



Storm Water Management

Evaluating Pointe at Jamestown BMP

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REU Summer Program 2007

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Objectives

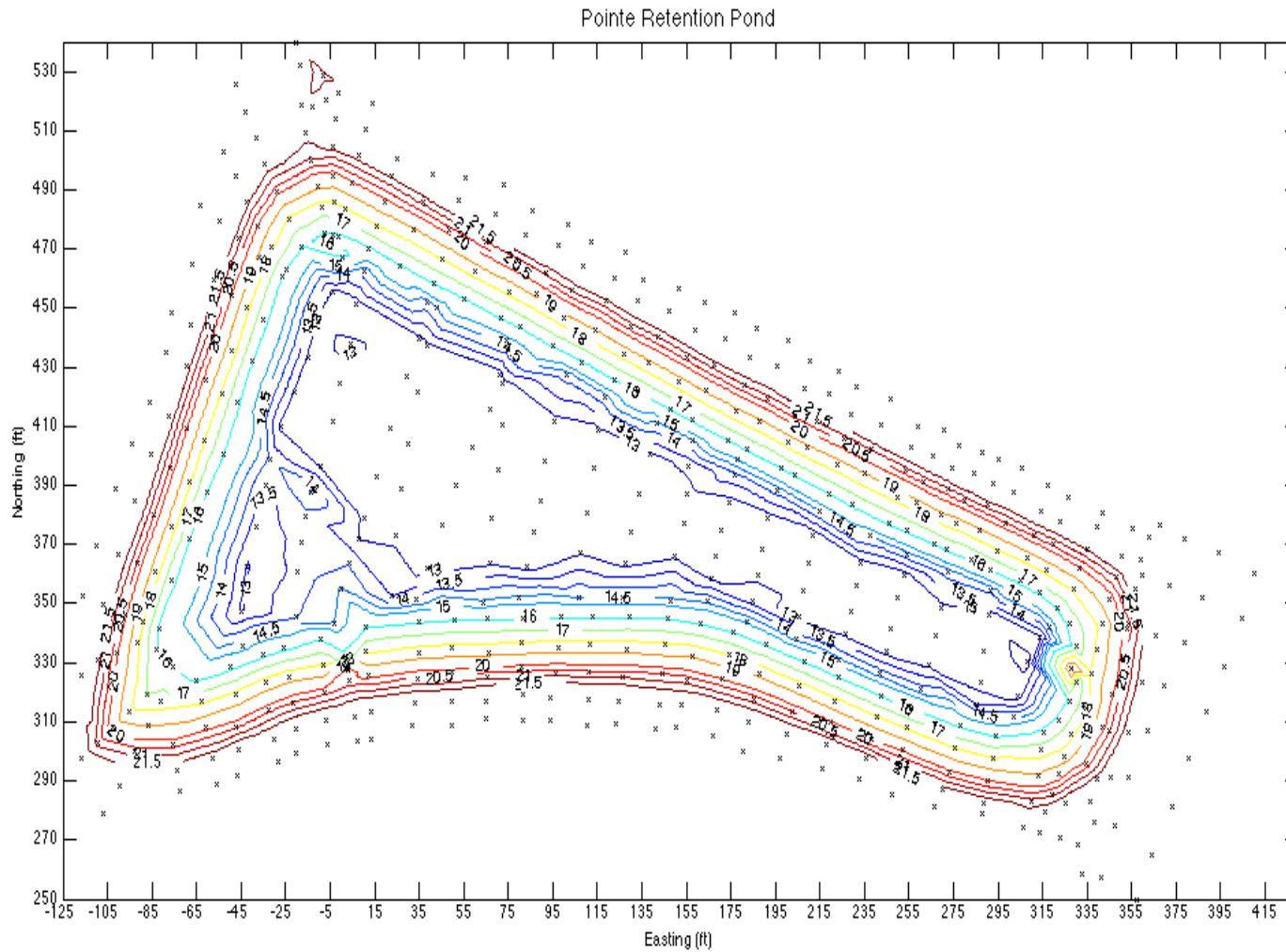
- Determine whether the peak inflows, peak outflows, centroid lag times, and runoff coefficients agree with design and regulations
- Compare pond dimensions and volumes with design and EPA recommendations
- Determine if there are any negative impacts on streams downstream of BMP's

Methodology – Flow Evaluation

- Determine pond elevation from pressure transducer and staff gauge
- Rain gauge data
- Use pond elevations to calculate flows in and out of BMP
- Salt Dilution Method as an indicator of “actual discharge”



Methodology – Surveying

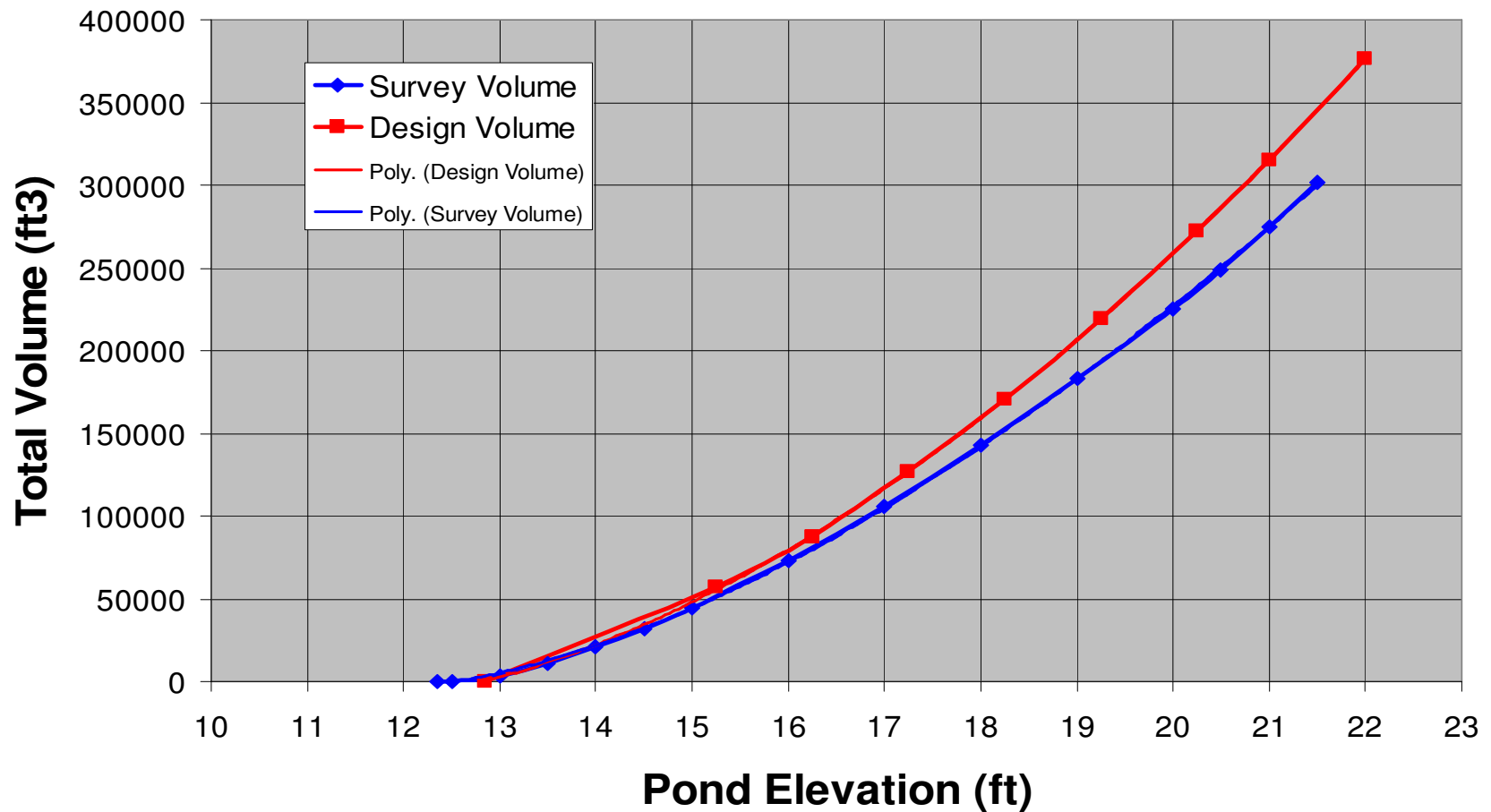


Survey Data

Pointe Pond Volume

$$y = -43.316x^3 + 4851.3x^2 - 87588x + 416503$$

$$y = -82.327x^3 + 6406.5x^2 - 111440x + 552165$$



Survey Data Summary

Based on Design

- Water Quality **Requirements**: 48,134 ft³
- Water Quantity **Requirements**: 109,844 ft³
- Total Storage **Required**: 157,978 ft³

- Water Quality Volume **Provided**: 72,063 ft³
- Water Quantity Volume **Provided**: 115,857 ft³
- Total Storage **Provided**: 187,920 ft³



Based on Survey

- Water Quality Volume: 67,481.99 ft³
- Water Quantity Volume: 94,403.94 ft³
- Total Storage: 161,885.9 ft³

- Wet Storage Difference: 4,581.01 ft³
- Dry Storage Difference: 21,453.06 ft³
- Total Storage Difference: 26,034.07 ft³

- **Wet Storage Difference: 6.4%**
- **Dry Storage Difference: 18.5%**
- **Total Storage Difference: 13.9%**
- **Water Quantity Requirements short 15,440.06 ft³**



EPA Design Recommendations

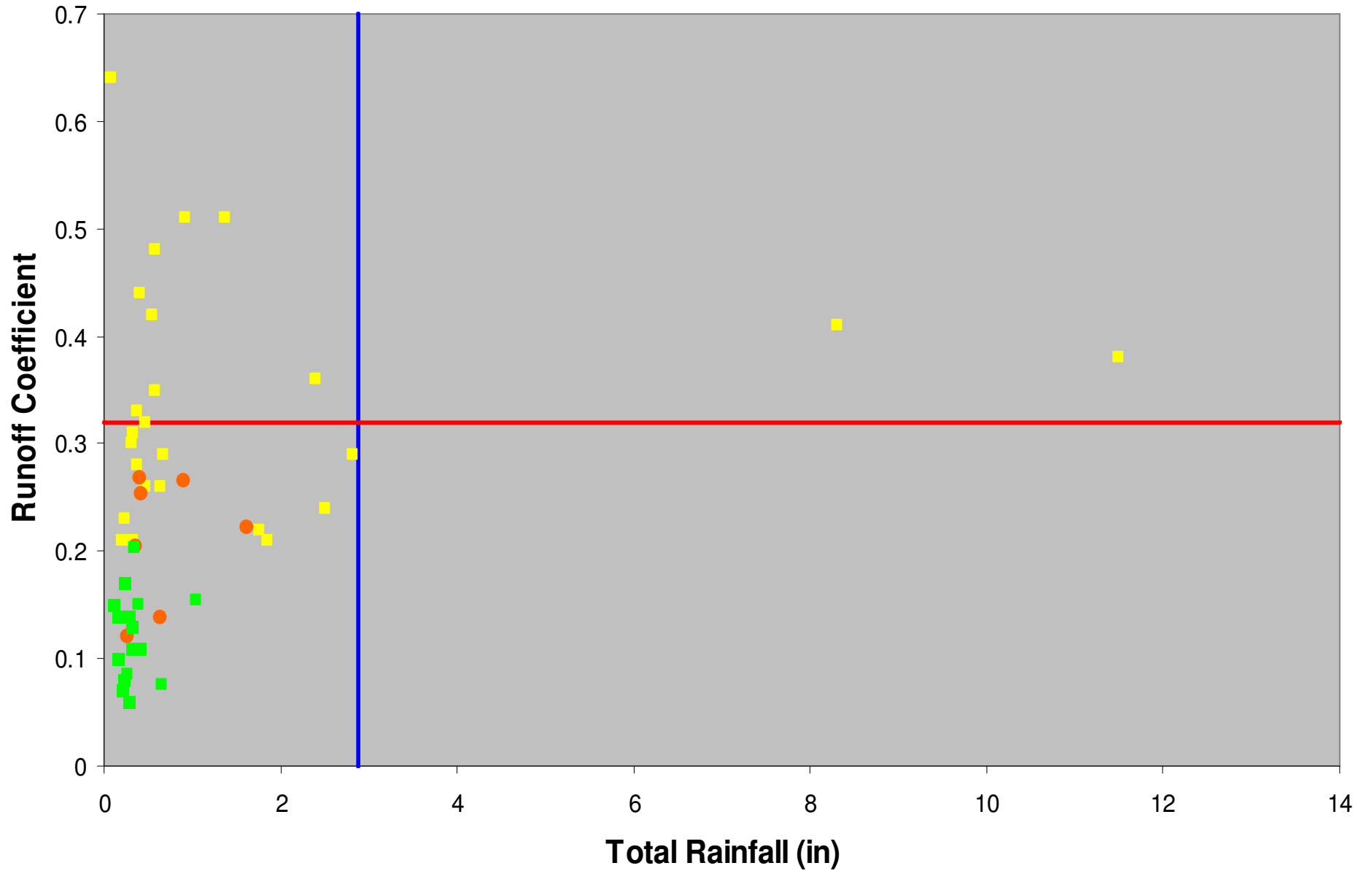
	EPA Recommendations	Pointe Results
Pond Depth	3-9 feet for permanent pool	2.24 ft
Area Ratio	Less than 100	49.22
Length/Width Ratio	At least 2:1	4.77:1

Hydrologic Performance

- Peak Inflow – maximum volumetric discharge into the pond
- Peak Outflow – maximum volumetric discharge out of pond
- Centroid Lag – time between peak inflow and peak outflow
- Runoff Coefficient – ratio of total surface runoff to total runoff into pond
- Salt Dilution – method for measuring volumetric discharge from BMP at a given staff gauge height



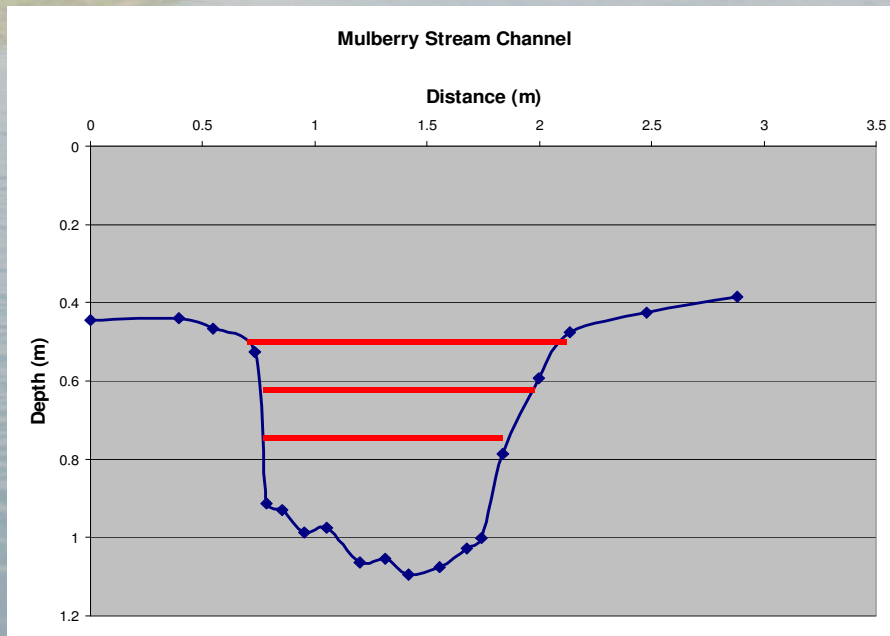
Runoff Coefficient vs Rainfall



Rosgen – Stream Classification

Problems

- Identifying Bankfull
- In incised streams, "bankfull" is really meant to refer to the "dominant" flow that sets the channel size



Stream Classification

Qualitative Analysis

- Streams with BMP's at the headwater appear more incised and entrenched
- Streams with recently installed BMP's contain dense root exposure and undercutting



Conclusions

- Hydrologic Performance
 - Greater Peak Inflows than predicted
 - Greater Peak Outflows than predicted
 - Centroid Lag time consistent with design and regulation
 - Underestimated Runoff Coefficient may explain why there are greater inflows and outflows
- Stream Classification
 - Difficult to apply Rosgen Method to incised streams
 - BMP's are not effective toward protecting streams
- Pond Dimensions
 - Less dry storage than needed may explain the greater outflows
 - Pond is adequate for sediment settlement but may not be efficient in water quality