ASSESSMENT OF EXISTING FLOW CONTROL FACILITIES IN WRIA 9

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Objective: In selected subwatersheds of the study area, determine the types and runoff storage volumes provided by existing stormwater management installations influencing our hydrologic indicators.

Purpose: If possible, quantitatively adjust SUSTAIN estimates of required new flow controls, and the associated costs; or at least qualitatively condition the estimates to reflect existing infrastructure.

Selected subwatersheds and contributing jurisdictions:

- Des Moines Creek—Cities of Des Moines and SeaTac, Port of Seattle
- Miller/Walker Creeks—Cities of Burien, Normandy Park, and SeaTac; King County; Port of Seattle
- City of Covington (part of Jenkins and Soos Creek subwatersheds)

Facilities included: Ponds (flow control), vaults, tanks, infiltration basins and trenches, airport runway filter strips

Data sources: Jurisdiction files, as-built or design plans, GIS output

Methods and Assumptions

- Low estimates based on:
  - Storage = volume of all flow control structures
  - Airport runway filter strips can store 0.5 inch of rain falling on runways + strips
- High estimates based on:
  - Natural-bed structures can store more than their volume because of infiltration and evaporation (ponds 1.25 x, infiltration 2 x volume)
  - Airport runway filter strips can store 1 inch of rain falling on runways + strips
- Pond and vault depths assumed to be 5 ft when only GIS areal data available (Burien)

Summary of Results

Subwatershed	Flow Control Facility Type	No. Quantified (Estimated Volume [thousand ft^3])	No. with Insufficient Data	Estimated Storage Volume[a] (watershed-inch)
Des Moines (5.781 $mile^2$, ~92% developed)	Ponds	20 (3070-3837)	3	0.40 – 0.52
	Vaults and tanks	25 (935)	2	
	Infiltration	4 (19-38)	2	
	Runway filter strips	172 acres (868-1735)	-	
	Undesignated	-	0	
Miller/Walker (8.125 $mile^2$, ~93% developed)	Ponds	67 (8269-10337)	3	0.53 – 0.67
	Vaults and tanks	44 (386)	15	
	Infiltration	88 (142-284)	0	
	Runway filter strips	92.2 acres (382-764)	-	
	Undesignated	-	126	
Covington (5.961 $mile^2$, ~89% developed)	Ponds	79 (4513-5642)	2	0.39 – 0.49
	Vaults and tanks	31 (336)	0	
	Infiltration	16 (16-31)	8	
	Undesignated	-	39	

[a] Total structure storage volume/Developed area

Context

Case (% impervious)	Flow Control Storage Requirement (watershed-inches)
Low density urban (9%)	1.6[a]
Medium density urban (28%)	2.3[a]
High density urban (66%)	3.8[a]
Intensive commercial (85%)	4.8[a]
SUSTAIN estimate for WRIA 9	2.8
Estimate of existing capacity	0.4 – 0.8

[a] To match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the 50-year peak flow

Qualifications

- There are reasons why existing storage may be underestimated:
  - Facilities with insufficient data or missing from records
  - Infiltration and evaporation could be more than maximum estimates, especially in Covington
  - Single-purpose water quality facilities also offer some storage (e.g., swales, wet ponds)
- And reasons for possible overestimation:
  - Some locations may not have as much existing as these
  - Facilities not functioning well because of poor care
  - Volumes may not be all “live storage” (e.g., dual-purpose pond with a wet pool for treatment)

Clarification

- This assessment concerned flow control facilities only and did not directly investigate water quality facilities.
- Nevertheless, the SUSTAIN analysis showed that installing the facilities required for hydrologic control would reduce pollutant loads substantially and result in low risks of exceeding water quality criteria

Conclusions

- All in all, it appears that we have installed at least 0.4 watershed-inch of storage in the study area, and not more than 0.7, with 0.5 probably being the best approximation to adjust SUSTAIN estimates of future needs.
- As with all project results, these findings can be a guide; but jurisdictions must do site-specific planning and establish what facilities actually exist and their capabilities.
- In preparation, inventories should be rechecked and completed.

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- SeaTac: Don Robinett, Adam McFayden, Chiaki Sakuma

Possible Discussion Questions

- Are the assumptions on pond, infiltration, and runway filter strip storage capability reasonable? If not, how would you adjust the analysis?
- Do you think we can assume existing facilities equivalent to 0.5 watershed-inch of flow control capacity throughout all or most of the developed portion of the study area for planning-level purposes? If not, how should we account for existing facilities?