Thurston County Stormwater Road Retrofit Planning Study

Olympia Utility Advisory Committee | March 5, 2026

Road runoff is a major concern for Puget Sound

Thurston County faces significant water quality challenges driven by stormwater runoff from its roadway network

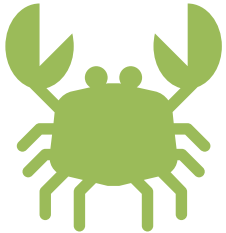
Much infrastructure predates modern stormwater regulations, lacking adequate flow control and water quality treatment

Exacerbated by population growth, aging infrastructure, and intensifying rainfall patterns associated with climate change

What road runoff carries

Stormwater mobilizes pollutants from road surfaces. It carries:

Fine sediments, heavy metals, nutrients, petroleum products, toxic tire wear byproducts such as **6PPD-quinone (6PPDQ)**



Untreated, it adversely impacts aquatic habitats, fish, shellfish, and public health

Why a prioritization framework is needed

Scale and diversity of infrastructure and water resources complicates where to start decisions

2,500+ miles of roadways

1,000 miles of streams and rivers, 108 lakes, 128 miles of marine coastline

Jurisdictions face limited budgets, data gaps, and competing priorities

Goal and Objectives

Goal: Improve Puget Sound water quality using a transparent, data-driven process to identify and rank retrofits across Thurston County

Expectations: Flexible and adaptable to new data, regulatory requirements, and a range of priorities

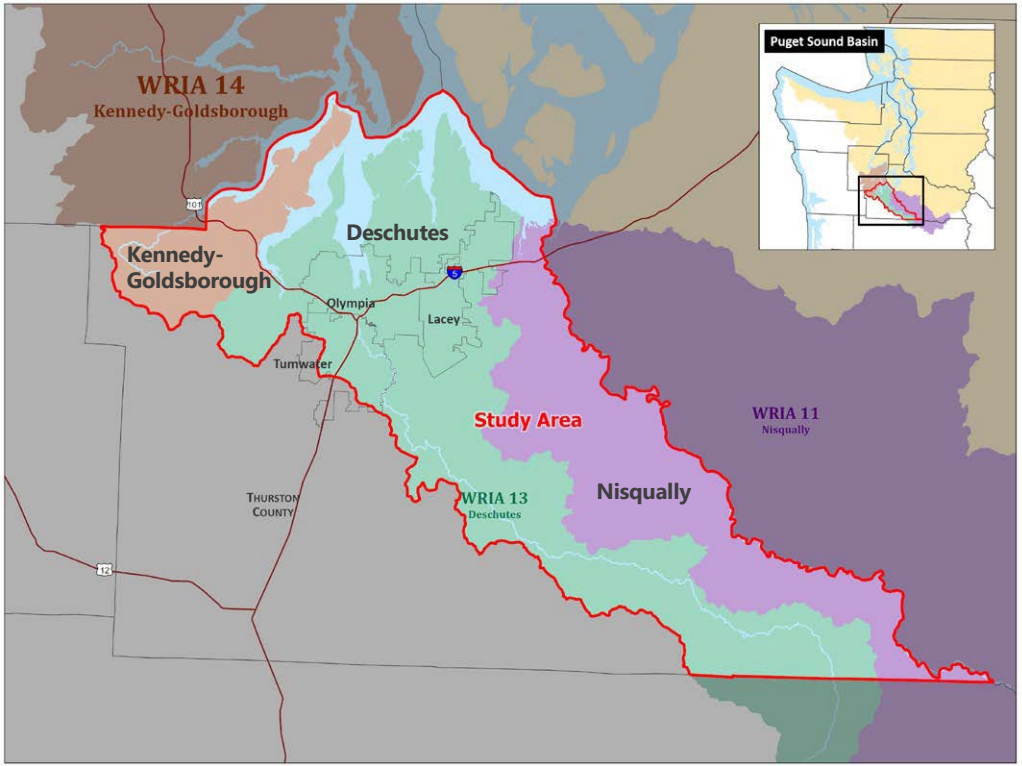
Objectives:

1. Develop a framework to prioritize basins/catchments and roadway segments where capital improvements would address priority concerns
2. Develop 20 road retrofit project concept designs that jurisdictions can add to Capital Facilities Plans and seek funding to implement
3. Identify best practices/policies supporting successful road retrofit projects
4. Develop an implementation strategy for local governments to pursue funding and construction of priority projects

Project Partners

Stormwater Roadway Retrofit Project Overview

- **Study Area:** Nisqually, Deschutes, and Kennedy-Goldsborough watersheds
- **Project Manager**: TRPC
- **Technical Lead:** Herrera Environmental Consultants
- **Funding:** $438,320 Puget Sound National Estuaries Program Stormwater Strategic Initiatives Grant
- **Timeline:** through December 31, 2026



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Toolkit – Key Elements

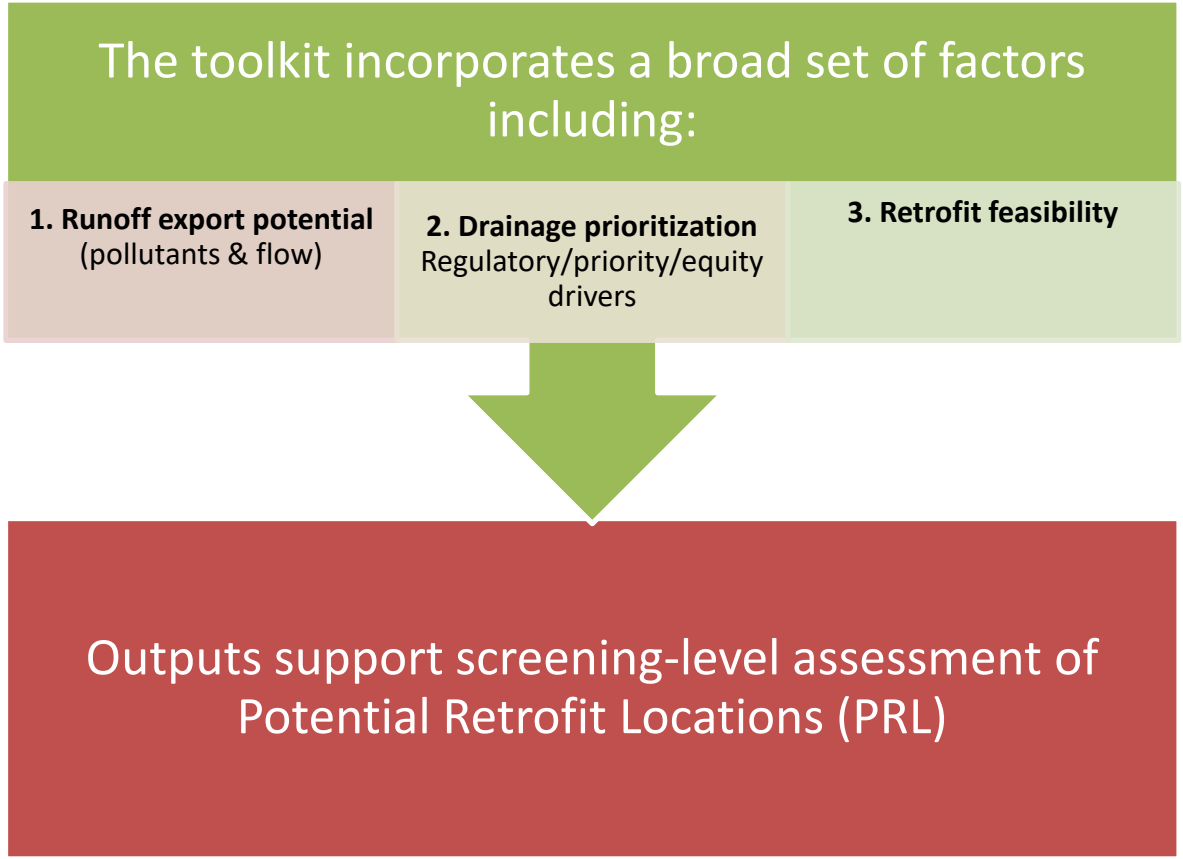
Replicable, data-driven framework for identifying and prioritizing retrofit opportunities that deliver the greatest benefit to receiving waters, aquatic habitats, and communities

- Builds on King County Screening Model classifying roadways by relative potential to export tire-derived pollutants such as 6PPDQ
- Expands to include pollutant export potential, drainage prioritization, retrofit feasibility, regulatory drivers, and equity considerations
- Integrates spatial datasets, expert input, and stakeholder feedback to generate composite scores for prospective retrofit locations—supporting informed stormwater BMP investments

Toolkit Users and Audience

- **Toolkit User:** Technical and GIS staff and other stakeholders from stormwater and transportation divisions
- **Toolkit Output User/Audience:** Project managers and technical staff who prioritize roadway retrofit projects:
  - Redevelopment
  - Roadway repair
  - Sewer repair Transit improvement projects
  - Park improvement projects

Toolkit Architecture: three modules working together



Location-Based Prioritization Framework

Purpose: Target stormwater retrofit investments where they will deliver the greatest benefit

How It Works:

- Assigns a quantitative score to every **Potential Retrofit Location** (PRL) in the study area
- Enables **site-specific prioritization** informed by watershed context
- Supports **transparent, repeatable, and adaptable** decision-making

PRLs Include:

- Publicly owned parcels
- Vacant parcels
- Rights-of-way
- Catch basins

How the Toolkit Scores PRLs

PRL is the final score for evaluating the priority of retrofits to treat roadway runoff.

PRL Score = Drainage Priority (DP) + Retrofit Feasibility (RF)

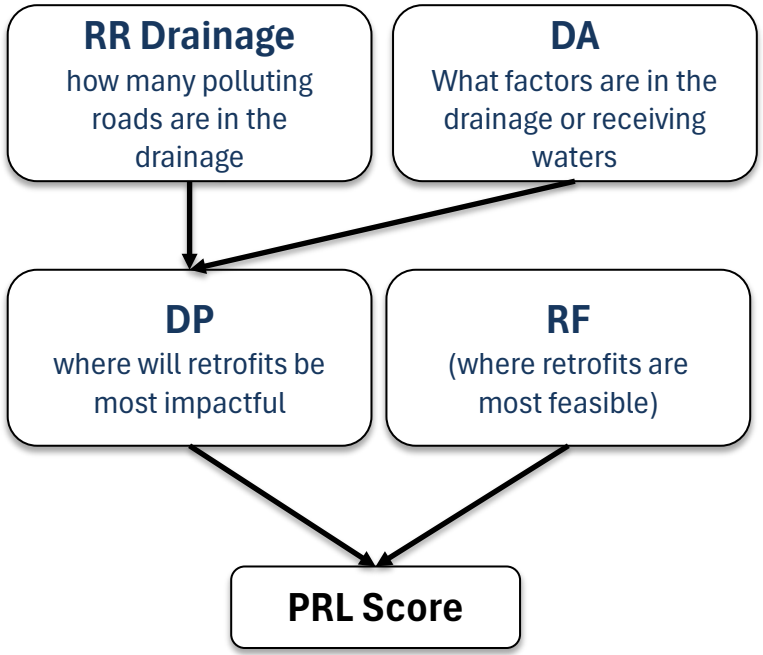
1. **Drainage Priority (DP) -** How important is it to invest in this drainage area?

DP is based on two factors:

   A. **Road Runoff Density (RRDrainage)**
      - How much roadway impact exists in the drainage
      - Accounts for both the **intensity of road runoff** and the **amount of roadway area**

   B. **Drainage Attributes (DA)**
      - Ecological, regulatory, and community importance
      - Includes water quality, habitat, flooding, equity, and MS4 coverage
      - Alternative weighting scenarios (Salmon, Equity, Flooding, etc.) are available

2. **Retrofit Feasibility (RF) -** How suitable is this specific site for a retrofit?
   - Site-scale constraints and opportunities
   - Calculated independently at the PRL level

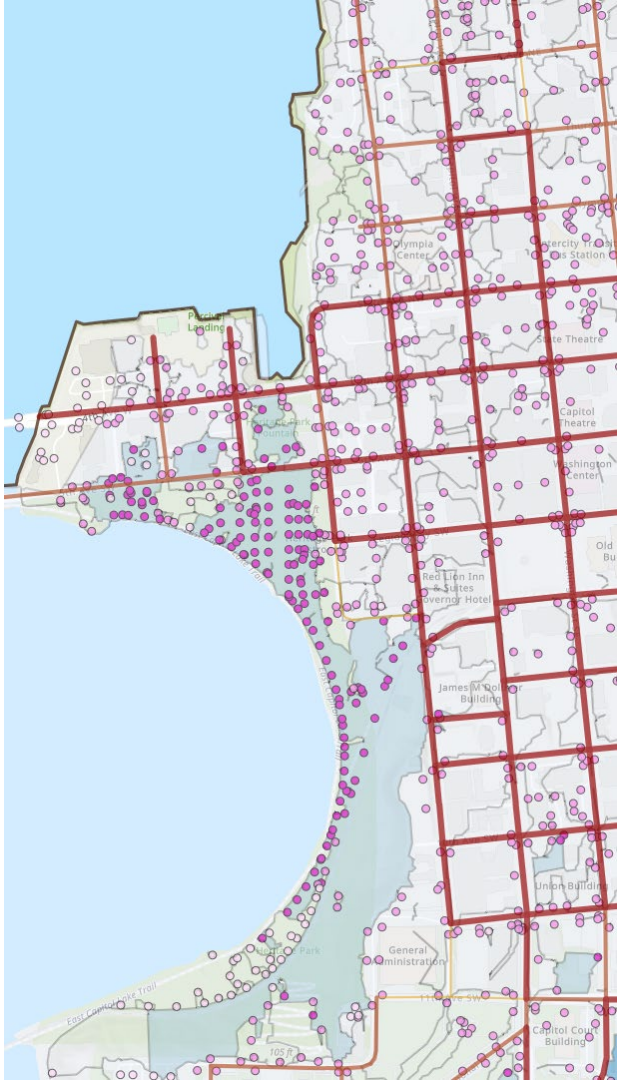


Module 1: Roadway Runoff – What it Measures

Purpose: Evaluates the potential stormwater impact from roadways.

A Road Runoff Score is a composite of both water quality and flow:

1. Water Quality Sub-Score, signifying impacts from pollutant loads:
   - Nutrients (Nitrogen, Phosphorus)
   - Toxics (6PPDQ, Copper, Zinc, PAHs)
   - Sediments
2. Flow Sub-Score, signifying impacts from peak runoff flows that may cause:
   - Flooding
   - Erosion
   - Habitat degradation



Roadway Runoff – How Connectivity & BMPs Influence Scores

The Two Sub-scores are qualified by:

1. Connectivity to Receiving Waters – Represents how likely roadway runoff is to reach streams, lakes, or marine waters

Score adjusts based on:

- Conveyance - catch basins, pipes, and ditches
- Distance to conveyance
- Slope and topography
- Quality of available GIS infrastructure data

2. Downstream BMP Water Quality Treatment/Flow Control

Score adjusts based on:

- Facility Type
- Level of treatment (basic, metals, oil, phosphorus)
- Flow control capacity

Roadway Runoff – Limitations & Adaptive Approach

Key Challenge: Stormwater infrastructure GIS data vary widely by jurisdiction.

- Some areas have detailed routed systems and drainage areas.
- Others lack comprehensive or current mapping.

Tiered Scoring Approach

- Uses high-confidence data where available.
- Defaults to a conservative worst-case (high connectivity) score where data are limited.
- Prevents underestimating potential impacts.

Moving Forward

- Prioritize data improvements in high-uncertainty areas.
- Collaborate with jurisdictions to standardize conveyance mapping.
- Update the module as better spatial data become available.

Module 2: Drainage Attribute – Purpose and Scope

Purpose: Identify drainage areas where stormwater retrofits will yield the greatest ecological and regulatory benefit.

Key Focus Areas:

- Complements roadway-based assessments
- Considers upland and receiving water characteristics
- Supports prioritization for retrofit planning

Primary Drivers:

- Basin Condition (2025 TRPC evaluation: intact → very degraded)
- Regulatory Drivers (303(d) listings, TMDLs)
- Aquatic Habitat (Salmon-bearing streams, especially Coho)
- Recreational Uses (Shellfish beds, swimming beaches)
- Flooding & Drainage Complaints
- Equity Index (prioritizes vulnerable areas)
- MS4 Coverage (jurisdictional feasibility)

Drainage Attribute – Scoring & Prioritization

Drainage Attribute Score:

- Sum of all factor scores, adjusted by MS4 coverage
- Reflects cumulative ecological and regulatory importance

Prioritization Scenarios:

- **Default:** all factors are summed & multiplied by fraction of the drainage area within regulated MS4 area
- **Coho:** drainages contributing to coho salmon bearing streams
- **Salmon:** drainages contributing to other salmonid bearing streams
- **Equity:** drainages with an Equity Index >=3 are selected
- **Flooding:** drainages with recent flooding or documented flood risks
- **Protection:** drainages identified as Intact or Sensitive are selected
- **Regulatory:** drainages contributing to waters with a 303(d) listing or established TMTL are selected

Composite Basin Layer:

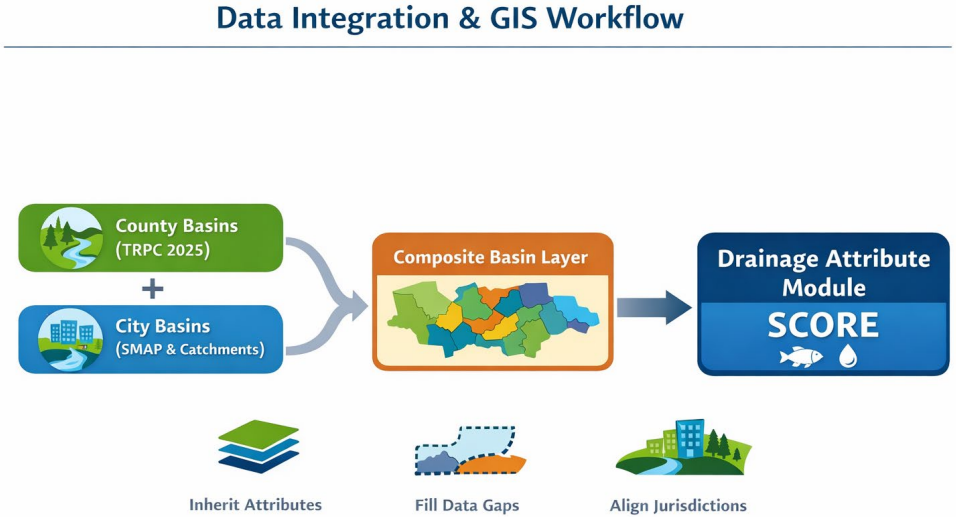
- Combines existing jurisdictional drainage datasets
- Preserves unincorporated county basins (TRPC 2025)
- Preserves incorporated city basins (ex: City of Olympia SMAP & catchments)
- Minimizes new spatial fragments, aligns jurisdictional and county datasets

Establishing Drainage Delineations

Purpose:
Ensure consistent, jurisdictionally aligned drainage areas for scoring and prioritization.

Approach:

- **Use Existing Data:**
  - County basins (TRPC 2025) for unincorporated areas
  - City basins (SMAP, catchments) for incorporated areas
- **Preserve Local Boundaries:**
  - Smaller jurisdictional basins remain within city limits
  - Attributes assigned from overlapping county basins when needed
- **Composite Basin Layer:**
  - Merges county and city delineations
  - Fills gaps using the best available data
  - Minimizes creation of new fragments or misaligned boundaries
- **Drainage Attribute Score:**
  - Each drainage area or catchment serves as a scoring unit for the Drainage Attribute Module.



Module 3: Retrofit Feasibility – What it Evaluates

Retrofit Feasibility Module identifies where and what type of stormwater retrofits are practical to build at each PRL - **Three Types of Retrofit Approaches**

Point Devices

- Small treatment systems installed at specific locations
- Examples: inlet filters, high-flow filters

Linear Systems

- Facilities that treat runoff along a stretch of roadway
- Examples: bioswales or vegetated filter strips

Regional Facilities

- Larger facilities that manage runoff from multiple streets or areas
- Examples: ponds, wetlands, or underground vaults

Key Factors That Influence Feasibility

Space

- Is there enough room in the right-of-way or nearby land?
- Are there buildings, trees, or utilities that limit space?

Soil Conditions

- Soil type and drainage
- Groundwater depth
- Slope and terrain

Existing Infrastructure

- Stormwater pipes, curbs, and ditches
- Opportunities to modify or upgrade existing systems

Land Ownership

- Public land and undeveloped parcels are typically easier to retrofit
- Private ownership may require additional coordination

Using the Feasibility Results

Retrofit Feasibility Module evaluates each potential retrofit location individually.

The results help planners:

- Identify locations where retrofits are most achievable
- Match appropriate facility types to specific sites
- Screen out locations with major constraints

Important Considerations -Toolkit focuses on structural retrofit opportunities. Other strategies may also manage roadway runoff:

- Street sweeping
- Coordinating with transportation or park projects
- Integrating retrofits into planned infrastructure upgrades

Early outputs for capital planning

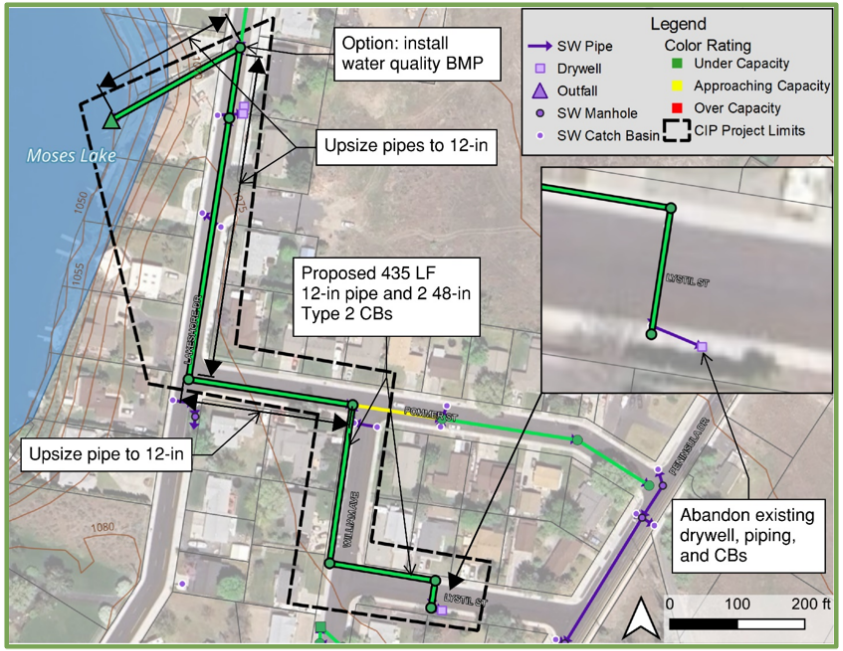
Toolkit was used to review **more than 60** potential road retrofit project locations

These locations were pared to **20 project concept designs** & **cost estimates**

Concept development to be completed in consultation with the Steering Committee and stakeholders

Final concept designs are documented and shared with partners for integration into capital planning and funding applications

Concept Designs and Cost Estimates



Design Schematic

Item No.	Item	Quantity	Unit	Unit Cost	Amount
	Construction Elements				
1	Removal of Structures & Obstructions	1	LS	$ 53,600	$ 53,600
2	Schedule A Storm Sewer Pipe, 12-In. Diam.	1,400	LF	$ 80	$ 112,000
3	Catch Basin, Type 2-48 In. Diam.	3	EA	$ 4,500	$ 13,500
4	Manhole 48 In. Diam. Type 1	4	EA	$ 6,600	$ 26,400
5	Shoring or Extra Excavation Class B	11,200	SF	$ 4	$ 44,800
6	Hot Mix Asphalt – Cl 1/2 In. PG 64-28	170	TN	$ 130	$ 22,100
7	Crushed Surfacing Base Course	300	TN	$ 70	$ 21,000
8	Crushed Surfacing Top Course	150	TN	$ 39	$ 5,850
9	Outfall Structure (Modified)	1	LS	$ 2,000	$ 2,000
	Water Quality				
10	Opportunistic Water Quality Add-On	1	EST	$ 63,000	$ 63,000
				Rounded Subtotal	$ 365,000
				Ancillaries	$ 128,000
				Contingency (25%)	$ 124,000
				Administration	$ 425,000
				Total Estimated Project Cost	**$ 1,042,000**

Notes:

1. The costs presented in this estimate are in 2024 dollars and do not include future escalation, financing, or any O&M costs.
2. This order of magnitude cost opinion was prepared for development of a Stormwater CIP budget and rate financing based on information available at the time of preparation and for the assumptions listed. Final project costs will depend on actual labor, materials, etc., costs at the time of implementation.
3. Ancillaries include percentages of the construction subtotal, as follows: 15% for erosion control, 10% for mobilization, and 10% for traffic control.
4. Administration includes lump sums or percentages of the subtotal for construction, ancillaries, and contingency, as follows: 8.5% for sales tax, 10% for administration, 20% for construction management, 30% for engineering costs, and $2k for Permitting.

Preliminary Cost Estimate

Best Practices

Purpose: Identify approaches for successfully integrating stormwater retrofits into local development and permitting processes.

Key Activities:

- Literature review of existing best practices
- Case study interviews with communities that have successfully implemented retrofits
- Recommendations to align local policies and procedures with retrofit goals

Outcome: Best Practices Report to guide local agencies in streamlining and supporting road retrofit projects

Implementation Strategy

Purpose: Develop a plan to implement prioritized roadway retrofits

Key Activities:

- Determine jurisdictional leads, schedule, and conceptual budget
- Identify funding sources and adaptive management strategies
- Incorporate input from the Steering Committee, community members, and Department of Ecology

Outcome: Retrofit Implementation Strategy with a list of prioritized projects, concept-level designs, and recommended implementation approaches

For more information, contact:

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Online Retrofit Toolkit

THURSTON REGIONAL PLANNING COUNCIL