



KING COUNTY

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

Signature Report

Motion 15540

Proposed No. 2019-0349.1

Sponsors Dunn and Lambert

1 A MOTION acknowledging receipt of a report by the road
2 services division pertaining to a plan to increase the total
3 number of miles of snowplow routes for future snowstorm
4 events in the unincorporated area of King County, as
5 required in the 2019-2020 Biennial Budget Ordinance
6 18835, Section 57, Proviso P1.

7 WHEREAS, the 2019-2020 Biennial Budget Ordinance 18835, Section 57,
8 Proviso P1, withheld \$50,000 until the executive transmits a plan to increase the total
9 number of miles of snowplow routes for future snowstorm events in the unincorporated
10 area of King County and a motion that should acknowledge receipt of the plan, and

11 WHEREAS, the plan shall include, but not be limited to, the following:

- 12 1. A description of all current snowplow routes;
- 13 2. A description of all proposed new snowplow routes, in descending order of
14 priority, to receive snowplow service in future snowstorm events under the plan,
15 including the general description of their location in unincorporated King County and the
16 number of miles per route; and
- 17 3. An analysis of resources, including, but not limited to, additional county
18 personnel and county equipment or contracting for services necessary to achieve the
19 increase in the total number of miles of snowplow routes for future snowstorm events in

20 the unincorporated area of King County proposed by the plan, and

21 WHEREAS, the executive should file the plan and a motion required by the
22 proviso by September 30, 2019, in the form of a paper original and an electronic copy
23 with the clerk of the council, who shall retain the original and provide an electronic copy
24 to all councilmembers, the council chief of staff and the lead staff for the planning, rural
25 service and environment committee, or its successor;

26 NOW, THEREFORE, BE IT MOVED by the Council of King County:

27 The receipt of the report entitled Snow and Ice Response Plan Report, included as
28 Attachment A to this motion, is hereby acknowledged.
29

Motion 15540 was introduced on and passed by the Metropolitan King County Council on 10/23/2019, by the following vote:

Yes: 8 - Mr. von Reichbauer, Mr. Gossett, Ms. Lambert, Mr. Dunn,
Mr. McDermott, Mr. Dembowski, Mr. Upthegrove and Ms. Kohl-
Welles
Excused: 1 - Ms. Balducci



KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

A handwritten signature in blue ink, appearing to read "Rod Dembowski", written over a horizontal line.

Rod Dembowski, Chair

ATTEST:

A handwritten signature in blue ink, appearing to read "Melani Pedroza", written over a horizontal line.

Melani Pedroza, Clerk of the Council

Attachments: A. Snow and Ice Response Plan Report



King County

Department of Local Services
Road Services Division

Motion 15540 Attachment A

King County Department of Local Services Road Services Division

Snow and Ice Response Plan Report

Submitted in Response to 2019-2020 Biennial Budget Ordinance 18835, Section 57, Proviso P1



July 23, 2019

Executive Summary

The King County Department of Local Services Road Services Division (“Roads”) maintains approximately 1,500 miles of roads and 182 bridges within unincorporated King County. As part of its mission, Roads conducts sanding and snow removal operations to mitigate hazardous driving conditions during snow and ice events. As snow events materialize, Roads mobilizes a strategic response commensurate with the scale of the winter storm and its anticipated impact to the County’s prioritized system of designated snow and ice routes.

Roads is currently resourced to clear a limited subset of designated snow and ice routes affected by localized storm events, typically within three days. As winter storms grow in size, intensity and duration, Roads resources are supplemented by other King County agencies. During countywide weather events, Roads, with the support of partner agencies, can clear all designated snow and ice routes (583 miles) typically within five days. With severe back-to-back storm events, such as the February 2019 winter weather emergency event, King County’s resources are stretched to the limit, where it is not possible to clear designated snow and ice routes as quickly as in smaller-scale events. During a severe storm, all available resources (including utilizing mutual aid agreements with other jurisdictions when feasible) are deployed to clear priority roads, support emergency response, and dig out snowbound communities. When not reacting to emergency needs, designated snow and ice routes continue to be cleared using a prioritized approach.

In response to the proviso, Roads identified 70 new miles of roads that could be added to the existing 583 miles of designated snow and ice routes, including 20 miles of contingency routes.¹ These additional route miles would improve service to neighborhoods and enhance connectivity and mobility within the existing system of designated snow routes. In addition to this potential increase in snow and ice route mileage, Roads has identified the resources needed to reduce the amount of time it takes for the County to clear all designated routes to bare ground following a countywide snow event. Additional mileage and timeliness improvements would require additional resources, which are described in detail in this report.

This report identifies three potential options to increase King County’s snow and ice response resources and level of service in the unincorporated areas. The first option involves retaining an on-call snow and ice response contractor to augment County staff during countywide storm events. Retaining on-call snow and ice contract services would provide a flexible solution to supplement existing County snow and ice response resources. This option has the lowest cost of the three options evaluated and is the preferred option identified in this report.

The second option would be to hire additional year-round Roads employees and purchase additional snow and ice equipment. These staff would be fully-trained and ready to respond to winter weather

¹ Contingency snow and ice routes, as proposed within this report, include 20 miles of lower elevation neighborhood roads that are included in Road’s annual work plan, but not specifically mapped, as part of the County’s designated snow and ice routes. Contingency routes are intended to provide for flexible deployment of snow response resources, as needed, during emergent storm events in lowland neighborhoods of unincorporated King County.

events, while also performing other needed seasonal road maintenance work, such as drainage improvements, when not on snow and ice duty. This is the highest cost option; however, if additional stable funding was available to support year-round work for these crews, this option could be very effective and efficient in the future.

The third option is to further leverage resources from other King County agencies by outfitting select Parks and Recreation Division (Parks) trucks with snow plowing and sanding capabilities and identifying additional staff to operate that equipment. The initial one-time capital costs to purchase snowplow and sanding equipment are high. In addition, it has not been determined if an adequate number of qualified, licensed employees could be found within the County's work force to operate the equipment during storm events.

Regardless of the option ultimately selected, Roads will continue to partner with other County agencies to leverage existing labor and equipment during larger storm events and continue to explore expanded partnership and collaboration opportunities as feasible.

1. Introduction

The King County Road Services Division (“Roads”) of the Department of Local Services maintains roads within unincorporated King County. As part of its mission, Roads conducts sanding and snow removal operations to mitigate hazardous driving conditions during snow and ice events. As snow events materialize, Roads leadership mobilizes a strategic response for designated snow and ice routes. Snow and ice removal activities are dynamic and reflect many factors including: King County’s annually updated Snow and Ice Route Plan; the magnitude of the storm event; evolving weather conditions; weather forecasts; best professional judgment; and the staffing and equipment resources available to maintain safe road conditions within unincorporated King County.

In areas of the country impacted by winter weather, local governments must prioritize response and service delivery, recognizing that not every road can be treated or cleared simultaneously during the immediate period of the storm event. When a severe storm event occurs, priorities are identified, and the needs of the area are triaged to deploy resources to meet the most pressing needs. As a result, it is a typical practice for public works agencies to address local roads only in the aftermath of a severe storm event when it is safe to redirect resources from more highly traveled routes.

King County’s response to winter storm events aligns with industry best practices, including other local government’s prioritized approaches to snow removal.² Roads strategically directs its finite resources, including additional County staff and equipment from other County departments, to maintain travel access on unincorporated roads. The County’s approach to sanding and snow removal reflects a prioritized progression through designated snow and ice routes, from main roadways such as primary arterials to minor arterials and local roads. Because it is not possible to simultaneously plow every road that is part of the County’s designated and prioritized snow and ice routes, even with all staff and equipment resources engaged, it is necessary for Roads to prioritize emergency response needs, with Roads staff working around the clock on 12-hour shifts as needed to clear roads and mitigate hazardous driving conditions during and after snow and ice events.

1.1 Proviso Report Overview

King County’s Adopted 2019-2020 Budget includes a proviso requesting the Executive to provide a plan to increase the total number of miles of snow routes for future snowstorm events in the unincorporated area of King County. The text of the proviso is provided below.

Ordinance 18835, Section 57, Proviso P1

PROVIDED THAT:

Of this appropriation, \$50,000 shall not be expended or encumbered until the executive transmits a plan to increase the total number of miles of snowplow routes for future snowstorm events in the unincorporated area of King County and a motion that should

²Research to support preparation of this report comes from best practices identified at the 2019 APWA Snow Conference and a review of industry best practices across 18 snow and ice response programs from around the nation, including Seattle, Washington State Department of Transportation, Snohomish County, and Pierce County.

acknowledge receipt of the plan and reference the subject matter, the proviso's ordinance, ordinance section and proviso number in both the title and body of the motion, and a motion acknowledging receipt of the plan is passed by council. The plan shall include, but not be limited to:

- A. A description of all current snowplow routes;*
- B. A description of all proposed new snowplow routes, in descending order of priority, to receive snowplow service in future snowstorm events under the plan, including the general description of their location in unincorporated King County and the number of miles per route; and*
- C. An analysis of resources, including, but not limited to, additional county personnel and county equipment or contracting for services necessary to achieve the increase in the total number of miles of snowplow routes for future snowstorm events in the unincorporated area of King County proposed by the plan.*

This report responds to the proviso as follows:

- Section 1 provides an overview of this proviso response and includes working definitions for typical snow and ice events experienced within King County;
- Section 2 summarizes existing snow and ice routes for unincorporated King County roads;
- Section 3 includes a proposal for additional routes to be added to King County's existing snow and ice routes;
- Section 4 provides a description of snow and ice program "levels of service";
- Section 5 provides an overview of current snow and ice program resources as well as an analysis of additional resources needed to achieve an increase in total snow and ice route mileage and improvement in level of service; and
- Section 6 contains a summary of this report's conclusions and recommendations.

This report was prepared with input from the King County Department of Natural Resources and Parks' (DNRP) Solid Waste and Parks Divisions.

1.2 Types of Snow and Ice Events in King County

Winter weather events in King County often lack predictability and are variable in geographic extent and severity. Consequently, resources needed to respond to such events also vary depending on the type of storm, its characteristics, and where it happens. A shifting climate is expected to produce greater variability to precipitation patterns in the Pacific Northwest.³ In response to these fluctuating elements, the County's snow and ice response program needs to be flexible and scalable to be responsive for highly variable winter weather patterns and conditions. For the purposes of this proviso report, three generalized types of winter storms that typically impact King County roads are included:

³ [Our Changing Climate in King County](#)

localized, countywide and severe storm events. The following are working definitions for each storm type.

Localized events

The most common snow and ice events in King County are of limited duration and geographic extent. These events typically affect areas above 500 feet and/or specific subareas of the County. Such localized events may include a forecast of any of the following conditions: a storm producing at least two inches of snow or severe frost with temperatures below 25 degrees; a storm producing snow accumulation between two inches and one foot; or freezing conditions with ice on the roads. Localized snow and ice events requiring a County response typically occur more than once per year within unincorporated King County. Since these events are geographically limited, far fewer road miles need to be cleared than for the countywide and severe storm events discussed below.

Countywide events

Countywide snow and ice events are characterized by heavy snow falling over all or the majority of unincorporated King County, with accumulations of more than two inches of snow in the lower elevations and additional accumulations of up to one foot of snow in elevations above 500 feet. These countywide snow events occur with an average recurrence interval of two to three years. For the purpose of this report, a countywide storm is defined as one storm event, not multiple back-to-back winter storms. Multiple, back-to-back storms cross over into the following severe storm category.

Severe Storm events

Historical data shows that approximately once every eight to ten years on average, King County experiences a severe storm event made up of multiple consecutive storms producing significant icing or depositing one or more feet of snow throughout the County. Severe storm events may last multiple days, or even weeks, and tax the resources of state and local governments. The most recent example of a severe winter storm event occurred during February 2019, when three back-to-back snowstorms cumulatively deposited between one to two feet of snow over a 17-day period.

2. Current Snow and Ice Routes

King County's current snow and ice routes comprise 583 centerline miles of unincorporated County roads, as mapped in Figure 1. These snow and ice routes include primary arterials, lifeline routes⁴, transit routes and minor arterials feeding densely-populated areas. King County's current snow and ice routes are organized and prioritized for treatment using four categories, with each category reflecting a different set of traffic volumes, arterial classifications, emergency route designations, maintainability, safety and other considerations. Please see Table 1 for details. Roads updates its designated snow and ice routes annually, to reflect any new information or changed conditions, such as recent annexations.

⁴ Lifeline routes, a subset of unincorporated King County roads, are prioritized for snow and ice response during a winter storm event to serve first responders, hospitals, and public safety facilities.

Annually, King County updates snow and ice route maps and information guide planning and operations during winter storm events.⁵

King County snow and ice route categories assist with the strategic deployment of finite snow and ice response resources during a winter storm event. Category 1 snow and ice routes typically have the highest traffic volumes while Category 4 routes typically carry the lowest traffic volumes. During a snow event, snow and ice treatment is prioritized first for Category 1, then Category 2 and 3, and finally Category 4 routes. Table 1 provides a summary of existing designated snow and ice routes for unincorporated King County roads.

Table 1. Current (2018-2019) King County designated and prioritized snow and ice routes

Snow and Ice Category #	Description	# Centerline Miles
1	Main roadways (primary arterials, transit routes, lifeline routes) providing regional connections between communities.	232
2	Main roadways (primary arterials, main thoroughfares, and arterials leading to state highways) and minor arterials feeding densely-populated areas.	76
3	Minor collectors, which lead to and connect with Category 1 and Category 2 routes. These routes provide continuity between towns, cities, and large subdivisions.	151
4	Secondary commuter routes, which connect Category 1, 2, and 3 routes along with other jurisdictions.	124
TOTAL (1-4)	Existing snow and ice routes	583

3. Potential New Snow and Ice Routes

This report identifies a potential new category of snow and ice routes to add to King County's existing inventory of Category 1 – 4 snow and ice routes. The new Category 5 snow and ice routes would be primarily comprised of neighborhood collector roads that are not currently included in the Category 1 – 4 routes. This new category would add an additional 70 centerline miles of prioritized routes to the County's existing 583 centerline miles of Category 1 - 4 snow and ice routes (Table 2).

Category 5 snow and ice routes were identified through a Road's Division evaluation of urban and rural neighborhood collector roads, many of which have been the subject of common public requests to the County for snow and ice treatment during past winter storm events. This subset of unincorporated County roads was further evaluated with respect to the 500 foot elevation line, a common threshold for rain/snow transitions. Approximately 50 centerline miles of neighborhood collector routes, located

⁵ Each year during the third quarter, Roads updates the County's snow and ice routes to reflect best available information. This document, titled *2018-2019 King County Snow and Ice Routes*, is used by staff to guide snow and ice response operations and programming.

above 500 feet in elevation, are identified for inclusion within Category 5 snow and ice routes (Figure 1) and would be added to the total miles of roads to be cleared by the Roads Division. These new potential Category 5 routes would improve King County’s snow and ice route connectivity within neighborhoods, between neighborhoods, and better connect neighborhoods to the larger roads that are part of the County’s existing Category 1 – 4 snow and ice route system.

Though less frequent in occurrence, some winter weather events produce snow and ice in the lowland (below 500 feet elevation) portions of unincorporated King County. Due to the unpredictable nature of winter weather events in Western Washington, localized lowland snow events are challenging to predict. Accordingly, this report identifies an additional 20 contingency miles of lower elevation Category 5 snow and ice routes. These 20 contingency miles are not mapped to give Roads staff the flexibility to deploy resources as needed. Thus, contingency areas are identified (see Figure 1) in Category 5 to reflect possible lowland routes located below 500 feet in elevation that may be impacted by snow and ice. These Category 5 contingency miles would improve the County’s flexibility and responsiveness to emergent storm conditions in lowland neighborhoods of unincorporated King County.

Table 2. Existing and potential new snow and ice routes for unincorporated King County roads

Snow and Ice Category #	Description	# centerline miles
1 - 4 (existing)	See Table 1 for description of current Snow and Ice Route Categories	583
5 (new)	Neighborhood collector roads above 500 feet in elevation (50 miles) plus additional contingency lowland neighborhood collector road miles (20 miles)	70
Total (1 – 5)	Existing and potential new snow and ice routes	653

4. Level of Service

For the purpose of this report, Roads defines level of service for snow and ice response as the amount of elapsed time it takes from the beginning of the storm to clear roads of snow to a bare ground condition along the County’s designated and prioritized snow and ice routes.

Roads snow and ice response generally consists of three phases: (1) making roads passable by plowing and applying sand and/or salt mixtures to the roadway; (2) widening the plowed area to the edge of the shoulders so that snow melt does not refreeze on the roadway; and (3) general cleaning up, such as removing sand, slush and downed tree limbs from the roadway. It is often necessary to make multiple snowplow passes over each road segment, to achieve the snow removal goal of reaching bare ground conditions.

During all types of storm events, snow and ice crews first respond to emergency requests, such as requests to aid in restoring power or other life safety needs, irrespective of the snow and ice route category of the road. Outside of emergency requests, snow removal work is prioritized and sequenced to clear snow and ice routes to bare ground, as prioritized within the County’s annually updated Snow and Ice Route Plan, starting with Category 1 routes and then moving on to Category 2, 3, and 4 snow and ice routes respectively.

4.1 Current Level of Service for King County’s Snow and Ice Program
 King County’s snow and ice levels of service, or the elapsed time it takes from the beginning of a storm to clear prioritized snow and ice routes to bare ground, vary by storm event type. The descriptions below summarize current levels of service by storm type.

Localized Storm Events - Level of Service

Localized storms only impact a subset of the County’s total designated snow and ice route mileage. Because the mileage is limited, Roads has adequate funding, staff and equipment to clear those roads to bare ground, typically within three days (Table 3). To accomplish this, Roads may strategically shift equipment and staff resources from different sections of the County to direct resources to subareas of the County with roads impacted by a localized storm. In a typical localized event, this level of service can be achieved within three days. For example, in December 2018, two back-to-back localized winter storm events resulted in a snow and ice response that cleared 75 miles of road to bare ground within the three-day period.

Table 3. Localized storm level of service, assuming current resource availability

Localized storm	# of days snow route cleared to bare ground
Category 1 Routes	Day 1
Category 2 Routes	Day 1 and Day 2
Category 3 Routes	Day 2 and Day 3
Category 4 Routes	Day 3

Countywide Storm Events - Level of Service

During countywide storm events, Roads supplements its existing staff and equipment with resources from the King County Parks and Solid Waste Divisions. With its current level of resources, as supplemented by resources from other divisions, Roads can clear prioritized Categories 1 - 4 snow and ice routes, which total 583 centerline miles, to bare ground within five days of the start of the storm event (Table 4).

Table 4. Countywide storm level of service, assuming up to 583 miles of snow routes affected and current resource availability

Countywide storm	Up to 5 days
Category 1 Routes	Day 1
Category 2 Routes	Day 2
Category 3 Routes	Day 3
Category 4 Routes	Day 4 and Day 5

Severe Storm Events - Level of Service

In a severe storm event, Roads does not have the resources (staff and trucks) that allow it to meet the service goal of clearing all designated snow and ice routes to bare ground within five days, which is the service goal associated with smaller countywide events. While the current snow and ice route plan is used to guide resources, in severe storm events life safety situations often necessarily take precedence over the planned prioritized response. In a severe storm event, Roads marshals all available resources, including those of other County agencies, and sometimes through mutual aid agreements with other jurisdictions, to direct snow removal efforts and achieve safe road conditions in unincorporated King County as quickly as conditions allow. This level of response was seen in the February 2019 snow event. A key takeaway from the experience of this event is that the amount of time it takes to clear designated snow and ice routes to bare ground varies during a severe storm since conditions are unpredictable and emergency response needs tend to escalate.

4.2 Level of Service Improvements for Countywide Snow Events

The service improvements described in this report focus on countywide storm events, because this is where improvements are most needed and where the best cost benefit can be realized. Localized storm events, because they are limited in geographic extent and duration, are typically manageable with Roads’ existing resources; making additional investment in resources not necessary or cost effective. While severe storm events are not the focus of this report because they tend to be very infrequent – sometimes decades between events – and unpredictable, the County’s response to severe storm events will benefit from any improved response and resourcing strategies developed for countywide events.

This report outlines a potential level of service improvement to Roads’ snow and ice response that includes the following:

- Adding 70 additional centerline miles of local neighborhood collector roads, as a new Category 5 snow and ice route category, to the County’s existing system of designated routes. This would increase the number of prioritized road miles to be cleared during countywide snow events from 583 to 653. This includes 20 contingency miles as described above.
- Targeting all snow and ice routes (including existing snow and ice routes plus the new Category 5 routes) to be cleared to bare ground within four days following a countywide snow event. This is one day less than it now currently takes to clear just the existing Category 1-4 routes.

These improvements are summarized in Table 5.

Table 5. Comparison of current and identified levels of service improvements, for snow and ice response following a countywide storm

Storm Event Type	Current Level of Service (# days for Category 1 – 4, 583 miles of snow routes to be cleared to bare ground)	Identified Level of Service Improvements (# days for Category 1 – 5, 653 miles of snow routes to be cleared to bare ground)
Countywide storm	Up to 5 days	Up to 4 days
Category 1 Routes	Day 1	Day 1
Category 2 Routes	Day 2	Day 2
Category 3 Routes	Day 3	Day 2 and Day 3
Category 4 Routes	Day 4 and Day 5	Day 3 and Day 4
Category 5 Routes	N/A	Day 4

5. Analysis of Resources

This section of the report first provides an overview of the County’s existing snow and ice response resources. Next, three approaches to achieve additional route mileage and improved snow and ice response level of service are evaluated to better understand additional resources needed.

5.1 Current Snow and Ice Response Resources

Existing King County snow and ice response resources available to support winter storm events include:

Personnel - Across King County Agencies:

- Within Roads, there are currently 115 FTEs including drivers, operators and utility workers available to support snow and ice response.
- Up to 18 drivers and operators from other King County agencies, such as DNRP Solid Waste and Parks Divisions.

Equipment

- 6, 5-yard trucks with interchangeable attachments including snowplow, and sander and anti-icer combinations
- 22, 10-yard trucks with snowplow and sander combinations
- 1, 1-ton truck with snowplow and sander
- 8 graders
- 9 backhoes
- 7 front loaders
- 5, 10-yard dump trucks
- 23 pickup trucks

- various trucks and equipment from other County agencies, as needed and available

Facilities to store/access materials:

- 8 alternate sand sites, geographically dispersed throughout the County
- 6 divisional maintenance sites with salt and sand stockpiles and anti-icer tanks

5.2 Options and Resources to Enhance Snow and Ice Response

The enhanced response service described in this subsection includes adding 70 new centerline miles of Category 5 snow and ice routes treated during countywide snow events and shortening the total amount of elapsed time it takes during a countywide snow event to clear all designated snow routes to bare ground to four days. Three options were identified to expand County resources to better serve the communities and neighborhoods throughout unincorporated King County and to achieve identified level of service improvements during a countywide snow event. While the four-day clearing goal would likely not be feasible during a severe storm event due to its characteristic severe and unpredictable conditions, the additional resources outlined below could possibly be deployed to incrementally improve service.

Option 1. Retain an on-call snow and ice contractor

The first option involves expanding the capacity of Roads' snow and ice response by retaining the services of one or more private snow and ice contractors to supplement King County staff and equipment resources on an as-needed basis during countywide winter storms. Other municipalities, such as Seattle, retain snow removal contractors to supplement their resources. The evaluation of this option was informed by review of the most recent City of Seattle snow removal contract.

To meet the countywide storm level of service goals outlined within this report, Roads estimates that the County's existing snow and ice labor and equipment resources would need to be supplemented by a total of 10 truck drivers, four equipment operators and two supervisors. The contractor would supply their own equipment (large dump trucks, graders, etc.). The costs associated with this option are summarized in Table 6 and reflect the following assumptions:

- On-call contracted services would supplement existing King County snow and ice staff, equipment and materials
- On-call contracted snow and ice services require 24 hours to mobilize
- On-call contracted resources would be deployed for a total of four days during each countywide storm event
- The on-call contractor would provide their own equipment and staff
- The on-call contractor would supervise their own staff, as directed by King County Roads
- This option was assessed for countywide storm events only, though contracted resources could be used in severe storm events:

Table 6. Estimated annual cost for on-call private contractor (Option 2)⁶

Cost Category	Additional Cost/Resources
Annual contractor retainer fee	\$50,000
Contractor snow response services, for one countywide snow event (labor + equipment)	\$300,000
Total Annual Cost (assumes one countywide snow event)	\$350,000

This option would provide scalable, flexible deployment of resources on an as-needed basis. A key factor for successfully deploying this option is the availability of contractors who are interested and have the capacity to provide these snow and ice response services. It would be a priority to contract with companies who utilize a represented workforce.

Option 2. Expand the Roads work force and purchase additional snow and ice equipment

The second option involves expanding the capacity of Roads’ snow and ice work force by hiring 18 additional County employees in the Roads Division to supplement the existing roster of drivers, utility workers, and equipment operators. In addition to hiring employees for additional snow and ice response crews, this option would require the purchase of additional snow and ice equipment to supplement Roads’ current fleet.

A guiding assumption for this option is that new staff hires would need to be full-time, year-round King County employees who support snow and ice response during the winter months and perform other seasonally appropriate maintenance and operations activities, such as drainage work, when not participating in snow and ice response.

The reason for assuming full-time, year-round staffing, rather than winter seasonal staffing, is that it is extremely challenging to attract, train, and retain skilled workers from year to year for winter seasonal employment. Other obstacles to hiring a seasonal workforce to support snow and ice response work includes a limited number of qualified individuals licensed and trained to drive snowplows on County roads under dangerous winter weather conditions. The most effective way for Roads crews to provide timely, safe and reliable snow and ice removal is by keeping licensed and trained staff employed on a year-round basis so they are available and ready to deploy when needed. The following assumptions guided an assessment of Option 2:

- Hire 18 full time, year-round employees to staff additional snow and ice crews that supplement existing King County drivers, utility workers and operators
- New hires would support snow and ice response during winter months and other Roads maintenance and operations, year-round
- A one-time capital investment to purchase new equipment for additional snow response crews to include:

⁶ Rates for option 1 reflect the City of Seattle’s current snow removal contract rates

- 6, 10-yard dump trucks with plow attachments
- 2 pickup trucks
- 4 crew trucks
- 653 centerline miles of designated and prioritized snow and ice routes cleared to bare ground within four days from onset of a countywide storm event.
- Planning level cost estimates for this option includes employee and equipment costs associated with snow and ice response; cost estimates do not reflect other (non-snow) seasonal projects and work program costs

Table 7. Estimated annual cost for hiring additional Roads staff and purchasing equipment to supplement Roads existing snow and ice resources (Option 2)

Cost Category	Option 2*. Additional Cost/Resources
Labor <i>NOTE:</i> Annual costs associated with new employee hires reflect full time, year-round salaries, given challenges associated with hiring a trained seasonal, winter-only labor force	\$2,705,918 (assumes 18 new employees for 12 months to supplement existing staff)
Equipment (one-time capital expense)	\$3,205,000
Equipment (ongoing Fleet rental fees) ⁷	\$1,493,000
Year 1, TOTAL COSTS (year 1 includes one-time equipment cost)	\$7,403,918
Ongoing (year 2 and beyond) TOTAL ANNUAL COSTS	\$4,198,918

*This option presents annual costs associated with hiring 18 new full time, year-round employees needed to achieve the identified level of service improvements for snow and ice response. New employees would work on other Roads maintenance and operational tasks, such as drainage, outside of winter weather events. The total annual cost presented for this option accounts for the full annual costs of 18 additional FTEs, it does not account for the full cost of the other programs these staff would work on.

Option 3. Leverage additional resources from other King County agencies

The third option identified is a collaborative approach with Department of Natural Resources and Parks which involves leveraging existing, non-Roads Division King County resources to enhance Roads’ service during a countywide snow and ice event.⁸ This option would not produce the additional supplementary snow and ice resources needed to achieve this report’s improved level of service of 653 miles of snow routes cleared to bare ground in four days. Instead, this option would result in 600 miles of routes cleared; the difference is a function of too few appropriately sized snowplow trucks. Further, this option has significant labor implications which would need to be addressed with the County’s labor partners.

⁷ Rental fees are based on FEMA rates that are scaled to reflect the type of equipment. FEMA rates are used post disaster declaration cost recovery purposes.

⁸ DNRP participated in the preparation of this snow and ice response option.

Currently, during a countywide or severe snow event, labor and equipment resources from the King County Parks and Solid Waste Divisions are called upon to help support Roads' snow and ice response. Roads maintains an annually updated roster of qualified Parks and Solid Waste employees who may be called upon to assist as truck drivers and equipment operators during a countywide snow event. In 2019, this roster contained:

- 14 qualified truck drivers who meet federal standards
- 4 qualified equipment operators

A significant issue that would need to be resolved prior to implementing this option is obtaining enough licensed drivers and utility workers to support the addition of six more snowplow trucks. Since Solid Waste and Parks staff already assist Roads crews by driving Roads' existing snowplow trucks and transporting salt and sand materials, the additional human resources needed to support six additional snowplow trucks exceeds the number of Solid Waste and Parks Division staff who are available to assist Roads during countywide or larger winter storm events.⁹ Relying on staff from other departments defers and delays work in their programs. Parks, for instance, was not able to address the winter storm-generated needs at many park facilities because Parks' staff were assisting with road snow and ice removal activities, leading to a substantial backlog in addressing snow removal at major parks sites and access roads. Tapping additional staff from other departments would increase this impact. This option would require further discussions with other departments and labor partners.

Should it be determined that it is possible to increase the number of available truck drivers and equipment operators through expanded interagency agreements and additional funding, it will be necessary to address the needs for additional large dump trucks outfitted with snowplows. Though other King County agencies currently operate large trucks, most of these vehicles do not meet the required specifications to safely support snow and ice response activities.

In partnership with Parks and Solid Waste Divisions, vehicle inventories and replacement schedules were evaluated for this analysis. The types and quantities of existing trucks that could potentially support a snowplow were assessed relative to where each vehicle is in its life cycle. Roads staff also inquired regarding near-term plans to invest in new dump trucks capable of being outfitted with snowplows, for larger trucks nearing the end of their life cycles.

A total of six Parks trucks were identified as potential candidates to serve in the future for snow plowing, sanding and anti-icing. Solid Waste's fleet utilizes tractor-trailer vehicles that are not suited to serve as snowplows. Parks currently has four 5-yard swap loader trucks that could be retrofitted for snow and ice response functions.

Parks also has four 10-yard dump trucks, none of which can be safely or economically retrofitted to serve as snowplows. Two of these larger-sized dump trucks are due for replacement in 2020, and there is potential for the newly-replaced trucks to be equipped with necessary snowplow equipment. From this analysis, this option assumes a maximum of six Parks Division trucks, four existing trucks to

⁹ Based on utilization data from previous snow and ice events.

be retrofitted and two new, appropriately outfitted trucks that may be available to support King County snow and ice response in the near-term.

The cost of retrofitting an existing truck, or outfitting a new truck, for snow and ice response is estimated at approximately \$100,000. Many details regarding the implementation and timelines associated with this option would need to be worked out with the other agencies. For the purposes of this proviso response, Table 8 summarizes the estimated cost of the snow and ice response equipment purchase and the additional labor needed to operate these King County trucks on a 24/7 basis, during one countywide snow event.

To achieve this report’s identified level of service (653 miles of snow routes cleared to bare ground in four days) a total of ten additional snowplows are needed to supplement the County’s existing snow and ice resources. This option identified the potential for six additional snowplows, so long as existing and newly-replaced trucks were retrofitted with a snowplow and other snow and ice response equipment. Six additional trucks, leveraged from non-Roads agencies, would result in 600 centerline miles of roadway cleared in four days – 53 miles less than the improved level of service for snow and ice response identified within this report. However, this option still represents a notable increase over current capabilities.

Table 8. Estimated cost for leveraging additional King County resources (Option 3)

Cost Category	Option 3. Additional Cost/Resources
Labor to operate 6 snowplow trucks for 24/7 response: 12 drivers and 4 equipment operators	\$78,000 per countywide event
Equipment (one-time capital expense):	
• Retrofit four existing 5-yard swap loader trucks for plowing, sanding and anti-icing	\$400,000 (@\$100,000/truck)
• Outfit two 10-yard dump trucks with snowplows when trucks are replaced in 2020	\$200,000 (@\$100,000/truck)
Total one-time capital equipment cost	\$600,000
Equipment (rental) per storm	\$36,000
Year 1, TOTAL ANNUAL COSTS (year 1 includes one-time equipment cost)	\$714,000 per storm event
Ongoing (year 2 and beyond) TOTAL ANNUAL COSTS	\$114,000 per storm event

Comparison of Options

An assessment of three options to increase the capacity of King County’s snow and ice response indicates that Option 1 (retaining an on-call snow and ice contractor), is an economically feasible and scalable near-term solution. The costs associated with both Option 2 (expanded Roads workforce and purchase equipment) and Option 3 (leverage additional resources from other King County agencies) are much higher and would significantly impact Roads’ budget, resulting in either reduction or elimination of other critical programs or an infusion of funds on an ongoing basis. Table 9 provides a comparative summary of Options 1, 2, and 3.

Table 9. Comparison of Option 1, 2 and 3, additional costs and resources needed

Planning Level Cost Estimate for Additional Costs/Resources			
Cost Category	Option 1: On Call Contractor	Option 2: Expanded County Workforce & purchase equipment**	Option 3: Leverage additional resources from other County agencies
Labor	\$250,000* (vendor hourly rate inclusive of labor + equipment)	\$2,705,918 (18 new full-time employees)	\$78,000*
Equipment (new)	Included above	\$3,206,000 (one-time capital investment)	\$600,000 (one-time capital investment)
Equipment (annual rental fees)	n/a	\$1,493,000	\$36,000*
Annual retainer	\$50,000	n/a	n/a/
PROJECTED Year 1 TOTAL COSTS (Annual)	\$300,000*	\$7,403,918	\$714,000*
PROJECTED TOTAL ANNUAL COSTS (Ongoing)	\$300,000*	\$4,198,918	\$114,000*

* Estimated cost reflects one countywide snow event. Historical trends suggest that countywide snow events occur approximately every 1-2 years.

**This option presents annual costs associated with hiring 18 new full time, year-round employees needed to achieve the identified level of service improvements for snow and ice response. New employees would work on other Roads maintenance and operational tasks, such as drainage, outside of winter weather events. The total annual cost presented for this option does not account for the full cost of the other programs these staff would work on.

6. CONCLUSION

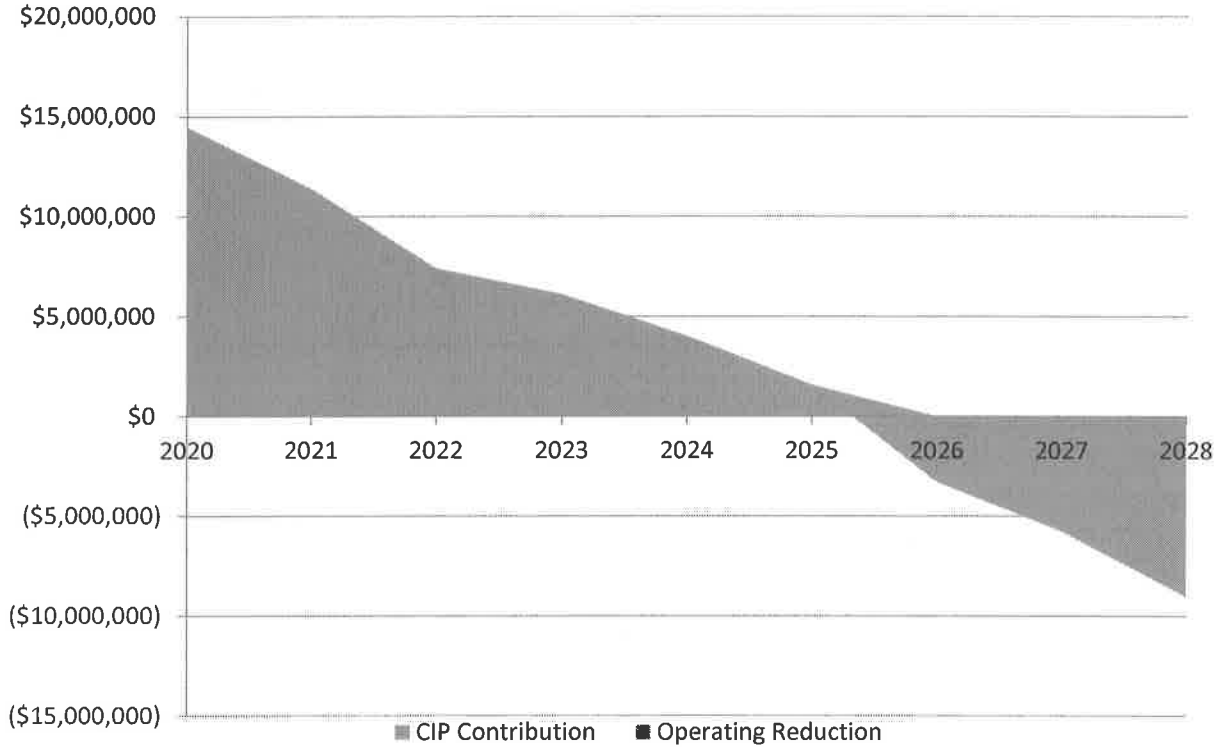
As required by the proviso, this report provides a description of all current snowplow routes and a description of proposed new routes that could receive service in the future. The Roads Division identified 70 new miles to add to the existing designated snow and ice routes, while seeking to reduce the amount of time to clear all routes during a countywide event from five days to four. Also as required, this report analyzed the personnel and equipment necessary to increase the number of miles plowed.

Three potential options to increase snow and ice response services to residents in unincorporated areas of King County during a countywide snow event, with a preferred option are identified. The three options evaluated for resourcing this improvement include: 1) retain an on-call snow and ice contractor; 2) expand the Roads work force and purchase additional snow and ice equipment; and 3) leverage additional resources from other King County agencies. Because localized events impact only a subset of the County's total designated snow and ice route mileage and can be addressed with current resources, no changes are recommended for localized storm events.

Retaining an on-call snow and ice contractor found in Option 1 offers the greatest flexibility to meet service needs within the constrained County resource environment. Retaining on-call snow and ice contract services provides a cost effective approach to supplementing existing County snow and ice response resources on an as-needed basis. This option could be implemented in time for the 2019-2020 winter season at a reasonable cost that will not severely impact other essential Roads programs.

Roads continues to struggle to meet its preservation service goals for unincorporated King County roads and bridges due to the County's structural gap between revenues and expenditures, where expenditures increase at a greater rate than the revenues the County is allowed to collect. The increasing cost of current service levels without a commensurate increase in revenues will directly impact Roads capital and maintenance programs. Without new and sustainable funding identified, Roads will reach a point within six years where there are no funds to support a capital program as illustrated in figure 2. Within this same timeframe, Roads would also be forced to reduce basic maintenance and operations services, including snow and ice response, in order to operate within available revenues. Without new revenue sources, adding the additional 70 miles to the snow and ice routes identified in this report will accelerate the impact to other programs and projects.

Figure 2. Decline in Roads CIP Contribution and Future Operating Reduction (2019-2028)
Decline in CIP Contribution and Future Operating Reduction (2019-2028)
(Based on 9/12/2018 Financial Plan)



Should sustainable, additional funding be identified for a wide range of Roads maintenance and preservation needs, including snow and ice removal, Option 2 that enhances the County workforce might be a viable and attractive option. While Option 3 is identified as a possibility, it is not recommended because of the high, one-time capital costs and it has not been determined if an adequate number of qualified, licensed employees could be found within the County’s workforce to operate the equipment during storm events.

The Department of Local Services and its divisions, including the Road Services Division, are committed to innovatively serving the residents of unincorporated King County. Moving forward, Roads will continue to pursue enhanced partnerships and agreements with other King County agencies, and potentially other jurisdictions as opportunities arise, to secure additional drivers and equipment to supplement Roads resources on an as-needed basis during countywide or severe storm events.

Figure 1. Snow and Ice Response Routes with new Category 5 routes and contingency areas identified

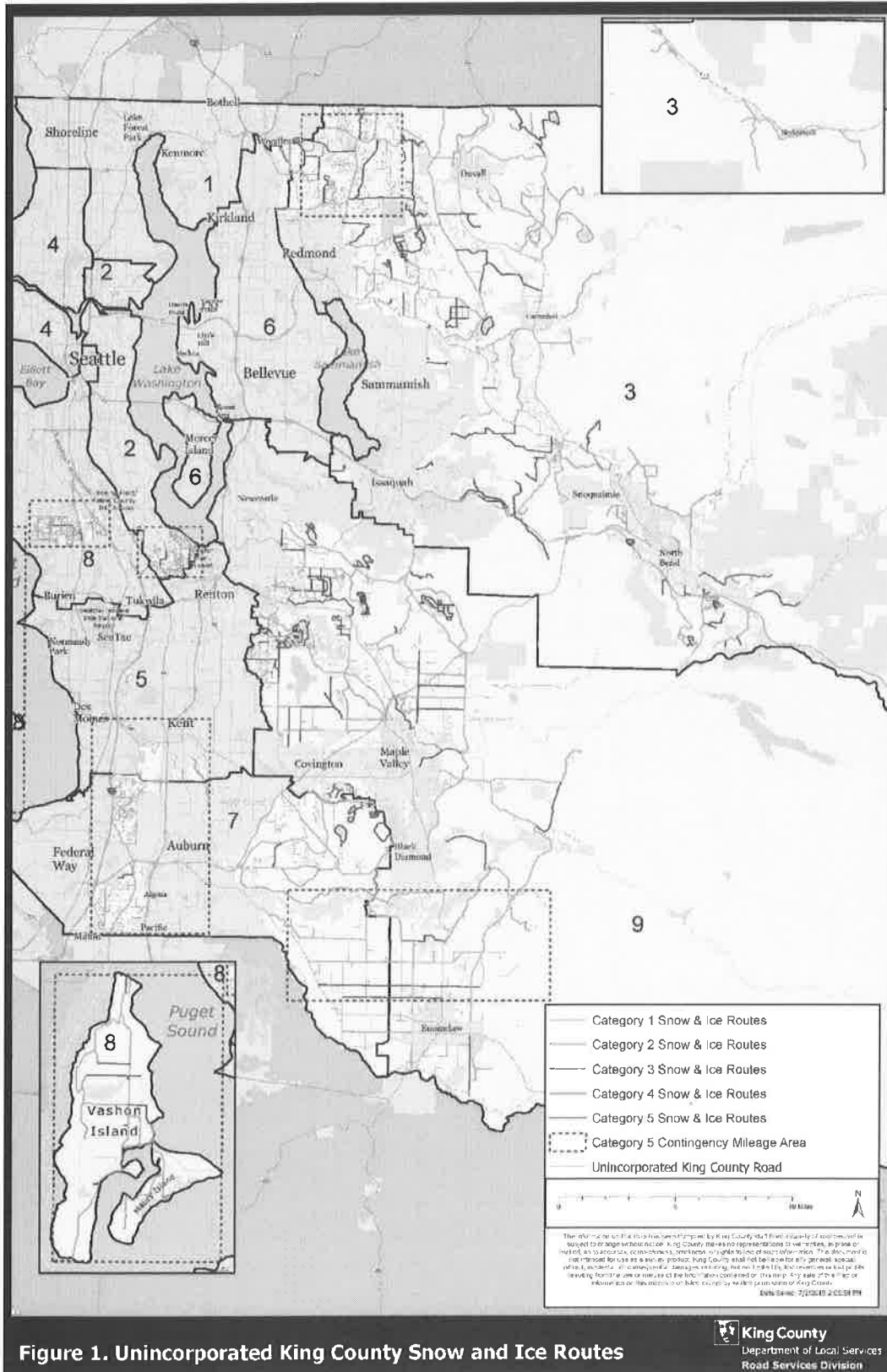


Figure 1. Unincorporated King County Snow and Ice Routes