2016
Technical Appendix C1:
Transportation Needs Report

November 22, 2016

King County
Department of Transportation
Road Services Division

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Chapter 1: Planning Context and Introduction

What Is the Transportation Needs Report and How Is It Used?

The Transportation Needs Report (TNR) is a long-term, comprehensive list of improvements to the roads, bridges and related infrastructure located in unincorporated King County. It includes consideration of significant projects in adjacent cities, counties, and on state highways as they relate to the overall functioning of the transportation system. The transportation needs outlined in the TNR include those that are currently known, as well as those that are forecast due to regionally-adopted targets for growth and development. For the most part, King County Road Services' engineers and transportation planning staff identify project needs based on infrastructure condition, technical assessments, and community input; others are developed based on traffic model data provided by the Puget Sound Regional Council (PSRC).

The TNR is a functional plan of the King County Comprehensive Plan. Together with the King County Department of Transportation, Road Services Division (Roads) Six-Year Capital Improvement Program (CIP) and the biennial operating budget, it fulfills the requirement of growth management legislation (RCW 36.70A.070) as the transportation capital facilities plan element of the King County Comprehensive Plan.

How does this TNR comply with the law?

1. It is based on the land use element of the comprehensive plan.
2. The list of transportation needs and recommended improvements for capacity projects was developed using travel demand forecasts that are based on the regionally-adopted growth targets.
3. It includes a financial analysis that reflects the most recent land use changes, project amendments, costs, and financial revenue assumptions.
4. It documents intergovernmental coordination, with particular attention to potential impacts on adjacent jurisdictions.
5. It includes non-motorized needs (bicycle and pedestrian).

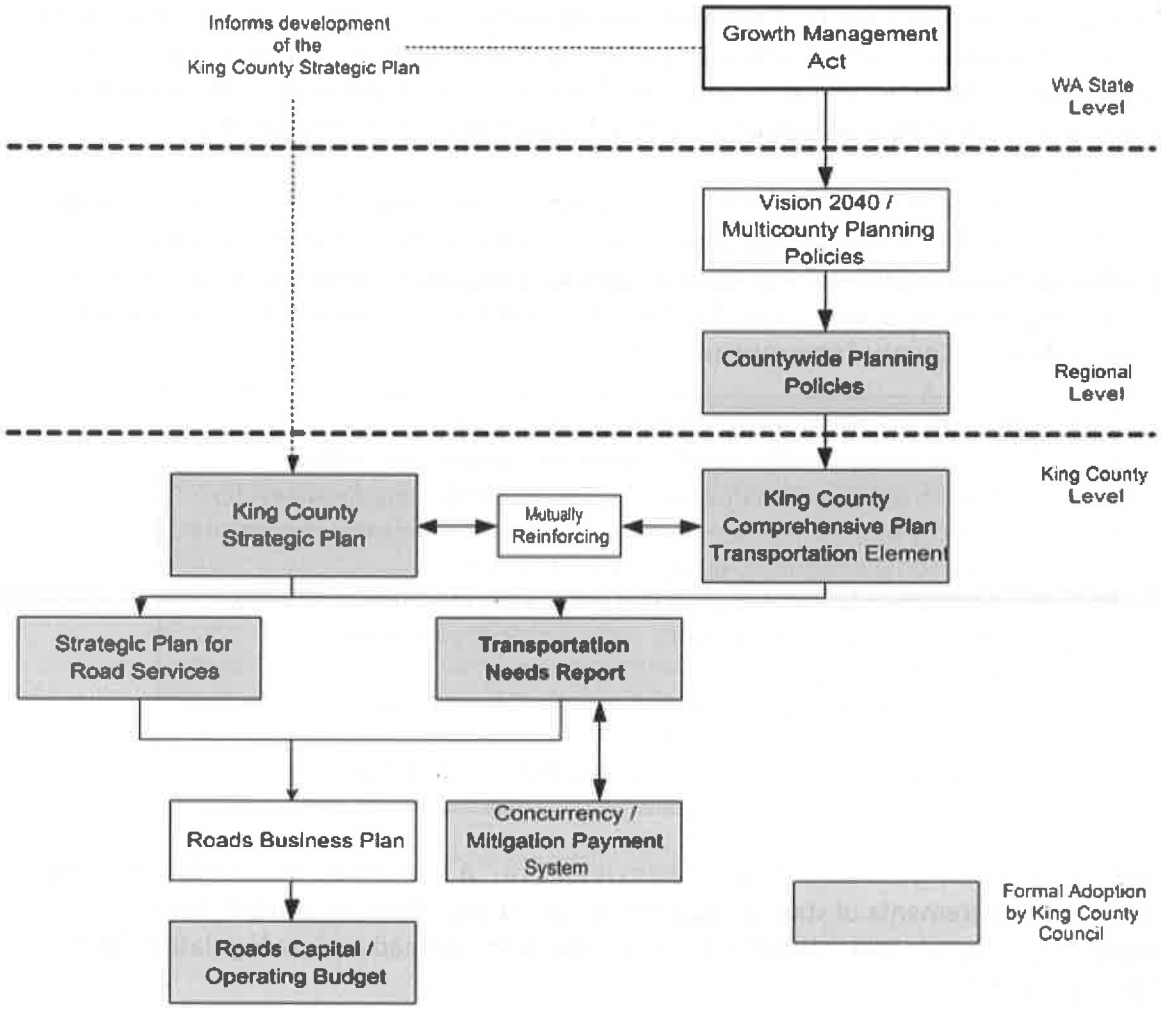
Relationship to King County Comprehensive Plan: A primary purpose of the TNR is to fulfill specific requirements of state growth management legislation for comprehensive planning. King County's TNR fulfills these requirements as outlined in state legislation (RCW 36.70A.070 (6)) are:

- Specific actions and requirements for bringing into compliance locally-owned transportation facilities or services that are below the Comprehensive Plan established level of service standard;
- Forecasts of traffic of at least ten years based on the adopted growth targets and land use plan to provide information on the location, timing, and capacity needs of future growth;
- Identification of state and local system needs to meet current and future demands;

- An analysis of funding capability to judge needs against probable funding resources; and
- A multiyear financing plan based on the needs identified.

The schedule for updating the TNR corresponds to major updates of the Comprehensive Plan, which occurs every four years. If circumstances warrant, interim updates may be developed and transmitted with the annual Comprehensive Plan technical amendments.

Planning Hierarchy Relationship to Growth Management Planning



Rural Regional Corridors

Rural Regional Corridors are recognized in the King County Comprehensive Plan as segments of certain arterials that pass through rural lands to primarily connect urban areas. This type of roadway plays a key regional mobility role in the county's transportation system. While additional capacity is generally prohibited by county policy on arterial roads in the rural area, a limited exception is made for Rural Regional Corridors. These corridors may receive capacity improvements if the increased capacity is designed to serve mobility and safety needs of the urban population while discouraging inappropriate development in the surrounding Rural Area or natural resource lands.

Rural Regional Corridors must be classified as Principal Arterials and carry high traffic volumes, defined as a minimum of 15,000 Average Daily Trips. They also have at least half of their PM Peak trips (the evening commute) traveling to cities or other counties. They connect one urban area to another, or to a highway of statewide significance that provides such connection, by traversing the rural area.

Based on the criteria in the Comprehensive Plan, the following King County unincorporated area roadways currently quality as Rural Regional Corridors:

	Woodinville Duvall Road	Novelty Hill Road	Issaquah Hobart Road	Avondale Road
Limits	Woodinville city limits to Duvall city limits	Redmond city limits to W. Snoq. Valley Road	Issaquah city limits to SR-18	NE 116th to Woodinville-Duvall Road
Functional Class	Principal Arterial	Principal Arterial	Principal Arterial	Principal Arterial
Average Daily Trips (ADT)	20,000	20,0000	18,000	16,000

Transportation Planning and Funding:

The TNR evaluates the difference between identified transportation needs and future revenues for King County. This analysis augments recent work undertaken by Roads to assess the County's ability to maintain the condition of its roadway assets given declining revenues. Projections illustrate that Roads' revenues will not keep pace with maintenance and preservation needs for King County's system given declining federal gas tax revenues and insufficient local property tax and other state revenues.

Most of the federal funding for transportation to the region is allocated via the PSRC which is the Municipal Planning Organization for King, Snohomish, Pierce and Kitsap Counties. PSRC developed grant criteria focuses on capacity and mobility projects primarily in identified urban centers. Upon completion of the few remaining annexations of urban areas into cities, King County Road's service area will be the rural area. Given the significant decline in revenues, the division is focused on core life safety, regulatory compliance and the maintenance and preservation of existing infrastructure which leaves no funding to add capacity to King County's unincorporated road system. Over the past two funding cycles, King County Roads has been unsuccessful in receiving funding for rural projects in countywide competitions. Rural projects

do not compete well against urban projects located in and around PSRC-identified centers. The majority of federal funding allocated to the region is allocated to urban projects that serve centers, fulfilling Growth Management Act goals. The PSRC does allocate funds exclusive to the rural area for rural roadway projects, but the amount is a little over $3 million every two years. By comparison, the total amount of federal funds awarded to all of the jurisdictions in King County amounts to between $50-55 million, every two years. Given these criteria and funding limitations, the county expects revenue from federal grant funds will continue to decline.

Historically, 50+ miles were overlaid annually to preserve roads near the lowest lifecycle cost. Based on current funding levels, after the 2015-2016 biennium, overlay funding will need to be funded primarily by grant funds. In the past two grant cycles (2013 and 2016), King County received funding to overlay eight miles of road in unincorporated King County.

The $16 billion 2015 state transportation package included close to $1M per year for unincorporated King County roads. Additional funds allocated to the State Transportation Improvement Board (TIB) and the County Road Administration Board (CRAB) for transportation projects are not projected to generate additional revenues due to the allocation methods and grant criteria that govern awards by these agencies. CRAB funding for counties is constrained by Washington Administrative Code that limits allocations based on lane miles as opposed to use.

Based on revenue projections, King County Roads does not have the funds to address the majority of the projects contained in the TNR. When capital funds are available, they will be directed to safety, regulatory and preservation projects consistent with Roads Strategic Plan and Line of Business Plan.

Coordination: The TNR helps to coordinate transportation improvements connecting King County with other jurisdictions including the Washington State Department of Transportation (WSDOT), adjacent cities, and counties. The Puget Sound Regional Council model incorporates the location and type of capacity projects anticipated by other agencies. The model helps King County understand how the overall transportation system will function in the future, indicating where unincorporated capacity improvements may be needed. By clearly showing the scope, location and cost of unincorporated road system projects, the TNR provides other jurisdictions with information to use in appropriately coordinating connecting systems.

Annexations: Cities considering annexing portions of unincorporated King County can refer to the TNR for identified road improvements that their city may need to address in the future.

Development Review: The TNR serves as a source of information in the review of proposed land developments and in determining appropriate mitigation measures required as a condition of new development approval. The County's Mitigation Payment System (MPS) uses the TNR to

help identify growth-related projects for the impact fee system; however, given the lack of funding for capacity improvements, the MPS system is going to need a major overhaul since there will soon be no funded growth-related road projects on which to charge impact fees.

Road Vacation: Property owners can petition King County to have portions of the County's unused road rights-of-way sold to them if the property is not needed for current or future transportation purposes. The TNR is used to identify future projects on the road system and is one tool in the road vacation process.

How is the TNR put together?

The development of the TNR is part of a comprehensive planning process guided by state growth management legislation. This process links the guidance of the King County Comprehensive Plan and the *Strategic Plan for Road Services* with the development of the TNR, the Roads Six-Year CIP, and the Roads biennial budget.

The Strategic Plan for Road Services (SPRS) articulates the division's mission and vision. It focused direction for an approximately ten year time frame by aligning employees, services, and programs with the overarching goals of King County. The plan informs decisions by the King County Executive and Metropolitan King County Council on matters of policy, operations, and budget. SPRS provides a framework to manage the division's programs and services.

Roads' Strategic Plan focuses on the critical funding problem coupled with a backlog of road system maintenance and preservation needs. While the Road Services Division recognizes that it may not be able to fully accomplish all of the goals and strategies suggested in the strategic plan, the plan prioritizes work that meets the most critical needs within available funding and resources. It places high priority on immediate operational safety, regulatory compliance (clean water activities), and the maintenance and preservation of infrastructure. The goals identified in the strategic plan are as follows (in order of priority):

1st Prevent and respond to immediate operational **life safety** and property damage hazards.
2nd Meet **regulatory requirements** and standards in cooperation with regulatory agencies.
3rd Maintain and **preserve the existing roadway** facilities network.
4th Enhance **mobility** (movement of people and goods) by facilitating more efficient use of the existing road system.
5th Address roadway **capacity** when necessary to support adopted growth targets.

Roadway Prioritization:

A key component identified in the strategic plan was the establishment of a service strategy. The plan creates a triaged approach toward maintaining and preserving infrastructure. According to the plan, the most-used arterials would receive the highest level of maintenance and preservation, storm response and snow and ice removal, while the lowest-priority roads could receive less service. Core Safety and regulatory compliance are the county's highest priorities and are accomplished regardless of the priority tier of the roadway.

The tiers are types of roads defined using objective criteria. Roads are categorized according to volume of use by motorists, safety requirements, detour length, and whether the road is considered sole-access, a lifeline route or important for buses. More information on the road tier system can be found by visiting: http://www.kingcounty.gov/transportation/kcdot/Roads/NewServiceLevels.aspx

The tier information establishes the criticality of the road to the operation of the network. Particularly given limited resources, the strategic plan directs that the most critical roads are prioritized for funding and inclusion in Roads' Capital Improvement Program.

Service Levels for Unincorporated King County Roads

Tier 1
Heavily traveled; connect large communities, major services, and critical infrastructure.

Tier 2
Highly used local roads; serve local communities and large residential areas.

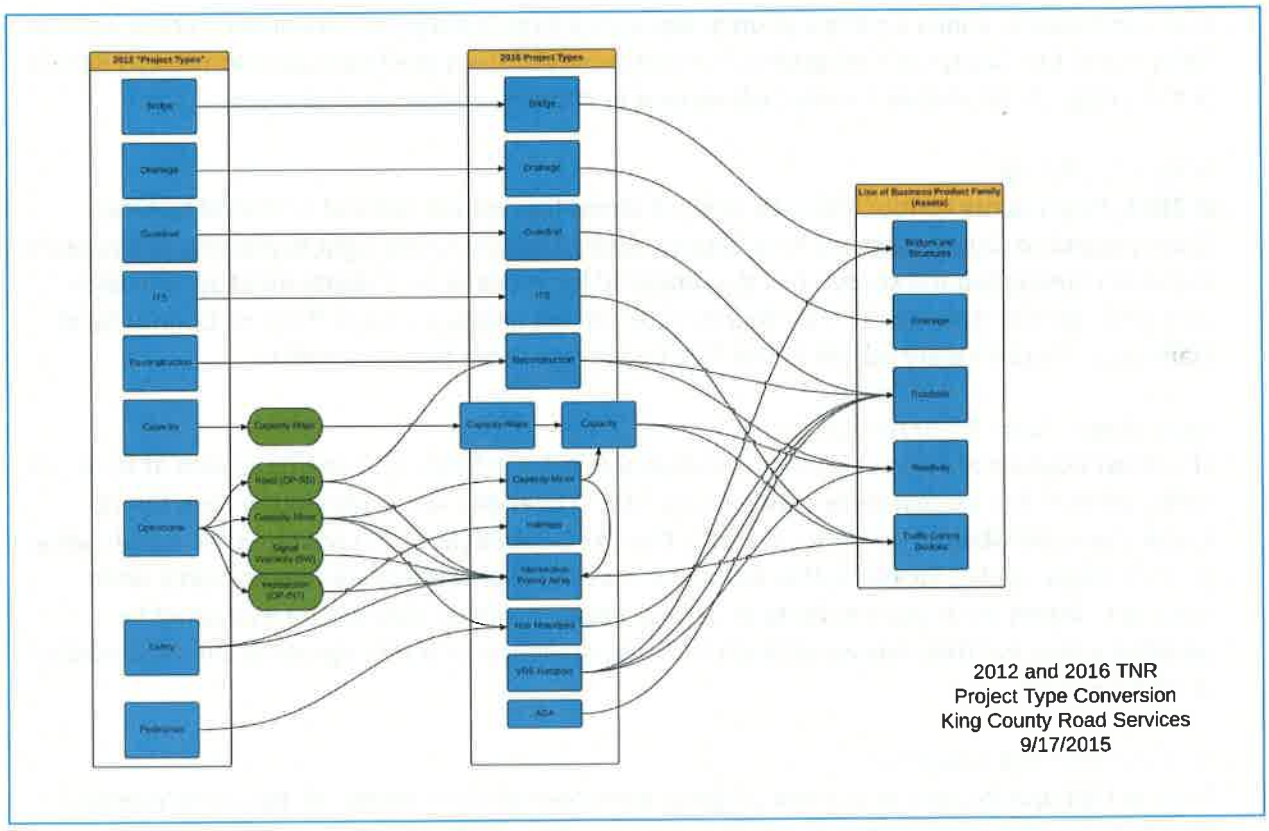
Tier 3
Highly used local roads that serve local communities and large residential areas.

Tier 4
Local residential dead-end roads with no other outlet.

Tier 5
Local residential roads that have alternative routes available for travel in case of road closures.

How Has the 2016 Transportation Needs Report Changed?

Organizing assets by Road Services Line of Business Plan product families:
Previous versions of the TNR organized projects into a series of project types. This version aligns the projects into the five product families identified by the Road Services Division 2015-2016 Line of Business Plan: Roadway, Roadside, Bridges and Structures, Traffic Control Devices and Drainage. The following graphic illustrates the migration of projects from previous project types to the Business Plan product families into which the projects in this TNR have been organized.



Including maintenance – programmatic/operating expenditures:
Road Services has developed various programs to respond to the emergent and routine needs of its assets. Descriptions of these programmatic maintenance and operations activities have been added to this version of the TNR to illustrate work being done by the agency, outside of capital projects that is funded by the operating budget.

Safety Projects:
Road Services analyzes accident data to determine the location of high accident locations. Once locations have been identified, projects are then designed to remedy any safety problems where possible. In 2015, a High Accident Location and Road Segment Analysis was done that identified locations with high accident rates (number of accidents/average daily traffic).

Accident rate is being considered in identifying the location of safety projects eligible for federal funding, but proposal projects to address safety problems will not be completed until spring 2016. The priority process for safety projects is discussed further in Chapter Two of this document.

Capital Project Completions:

Capital projects completed since the adoption of the 2012 Transportation Needs Report were deleted from the needs list.

Annexations:

Cities continue to annex portions of unincorporated King County. When annexed areas include TNR project locations, the TNR project is either removed from the Transportation Needs Report or the project is shortened to only include that portion in unincorporated areas.

Street Lighting:

In 2014, King County conducted a study on all street lighting owned and operated by King County Roads in unincorporated King County, called the LED Street Light Replacement Study. As engineers conducted the study, they documented locations in the County Road System with turn lanes that do not comply with Section 5.05 (Street Illumination) of the King County Road Standards. Projects were added to the TNR to address these turn lane needs.

Signal Warrant Priority Array:

The latest analysis of intersections was completed in April, 2015. Intersections with at least one traffic warrant for a signal were added to the TNR. Locations which previously met, but no longer meet the Manual on Uniform Traffic Control Devices (MUTCD) warrants for signals were deleted. In particular, locations that no longer met the four MUTCD volume warrants were removed. When the highest priority locations receive funding, they will be evaluated to consider a solution that may result in either the installation of traffic signals or the construction of roundabouts.

Non-motorized Projects:

For this TNR update, non-motorized projects were re-evaluated based on the Comprehensive Plan policy guidance and assessment of current conditions. Road Services staff reviewed each project and considered factors including potential non-motorized travel destinations, traffic volumes and speeds, existing shoulder widths, and proximity of a school or other community gathering place. Road staff also researched resident requests for sidewalk locations and, where appropriate, included those projects in this edition of the TNR.

Drainage Projects:

Drainage projects have been divided into three primary categories: 1) Large-scale preservation projects (previously included in the TNR); 2) Small-scale routine maintenance; and, 3) Small-scale drainage preservation projects. Two of the three categories of projects have been added to the 2016 TNR. Routine drainage maintenance needs are captured by description in Chapter Two.

Roads has embarked on an asset management program identified in the strategic plan that seeks "to make the most cost-effective operating and capital investments—from maintenance through preservation and replacement—at whatever funding level is available." Drainage needs are identified in conjunction with other roadway assets. The first step in developing an inventory of drainage needs is to assess the condition of the infrastructure. In 2015, a pilot project was launched to develop a methodology for screening and scoring the condition of the pipes, vaults and ditches that make up part of the drainage infrastructure in the right-of-way. As a result, additional drainage needs will be identified for future editions of the TNR.

Chapter 2: How Road Services Prioritizes Unincorporated King County's Roadway Assets

Roadway

Roadway Facts

Nearly 1500 miles (more than the distance from Canada to Mexico)

About 1/3 of the road system consists of arterials; of which 320 miles require reconstruction.

Over 1 million trips per day occur on King County roads.

The Roadway category of assets is one of five product families identified in the division's Line of Business Plan. This category of assets includes the drivable surface and supporting road base -- including several layers of gravel, dirt, and other materials of the road. Road pavement protects against deterioration of the road base that is the structural integrity of the road. If the road base becomes deteriorated, no amount of repaving will keep the surface smooth and repaving will not last as long as expected.

This section discusses how stand-alone projects are prioritized, the tasks associated with maintenance and operations and the programs associated with managing unincorporated King County's roadways. Needs associated with traffic impacted by the design constraints of the road prism are discussed in the Traffic Control Devices Section.

Pavement Inspection and Testing

Pavement and road deterioration continues from the impacts of stormwater, weather changes and growing traffic volumes. Pavement condition index scores and deflection testing data reflect a snapshot in time but, over time, give you a rate of deterioration.

The state County Road Administration Board requires the County to rate and report on pavement condition in order for the County to receive state gas tax revenues.

Pavement Condition Index (PCI): PCI is a scale of pavement condition rating ranging from 0 to 100, with 0 representing the worst and 100 representing the best possible condition. Road Services categorizes pavement condition as: Very Poor (PCI<25), Poor (PCI 25-49), Fair (PCI 50-70), and Good to Excellent (PCI 71-100). Ratings are based on a visual assessment of road surface conditions therefore may not accurately indicate the condition of the under laying base and sub-grade of the pavement.

Historically, Road Services conducted field assessments of arterials on a routine schedule to visually determine the condition of the pavement by walking all of its arterials on a rotating

basis. In some cases, advances in and access to current satellite imagery such as Google Street View allows visual assessments to be conducted over the internet, saving labor costs.

PCI scores guide Road Services' engineers toward pavement preservation measures; whether crack sealing, overlay, or pavement rehabilitation.

Deflection Testing: Between 2003 and 2012, Roads conducted deflection testing on all of the County's arterials to evaluate the subsurface condition. The deflection testing (Falling Weight Deflectometer testing) consisted of applying a seating drop and one loading drop. The spacing between tests was about 200 feet. In the 2003 and 2007 deflection testing efforts, core samples of the road material were collected and analyzed. Samples were analyzed for surface composition, base course thickness, composition and course condition, subgrade soil type, and subgrade strength.

Deflectometer testing was done using trailer mounted equipment consisting of a load package, load plate, load cell, and geophones referred to as deflection sensors. The load package was made of steel plates balanced on either side of the load cell and tower assembly. This package was raised up to a set height and dropped onto the load plate. During the loading of the plate, the load cell records the amount of load applied to the plate (over a period of time) and the maximum load is recorded. Once captured, the deflectometer data was analyzed using the AREA and EVERCALC 5.0 programs to determine the condition of the roadway. The data and calculated parameters were used to identify sections of roadway categorized as having low structural value (i.e. candidates for road reconstruction or rehabilitation) and to provide input for pavement rehabilitation or overlay.

Pavement Preservation Program

In light of declining roads revenues, Road Services has revisited how it manages pavement preservation. Beginning in 2015, the program is managed by a team of technical experts that, instead of using strictly overlay, research and employ other cost-effective rehabilitation and preservation approaches to collect cost-specific data from rehabilitation and preservation measures performed and to process road condition data. Road Services uses the County Road Administration Board (CRAB) visual data collection system (VisRate) to select potential candidates for either preservation or reconstruction. These road segments are either placed into Roads' Maintenance Section's High Risk Roads Preservation or the Roads' Countywide Preservation lists. The amount funded every year from these lists depends upon available revenue.

Approach

Roads' Pavement Preservation Program has adopted a new approach to managing King County's roadway system given that funding levels are insufficient to manage the system in a traditional way – repaving at optimal times to maximize lifecycle and minimize cost. By conducting minor rehabilitation and maintenance activities, Roads' pavement preservation approach seeks to delay the decline of pavement surface conditions and extend service life. Road Services uses a variety of pavement management strategies and processes in the most cost-effective way possible toward managing unincorporated roadways.

King County's arterial road system will be subject to considerable deterioration over the next ten years due to recent and projected lack of resources to invest in pavement maintenance or reconstruction. Portions of the system may be subject to speed limitations or partial closure in the future.

- Crack sealing, patching, minor reconstruction, seal coatings, paving, and shoulder restoration.
- Implement pavement management techniques according to their appropriate use for materials, condition, structure, Road Services' tier, and road classification.
- Conduct a cost-benefit analysis to guide decisions regarding the use of these techniques.
- Collect life-cycle costs for each resurfacing type; costs of maintenance and rehabilitation activities to be updated at the end of each construction season. Cost and performance data regarding both contracted work and work performed by County forces will be updated and compared to the data available from peer agencies.
- Conduct an annual review of Washington State Department of Transportation and other peer agencies to identify those agencies' use of different types of overlay and seal technologies. Any successful new technologies will be evaluated to determine whether they align with Roads' goals.
- As data accumulates in the new asset management system, Road Services will be able to use the data to establish performance measures and targets, which will better guide decision making.
- Prepare yearly accomplishment report for the Governmental Accounting Standards Board (GASB) and both projection and accomplishment reports for the County Road Administration Board (CRAB).

Prioritization

The process by which roadway preservation candidates are prioritized conforms to the priority matrix and tiered service strategy established by Roads' Strategic Plan. The allocation of available funding is further prioritized through Roads' Tiered Road Classification (Tiers 1, 2, and 4 receive the highest priority; Tiers 3 and 5 the lowest). Candidates for pavement preservation will be selected based on these priorities; the lack of available funding means, however, that portion of the County's roadway network will not be adequately preserved.

Selection

Selection of roadway candidates for preservation starts with the collection and entry of visual condition data into the Division's Comprehensive Pavement Preservation List (CPPL), which provides the specific roadway condition data needed to assist Engineers in establishing smaller Year-, Tier-, or PCS score-specific candidates' lists. These lists are shared and reviewed with the Maintenance Section to coordinate pavement preservation efforts throughout the County.

Prioritization Process Outline:

1. Process visual condition rating data.
2. Update the CPPL as new data is received.
3. Create candidates list to facilitate collaboration with the Maintenance Section, the development of Capital Improvement Program (CIP) projects, and potential federal and state grant funding calls.
4. Evaluate potential preservation options based on projected funding.
5. Publish final candidates' list for High Risk Roadway Candidates; implemented by Maintenance staff.
6. Develop the candidates' list for upcoming year; implemented as preservation projects and done by a contractor.

Roadway Reconstruction

Roadway reconstruction involves full removal and replacement of the surface layer, road base, and ancillary structures (culverts, guardrail). Reconstruction projects follow the same prioritization matrix as described for the Pavement Preservation Program, except that average daily traffic and truck traffic is also evaluated for roadway segments identified for full reconstruction. Segments with higher, heavy truck traffic are anticipated to degrade at a quicker rate, increasing the priority of the road reconstruction need. This heavy truck traffic is typically on roads designated as a freight corridor for the transportation of goods or provides access to facilities that routinely uses heavy trucks, such as gravel mines, transfer stations or farm-to-market roads.

Did you Know?
Many of the County's older roads were built upon wood, rock, and brick; rather than being engineered with modern materials.

In 2007, as part of Road Services' deflectometer testing, 82 road segments were identified as having high deflections requiring further analysis to determine if full road reconstruction was needed. Following the analysis, a preliminary scope of work and cost estimate was developed for the reconstruction of 30 road segments; which were subsequently added to the 2008 TNR. Additional deflectometer testing (completed in 2012), routine pavement condition testing, and other studies have identified new reconstruction projects and roads have been rehabilitated or annexed

Since 2007, many of the road segments identified in the 2016 TNR as having reconstruction needs have been temporarily preserved using the approaches listed above; specifically pavement overlay, rehabilitation, or crack sealing and patching. Depending on the original road

design, these preservation measures can extend the life of the road three to ten years, until funding is available for full reconstruction.

Roadway Maintenance and Operations

The roadway enables the 24/7 movement of people and goods; serving residents, commerce, emergency services, and other users. Cars, trucks, buses and bicycles all use the roadway for their travel needs. Traffic volume and vehicle weight, especially heavy trucks and buses, plus water and weather, all impact the rate of deterioration of the roadway asset.

Road Services employs programs that facilitate routine inspections, maintenance, repair, and operation of the roadway. These programs fall into the following categories:

Gravel Road Fact
Gravel roads need to be graded seven times a year to remove ruts and corrugations in the gravel roadway surface.

Small Surface Repairs: Pothole filling; square cut, skin surface and grinder patching; acute pavement surface repair; crack sealing and pouring; curb and gutter replacement and repair; and gravel roadway grading and patching.

General Roadway Maintenance: Routine, but important safety and environmental compliance work; such as sweeping and dust control. This removes leaves, rocks, fallen trees and debris from the roadway keeping it safe. Prompt cleaning also prevents dirty sediments from flowing into creeks and streams, polluting them and endangering salmon and water quality.

Storm - Quick Response: Work associated with any unanticipated damage and emergency repairs related to storm events, landslides, or severe roadway condition deterioration such as snow and ice control, de-icing applications, and storm washout repair from flooding.

Roadside

Roadside is another of the five product families in Road Services' Line of Business Plan. The roadside category of road infrastructure includes road system features and components within the road right-of-way but outside the travel lanes of the road. Drainage facilities may be located in the roadside area, but are treated as a separate category. Roadside infrastructure includes:

Roadside Facts

Over 827 miles of gravel shoulders

Over 73,000 linear feet of sidewalk

An average of 2700 cubic yards of slide debris removed from the roadway annually.

An average of 400 danger trees removed annually.

- Non-motorized assets, including sidewalks, pathways and American Disability Act compliant ramps to enhance pedestrian safety and mobility;
- Road shoulders to provide space for slow moving and disabled vehicles, non-motorized travel, construction and maintenance activities and emergency and police activities;
- Guardrail to mitigate impacts to cars that run off the road and help prevent vehicles from colliding with dangerous obstacles or vulnerable areas; and
- Landscaping and vegetation that includes landscaped walls, slopes and planters.

Non-Motorized Safety and Mobility

2015 Non-Motorized Evaluation

For the 2016 TNR, Roads reviewed the previous list of non-motorized projects for reasonable need based on the answers to the following questions regarding corridor use:

- Does the corridor serve transit?
- Does the corridor have logical termini (i.e. joins into another non-motorized facility)?
- Does the corridor connect to logical and commonly accessed destination points such as parks, libraries, trails, community centers, shopping and commercial areas?
- Does the corridor provide a community walking or biking school route? Is the segment close to a school?
- Will the proposed scope of work improve upon the existing conditions?

Once the non-motorized "uses" of the project corridor were determined, the existing conditions of the corridor were reviewed for:

- Existing width of paved and gravel shoulders.
- Condition of the paved and gravel shoulders.
- Road volume and use (i.e. local access vs arterial).
- Density of the surrounding area.

Non-motorized projects that met the following criteria were removed:

- Did not serve a community or provide a connection to other facilities or destination points; and had acceptable shoulder widths.
- Were located in low density areas and on low volume roads; and answered "no" to the use questions listed above.
- Were either annexed by adjacent cities or constructed by Road Services since adoption of the 2012 TNR.

Road Services solicited King County Parks for projects that would modify the roadside infrastructure. That list of projects has been included here for planning purposes but because they are captured in King County Parks' needs list they have not been included in the TNR project lists or maps.

King County Parks
Proposed Future Projects with Potential King County Roads Overlap:

Trail Project	Location	Description	From	To	Comment
Green to Cedar Rivers Trail (South Segment)	Maple Valley/Black Diamond Green River Valley at 218th Ave SE	Trail sidepath or other trail/road ROW project	218th Ave SE at Green to Cedar Rivers Trail	SE Green Valley Road	Current feasibility study uses 218th Ave SE as a possible route for the trail in south Black Diamond to SE Green Valley Rd
Green to Cedar Rivers Trail (South Segment)	Upper Green Valley at 218th Ave SE	SE Green Valley Road crossing			Current feasibility study would have the trail cross SE Green Valley Rd at 218th Ave SE
Green to Cedar Rivers Trail (South Segment)	Upper Green Valley at SE Green Valley Road	SE Green Valley Road Sidepath	218th Ave SE	SE Flaming Geyser Road	Current feasibility study envisions sidepath along SE Green Valley Road from 218th Ave SE to SE Flaming Geyer Rd

Trail Project	Location	Description	From	To	Comment
Green River Trail, North Extension (Green to Duwamish)	Tukwila and Unincorporated King County at W. Marginal Place	W. Marginal Place Sidepath or other trail/road ROW project	S 102nd Street	S. Director Street	Feasibility study envisions extending the Green River Trail along W. Marginal Place between Cecil Moses Park in Tukwila to Seattle's South Park community
Snoqualmie Valley Trail, Snoqualmie Mill Gap	Unincorporated King County, Snoqualmie River Bridge at SE Reinig Rd	SE Reinig Road Trail Bridge crossing			New trail bridge structure will be needed to cross SE Reinig Rd to facilitate trail development through the Mill Gap from the Snoqualmie River Bridge. An interim at-grade crossing may be used.
Green River Trail, Phase 2	S. 259th Street, south Kent at Green River Trail	Green River Trail, Phase 2 project at S. 259th Street	S. 259th Street	Existing Green River Trail	ROW improvements may be needed to transition trail segment to street
Green River Trail 2.2	S. 259th Street, south Kent at Green River Trail	Trail sidepath or other trail/road ROW project	S 259th Street at Union Pacific Railway bridge	S 259th Street at Green River Trail Phase 2	Project assumes that S 259th Street ROW will be used for a sidepath between the UP RR bridge and the proposed Green River Trail, Phase 2
Green River Trail, Phase 3	Green River Road, Unincorporated King County	Trail sidepath or other trail/road ROW project	Green River Road at Green River Trail, Kent	Green River Road at S 277th Street	Alternative concept for this trail segment would cross Green River Road where the existing Green River Trail meets the road in south Kent, cross the road, then used use Green River Road ROW for sidepath segments to S 277th Street bridge
Green River Trail, Phase 5	Green River Valley	SE Green Valley Rd sidepath or other trail/road ROW project	SR-18	SE Flaming Geyser Rd	Upper Green River Trail concept would develop a sidepath along SE Green Valley Road and the Green River
East Plateau Trail	Unincorporated King County near Klahanie; SE Duthie Hill Road near SE Issaquah-Fall City Road	SE Duthie Hill Rd, signalized crossing and other ROW improvements			Likely signalized crossing of SE Duthie Hill Road near SE Issaquah-Fall City Road to access Duthie Hill Park and continue trail to the northeast

Trail Project	Location	Description	From	To	Comment
East Plateau Trail	Unincorporated King County west of Trossachs Blvd SE	SE Duthie Hill Rd Trail crossing and sidepath and/or other trail/road ROW project	Duthie Hill Park west of Trossachs Blvd SE	Trossachs Blvd SE	Planning envisions the trail existing north entrance of Duthie Hill Park and running as a sidepath in SE Duthie Hill Road ROW before crossing at the intersection with Trossachs Blvd SE and continuing north along Trossachs Blvd
Landsburg-Kanaskat Trail	Landsburg Rd SE at Landsburg	Landsburg Rd SE signalized crossing			Likely signalized crossing of Landsburg Road SE from existing Cedar River Trail
Tolt Pipeline Trail and Bridge – Snoqualmie River	W. Snoqualmie Valley Rd NE north of NE 124th Street	W. Snoqualmie Valley Rd NE signalized crossing and/or other trail/road ROW project			Likely crossing of W. Snoqualmie Valley Road to continue trail to the Snoqualmie River
Green to Cedar Rivers Trail (South Segment)	Maple Valley/Black Diamond Green River Valley at 218th Ave SE	Trail sidepath or other trail/road ROW project	218th Ave SE at Green to Cedar Rivers Trail	SE Green Valley Road	Current feasibility study uses 218th Ave SE as a possible route for the trail in south Black Diamond to SE Green Valley Rd

Roadside Barriers; Guardrail

Road Services uses a quantitative methodology for identifying and ranking potential roadside safety mitigation sites into three categories: New barriers, retrofits to existing barriers, and bridge rail upgrades.

Risk potential and severity are the primary considerations when considering guardrail prioritizations. Risk is a function of the probability associated with vehicles running off the road. Severity is the quantitative potential for personal injury if a run-off-the-road accident were to occur. Factors included in the analysis include accident data, average daily traffic, road functional classification, corridor geometry, bridge geometry, speed limit, need as defined by embankment slopes, and roadside obstacles. The algorithms developed to prioritize the retrofit of existing barriers and upgrades to bridge railings incorporate parameters for existing barrier and rail deficiencies.

New Barrier Locations – The sources for establishing potential new barrier locations include:

- Locations not yet built from the existing barrier priority array; and
- A comprehensive roadside hazard inventory that was recently completed on the County arterial roadway system.

Barrier Retrofit – All sites with existing roadside barriers that are not compliant with current standards were included as candidates for barrier retrofit. About half of the existing non-compliant barriers were determined to have deficient crash-worthy end terminals. Risk exposure and the degree of deficiency are the primary considerations in the prioritization process for barrier retrofits. The severity factor was not used because it is assumed that all barrier locations were warranted.

Bridge and Culvert Rails – All bridges and culvert crossings maintained by King County were included as candidates for bridge rail upgrades. Many of the candidate bridges were built prior to the requirement of bridge rails established in 1964. The bridge rail array identifies locations with safety deficiencies and prioritizes their upgrade. Three specific bridge deficiency and difficulty factors were established: structural deficiency, difficulty of upgrade, and end transition deficiency. In addition, a risk potential factor (average daily traffic) and a severity factor (posted speed limit) were included.

Priority arrays were developed for each of the three categories of barrier using the appropriate factors and algorithms. Each priority array was fully tested following development. Statistically valid sample sizes were developed for each array, and county engineering staff field reviewed

and ranked the sites. In each case, rankings correlated 90% or better with the results of the priority arrays.

Americans with Disabilities Act (ADA) Program

The Federal Highway Administration (FHWA) requires compliance with the federal, American with Disabilities Act (ADA). Compliance requires that any alterations to a roadway intersection, including simple overlay, can trigger upgrades for all ADA facilities at the intersection such as curb ramps, push buttons and auditory devices at cross walks to accommodate people with disabilities.

Road Services expects to complete a complete inventory of Americans with Disabilities Act location needs by the end of 2017. The inventory is being conducted using internet mapping resources in addition to field visits. This year, the division will be working to complete an ADA Transition Plan, an element required by FHWA. The plan will attempt to quantify the ADA need and formalize Road Services strategy toward addressing those needs. Since neither the plan nor the inventory is complete, the 2016 TNR does not contain any ADA capital projects.

Roadside Maintenance and Operations

Maintenance and operation activities in and along roadsides are done to enhance pedestrian safety and mobility on pathways and sidewalks and to mitigate the impacts of run-off-the-road collisions from barriers. Properly maintained roadsides have good sight distance and are free of hazards, obstructions and vegetation. The roadside area provides space for vehicles and non-motorized users while mitigating the slide and washout risk of the roadway from hillsides alongside the road.

Slope and shoulder mowing serves a critical safety function by removing vegetation from lines of sight, from blocking visibility of traffic control devices, and from obstructing pedestrian walkways. Roads current funding has reduced the frequency of slope and shoulder mowing activities.

Road Services maintenance and operations employs a continuous cycle of inspections, maintenance, repairs, and replacement of/improvements to its roadside features. These programs fall into the following categories:

- **Vegetation Management** includes mowing and maintaining trees, brush, and natural areas on the roadside to provide clear sightlines for drivers, improve drainage, and to keep traffic control signs, wayfinding signs, and traffic signals from being obscured. Overgrown vegetation on sidewalks, shoulders, and other walkways can lead to pedestrians walking in the roadway, and dangerous or downed trees can block roadways. Noxious weed control and shoulder/roadside spraying is also employed.

- **Clear Zone Safety** addresses federal mandates for removing, retrofitting or re-engineering objects in the roadside clear zone (the area within ten feet of the outside edge of travel lanes), including but not limited to: Repair of sidewalks and walkways, guardrail maintenance, and removal of objects or structures that encroach into roads right of way such as illegally placed fencing, mailboxes and other structures.

- **Shoulder Cleaning and Restoration** involves the maintenance of gravel shoulders, including gravel patching, grading and restoration, and landscape maintenance. Maintaining shoulders prevents standing water and reduces deterioration of the roadway.

- **Storm Response** involves response to slide events, including bank stabilization, material removal and disposal, and repairs. Storm response activities include a preventative maintenance program that identifies areas with greatest washout risk, where measures are implemented to prevent future damage. Most critical washout repairs are made immediately, while others take more time to complete.

- **Minor maintenance** for roadside features includes: Repair or replacement of rock walls, gabion retaining walls and fences, hazardous material and roadside debris/litter removal.

ROADSIDE FACT
Gravel shoulders should be maintained/restored every 2-years.

Traffic Control Devices

Did You Know that Unincorporated King County has...
- ✓ **78 traffic signals?**
- ✓ **Over 44,000 traffic signs?**
- ✓ **Over 200,000 linear feet of thermoplastic markings?**
- ✓ **Over 2,500 miles of lane striping?**

King County's traffic code (Chapter 46.04, King County Code) is based on the Washington Model Traffic Ordinance (Washington Administration Code Chapter 308-330) which is, in turn, based on the Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD was developed by the U.S. Department of Transportation, Federal Highway Administration to set national standards for road managers when installing and maintaining traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. National standards contained within the MUTCD are applicable to all traffic control devices, including:

- **Traffic signs** to warn the public of sharp curves and intersections, guide traffic, control intersections, and prohibit parking.
- **Traffic signals or controls,** including warning flashers and red-light cameras, exclusive and protected left turn lanes, signal timing, signal head visibility, and new intersections within the existing alignment (signalized or roundabouts).
- **Roadway delineation or pavement markings,** including edge line markings, raised pavement markers, or post delineators.
- **Lighting or illumination**.
- **Channelization,** including left and right turn lanes (with signal), acceleration or deceleration lanes, and access restrictions (i.e. curbs).
- **Pavement treatments** such as special surface treatments (i.e. high friction surface).
- **Alignment alterations** that modify the horizontal and vertical alignment, and curve reconstructions.

Traffic control devices optimize traffic performance, promote uniformity nationwide, and help improve safety by reducing the number and severity of traffic crashes. The following sections describe the processes developed for identifying projects and managing programs aimed at addressing accidents, congestion, MUTCD requirements, and design constraints.

Traffic Signals

The process to prioritize signal needs conforms to the laws set forth by the federal government, adopted with amendments by state government, and presented in the *Manual on Uniform Traffic Control Devices* (MUTCD) published by the Federal Highway Administration and the U.S. Department of Transportation.

The prioritization process evaluates signal warrants set forth in the MUTCD and assigns rating values to each warrant. There are 5 primary warrants (described in the inset) used in evaluating a signalization need and the sum of these individual warrant ratings provides a comparison to other potential signal locations.

Prioritization and selection of intersections for signalization starts with data collection. Road Services' Traffic Engineering staff collects vehicle and pedestrian volumes, prevailing speeds, and collision history at each intersection, over the most recent three-year period. Each intersection is then evaluated using MUTCD warrants based on the number of approach lanes and the collected data.

The MUTCD states that signal warrants define the minimum conditions under which installing a traffic control signal might be justified. However, selection and use of traffic control signals should be based on careful analysis of traffic operations, pedestrian and bicyclist needs and other factors, coupled with engineering judgment. Traffic signals should not be installed unless one or more of the nine signal warrants are met. Three of these warrants are based on traffic volumes at several periods during the day: The peak hour, the fourth highest hour, and the eighth highest hour. Another warrant examines the traffic collision history, focusing attention on accidents correctable by signalization (left-turn and right-angle types). Two warrants examine pedestrian activity to determine if pedestrian volumes warrant signalization. Two warrants examine

Five Primary Warrants Used for Unincorporated King County

Warrant 1 – Eight-Hour Vehicular Volume

- Condition A: Minimum Vehicular Volume
- Condition B: Interruption of Continuous Traffic

Warrant 2 – Four-Hour Vehicular Volume

Warrant 3 – Peak-Hour Vehicular Volume

Warrant 6 – Coordinated Signal System

Warrant 7 – Crash Experience

whether signalization would improve traffic flow in a coordinated signal system or roadway network. The final warrant examines the proximity to a grade (rail) crossing.

Five primary warrants are used to prioritize (rate and rank) all intersections. The remaining warrants are also considered in the evaluation process, but these warrants are less applicable to the suburban and rural nature of unincorporated King County.

In addition to the five MUTCD warrants that are most applicable to unincorporated roadways, King County adds a factor for proximity to a school site. This additional factor does not replace the pedestrian-related warrants. For locations near schools, shopping and other pedestrian attractors, the volume of pedestrian activity is examined as well as pedestrian warrants. The proximity to school factor addresses the potential for pedestrian activity outside of average-day activities.

Rating values, representing the degree to which signal warrants are met, are calculated for each of the five primary warrants. Values are summed by intersection, and the list of intersections is sorted to separate those that meet at least one signal warrant from those that do not. Intersections that meet one or more warrants are sorted by rating value from the largest to the smallest and are then numbered according to their order in the list. The resulting list of rank-ordered intersections is called the priority array. It provides a starting point for determining locations to signalize.

Intersections on the top of the priority array undergo an extensive evaluation of alternatives to signalization as listed in the MUTCD, Section 4B.04. The list of alternatives includes, but is not limited to, the construction of additional lanes, revising the intersection geometrics to channelize movements and realign intersections, installing street lighting, improving sight distance, installing roundabouts, implementing other measures to reduce approach speeds, changing lane use assignments, restricting movements, or adding stop controls or intersection flashers. Particular attention is given to the predominant type of collision recurring at the intersection. The evaluation also includes existing and forecast traffic operational analyses to determine the effectiveness of each alternative and development of estimates for cost comparisons. A committee of engineers and maintenance staff reviews the information developed from these analyses and selects the improvement providing the safest, most cost effective, long-term solution.

Traffic Signal Programmatic Needs – Inspection and Planning

The Traffic Control Signal Priority Array includes the results of a review of un-signalized intersections to determine if existing conditions meet the criteria for installation of a new traffic signal, the review of left-turn signal phasing at existing traffic signalized locations, and review of traffic signalized intersections relative to safety and/or congestion concerns. The Traffic Control Signal Priority Array (Array) is updated continuously as new traffic count data and/or requests for review are received. This review looks at un-signalized intersections identified as being congested and/or has a safety concern which a traffic signal may address. The Federal

Highway Administration's *Manual on Uniform Traffic Control Device*s provides a series of tests, called warrants, based on vehicle volumes, pedestrian volumes, collision history, speeds, and proximity to other signals. The Array forms the basis for decisions and selection of projects for the TNR (as discussed above in the Traffic Control Signal Projects section).

Phasing – Monitoring the left-turn phasing at existing traffic signal locations ensures that the appropriate level of protection is provided. Signals with permissive left turn phasing (yield condition indicated by green ball signal display) and those with protected-permissive phasing (green arrow followed by yield condition indicated by green ball signal display) are evaluated to determine if the current left-turn signal phasing is appropriate. If a study finds that the current left-turn signal phasing should be upgraded to provide additional protection for left-turning vehicles, plans are made to implement the changes.

Signal Operations –Existing traffic signal operations are field reviewed on a two year cycle to ensure that changes in conditions such as new development adjacent to the signal, shifts in vehicle volumes due to road improvements, new/improved pedestrian pathways or attractors, growth of vegetation, queue lengths relative to length of existing turn pockets, vehicle delays by movement, and other elements of the traffic signal operation are acceptable based on engineering judgment.

Street Lighting – Is required on all roadways with three or more lanes of travel and as identifiers when a local road intersects an arterial, per the King County Road Standards. Street lighting provides motorists with the increased ability to see existing turn channelization and safely maneuver. King County has identified locations in unincorporated King County with existing turn channelization but limited-to-no street lighting. These street lighting needs will be addressed by King County programmatically.

Intelligent Transportation Systems

Intelligent transportation system (ITS) improvements include cameras, vehicle detection, traffic signal equipment and timing upgrades, pavement conditions sensors, and the communications infrastructure to support these devices.

Road Services' 2005 ITS Strategic Plan identified 34 key corridors that could benefit from ITS implementation. Corridors were chosen after review of various planning documents and from stakeholder feedback regarding transportation needs in unincorporated King County. For the most part, these corridors are linked to each other or to other King County ITS projects, allowing for communications continuity and the establishment of a regional ITS corridor network. Corridors include both urban arterials and smaller-capacity, rural roads.

Other factors such as funding availability, dependence on other projects and overall project feasibility contribute to whether or not an ITS project will be implemented. King County maintains a relative priority of ITS projects that is not organized into a set order for deployment.

Intelligent Transportation Systems (ITS) Corridor Project Prioritization Criteria

In the 2005 ITS Strategic plan, the criteria for analyzing project priorities were established based upon examples from the 2004 Transportation Needs Report, other criteria specific to ITS projects and King County's needs. Each criterion was analyzed on a scale of 1 – 5 points and no single criterion was weighted more heavily than another. Priorities were established by totaling the points received by each project. A general priority level (Low, Medium, High) was then assigned by comparing the scores each project received.

ITS Criteria included:

Average Daily Traffic (ADT): The same traffic volume scale as developed for capacity projects were used to assign priority for ITS projects along roads with the highest ADT.

Volume to Capacity Ratios: Roads whose volumes are approaching or exceeding capacity were given priority.

Accident Rates: Corridors with high accident rates were considered higher priority.

Transit Ridership: Corridors with greater volumes of transit ridership were considered higher priority.

Potential for Annexation: Proposed and approved land annexations for 2004 and 2005 as well as proposed future annexations were considered. Corridors with little probability of annexation were considered higher priority.

Availability of Communications: Corridors with access to communications infrastructure were considered higher priority.

Links to Other Existing/Planned Projects: Higher priority was given to corridor projects that could coordinate or build off of other county ITS corridor projects.

Hazard Areas: King County identified a number of hazards along county roadways, including High Accident Road Segments (HARS), High Accident Locations (HALs), and areas prone to flooding, ice, and landslides. Corridors with two or more of these hazard locations were given a higher score than those where only one identified hazard was identified.

Since 2005, seven of the 34 identified ITS corridor improvements have been completed, two corridors have received partial improvements, two corridors have been designed (construction planned for 2016-2017), and nine corridors have been annexed by other jurisdictions. The majority of the remaining projects were ranked as having a medium or low priority using the criteria presented above. These remaining projects have been included in the 2016 TNR project list.

Programmatic Intelligent Transportation Systems (ITS) Projects

Programmatic ITS projects provide the information processing and dissemination capability to add value to the data collected by the field devices deployed by the corridor projects. They also include countywide projects that can be implemented throughout the County and are not focused on one corridor. The regional ITS projects include Emergency Management, Traffic Management, Data Management, Communications, Maintenance and Construction Activity Coordination and Traveler Information.

Regional ITS projects were evaluated for priority using the following criteria:

- Improvement to traffic flow
- Improvement to incident response time
- Improvement to regional information sharing for traveling public
- Improvement to the efficiency of County services delivery
- Potential for phased implementation
- Relative ease of implementation
- Eligible to leverage non-County funding sources
- Builds upon existing infrastructure/projects

High Accident Locations (HALs) and High Accident Road Segments (HARS)

Every three years King County releases its list of High Accident Locations (HALs) and High Accident Road Segments (HARS). The list is consistent with the goals and criteria established by the Target Zero program, sponsored by the Washington Traffic Safety Commission.

The initial list of HARS projects is compiled by using collision data (crash frequency analysis) from the previous three-year period and applying a Sliding Spot Query. This query "crawls" the database, totaling collisions by a specified length and generating a list of segments where collisions exceed a designated threshold.

A new type of listing was created to address high accident roadway segments that are not part of the arterial system called Local High Accident Roadway Segments (LHARS). Four roadways were found to have high crash frequencies on local unincorporated roads.

Longer corridors of one mile in length were also reviewed for safety concerns stretching along roadway segments considerably longer than 1,000 feet. These roadway corridors were designated as High Accident Corridors and five roads were listed that had 30 or more collisions along their lengths.

Once the locations were identified, data such as collision types, traffic volumes, and roadway characteristics were collected for each location. This information was used to develop improvements intended to reduce the occurrence of collisions called countermeasures. There are a broad range of countermeasures, with approaches ranging from changing roadway geometrics to altering traffic signal timing. Countermeasures were selected based on predominant collision patterns, field observations, County practices, and the experience of the review team.

Countermeasures were developed for most but not all of the locations. There are several reasons for not developing countermeasures for a given location that include:

- Locations where recent or near-term improvements were judged likely to have a significant effect on the predominant accident patterns were omitted.
- Locations that had been recently annexed by other jurisdictions were omitted.
- Sites with no clear collision pattern and no noted deficiencies were omitted.

Once the countermeasures were developed, a benefit-cost analysis was prepared for each location. Benefit/cost ratios are frequently used to prioritize safety improvements since it can indicate if the benefits of a proposed countermeasure are greater than the costs and thus are worthy of improvement. The ratio is equal to the benefit of the expected reduction in collision costs divided by the project cost. Generally, if the ratio is equal to or exceeds one it indicates that the project is worth the investment.

To determine the benefit of the project, the expected reduction in collisions due to a given countermeasure was estimated using nationally published "reduction factors" with modifications based on King County's past experience. The reduction factor was used in combination with typical collision costs to determine the expected societal benefit (in dollars) of completing the improvement. The benefit was then "normalized" by converting to a present value based on the expected service life of the improvement. Finally, the normalized benefit was divided by a planning-level cost estimate to obtain the benefit-cost ratio for the project.

The results of the benefit/cost analysis and detailed documentation of the process used are contained in the report, *High Accident Locations and Road Segments Analysis, King County, Washington*; King County Department of Transportation, Engineering Section; February 2016.

The culmination of this analysis identified a list of safety improvements. These projects were then prioritized further, according to their respective benefit-cost ratio.

The 2016 HAL/HARS analysis will be published in the spring of 2016. This is the comprehensive list of identified life safety needs for roads in Unincorporated King County. Road Services may amend future TNRs with the results of the 2016 High Accident Locations and Road Segments Analysis so that these capital safety projects can be included.

High Crash Rate Analysis

To identify roadway safety needs, there are several different types of data analysis that can be conducted. In 2014, the Federal Highway Administration encouraged local agencies to start using the *crash rate* of a road segment or intersection to determine safety needs. As stated by FHWA, the benefit of a crash rate analysis is that it provides a more effective comparison of similar locations with safety issues by taking traffic volumes into account. This allows for the prioritization of these locations when considering safety improvements with limited resources.

In 2014, King County Roads started developing crash/accident rates for roadway segments and intersections in unincorporated King County. The crash rate is a ratio of accidents divided by average daily traffic. As part of the preliminary analysis, Intersections with rates at or near 1.0 accident per million entering vehicles were considered high crash locations. Roadway sections with crash rates of approximately 5 to 10 accidents per million vehicle miles traveled and higher were deemed high crash roadways.

Small Scope Operational Projects

In 2005, Road Services recognized the need to establish a program for projects that address small scope traffic flow and safety issues. The need for a program arose from the realization that these types of projects had typically not been included in other types of prioritization processes and had not received funding but do yield high benefit to cost rations. Small scope operational project types can include pedestrian facilities, non-signal intersection improvements and projects at various roadway locations.

Project Selection Process

A list of potential improvements was compiled from recommendations by a number of sources including King County Roads engineering staff, businesses, community groups, and members of the general public. Once projects were identified, they were scoped further by conducting:

- A field review - scope verification, cost estimating, and identification of unique constraints and challenges.
- Collection of up-to-date field information and photographs
- Development of site specific diagrams and sketches
- Analysis of King County traffic volume and accident data

The evaluation for each project was based on a preliminary screening of the project information obtained during data collection. Preliminary screening/feasibility analysis was undertaken prior to project development to assure a candidate project is feasible and satisfies program goals and criteria before it is evaluated. As each project was screened, it was assigned a relative (high, medium, low) priority to develop a preliminary ranking and determination of whether to advance formal prioritization process.

Determination of Priority Process Score

The priority process was developed with the purpose of providing a quantitative assessment of each project's merits for comparison with similar projects. Prioritization and selection of projects began with project screening/feasibility analysis and ended with the prioritized project list. Data on vehicle and pedestrian volumes, vehicle speeds, existing and planned facility capacities and accident history at each location over the most recent three or five year period was also collected as part of the analysis process.

Each project was unique due to the specific issues addressed. Certain concerns were indicative of site deficiencies that could be addressed by specific countermeasures – improvements that address problems at a given location to improve the safety or traffic operations. Countermeasures were developed for the three separate categories (pedestrian facilities, non-signal intersection improvements and roadway locations) based on the predominant problems, field observations, King County practices and standards, and the experience of the review team.

Pedestrian-oriented projects used the existing pedestrian priority array (see the non-motorized discussion earlier in this document). The algorithm for non-signal intersection improvements and roadway location projects was developed specifically by Road Services Traffic Engineering staff to score projects in their respective categories.

Evaluations of Candidate Locations and Project Selection

Scores for each location ranged from 0 to 100 into low, medium and high levels. Potential projects were reviewed with planning-level cost estimates and then subjected to a basic financial analysis. Low scoring projects or those with prohibitive costs are given less consideration. The highest scoring projects are prioritized and then considered as best candidates for the program.

Small scope operational projects include a broad cross-section of both urban and rural locations, and priority arrays are developed for each of the three categories. Final project selections are based on the priority scores, weighted based on an assessment of each project's potential effectiveness. Consideration and higher priority is also given to such factors as whether the project can coordinate with or enhance other King County transportation needs and priorities.

Traffic Control Devices: Maintenance and Operations

Traffic Control Devices, including ITS, can promote safety and efficiency, and can enhance transit speed and reliability by enabling the orderly movement of all road users on streets and highways. This equipment provides real-time traffic information to King County traffic operators, the media, and the traveling public.

- *Street Lighting, Signals, Flashers and ITS Equipment* and all associated components such as controllers, lights, mast arms, timers, cameras, cabinets, and loop detectors.
- *Sign* maintenance includes replacement and installation, fabrication, inspection, cleaning, and responding to resident call-outs.
- *Pavement marking* maintenance includes replacement of pavement markings, including striping, thermoplastic, and buttons.

Sign Fact
All signs should be cleaned at least once a year, and replaced every 10 years as reflectivity is reduced

Regular maintenance of traffic control devices ensures that:

- Safety standards are met;
- Damaged signs are replaced;
- Traffic signs, stripes, and markings are replaced so that they are visible night and day;
- Intersections are operating efficiently;
- Traffic control systems are operating correctly;
- Traffic information is accurate, clear, and appropriate; and
- Traffic restrictions are clearly marked.

Drainage

Did you know that unincorporated King County Roads has...

- Over 3,200,000 linear feet of pipe.
- Over 5,000 culverts.
- Over 6,000,000 linear feet of ditch.
- Over 23,000 catch basins.
- Over 750 manholes.

Road Services is responsible for the drainage infrastructure within, alongside and under unincorporated roads right-of-way, including: pipes, ditches, catch basins, manholes, retention/detention ponds, rain gardens, vaults, and bio-swales.

The largest and most costly component of King County's aging system are the enclosed pipes, greater in diameter than 24 inches. These pipes serve a critical role in conveying regional surface waters and will have the largest consequences if they fail, because their failure poses the greatest risk to public safety, property, and aquatic resources.

In unincorporated King County, regional pipe systems represent about 2% of the drainage system in the road right of way. This section discusses how larger-scale drainage projects that would be stand-alone capital projects are identified and prioritized. These large projects are those that are listed in the 2016 TNR. Smaller projects, constructed by in-house staff under the Road Services' Countywide Drainage Program, are not included in the 2016 TNR project list but are prioritized in the same manner.

Larger, Stand-Alone Drainage Project Identification and Prioritization

Drainage projects are identified in two ways: field confirmation of deficiency and a life-cycle analysis/condition rating.

Field Confirmation: Drainage problems and concerns are brought to the attention of Road Services in variety of ways including by resident complaint or concern, as a result of routine road patrol and field work, or from outside or internal agency requests. Drainage complaints and requests are then reviewed to determine the responsible owner. When Road Services is the owner, a project is created and entered into the Drainage Tracker Priority Array. Two evaluation systems are used to rate the priority of drainage projects: a Field Priority Score and Habitat Evaluation Process.

In 2014, Road Services received a grant to fund the development of a third prioritization system for drainage projects based on quantifying the benefits to water quality. That work is underway and will be completed by the end of 2016.

Field Priority Scores: Scores for field priority reflect the problem's threat to the public safety associated with the roadway and its contribution to drainage problems, on private property, downstream of the roadway. There are eight criteria used to evaluate each problem site that yield the field priority score. These criteria help identify system-wide impacts of each drainage problem.

Field priority criteria are assigned point values (from 0 to 10), and weights, (from 1 to 5), based on their importance to the maintenance of the county road system. This assigns priority to projects in the Drainage Tracker and serves as a priority array.

Habitat Evaluation Process: To address federal, state and local regulatory requirements (such as the Endangered Species Act (ESA), the Washington State Hydraulic Code and King County's Critical Areas Ordinance) as well as to improve environmental health, a habitat evaluation is completed for projects that affect aquatic areas, fish habitats and their buffers. These sites are visited by a Road Services staff biologist. The project's impacts or benefits to these areas are identified using the habitat evaluation criteria to generate a priority score.
The Habitat Evaluation is also used to document potential regulatory mitigation requirements.

After the Field Priority Score and the Habitat Evaluation are completed the scores and other available information are entered into the Drainage Tracker. After the projects have been prioritized, the Drainage Tracker is then used to monitor the status of the projects through design, permitting, and project completion.

Drainage Project Prioritization Schemes

Field Priority Criteria

1. Threat to public safety
2. Threat to public property
3. Threat to private property
4. Water quality improvement
5. Maintenance problem resolved
6. Road closure severity (detour, sole access or no impact)
7. Road classification (local access, arterial use, collector use)
8. Road failure potential

Habitat Evaluation Criteria

1. Fish stock status (species of concern or ESA listed?)
2. Site specific information (fish passage, water quality, wetland improvement or risk of habitat damage?)
3. Basin/system concerns (does the project address basin concerns or consideration of the stream habitat opened for fish passage?)

Emergency projects and project schedules: Projects are scheduled in the Countywide Drainage Preservation Program annually. Scheduling annually helps reduce frequent reallocation of resources except in the case of a severe emergency. However, drainage problem sites are reported to Road Services' Maintenance crews almost daily. Some of these drainage concerns are so urgent that they must be included in the current year's work program. Project priorities are re-evaluated every time a new project is added to the Drainage Tracker to ensure that effort is expended on the most urgent safety and preservation projects.

Drainage Program Programmatic Needs

Road Services' Drainage Tracker provides a prioritized list of the known major and minor drainage infrastructure needs. These projects range in scale from the replacement of small segments of pipe to large cross-culvert replacements. They can be triggered by regulatory requirements, or safety and preservation needs. For planning purposes, there is a major division in the backlog of the Drainage Tracker projects between those that impact streams and those that don't. Culvert replacements that impact streams are those that are required to eliminate barriers to spawning fish, including vertical drops, water depth, and water velocity. Non-stream impacting drainage projects include stormwater system retrofits and the installation or replacement of catch basins, vaults or pipes.

Drainage System Condition Assessment: A large portion of King County's unincorporated drainage system is at or nearing the end of its useful life and its current condition is largely unknown. To address this lack of knowledge, an effort is underway to identify the location, age, type, size, and condition of regional drainage facilities in Road Services' road right of way. This information is necessary to identify and assess the urgency and cost of drainage facility maintenance and renewal needs. In 2015, Road Services, in coordination with King County's Water and Land Resources Division, initiated this effort for the parts of unincorporated system deemed most at risk, which is estimated at 40% of the pipes that are 24" and larger system or 2% of the entire system in the road way.

This effort will provide information for Road Services to use in completing an inventory and condition assessment of the remaining drainage system. The assessment will also inform policy discussions regarding the responsibility and funding structure for operation, maintenance, and renewal of regional drainage systems in the unincorporated and incorporated areas.

A final "Road Right-of-Way Drainage Trunk Line Assessment" report was issued in February 2016.[1]

Drainage Maintenance and Operations

Standing water can be a safety hazard to road users and accelerates the deterioration of the roadway surface and substructure. Drainage infrastructure moves stormwater away from the roadway and reduces flood risk to the built environment

Ditch Fact
Ditches need to be cleaned every 2 years.

[1] http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/KC_ROW_Drainge_Assessment_Final_Report.pdf

(public and private property) by collecting and redirecting stormwater to natural bodies of water and designated collections points. Drainage infrastructure reduces water pollution by collecting stormwater and filtering out pollutants and sediment via settlement, infiltration, or other processes.

To ensure these outcomes, Road Services employs routine inspections, regular maintenance, repair, and the replacement of drainage infrastructure that fall into the following categories:

Quick response: Work associate with unanticipated failures of the drainage system.

Drainage system cleaning: Routine maintenance to the drainage system, including pipe and catch basin cleaning, vactoring sediment, and small incidental repairs.

Ditch maintenance: Reshapes and cleans roadside ditches to ensure proper drainage. This work is primarily preformed through bucket ditching with a front end loader or a back hoe.

Minor repair: Includes repairs to the drainage system, such as: drainage pipe repair or replacement, repair of catch basins, pipe marking, trash rack and header repairs, erosion prevention, rip-rap replacement, and catch basin lid replacement, the installation of stream by-passes, stream restoration all using best management practices.

Stormwater Pond Maintenance: Mowing, brush removal, and cleaning of stormwater ponds.

Drainage infrastructure is doing its job when...

- It meets safety and environmental standards.
- Water on the roadway causes minimal impact to travelers, infrastructure or private property.
- Surrounding streams, rivers and lakes enjoy good water quality.
- Ponds, ditches and enclosed drainage systems are free of litter/debris.
- Road-related ponds or ditches are mosquito free.

Pipe Fact

All pipes need to be marked every 3 years to ensure clear visibility of the drainage infrastructure and provide ready identification of the structure for crews implementing routine maintenance.

Bridges and Structures

Bridges are key components of the County road network, providing routes over bodies of water, roads, lowlands, railroad tracks, or other obstacles. Road Services owns, operates and maintains 181 bridges. The bridge category includes long span bridges (those that appear on the national bridge inventory), short span bridges, safety enhancement bridges (to keep wildlife off of roadways), and pedestrian bridges. These bridges can be made of concrete, steel, timber, or a combination of the three building materials.

Structures include infrastructure designed to retain or contain the natural environment and protect the built environment (seawalls, retaining walls, and riprap walls/slopes); as well as those buildings necessary for daily operations (sheds, maintenance shops, and office buildings).

Bridge Replacement and Preservation

County bridges are inspected regularly and assessed to ensure the safety of the traveling public. Inspection of all County roadway bridges occurs on a two-year cycle and aim to implement the National Bridge Inspection Standards (NBIS) by calculating a sufficiency rating for each bridge. The sufficiency rating is based on factors such as structural adequacy and safety, serviceability and functional obsolescence, and how essential the bridge is for public use. Sufficiency rating ranges from zero (worst) to 100 (best). The sufficiency rating score is used to establish eligibility for federal bridge replacement and rehabilitation funds. Bridges with a sufficiency rating less than or equal to 50 that are either functionally obsolete or structurally deficient, are eligible for replacement funds. Any bridge with a sufficiency rating less than or equal to 80 that is functionally obsolete (defined as the function of the geometrics of the bridge in relation to the geometrics required by current design standards) or structurally deficient is eligible for rehabilitation funds.

In Washington, federal bridge funds are allocated to local agencies through the Washington Department of Transportation (WSDOT) using a competitive process. WSDOT is focusing on funding local agency bridges that are classified as structurally deficient with a sufficiency rating of 40 or less for replacement, and structurally deficient with a sufficiency rating of 80 or less for rehabilitation projects.

Though the sufficiency rating establishes eligibility for federal funding, it is inadequate to prioritize King County's bridges for replacement or rehabilitation because the rating does not give enough weight to important criteria such as load limitations, hydraulics, geometric deficiency, and expected useful life. The King County Bridge Priority Process establishes the need for individual bridge replacement by score and rank using criteria approved by the King County Council (Ordinance 11693).

In 2011, Road Services moved forward with implementing the use of the tier service level criteria for all unincorporated King County Roads. Tier service levels are now applied in addition to the bridge priority process to help establish priorities for allocating funding for bridge projects. The results of the bridge priority process are published annually and reported in Road Services' Annual Bridge Report, a supporting document to the Road Services' budget.

Road Services' bridge priority process is used to inform short- and long-term needs for Road Services 181 bridges. Minor maintenance and repair activities and quick responses to bridge needs are covered by maintenance and operations. Larger projects are designated as stand-alone preservation projects or are addressed through bridge preservation programs, including:

Preservation – Bridge Priority Maintenance (BPM): Includes bridge needs outside of routine or minor maintenance and repair and activities such as: major damage repairs, deck or traffic rail replacements, and scour protection and mitigation.

Bridge Painting: King County has 23 bridges with painted steel components; trusses, steel girders and floor beams, plus secondary stabilizing members. Of these bridges, approximately one-third have lead paint that was applied prior to 1970. All lead paint must be properly removed prior to applying new paint, which necessitates a costly full lead containment and abatement system.

Bridge Inspection: All bridges are inspected at 24 month intervals and the reports for bridges on the National Bridge Inventory are collected and reported to the Federal Highway Administration by the Washington State Department of Transportation. Some bridges require more frequent or special inspections when deterioration is being closely monitored. This work includes not only the labor, but also the equipment and contract services that sustain inspection activities.

Bridge Replacement: Includes design, environmental compliance, and construction of full

bridge replacements. The 20-year projected need for bridge replacement includes 43 bridges selected by using three factors; the current bridge condition and projected remaining useful life based on the age of the bridge, the Council-approved criteria for bridge funding priority, and an expert review of candidate bridges. The resultant list is the best current representation of the bridges that will be most in need of replacement over the next 20 years. The list includes both short-span bridges and bridges eligible for federal funding.

Structures Needed to Protect Vulnerable Road Segments

Structures enable roads to exist in diverse landscapes by controlling and shaping the natural environment and providing protection from environmental impacts such as flooding, tides, waves, storm surges or landslides. Structures include infrastructure such as seawalls, retaining walls, armored slopes, and even bridges.

King County's roadways have suffered repeated failures requiring emergency or routine repairs following storm events or even prolonged rain. These locations have been designated as vulnerable road segments; which was defined as a road segment that requires abnormally expensive and/or frequent repairs. In 2005 the first Vulnerable Road Segments (VRS) study was conducted to identify, quantify, and prioritize vulnerable road segments throughout the County and developed projects to resolve the vulnerability of the identified road segments. The study process developed a list of unstable slopes and locations requiring routine maintenance.

Sixty three road segments were initially identified as candidates. Each of the road segments was grouped into one of six problem categories: steep slopes, landslide, seawall, river erosion, flood, and roadway settlement. These categories helped the team in identifying the proposed solution and the possible environmental impacts, and ultimately the project cost.

Once the projects were grouped into their categories, the project team analyzed the list of identified vulnerable road segments based on the following:

- Traffic data
- Engineering assessment of the problem
- Estimated cost to remedy the problem
- Guardrail needs
- Roadway classification
- Detour length

General information was also developed for each road segment, including but not limited to: the segment location, description of the road segment, and a description of the scope of work. Proposed solutions and recommendations were developed during the analysis, ranging from proposed projects to no action.

In 2008 and 2011, the engineers who conducted the original study regrouped and re-evaluated the existing list against known problems and existing conditions. In 2011, three new road segments were identified as vulnerable road segment candidates.

Priority Ranking: The projects developed during the analysis of the identified road segments were prioritized based on the following:

- **Maintenance Cost per Year** – this is the average estimated amount of money spent each year repairing the road segment to its pre-damage condition (temporary repair). Those projects with higher annual maintenance costs were given a higher priority.
- **Construction Cost/Vehicle** – this factor divides the cost of the permanent construction fix (project identified in the TNR) by the average daily number of vehicles that travel the road. Projects with a lower cost benefitting a higher number of vehicles were given a higher priority.
- **Impact of Failure** – this factor accounted for the importance of correcting a vulnerable road segment. The roadways were scored from 1 to 5, where a score of 1 was associated with a roadway that, left uncorrected, would result in a total failure resulting in complete closure of the road; and a score of 5 was associated with a roadway that, left uncorrected, maintenance would be necessary with no foreseeable loss of road function.
- **Driver Inconvenience** – this factor measures the overall level of driver inconvenience if a segment of road is closed, taking in to consideration the detour length and traffic volume. Road segments involving longer detours with higher traffic volumes were given more priority.
- **Inclusion in a Future Project** – this factor gives priority to segments that were part of a planned project in the RSD CIP or TNR; accounting for the opportunity to complete two needs with one project.

- **Guardrail Need** – this factor gave a higher priority to road segments slated for future guardrail improvements, accounting for the opportunity to fulfill two needs with one project.

The factors were chosen by the project team and refined through an iterative process. After each iteration the values and percentages (weighting) of the factors, as well as the segment rankings were studied for reasonableness. The ranking process was finalized when the full numerical range of each factor was well distributed among the segments and the weighting percentage of each factor seemed to result in a logical ranking of segments. The road segment with the lowest score was considered the best candidate (high priority) for a road project.

Structure Needs: The proposed permanent solutions to the vulnerable road segments included: construction of retaining walls, replacement of seawalls, replacement of culverts with bridges, construction or rockery or armored sloped, raising the roadway with walls and culverts, reconstruct the roadway, roadway re-alignment with walls, and for seven locations it was recommended to continue routine maintenance at that location (no permanent fix). All of the projects identified in the VRS study that result in a permanent repair have been included the TNR list and given the appropriate product family label (i.e. reconstruction projects identified in the VRS study were labeled as roadway projects, and walls and bridges were labeled as bridge/structure projects). The following types bridge/structure needs were identified as part of the VRS study:

- Construct retaining walls to prevent slides on steep slopes above and below the roadway, stabilizing the slope and adjacent river banks
- Replace seawalls to adequately support the road prism, protect the road from storm wave action, and eliminate routine road failures.
- Replace undersized culverts with bridges to provide better conveyance of water, silt, and debris.
- Raise the roadway using walls or other armored structures (i.e. rip rap) to minimize flooding and erosion impacts to the roadway. Typically these projects require the perforations in the armored walls to allow for the conveyance of water and the inclusion of guardrails.
- Armor road shoulders with riprap or other hardened structures to prevent routine washouts during flood events.

Some of the VRS candidates did not result in a proposed project due to various constraints such as: difficulty in obtaining regulatory approvals, low average daily traffic, limited right-of-way, or where an interim repair or routine maintenance was deemed sufficient. Those candidates that resulted in a project are included in the 2016 TNR project list.

Bridges and Structures – Maintenance and Operations

Bridges are key components of the County road network that provide routes over bodies of water, other roads, lowlands, railroad tracks, or other obstacles. Structures related to the road infrastructure enable roads to exist in diverse landscapes by controlling and shaping the natural environment and providing protection from environmental impacts such as flooding, tides, waves, storm surges, or landslides.

Structures related to the services provided by Road Services enable the County to not only provide timely emergency response; but also provide the tools necessary for routine maintenance and operation of the road network.

If bridges and road structures are not regularly inspected and maintained, they may become unsafe and require closures which can result in loss of access to property or longer travel times. If service structures do not supply the necessary tools to accomplish routine or emergency tasks, or are not situated in a location that provides equitable access to the surrounding road network; the public will experience inefficient and inconsistent service. To minimize these consequences and maximize the outcomes listed above, Road Services employs programs that facilitate routine inspection, maintenance, repair, and replacement of Bridges and Structures. These programs fall into the following categories:

Routinely inspected and maintained bridges and structures serve the public by ensuring that:

- Safety and environmental standards are met.
- The structures are free of hazards.
- Roads remain open to travel.
- There are no load or height restrictions.
- They provide non-motorized access.
- Crossing delays are minimized.

Minor bridge maintenance and repair: Includes work associated with routine bridge maintenance and repair such as small repairs, debris removal, surface cleaning, and graffiti removal. Routine inspections, load ratings, and other analyses inform the need for the minor maintenance and repair of structures.

Operations: Includes the resources needed to operate a bascule bridge (such as the South Park Bridge), which requires bridge tender staff to raise and lower the bridge for boat traffic.

Quick response: Includes work associated with unexpected failures in the bridge system and seawalls.

Facilities

Road Services has six regional maintenance facilities and a maintenance headquarters that provide routine and emergency services to the road system throughout the unincorporated area. Many of the County's existing road maintenance facilities are old and require significant capital improvements or have exceeded their useful lives and require replacement. Most are between 40 and 60 years old, with a few dating back to the early 1900s. As such, some do not meet current building standards or do not readily accommodate the needs of a modern workforce and equipment inventory. Some facilities have inadequate heat, insufficient restrooms, or failing septic systems. Some facilities have been plagued by leaking roofs, mold, or rodent infestations.

Maintenance activities keep the County's road-related assets in working condition to maximize the public's investment and provide for the safety of users. People and equipment are the tools to deliver safety services on County roads; adequate tools including heat, power, and weathertight maintenance facilities located in the right places are necessary to support the efficient provision of vital services to the traveling public. The existing conditions of the Road Services facilities have resulted in a compromised ability to provide services, often during public emergencies.

The ability to respond to incidents and public emergencies 24 hours a day, seven days a week is an important part of operating a road network. Emergency response capability also helps keep the road system safe and operational during severe weather and after earthquakes or other events. With deteriorated or a lack of appropriate facilities, the sand used in responding to snow and ice will freeze in trucks, resulting in significant delay of road treatment to make them passable. An investment in the highest priority facility failures and sub-standard facilities are necessary for continued delivery of essential safety and routine maintenance services.

Assessment of current facilities: As part of the facility planning effort to develop the Facilities Master Plan (FMP), the current facilities were assessed for conditions, locations, and functions. The results of these assessments helped identify facility needs.

Physical condition: To get a current and comprehensive understanding of the condition of its existing maintenance facilities, the County engaged facilities consultant DLR Group in 2013 to conduct a facilities condition assessment. DLR Group assessed and documented various components of the buildings and properties of the regional maintenance shops and the maintenance headquarters. The study included the cost estimates for capital needs of each facility and projected costs associated with future use for each facility.

The DLR condition report and analysis was used to help prioritize needed maintenance repairs and inform future cost-benefit analysis and decisions regarding whether to invest in expensive repairs or rehabilitation of facilities, or to relocate or rebuild facilities.

Location suitability: As the unincorporated service area has changed significantly with annexations and incorporations over the past two decades, a number of facilities are no longer sited in the best locations to serve the core unincorporated service areas. In addition, facilities sites have certain size, land use, zoning, environmental and other requirements. Because RSD's facilities have been sited, acquired, and developed ad hoc over a very long period of time, many current facilities have issues related to their location (i.e. the Fall City site is located in the Snoqualmie River Floodplain). The Roads Services Division assessed each facility according to a set of criteria that considered travel time, size, land use issues, and many other factors.

Functional/operational deficiencies: Road Services facilities were also assessed against a set of functional criteria to identify deficiencies from a functional/operational perspective. The functional/operational criteria include covered and heated bays for vehicle and equipment storage; covered sand and bulk salt storage for snow and ice operation; and adequate administrative and crew facilities.

Identified Needs: The consultant identified the following types of facility needs:

- Move and co-locate with WSDOT (including facility expansion)
- Construct and expand permanent facilities
- Relocate and construct or expand permanent facilities
- Enhance two emergency response satellite facilities
- Major renovation of existing facilities
- High Priority Maintenance and Repair (septic system replacement, fencing, doors and windows, HVAC Systems, roof repairs, and interior improvements electrical, plumbing)

Facility Maintenance: Facilities include any properties operated at remote offices, shops, and yards and pit sites. The needs associated with efficiently maintaining and operating these facilities includes, but is not limited to the following: yard maintenance, cleaning, utility service, and building security, and work as needed (carpentry, electrical repair, painting, fence repair, machinery service, structural repairs, and plumbing).

Chapter 3 – Transportation Modeling

The Transportation Needs Report is part of the King County Comprehensive Plan. Travel demand forecasting for the Transportation Needs Report fulfills several requirements for the Transportation element of the King County Comprehensive Plan; these requirements can be found at RCW 36.70A.070(6)(a). They consist of the following: 1. Traffic forecasts of 10 years or more: TNR forecasts are for 2031, 15 years from the expected adoption of the TNR in 2016. 2. Land use assumptions: Regionally adopted household, population and employment data are key inputs into the traffic forecasts used. 3. Intergovernmental coordination: Travel forecasts used for the TNR are based on land use forecast growth target assumptions agreed to regionally by a coalition of jurisdictions in King County. 4. Estimated traffic impacts to state-owned facilities: Year 2031 travel forecasts for state facilities were analyzed as part of a deficiency analysis. 5. Consistency of plans: the PSRC solicited input from member jurisdictions in the development of their travel model, and forecast land use and road improvement assumptions were used for the PSRC's Transportation 2040 plan.

Travel Demand Forecasting at King County

Travel demand forecasting is the process of estimating the number of vehicles that will use a particular transportation facility in the future. Travel forecasting begins with the collection of current traffic data. This traffic data is combined with other known data, such as population, employment and trip rates to develop a traffic demand model for the existing situation. Coupling it with projected data for population, employment, etc., results in estimates of future traffic. Traffic forecasts are used in transportation policy, planning, and engineering, to determine demand and provide the basis for calculating the capacity of infrastructure and determining level of service performance.

The official travel forecasting model at the PSRC is called 4k. It was used in development of the PSRC's Transportation 2040 Plan update in 2014, and is being used for the 2016 King County Comprehensive Plan update. The 4k model is a Trip-Based Model. A trip-based model estimates daily travel patterns and conditions within the four counties (King, Kitsap, Pierce, and Snohomish) of the Puget Sound region. [2]

The 4k model relies upon population and employment forecasts from the land use model at PSRC. The model is used to generate forecasts to provide travel measures for use in regional analysis. For every household in the region, the model estimates how many trips are made each day, where they go, what time of day they travel, which modes they use, and which routes they follow.

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[2] Puget Sound Regional Council, "Travel Demand Forecasting," Analysis and Forecasting at PSRC, October 2009, http://www.psrc.org/assets/2938/Travel_Demand_White_Paper_2009_final.pdf.

Prior to the 4k model, King County used a custom model based on an older generation of the PSRC's Trip-Based Model. The major difference is that the King County model used localized traffic data, including concurrency and local development data specific to unincorporated King County, whereas the PSRC model used regional level data. Following the incorporation of remaining major urban portions of King County, unincorporated King County is primarily a rural area with an older, transportation infrastructure with less density, much lower growth levels, and mature and stable growth patterns. A highly specialized and detailed travel demand model is no longer needed, so in the interest of program and cost efficiency, as well as to ensure regional planning consistency, King County adopted the 4k model in 2015.

Forecasted P.M. peak hour (afternoon rush hour[3]) traffic volumes were reviewed for indications of potential level-of-service problems. King County staff used PSRC Travel Model output data to analyze deficiencies for the forecast year 2031. The Travel Model's afternoon rush hour field covers a three hour time period for both directions of vehicle travel. The latest model forecast showed fewer deficiencies than were forecasted in 2012. This change can be attributed in part to differences in travel models, however these differences are not as great in unincorporated King County, where the PSRC has increased the level of detail in recent versions of its model.

Capacity Projects Derived from PSRC Travel Model for Unincorporated King County

No additional capacity projects were proposed as a result of the deficiency analysis performed for the TNR. Most of the remaining deficiencies are on unincorporated arterial roadways with severe congestion levels and significant cost or engineering challenges dating back many years, and which are unlikely to see improvement without very significant investments.

[3] Defined by PSRC as 3:00 pm – 6:00 pm

Chapter 4 – Drivers of Change Affecting Transportation in Unincorporated King County

Puget Sound Regional Demographic and Employment Trends

The most powerful indicators of how people travel are where they live and work. The Puget Sound region is expected to continue to grow jobs and urbanize, creating more demands on a transportation system that has been outgrown. New forecasts from the PSRC indicate population in the region is expected to reach about five million people by 2040, an approximately 30 percent increase from 2014. This substantial increase in population will create the need for more housing, employment and services, creating significant impacts on travel patterns and demands.

The Puget Sound region's current transportation system reflects and is guided by land use patterns developed through decades of growth. As the region continues to grow in the future, its demographic profile will continue to evolve and changes may likely accelerate. Future transportation system users will include a wider range of ages, and be more ethnically and racially diverse. As jobs increasingly locate into large city centers, alternative modes of travel including transit and non-motorized modes will become increasingly important.

The Millennial Generation (people in their 20s and early 30s in 2015) has the potential to lead lasting change in regional housing and transportation choices. Current trends suggest this younger generation, nationwide, is less car-focused than older generations and values housing locations near mass transit or within walking or biking distance to work, thus making fewer trips by car.[1] As the Seattle area ranks as a top destination for young professionals both locally and nationally, this could signal a greater change in transportation patterns in the region.
The retiring Baby Boomer generation displays similarly more urban-oriented housing choices than past retiring generations. Retirees are increasingly downsizing from suburban homes to city apartments and small houses for pedestrian and transit oriented access to cultural activities and lifestyle amenities.

The region is and will remain a relatively affluent region, with higher wages lead by technology companies and technology workers throughout the regional economy.[2] Their willingness to pay for transportation choices that they value remains high, at least for now. In contrast, lower income populations will face increasing economic challenges as housing, transportation, and other living costs escalate.

Uncertainty lingers, however, over the long-term effects on housing and transportation, given the newness of the younger and older generations' lifestyle choices. In the long-run, if these trends continue, the region's demographics could increase demand for higher density housing

[1] Ibid., 15, 18–20.
[2] Ibid., 38–39.

in compact, walkable neighborhoods and a balanced transportation system that enables these land use patterns.

Puget Sound Transportation Trends

Commuting behavior in the region has been relatively consistent with the bulk of workers choosing to drive alone. Single-occupancy vehicle (SOV) travel will likely continue to be an important mode choice throughout the region as the lack of density and lack of funding makes mass transit service impractical in the rural area. According to findings from the PSRC's recent Regional Travel Survey, most trips in the region – 82% - are still in personal vehicles, but the share of trips by car has been declining steadily since the 1999 Regional Travel Survey.[3] Overall, most trip lengths are the same as they have been in the past, and commute characteristics are mostly the same as well, with a slight increase in distance covered by drivers.[4] Average commute times and distances have fluctuated only slightly, with average drive-alone distance increasing by a mile (to 12.2 miles in 2014) while average commute time wavered around 28 and 29 minutes between 1999 and 2014.

Future gas prices and potential roadway tolling will be significant contributors to further consolidating housing and employers. The regional transportation plan – Transportation 2040 – plans for a regional tolling system as both a way to raise critical funding for transportation capacity investments and to reduce peak-period demand on the transportation system.[5] Several studies have been completed or are currently underway by the Washington State Department of Transportation, such as for State Route SR 167, SR 509 and Interstate 405. The evolution of tolling will likely continue on this pathway, with additional high-occupancy toll lanes brought into operation in the first decade of the plan.[6] Also, major highway capacity projects will be at least partially financed through tolls. Eventually, in the later years of the plan, the intent is to manage and finance the highway network as a system of fully tolled facilities.

The second highest expense for a typical U.S. household is transportation. Gasoline prices are always unpredictable and volatile, mirroring crude oil prices which are determined in the global crude oil market by the worldwide demand for and supply of crude oil.[7] Washington State's previous gas tax of 37.5-cents-per-gallon is one of the highest gas taxes in the United States and with the passing of the transportation package from the 2015 legislative session, will increase the present gas tax 11.9-cents-per-gallon phased in over three years to 49.4-cents-per-gallon -

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[3] Puget Sound Regional Council, "PSRC's 2014 Regional Travel Study: Key Comparisons of 1999, 2006, and 2014 Travel Survey Findings" (Puget Sound Regional Council, June 2015), 1.

[4] Ibid., 21.

[5] "Adopted Transportation 2040 Plan," 39–42,46, accessed July 27, 2015, http://www.psrc.org/transportation/t2040/t2040-pubs/final-draft-transportation-2040/.

[6] Ibid., 47.

[7] "Gas Prices Explained," *American Petroleum Institute*, accessed August 3, 2015, http://www.gaspricesexplained.com/#/?section=gasoline-diesel-and-crude-oil-prices.

second nationally only to Pennsylvania.[8] Combined with the current federal gas tax of 18.4-cents-per-gallon, a total of 67.8-cents-per-gallon will be added to the cost of gasoline for Washington drivers. With overall demand for oil trending up, the price of gas is increasing, making it reasonable to forecast not only $4.00-per-gallon prices in the near-term, as the local and global economy continues to improve, but $5.00-per-gallon prices and above in the decades to come.[9]

Transportation Trends in Unincorporated King County

Decades of annexations, declines in gas tax revenues, and the effects of voter initiatives within King County have all directly contributed to the decline of revenues needed to maintain and preserve King County's nearly 1,500 mile road network.[10] King County Roads' financial forecasts show that revenues needed to sustain capital improvements will end in 2030 and despite significant efficiencies made by the agency, additional cuts to the operating budget will be required if additional revenues are not secured. King County Roads is operating under an unsustainable financial model with insufficient revenue to support unincorporated roadway infrastructure.

In addition, the majority of population, development, and employment growth have been within the Urban Growth Area, not in unincorporated King County.[11] Following adoption of King County's first Comprehensive Plan in 1994, the percent of growth in rural areas has generally declined each year[12] and the small growth trend is expected to continue. The combined population of all small cities and towns is just 5.4% of the county total.[13] With the majority of people and jobs located within the urban growth area, this leaves few employment options in the rural area and the necessity for rural residents to drive long distances to jobs in urban employment centers.

Unless changes are made to the state and regional transportation funding allocation process, federal, state and local transportation investments will continue to be focused within King County's Urban Growth Boundary serving the densest residential and employment centers, which enable local and regional transit improvements and active modes of travel. This leaves unincorporated King County with a more geographically dispersed population – traditionally more difficult to be served efficiently by transit. As transportation investments go to urbanized areas, King County may be forced to examine other transit service delivery options, such as dial-

[8] "Gasoline Tax," accessed August 3, 2015, http://www.api.org/oil-and-natural-gas-overview/industry-economics/fuel-taxes/gasoline-tax.

[9] "U.S. Gasoline and Diesel Retail Prices," *U.S. Entergy Information Administration*, accessed August 3, 2015, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_a.htm.

[10] "Executive Constantine Names Panel to Address Sustainable Funding for Deteriorating County Bridges and Roads - King County," accessed September 14, 2015, http://kingcounty.gov/elected/executive/constantine/News/release/2015/August/05-roads-task-force.aspx.

[11] Puget Sound Regional Council, "Population of Cities and Towns," Puget Sound Trends (Puget Sound Regional Council, January 2015), 1, http://www.psrc.org/data/trends.

[12] King County, "The King County Buildable Lands Report 2014," Buildable Lands Report, July 23, 2014, 134.

[13] Ibid., 36.

a-ride, rideshare, and vanpool services in areas with little to no fixed route transit options. With high levels of commuting to jobs in the Urban Growth Area, but little available transit service, many rural unincorporated King County residents will continue to rely on autos to get to work while demand and usage of unincorporated roadways increases by those outside of the County driving into the urban centers.

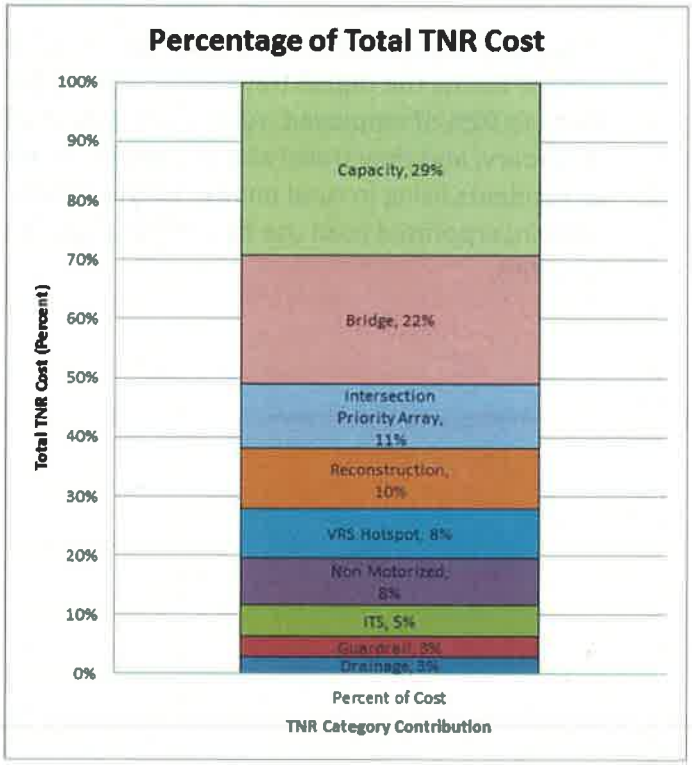
King County's unincorporated road system supports more than one million trips per day with people across the region traveling to work, school, and recreation.[14] The PSRC estimates that close to 92% of employed, rural study area residents travel to jobs inside the Urban Growth Boundary, and they travel about twice as far with an average commute of 22 miles.[15] Just 9% of residents living in rural unincorporated areas work in those areas,[16] illustrating the high level of unincorporated road use by residents coming from and to Pierce, Snohomish and other counties.

[14] "Executive Constantine Names Panel to Address Sustainable Funding for Deteriorating County Bridges and Roads - King County."
[15] "Adopted Transportation 2040 Plan," 4.
[16] Puget Sound Regional Council, "Transportation 2040 Update - Appendix R: Rural Transportation Study," May 29, 2014, 4, http://www.psrc.org/transportation/t2040/transportation-2040-update.

Chapter 5 Project Needs List - Cost Analysis

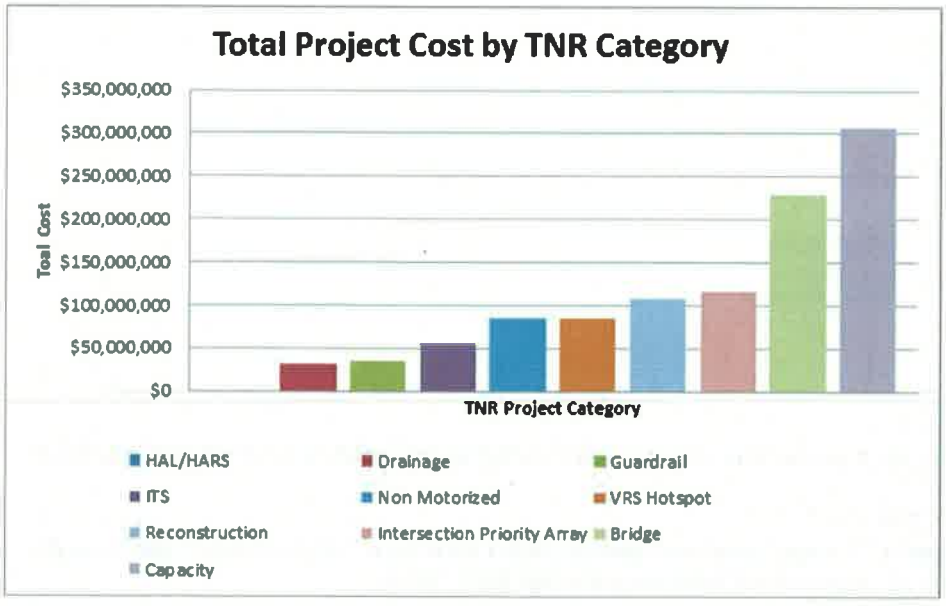
2016 TNR Project list – Composition and Characteristics

The 2016 TNR Project Needs List is composed of projects derived from the varied work within Road Services. Projects were organized within nine categories – Drainage, Guardrail, ITS (Intelligent Transportation Systems), Non-Motorized, VRS Hotspot (Vulnerable Road Segment), Reconstruction, Intersection Priority Array, Bridge and Capacity. This does not include the HAL/HARS category of projects.

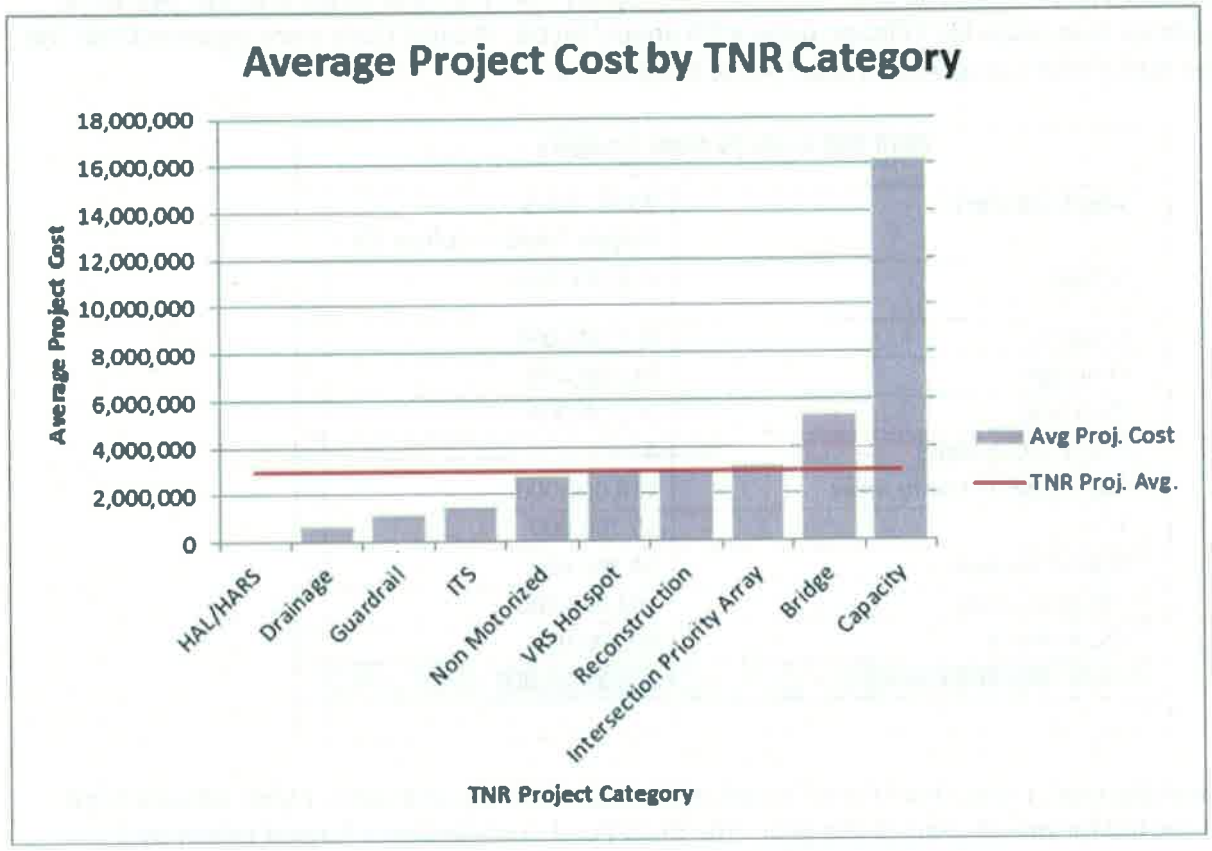


Total costs for Drainage and HAL/HARS (safety) projects are either not or under represented because processes for identifying those needs is underway.

Together the total cost estimates for Capacity and Bridge projects contributed over half of the total cost of the TNR Project Needs List (see graph: Percentage of Total TNR Cost). This is attributed to the significantly higher cost of engineering, materials, physical labor, environmental permitting and cost of right-of-way that goes into widening roads, reconfiguring intersections for roundabouts, and replacing/repairing bridges compared to relatively smaller-scale projects such as guardrail or dynamic messaging boards.



Viewing the project list by average project cost shows the same ascending pattern as by percentage and total project cost (see graph: Average Project Cost by TNR Category). The graph illustrates a stark contrast in individual category project costs. For instance, there is a 135% difference in the average Capacity project cost than the average project cost in the TNR.



Chapter 6. Financial Analysis

Assumptions and Financial Plan

A financial analysis was done to compare the cost of projected needs to Road Services' anticipated revenue. The cost estimates for projects from previous versions of the TNR were updated to account for inflation using a 3% annual factor. Project costs were organized into the ten major asset categories as listed in the table below:

2016 TNR Costs by Asset Category	
Asset Category	**2016 - 2035 Project Costs in dollars ($)**
Bridge	229,000,000
Capacity	307,000,000
Drainage	31,000,000
Guardrail	35,200,000
HAL/HARS (safety)	0
Intersection Priority Array	116,000,000
ITS	55,700,000
Non Motorized	84,900,000
Reconstruction	107,000,000
VRS Hotspot	85,900,000
Total 2016 TNR Costs	1,051,700,000

Available revenues of Road Fund Contribution, Grant Funding, and other minor sources were projected for the 20 years of the plan. The Road Fund Contribution is funded chiefly by a dedicated unincorporated area property tax and gas tax distribution. Property tax revenue projections are based on the most recent approved King County, Office of Economic and Financial Analysis forecast as of September 30, 2015. Gas tax projections reflect increases adopted by the Washington State Legislature in 2015 that for King County amount to $500,000 in 2016 and 2017 and $1.06 million annually from 2018 to 2031.

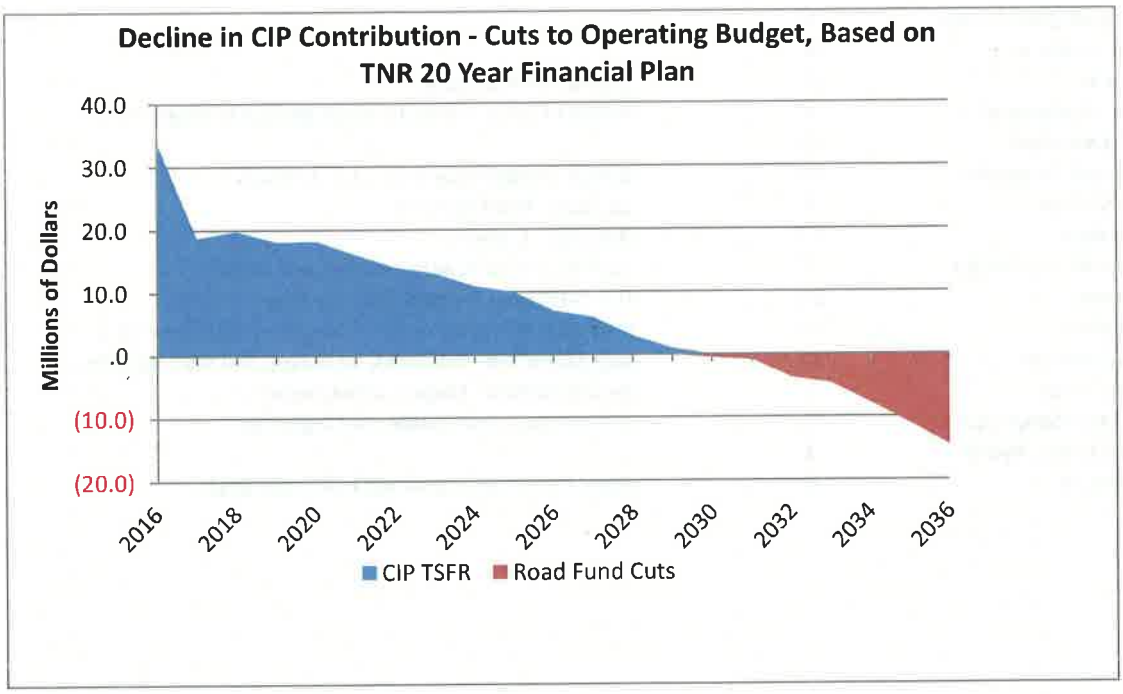
Funded Capital Costs	**2016 - 2035**
Overlay	140,000,000
Safety	59,501,000
Facilities	20,000,000
Total Capital Costs	219,501,000
Calculation of Shortfall for TNR projects	
Forecasted Revenue	289,349,991
Less: Capital Costs	(219,501,000)
Funds Available	69,848,991
Shortfall to fund 2016 TNR	(981,851,009)

Total revenue needs are $1.05 billion, expressed in constant 2016 dollars and totaled through the year 2035. The TNR shortfall is calculated by subtracting the projected costs from projected revenues for the 20 year TNR period, 2016-2035.

The total project costs that can be funded in this period are approximately $70 million of the identified 2016 TNR however, when considering cash flow and the cost of Road Services' operating budget, projections show that there are insufficient revenues to fund capital projects after 2030. This is illustrated in the graph below.

Allocation of Funds Available	
Asset Category	**2016 - 2035 Allocation**
Bridge	31,043,998
Capacity	0
Drainage	36,217,998
Guardrail	2,587,000
HAL / HARS	0
Intersection Priority Array	0
ITS	0
Non Motorized	0
Reconstruction	0
VRS Hotspot	0
Total Needs	69,848,991

The allocation of available funding for the 20 year period was made to asset categories that align with Road Services' strategic priorities of safety, regulatory compliance and preservation. In addition, completion of Roads' drainage inventory assessment will most likely increase costs and allocations for that asset category. Existing funding for the Roads Capital Improvement Project (CIP) list from the County Road Fund declines steadily and reaches zero in 2030.



NEEDS LIST for the Transportation Needs Report 2016

Needs are divided into twenty-three Map Areas. The Map Area Number is for use with the map atlas.
The Needs List is sorted alphabetically in the following order:

	Map Area	Map Area Number
1	Carnation	14
2	Covington/Black Diamond	10
3	Cumberland	18
4	Duvall	13
5	East Enumclaw	19
6	East Federal Way	5
7	East North Bend	22
8	East Renton/Lake Youngs	9
9	Kent/Des Moines	4
10	Mount Si	21
11	Newcastle/Issaquah	8
12	North Enumclaw	11
13	North Fork Snoqualmie	20
14	North Vashon	1
15	Ravensdale	17
16	Redmond/Sammamish	7
17	Skykomish	23
18	Snoqualmie	15
19	South Enumclaw	12
20	South Vashon	2
21	Tiger Mountain/Hobart	16
22	White Center/Skyway	3
23	Woodinville	6

Legend for Needs List:
Product Family - From the Road Services Strategic Plan

Bridge - Bridge replacements and repairs
Capacity - Road widening
Drainage - Culverts
Guardrail - Guardrail installation and repair
ITS - Intelligent Transporation Systems
Intersection Priority Array - Intersection improvements
Non Motorized - Sidewalks, walkways, and road shoulders
Reconstruction - Major roadway repairs
VRS Hotspot - Vulnerable road segments

Note: Project costs updated in January 2016

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Carnation (14)					
Corridor: NE Ames Lake Rd					
OP-RD-4	NE Ames Lake Rd: Union Hill Rd to State Route 202	Realign and widen lanes	Traffic Control Devices	Intersection Priority Array	$ 9,990,000
Corridor: NE Tolt Hill Rd					
OP-RD-37	NE Tolt Hill Rd: From Tolt Hill Bridge to 500 feet west of State Route 203	Reconstruct roadway	Roadway	Reconstruction	$ 1,780,000
RC-32	Tolt Hill Rd: From Tolt Hill Bridge to State Route 203	Armor shoulders to reduce washouts during floods	Roadside	VRS Hotspot	$ 104,000
Corridor: NE Union Hill Rd					
ITS-11	NE Union Hill Rd: From 238th Ave NE to NE Ames Lake Rd	Cameras, speed warning system, vehicle detection	Traffic Control Devices	ITS	$ 200,000
Corridor: West Snoqualmie Val Rd NE					
RC-15-1	West Snoqualmie Valley Rd NE: From NE 80th St to Ames Lake Carnation Rd NE	Reconstruct roadway	Roadway	Reconstruction	$ 10,100,000
Corridor: Misc.					
BR-2133A	Sikes Lake Trestle: 284th Ave NE at Sikes Lake, about 0.5 mile east of State Route 202	Replace bridge	Bridges and Structures	Bridge	$ 9,610,000
BR-257Z	Horseshoe Lake Creek Bridge: 310th Ave NE at Horseshoe Lake Creek	Replace bridge	Bridges and Structures	Bridge	$ 2,190,000
BR-916A	West Snoqualmie River Road Bridge: West Snoqualmie River Road over a slough to the Snoqualmie River	Replace bridge	Bridges and Structures	Bridge	$ 1,580,000
GR-11S	East Ames Lake Dr NE: From W Ames Lake Dr NE to W Ames Lake Dr NE	Construct guardrail	Roadside	Guardrail	$ 23,600
GR-15-10	NE Tolt River Rd: From Carnation city limits to NE 80th St	Construct guardrail	Roadside	Guardrail	$ 1,440,000
GR-15-18	SE 24th St / Lake Langlois Rd: From State Route 203 to end of road	Construct guardrail	Roadside	Guardrail	$ 1,710,000
GR-15-30	310th Ave NE / NE 60th St: From NE Carnation Farm Rd to State Route 203	Construct guardrail	Roadside	Guardrail	$ 650,000
GR-15-37	NE 100th St: From W Snoqualmie Valley Rd NE to 284th Ave NE	Construct guardrail	Roadside	Guardrail	$ 792,000
GR-80	West Snoqualmie River Rd SE: From SE 24th St to NE Tolt Hill Rd	Construct guardrail	Roadside	Guardrail	$ 102,000
ITS-25	W Snoqualmie River Rd SE: From SE 24th St to NE Tolt Hill Rd and State Route 203	Cameras, vehicle detection, pavement sensors	Traffic Control Devices	ITS	$ 521,000
RC-18	West Snoqualmie River Rd NE: From NE Tolt Hill Rd to SE 24th St	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 385,000
RC-34	284th Ave NE: From NE 100 St to NE Carnation Farm Rd	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 216,000
RC-36	NE 80th St: From West Snoqualmie Valley Rd NE to Ames Lake-Carnation Rd	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 1,580,000
RC-38	NE 100th St: From West Snoqualmie Valley Rd to 284th Ave NE	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 706,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Covington/Black Diamond (10)					
Corridor: Kent Black Diamond Rd SE					
BR-30860X	Berrydale OX Bridge: Kent Black Diamond Rd SE over the railroad, at SE 292nd St (Jenkins Creek)	Replace bridge	Bridges and Structures	Bridge	$ 10,100,000
DR-15-17	Kent Black Diamond Rd SE & SE 292nd St at Jenkins Creek	Replace undersized culvert	Drainage	Drainage	$ 1,160,000
Corridor: SE 216th St					
NM-5049	SE 216th St: From SE 276th Ave SE to Maxwell Rd SE	Provide nonmotorized facility	Roadside	Non Motorized	$ 1,310,000
OP-INT-95	SE 216th Way & Dorre Don Way	Construct turn lanes	Traffic Control Devices	Intersection Priority Array	$ 376,000
Corridor: SE 216th Way					
RC-129	SE 216th Way: From State Route 169 to 244th Ave SE	Reconstruct roadway 1.13 miles	Roadway	Reconstruction	$ 2,270,000
Corridor: SE 240th St					
DR-10	SE 240th St & 172nd Ave SE at Little Soos Creek	Replace undersized culvert with a bridge structure	Drainage	Drainage	$ 1,720,000
NM-4041	SE 240th St: From 156th Ave SE to 172nd Ave SE	Widen walkway	Roadside	Non Motorized	$ 29,300
NM-5068	SE 240th St: From 148th Ave SE to 164th Ave SE	Provide nonmotorized facility	Roadside	Non Motorized	$ 726,000
NM-5069	SE 240th St: From 164th Ave SE to 180th Ave SE	Provide nonmotorized facility	Roadside	Non Motorized	$ 726,000
Corridor: SE Covington-Sawyer Rd					
OP-RD-41	SE Covington-Sawyer Rd: From Thomas Rd to 216th Ave SE	Realign roadway	Traffic Control Devices	Intersection Priority Array	$ 9,990,000
RC-6	SE Covington-Sawyer Rd: From Covington city limits to 216th Ave SE	Road rehabilitation (pavement treatment)	Roadway	Reconstruction	$ 1,750,000
Corridor: SE Petrovitsky Rd					
IPA-26	SE Petrovitsky Rd & Sweeney Rd SE	Construct traffic signal with turn lanes	Traffic Control Devices	Intersection Priority Array	$ 900,000
SW-13	SE Petrovitsky Rd & Sweeney Rd SE	Construct roundabout or north and east turn lanes	Traffic Control Devices	Intersection Priority Array	$ 1,690,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Corridor: Misc.					
DR-9	164th Ave SE & SE 225th St	Replace failing culvert	Drainage	Drainage	$ 1,110,000
GR-15-38	184th Ave SE / Peter Grubb Rd: From SE Lake Youngs Rd to SE 224th St	Construct guardrail	Roadside	Guardrail	$ 757,000
GR-88	156th Ave SE: From SE 240th St to SE 251st St/Covington city limits	Construct guardrail	Roadside	Guardrail	$ 385,000
IPA-33	164th Pl SE & SE Covington-Sawyer Rd	Construct turn lane and traffic signal	Traffic Control Devices	Intersection Priority Array	$ 1,650,000
NM-0202	195th Ave SE: From E Lake Morton Dr SE to SE 320th St	Construct asphalt shoulder (west side)	Roadside	Non Motorized	$ 96,800
NM-4033	164th Ave SE: From SE 224th St to SE 240th St	Widen pathway and improve lighting	Roadside	Non Motorized	$ 104,000
NM-5034	168th Ave SE: From Kent-Black Diamond Rd SE to SE Auburn Black Diamond Rd	Provide nonmotorized facility	Roadside	Non Motorized	$ 873,000
NM-5050	Sweeney Rd SE/SE Petrovitsky: From 196th Ave SE to SE 232nd St	Provide nonmotorized facility	Roadside	Non Motorized	$ 1,210,000
NM-9980	168th Way SE & Covington Creek	Widen bridge and construct sidewalk (east side)	Roadside	Non Motorized	$ 66,400
SW-56	164th Ave SE & SE 240th St	Construct roundabout	Traffic Control Devices	Intersection Priority Array	$ 1,460,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Cumberland (18)					
Corridor: SE 400th Way					
NM-5010	SE 400th Way: From SE 400th St to SE 392nd St	Reconstruct roadway 2.18 miles	Roadway	Reconstruction	$ 2,010,000
Corridor: SE Green River Headworks Rd					
OP-INT-72	Cumberland Kanaskat Rd SE & SE Greenriver Headworks Rd	Reconstruct intersection with signal improvements	Traffic Control Devices	Intersection Priority Array	$ 90,600
Corridor: Veazie-Cumberland Rd SE					
DR-15-11	284th Ave SE/Veazie-Cumberland Rd SE & North Fork Newaukum Creek	Replace failing culvert	Drainage	Drainage	$ 822,000
NM-5007	Veazie-Cumberland Rd SE: From SE 384th St to SE 416th St	Provide nonmotorized facility	Roadside	Non Motorized	$ 1,490,000
Corridor: Misc.					
BR-3035A	Coal Creek Bridge: SE Lake Walker Rd at Coal Creek 1.5 mile southeast of Veazie-Cumberlund Rd SE	Replace bridge	Bridges and Structures	Bridge	$ 3,230,000
GR-15-32	292nd Ave SE/SE 416th St: From SE 392nd St to 284th Ave SE	Construct guardrail	Roadside	Guardrail	$ 1,080,000
GR-15-33	278th Way SE: From SE 392nd St to SE 416th St	Construct guardrail	Roadside	Guardrail	$ 857,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Duvall (13)					
Corridor: Misc.					
BR-5032	Stossel Creek Bridge: Stossel Creek Rd NE at Stossel Creek, about 6.2 miles northeast of Kelly Rd NE	Replace bridge	Bridges and Structures	Bridge	$ 2,560,000
BR-5034A	Lake Joy Bridge: NE Lake Joy Dr & 346th Pl NE	Replace bridge	Bridges and Structures	Bridge	$ 2,000,000
DR-15-12	NE Lake Joy Rd & Cherry Creek. North of NE Moss Lake Rd	Replace undersized culvert	Drainage	Drainage	$ 1,690,000
DR-4	NE 106th St & 314th Ave NE	Replace failing culvert	Drainage	Drainage	$ 563,000
DR-5	NE 195th St & Margaret Creek. West of 327th Ave NE	Replace failing culvert	Drainage	Drainage	$ 563,000
GR-15-23	NE Lake Joy Rd: From Kelly Rd NE to W Lake Joy Dr NE	Construct guardrail	Roadside	Guardrail	$ 982,000
GR-15-24	Mountain View Rd NE / 318th Ave NE: From NE Cherry Valley Rd to end of road	Construct guardrail	Roadside	Guardrail	$ 645,000
GR-94	NE 124th St: From State Route 203 to end of road (286th Ave NE)	Construct guardrail	Roadside	Guardrail	$ 725,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: East Enumclaw (19)					
Corridor: Misc.					
DR-3	SE 440th St at the 27000 block	Replace failing culvert	Drainage	Drainage	$ 563,000
GR-103	SE 432nd St: From Enumclaw city limits to 284th Ave SE	Construct guardrail	Roadside	Guardrail	$ 339,000
GR-15-15	286th Ave SE/288th Ave SE: From SE 464th St to SE 480th St	Construct guardrail	Roadside	Guardrail	$ 537,000
GR-86	284th Ave SE: From SE Mud Mountain Rd to SE 451st St	Construct guardrail	Roadside	Guardrail	$ 537,000
NM-5008	SE 432nd St: From 284th Ave SE to Enumclaw city limits	Provide nonmotorized facility	Roadside	Non Motorized	$ 969,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: East Federal Way (5)					
Corridor: 28th Ave					
NM-4066	28th Ave S: From S 349 St to S 360th St	Construct walkway	Roadside	Non Motorized	$ 323,000
Corridor: 51st Ave S					
SW-21	51st Ave S & S 316th St	Construct roundabout or left-turn lanes	Traffic Control Devices	Intersection Priority Array	$ 1,690,000
Corridor: Military Rd S					
IPA-25	Miltary Rd S & S 360th St	Construct roundabout or signal with turn lanes	Traffic Control Devices	Intersection Priority Array	$ 1,690,000
NM-5014	Military Rd S: From Peasley Canyon Way S to State Route 161	Provide nonmotorized facility	Roadside	Non Motorized	$ 9,670,000
Corridor: Peasley Canyon Rd S					
ITS-8	S Peasley Canyon Rd: From Military Rd S to Peasley Canyon Way S	Upgrade signal equipment and coordinate timing	Traffic Control Devices	ITS	$ 2,570,000
Corridor: Peasley Canyon Way					
RC-42	Peasley Canyon Way S: From S Peasely Canyon Rd to Military Rd S	Construct retaining wall to prevent slides	Bridges and Structures	VRS Hotspot	$ 664,000
Corridor: S 321st St					
OP-INT-100	S 321st St: From S Peasley Canyon Rd to 46th Pl S	Reconstruct 321st St approach; expand turn lanes	Traffic Control Devices	Intersection Priority Array	$ 2,250,000
SW-73	46th Pl S & S 321st St	Counstruct roundabout or signalalized intersection	Traffic Control Devices	Intersection Priority Array	$ 2,480,000
Corridor: S 360th St					
OP-RD-48	S 360th St: From State Route 161 to 28th Ave S	Construct a two-way left turn lane	Traffic Control Devices	Intersection Priority Array	$ 4,750,000
Corridor: SE Auburn Black Diamond Rd					
RC-138	SE Auburn Black Diamond Rd: From SE Green Valley Rd to SE Lake Holm Dr	Reconstruct roadway 0.23 miles	Roadway	Reconstruction	$ 367,000
RC-139	SE Auburn Black Diamond Rd: From SE Lake Holm Rd to 148th Way SE	Reconstruct roadway 2.18 miles	Roadway	Reconstruction	$ 4,850,000
Corridor: SE Lake Holm Rd					
RC-140	SE Lake Holm Rd: From SE Auburn Black Diamond Rd to 147th Ave SE	Reconstruct roadway 1.64 miles	Roadway	Reconstruction	$ 2,530,000
Corridor: Misc.					
BR-3015	Patton Bridge: SE Green Valley Rd at Green River, about 1.5 miles southeast of Highway 18	Replace bridge	Bridges and Structures	Bridge	$ 25,100,000
NM-4067	32nd Ave S: From S 360th St to S 368th St	Construct walkway	Roadside	Non Motorized	$ 323,000
RC-137	SE Auburn Black Diamond Rd: From Highway 18 to SE Green Valley Rd	Reconstruct roadway 0.18 miles	Roadway	Reconstruction	$ 330,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: East North Bend (22)					
Corridor: Misc.					
GR-15-3	437th Ave SE: From Cedar Falls Way SE to SE 150th St	Construct guardrail	Roadside	Guardrail	$ 99,700
GR-78	SE Middle Fork Rd: From North Bend city limits to 496th Ave SE	Construct guardrail	Roadside	Guardrail	$ 15,800
OP-RD-39	SE Mount SI Rd: From 452 AVE SE to 800' E	Realign roadway	Traffic Control Devices	Intersection Priority Array	$ 502,000
OP-RD-54	SE Middle Fork Rd: From 496th Ave SE to 476th Ave SE	Reconstruct roadway	Roadway	Reconstruction	$ 4,760,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: East Renton/Lake Youngs (9)					
Corridor: 140th Ave SE					
ITS-23	SE 204th Way / 140th Ave SE: From 137th Ave SE to SE 192nd St	Cameras, vehicle detection, synchronize signals	Traffic Control Devices	ITS	$ 4,400,000
SW-81	SE 140th Ave SE & SE 200th St	Construct left-turn lanes	Traffic Control Devices	Intersection Priority Array	$ 1,690,000
Corridor: 154th Pl SE					
ITS-19	154th Pl SE / SE 142nd Pl: From State Route 169 to 156th Ave SE	Cameras, pavement sensors, speed warning system	Traffic Control Devices	ITS	$ 237,000
OP-RD-25	154 PL SE / SE 142 PL: From SE Jones Rd to 156th Ave SE (Renton city limits)	Construct congestion relief measures	Roadway	Capacity-Major	$ 5,270,000
Corridor: 164th Ave SE					
ITS-34	164th Ave SE: From SE 128th St to SE May Valley Rd	Cameras, vehicle detection, communications system	Traffic Control Devices	ITS	$ 1,840,000
Corridor: 196th Ave SE					
RC-50	196th Ave SE: From SE 162nd St to SE 170th St	Construct a retaining wall to prevent slides	Bridges and Structures	VRS Hotspot	$ 1,120,000
Corridor: Cedar Grove Rd SE					
BR-83D	Issaquah Creek Bridge: Cedar Grove Rd SE at Issaquah Creek, about 0.5 mile north of SE 156th	Replace bridge	Bridges and Structures	Bridge	$ 3,040,000
Corridor: Issaquah Hobart Rd SE					
BR-1384A	Fifteen Mile Creek Bridge: Issaquah Hobart Rd SE at Fifteenmile Creek, south of SE May Valley Rd	Replace bridge	Bridges and Structures	Bridge	$ 8,230,000
CP-15-2	Issaquah Hobart Rd SE: From Issaquah city limits to Cedar Grove Rd SE	Construct congestion relief measures	Roadway	Capacity-Major	$ 29,600,000
ITS-15	Issaquah Hobart Rd SE: From Cedar Grove Rd SE to Highway 18	Cameras, message signs, weather stations	Traffic Control Devices	ITS	$ 851,000
OP-INT-124	Issaquah-Hobart Rd SE & SE May Valley Rd	Construct roundabout	Traffic Control Devices	Intersection Priority Array	$ 2,580,000
RC-118	Issaquah Hobart Rd SE: From S Issaquah city limits to SE May Valley Rd	Reconstruct roadway 1.86 miles	Roadway	Reconstruction	$ 1,030,000
RC-119	Issaquah Hobart Rd SE: From SE May Valley Rd to Cedar Grove Rd SE	Reconstruct roadway 0.98 mile	Roadway	Reconstruction	$ 2,750,000
RC-120	Issaquah Hobart Rd SE: From SE 156th St to Cedar Grove Rd SE	Reconstruct roadway 1.2 miles	Roadway	Reconstruction	$ 2,360,000
RC-121	Issaquah Hobart Rd SE: From SE 156th St to Highway 18	Reconstruct roadway 2.27	Roadway	Reconstruction	$ 4,050,000
Corridor: SE 128th St					
GR-15-5	SE 128th St: From Renton city limits (158th Ave SE) to 175th Ave SE	Construct guardrail	Roadside	Guardrail	$ 597,000
ITS-28	SE 128th St: From 158th Ave SE to SE May Valley Road	Cameras, vehicle detection, synchronize signals	Traffic Control Devices	ITS	$ 5,280,000
OP-RD-21	SE 128th St: From Patriot Way SE to 168th Ave SE	Improve sight distance and construct turn lanes	Traffic Control Devices	Intersection Priority Array	$ 1,480,000
Corridor: SE 204th Way					
BR-3109B	Lake Youngs Way Bridge: SE Lake Youngs Way at Big Soos Creek, 0.3 miles northeast of SE 208th St	Replace bridge	Bridges and Structures	Bridge	$ 2,000,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Corridor: SE May Valley Rd					
BR-493C	Fifteen Mile Creek Bridge: SE May Valley Rd at Fifteenmile Creek, west of Issaquah Hobart Rd SE	Replace bridge	Bridges and Structures	Bridge	$ 4,170,000
ITS-29	SE May Valley Rd: From State Route 900 to Issaquah Hobart Rd SE	Cameras, vehicle detection, road weather sensors	Traffic Control Devices	ITS	$ 346,000
OP-RD-22	SE May Valley Rd: From SE 128th Way to Issaquah Hobart Rd SE	Widen travel lanes	Traffic Control Devices	Intersection Priority Array	$ 9,320,000
OP-RD-26	SE May Valley RD: From State Route 900 to SE 128th Way	Improve sight distance	Traffic Control Devices	Intersection Priority Array	$ 7,800,000
Corridor: SE Petrovitsky Rd					
CP-15	140th Ave SE & SE Petrovitsky Rd	Construct congestion relief measures	Roadway	Capacity-Major	$ 17,400,000
CP-15-4	SE Petrovitsky Rd: From 151st Ave SE to SE 184th St	Construct congestion relief measures	Roadway	Capacity-Major	$ 10,300,000
IPA-1	SE Petrovitsky Rd: From 140th Ave SE to 143rd Ave SE	Street lighting for existing turn lanes and tapers	Traffic Control Devices	Intersection Priority Array	$ 412,000
ITS-24	SE Petrovitsky Rd: From 151st Ave SE to Highway 18	Cameras, vehicle detection, weather station	Traffic Control Devices	ITS	$ 10,200,000
OP-INT-106	SE Petrovitsky Rd & SE 192nd St	Construct southeast bound left turn lane	Traffic Control Devices	Intersection Priority Array	$ 886,000
RC-3	SE Petrovitsky Rd: From 134th Ave SE to 143rd Ave SE	Road reconstruction	Roadway	Reconstruction	$ 3,690,000
Corridor: Misc.					
BR-1741A	Issaquah Creek Bridge: 252nd Ave SE at Issaquah Creek, south of Issaquah Hobart Rd SE	Replace bridge	Bridges and Structures	Bridge	$ 8,030,000
BR-3109A	Soos Creek Bridge: SE 216th St at Big Soos Creek, about 0.3 mile east of 132nd Ave SE	Replace bridge	Bridges and Structures	Bridge	$ 2,380,000
BR-3202	Maxwell Road Bridge: 225th Ave SE/Maxwell Rd SE cattle crossing	Replace bridge	Bridges and Structures	Bridge	$ 1,470,000
BR-83B	Issaquah Creek Bridge: SE 156th St at Issaquah Creek, east of Cedar Grove Rd SE	Replace bridge	Bridges and Structures	Bridge	$ 2,250,000
DR-15-3	229th Dr SE & McDonald Creek, north of SE 139th Ct	Construct scour mitigation measures	Drainage	Drainage	$ 255,000
GR-15-14	SE 208th St: From 244th Ave SE to 276th Ave SE	Construct guardrail	Roadside	Guardrail	$ 1,110,000
GR-15-19	236th Ave SE / 235th Ave SE: From SE 196th St to SE Norvydan Rd	Construct guardrail	Roadside	Guardrail	$ 586,000
GR-15-35	SE 156th St: From SE Cedar Grove Rd to Issaquah Hobart Rd SE	Construct guardrail	Roadside	Guardrail	$ 375,000
GR-15-36	SE Mirrormont Dr: From Issaquah Hobart Rd SE to Tiger Mountain Rd SE	Replace jersey barrier with guardrail	Roadside	Guardrail	$ 1,110,000
GR-15-8	SE 127th St: From SE May Valley Rd to 206th Pl SE	Construct guardrail	Roadside	Guardrail	$ 425,000
NM-5038	SE 208th St: From 148th Ave SE to Kent city limits	Provide nonmotorized facility	Roadside	Non Motorized	$ 362,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Kent/Des Moines (4)					
Corridor: 148th Ave SE					
BR-3108	Soos Creek Bridge: 148th Ave SE at Soos Creek, about 0.2 mile north of SE 240th	Replace bridge	Bridges and Structures	Bridge	$ 2,450,000
SW-20	148th Ave SE & SE 224th St	Construct roundabout and modify approach grades	Traffic Control Devices	Intersection Priority Array	$ 2,810,000
Corridor: Military Rd S					
CP-5	Military Rd S: From S 272nd St to S Star Lake Rd	Construct congestion relief measures	Roadway	Capacity-Major	$ 7,040,000
Corridor: S 272nd St					
OP-INT-120	40th Ave S & S 272nd St	Add turn lanes on 272nd, rebuild traffic signal	Traffic Control Devices	Intersection Priority Array	$ 2,810,000
Corridor: S 277th St					
BR-3126	S 277th St Bridge: Mullen Slough, west of State Route 167	Replace bridge	Bridges and Structures	Bridge	$ 2,470,000
CP-15-6	S 277th St & 55th Ave S / S Star Lake Rd	Construct congestion relief measures	Traffic Control Devices	Capacity-Major	$ 3,680,000
DR-2	S 277th St & 55th Ave S	Drainage improvement to reduce property flooding	Drainage	Drainage	$ 563,000
Corridor: S 288th St					
IPA-3	S 288th St: From Federal Way city limits (I-5) to Auburn city limits (51st Ave S)	Restripe road from 4 to 3 lanes, modify the signal	Traffic Control Devices	Intersection Priority Array	$ 955,000
Corridor: West Valley Hwy N					
DR-15-10	West Valley Hwy N, 1300 Ft S of S 277th	Install box culvert by trenching	Drainage	Drainage	$ 694,000
Corridor: Misc.					
BR-3109	Soos Creek Bridge: SE 224th St at Soos Creek, about 0.3 mile east of 132nd Ave SE	Replace bridge	Bridges and Structures	Bridge	$ 2,000,000
DR-15-9	Green River Rd S & 94th Pl S	Replace failing culvert	Drainage	Drainage	$ 1,230,000
GR-15-29	S 282nd St: From 46th Ave SE to 48th Ave SE	Construct guardrail	Roadside	Guardrail	$ 67,200
GR-15-39	94th Pl S: From Kent city limits to Green River Rd	Construct guardrail	Roadside	Guardrail	$ 527,000
NM-4042	38th Ave S: From S 304th St to S 308th St	Pave shoulders (east side)	Roadside	Non Motorized	$ 104,000
NM-5015	Green River Rd: From Kent city limits (S 259th St) to Kent city limits (S 277th St)	Provide nonmotorized facility	Roadside	Non Motorized	$ 10,600,000
NM-9970	34th Ave S: From S 288th St to S 298th St	Construct sidewalk (west side)	Roadside	Non Motorized	$ 607,000
NM-9971	36th Pl S/ S 294 St/ 45 Pl S: From S 298th St to S 288th St	Construct sidewalk (west side)	Roadside	Non Motorized	$ 927,000
RC-24	S 304th St: From 32nd Ave S to 37th Ave S	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 241,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Mount Si (21)					
Corridor: Misc.					
BR-122N	Tate Creek Bridge: SE 73rd St at Tate Creek, west of 440th Ave SE	Replace bridge	Bridges and Structures	Bridge	$ 6,020,000
RC-8	N Fork Rd SE: From 428th Ave SE to Lake Hancock Rd	Road reconstruction and drainage infrastructure	Roadside	Reconstruction	$ 185,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Newcastle/Issaquah (8)					
Corridor: Misc.					
GR-15-34	169th Ave SE/SE Licorice Way: From SE 112th St to end of road (173rd Ave SE)	Construct guardrail	Roadside	Guardrail	$ 938,000
OP-RD-24	SE May Valley Rd: From Renton city limits (148th Ave SE) to State Route 900	Widen travel lanes	Traffic Control Devices	Intersection Priority Array	$ 19,900,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: North Enumclaw (11)					
Corridor: 244th Ave SE					
NM-5012	244th Ave SE: From Enumclaw city limits (SE 436th) to SE 400th St	Provide nonmotorized facility	Roadside	Non Motorized	$ 10,600,000
Corridor: SE Auburn Black Diamond Rd					
DR-15-16	SE Auburn Black Diamond Rd at Krisp Creek	Replace undersized culvert	Drainage	Drainage	$ 1,130,000
IPA-12	SE Auburn Black Diamond Rd & 190th Ave SE	Realign intersection	Traffic Control Devices	Intersection Priority Array	$ 773,000
ITS-27	SE Auburn Black Diamond Rd: From Kent Black Diamond Rd SE to SE Lake Holm Rd	Vehicle detection/flasher system, slide detection	Traffic Control Devices	ITS	$ 174,000
Corridor: SE Lake Holm Rd					
OP-RD-44	SE Lake Holm Rd: From East Lake Holm Dr SE to 170th Pl SE	Construct congestion relief measures	Roadway	Capacity-Major	$ 1,050,000
Corridor: Thomas Rd SE					
OP-INT-97	Thomas Rd SE & Kent Black Diamond Rd SE	Realign intersection	Traffic Control Devices	Intersection Priority Array	$ 912,000
Corridor: Misc.					
BR-3020	Green Valley Rd Bridge: SE Green Valley Rd, about 5.5 miles east of Highway 18	Replace bridge	Bridges and Structures	Bridge	$ 2,820,000
BR-3022	Green Valley Rd Bridge: SE Green Valley Rd, about 6.7 miles east of Highway 18	Replace bridge	Bridges and Structures	Bridge	$ 2,820,000
BR-3030	SE 380th St Bridge: SE 380th St & SE 383rd Way, about 1 mile west of State Route 169	Replace bridge	Bridges and Structures	Bridge	$ 2,000,000
GR-15-28	SE 384th St/ SE 383rd St/ SE 380th St: From 244th Ave SE to State Route 169	Construct guardrail	Roadside	Guardrail	$ 957,000
RC-142	SE Green Valley Rd: From 243rd Ave SE to State Route 169	Reconstruct roadway 1.3 miles	Roadway	Reconstruction	$ 2,210,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: North Fork Snoqualmie (20)					
Corridor: Misc.					
BR-364A	Deep Creek Bridge: North Fork Rd SE, about 13.7 miles north of North Bend	Replace bridge	Bridges and Structures	Bridge	$ 3,590,000
RC-19	North Fork Rd SE & N Fork Snoqualmie River	Construct retaining wall to prevent slides	Bridges and Structures	VRS Hotspot	$ 104,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: North Vashon (1)					
Corridor: SW Cove Rd					
RC-58	Crescent Dr SW: From Westside Highway SW to SW Cove Road	Reconstruct roadway	Roadway	VRS Hotspot	$ 692,000
Corridor: Vashon Hwy SW					
SW-96	Vashon Highway SW & SW Cemetery Rd	Construct roundabout	Traffic Control Devices	Intersection Priority Array	$ 1,690,000
Corridor: Westside Hwy SW					
RC-56	Westside Highway SW: From Crescent Dr SW to McIntyre Rd SW	Reconstruct roadway	Roadway	VRS Hotspot	$ 553,000
Corridor: Misc.					
DR-8	SW 171st St & 93rd Ave SW (Gorsuch Creek)	Replace failing culvert	Drainage	Drainage	$ 957,000
NM-0106	SW Bank Rd: From 97 Pl SW to Beall Rd SW	Construct asphalt shoulder (south side)	Roadside	Non Motorized	$ 705,000
NM-0203	Vashon Hwy SW: From SW 177th St to 98th Pl SW	Construct sidewalk (east and south sides)	Roadside	Non Motorized	$ 96,800
NM-15-9	SE Cemetery Rd/ Beall Rd SW: From 107th Ave SW to SW 184th St	Construct asphalt pathway	Roadside	Non Motorized	$ 954,000
NM-5054	SW Bank Rd: From 107th Ave SW to Vashon Hwy SW	Provide nonmotorized facility	Roadside	Non Motorized	$ 726,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Ravensdale (17)					
Corridor: 276th Ave SE					
RC-127	276th Ave SE: From SE 216th St to SE Summit Landsburg Rd	Reconstruct roadway 2.59 miles	Roadway	Reconstruction	$ 5,150,000
Corridor: Landsburg Rd SE					
RC-128	Landsburg Rd SE: From SE Summit Landsburg Rd to SE Kent Kangley Rd	Reconstruct roadway 1.27 miles	Roadway	Reconstruction	$ 2,250,000
Corridor: Retreat Kanaskat Rd					
OP-INT-92	SE Kent-Kangley Rd & Retreat Kanaskat Rd	Realign intersection and install turn lanes	Traffic Control Devices	Intersection Priority Array	$ 1,440,000
RC-136	Retreat Kanaskat Rd: From SE Kent Kangley Rd to Cumberland Kanasket Rd SE	Reconstruct roadway 3.04 miles	Roadway	Reconstruction	$ 4,950,000
Corridor: SE 216th St					
RC-130	SE 216th St: From 244th Ave SE to 276th Ave SE	Reconstruct roadway 2.0 miles	Roadway	Reconstruction	$ 3,110,000
Corridor: SE Kent-Kangley Rd					
IPA-22	SE Kent-Kangley Rd & Landsburg Rd SE	Roundabout or traffic signalization w turn lanes	Traffic Control Devices	Intersection Priority Array	$ 900,000
RC-132	SE Kent-Kangley Rd: From Kent city limits to Landsburg Rd SE	Reconstruct roadway 1.14 miles	Roadway	Reconstruction	$ 2,730,000
RC-133	SE Kent Kangley Rd: From Landsburg Rd SE to Retreat Kanaskat Rd	Reconstruct roadway 1.18 miles	Roadway	Reconstruction	$ 2,750,000
Corridor: SE Ravensdale Way					
NM-5051	Black Diamond-Ravensdale Rd SE: From State Route 169 to SE Kent-Kangley Rd	Provide nonmotorized facility	Roadside	Non Motorized	$ 2,620,000
RC-135	SE Ravensdale Way: From SE Kent-Kangley Rd to 268th Ave SE	Reconstruct roadway 0.6 miles	Roadway	Reconstruction	$ 930,000
Corridor: Misc.					
GR-11	SE 309th St: From Cumberland-Kanasket Rd SE to SE 310th St	Construct guardrail	Roadside	Guardrail	$ 134,000
GR-15-25	SE 224th St: From 244th Ave SE to 276th Ave SE	Construct guardrail	Roadside	Guardrail	$ 1,050,000
GR-95	SE Courtney Rd: From Kanasket-Kangley Rd to end of route	Construct guardrail	Roadside	Guardrail	$ 15,800
RC-15-3	SE Summit Landsburg Rd: From Kent city limits (244th Ave SE) to Landsburg Rd SE	Reconstruct roadway	Roadway	Reconstruction	$ 3,910,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Redmond/Snammish (7)					
Corridor: 208th Ave NE					
OP-INT-113	208th Ave NE & NE Union Hill Rd	Construct southbound right turn lane	Traffic Control Devices	Intersection Priority Array	$ 1,690,000
Corridor: 238th Ave					
SW-51	238th Ave NE & NE 63rd PL	Construct roundabout	Traffic Control Devices	Intersection Priority Array	$ 1,460,000
Corridor: NE Union Hill Rd					
CP-15-1	NE Union Hill Rd: From 196th Ave NE to 208th Ave NE	Construct congestion relief measures	Roadway	Capacity-Major	$ 11,300,000
DR-15-2	NE Union Hill Rd & 225th Ave NE	Replace failing culvert	Drainage	Drainage	$ 1,510,000
ITS-20	NE Union Hill Rd: From 196th Ave NE to 238rd Ave NE	Cameras, speed warning system, vehicle detection	Traffic Control Devices	ITS	$ 4,050,000
OP-RD-5	NE Union Hill Rd: From 208th Ave NE to 238th Ave NE	Construct congestion relief measures	Roadside	Capacity-Major	$ 7,070,000
RC-116	NE Union Hill Rd: From 238th Ave NE to 258th Ave NE	Reconstruct roadway 1.5 miles	Roadway	Reconstruction	$ 2,060,000
RC-44	NE Union Hill Rd: From 196th Ave NE to 206th Pl NE	Construct retaining wall to stabilize slope	Bridges and Structures	VRS Hotspot	$ 187,000
RC-51	NE Union Hill Rd: From 229th Pl NE to 238th Ave NE	Construct retaining wall to stabilize slope	Bridges and Structures	VRS Hotspot	$ 2,550,000
Corridor: Misc.					
BR-578A	Evans Creek Bridge: 196th Ave NE & State Route 202 at Evans Creek	Replace bridge	Bridges and Structures	Bridge	$ 1,580,000
DR-7	NE 40th St & 26th Ave NE (Dry Creek)	Replace failing culvert	Drainage	Drainage	$ 563,000
GR-15-27	NE 50th St: From 196th Ave NE to Sahalee Way NE	Construct guardrail	Roadside	Guardrail	$ 435,000
RC-35	NE 50th St: From 214th Ave NE to State Route 202	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 83,300

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Skykomish (23)					
Corridor: NE Old Cascade Highway					
RC-57	NE Old Cascade Highway at Miller River	Permanent road end closure improvements	Roadway	Reconstruction	<Null>
Corridor: Misc.					
BR-509A	Baring Bridge: Index Creek Rd over the South Fork Skykomish River, west of Highway 2	Replace bridge	Bridges and Structures	Bridge	$ 17,200,000
GR-15-12	NE Old Cascade Hwy: From State Route 2 to Skykomish city limits	Construct guardrail	Roadside	Guardrail	$ 407,000
RC-55	NE Money Creek Rd & Money Creek	Construct retaining wall to prevent slides	Bridges and Structures	VRS Hotspot	$ 831,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Snoqualmie (15)					
Corridor: Preston Fall City Rd SE					
DR-15-14	Preston Fall City Rd SE & SE 47th St	Replace undersized and failing culvert	Drainage	Drainage	$ 844,000
ITS-14	Preston Fall City Rd SE: From I-90 to State Route 202	Cameras, road sensors, weather station	Traffic Control Devices	ITS	$ 6,660,000
OP-INT-88	Preston Fall City Rd SE & SE 43rd St	Realign intersection	Traffic Control Devices	Intersection Priority Array	$ 783,000
RC-15-4	Preston Fall City Road: From the 7600 block to 7800 block	Reconstruct roadway	Roadway	Reconstruction	$ 3,440,000
Corridor: SE High Point Way					
IPA-27	SE 82nd St/ SE High Point Way & SE 82nd St	Construct a roundabout	Traffic Control Devices	Intersection Priority Array	$ 3,500,000
Corridor: Misc.					
BR-1086B	Coal Creek Bridge: 378th Ave SE at Coal Creek	Replace bridge	Bridges and Structures	Bridge	$ 1,470,000
BR-1239A	Upper Preston Bridge: Upper Preston Rd SE at Echo Lake Creek, north of SE 110th St	Replace bridge	Bridges and Structures	Bridge	$ 4,060,000
BR-249B	C.W. Neal Road Bridge: Neal Rd SE, about 1.5 mile south of State Route 203	Replace bridge	Bridges and Structures	Bridge	$ 1,470,000
BR-249C	C.W. Neal Road Bridge: Neal Rd SE, about 0.3 mile south of State Route 203	Replace bridge	Bridges and Structures	Bridge	$ 1,580,000
BR-61B	Fish Hatcher Bridge: SE Fish Hatchery Rd, about 0.8 mile southwest of State Route 202	Replace bridge	Bridges and Structures	Bridge	$ 1,580,000
BR-99L	Kimball Creek Bridge: SE 76th St at Kimball Creek, 0.5 mile west of State Route 202	Replace bridge	Bridges and Structures	Bridge	$ 2,940,000
DR-15-15	SE 55th St & W Lake Alice Rd SE	Replace culvert	Drainage	Drainage	$ 1,690,000
GR-121	Upper Preston Rd SE: From 312th Ave SE to under I-90 overpass	Construct guardrail	Roadside	Guardrail	$ 22,500
GR-15-11	SE 48th St: From 317th Pl SE to 328th Ave SE	Construct guardrail	Roadside	Guardrail	$ 382,000
GR-15-20	356th Dr SE/ 364th Way SE: From State Route 203 to end of road (SE 27th St)	Construct guardrail	Roadside	Guardrail	$ 1,050,000
GR-28	SE David Powell Rd: From Preston-Fall City Rd SE to end of route	Construct guardrail	Roadside	Guardrail	$ 222,000
GR-98	Fish Hatchery Rd/ 372nd Ave SE: From State Route 202 to State Route 202	Construct guardrail	Roadside	Guardrail	$ 1,150,000
RC-15-5	Upper Preston Rd: From SE 97th St to SE 97th St	Stabilize downhill side and improve drainage	Roadside	VRS Hotspot	$ 2,680,000
RC-17	SE 24th St: From 309th Ave SE to W Snoqualmie River Rd SE	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 385,000
RC-40	Neal Rd SE: From State Route 203 to State Route 203	Armor shoulders to reduce road washouts	Roadside	VRS Hotspot	$ 1,330,000
RC-7	Neal Rd SE: From State Route 203 to State Route 203	Reconstruct road at re-occurring sinkhole	Roadway	Reconstruction	$ 459,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: South Enumclaw (12)					
Corridor: 244th Ave SE					
BR-3068	Newaukum Creek Bridge: 244th Ave SE at Newaukum Creek, 0.2 mile north of SE 436th St	Replace bridge	Bridges and Structures	Bridge	$ 2,430,000
Corridor: Misc.					
BR-3055A	Boise X Connection Bridge: SE Mud Mountain Dam Rd at Boise Creek, south east of State Route 410	Replace bridge	Bridges and Structures	Bridge	$ 2,020,000
GR-104	196th Ave SE: From SE 400th St to SE 456th St	Construct guardrail	Roadside	Guardrail	$ 18,000
GR-15-31	SE 424th St: From 196th Ave SE to State Route 169	Construct guardrail	Roadside	Guardrail	$ 2,370,000
GR-92	228th Ave SE: From SE 400th St to SE 452nd St	Construct Guardrail	Roadside	Guardrail	$ 665,000
GR-96	SE 456th Way: From 196th Ave SE to 228th Ave SE	Construct guardrail	Roadside	Guardrail	$ 434,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: South Vashon (2)					
Corridor: Dockton Rd SW					
GR-15-40	Dockton Rd SW: From SW Ellisport Rd to SW 222nd St	Construct guardrail along seawall	Roadside	Guardrail	$ 528,000
RC-10	Dockton Rd SW: From SW Ellisport Road to Portage Way SW	Replace failing seawall	Bridges and Structures	VRS Hotspot	$ 37,700,000
Corridor: SW Quartermaster Dr					
GR-15-42	SW Quartermaster Dr: From Monument Rd SW to Dockton Rd SW	Construct guardrail along seawall	Roadside	Guardrail	$ 343,000
Corridor: Vashon Hwy SW					
GR-15-41	Vashon Hwy SW Seawall: From SW 240th Pl to 115th Ave SW	Construct guardrail along seawall	Roadside	Guardrail	$ 417,000
NM-9975	SW Tahlequah Rd near Tahlequah Ferry Dock	Construct asphalt shoulder (south side)	Roadside	Non Motorized	$ 222,000
RC-15	Vashon Hwy SW: From 115th Ave SW to SW 240th Pl	Replace seawall	Roadway	VRS Hotspot	$ 18,800,000
Corridor: Misc.					
DR-15-13	Chautauqua Beach Rd SW & Ellisport Creek	Replace undersized and failing culvert	Drainage	Drainage	$ 1,130,000
RC-54	SW Govenors Lane Ln: From 99th Ave SW to 96th Ave SW	Replace failing seawall	Bridges and Structures	VRS Hotspot	$ 3,360,000
RC-59	Kingsbury Rd SW: From SW 234th St to 80th Ave SW	Roadway reconstruction	Roadway	VRS Hotspot	$ 692,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Tiger Mountain/Hobart (16)					
Corridor: 276th Ave SE					
DR-15-18	276th Ave SE at Carey Creek	Replace failing and undersized culvert	Drainage	Drainage	$ 3,840,000
RC-125	276th Ave SE: From Highway 18 to SE 200th St	Reconstruct roadway 1.18 miles	Roadway	Reconstruction	$ 1,630,000
RC-126	276th Ave SE: From SE 200th St to SE 216th St	Reconstruct roadway 1.0 miles	Roadway	Reconstruction	$ 1,830,000
Corridor: Misc.					
BR-909B	Clough Creek Bridge: 415th Way SE & SE 141st St	Replace bridge	Bridges and Structures	Bridge	$ 1,580,000
GR-15-16	SE 131st St: From 409th Ave SE to 415th Way SE	Construct guardrail	Roadside	Guardrail	$ 77,700
GR-57	SE 208th St: From 276th Ave SE to end of route	Construct Guardrail	Roadside	Guardrail	$ 461,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: White Center/Skyway (3)					
Corridor: 68th Ave S					
RC-41	68th Ave S: From State Route 900 to Renton city limits	Construct retaining walls for slope stabilization	Bridges and Structures	VRS Hotspot	$ 2,620,000
Corridor: 80th Ave S					
NM-4012	80th Ave S: From S 114th St to S 118th St	Improve and widen shoulder (West Side)	Roadside	Non Motorized	$ 37,100
Corridor: Myers Way S					
ITS-26	1st Ave S, SW 100th St to SW 112th St	Cameras, vehicle detection, sync signals	Traffic Control Devices	ITS	$ 1,150,000
Corridor: Rainier Ave S					
ITS-33	Rainier Ave S: From Seattle city limits to Renton city limits	Cameras, vehicle detection, sync signals	Traffic Control Devices	ITS	$ 2,760,000
Corridor: Renton Ave S					
IPA-35	Renton Ave S: From 74th Ave S to 75th Ave S	Construct sidewalk along south side	Roadside	Non Motorized	$ 1,010,000
IPA-36	Renton Ave S: From 76th Ave S to 78th Ave S	Construct sidewalk along south side	Roadside	Non Motorized	$ 1,010,000
ITS-12	Renton Ave S: From Seattle city limits (S 112th St) to Renton city limits (S 130th St)	Cameras, vehicle detection, sync signals, fiber	Traffic Control Devices	ITS	$ 5,740,000
Corridor: S 132nd St					
GR-15-6	S 132nd St: From State Route 900 to S Langston Rd	Construct guardrail	Roadside	Guardrail	$ 509,000
NM-15-2	S 132nd St: From S Langston Rd to S 133rd St	Construct sidewalk	Roadside	Non Motorized	$ 690,540
NM-15-4	S 133rd St: From State Route 900 to S 132nd St	Complete sidewalk segments	Roadside	Non Motorized	$ 949,280
Corridor: SW 112th St					
NM-4077	SW 112th St: From 16th Ave SW to 10th Ave SW	Improve walkway	Roadside	Non Motorized	$ 258,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Corridor: Misc.					
DR-15-4	S 96th St: From 4th Ave S to 10th Ave S	Construct drainage improvements (slip line)	Drainage	Drainage	$ 1,440,000
DR-15-5	S 96th St: From 4th Ave S to 10th Ave S	Construct drainage improvements (slip line)	Drainage	Drainage	$ 1,910,000
DR-15-6	S 96th St: From 4th Ave S to 10th Ave S	Construct drainage improvements (slip line)	Drainage	Drainage	$ 2,920,000
DR-6	60th Ave S/S Langston Rd: From S 129th St to S 124th St	Replace undersized culvert	Drainage	Drainage	$ 563,000
GR-15-2	S 123rd St: From S 124th St to S 125th St	Construct guardrail	Roadside	Guardrail	$ 120,000
GR-15-7	21st Ave SW: From SW 100th St to SW 106th St	Construct guardrail	Roadside	Guardrail	$ 197,000
GR-15-9	W Marginal Pl S: From Tukwila city limits to S 95th St	Construct guardrail	Roadside	Guardrail	$ 529,000
IPA-37	S 114th St: From Cornell Ave S to 80th Ave S	Construct sidewalk	Roadside	Non Motorized	$ 1,350,000
IPA-38	S 126th St: From 76th Ave S to 78th Ave S	Construct sidewalk along south side	Roadside	Non Motorized	$ 563,000
NM-0004	76th Ave S: S 114th St to S 116th St	Construct asphalt walkway	Roadside	Non Motorized	$ 88,900
NM-0302	1st Ave SW: From SW 108th St to SW 112th St	Construct sidewalk (west side)	Roadside	Non Motorized	$ 96,800
NM-15-1	S Langston Rd: From 64th Ave S to S 132nd St	Construct sidewalk	Roadside	Non Motorized	$ 1,156,000
NM-15-10	14th Ave SW: SW 110th St to SW 114th St	Improve east sidewalk. Enclose ditches	Roadside	Non Motorized	$ 37,100
NM-15-3	S 120th St: From Beacon Ave S to 68th Ave S	Construct sidewalk	Roadside	Non Motorized	$ 1,632,000
NM-15-5	84th Ave S: From Rainier Ave S to S 124th St	Construct sidewalk	Roadside	Non Motorized	$ 3,060,000
NM-15-6	S 120th Pl: From 68th Ave S to Skyway Park	Construct sidewalk	Roadside	Non Motorized	$ 748,000
NM-15-7	S 123rd St: From S 125th St to S 124th St	Construct sidewalk	Roadside	Non Motorized	$ 1,632,000
NM-15-8	81st Pl S/S 124th St: From SE side of middle school to 84th Ave S	Construct sidewalk	Roadside	Non Motorized	$ 1,088,000
NM-5017	SW 102nd St: From 8th Ave SW to 17th AVE SW	Provide nonmotorized facility	Roadside	Non Motorized	$ 169,000
NM-5018	SW 104th St: From 15th Ave SW to 17th Ave SW	Provide nonmotorized facility	Roadside	Non Motorized	$ 70,900
NM-5020	8th Ave SW: From SW 108th St to SW 100th St	Provide non-motorized facility	Roadside	Non Motorized	$ 896,580
NM-5021	76th Ave S: From S 124th St to S 128th St	Provide nonmotorized facility	Roadside	Non Motorized	$ 104,000
NM-9920	28th Ave SW: From SW Roxbury St to SW 102nd St	Construct asphalt shoulder (east side)	Roadside	Non Motorized	$ 215,000
NM-9922	SW 112th St: From 16th Ave SW to 26th Ave SW	Construct asphalt shoulder (south side)	Roadside	Non Motorized	$ 563,000

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Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
NM-9930	SW 112th St: From 1st Ave S to 4th Ave SW	Construct sidewalk (north side)	Roadside	Non Motorized	$ 163,000
NM-9936	75th Ave S / S 122nd St: From Renton Ave S to 80th Ave S	Construct sidewalk (south side)	Roadside	Non Motorized	$ 401,000
NM-9937	S 120th St: From 76th Ave S to 80th Ave S	Construct sidewalk (south side)	Roadside	Non Motorized	$ 246,000
NM-9938	78th Ave S: From S 120th St to S 124th St	Construct sidewalk (east side)	Roadside	Non Motorized	$ 246,000
NM-9939	76th Ave S: From S 120th St to S 124th St	Construct sidewalk (east side)	Roadside	Non Motorized	$ 252,000
OP-INT-79	87th Ave S: From Stevens Ave NW/Taylor Pl NW to S 123rd Pl	Realign intersection	Traffic Control Devices	Intersection Priority Array	$ 844,000
OP-RD-12	8th Ave S: From Seattle city limits to Burien city limits (S 112th St)	Construct congestion relief measures	Roadway	Capacity-Major	$ 3,810,000
OP-RD-14	6th Ave S: From Myers Way S to 5th Ave S	Construct congestion relief measures	Roadway	Capacity-Major	$ 2,800,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Map Area: Woodinville (6)					
Corridor: 197th Ave NE					
GR-15-1	204th Ave NE: From NE Woodinville Duvall Rd to Snohomish County line	Construct guardrail	Roadside	Guardrail	$ 1,110,000
NM-5001	204th Ave NE/NE 198th St/197th Ave: From NE Woodinville Duvall Rd to Snohomish County line	Provide nonmotorized facility	Roadside	Non Motorized	$ 691,000
Corridor: Avondale Rd NE					
CP-15-5	Avondale Rd NE: From NE 133rd St to NE Woodinville Duvall Rd	Construct congestion relief measures	Roadway	Capacity-Major	$ 22,300,000
OP-INT-99	Avondale Road NE & NE 165th St	Turn lanes, replace traffic signal	Traffic Control Devices	Intersection Priority Array	$ 2,480,000
RC-151	Avondale Rd NE: From NE 133rd St to NE Woodinville Duvall Road	Reconstruct roadway	Roadway	Reconstruction	$ 4,990,000
Corridor: NE 124th St					
IPA-23	162nd Pl NE & NE 124th St	Left-turn lanes on NE 124th St and traffic signal	Traffic Control Devices	Intersection Priority Array	$ 2,270,000
Corridor: NE 128th St					
ITS-16	NE 124th Way/NE 128th St: From Remond city limits to Avondale Road NE	Cameras, vehicle and flood detection	Traffic Control Devices	ITS	$ 3,290,000
OP-RD-52	NE 128th St/Avondale Rd NE/NE 132nd St: 181st Ave NE to NE 133rd St	Construct congestion relief measures	Traffic Control Devices	Capacity-Major	$ 35,400,000
Corridor: NE 132nd St					
BR-240A	Cottage Lake Creek Bridge: NE 132nd St at Cottage Lake Creek, east of Avondale Rd NE	Replace bridge	Bridges and Structures	Bridge	$ 1,910,000
Corridor: NE 133rd St					
333A	Bear Creek Bridge: NE 133rd St at Bear Creek, east of Bear Creek Rd NE	Replace bridge	Bridges and Structures	Bridge	$ 2,190,000
Corridor: NE Novelty Hill Rd					
CP-15-8	NE Novelty Hill Rd: From 243rd Ave NE to W Snoqualmie Valley Rd NE	Construct congestion relief measures	Roadway	Capacity-Major	$ 81,800,000
ITS-35	NE Novelty Hill Rd: From 208th Ave NE to West Snoqualmie Valley Road	Upgrade, interconnect and synchronize signals	Traffic Control Devices	ITS	$ 506,000
CP-8	Novelty Hill Rd: From 197th Pl NE to 234th Pl NE	Construct congestion relief measures	Traffic Control Devices	Capacity-Major	$ 38,400,000

Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Corridor: NE Woodinville Duvall Rd					
BR-1136B	Woodinville-Duvall Road Bridge: NE Woodinville Duvall RD 0.3 mile west of State Route 203	Replace bridge	Bridges and Structures	Bridge	$ 54,400,000
BR-1136C	Woodinville-Duvall Road Bridge: NE Woodinville Duvall Rd 0.6 mile west of State Route 203	Replace bridge	Bridges and Structures	Bridge	$ 6,940,000
BR-1136D	Woodinville-Duvall Road Bridge: NE Woodinville Duvall Rd 0.8 mile west of State Route 203	Replace bridge	Bridges and Structures	Bridge	$ 5,870,000
BR-1136E	Woodinville-Duvall Road Bridge: NE Woodinville Duvall Rd 0.9 mile west of State Route 203	Replace bridge	Bridges and Structures	Bridge	$ 4,810,000
CP-12	Woodinville-Duvall Rd: 171st Ave NE to Avondale Rd NE	Construct congestion relief measures	Roadway	Capacity-Major	$ 11,900,000
CP-15-7	NE Woodinville Duvall Rd & 194th Ave NE	Construct congestion relief measures	Roadway	Capacity-Major	$ 1,960,000
CP-16	NE Woodinville Duvall Rd: From Avondale Rd NE to 194th Ave NE	Construct congestion relief measures	Roadway	Capacity-Major	$ 9,220,000
IPA-40	NE Woodinville-Duvall Rd & West Snoqualmie Valley Rd NE	Intersection and drainage improvements	Traffic Control Devices	Intersection Priority Array	$ 3,440,000
NM-5002	NE Woodinville Duvall Rd: From Avondale Rd NE to Duvall city limits	Provide nonmotorized facility	Roadside	Non Motorized	$ 18,000,000
RC-43	NE Woodinville Duvall Rd: From Old Woodinville-Duvall Rd to W Snoqualmie Valley Rd NE	Construct retaining wall to stabilize slope	Bridges and Structures	VRS Hotspot	$ 581,000
ITS-13	NE Woodinville Duvall Rd: From 212th Ave NE to Duvall city limits	Cameras, data stations, message signs	Traffic Control Devices	ITS	$ 4,200,000
Corridor: West Snoqualmie Val Rd NE					
CP-15-3	W Snoqualmie Valley Rd: From NE 124th St to NE Novelty Hill Rd	Construct congestion relief measures	Roadway	Capacity-Major	$ 6,830,000
ITS-18	W Snoqualmie Valley Rd NE: From NE Woodinville Duvall Road to Ames Lake Carnation Rd NE	Vehicle detection, flood detection, cameras	Traffic Control Devices	ITS	$ 742,000
OP-INT-122	NE 124th St & West Snoqualmie Valley Rd NE	Construct turn pockets and replace signal	Traffic Control Devices	Intersection Priority Array	$ 2,700,000
RC-113	West Snoqualmie Valley Rd NE: From NE 124th St and NE Novelty Hill Rd	Reconstruct roadway 0.28 mile	Roadway	Reconstruction	$ 455,000
RC-150	West Snoqualmie Valley Rd NE: From Snohomish County line to NE Woodinville Duvall Rd	Construct retaining wall to prevent slides	Bridges and Structures	VRS Hotspot	$ 3,640,000
RC-39	West Snoqualmie Valley Rd NE: From NE 124th St to Ames Lake Carnation Rd NE	Construct retaining wall to prevent slides	Bridges and Structures	VRS Hotspot	$ 3,900,000

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Project Number	Project Location	Project Scope	Product Family	Category	Est. Cost
Corridor: Misc.					
BR-480A	Bear Creek Bridge: NE 116th St at Bear Creek, east of Avondale Rd NE	Replace bridge	Bridges and Structures	Bridge	$ 1,580,000
BR-5011	Walter Shults Bridge: NE 106th St at Lower Bear Creek , east of Avondale Rd NE	Replace bridge	Bridges and Structures	Bridge	$ 1,740,000
DR-15-1	185th Ave NE, north of NE 179th St	Elevate roadway 1.5' and replace culvert	Drainage	Drainage	$ 455,000
DR-15-7	NE 124th St & 162nd Pl NE	Replace failing culvert	Drainage	Drainage	$ 494,000
DR-15-8	NE 124th St: From 570 Ft W of 164th Ave NE	Replace failing culvert	Drainage	Drainage	$ 648,000
GR-15-13	148th Ave NE: 140th Pl NE to NE 172nd St	Construct guardrail	Roadside	Guardrail	$ 533,000
GR-15-17	Mink Rd NE: From Bear Creek Rd NE to NE Woodinville Duvall Rd	Construct guardrail	Roadside	Guardrail	$ 901,000
GR-15-21	NE Redmond Rd: From NE Novelty Hill Rd and 204th Ave NE	Construct guardrail	Roadside	Guardrail	$ 717,000
GR-15-22	222nd Way NE: From NE Woodinville Duvall Rd and NE 194th St	Construct guardrail	Roadside	Guardrail	$ 358,000
GR-15-26	232nd Ave NE: From NE 133rd St to Old Woodinville Duvall Rd	Construct guardrail	Roadside	Guardrail	$ 1,460,000
GR-15-4	236th Ave NE: From NE Woodinville Duvall Rd to NE 184th St	Construct guardrail	Roadside	Guardrail	$ 214,000
NM-5026	172nd Ave NE: From NE 134th Pl to NE 125th St	Construct neighborhood pathway	Roadside	Non Motorized	$ 503,000
NM-5027	171st/174th Ave NE: From NE Woodinville Duvall Rd to NE 172nd Pl	Provide nonmotorized facility	Roadside	Non Motorized	$ 581,000
OP-INT-81	155th Ave NE & NE 146th Pl	Reconstruct intersection to improve sight distance	Traffic Control Devices	Intersection Priority Array	$ 902,000
OP-RD-18	NE 172 Pl / NE 172nd Pl NE: From 164th Ave NE to 174th Ave NE	Reconstruct roadway	Roadway	Reconstruction	$ 3,120,000
OP-RD-45	232nd Ave NE: From NE 142nd Pl to Old Woodinville Duvall Rd	Reconstruct roadway	Roadway	Reconstruction	$ 4,480,000
OP-RD-7	NE 165th St: From 179th Pl NE to 183rd Pl NE	Reconstruct roadway	Roadway	Reconstruction	$ 6,380,000
OP-RD-9	NE Old Woodinville-Duvall Rd: From NE Woodinville-Duvall Rd to NE Woodinville-Duvall Rd	Reconstruct roadway	Roadway	Reconstruction	$ 5,470,000
RC-48	NE 146th Pl: From Woodinville city limits to 155th Ave NE	Construct retaining wall to stabilize slope	Bridges and Structures	VRS Hotspot	$ 138,000

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BR-1136C	28	6
BR-1136D	28	6
BR-1136E	28	6
BR-122N	13	21
BR-1239A	21	15
BR-1384A	9	9
BR-1741A	10	9
BR-2133A	1	14
BR-240A	27	6
BR-249B	21	15
BR-249C	21	15
BR-257Z	1	14
BR-3015	7	5
BR-3020	15	11
BR-3022	15	11
BR-3030	15	11
BR-3035A	4	18
BR-3055A	22	12
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BR-3202	10	9
BR-333A	27	6
BR-364A	16	20
BR-480A	29	6
BR-493C	10	9
BR-5011	29	6
BR-5032	5	13
BR-5034A	5	13
BR-509A	20	23
BR-578A	19	7
BR-61B	21	15
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BR-909B	24	16
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CP-15-5	27	6
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DR-15-11	4	18
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DR-6	26	3
DR-7	19	7
DR-8	17	1
DR-9	3	10
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GR-15-13	29	6
GR-15-14	10	9
GR-15-15	6	19
GR-15-16	24	16
GR-15-17	29	6
GR-15-18	1	14
GR-15-19	10	9
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GR-15-20	21	15
GR-15-21	29	6
GR-15-22	29	6
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GR-15-24	5	13
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GR-15-33	4	18
GR-15-34	14	8
GR-15-35	11	9
GR-15-36	11	9
GR-15-37	1	14
GR-15-38	3	10
GR-15-39	12	4
GR-15-4	29	6
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GR-15-41	23	2
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GR-15-6	25	3
GR-15-7	26	3
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GR-94	5	13
GR-95	18	17
GR-96	22	12
GR-98	21	15
IPA-1	10	9
IPA-12	15	11
IPA-22	18	17
IPA-23	27	6
IPA-25	7	5
IPA-26	2	10
IPA-27	21	15
IPA-3	12	4
IPA-33	3	10
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IPA-36	25	3
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ITS-18	28	6
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ITS-20	19	7
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ITS-26	25	3
ITS-27	15	11
ITS-28	9	9
ITS-29	10	9
ITS-33	25	3
ITS-34	9	9
ITS-35	27	6
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NM-0202	3	10
NM-0203	17	1
NM-0302	26	3
NM-15-1	26	3
NM-15-10	26	3
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NM-15-3	26	3
NM-15-4	25	3
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NM-15-6	26	3
NM-15-7	26	3
NM-15-8	26	3
NM-15-9	17	1
NM-4012	25	3
NM-4033	3	10
NM-4041	2	10
NM-4042	12	4
NM-4066	7	5
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NM-5008	6	19
NM-5010	4	18
NM-5012	15	11
NM-5014	7	5
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NM-5017	26	3
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NM-5020	26	3
NM-5021	26	3
NM-5026	29	6
NM-5027	29	6
NM-5034	3	10
NM-5038	11	9
NM-5049	2	10
NM-5050	3	10
NM-5051	18	17
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NM-9930	26	3
NM-9936	26	3
NM-9937	26	3
NM-9938	26	3
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OP-INT-99	27	6
OP-RD-12	26	3
OP-RD-14	26	3
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OP-RD-22	10	9
OP-RD-24	14	8
OP-RD-25	9	9
OP-RD-26	10	9
OP-RD-37	1	14
OP-RD-39	8	22
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OP-RD-44	15	11
OP-RD-45	29	6
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RC-118	9	9
RC-119	9	9
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RC-121	9	9
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RC-126	24	16
RC-127	18	17
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RC-132	18	17
RC-133	18	17
RC-135	18	17
RC-136	18	17
RC-137	7	5
RC-138	7	5
RC-139	7	5

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RC-15	23	2
RC-150	28	6
RC-151	27	6
RC-15-1	1	14
RC-15-3	18	17
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RC-15-5	21	15
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RC-34	1	14
RC-35	19	7
RC-36	1	14
RC-38	1	14
RC-39	28	6
RC-40	21	15
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RC-51	19	7
RC-54	23	2
RC-55	20	23
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RC-7	21	15
RC-8	13	21
SW-13	2	10
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SW-73	7	5
SW-81	9	9
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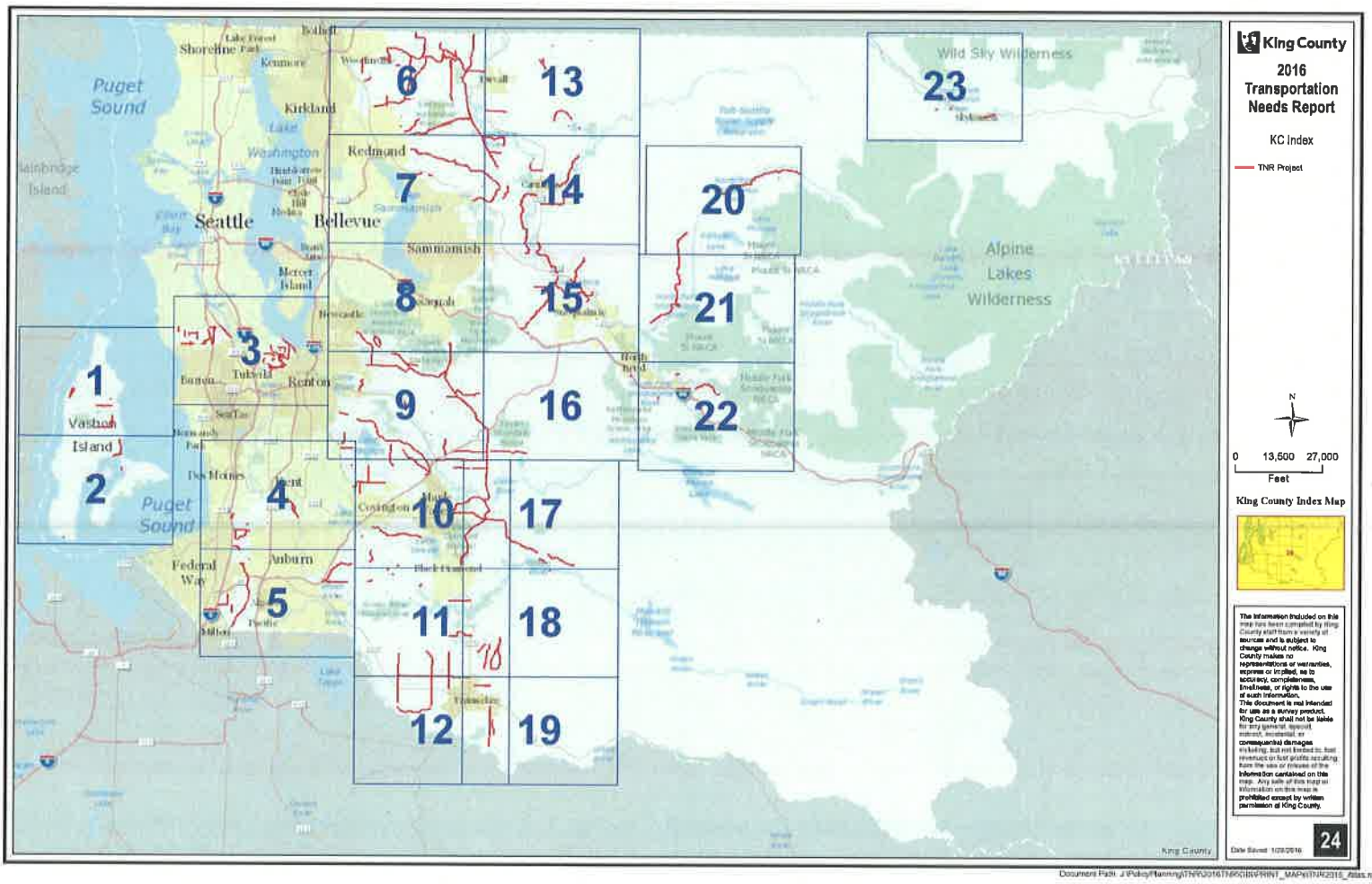

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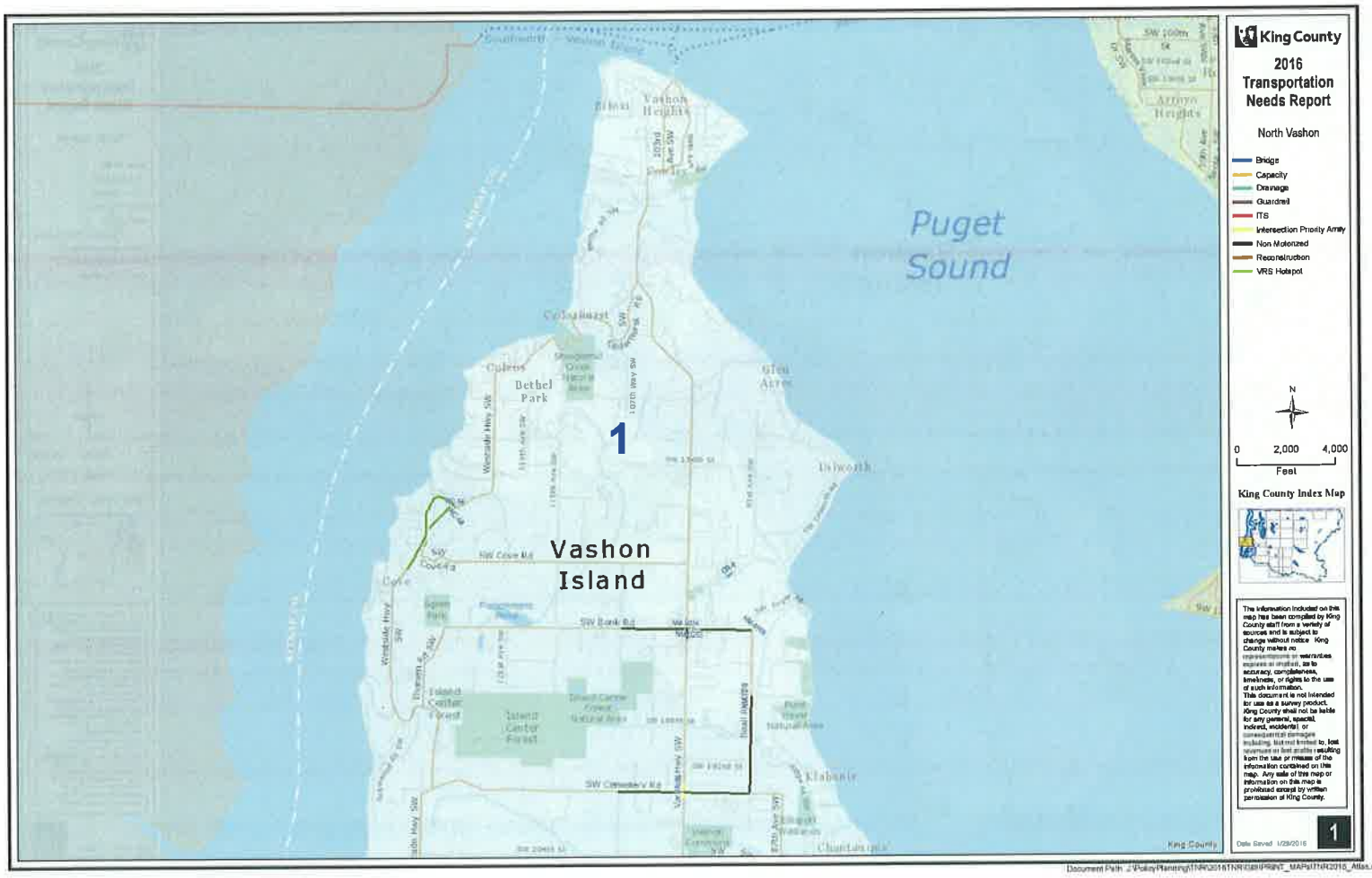

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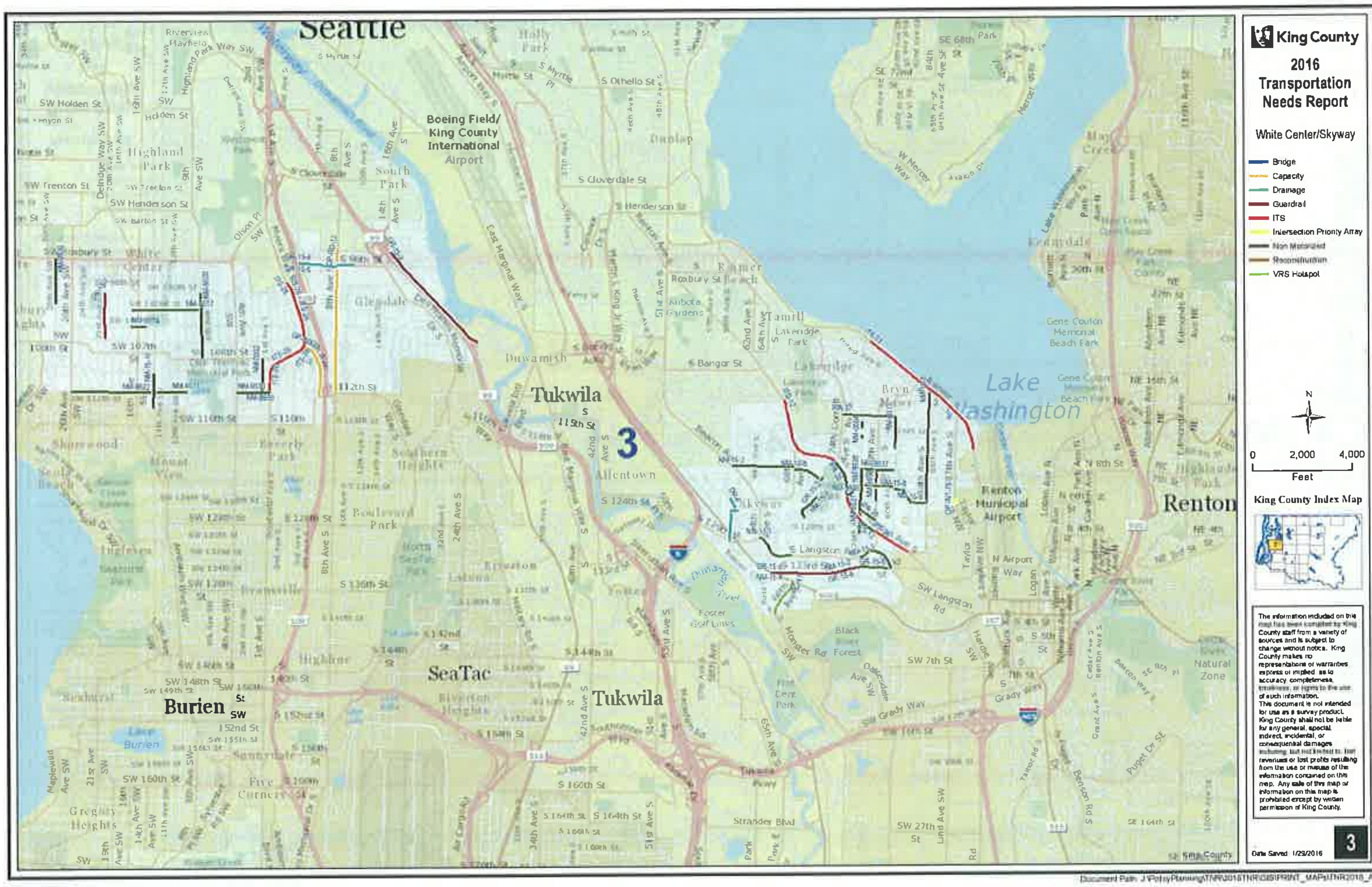
King County
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Seattle
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King County
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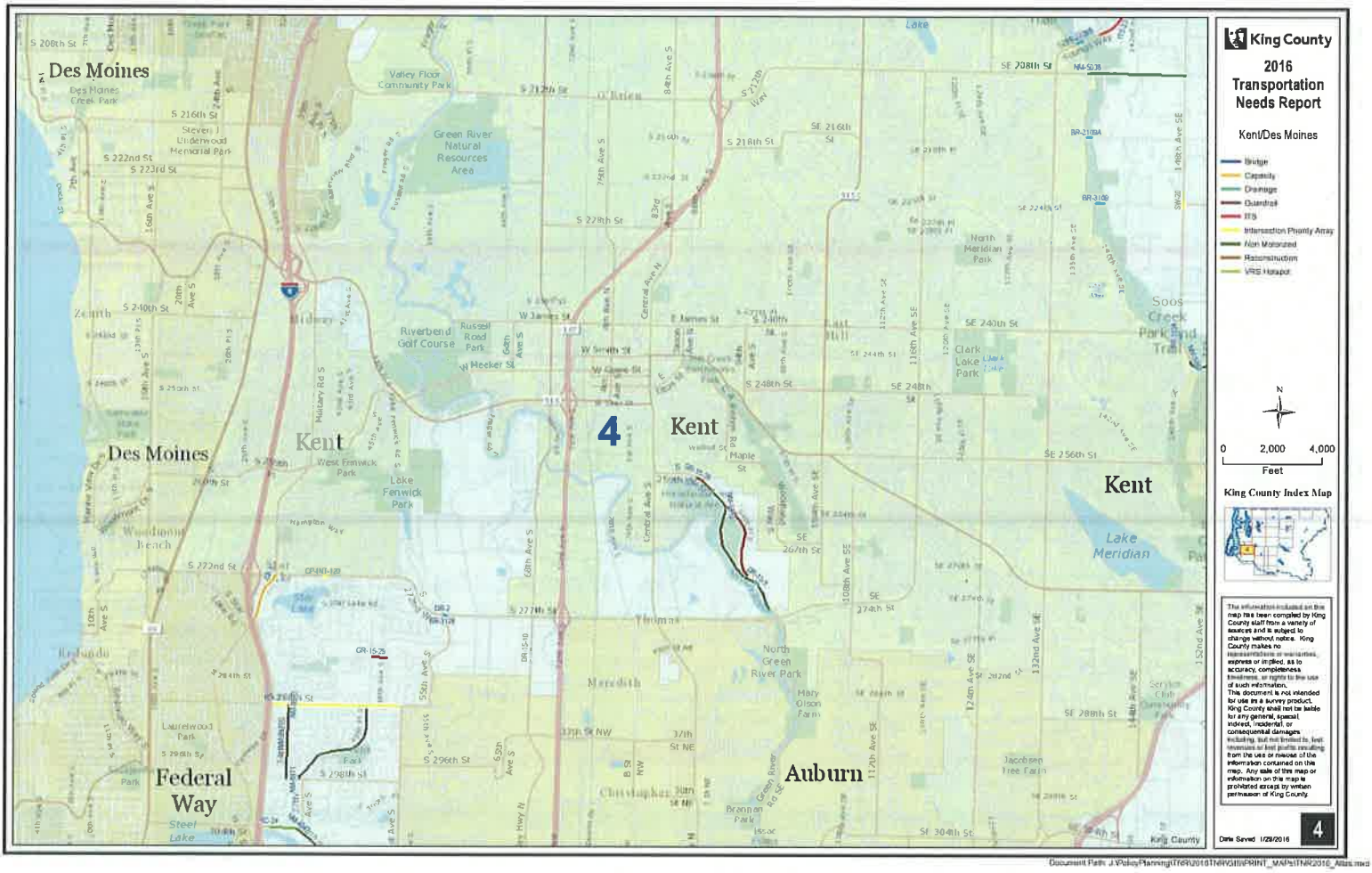
Airport
Tukwila
Renton
Lake
Washington
SeaTac
Burien
Renton
Municipal
Airport



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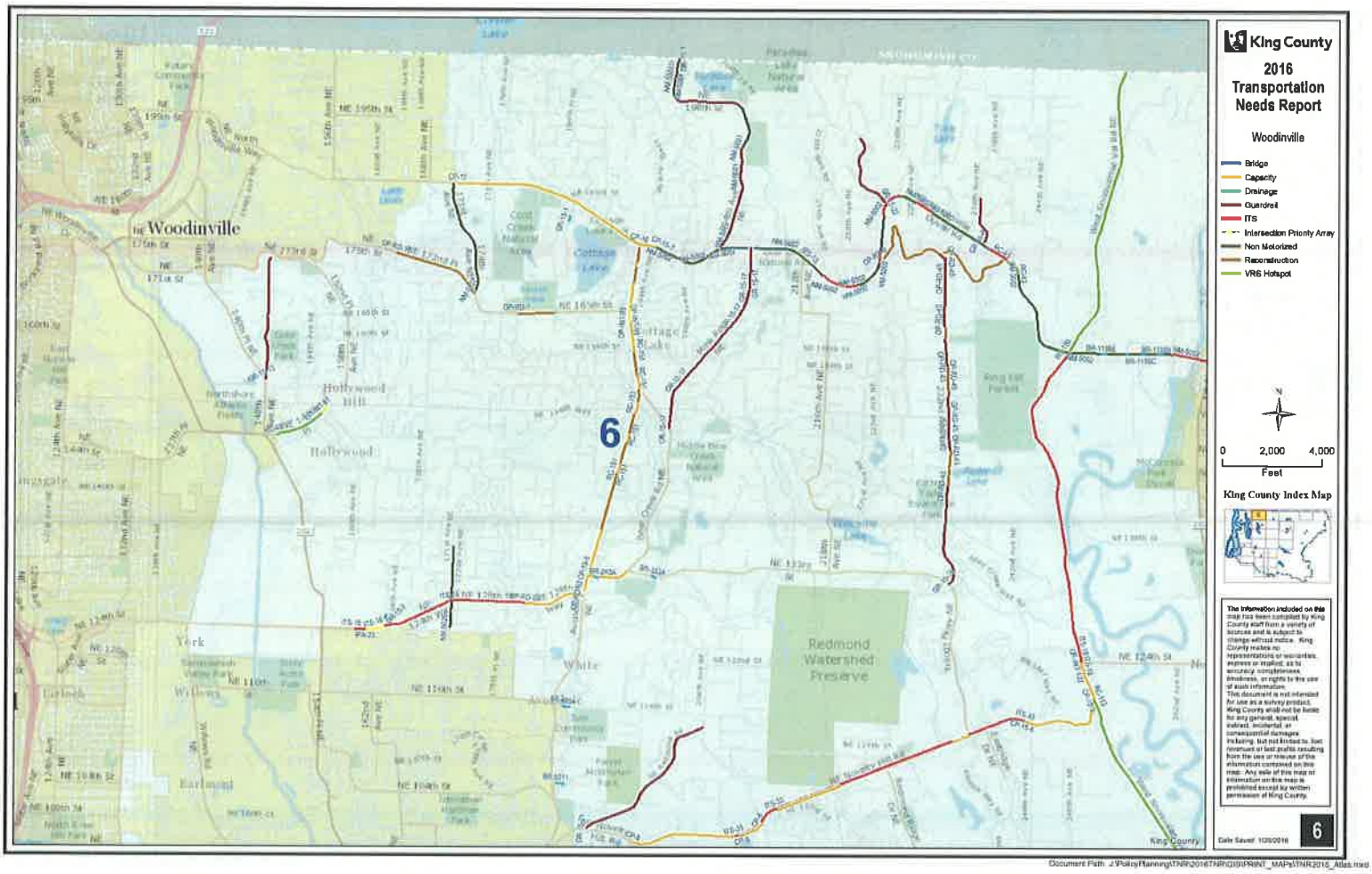

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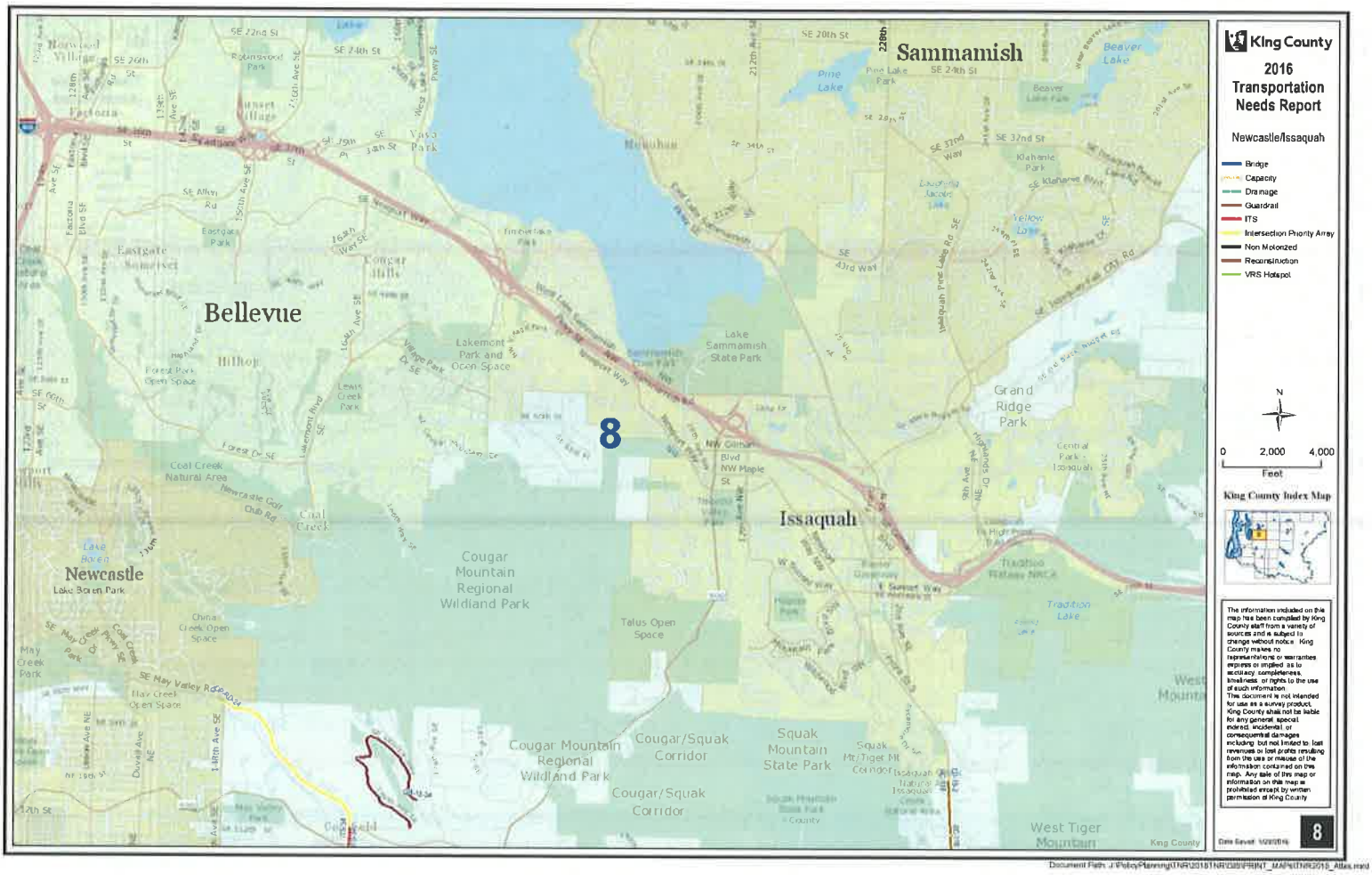

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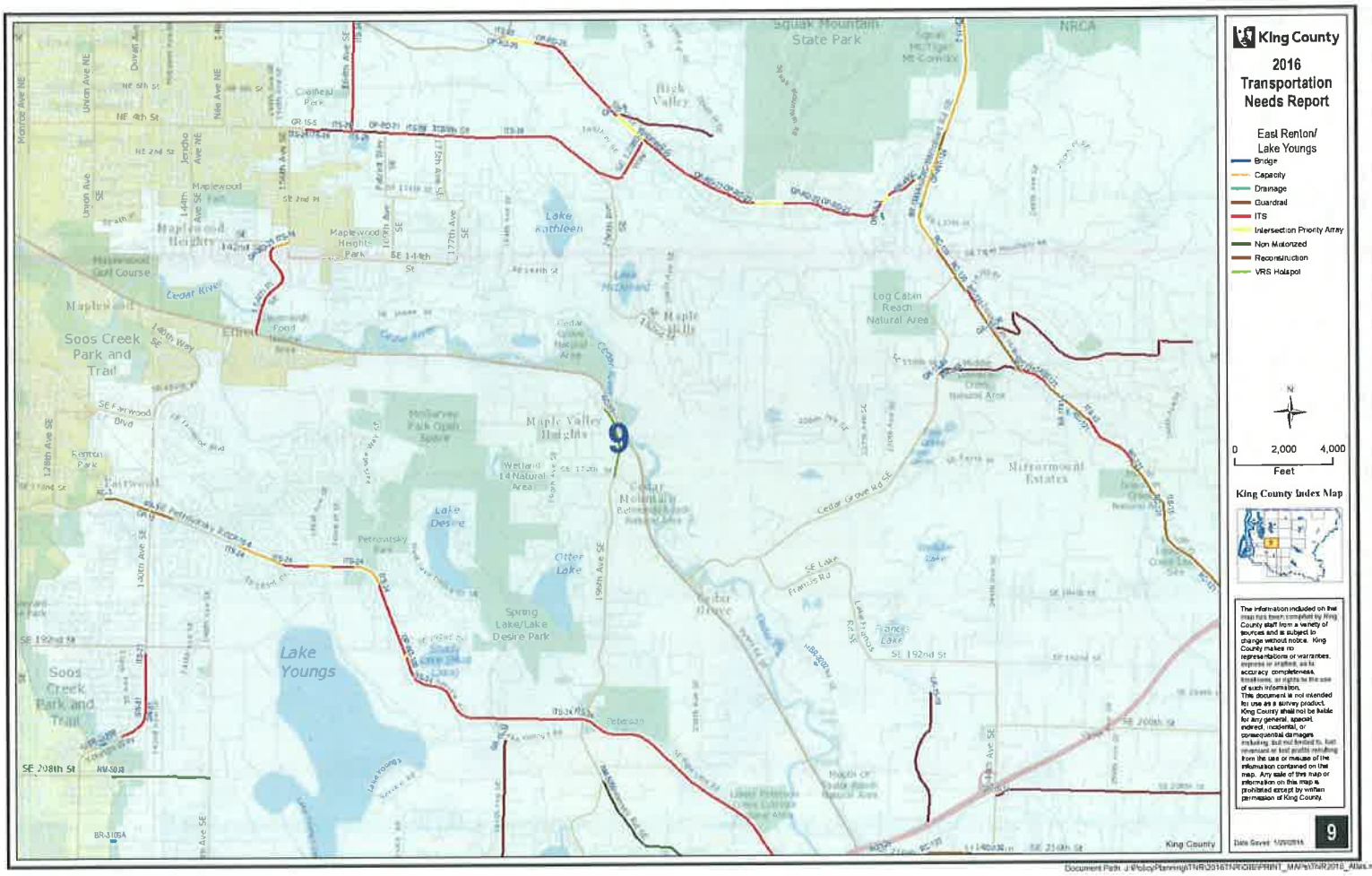
King County
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East Renton/
Lake Youngs
Bridge
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Drainage
Guardrail
ITS
Intersection Priority Array
Non Motorized
Reconstruction
VRS Hotspot
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Feet
King County Index Map
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Squak Mountain State Park
NRCA
Soos Creek Park and Trail
Maple Valley Heights
Lake Kathleen
Lake Desire
Otter Lake
Lake Youngs
Spring Lake/Lake Desire Park
Log Cabin Reach Natural Area
Cedar Grove Rd SE
SE 208th St
SE 192nd St
King County
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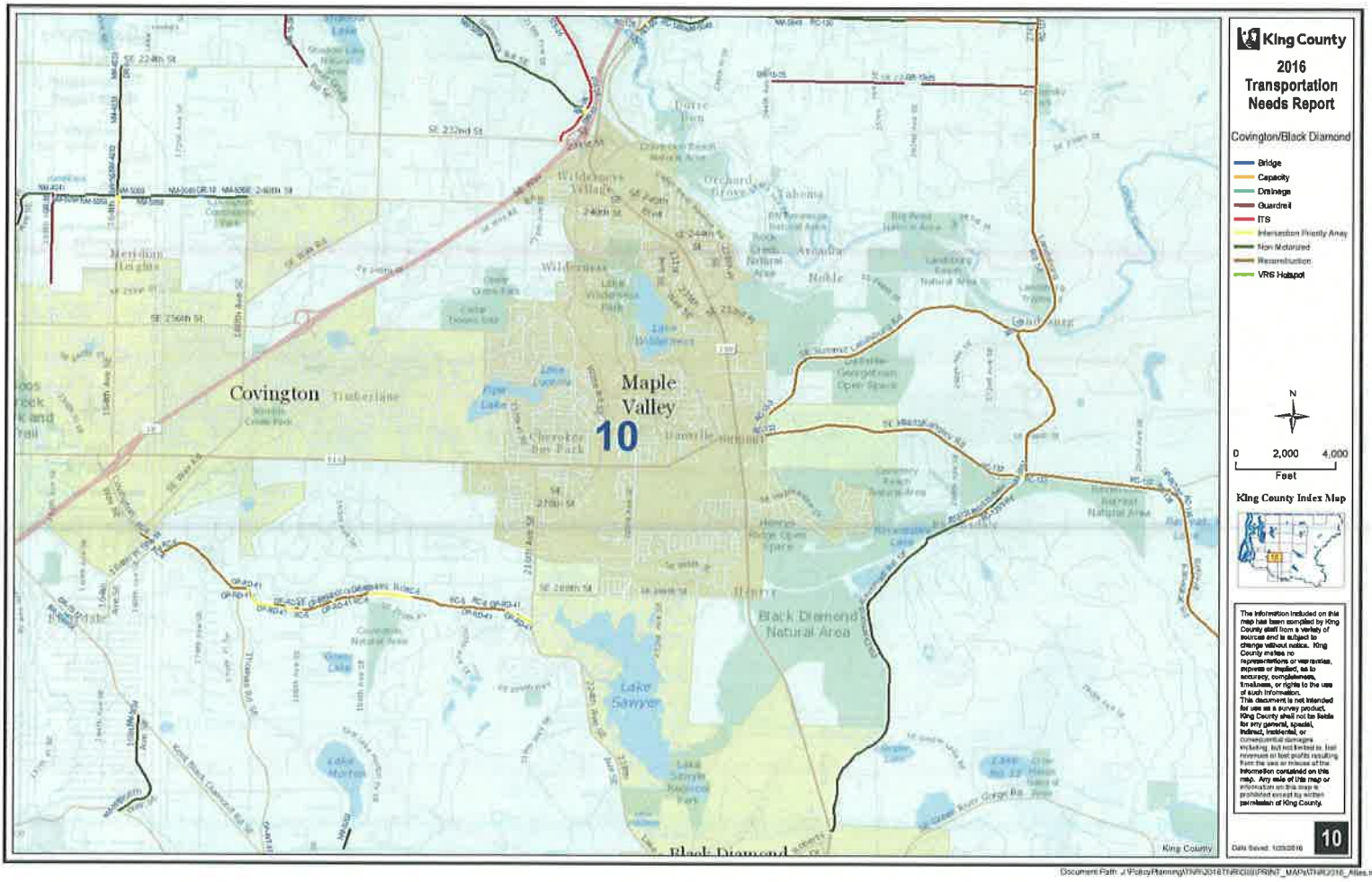

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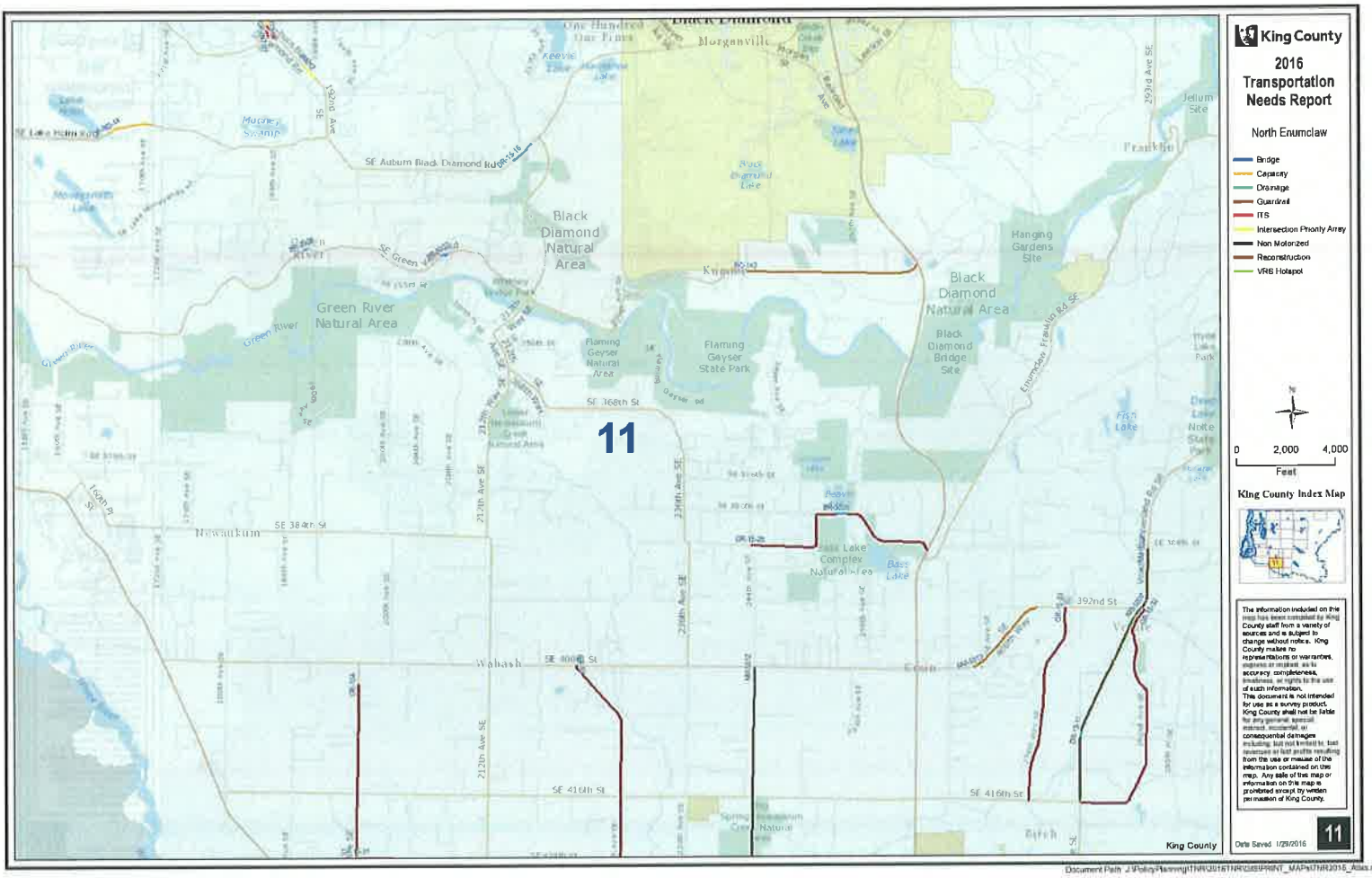

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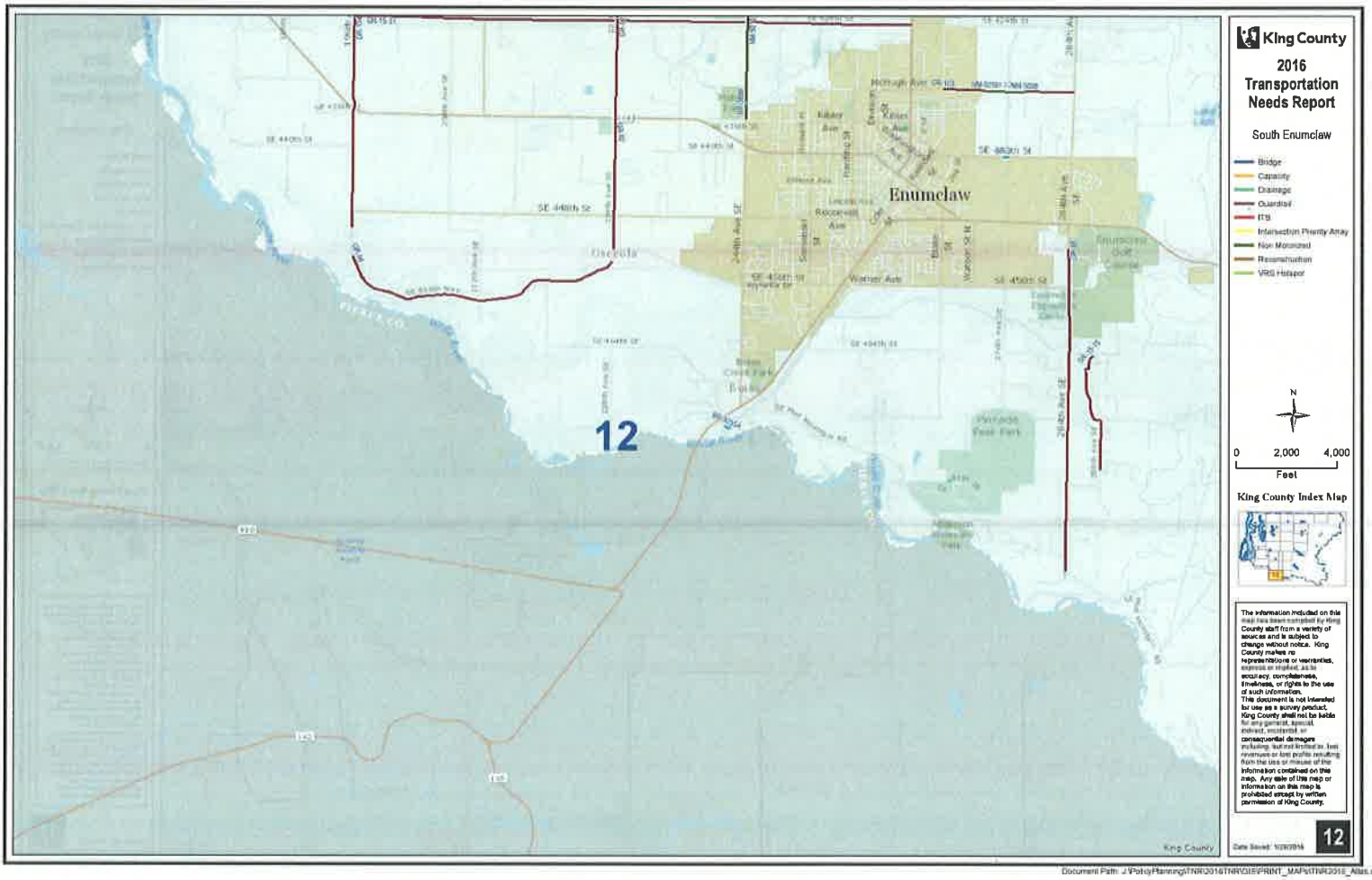

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King County
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Duvall
Bridge
Capacity
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Feet
King County Index Map
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Duvall
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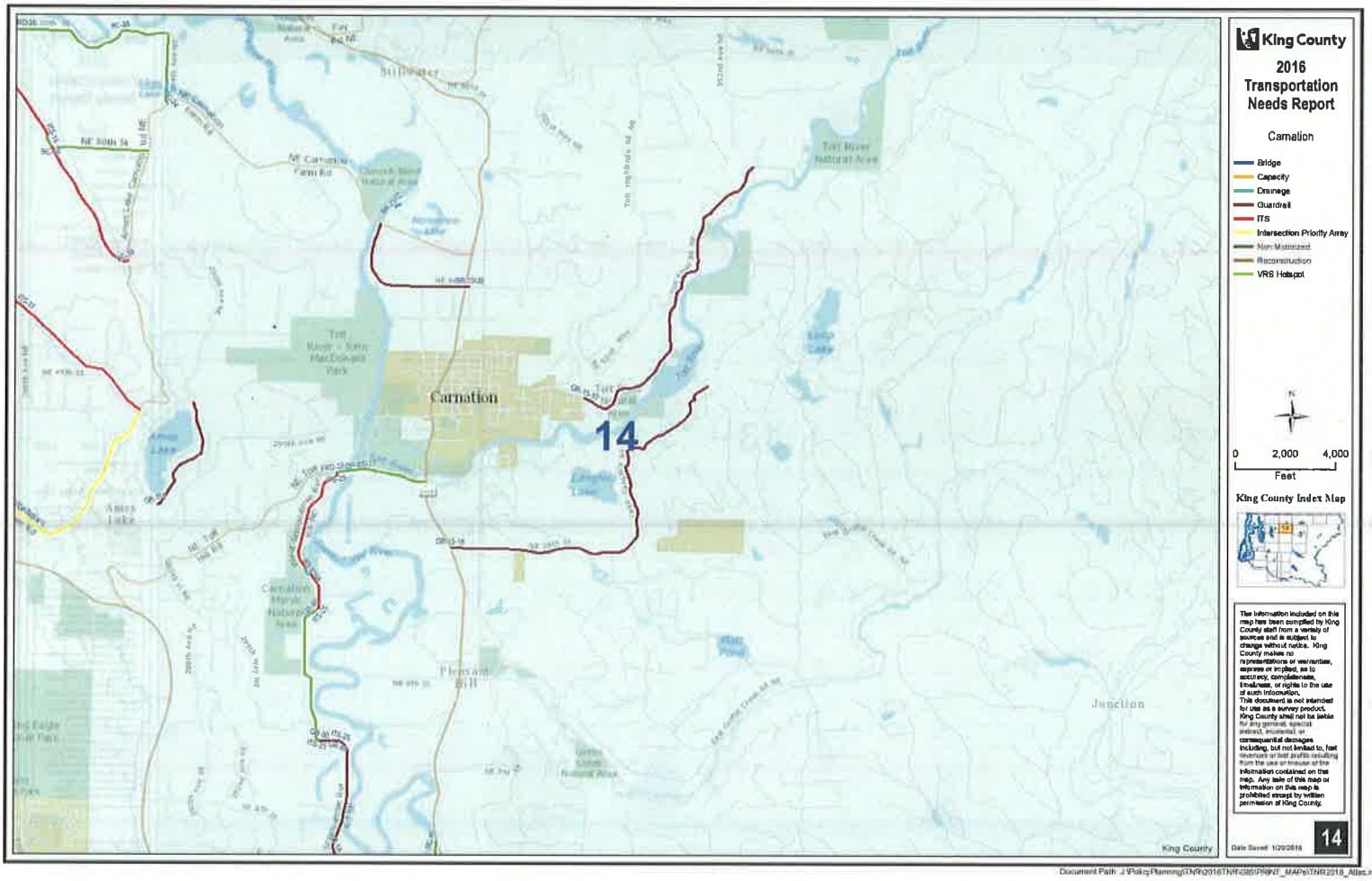

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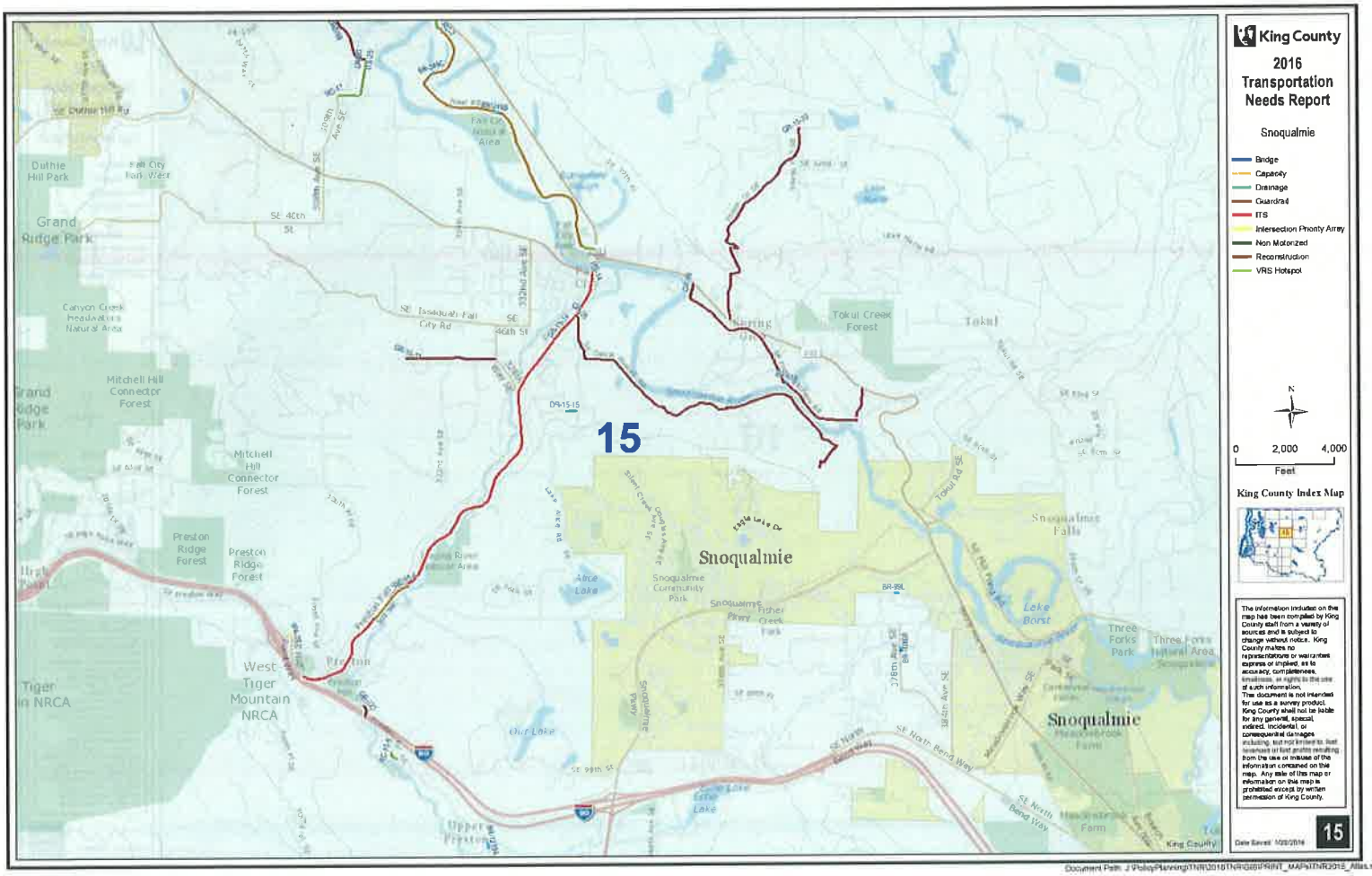

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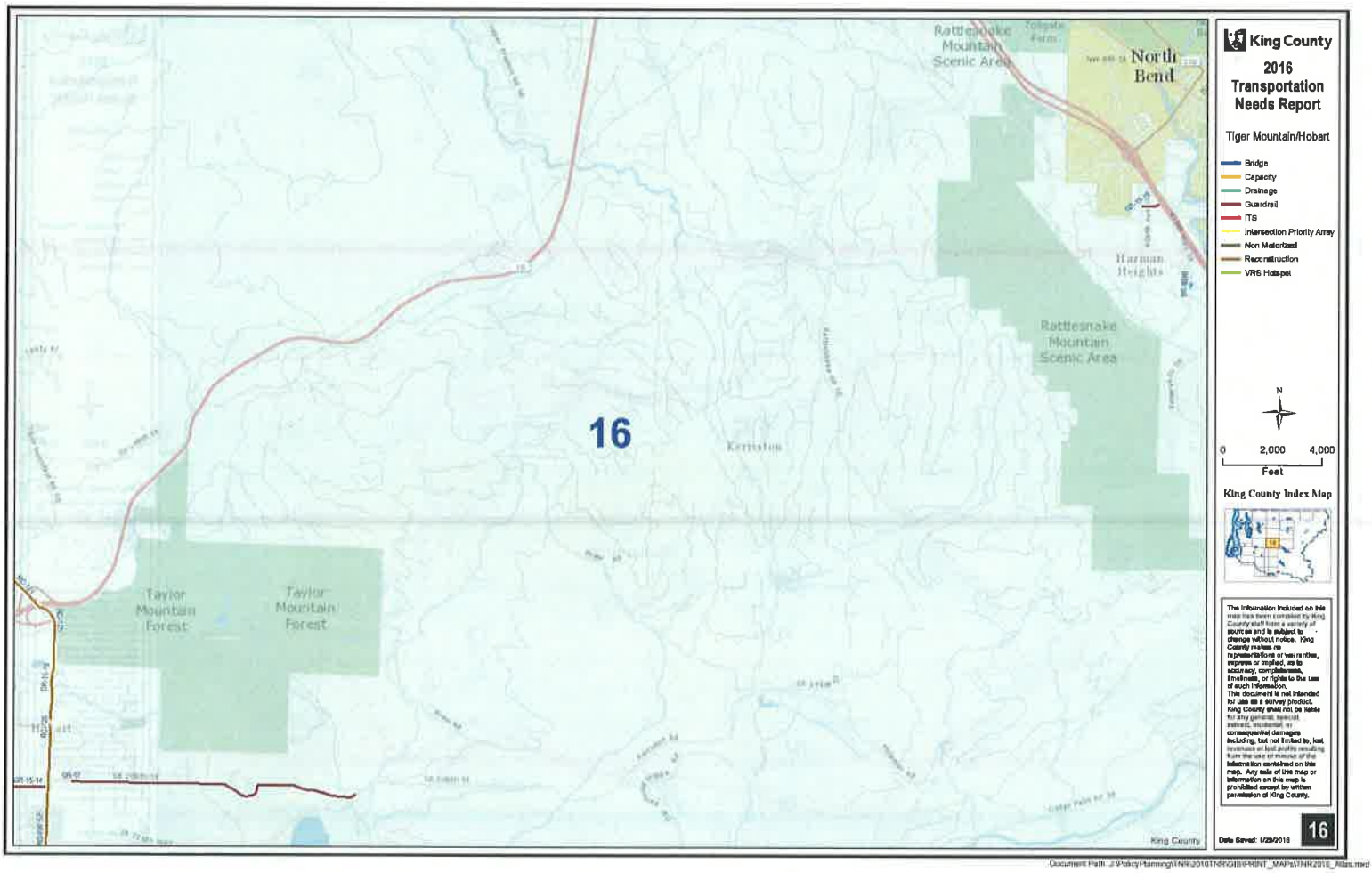

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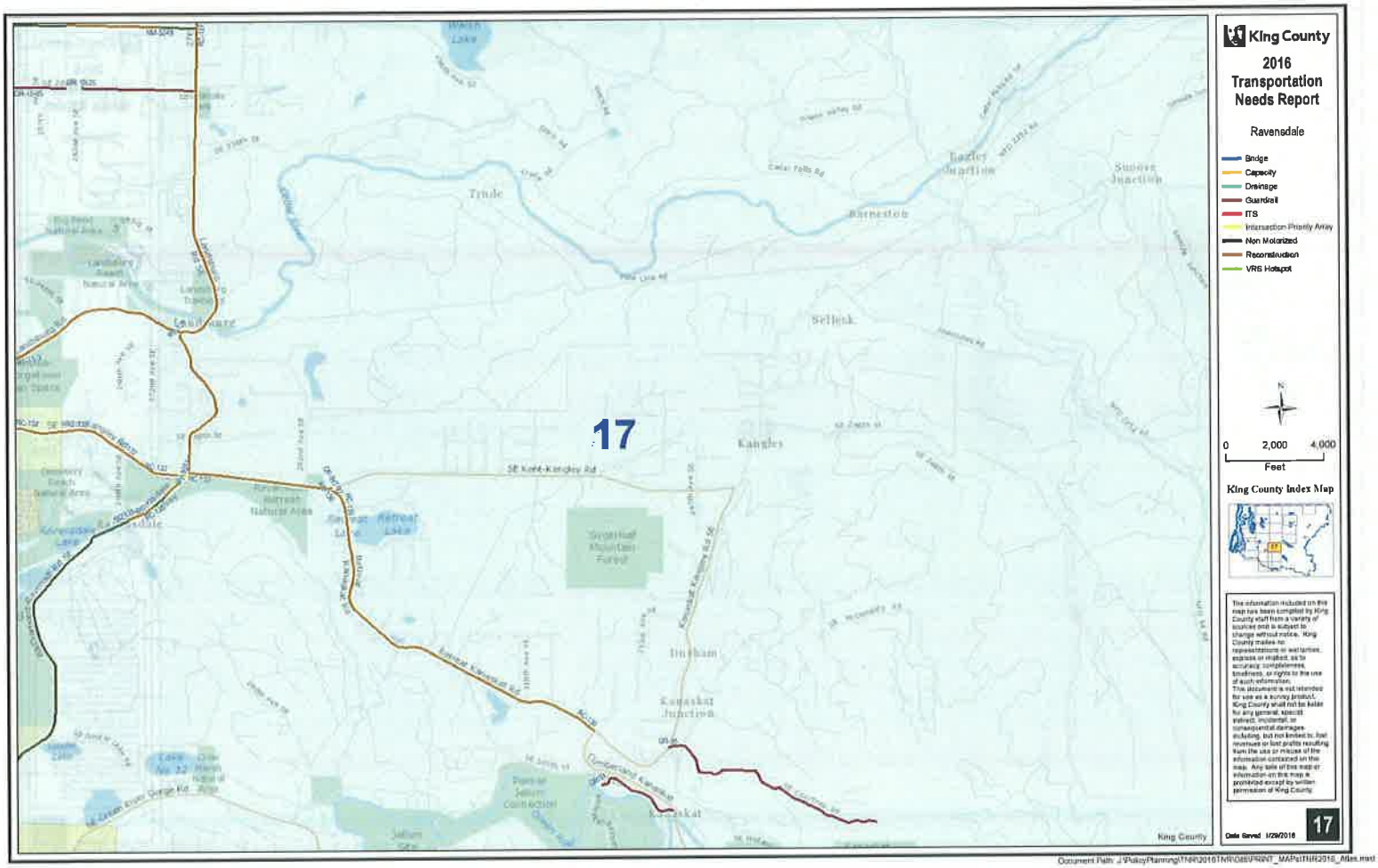

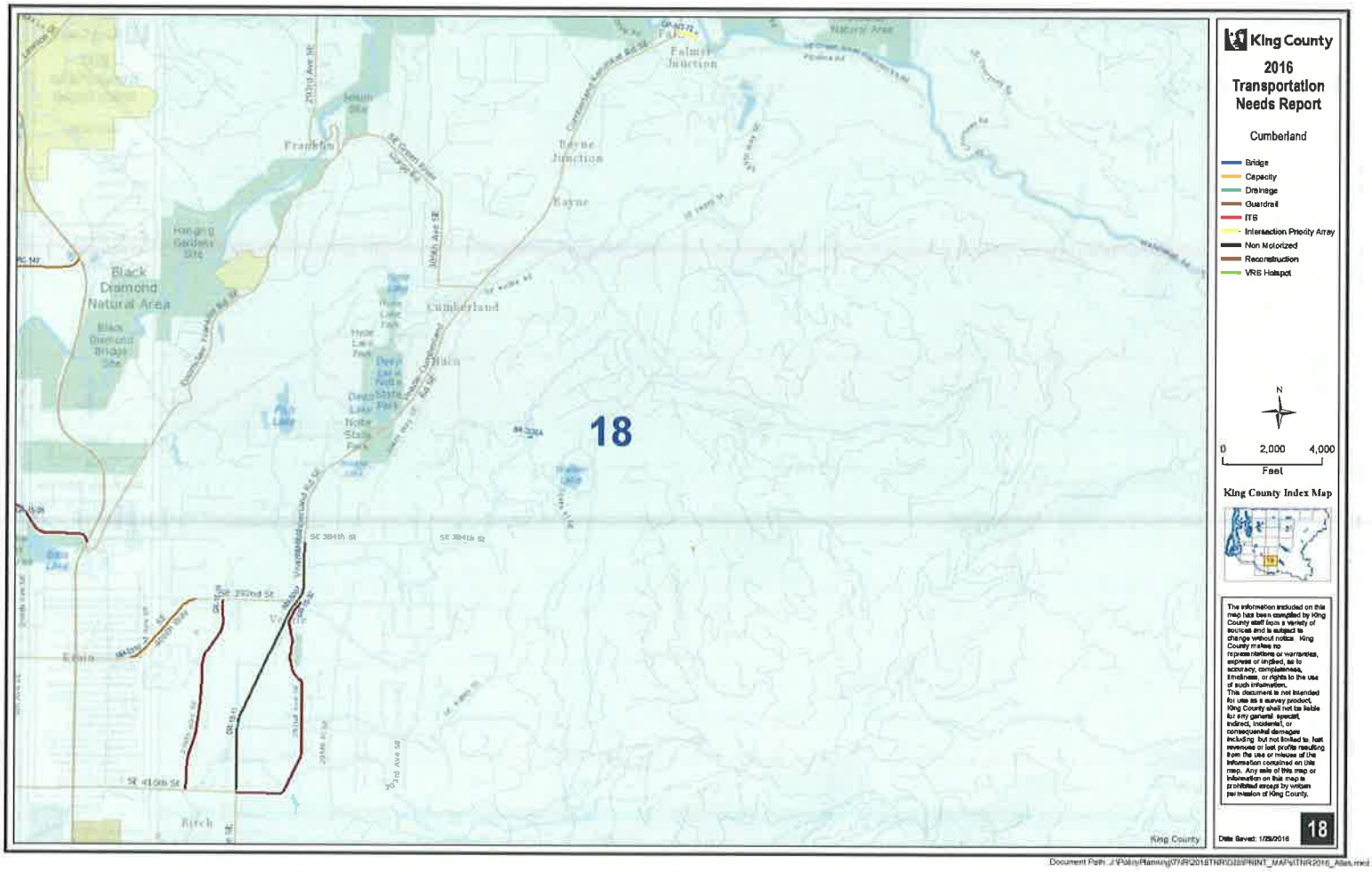

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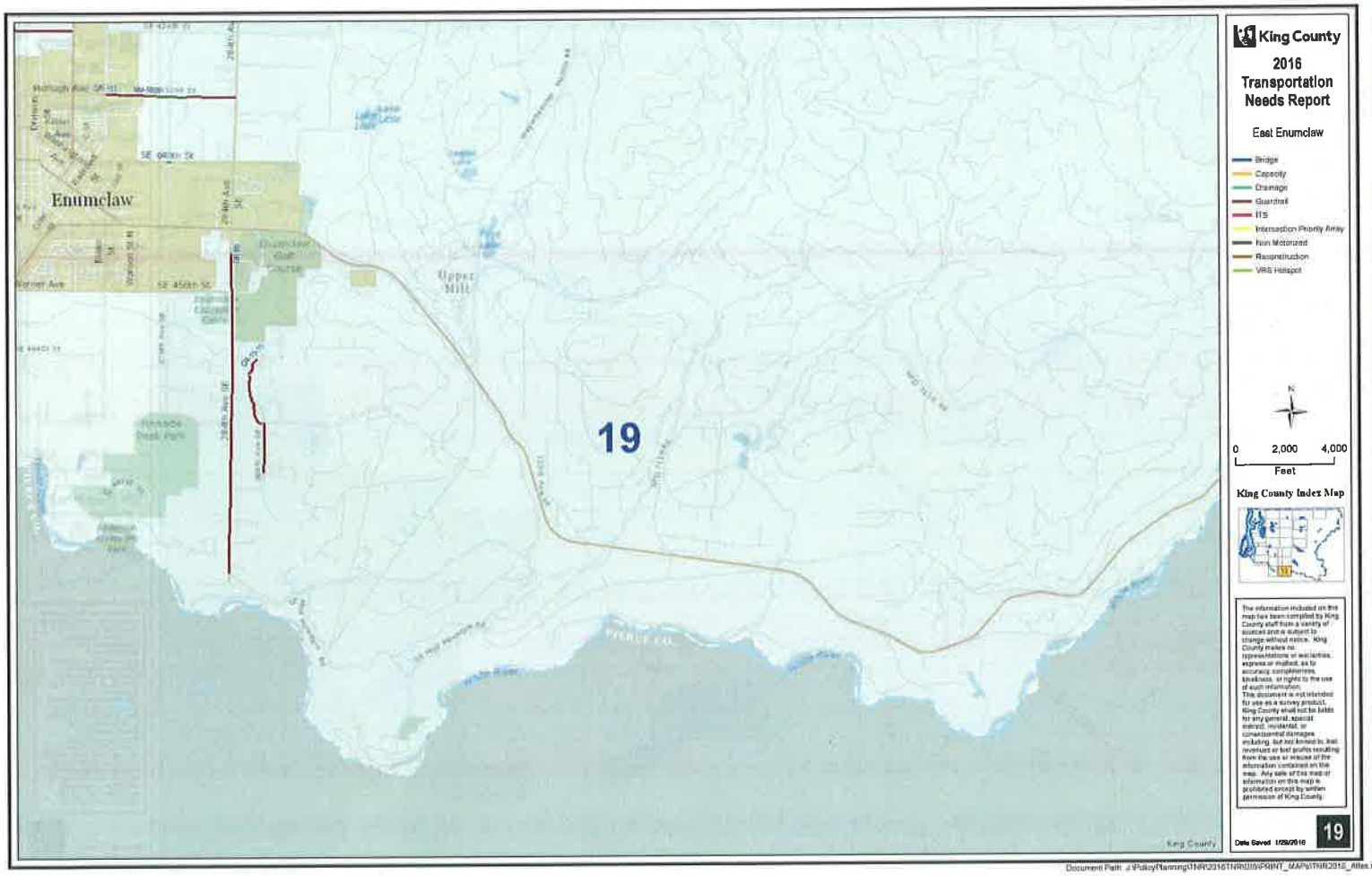

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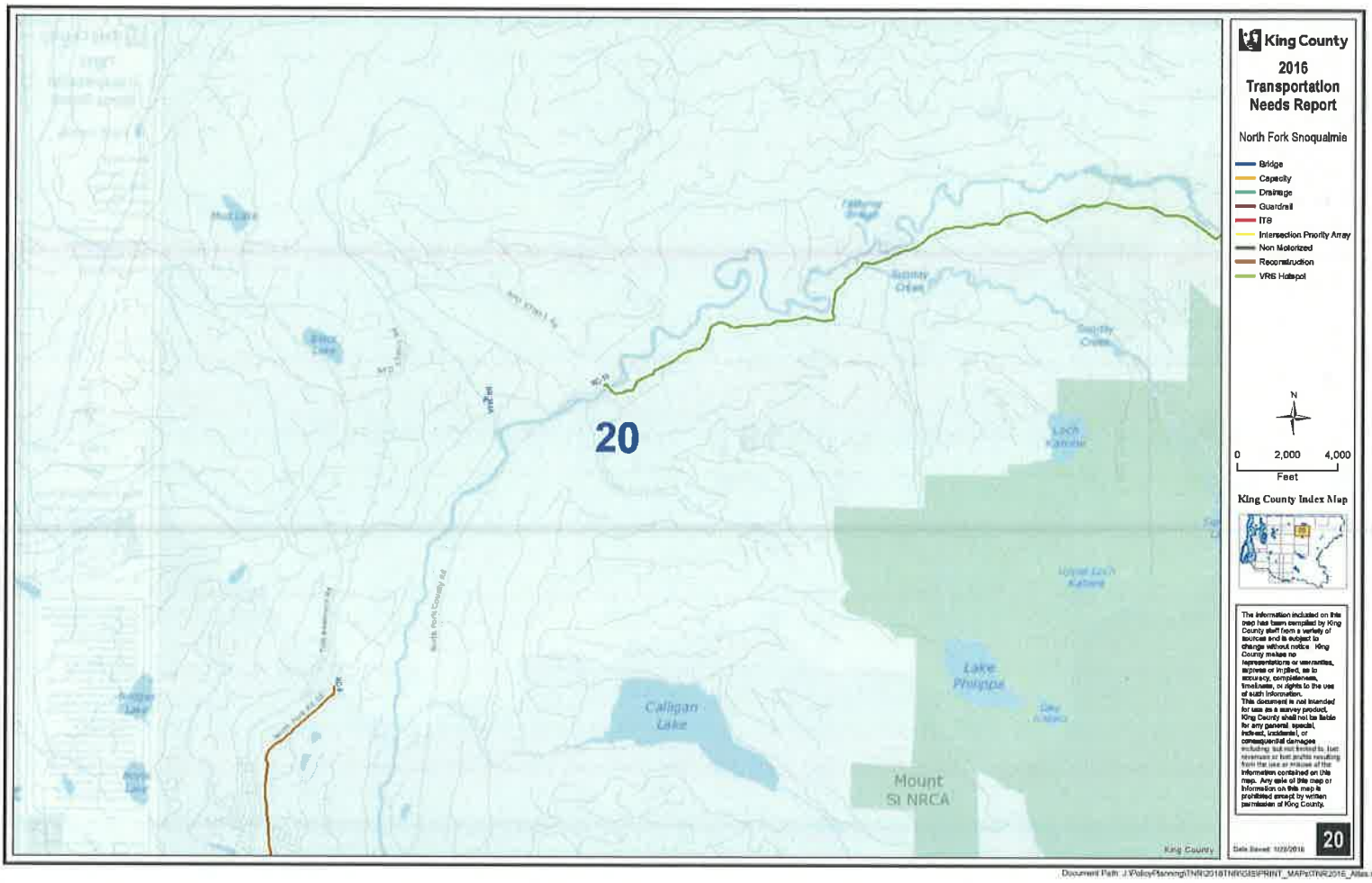

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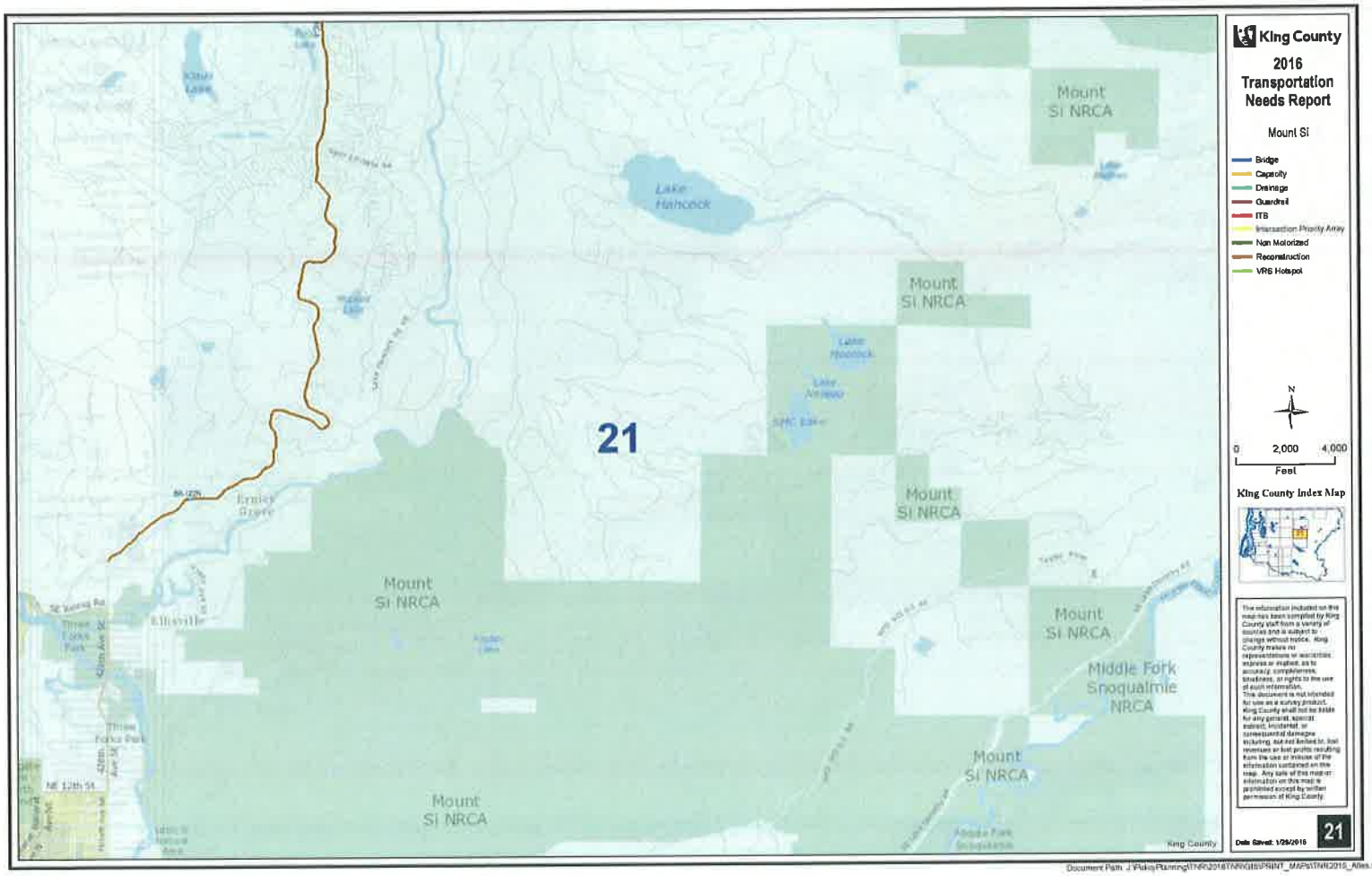

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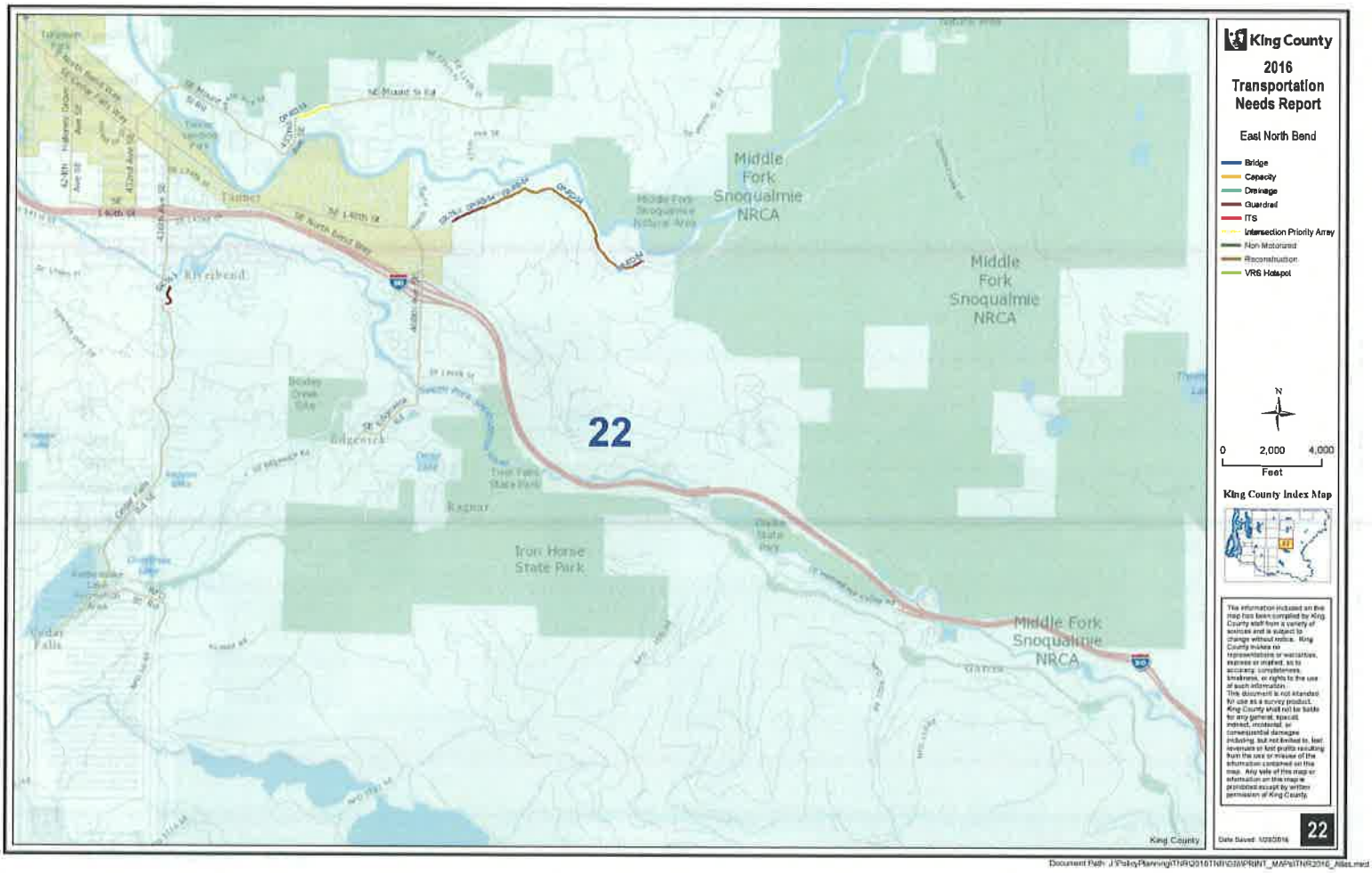

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Wild Sky Wilderness
Wild Sky Wilderness
Wild Sky Wilderness
23
Skykomish
King County
2016 Transportation Needs Report
Skykomish
Bridge
Capacity
Drainage
Guardrail
ITS
Intersection Priority Array
Non Motorized
Reconstruction
VRS Hotspot
N
0
2,000
4,000
Feet
King County Index Map
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