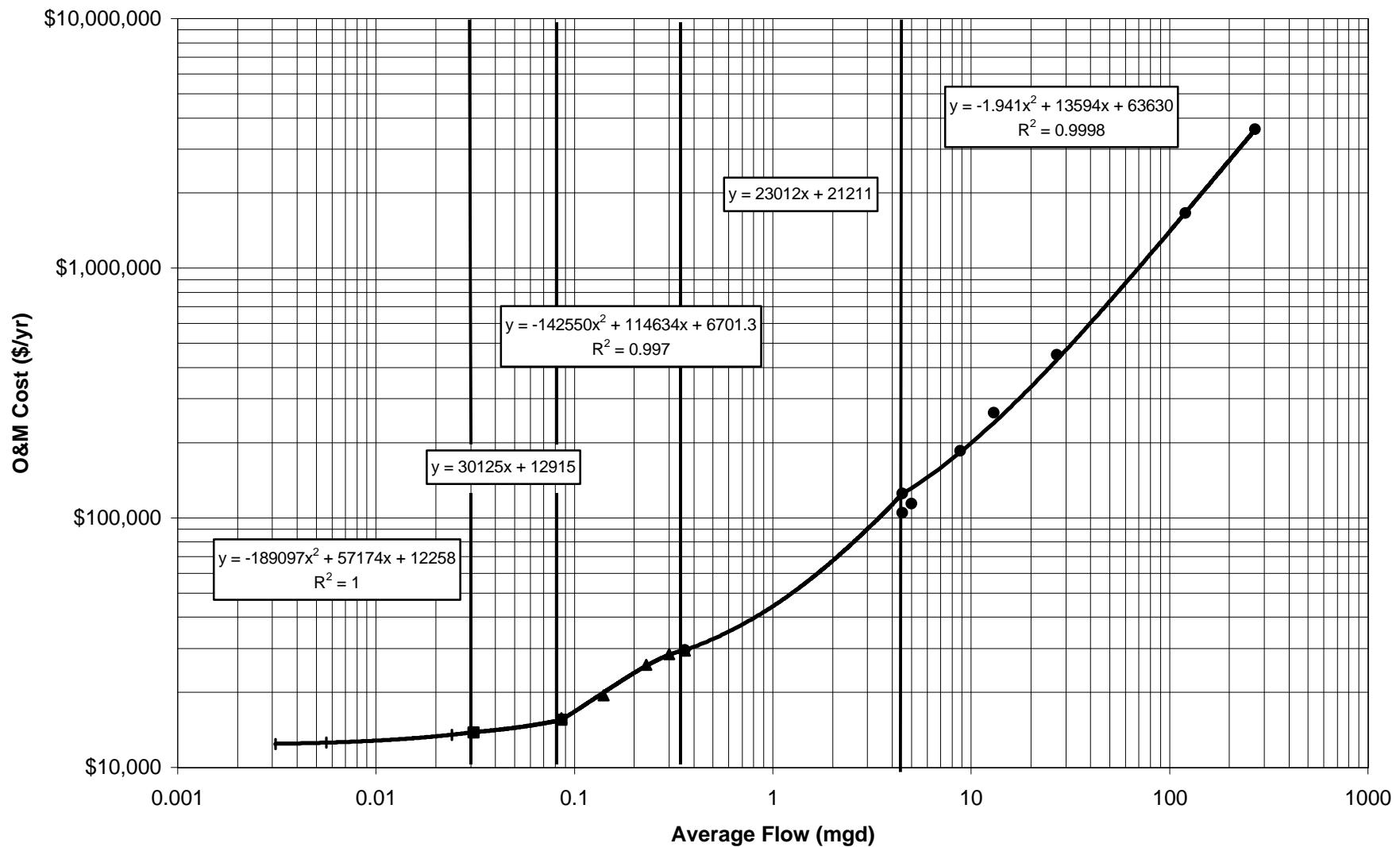
**Figure 3-38**  
**Coagulation Assisted Microfiltration**  
**O&M Cost - 50 Percent Removal**



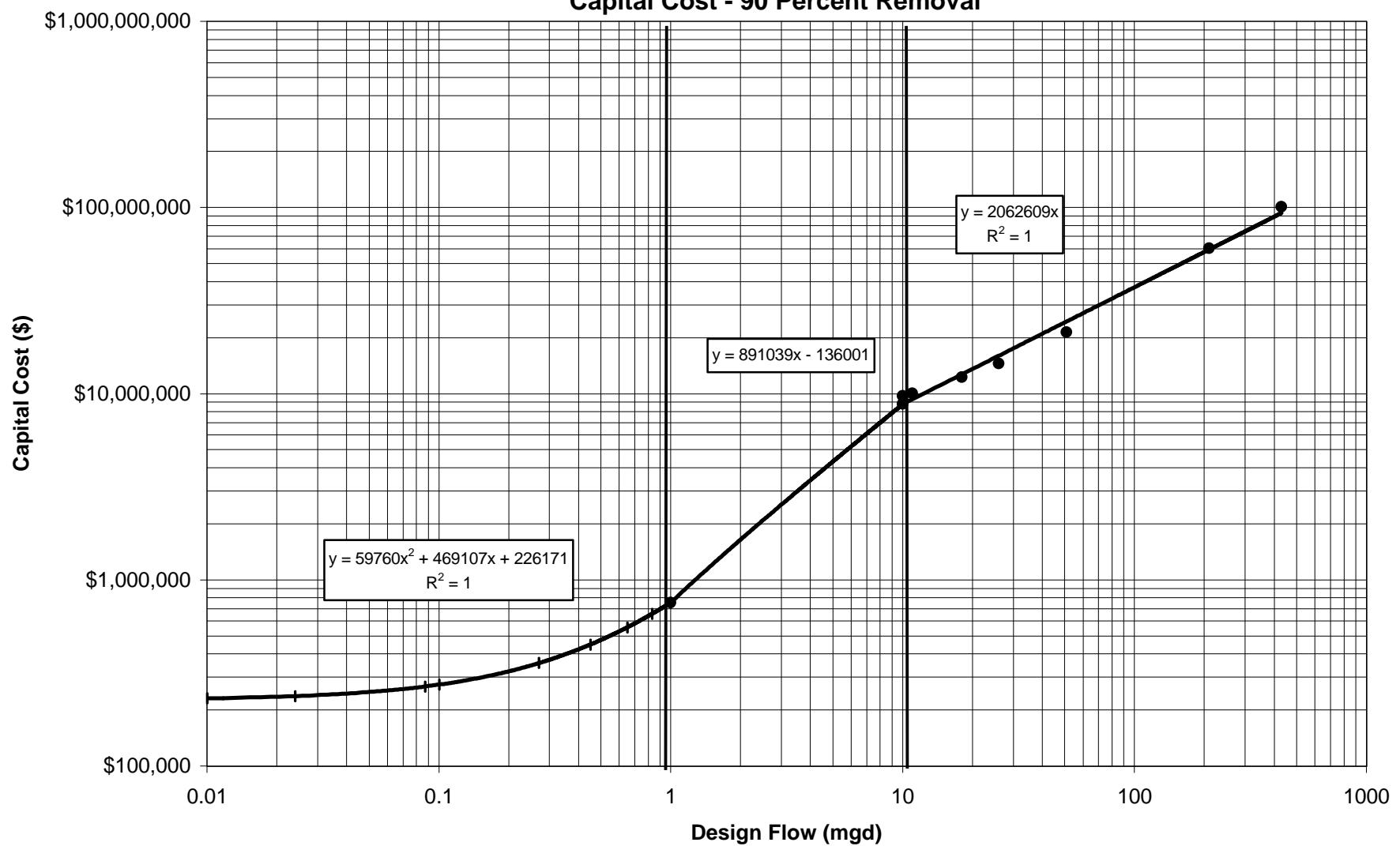
**Figure 3-39**  
**Coagulation Assisted Microfiltration**  
**Capital Cost - 30 Percent Removal**



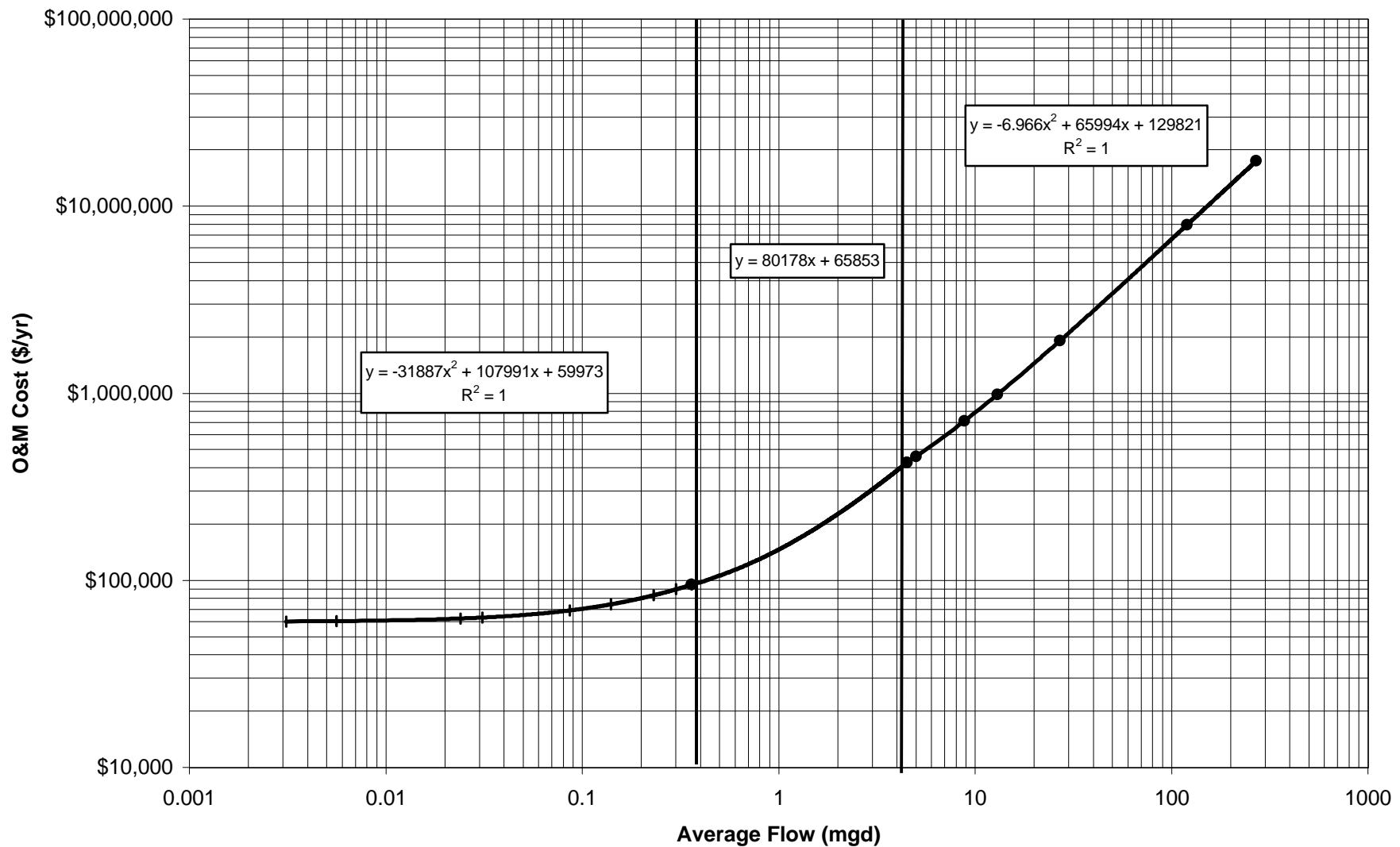
**Figure 3-40**  
**Coagulation Assisted Microfiltration**  
**O&M Cost - 30 Percent Removal**



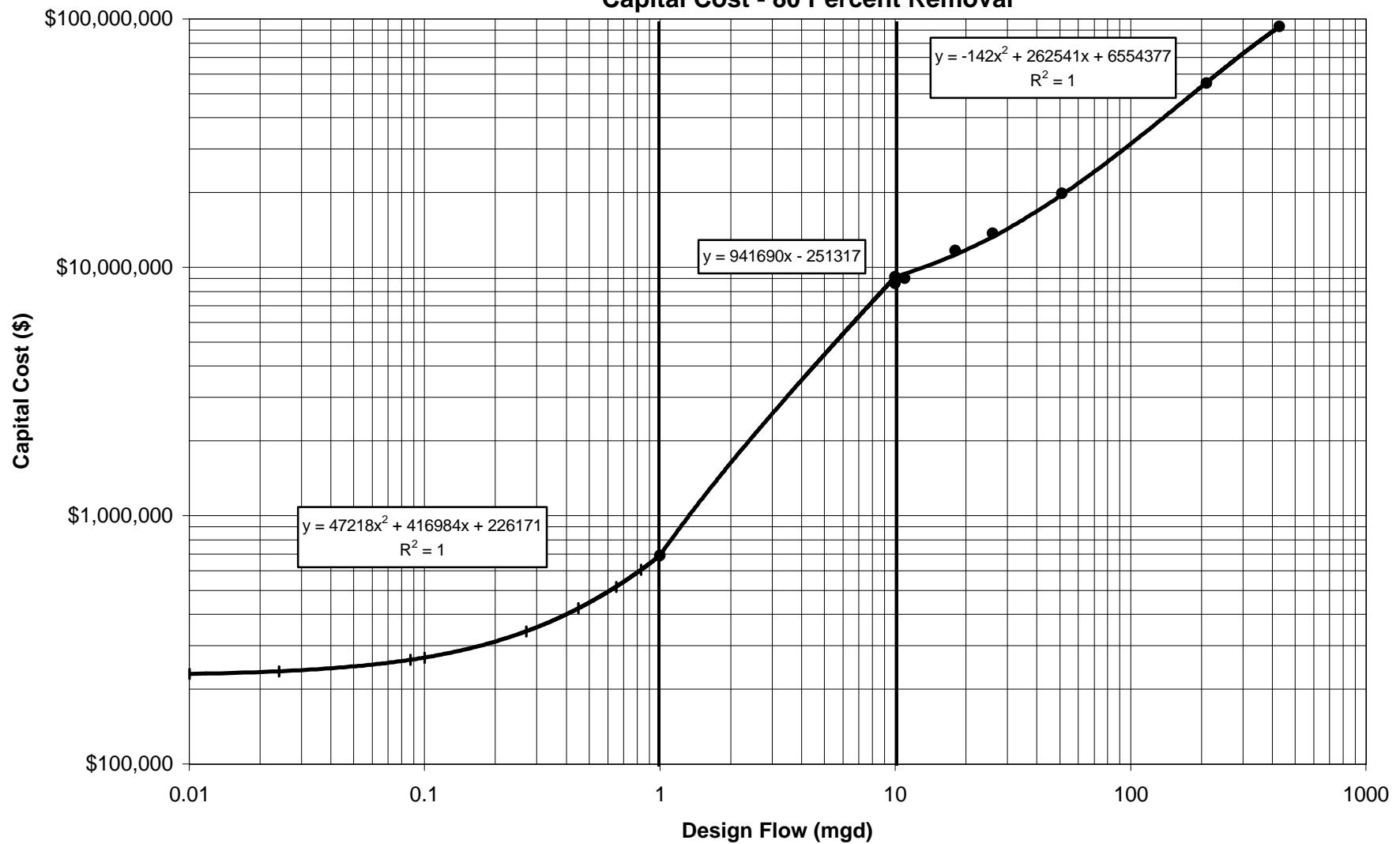
**Figure 3-41**  
**Lime Softening**  
**Capital Cost - 90 Percent Removal**



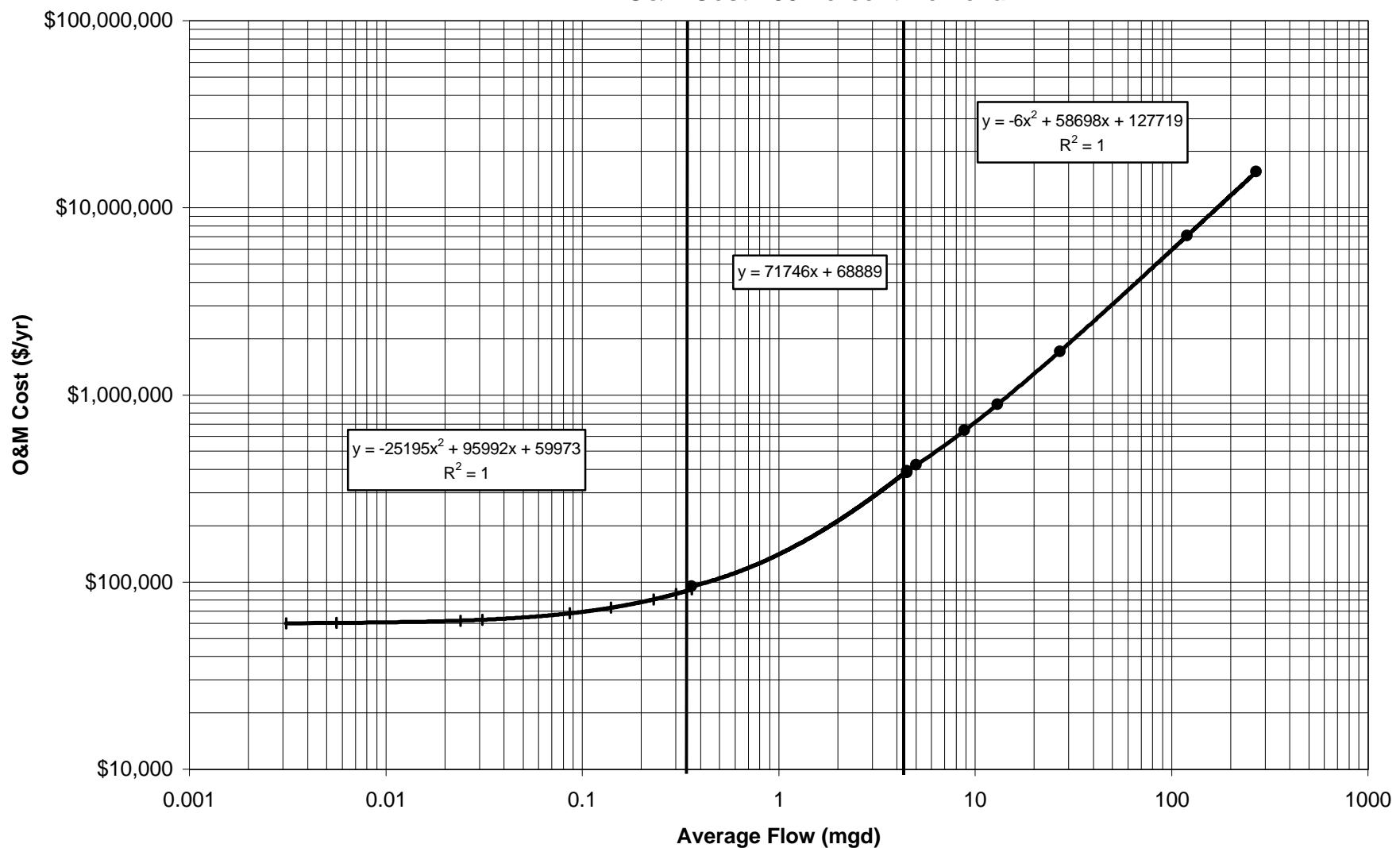
**Figure 3-42**  
**Lime Softening**  
**O&M Cost - 90 Percent Removal**



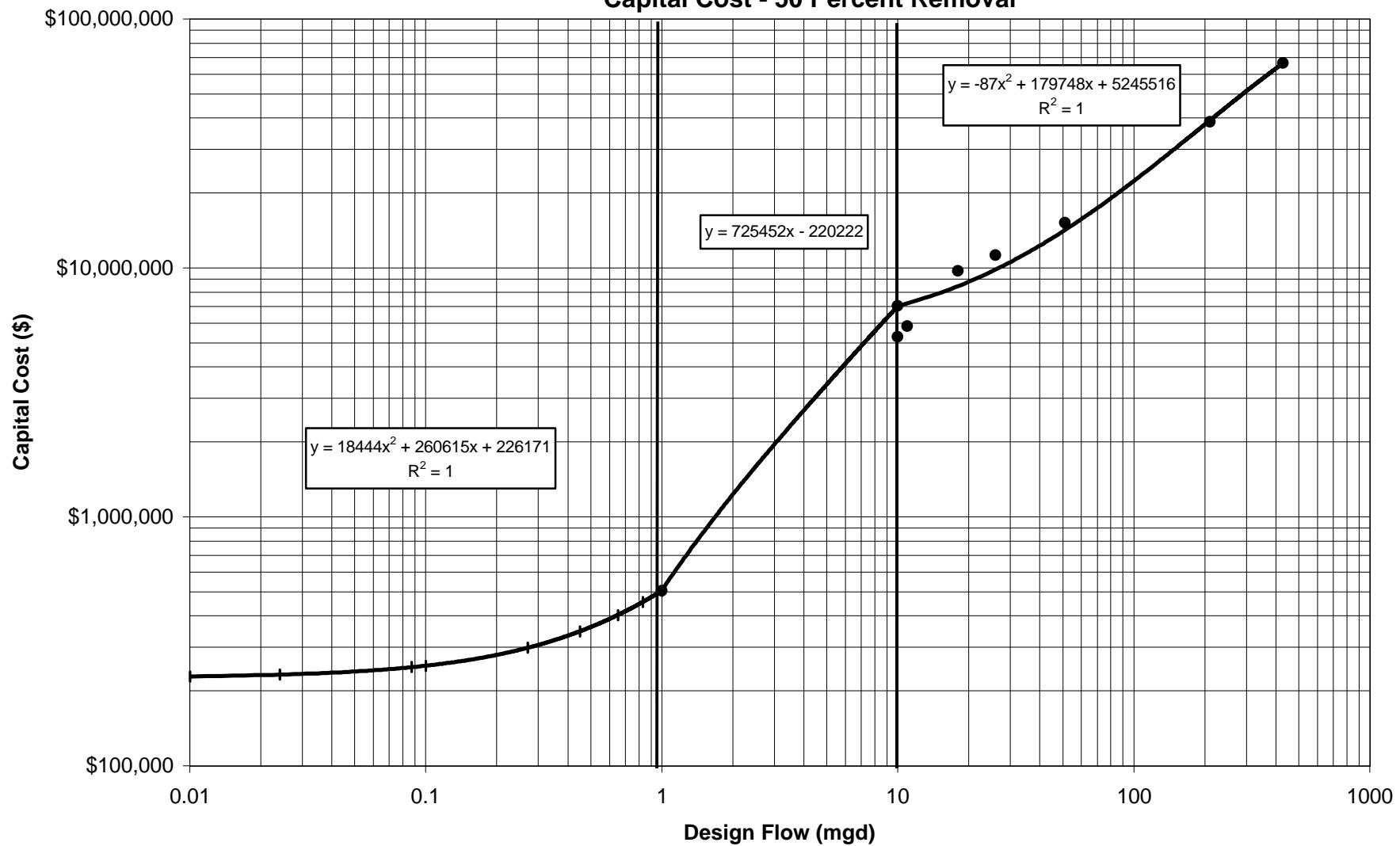
**Figure 3-43**  
**Lime Softening**  
**Capital Cost - 80 Percent Removal**



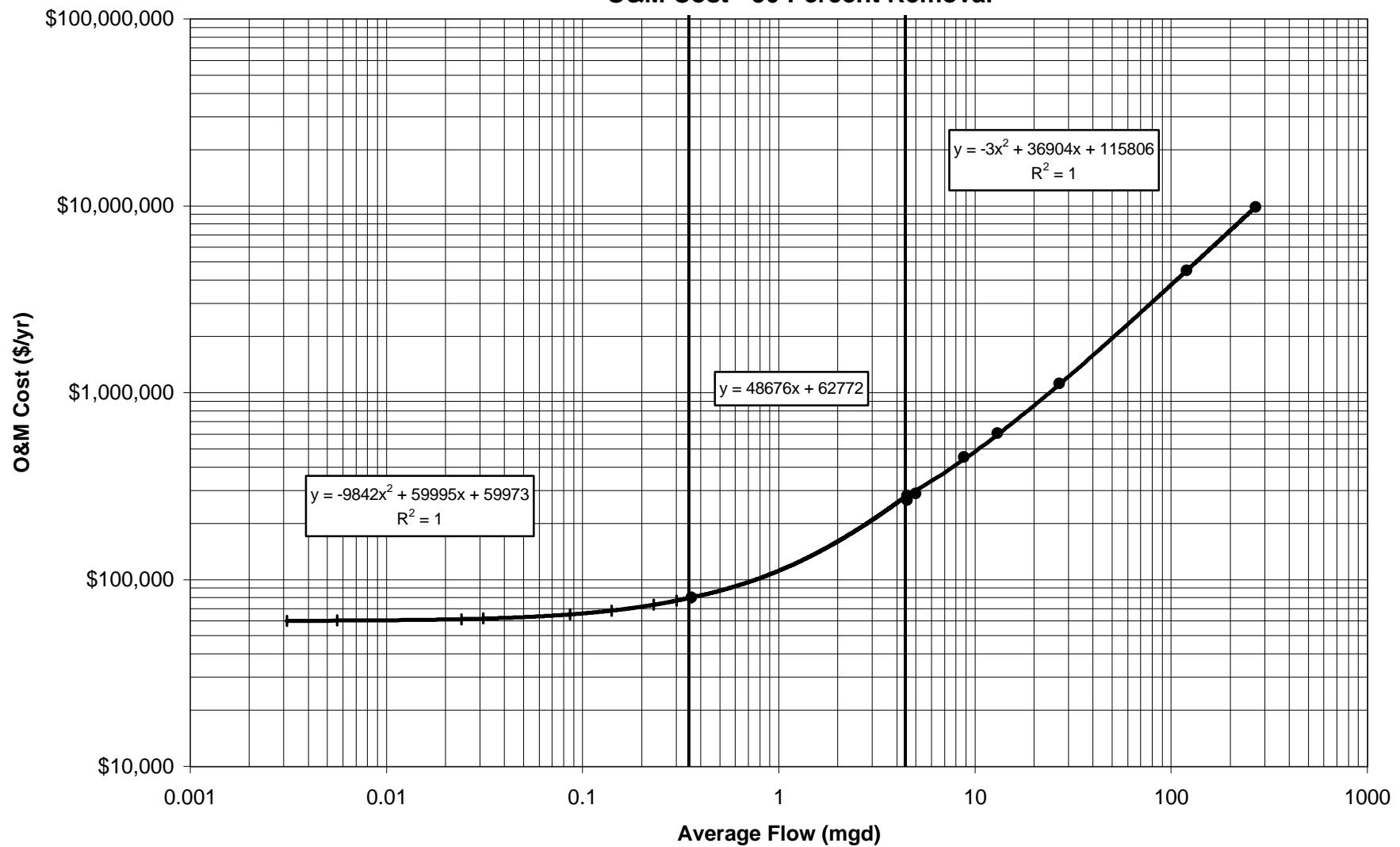
**Figure 3-44**  
**Lime Softening**  
**O&M Cost - 80 Percent Removal**



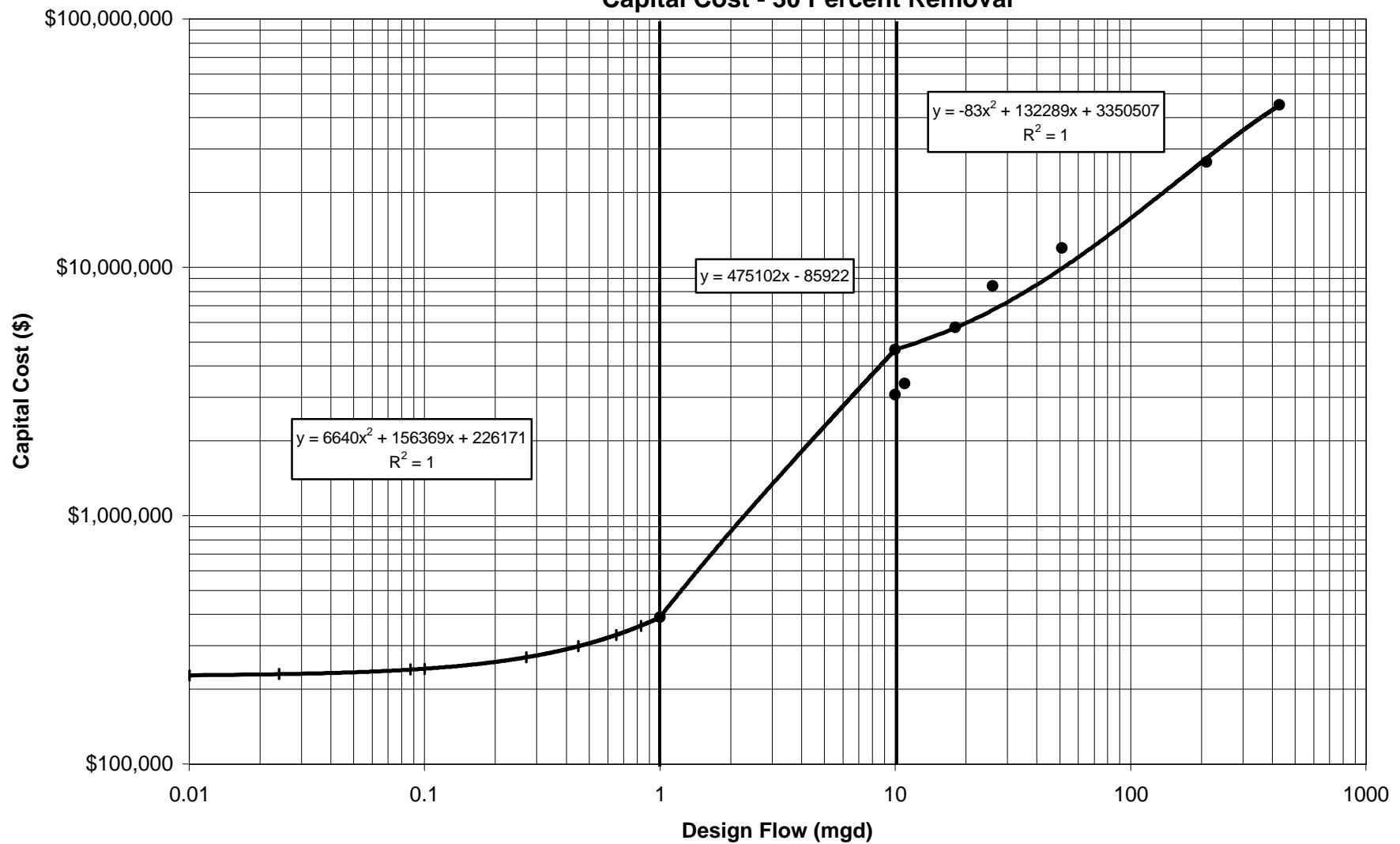
**Figure 3-45**  
**Lime Softening**  
**Capital Cost - 50 Percent Removal**



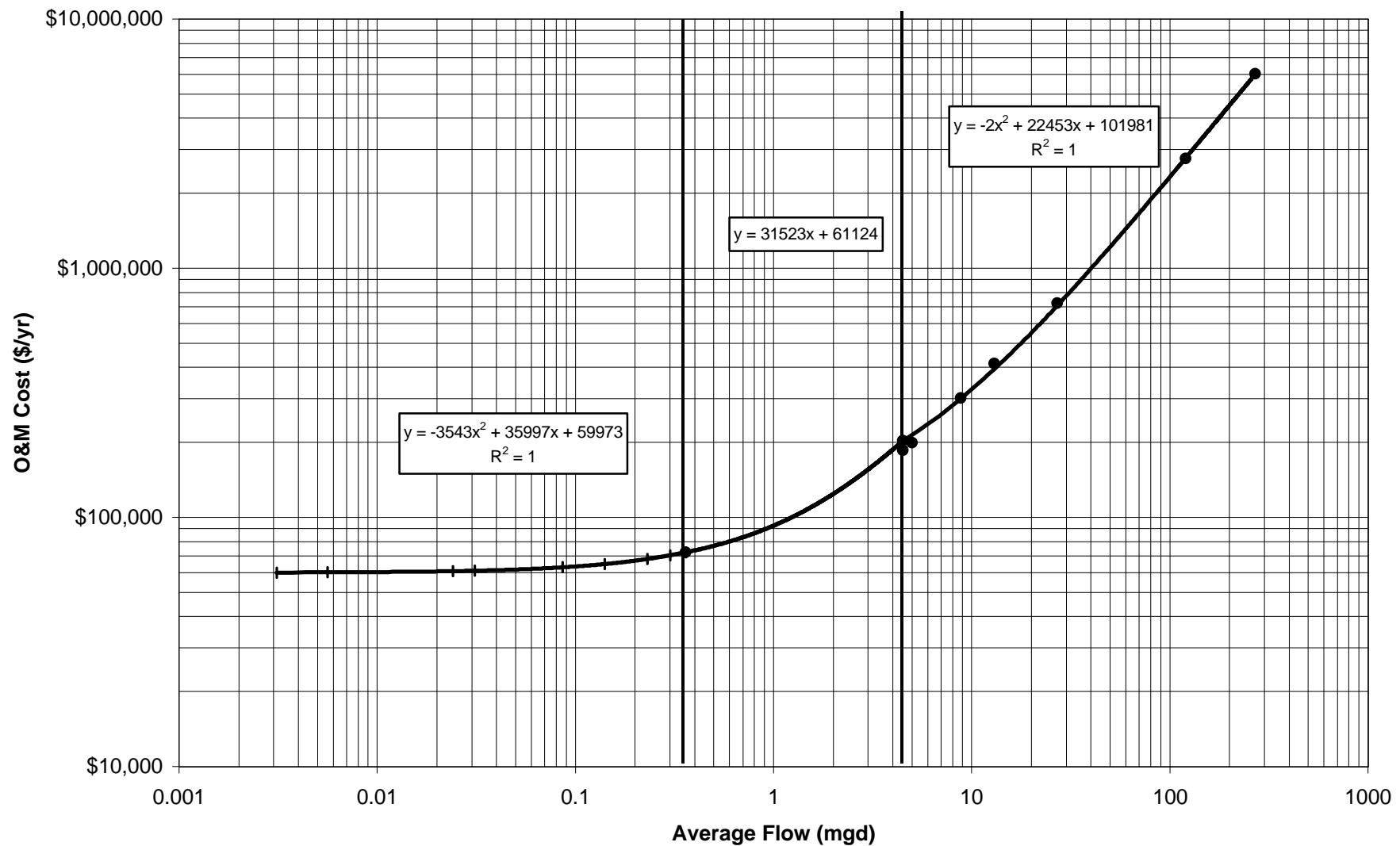
**Figure 3-46**  
**Lime Softening**  
**O&M Cost - 50 Percent Removal**



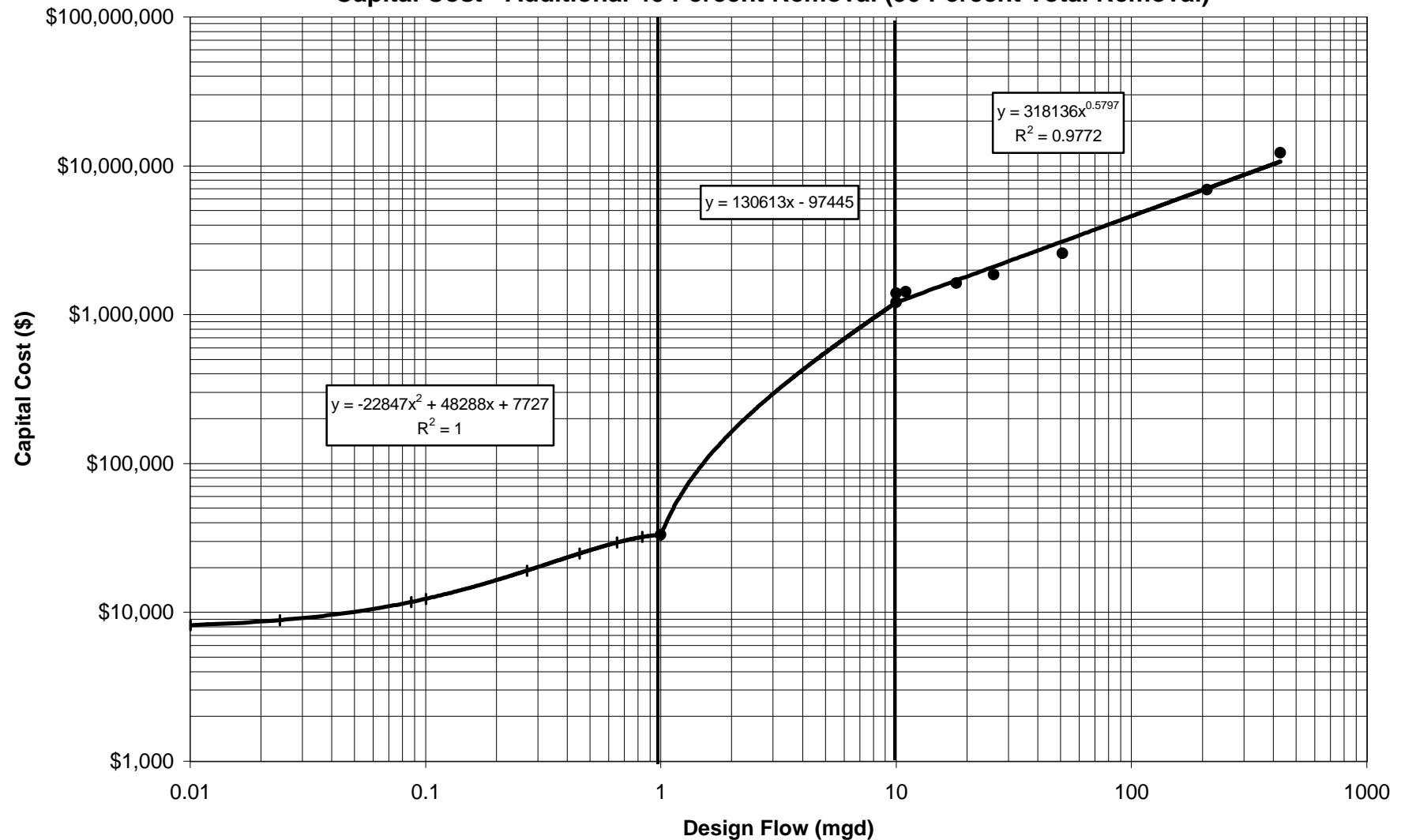
**Figure 3-47**  
**Lime Softening**  
**Capital Cost - 30 Percent Removal**



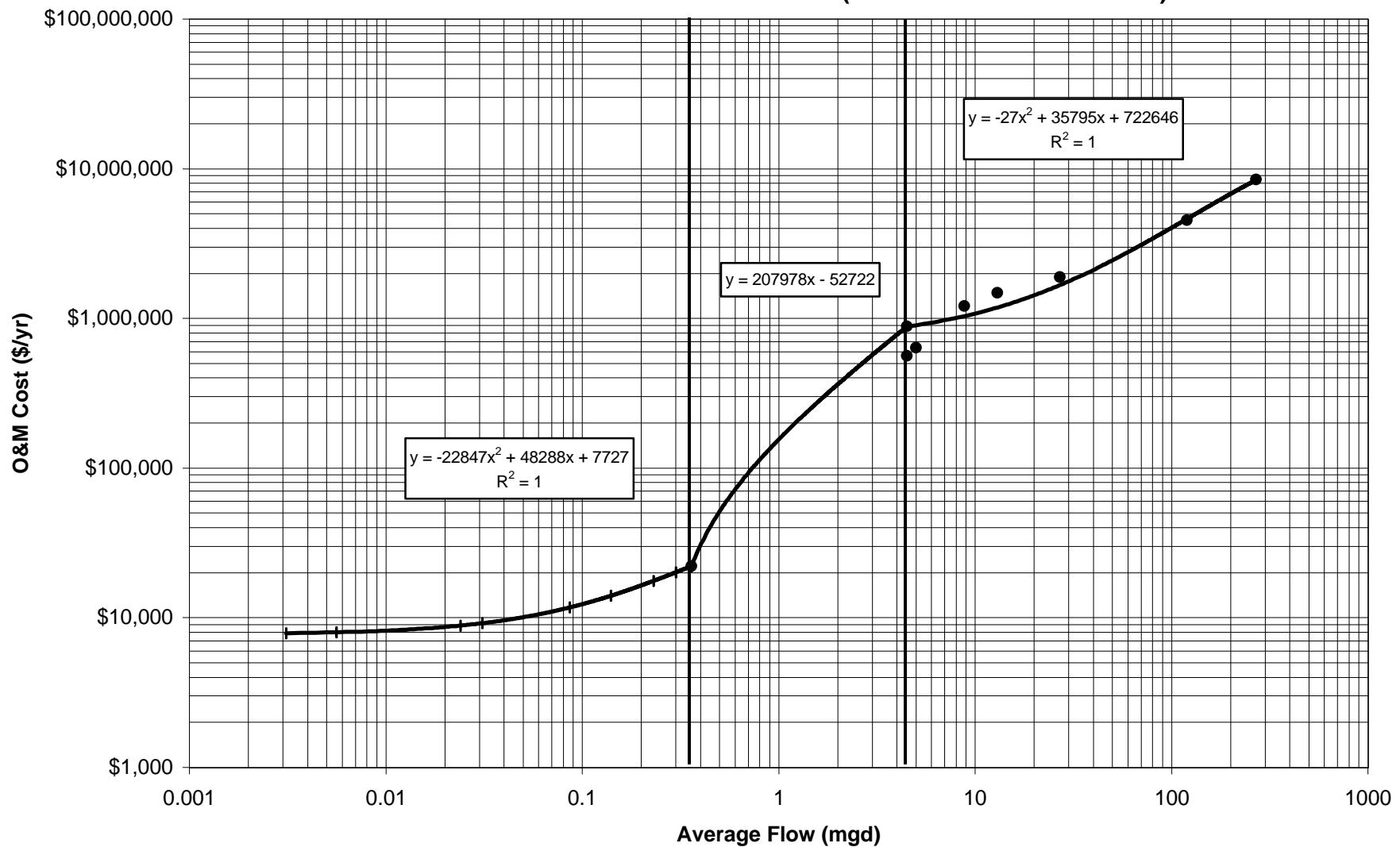
**Figure 3-48**  
**Lime Softening**  
**O&M Cost - 30 Percent Removal**



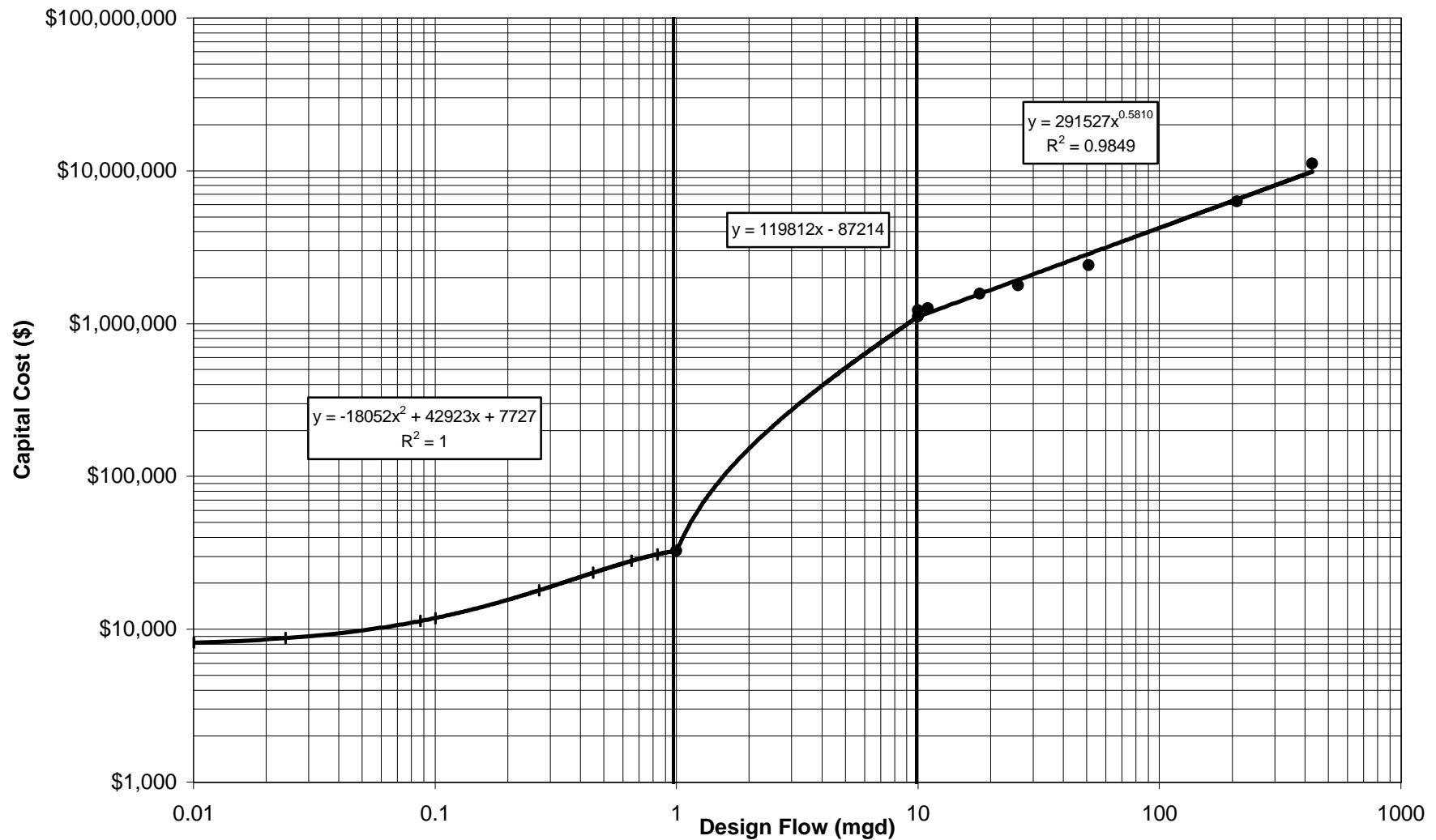
**Figure 3-49**  
**Enhanced Lime Softening**  
**Capital Cost - Additional 40 Percent Removal (90 Percent Total Removal)**



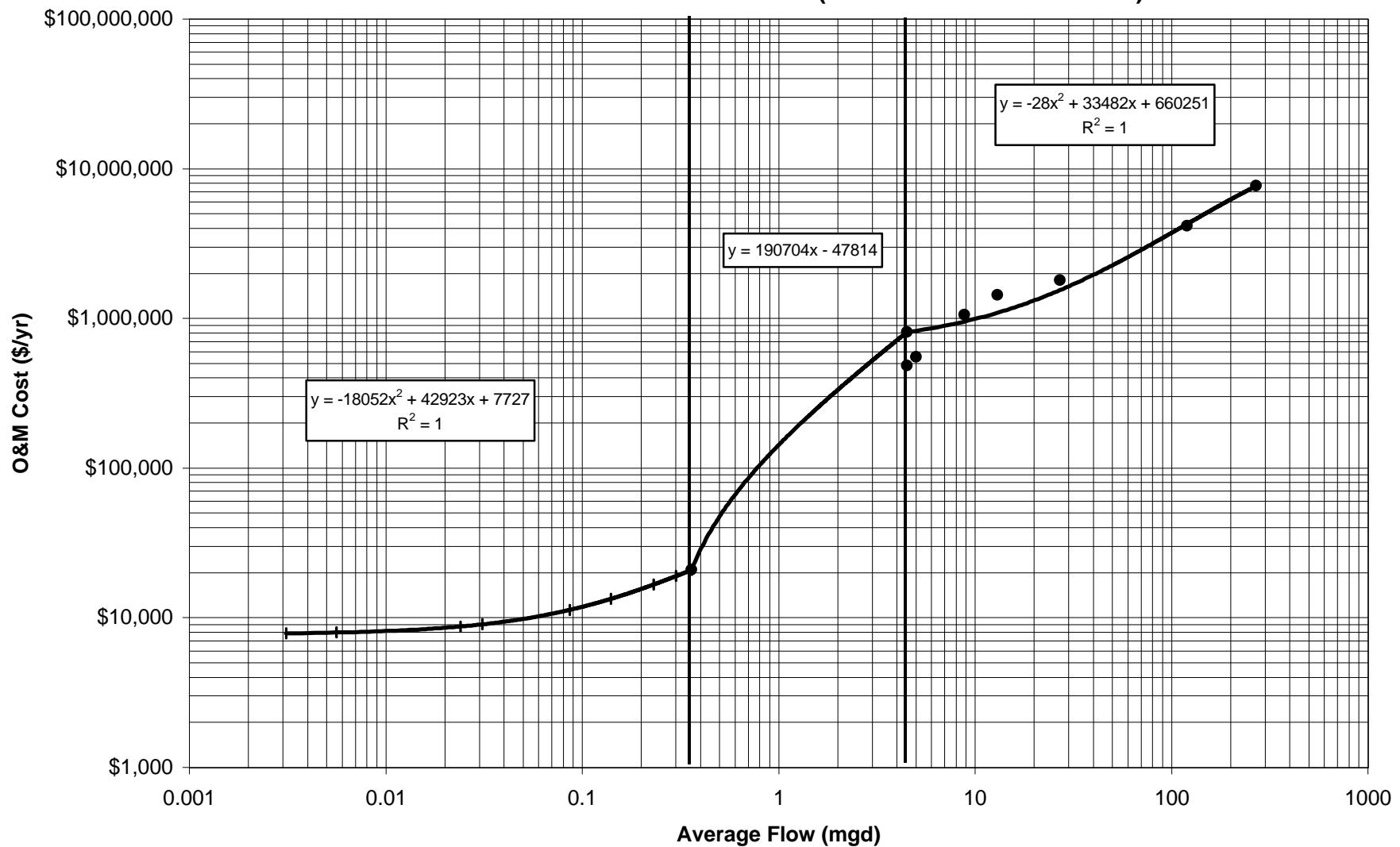
**Figure 3-50**  
**Enhanced Lime Softening**  
**O&M - Additional 40 Percent Removal (90 Percent Total Removal)**



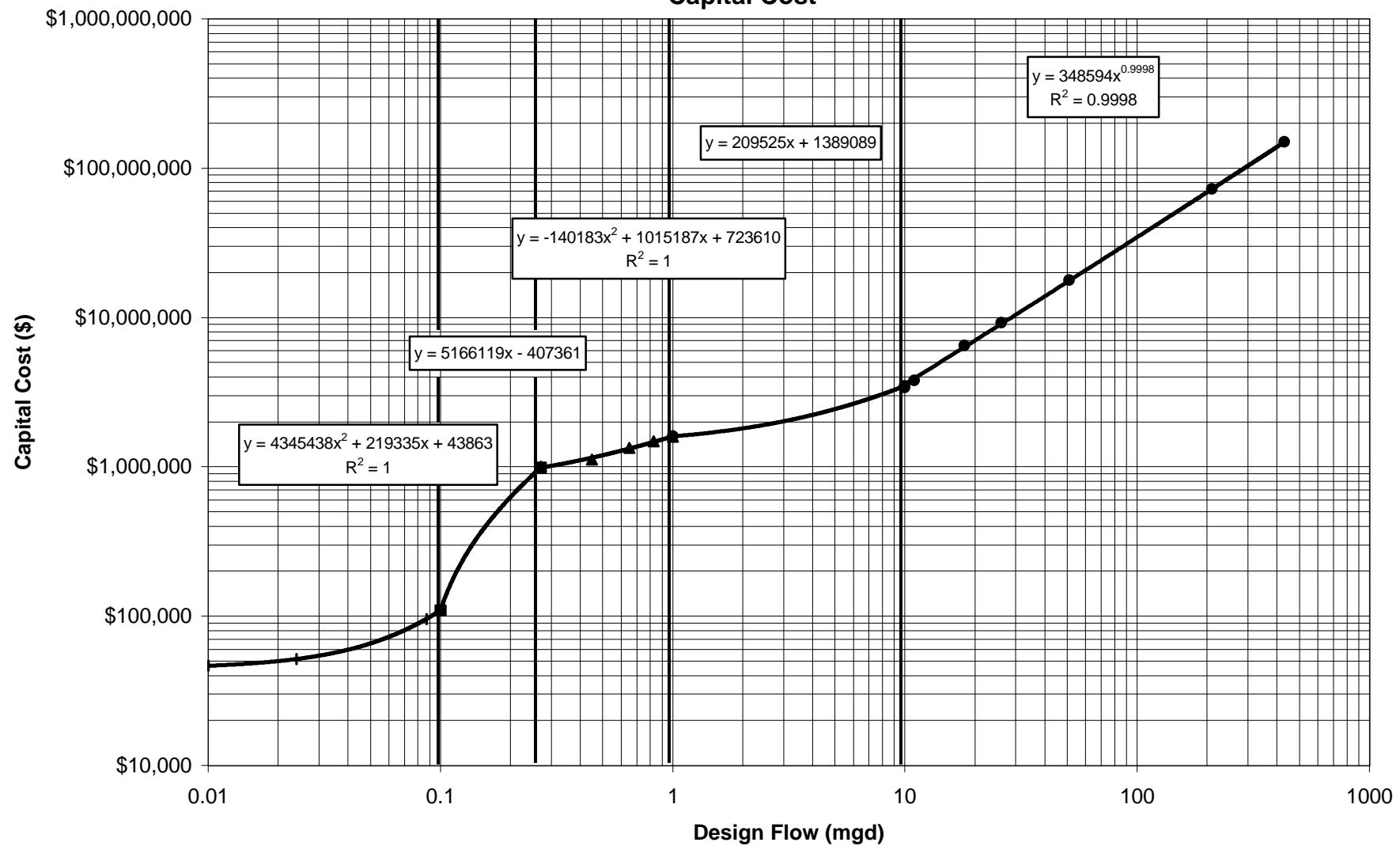
**Figure 3-51**  
**Enhanced Lime Softening**  
**Capital Cost - Additional 30 Percent Removal (80 Percent Total Removal)**



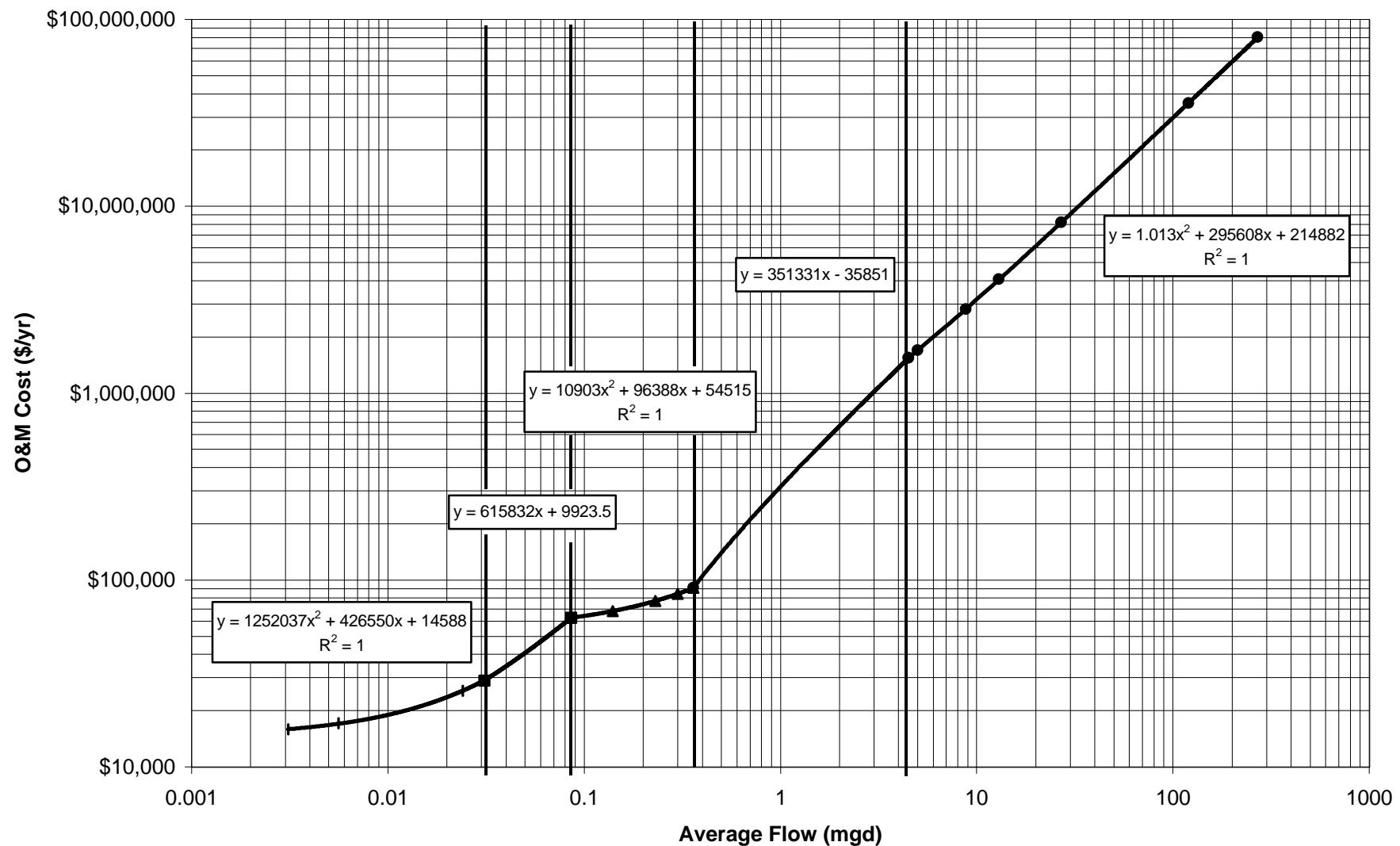
**Figure 3-52**  
**Enhanced Lime Softening**  
**O&M - Additional 30 Percent Removal (80 Percent Total Removal)**



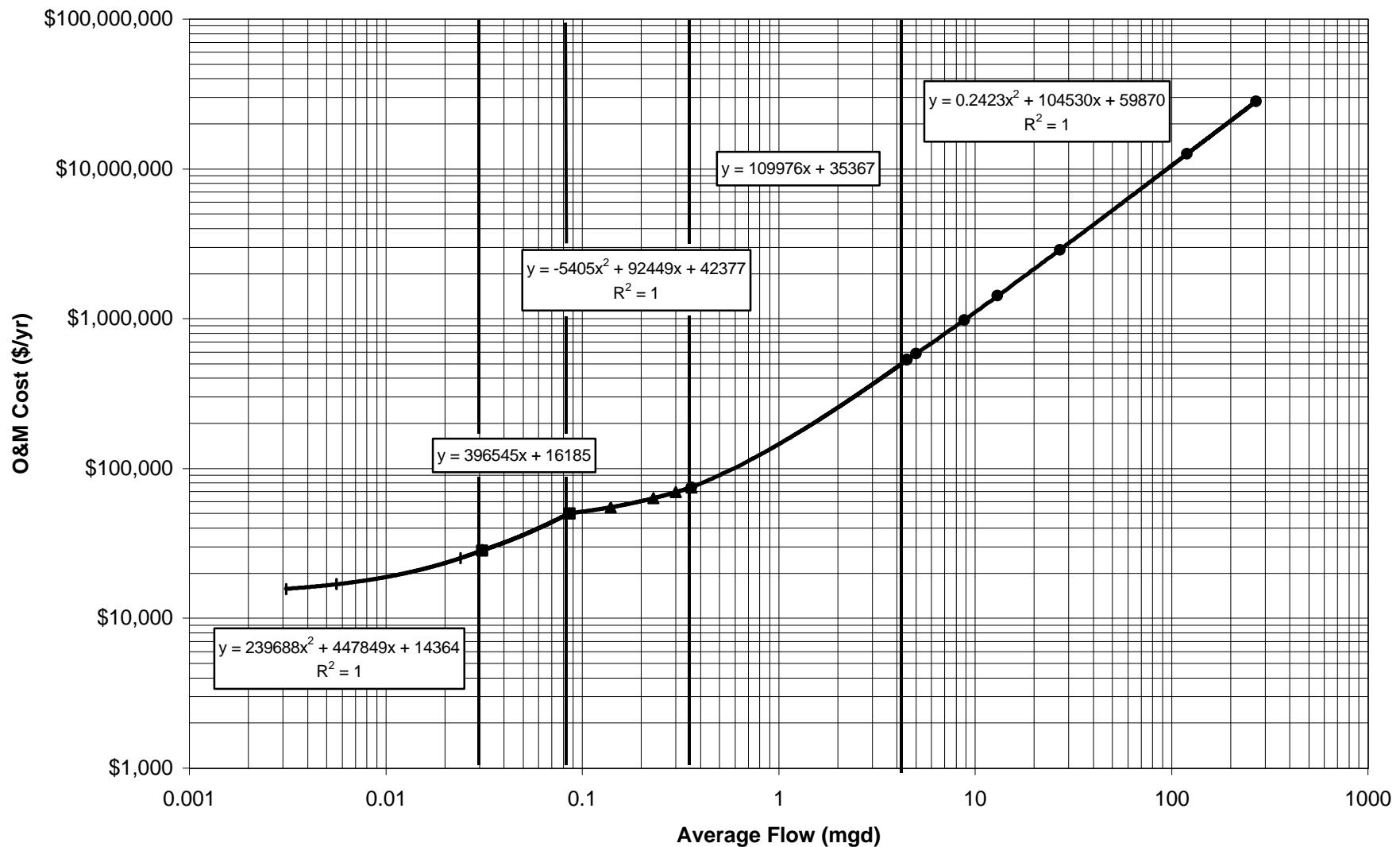
**Figure 3-53**  
**Activated Alumina**  
**Capital Cost**



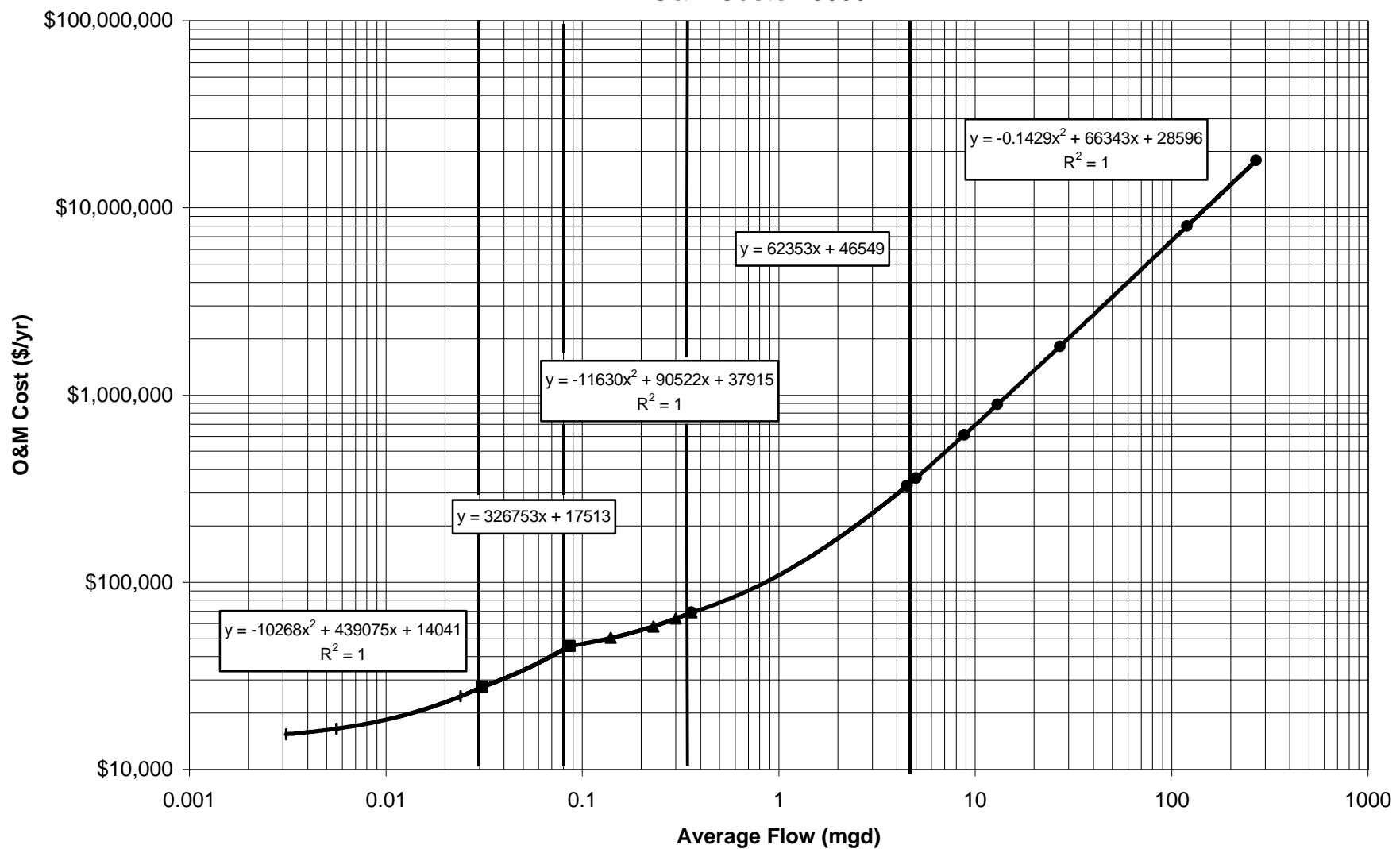
**Figure 3-54**  
**Activated Alumina**  
**O&M Costs - 500 BV**



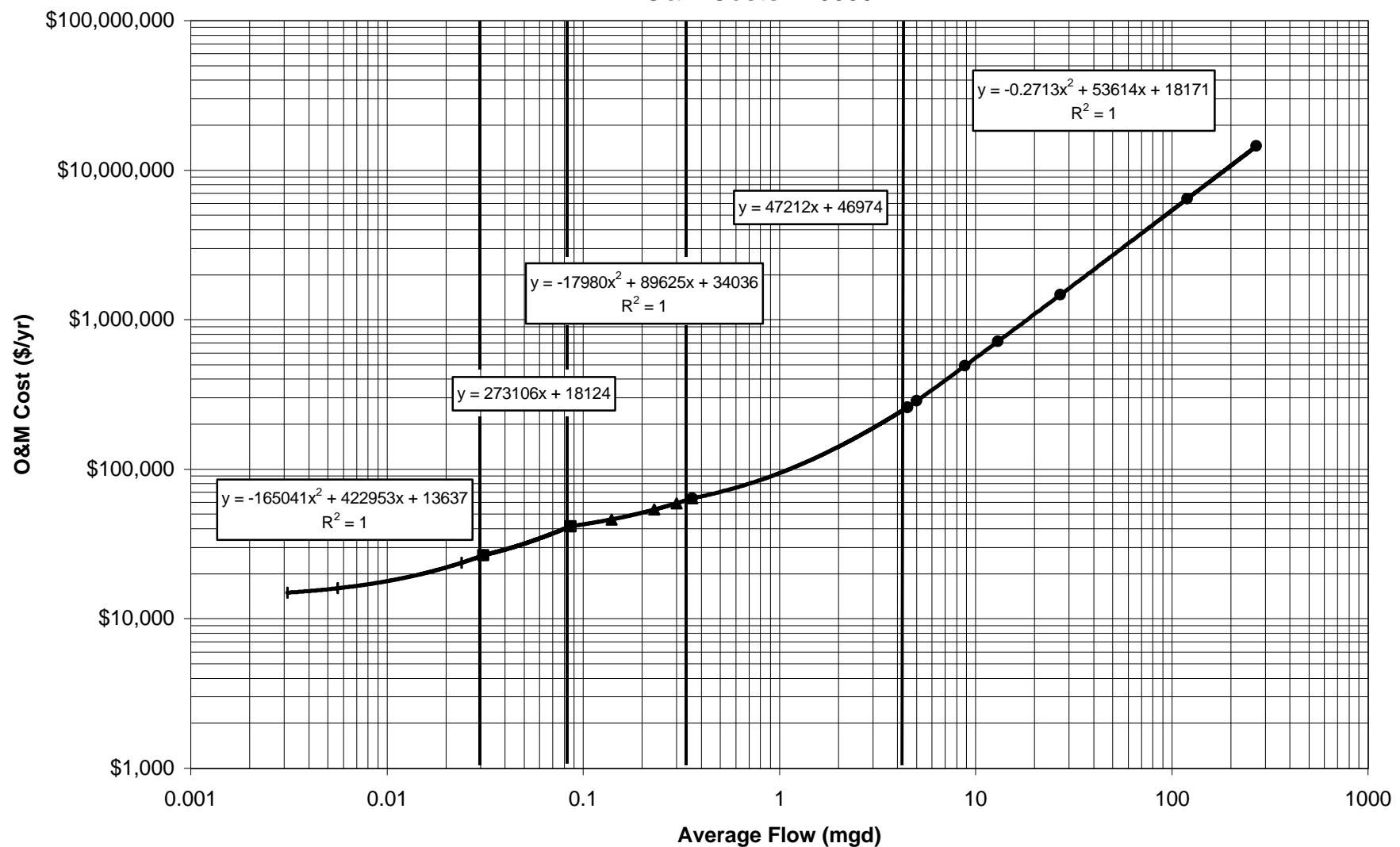
**Figure 3-55**  
**Activated Alumina**  
**O&M Costs - 2000 BV**



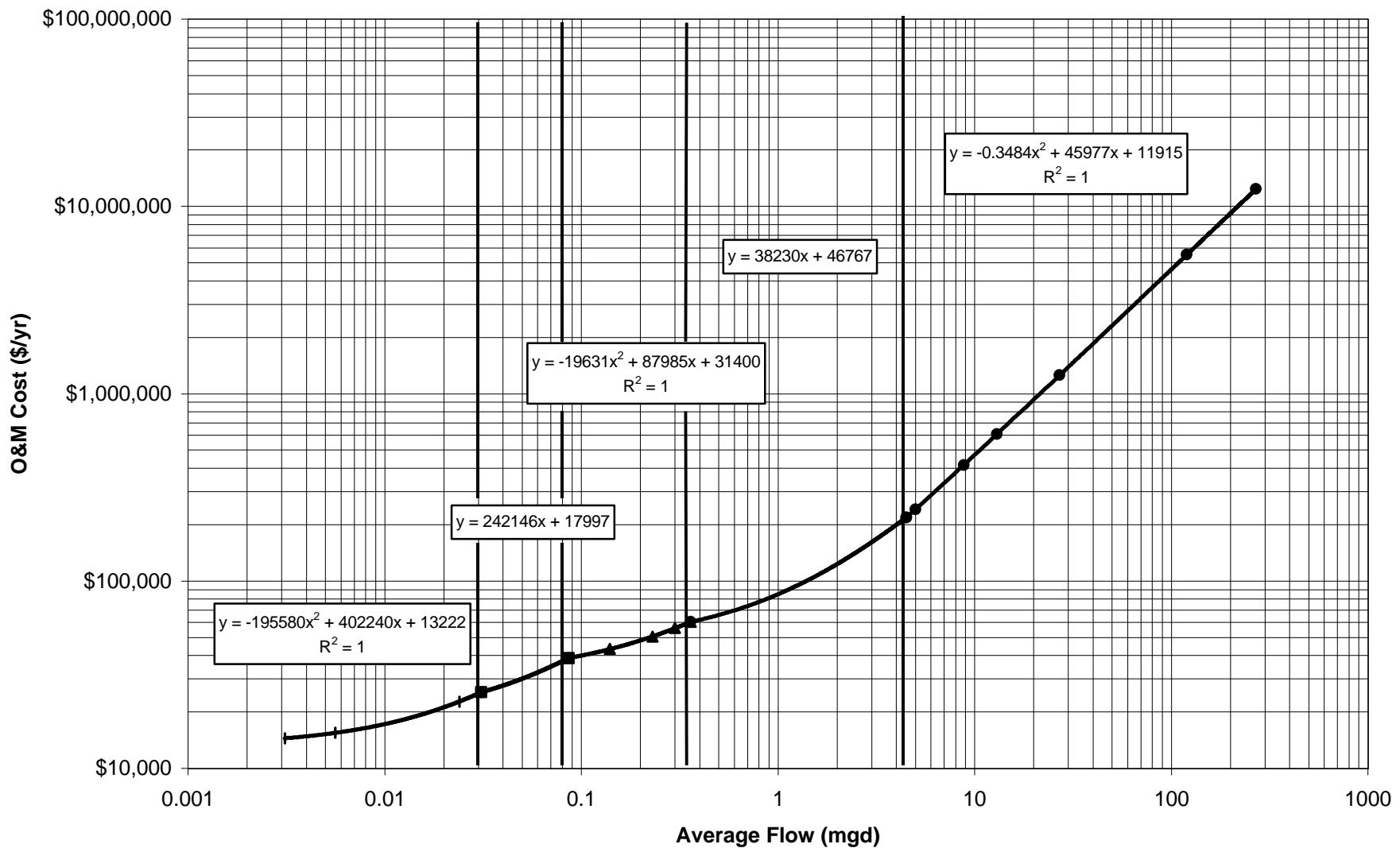
**Figure 3-56**  
**Activated Alumina**  
**O&M Costs - 5000 BV**



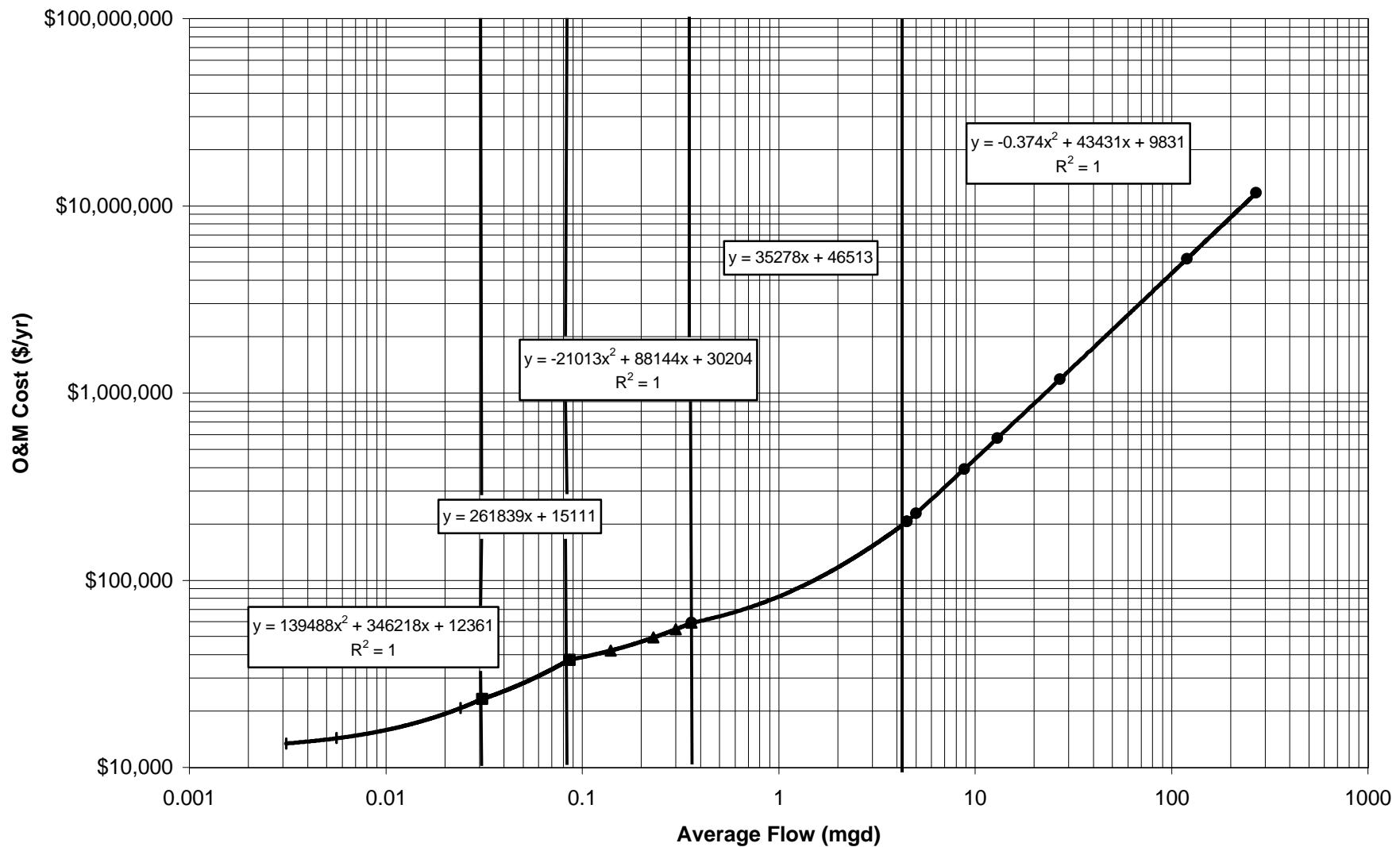
**Figure 3-57**  
**Activated Alumina**  
**O&M Costs - 10000 BV**



**Figure 3-58**  
**Activated Alumina**  
**O&M Costs - 25000 BV**

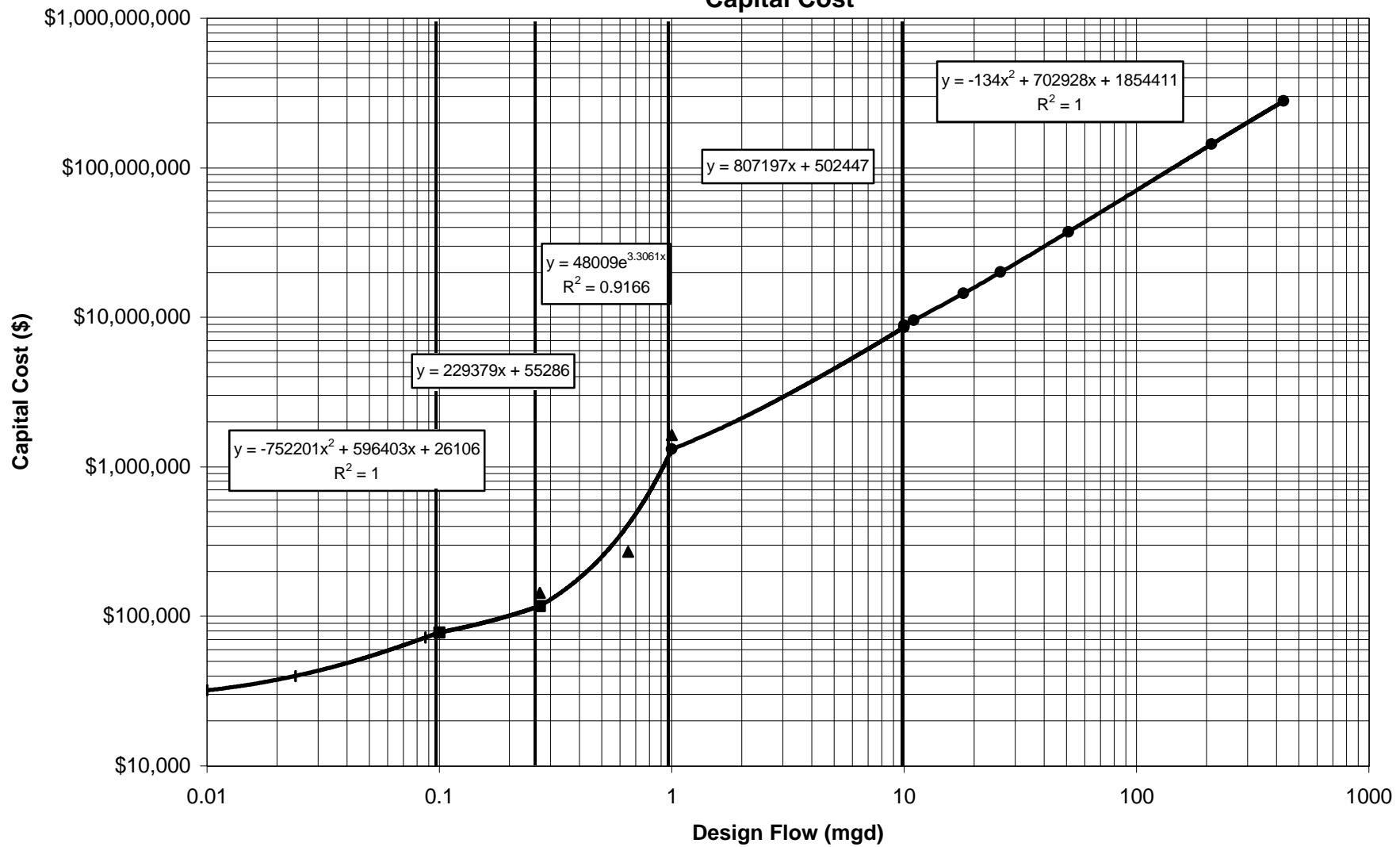


**Figure 3-59**  
**Activated Alumina**  
**O&M Costs - 50000 BV**

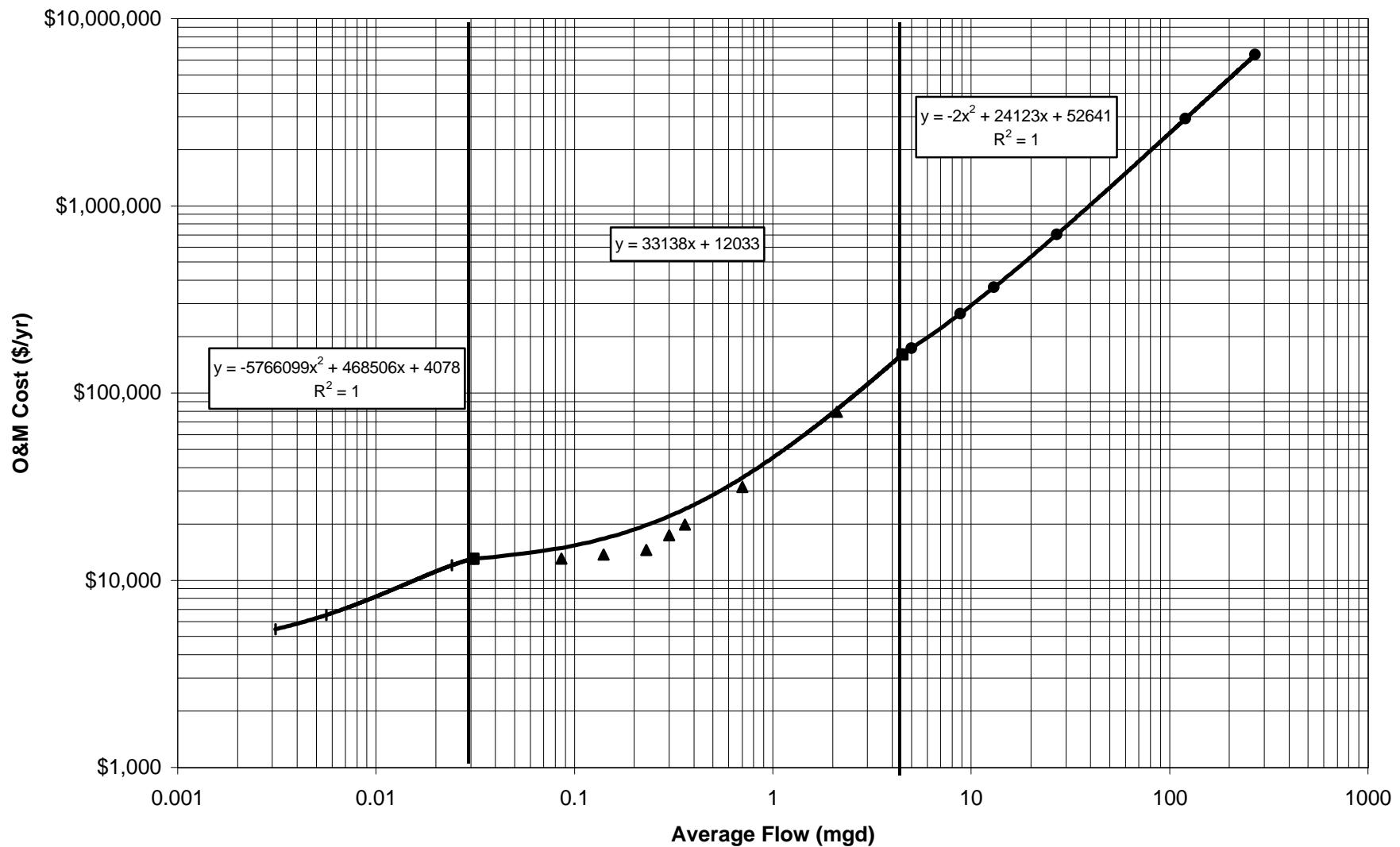


**Graphs 3-60 through 3-64 are not available electronically.  
Please contact Jeff Kempic (202 260 9567 or [kempic.jeffrey@epa.gov](mailto:kempic.jeffrey@epa.gov)) for more information.**

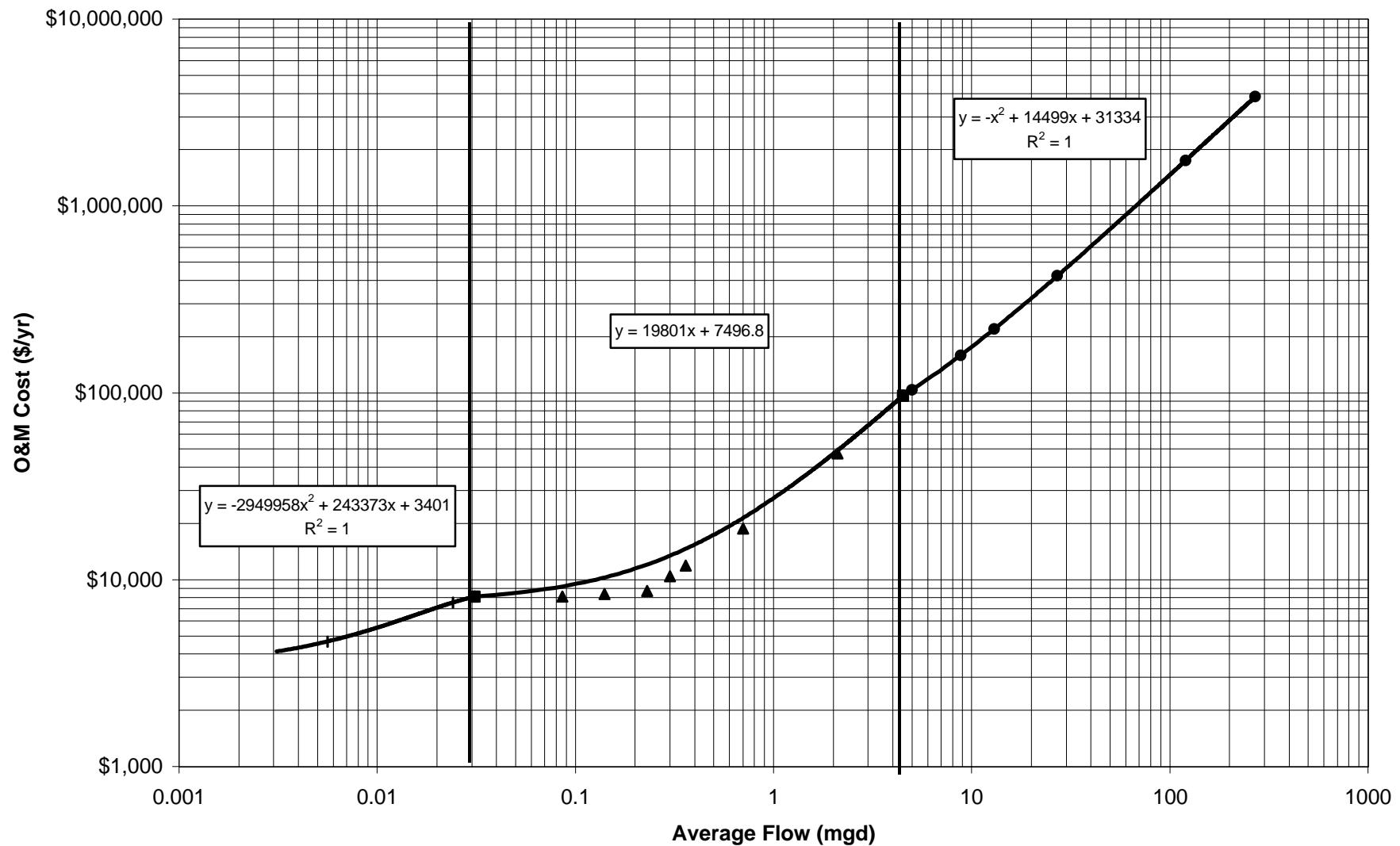
**Figure 3-65**  
**Ion Exchange**  
**Capital Cost**



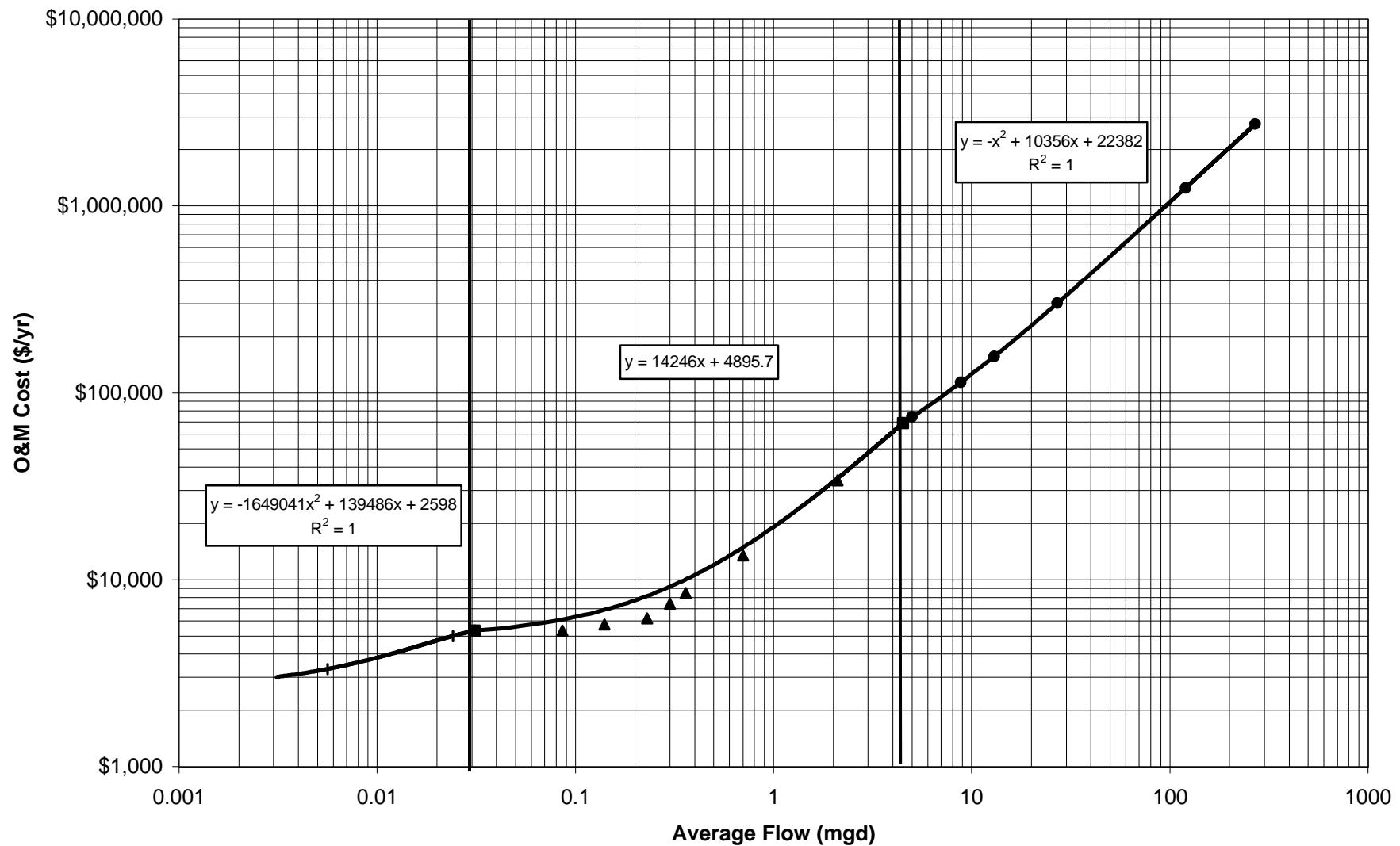
**Figure 3-66**  
**Ion Exchange**  
**O&M Costs - 300 BV**



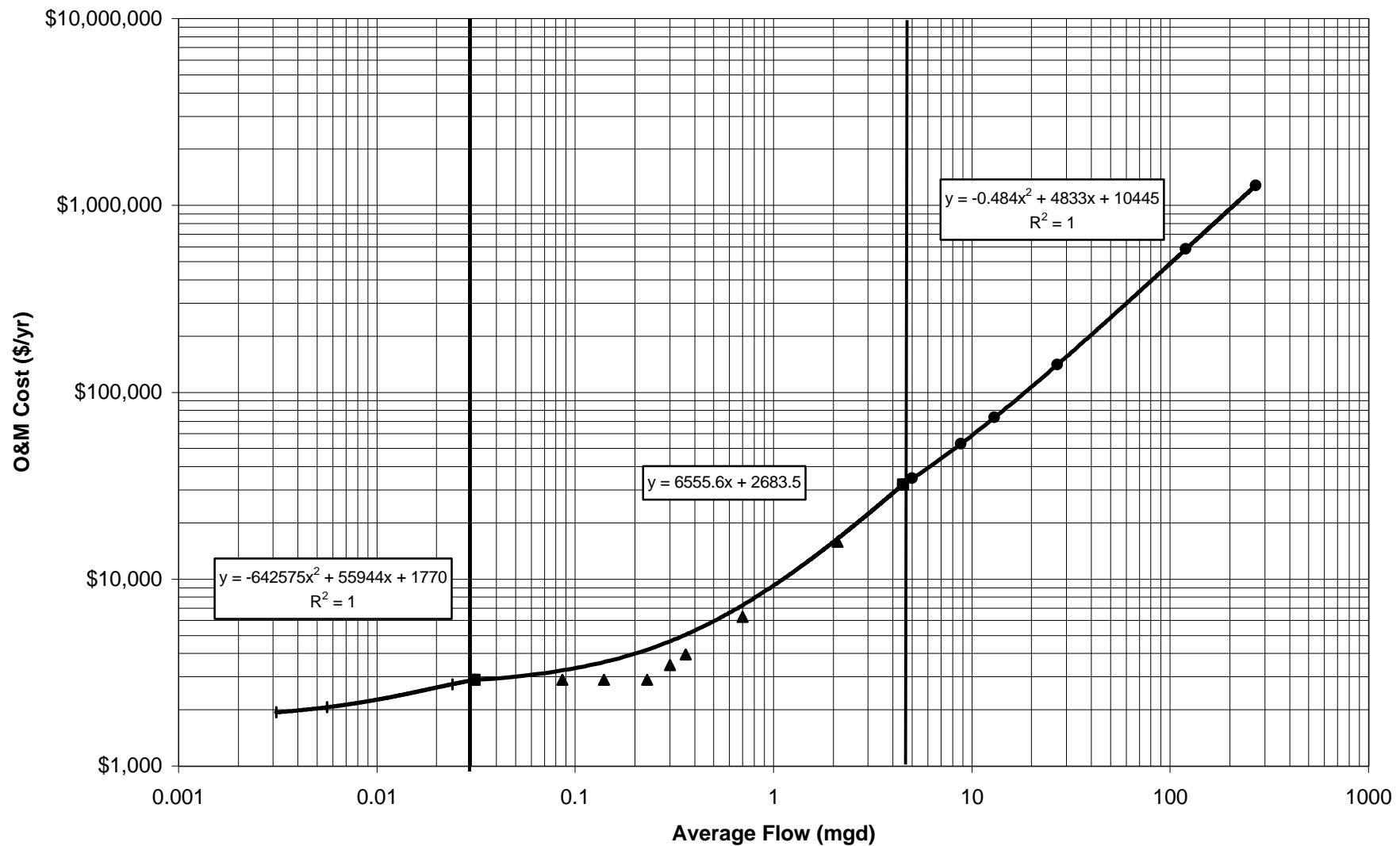
**Figure 3-67**  
**Ion Exchange**  
**O&M Costs - 500 BV**



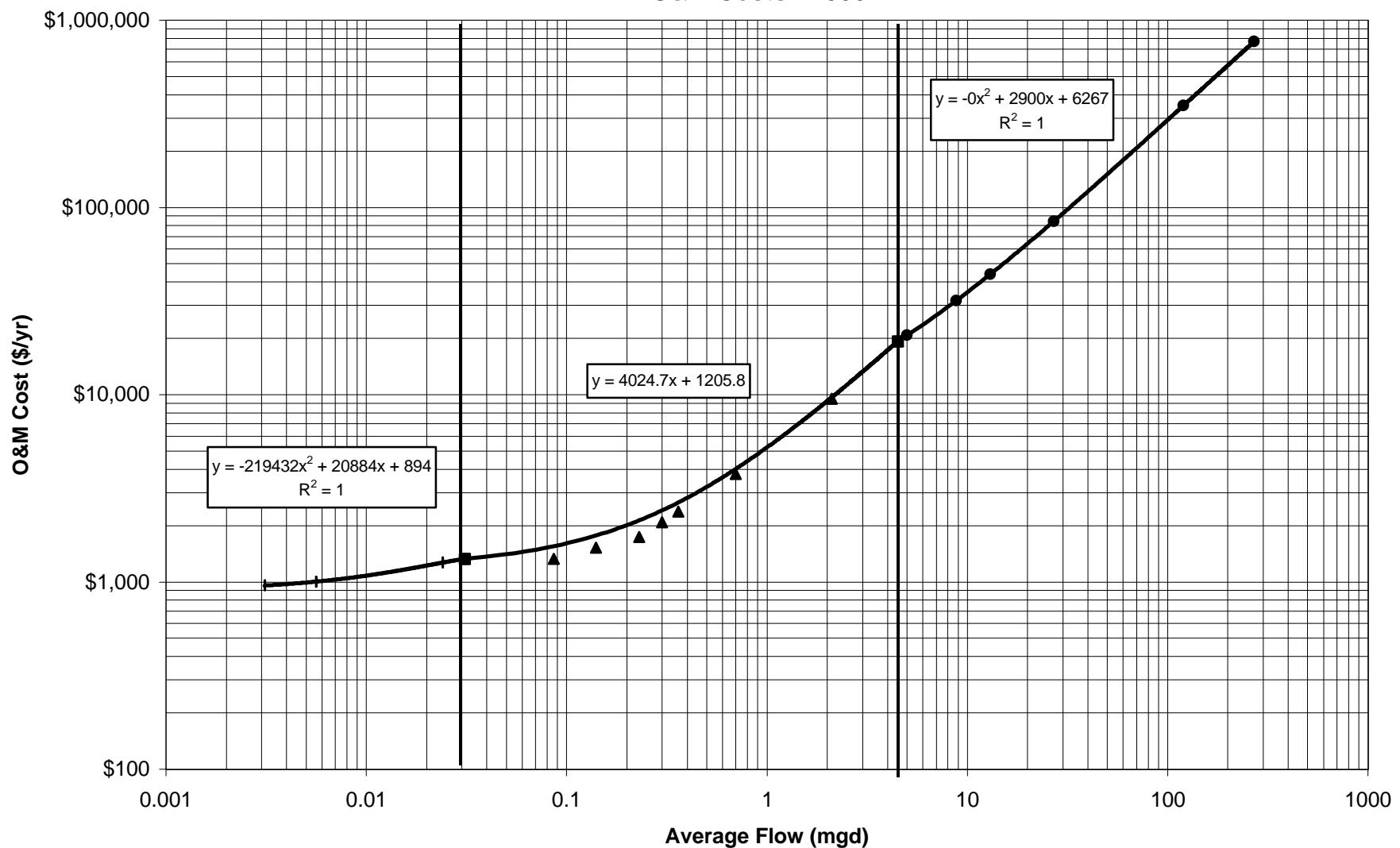
**Figure 3-68**  
**Ion Exchange**  
**O&M Costs - 700 BV**



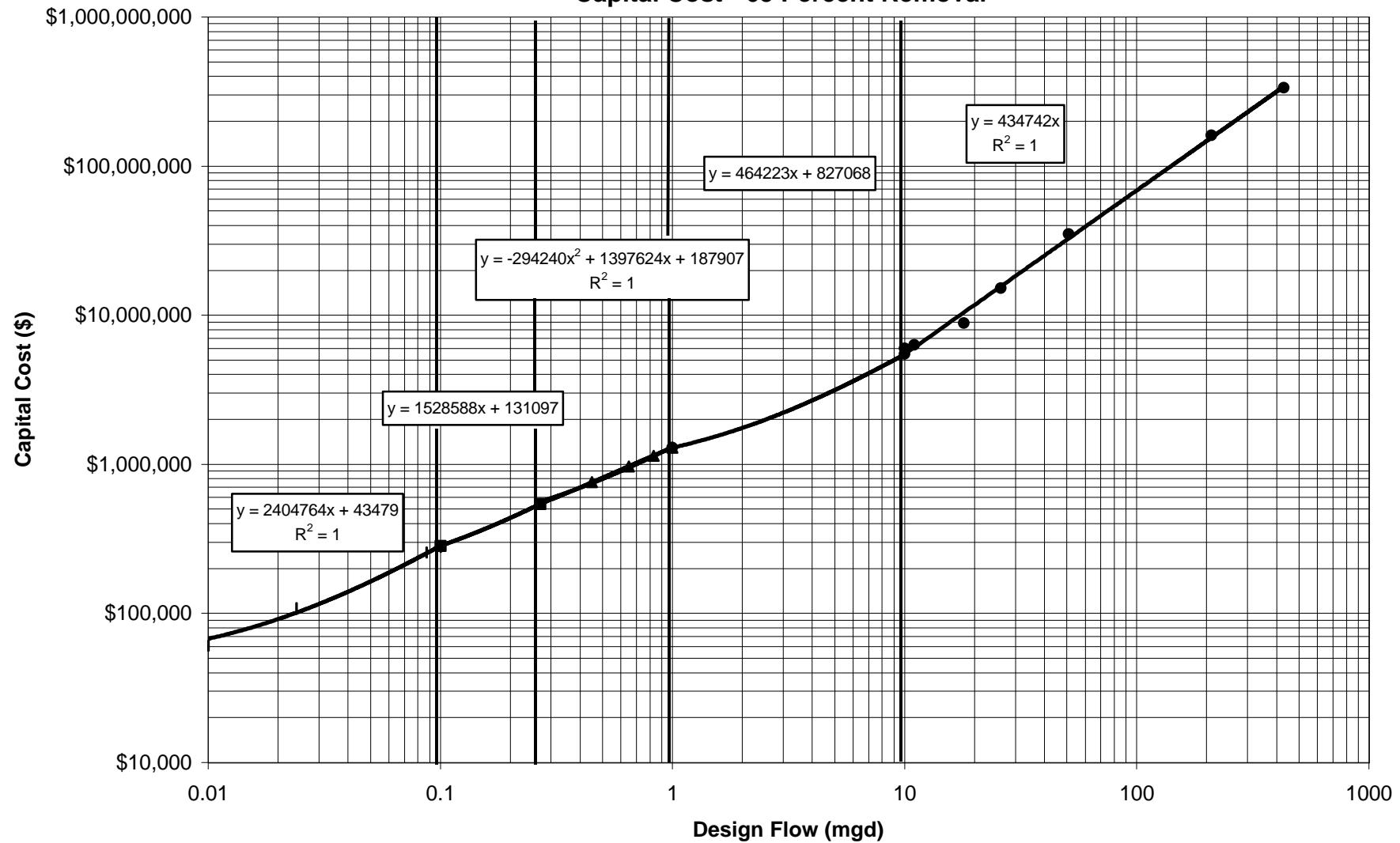
**Figure 3-69**  
**Ion Exchange**  
**O&M Costs - 1500 BV**



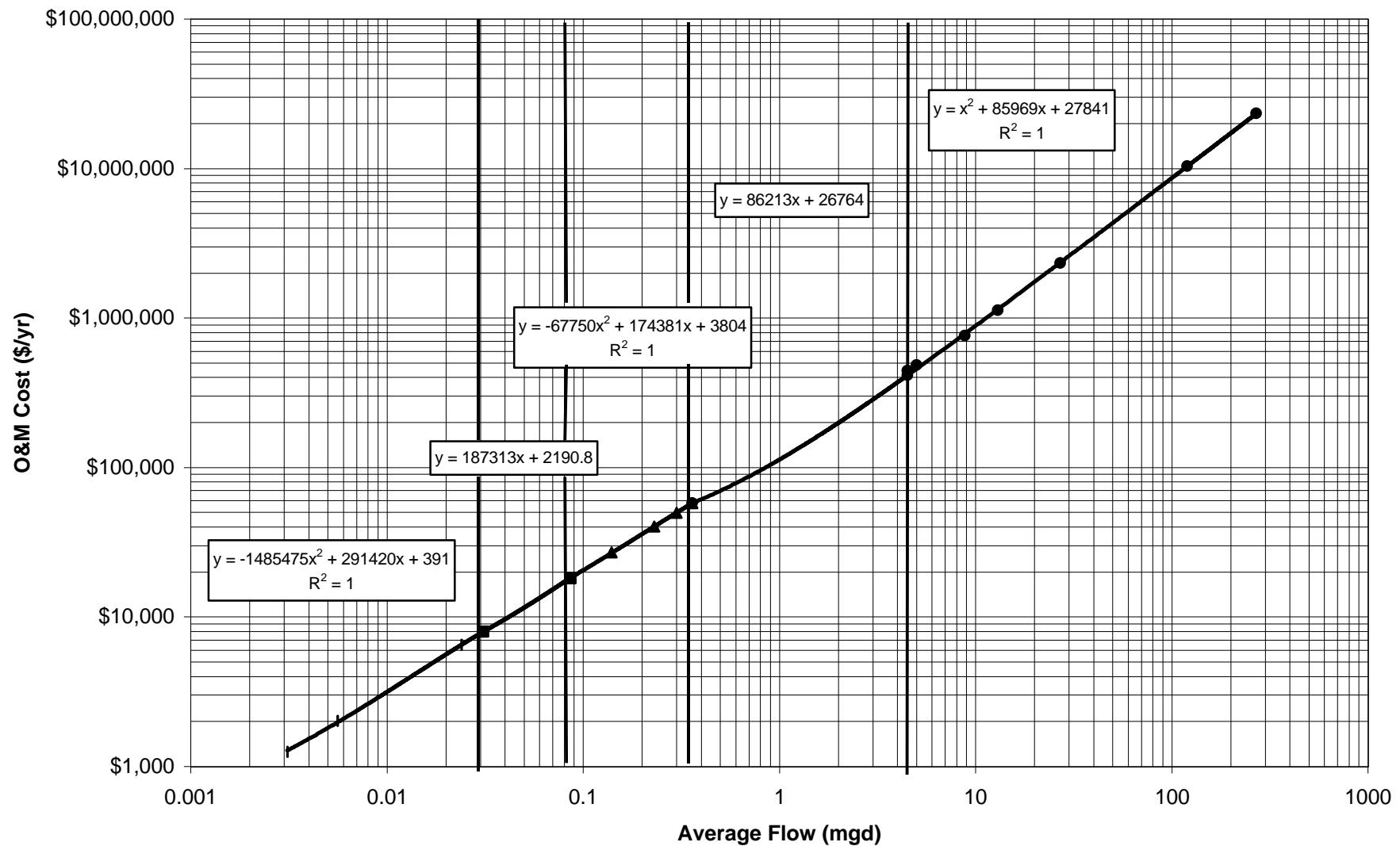
**Figure 3-70**  
**Ion Exchange**  
**O&M Costs - 2500 BV**



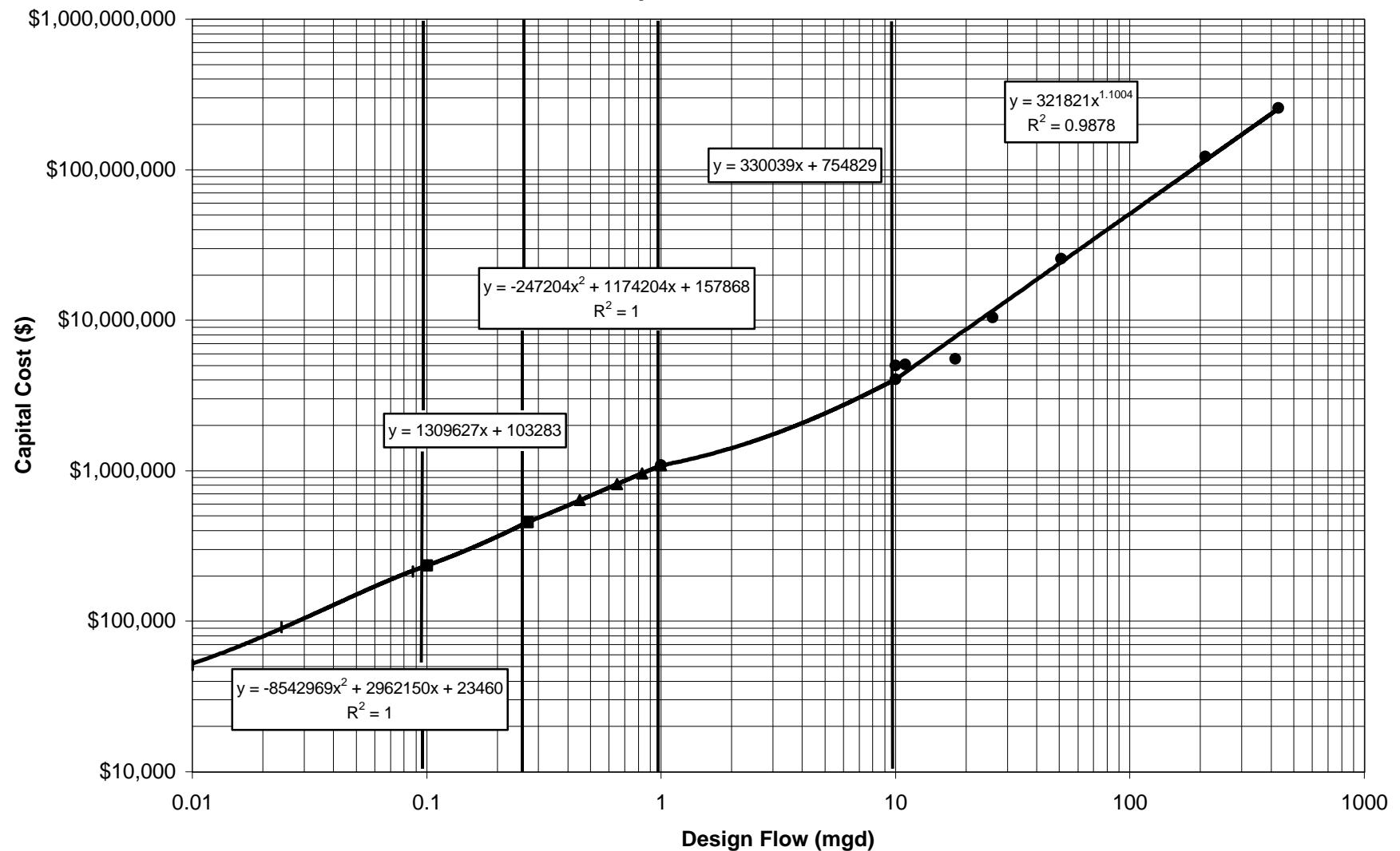
**Figure 3-71**  
**Ultrafiltration**  
**Capital Cost - 65 Percent Removal**



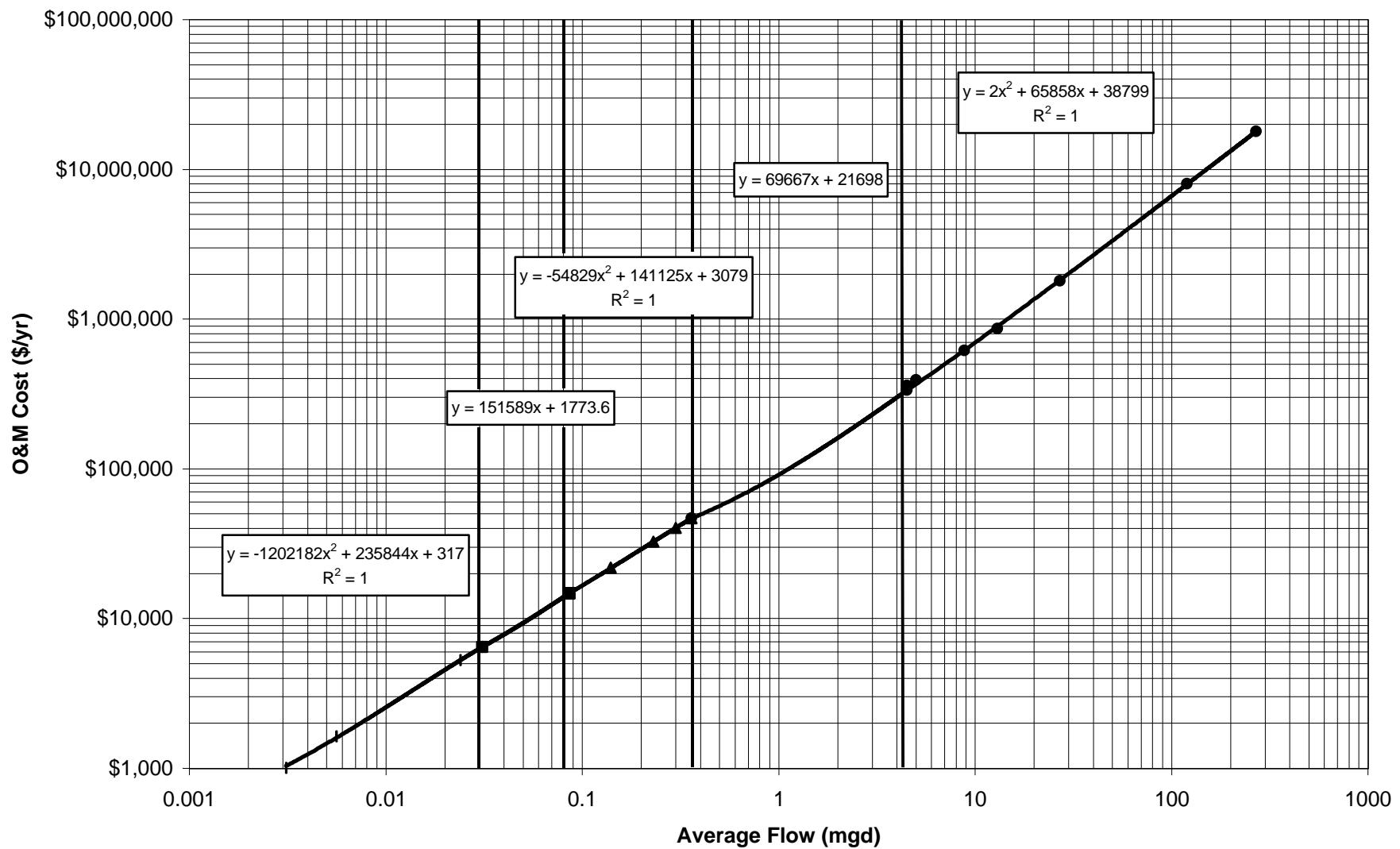
**Figure 3-72**  
**Ultrafiltration**  
**O&M Cost - 65 Percent Removal**



**Figure 3-73**  
**Ultrafiltration**  
**Capital Cost - 50 Percent Removal**

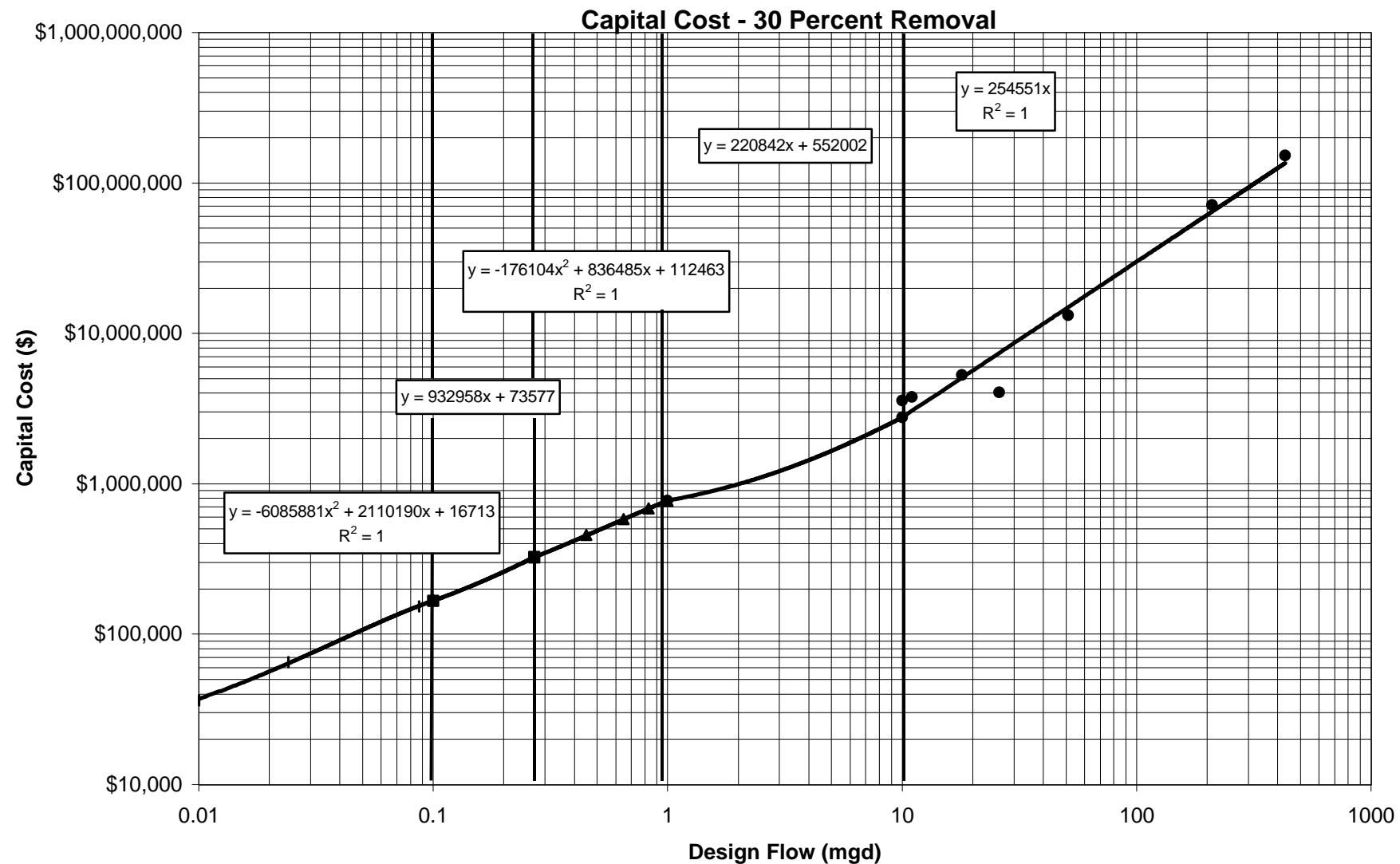


**Figure 3-74**  
**Ultrafiltration**  
**O&M Cost - 50 Percent Removal**

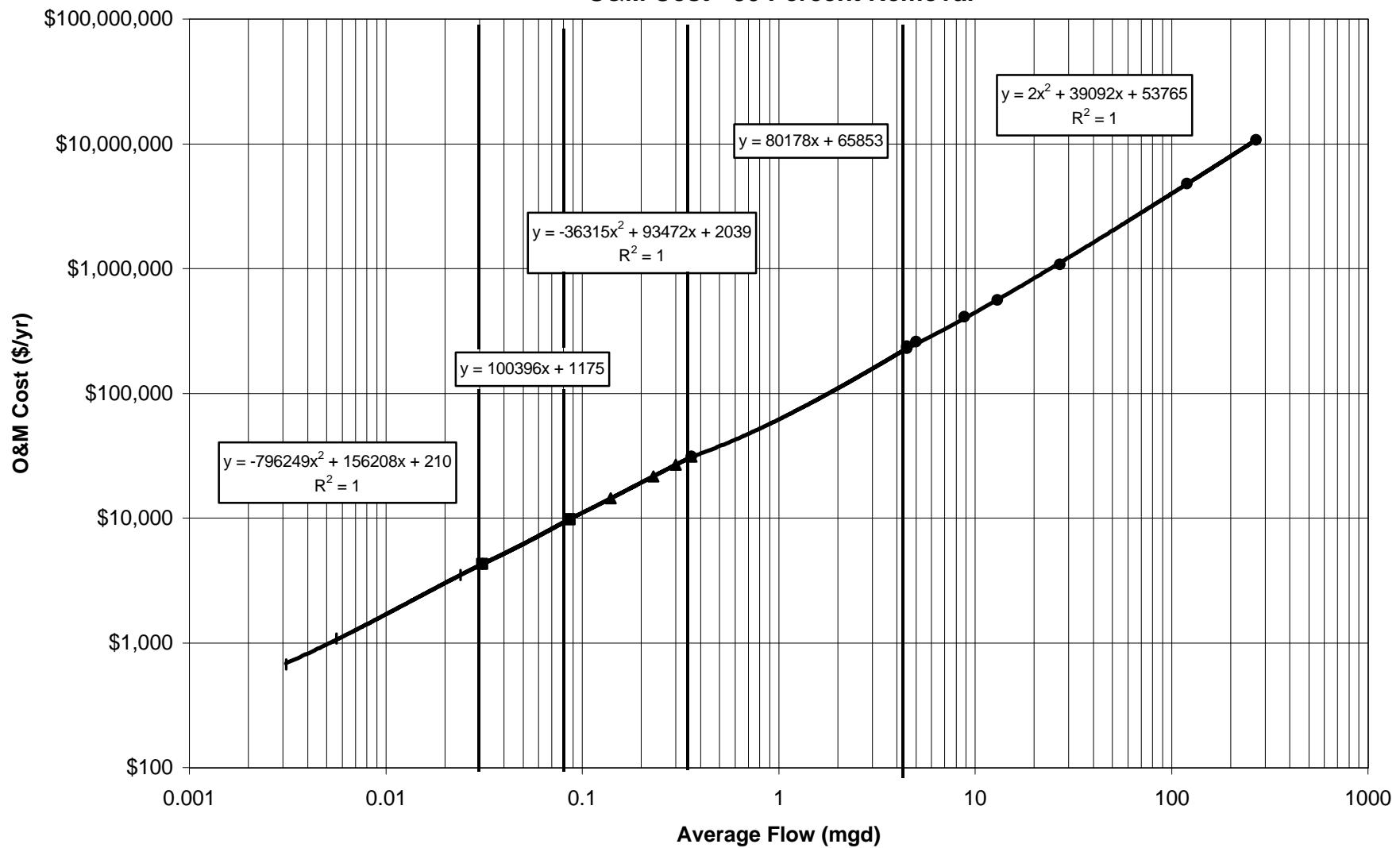


**Figure 3-75**

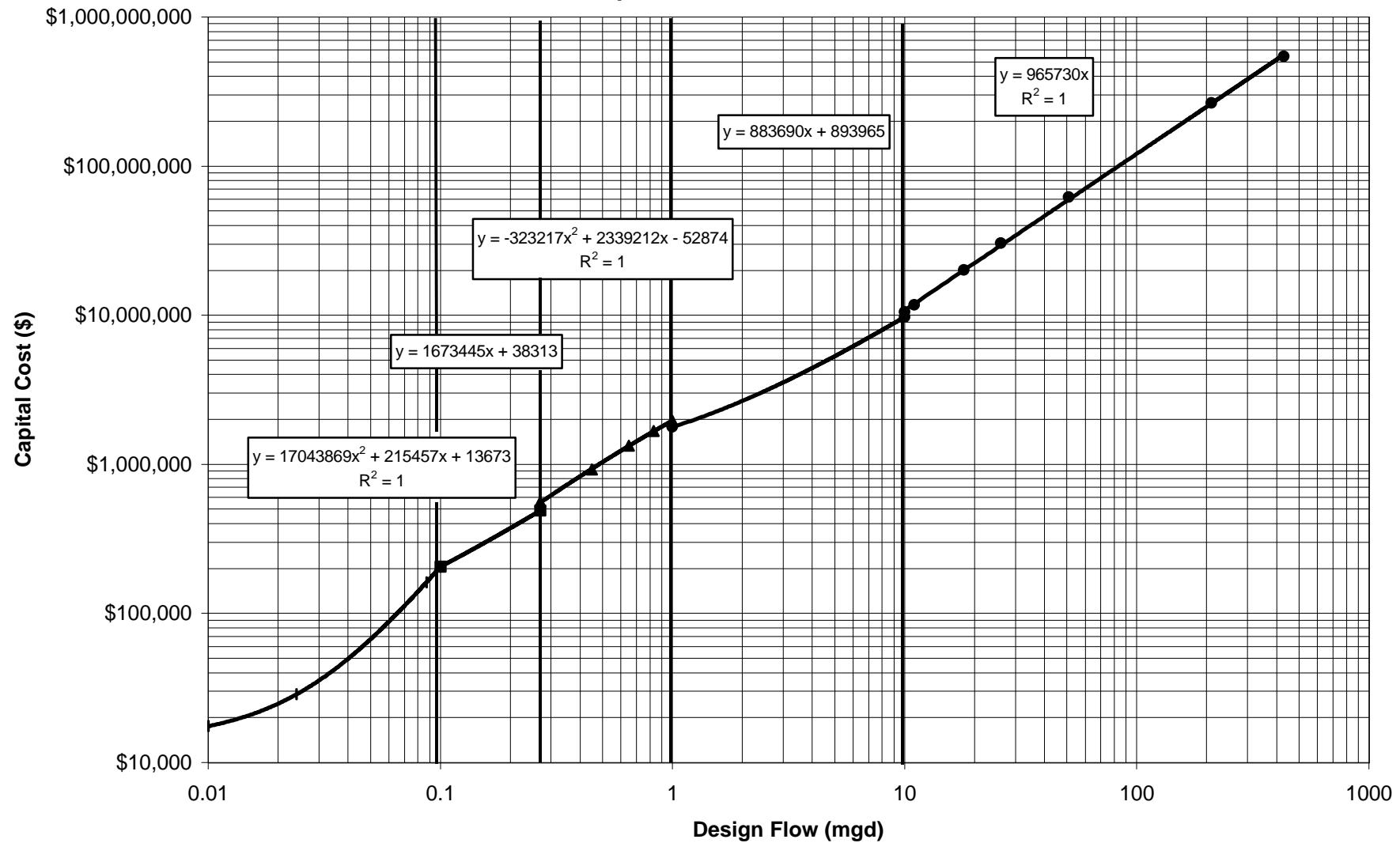
**Ultrafiltration**



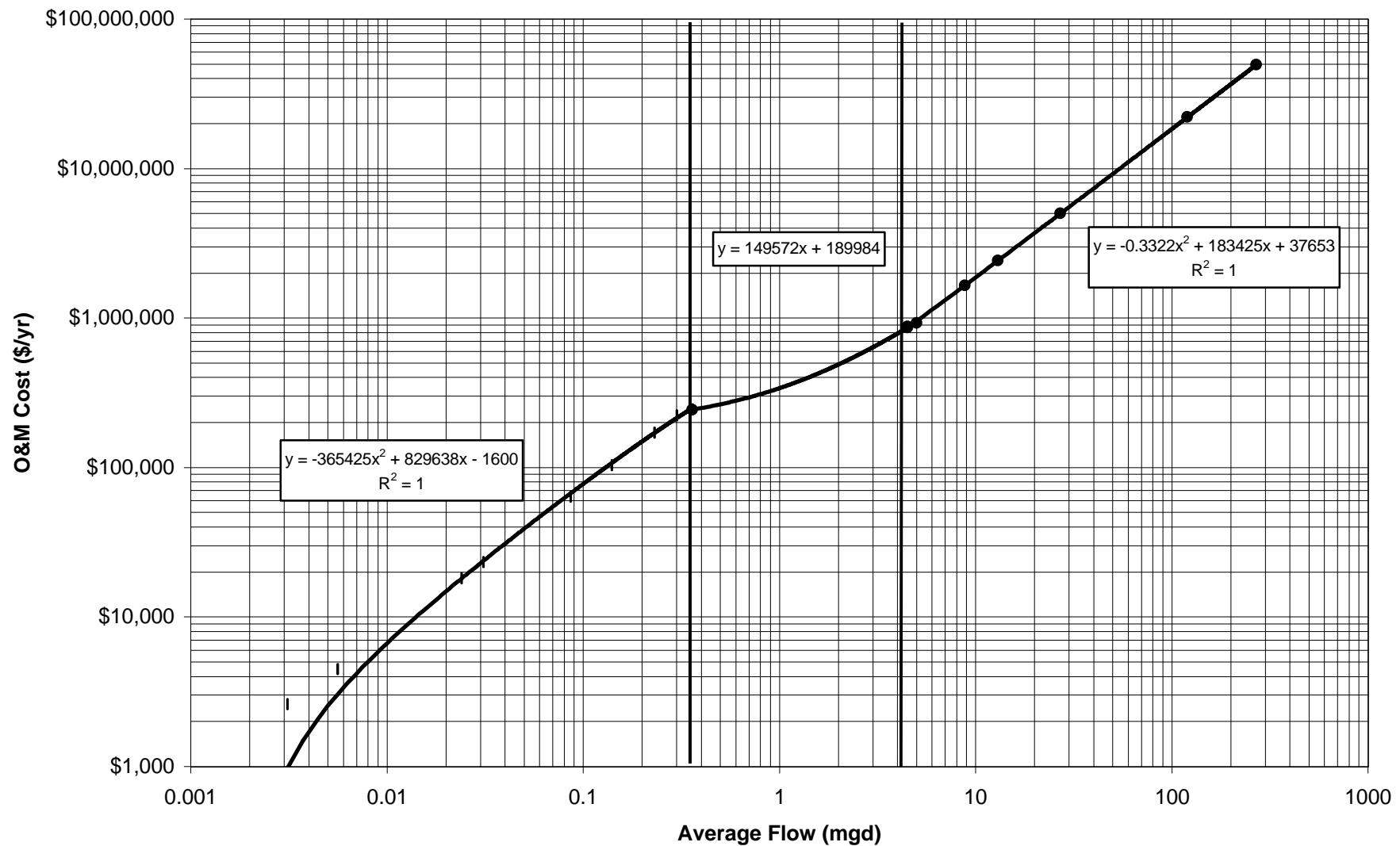
**Figure 3-76**  
**Ultrafiltration**  
**O&M Cost - 30 Percent Removal**



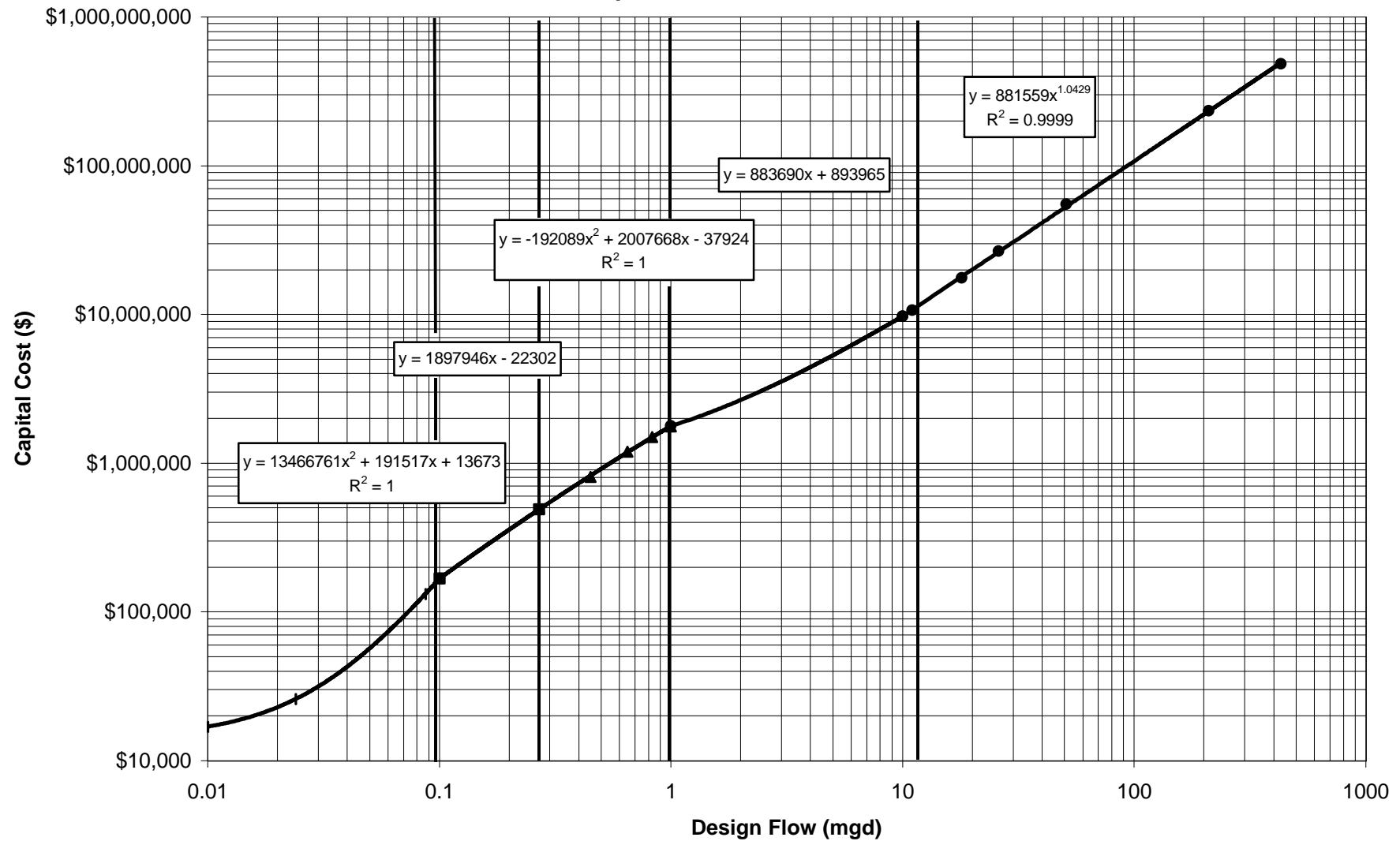
**Figure 3-76**  
**Nanofiltration**  
**Capital Cost - 90 Percent Removal**



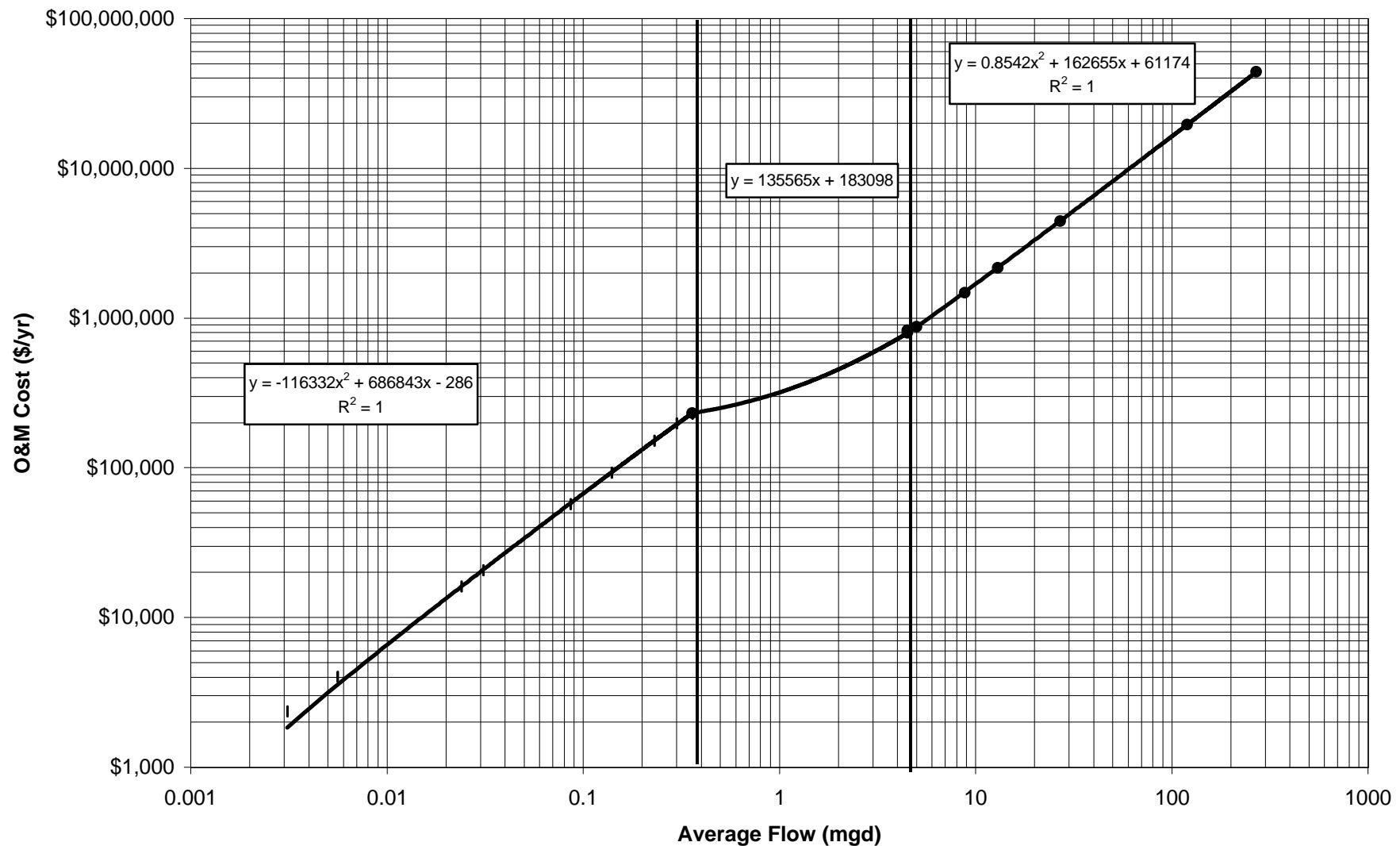
**Figure 3-77**  
**Nanofiltration**  
**O&M Cost - 90 Percent Removal**



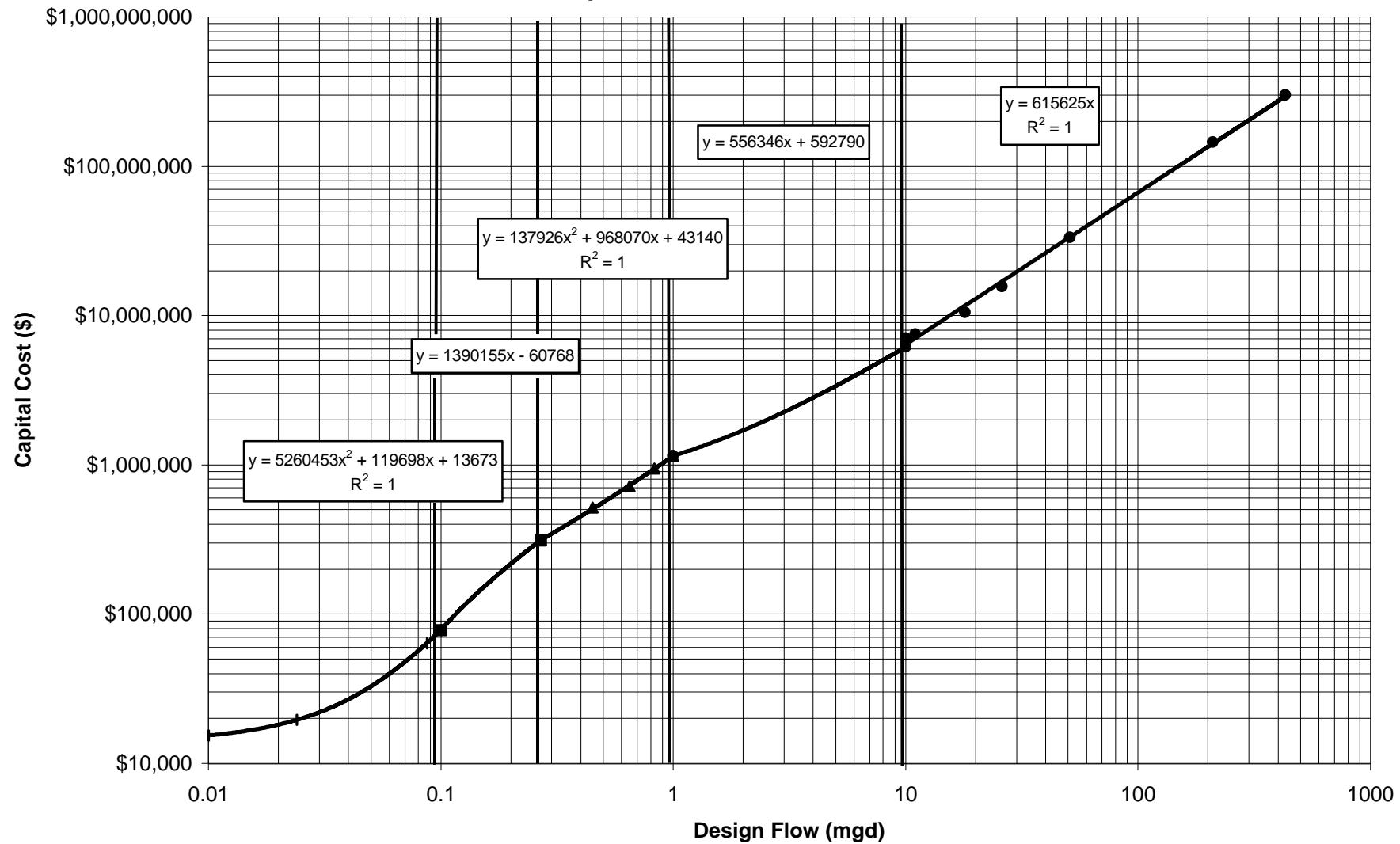
**Figure 3-78**  
**Nanofiltration**  
**Capital Cost - 80 Percent Removal**



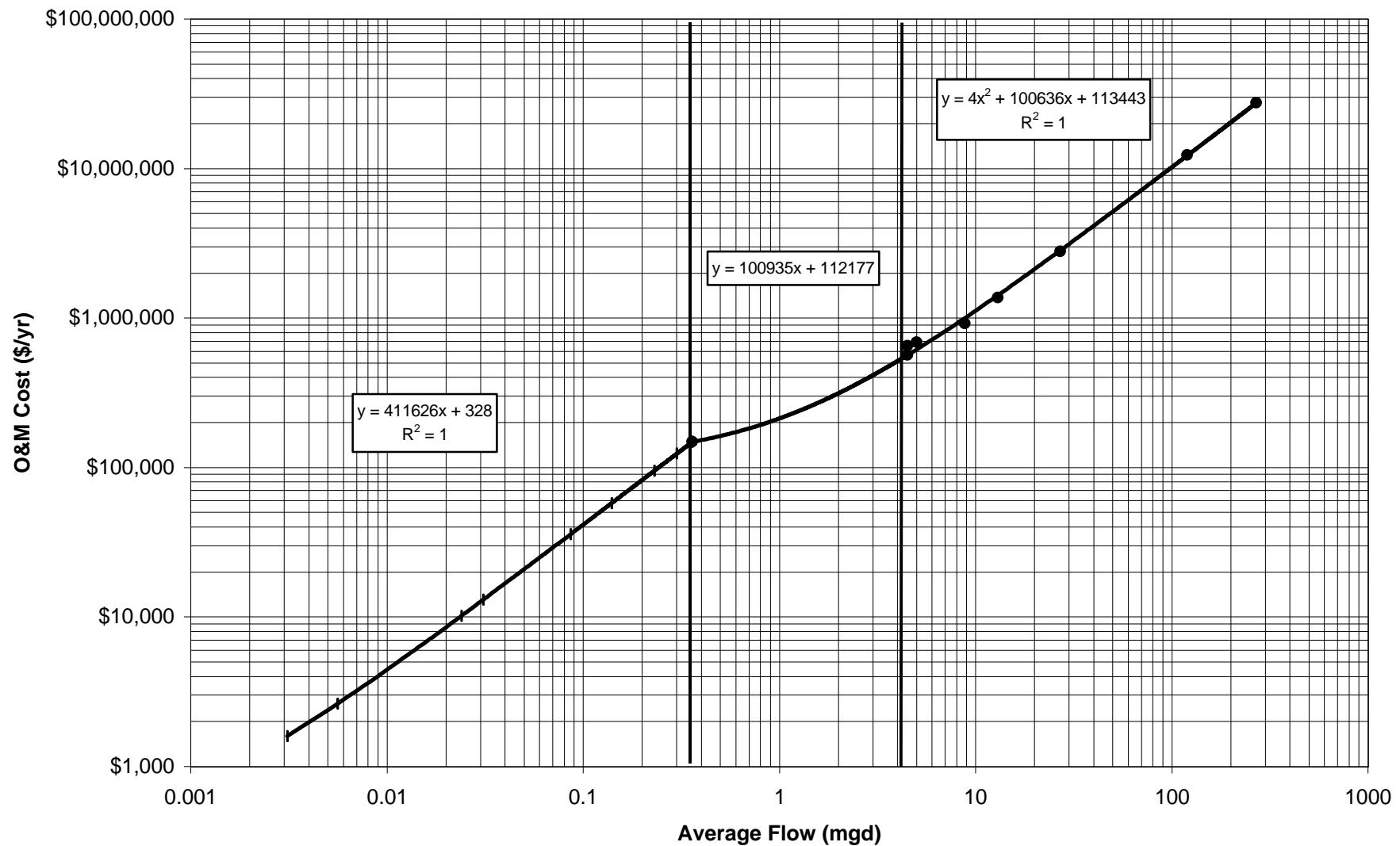
**Figure 3-79**  
**Nanofiltration**  
**O&M Cost - 80 Percent Removal**



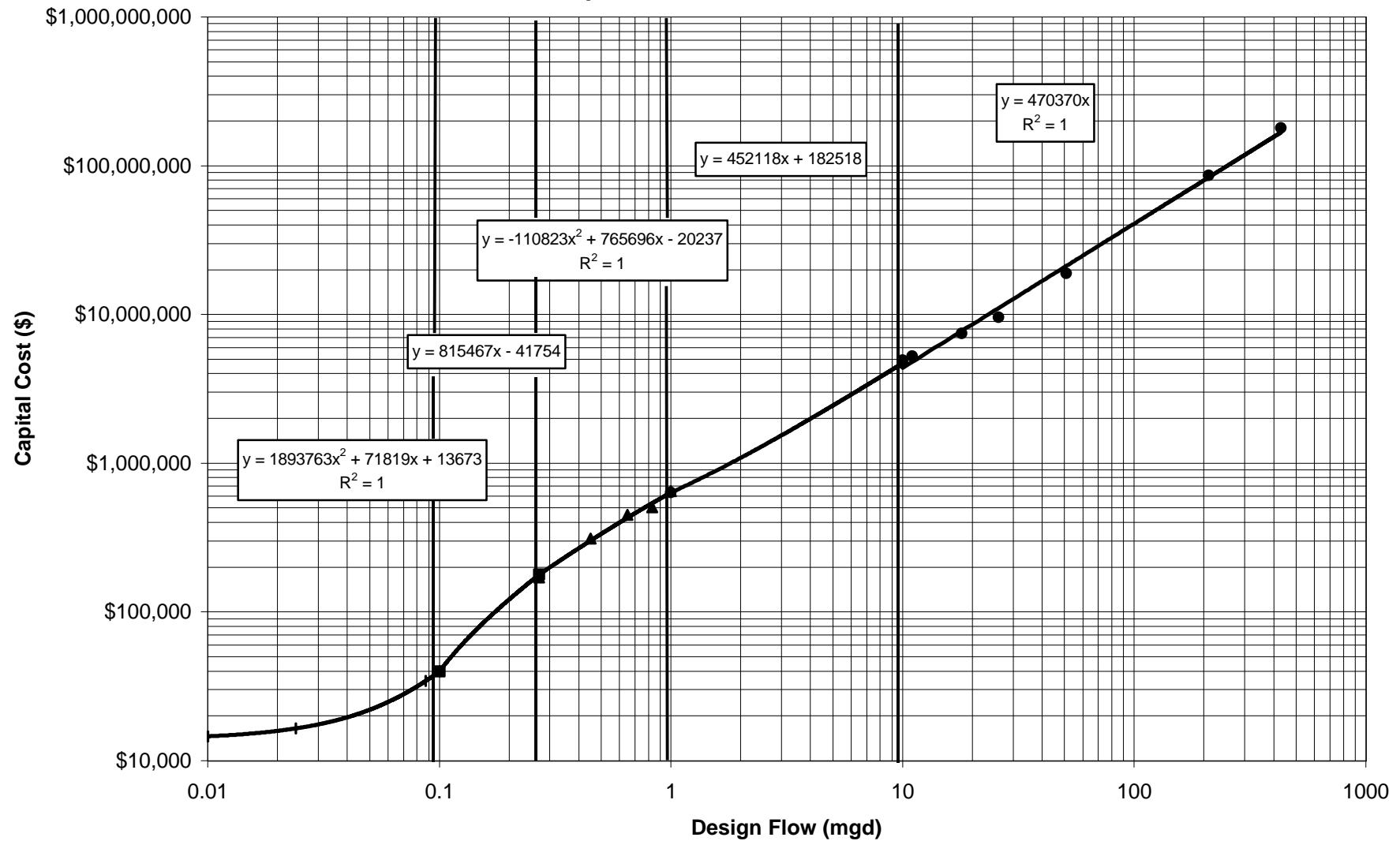
**Figure 3-80**  
**Nanofiltration**  
**Capital Cost - 50 Percent Removal**



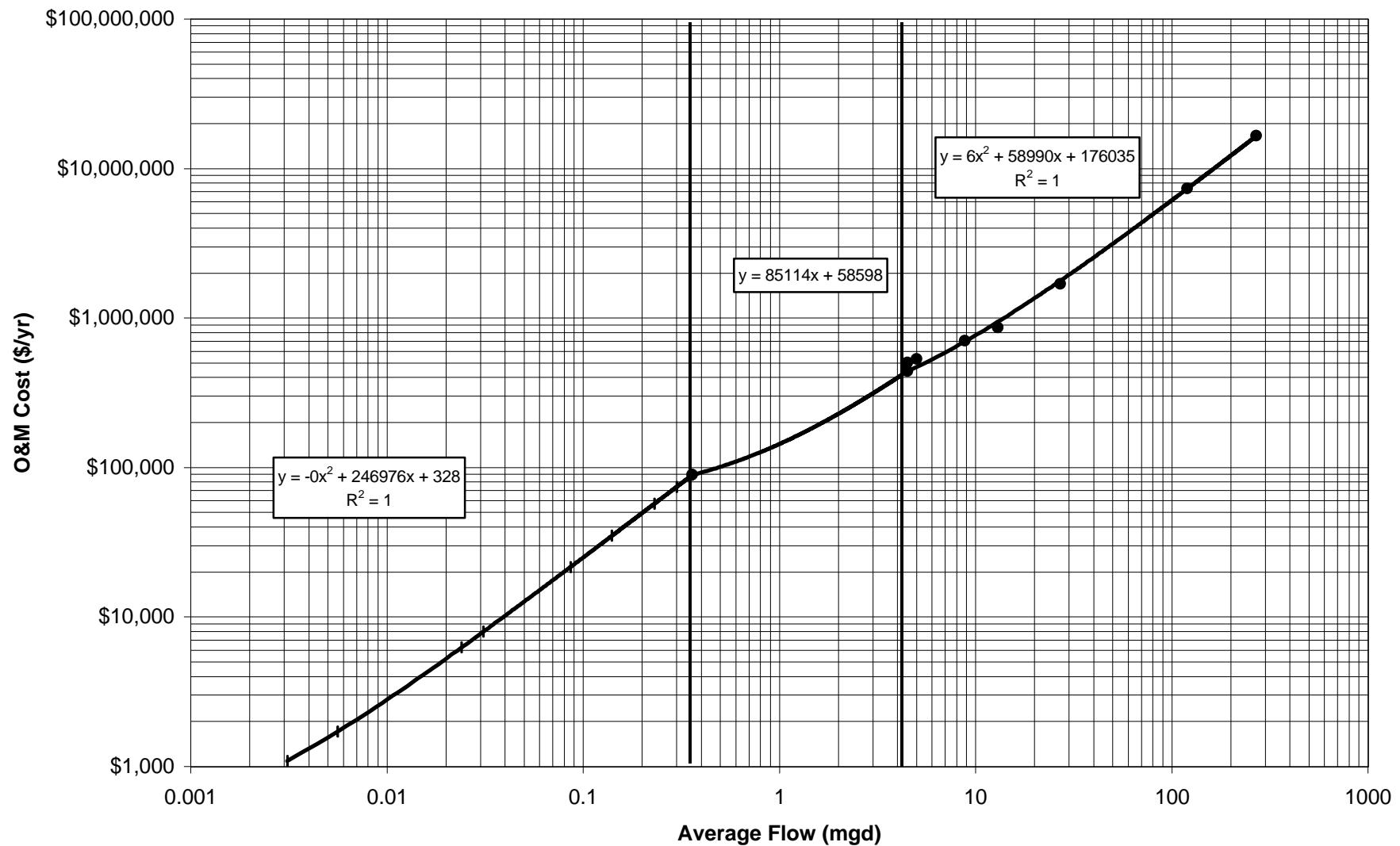
**Figure 3-81**  
**Nanofiltration**  
**O&M Cost - 50 Percent Removal**



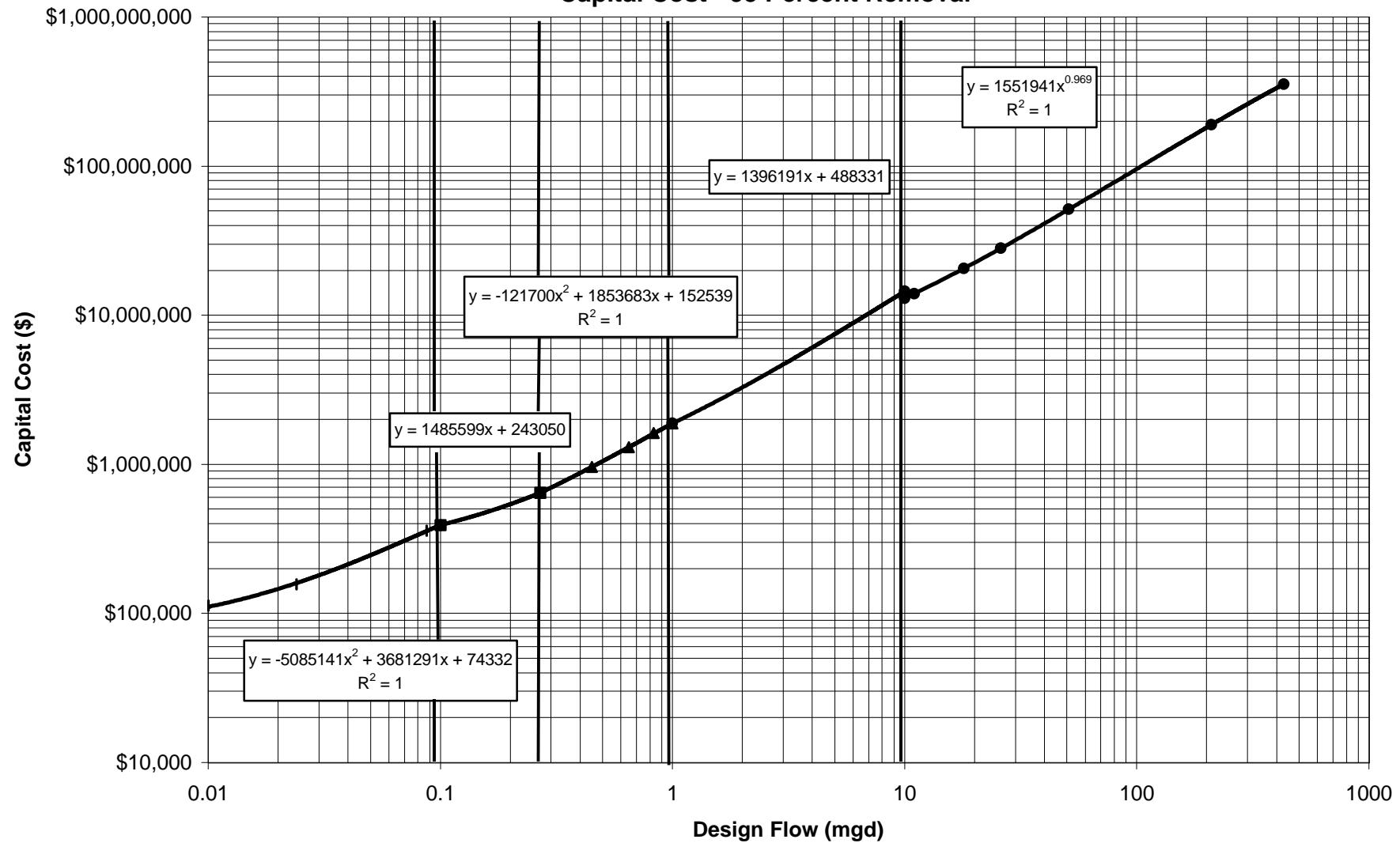
**Figure 3-82**  
**Nanofiltration**  
**Capital Cost - 30 Percent Removal**



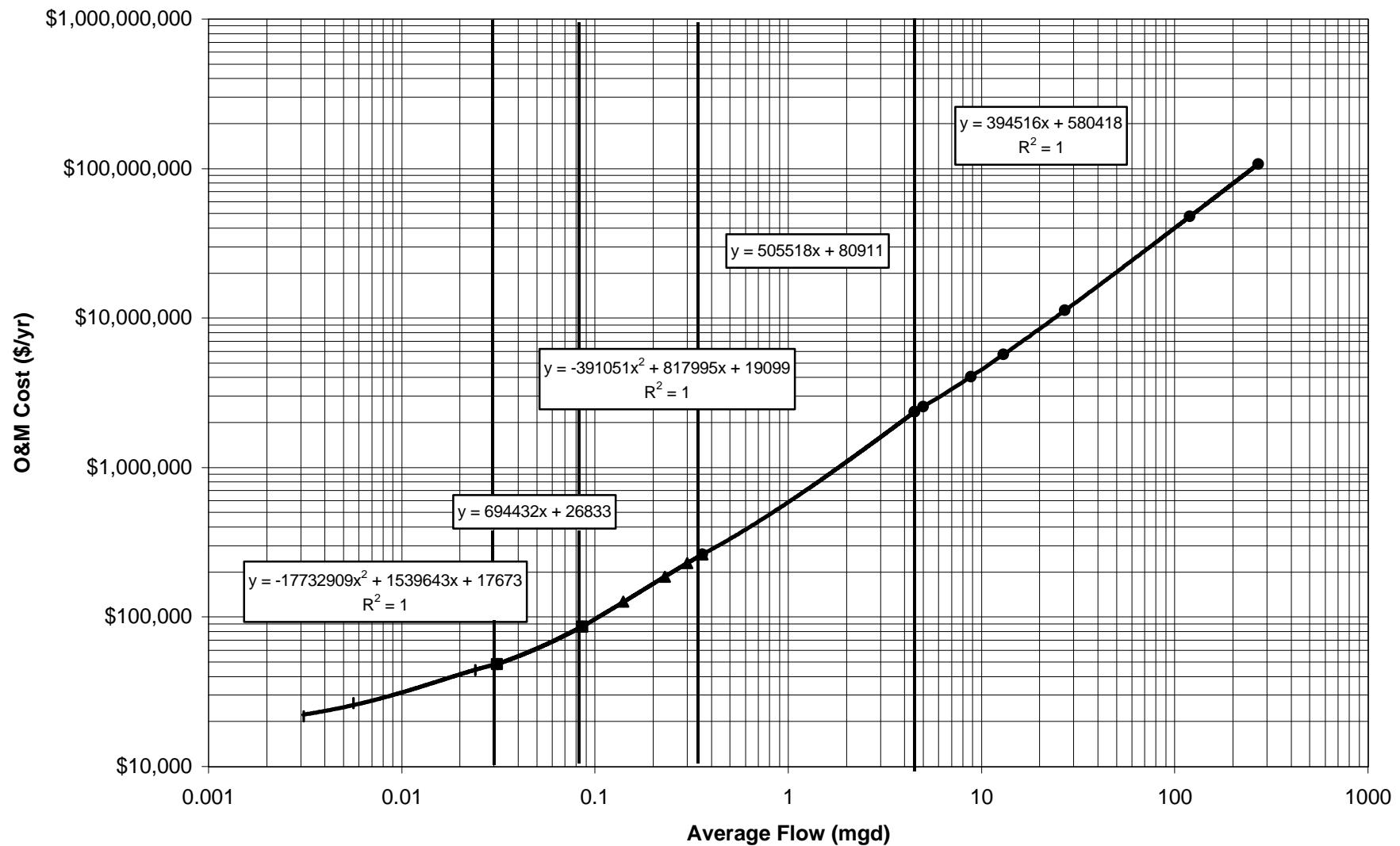
**Figure 3-83**  
**Nanofiltration**  
**O&M Cost - 30 Percent Removal**



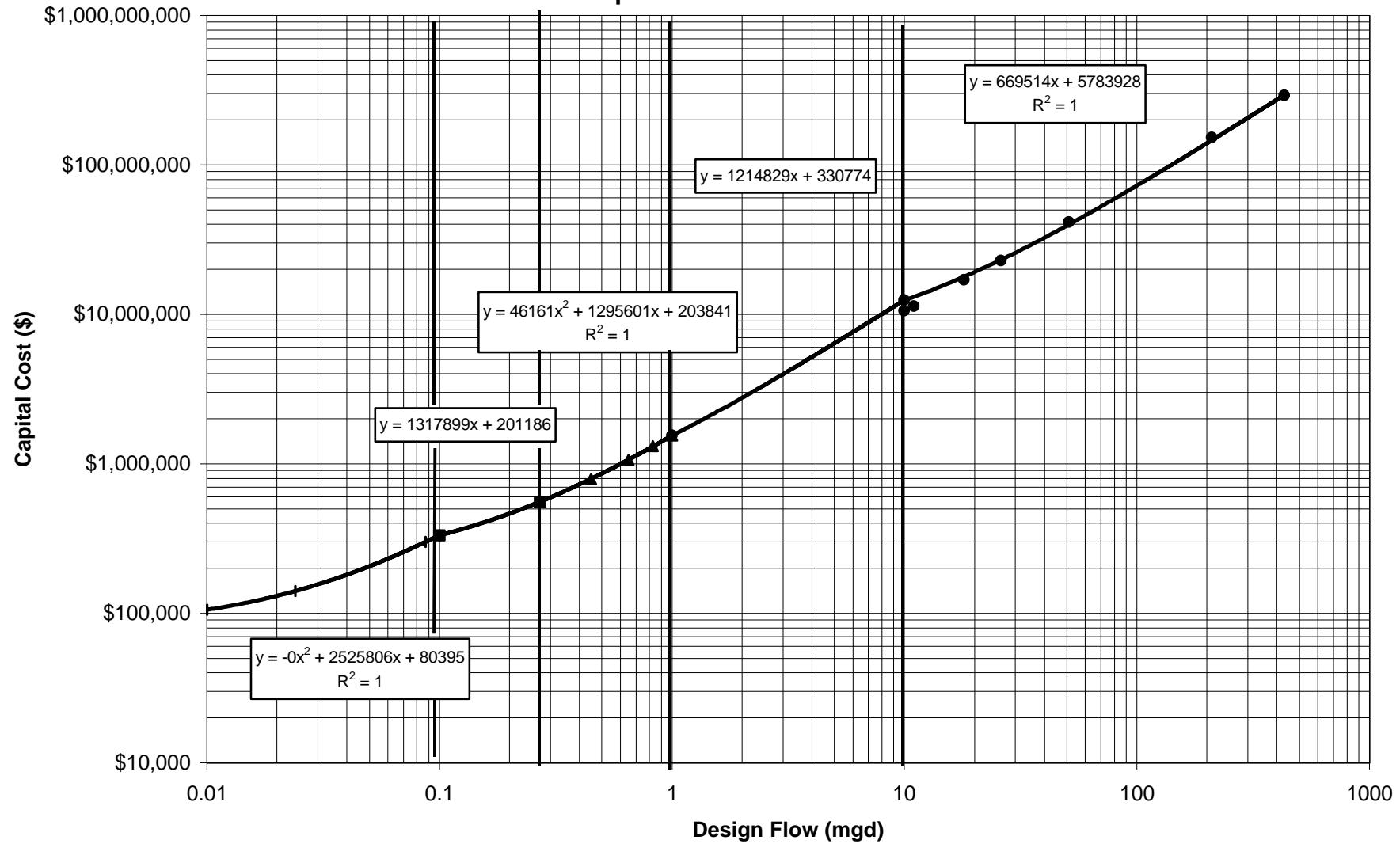
**Figure 3-84**  
**Reverse Osmosis**  
**Capital Cost - 95 Percent Removal**



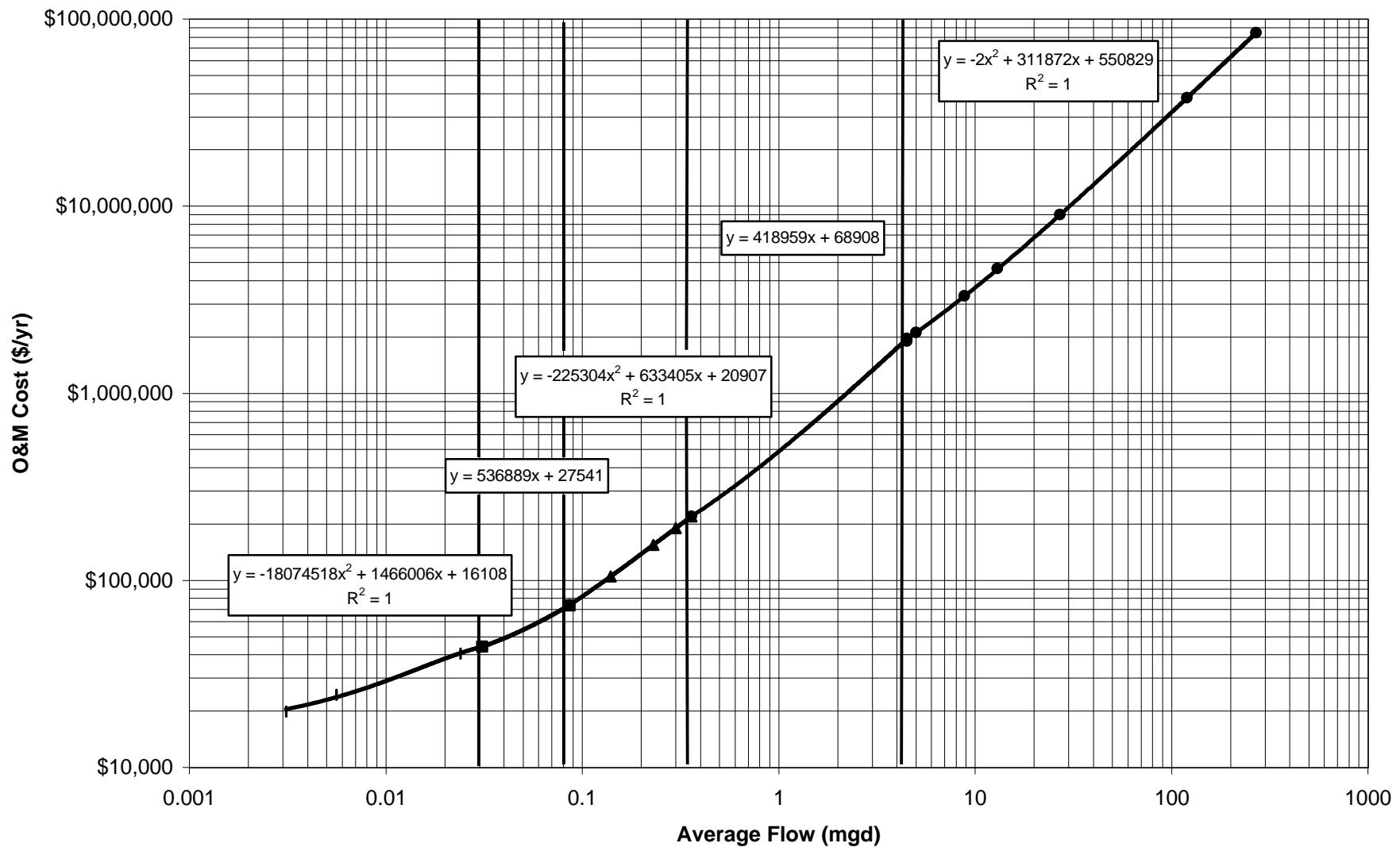
**Figure 3-85**  
**Reverse Osmosis**  
**O&M Cost - 95 Percent Removal**



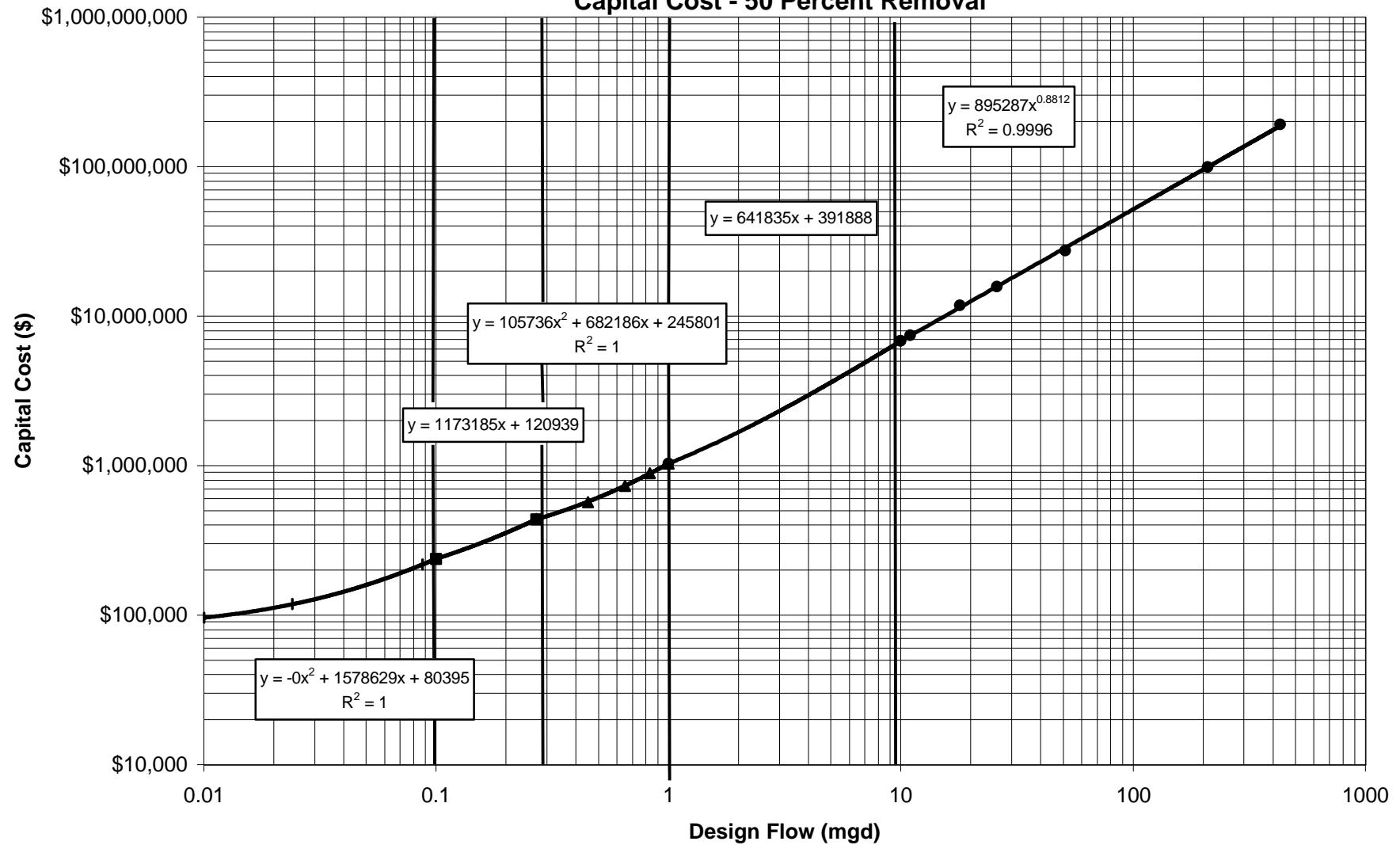
**Figure 3-86**  
**Reverse Osmosis**  
**Capital Cost - 80 Percent Removal**



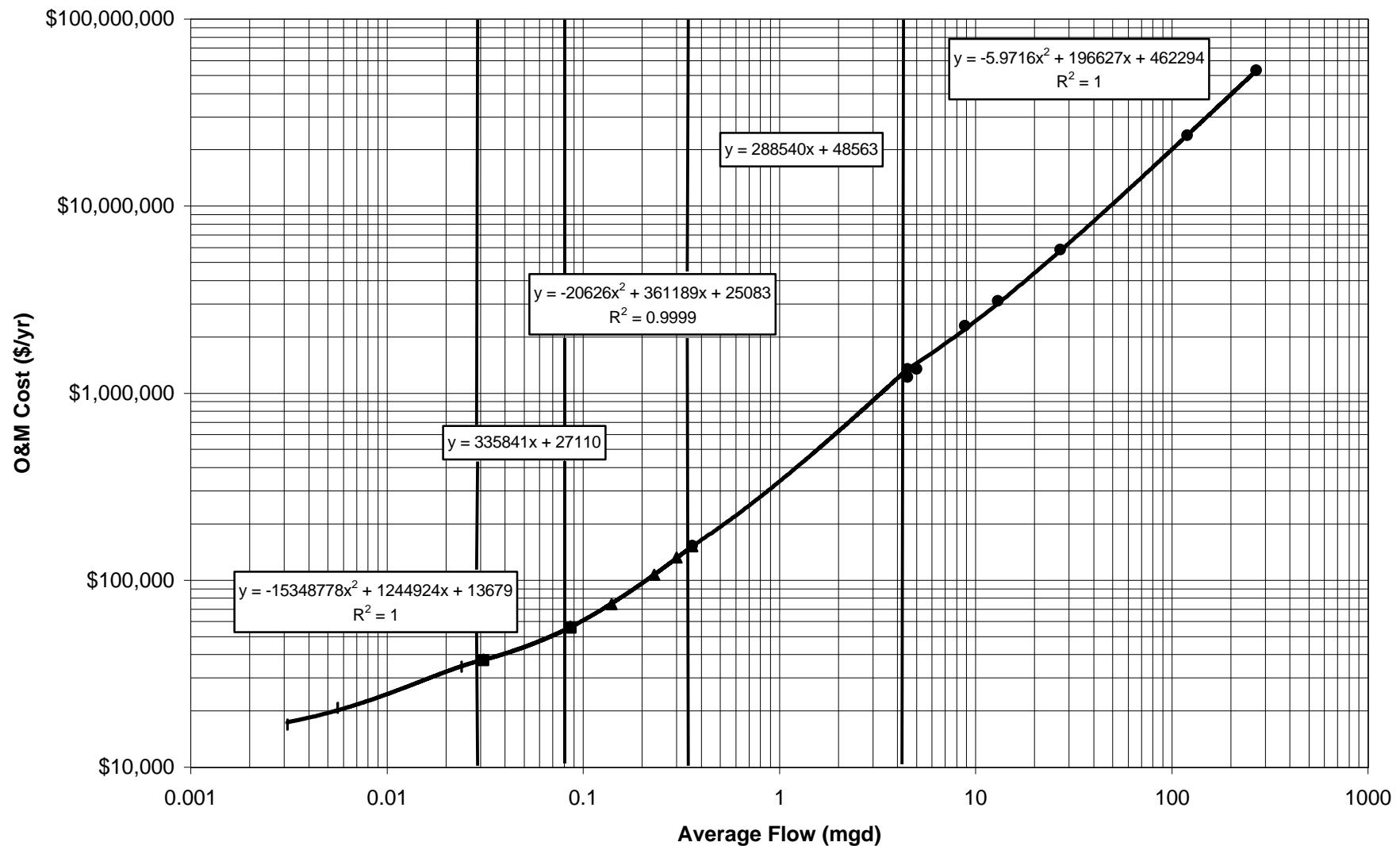
**Figure 3-87**  
**Reverse Osmosis**  
**O&M Cost - 80 Percent Removal**



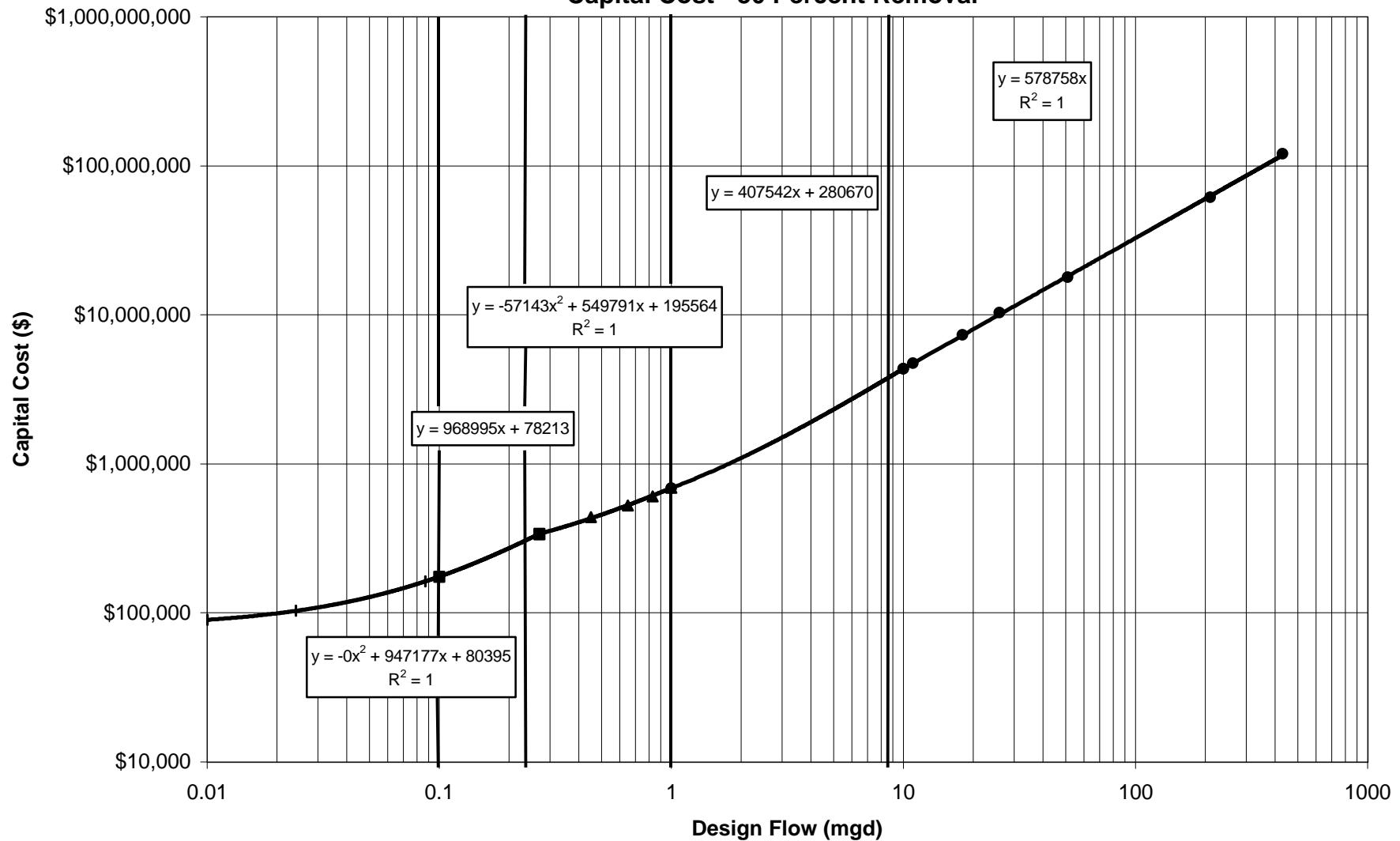
**Figure 3-88**  
**Reverse Osmosis**  
**Capital Cost - 50 Percent Removal**



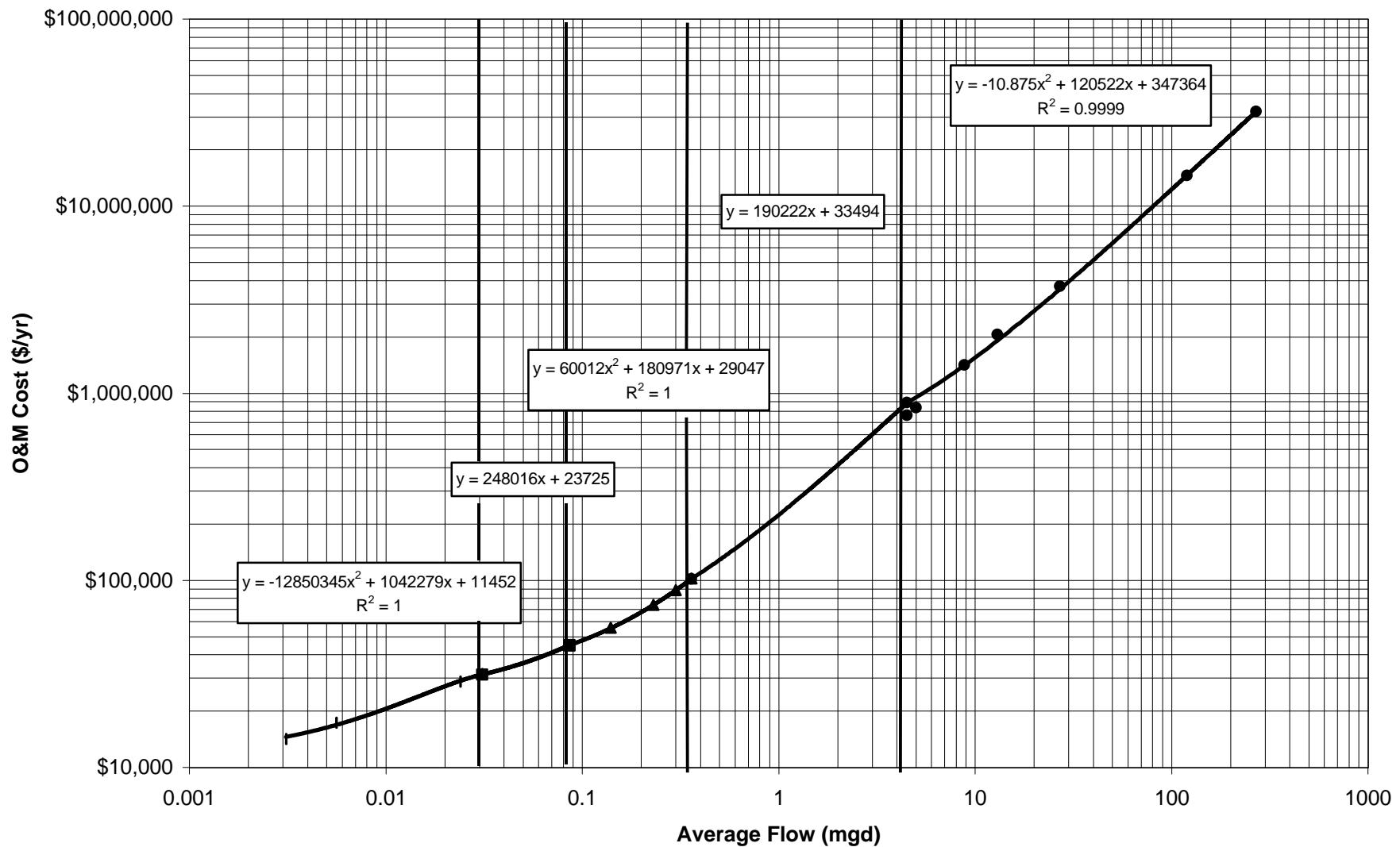
**Figure 3-89**  
**Reverse Osmosis**  
**O&M Cost - 50 Percent Removal**



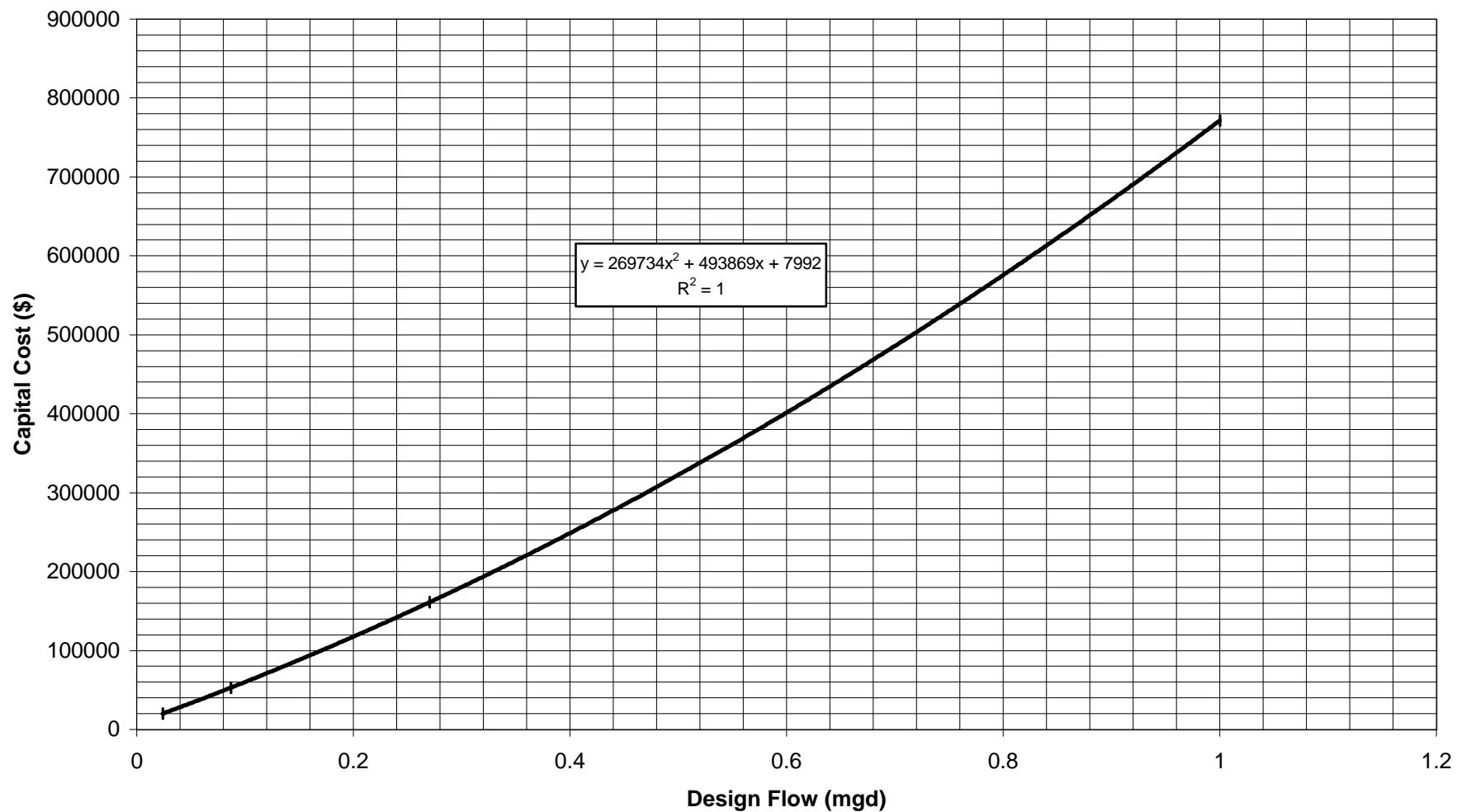
**Figure 3-90**  
**Reverse Osmosis**  
**Capital Cost - 30 Percent Removal**



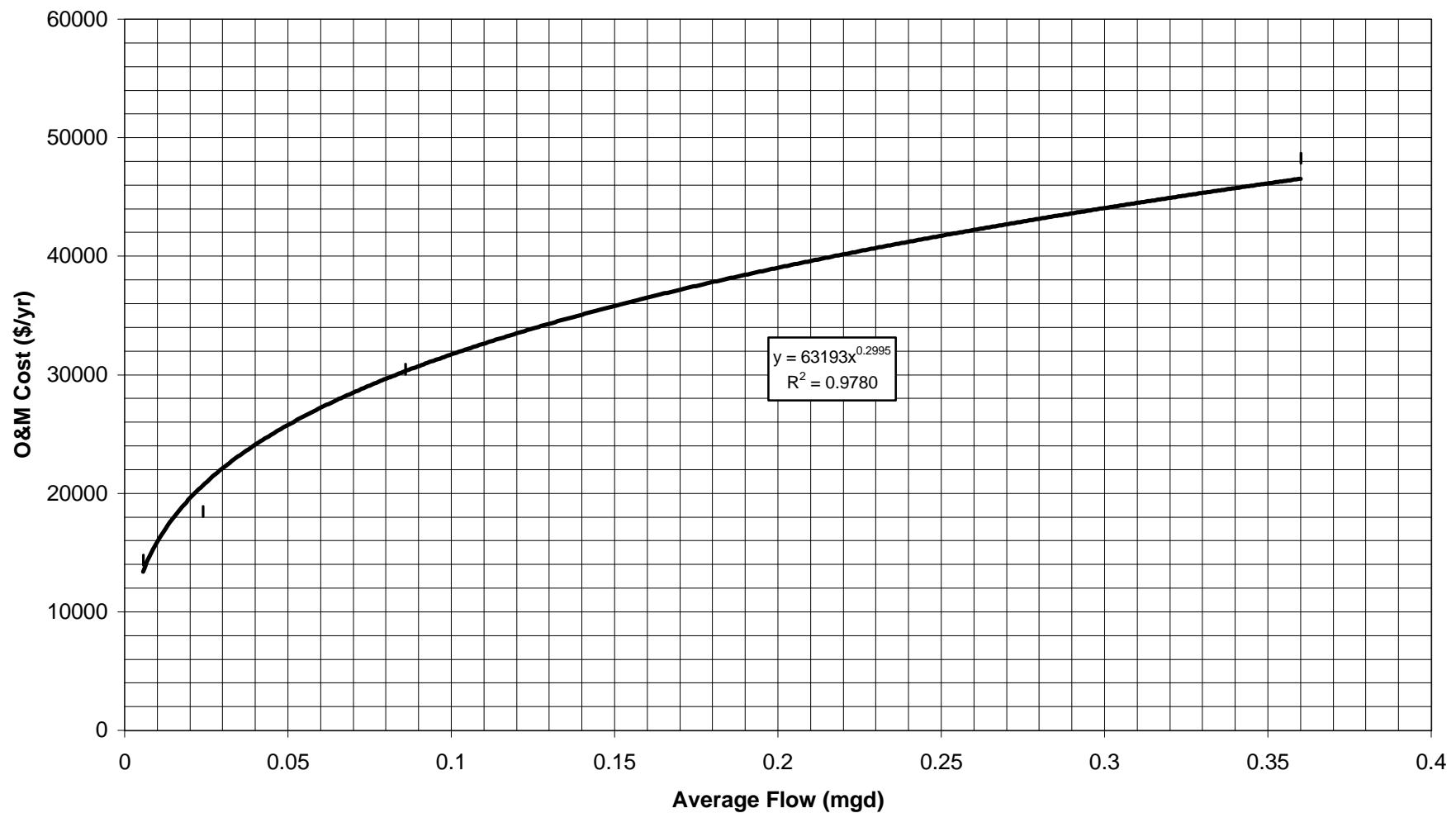
**Figure 3-91**  
**Reverse Osmosis**  
**O&M Cost - 30 Percent Removal**



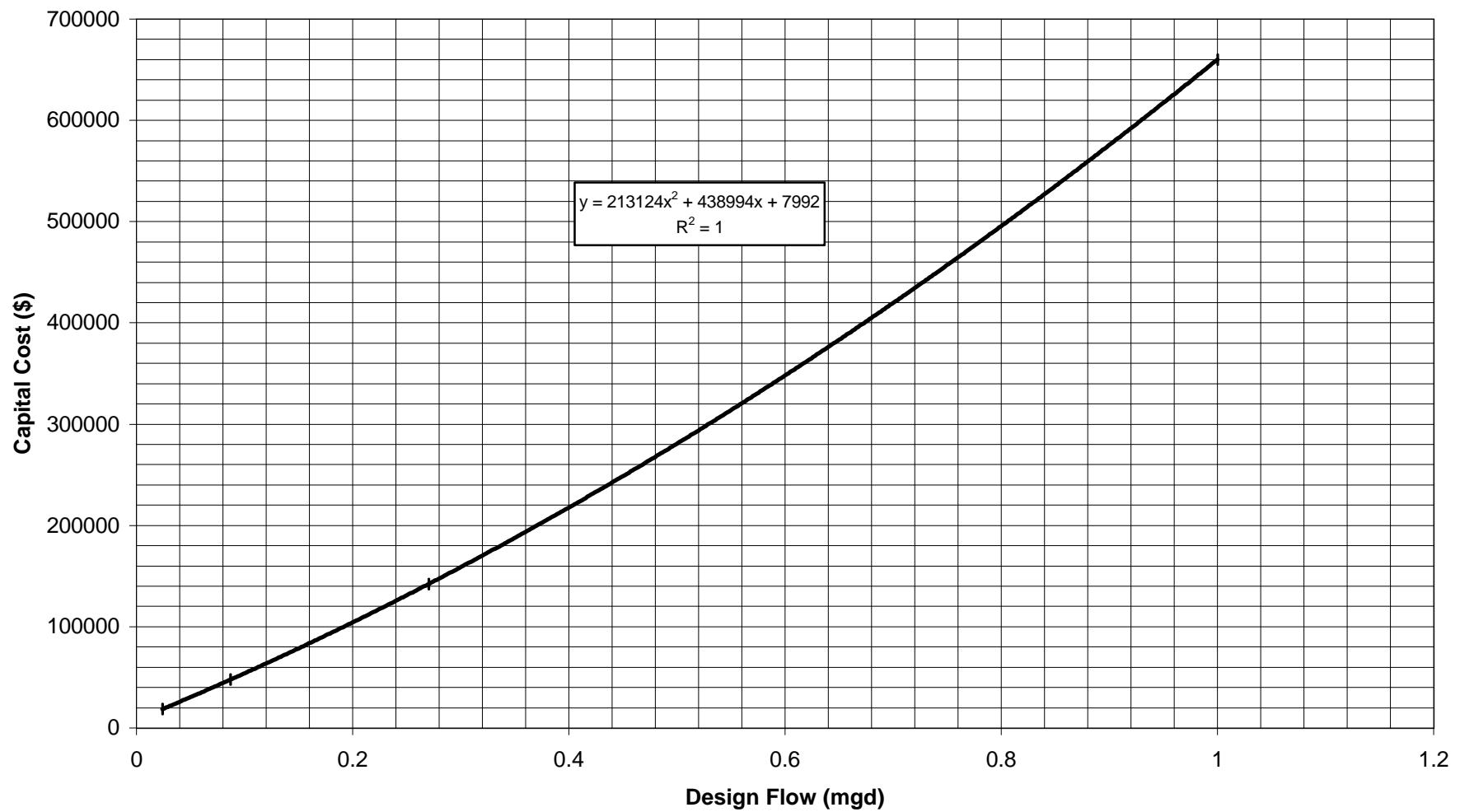
**Figure 3-92**  
**Greensand Filtration**  
**Capital Costs - 90 Percent Removal**



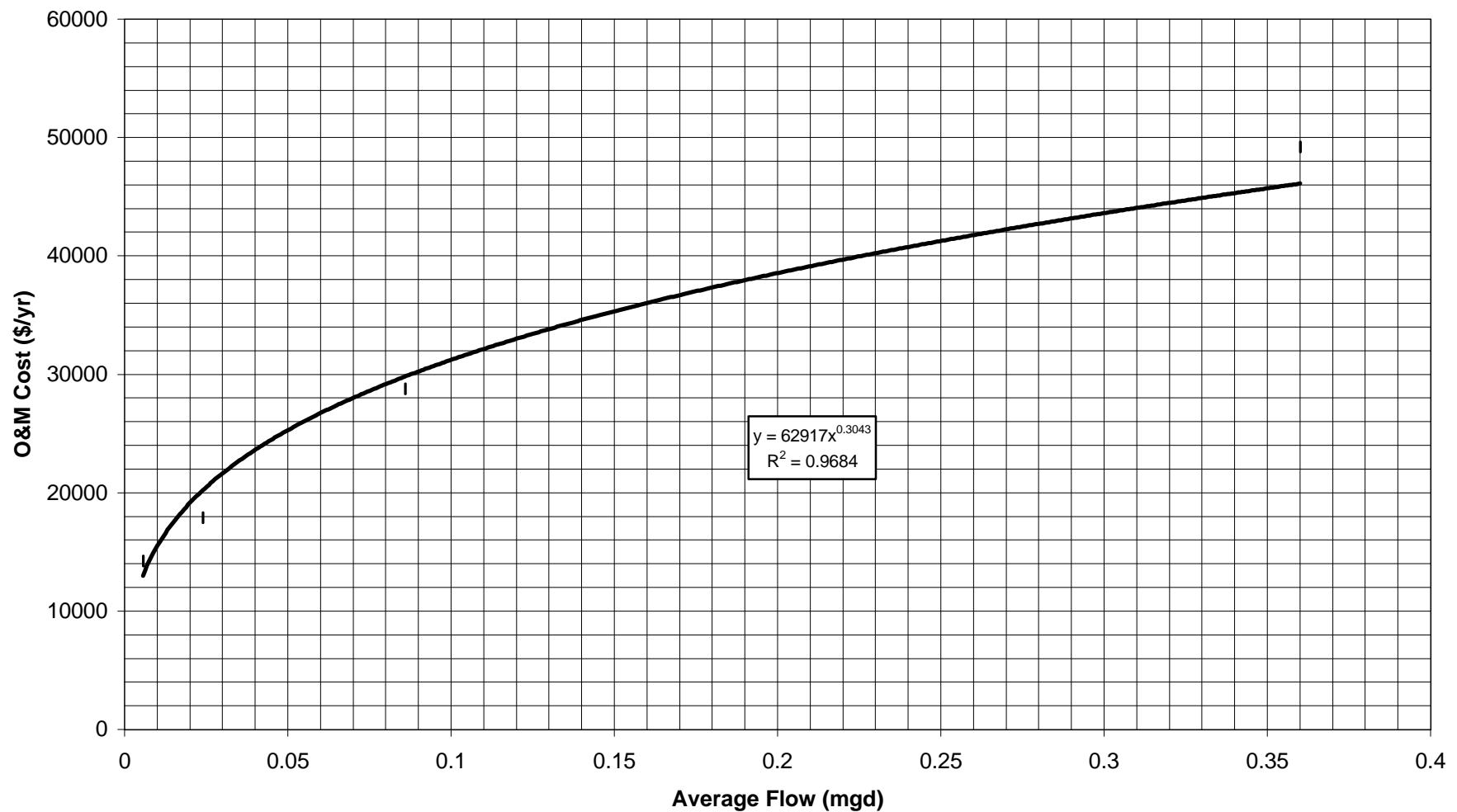
**Figure 3-93**  
**Greensand Filtration**  
**O&M Costs - 90 Percent Removal**



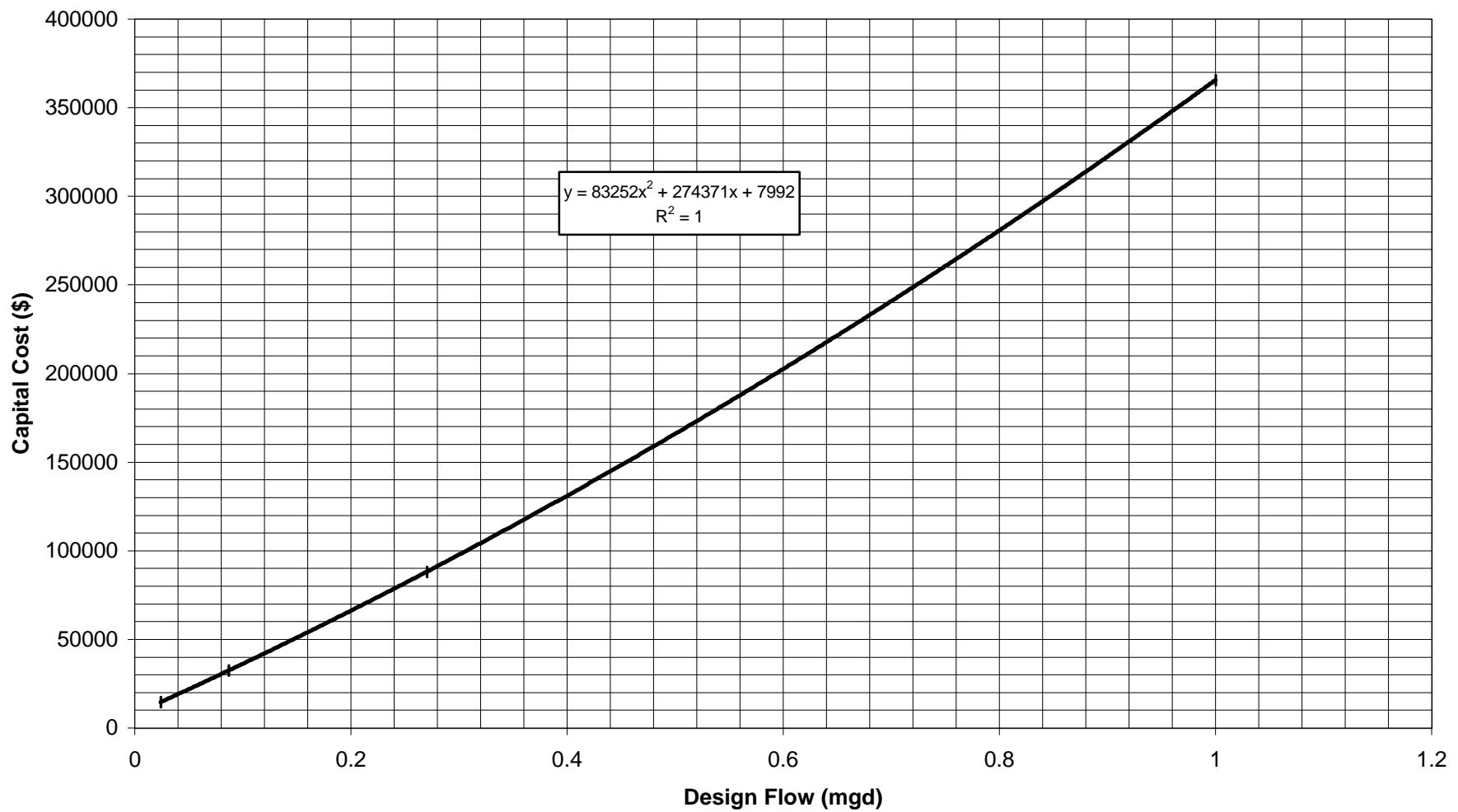
**Figure 3-94**  
**Greensand Filtration**  
**Capital Costs - 80 Percent Removal**



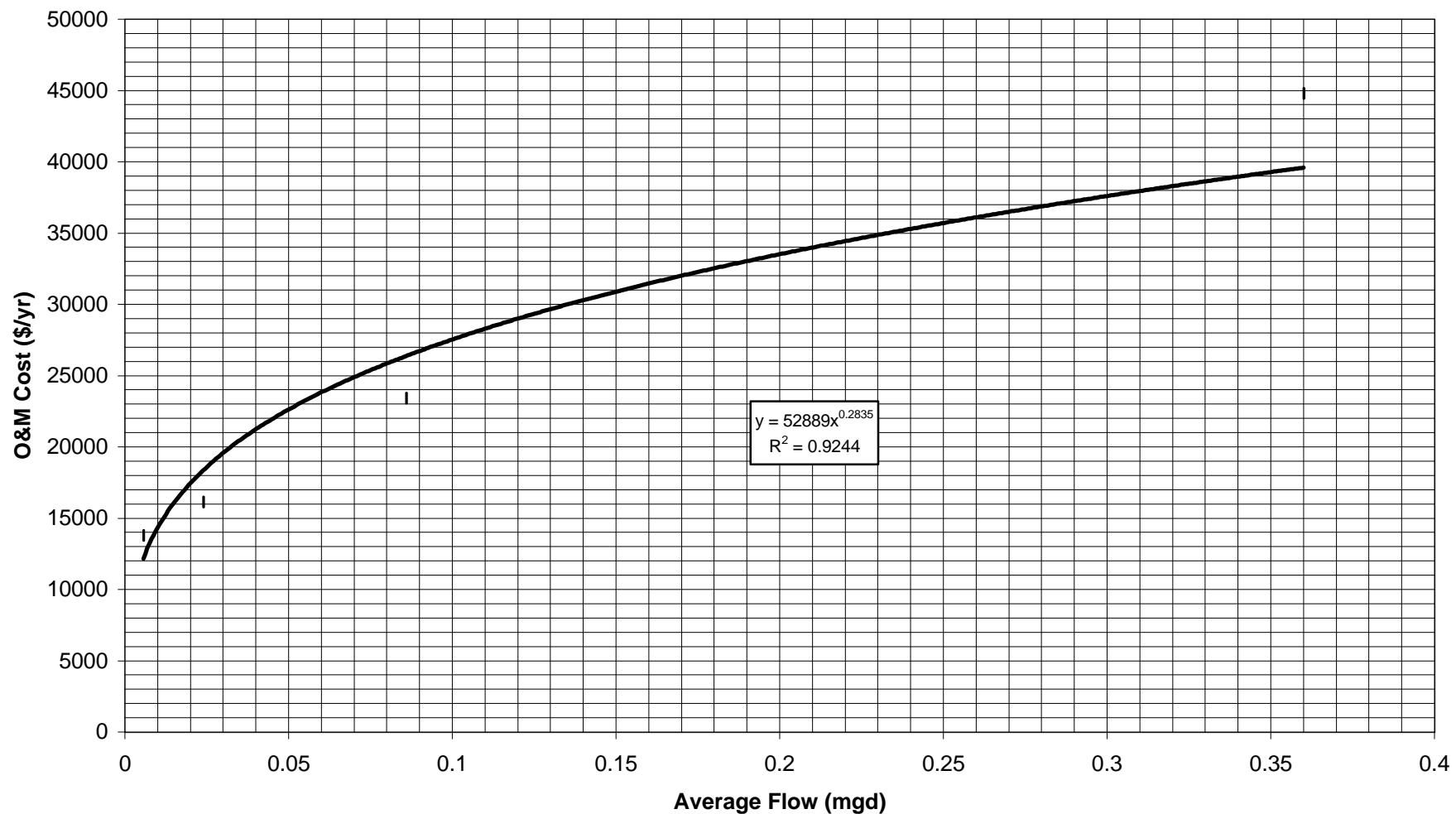
**Figure 3-95**  
**Greensand Filtration**  
**O&M Costs - 80 Percent Removal**



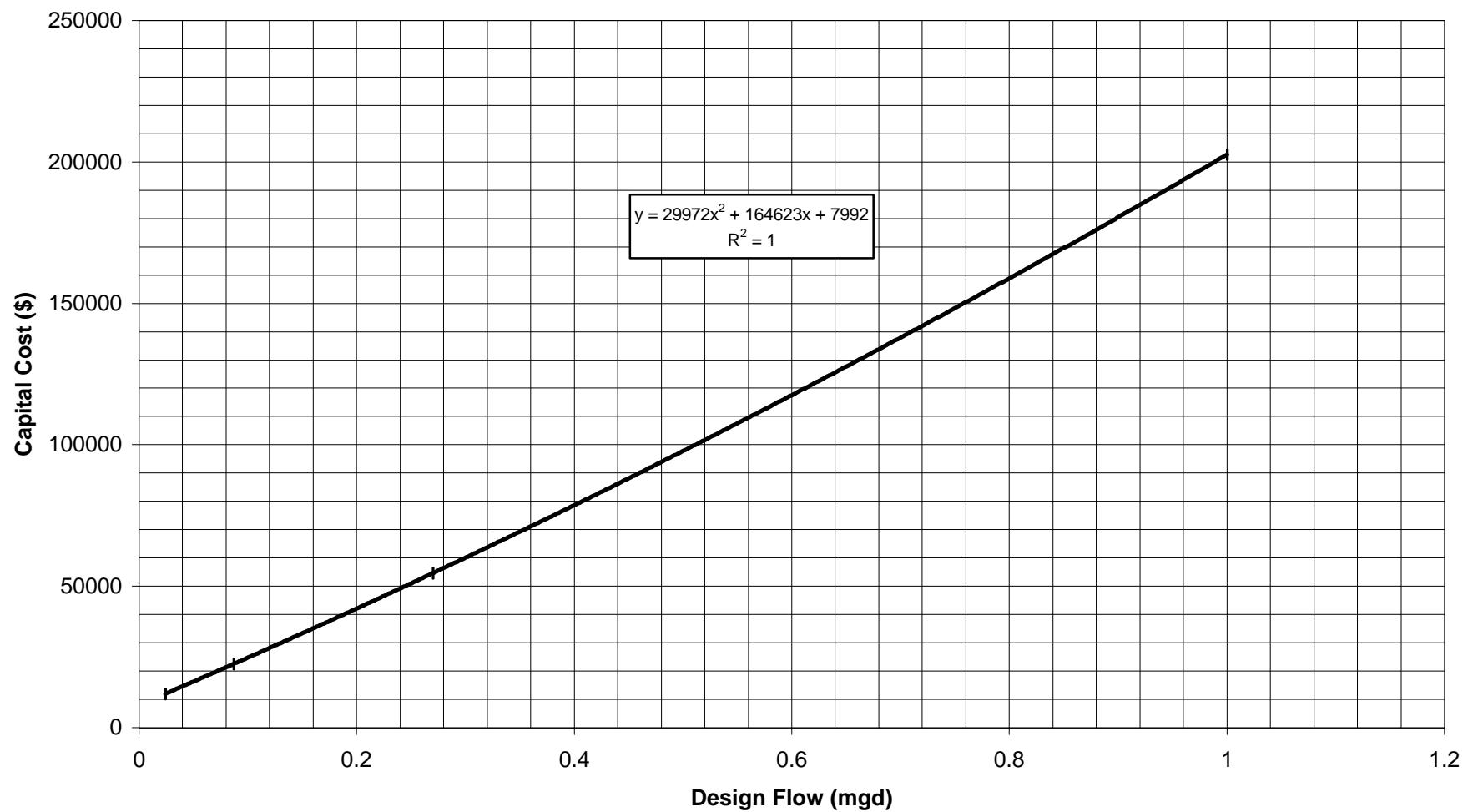
**Figure 3-96**  
**Greensand Filtration**  
**Capital Costs - 50 Percent Removal**



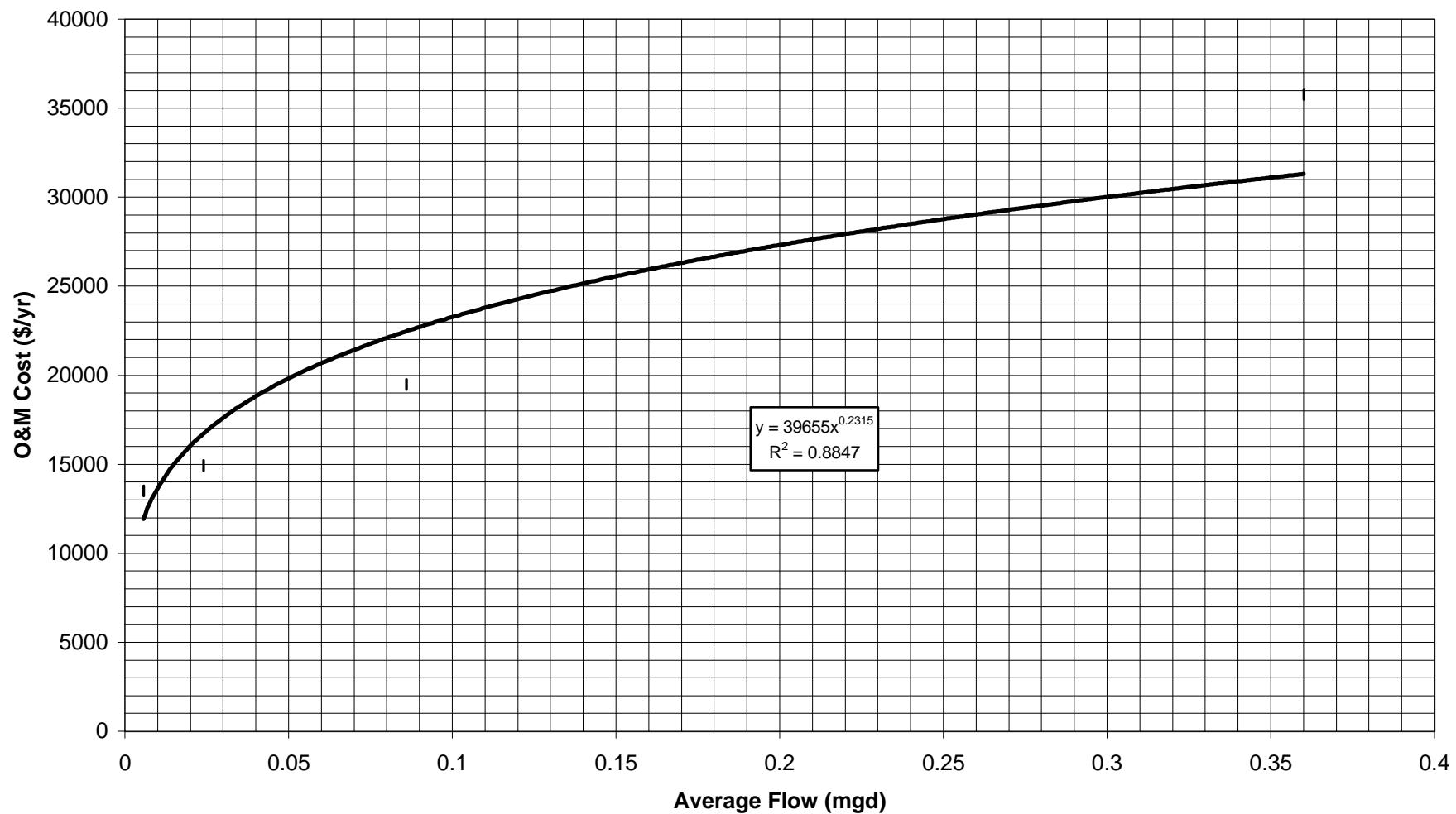
**Figure 3-97**  
**Greensand Filtration**  
**O&M Costs - 50 Percent Removal**



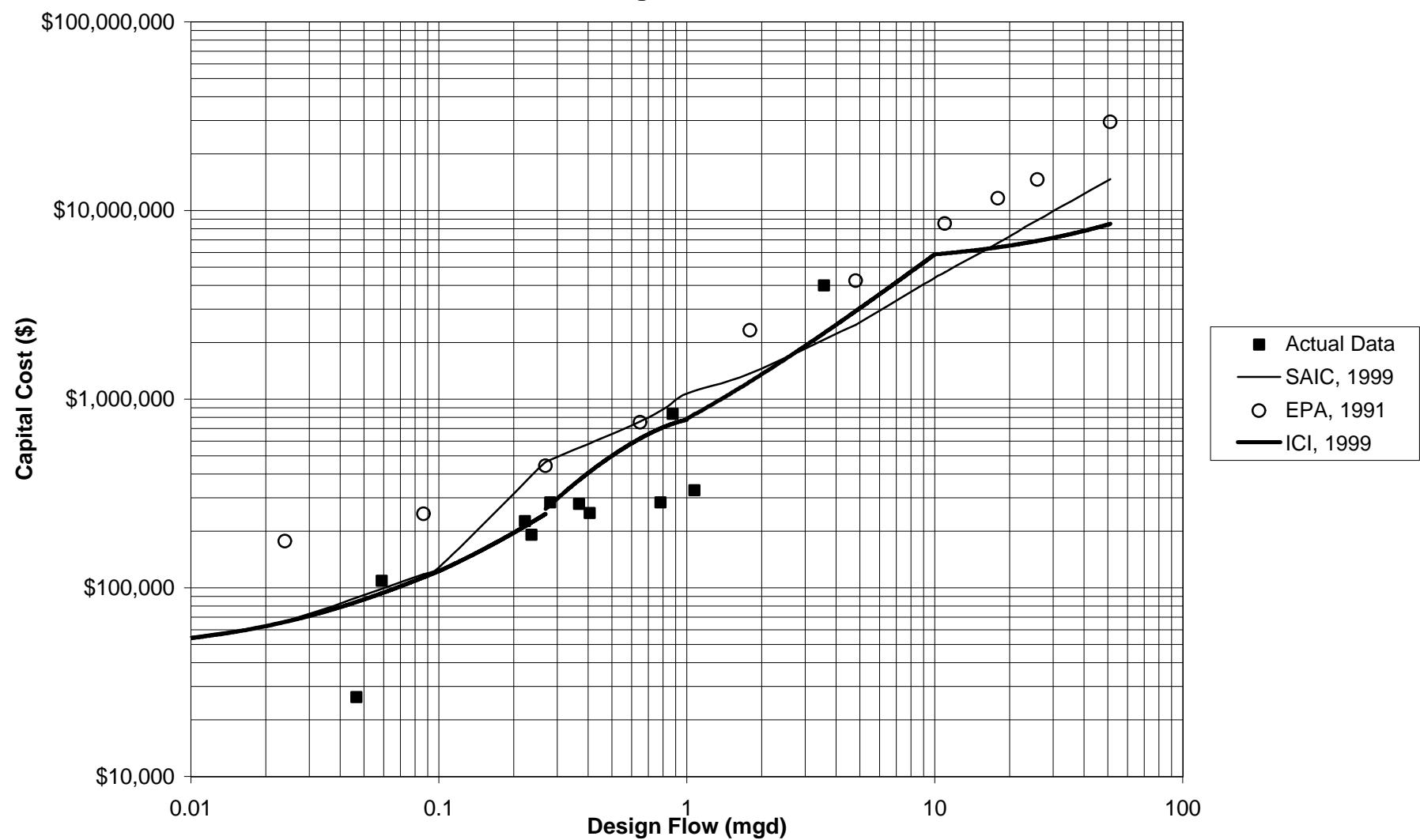
**Figure 3-98**  
**Greensand Filtration**  
**Capital Costs - 30 Percent Removal**



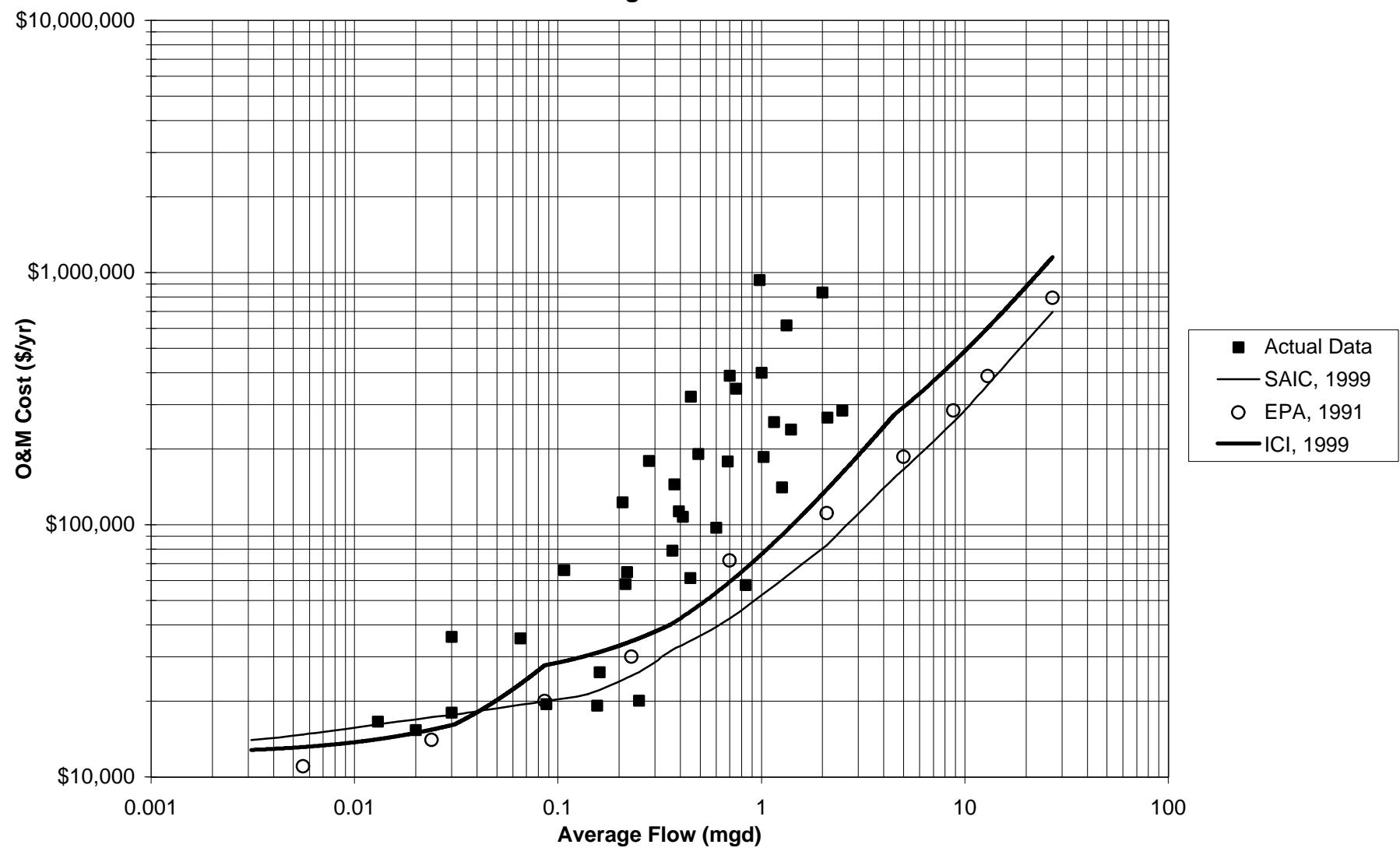
**Figure 3-99**  
**Greensand Filtration**  
**O&M Costs - 30 Percent Removal**



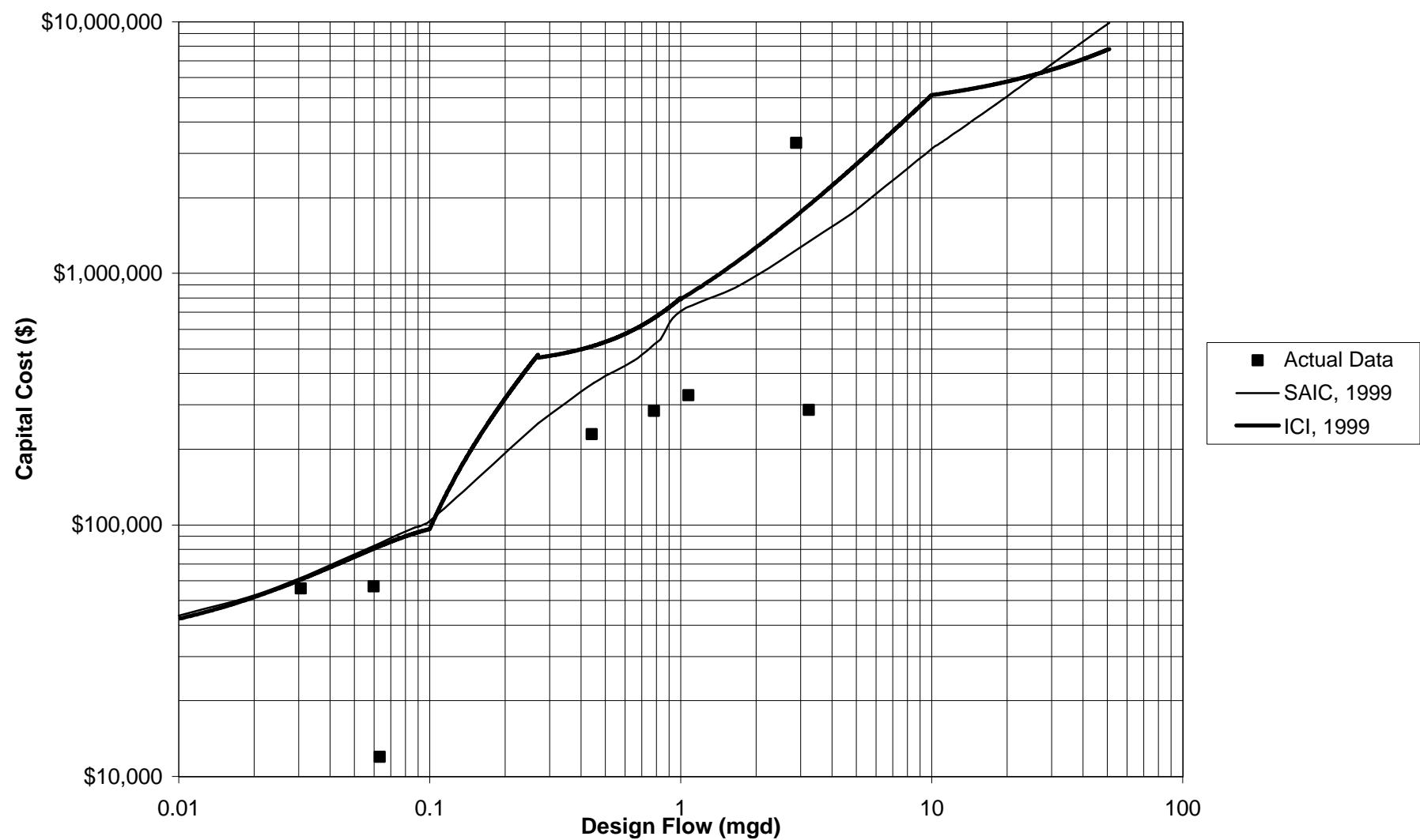
**Figure 3-100**  
**Comparison of Capital Cost Estimates**  
**Coagulation/Filtration**



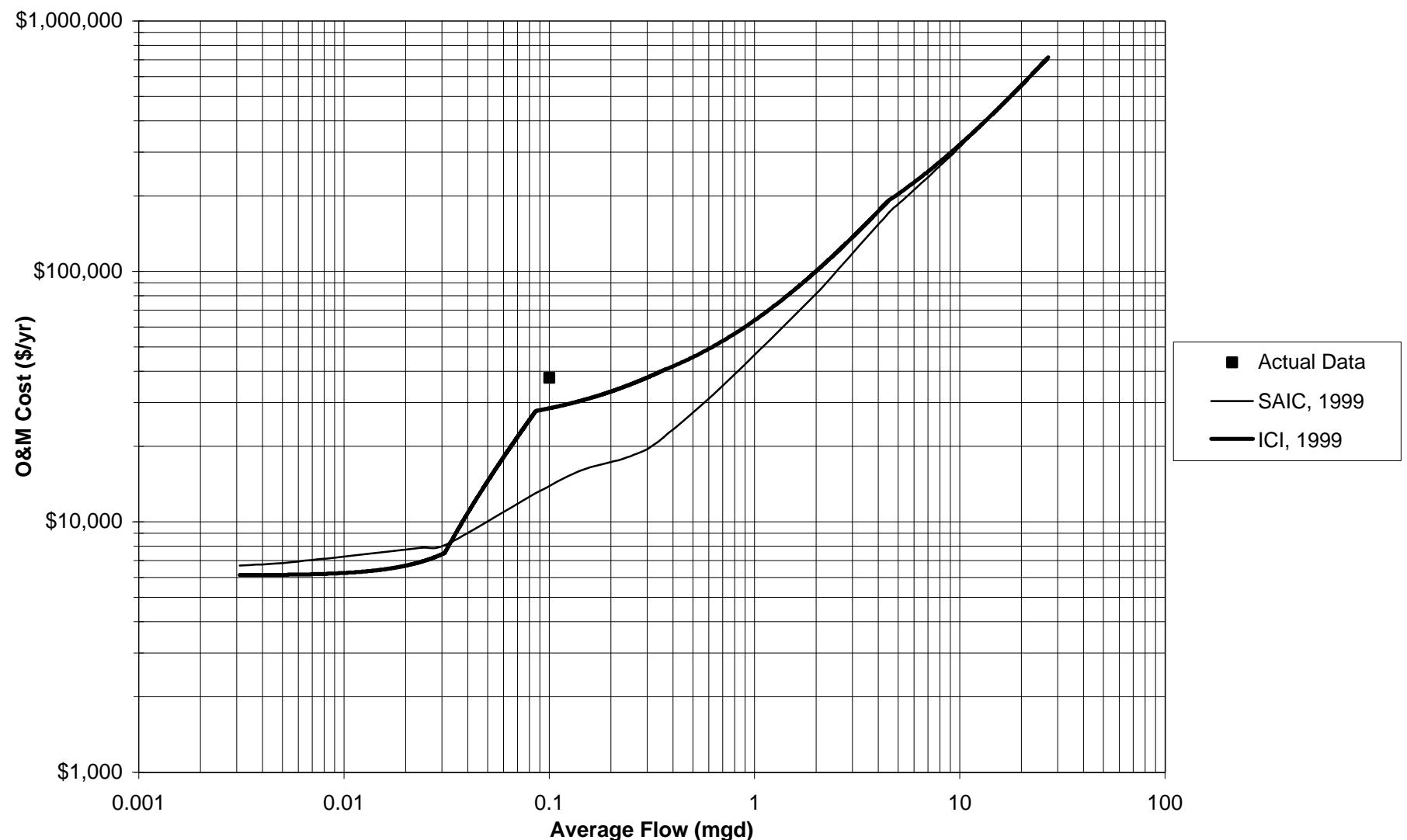
**Figure 3-101**  
**Comparison of O&M Cost Estimates**  
**Coagulation/Filtration**



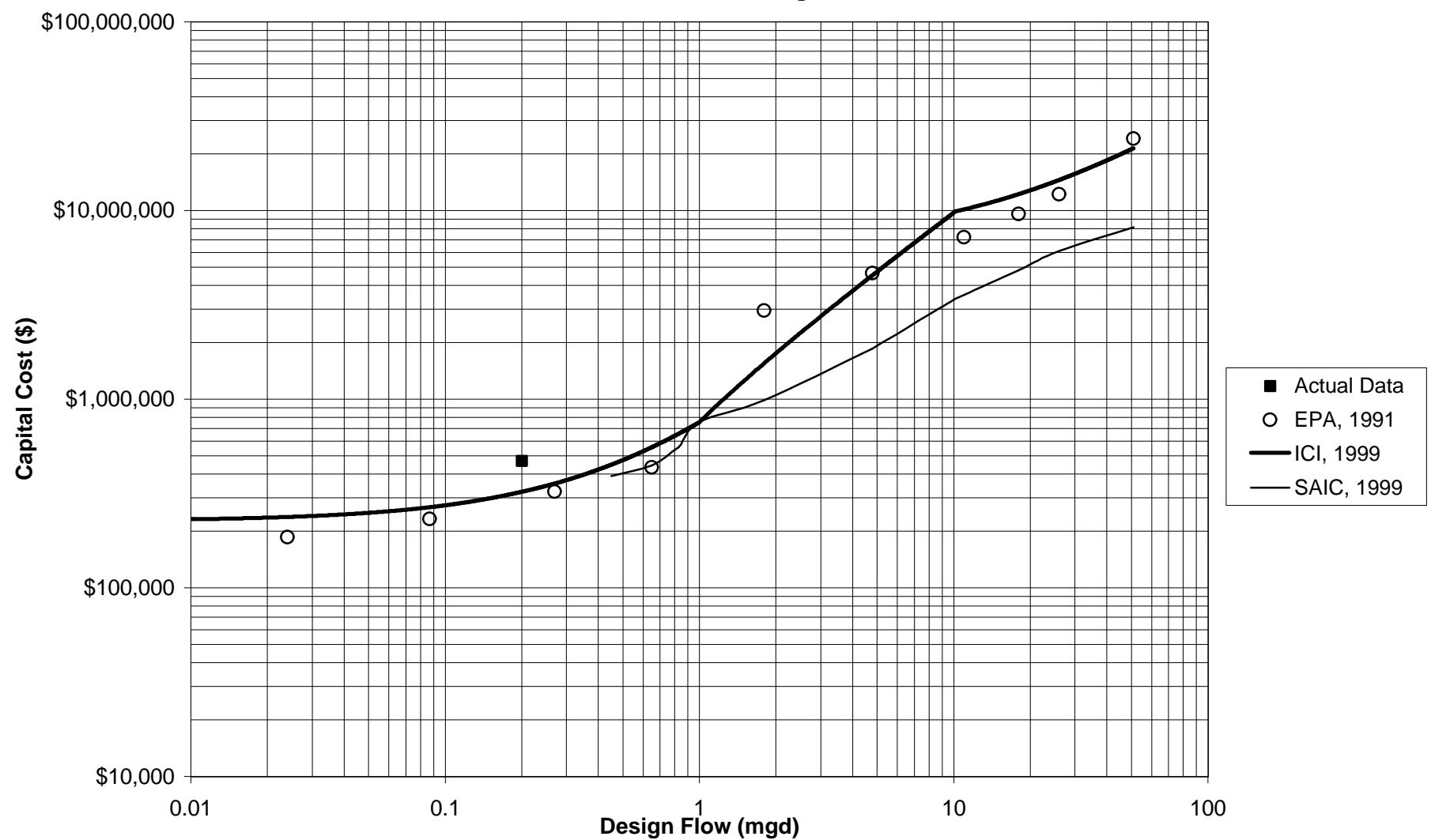
**Figure 3-102**  
**Comparison of Capital Cost Estimates**  
**Direct Filtration**



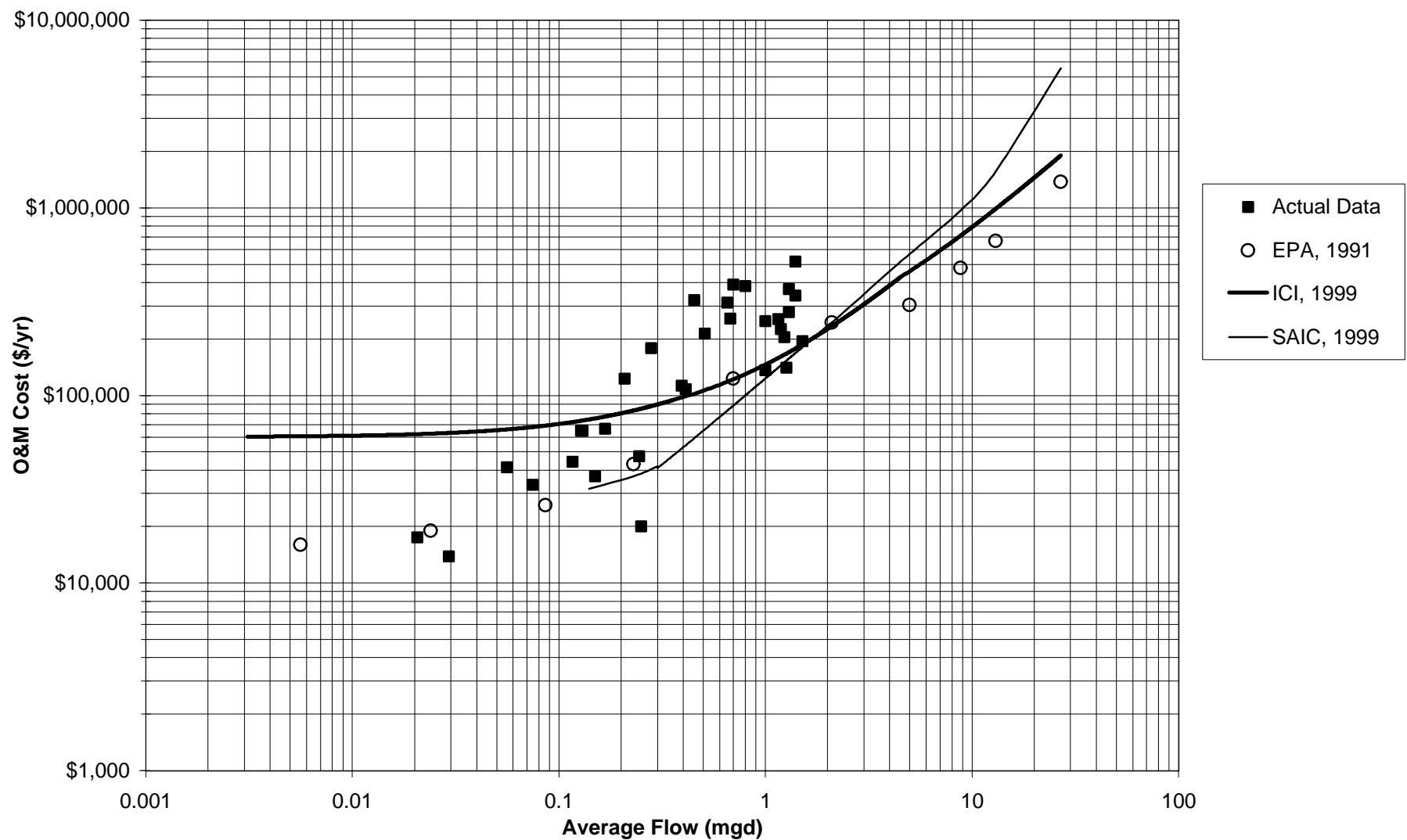
**Figure 3-103**  
**Comparison of O&M Cost Estimates**  
**Direct Filtration**



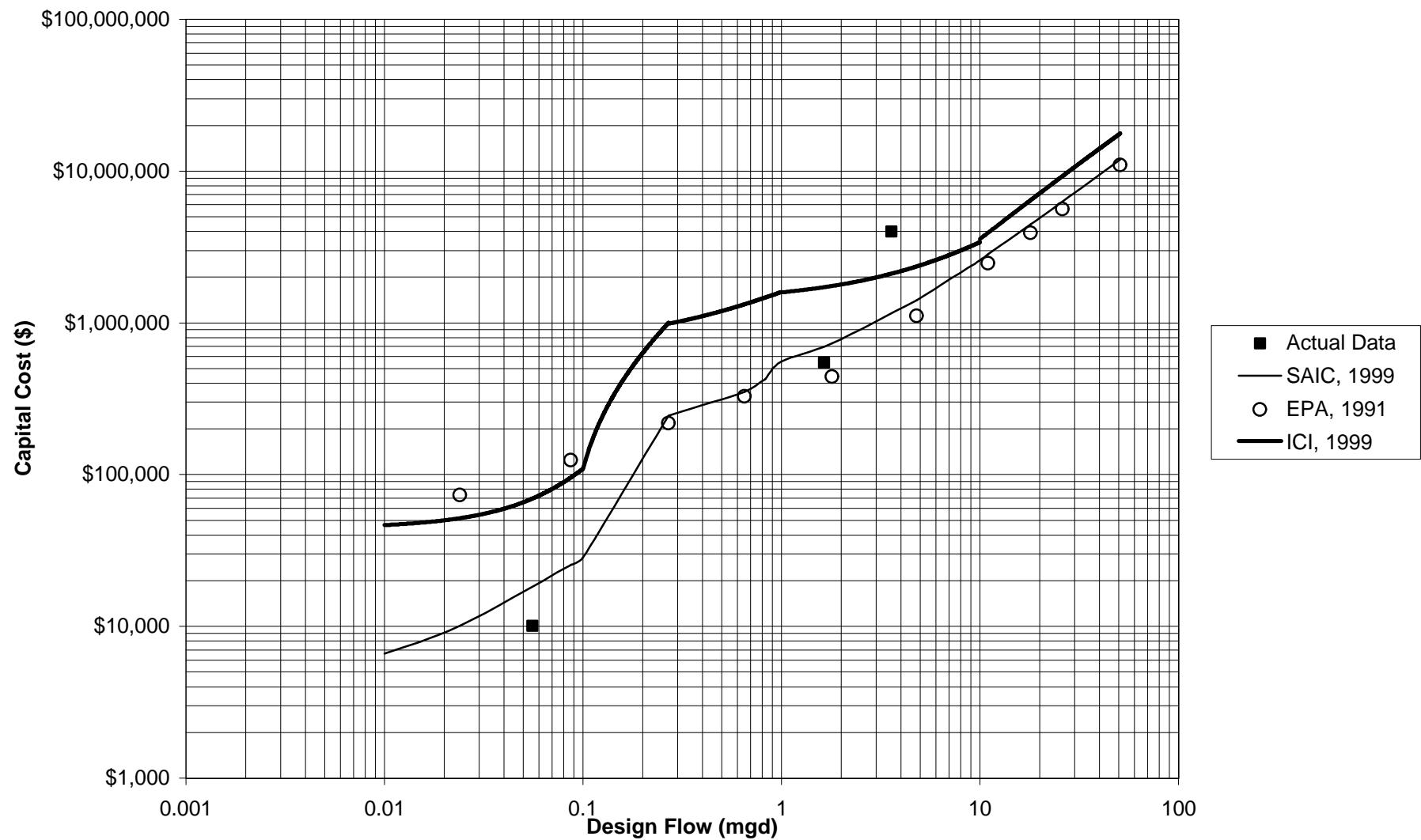
**Figure 3-104**  
**Comparison of Capital Cost Estimates**  
**Lime Softening**



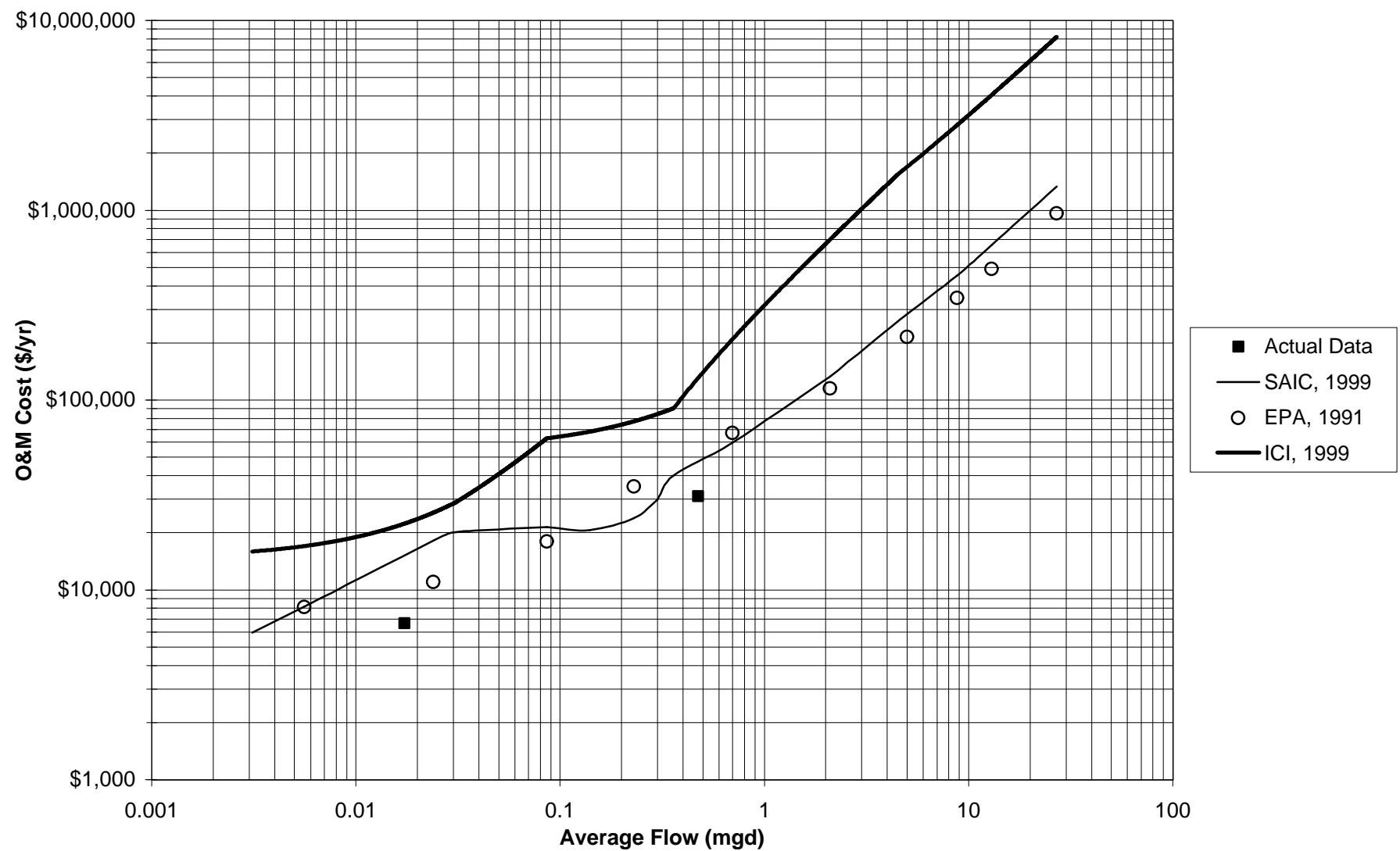
**Figure 3-105**  
**Comparison of O&M Cost Estimates**  
**Lime Softening**



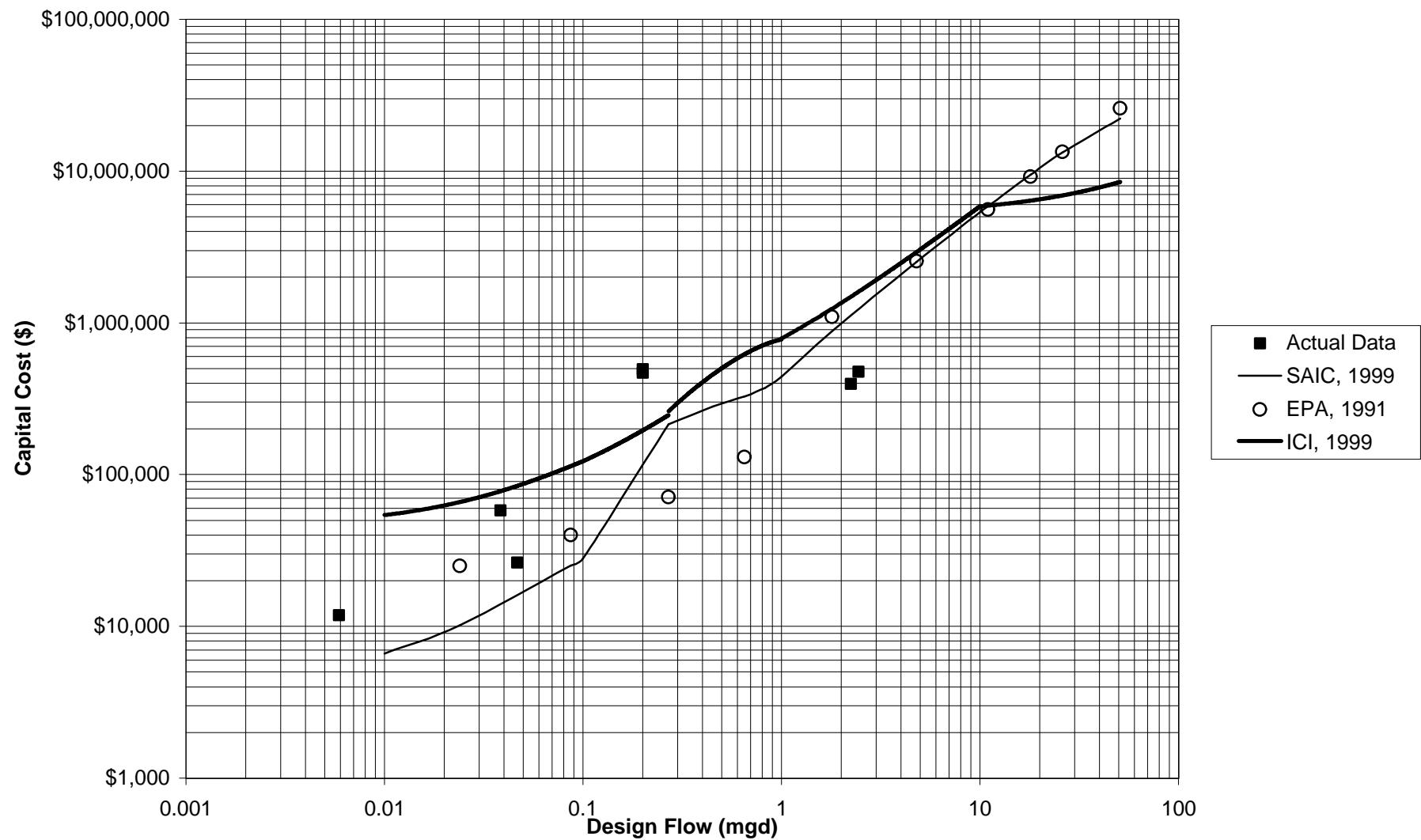
**Figure 3-106**  
**Comparison of Capital Cost Estimates**  
**Activated Alumina**



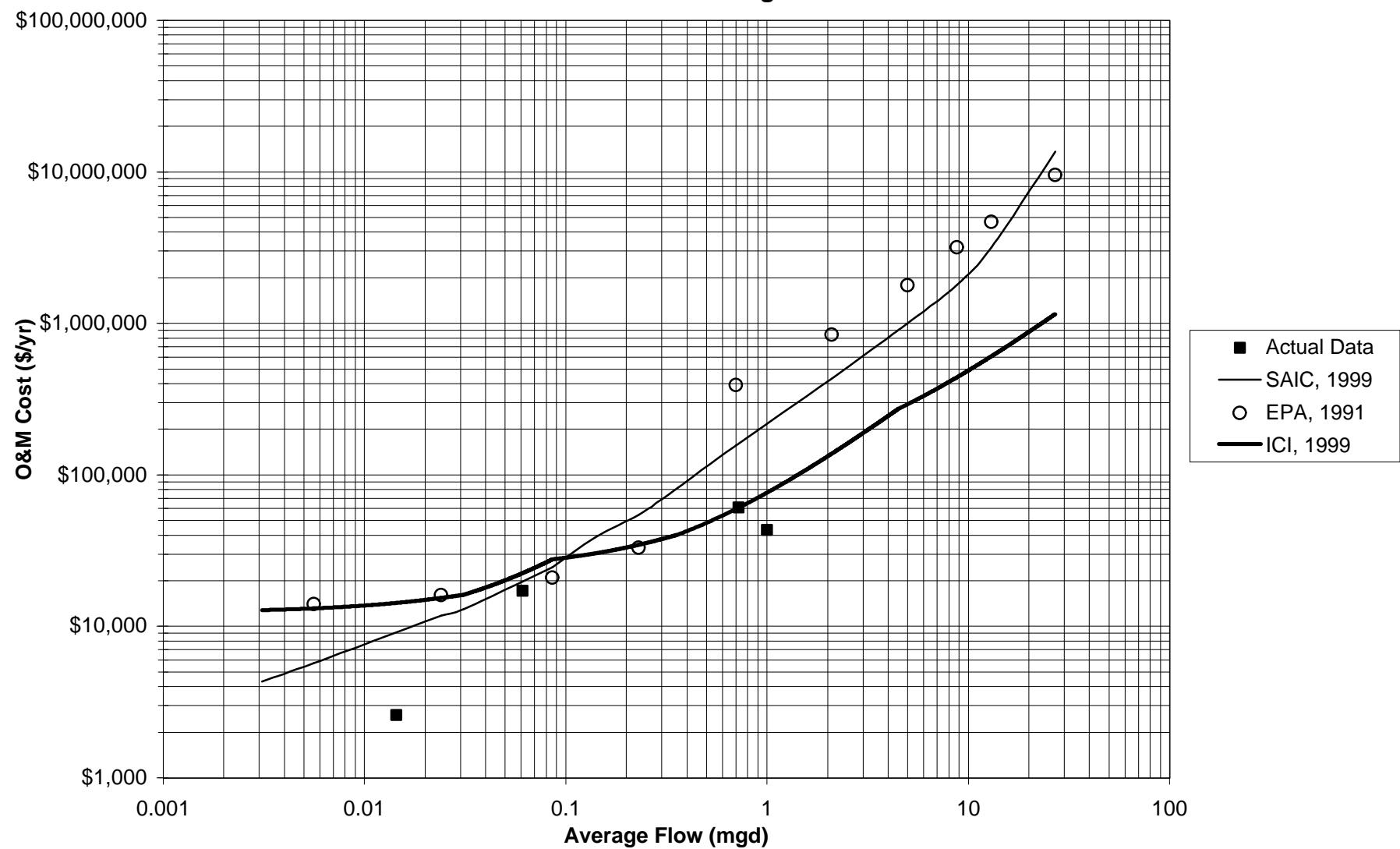
**Figure 3-107**  
**Comparison of O&M Cost Estimates**  
**Activated Alumina**



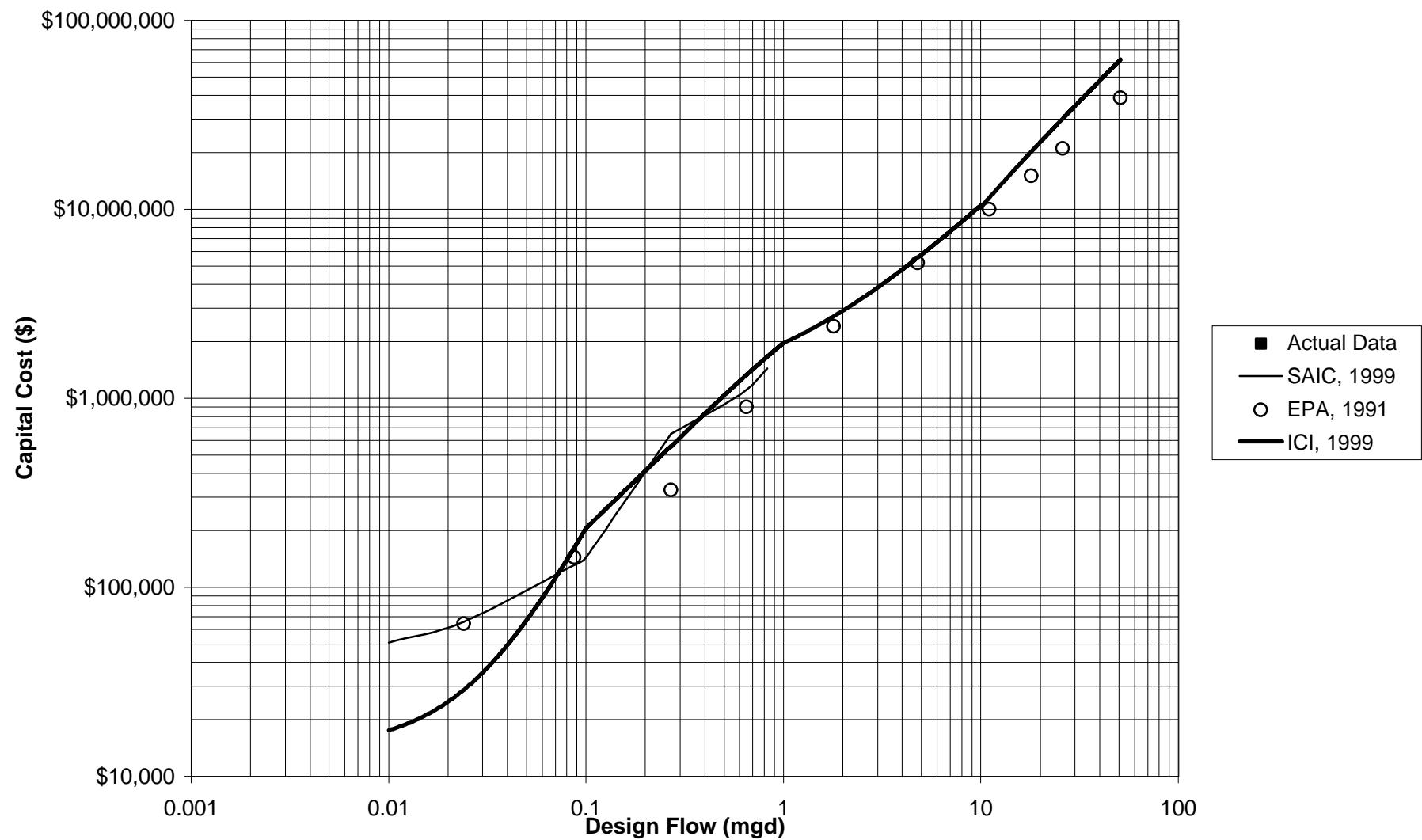
**Figure 3-108**  
**Comparison of Capital Cost Estimates**  
**Ion Exchange**



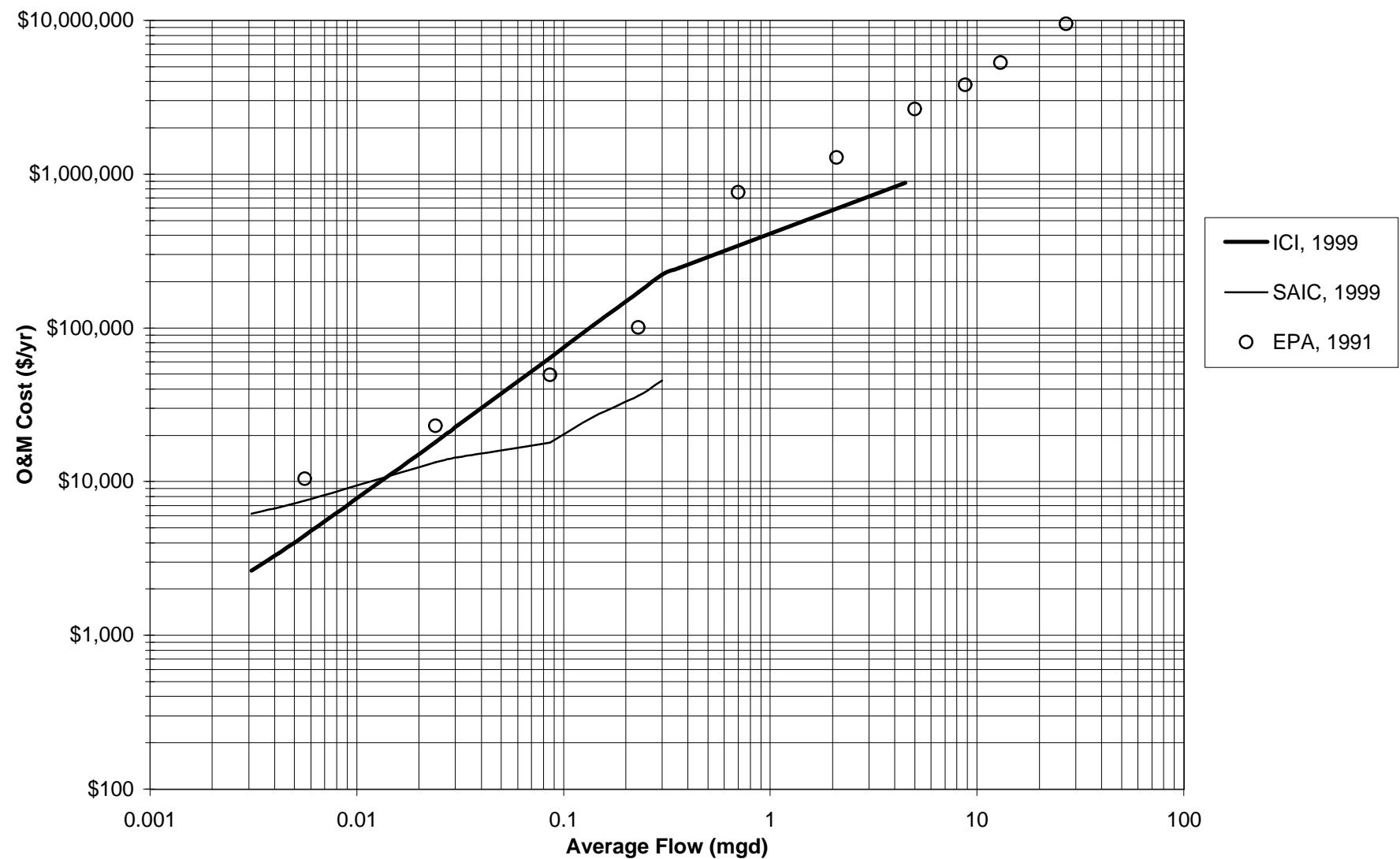
**Figure 3-109**  
**Comparison of O&M Cost Estimates**  
**Ion Exchange**



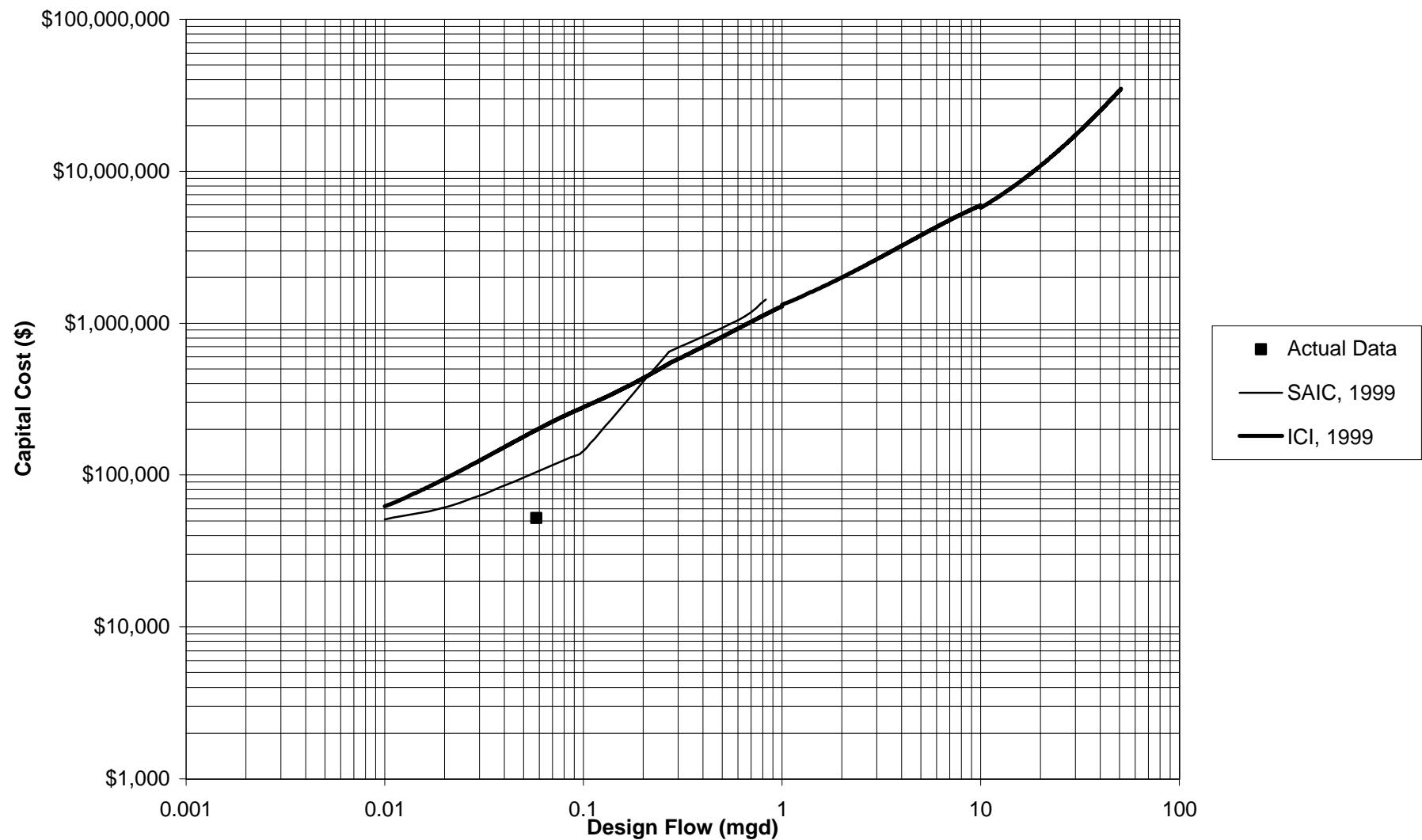
**Figure 3-110**  
**Comparison of Capital Cost Estimates**  
**Nanofiltration**



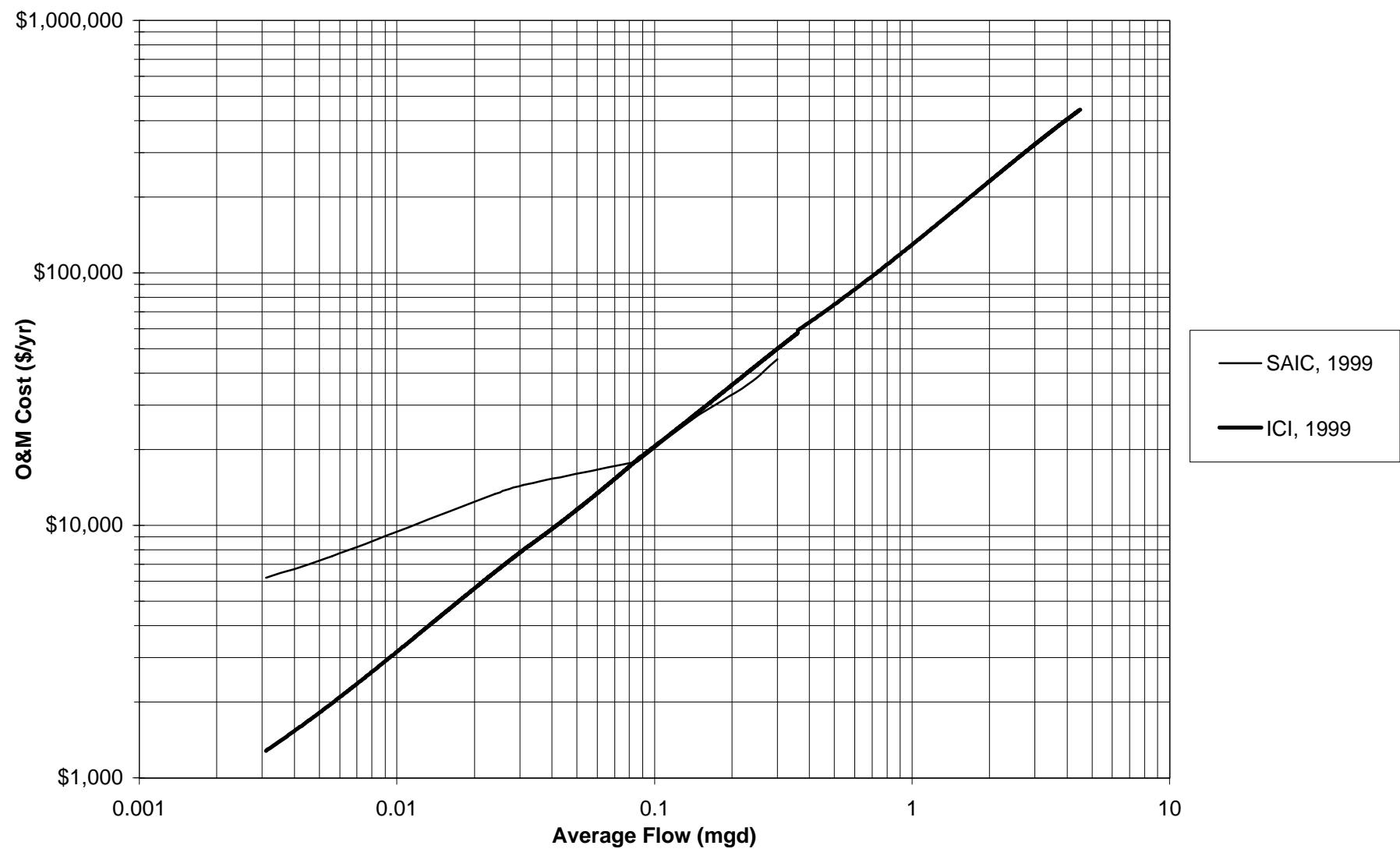
**Figure 3-111**  
**Comparison of O&M Cost Estimates**  
**Nanofiltration**



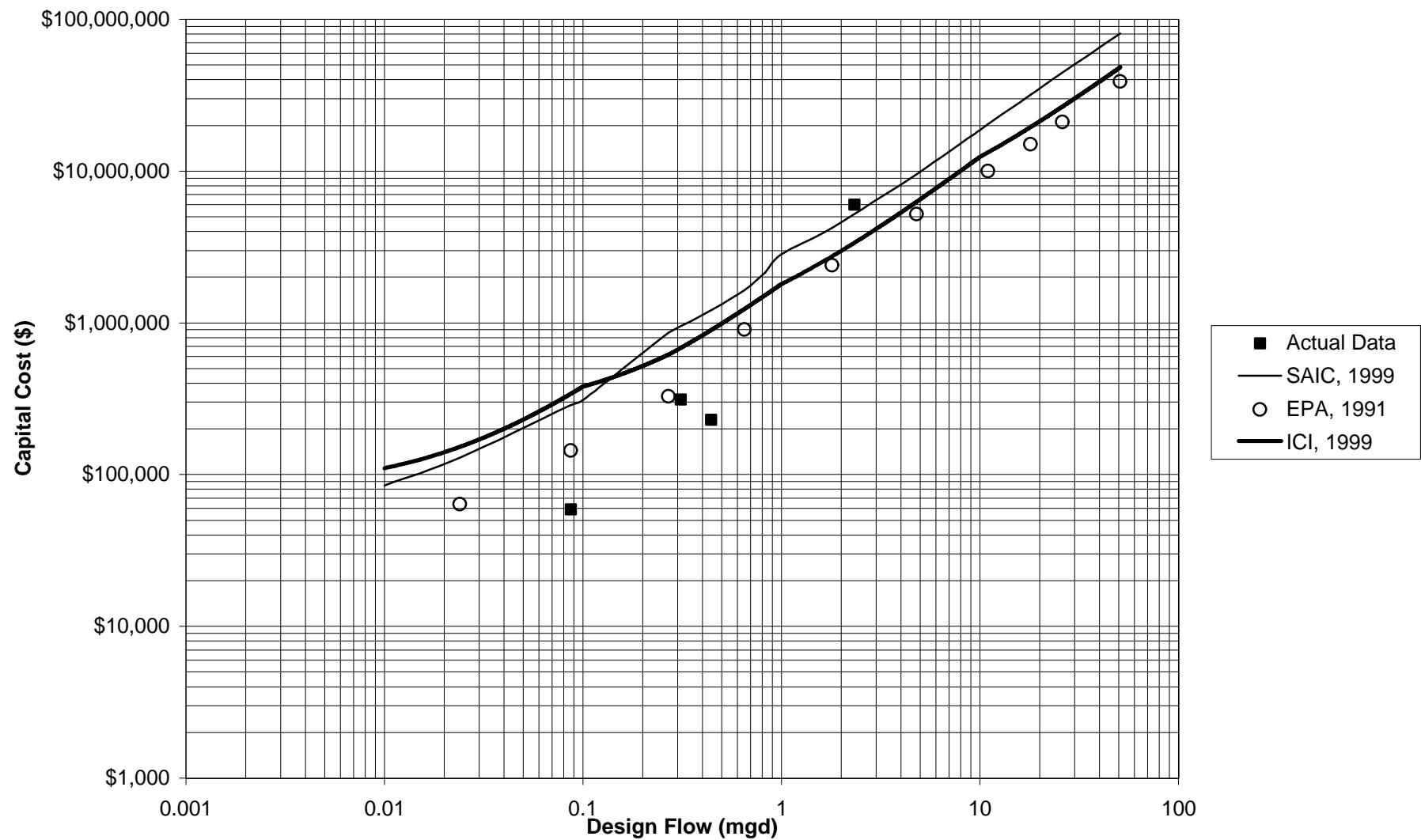
**Figure 3-112**  
**Comparison of Capital Cost Estimates**  
**Ultrafiltration**



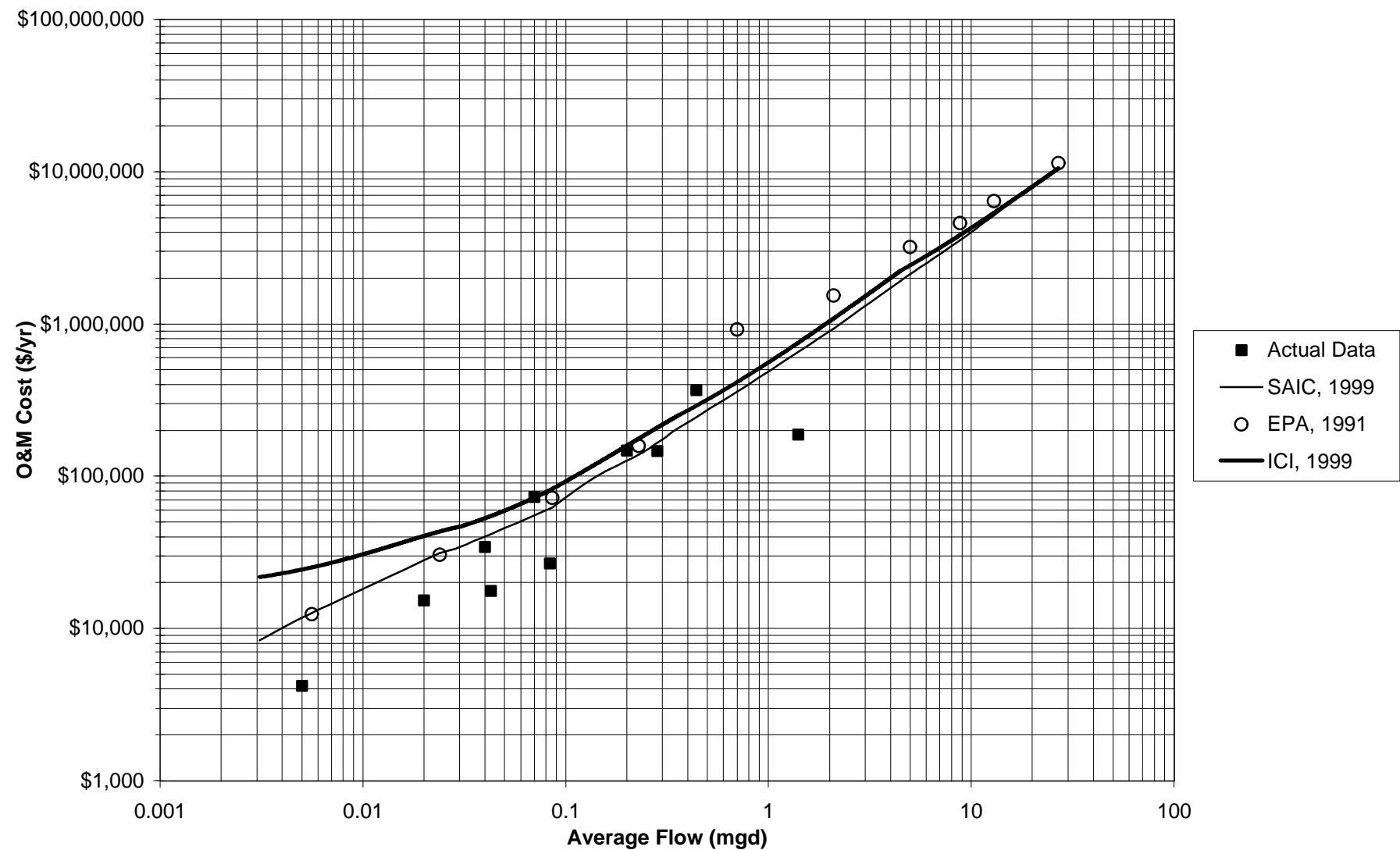
**Figure 3-113**  
**Comparison of O&M Cost Estimates**  
**Ultrafiltration**



**Figure 3-114**  
**Comparison of Capital Cost Estimates**  
**Reverse Osmosis**



**Figure 3-115**  
**Comparison of O&M Cost Estimates**  
**Reverse Osmosis**



**Graphs 5-1 through 5-3 are not available electronically.  
Please contact Jeff Kempic (202 260 9567 or [kempic.jeffrey@epa.gov](mailto:kempic.jeffrey@epa.gov)) for more information.**