METRO HIGHWAY JURISDICTIONAL TRANSFER FRAMEWORK

Cost Estimating Methodology DRAFT

Date: October 2019

Subject: Cost Estimating Methodology Memo

1 Introduction

1.1 Purpose of the Regional Framework for Highway Jurisdictional Transfer

The purpose of the regional framework for highway jurisdictional transfer study (study) is to identify which state-owned routes in greater Portland should be evaluated and considered for a jurisdictional transfer, identify gaps and deficiencies on those routes, regionally tier the routes, and address some of the opportunities and barriers to transfer the tiered routes. For the purposes of this study, jurisdictional transfer (also referred to as interjurisdictional transfer) is the process of changing ownership of a highway right of way from the State to a local jurisdiction – a city or county. The decision framework will serve as a tool for state, regional and local jurisdiction leaders to identify promising candidate roadways for transfer and facilitate successful transfer of roadway ownership. The study is convened by Metro in collaboration with the Oregon Department of Transportation (ODOT).

Metro's 2018 Regional Transportation Plan (RTP) identified a jurisdictional transfer assessment as a necessary step to help the region meet its equity, safety and multimodal goals. In greater Portland, ownership patterns of streets, roads and highways reflect historical patterns, but do not necessarily reflect current transportation, land use and development needs.

Several arterials in greater Portland were originally constructed to provide connections from farmland to the city (referred to as "farm-to-market" roads). Over time, they grew to become highways. In 1956, the federal government began building the Interstate Highway System (known as the Dwight D. Eisenhower National System of Interstate and Defense Highways) and between 1960 and 1980 the highway system in the Portland area was built. It included limited access facilities such as Interstate (I-)5, I-205 and Highway 26, which provided more efficient long-distance travel options and replaced the function of the existing state system. Since then, much of the land surrounding these highways has evolved to accommodate population growth, new development and diversified land use. As a result, many of the original roads now serve multiple travel needs, providing space for people walking and biking, transit and short-distance travel for vehicles. Roadway designs that were useful last century do not always work for our communities today. Managing these roads that used to function as highways to meet the needs of our communities, especially people of color, people with low-incomes, or limited-English speakers has become increasingly complex.

While their function has changed, for many, their roadway classification and physical design has not; those that remain state highways retain the same classification identified in the 1999 Oregon Highway Plan (OHP), as amended. Transferring non-limited access state highways that function as urban arterials to local jurisdictions would allow them to be operated and maintained consistent with local design

standards that may respond better to modern transportation uses and mobility options, land use and development patterns, and community needs.

1.2 Purpose of the memorandum

This memorandum describes a methodology for estimating high-level planning costs associated with transferring ownership of a highway from one jurisdiction to another, typically ODOT to a city or county. It includes methodologies to estimate direct costs (e.g., upgrading roadway elements) and indirect costs (e.g., ongoing maintenance of roadway elements). This methodology is part of a toolkit that establishes a regional approach for how to assess needs and deficiencies for facilities under consideration for transfer and prepare assessments for each corridor segment. For the purposes of this study, a corridor segment is defined as the portion of a highway within a single jurisdiction, while recognizing that jurisdictional transfer can occur for more than one segments or a section of a segment, depending on local context.

The overall cost estimating methodology includes physical and programmatic cost considerations. Physical costs are immediate state of good repair upgrades, identified capital needs, or future maintenance projects that require construction work. Programmatic cost considerations are costs incurred as part of the ownership (i.e., soft costs) and management of a corridor over time. The following four categories address both physical costs and programmatic cost considerations to provide a full understanding of financial implications of jurisdictional transfer.

- State of good repair
- Regionally or locally identified capital needs
- Maintenance and operations
- Soft ownership costs

Subsequent sections of this memorandum describe these four categories.

The study team developed this cost estimating methodology to provide partners with a consistent process for use in developing and understanding the costs associated with a highway jurisdictional transfer in greater Portland. The methodology is based on industry practices, asset management strategies, past jurisdictional transfers, and technical expertise in consultation with ODOT staff and technical experts. Roadways require maintenance, improvements and oversight over the course of ownership. This methodology ensures partners have consistent, necessary tools to consider these variables as local jurisdictions, Metro and ODOT engage in conversations regarding highway jurisdictional transfer.

2 Methodology

The cost estimate methodology is a step-by-step process to develop cost estimates for a highway jurisdictional transfer from ODOT to a local jurisdiction; it does not estimate the costs for a specific potential transfer. It is a tool for decision-makers to understand the actual highway transfer costs and future costs (e.g., roadway maintenance). State, regional and local partners can use this methodology to determine near-term improvement costs, the cost of capital needs, long-term maintenance costs, and programmatic costs associated with a highway jurisdictional transfer.

The methodology consists of four components:

1. Establish state of good repair costs
2. Assess known or identified capital needs
3. Identify maintenance and operations costs
4. Identify soft ownership costs

2.1 Establish state of good repair costs

This section describes the methodology to evaluate existing conditions of typical corridor elements (e.g., pavement, signal systems, striping, signing, lighting, sidewalks, etc.), identify necessary improvements, develop corridor-based unit costs for improvements, and account for design and delivery costs of bringing the corridor to a state of good repair.

Why use a state of good repair approach?

A state of good repair (SOGR) approach applies a fair cost estimate to determine which roadway elements need to be upgraded so they do not impart unknown costs onto the receiving jurisdiction. At its core, a SOGR approach ensures that all corridor elements function as intended. Corridor elements are components of a roadway facility that serve an important functional need such as pavement, drainage system or signal systems.

Follow these seven steps to bring a corridor segment to a SOGR.

1. Identify and delineate corridor segment
2. Inventory programmed funded projects
3. Agree on SOGR definitions and assessment methods
4. Understand and inventory current maintenance responsibilities
5. Conduct an existing inventory and assess SOGR conditions
6. Determine upgrades
7. Assess upgrade costs

Step 1. Identify and delineate corridor segment

The first step to develop a SOGR cost estimate is to determine the corridor length and endpoints for the transfer. Frequently, a highway extends through several jurisdictions. For example, 82nd Avenue (OR 213N) extends through two jurisdictions: the City of Portland and Clackamas County. For the purposes of this study, a corridor segment is defined as a portion of a highway within a single jurisdiction.

Step 2. Inventory programmed funded projects

Conduct an inventory of current programmed state and local projects at the beginning of the SOGR cost estimate process (e.g., those projects listed in a local Capital Improvement Program (CIP), the Statewide Transportation Improvement Program (STIP), or funded through other mechanisms, such as a Legislative bill or measure that becomes law). Costs for improvements associated with programmed projects are subtracted from a cost estimate because they are already programmed and funded. Include recently completed, under construction, and programmed projects along the highway segment. Improvements can be related to maintenance, upgrades, or replacement of any roadway element along the highway segment.

Step 3. Agree on SOGR definitions and assessment methods

SOGR is a condition in which the existing assets for an element are performing their intended purpose. To ensure that both partners use a consistent set of assumptions, ODOT and the local jurisdiction must agree on the SOGR definitions and assessment methods for application. Without agreement, a local jurisdiction and ODOT may have conflicting expectations for SOGR, resulting in differing cost estimates. The typical corridor element SOGR definitions and assessment methods shown in Table 1 are provided as a recommended starting place and have been used in jurisdictional transfer discussions. The local jurisdiction and ODOT should identify any additional elements for consideration, and define each element's SOGR definition. Assessment methods may vary depending on readily-available data regarding the corridor element's condition (see Step 5).

Table 1. Corridor element descriptions, SOGR definitions, and assessment methods

Element	Description	State of good repair definition	Assessment methods
Pavement	The hard surface of the roadway that is specifically designed for vehicle traffic.	▪ Minimal hairline cracking (i.e., hard to detect) ▪ Minor patching and deformation ▪ Pavement rutting[1] is less than 0.5 inch deep ▪ Ride quality is considered very good and not noticeable to road user	▪ Collect and review data including major maintenance efforts, pavement condition reports, pavement design features, traffic, and climate conditions, and available performance data ▪ Conduct field survey to verify pavement conditions with attention given to cracking, deformation, rutting, and ride quality
Signals and signal systems[2]	The systems that control motor vehicle, bicycle, and pedestrian movements at intersections and crossings. These include vehicle signals, crossing signals, bike signals, and mid-block pedestrian crossing signals such as rectangular rapid flashing beacons (RRFB), pedestrian-activated signals, and high-intensity activated crosswalk (HAWK) signals.	▪ Signal does not have a "poor" or "very poor" rating in Oregon's Traffic Signal Asset Management rating system ▪ Pedestrian pushbutton functions ▪ Pole and cabinet are in functional condition; hardware is mounted properly; Poles do not have visual structural damage that show significant deformation or cause the pole to lean and functions per their intended purpose ▪ For ITS devices, the device and support structures function properly	▪ Review asset management documentation including ODOT's traffic signal conditions rating system ▪ Conduct field survey to assess conditions of aboveground hardware ▪ Conduct field survey to assess the physical condition of supports and above ground hardware

[1] Rutting is a depression or groove worn into a road or path by the travel of wheels.

[2] Traffic signal communications and intelligent transportation systems (ITS) include variable message signs, traffic cameras, Bluetooth readers, and traffic signal communications network connectivity devices.

Element	Description	State of good repair definition	Assessment methods
Pavement markings (striping)	All markings applied to the roadway surface including, but not limited to, lane pavement markings, turn arrows, bike lane markings and bike lane symbols, pavement bars, pavement text, and other markers applied to the roadway surface and paint for curbs (e.g., loading and emergency zones). Raised pavement markers (reflective and non-reflective) and surface-mounted tubular markers are also included.	▪ Pavement marking are not worn or missing ▪ Pavement markings are consistent with other pavement markings and signs in the corridor conveying information to road users	▪ Conduct field survey of high traffic areas to evaluate wear from traffic and consistency between striping and signs and to develop an overall percentage of pavement marking replacement per section of corridor
Signage	All regulatory, warning, and guide signs along the roadway used to direct traffic, warn road users of oncoming obstructions, or provide guidance where needed. Includes signs within an approved school zone. Signage includes sign panels, sign supports, and footings.	▪ Sign supports and footings function properly ▪ Signs are secured properly to a mounting structure ▪ Sign's message is legible and not obstructed by heavy wear, graffiti, or damage; sign face is not faded and has reflective background and legend (when required) ▪ Signs are consistent with pavement markings in directing road users	▪ Obtain approved school zone documentation and crosswalk closure documentation ▪ Conduct visual field survey to assess condition of sign panels, post types, and footings and sight distance and obstructions to visibility ▪ Review ODOT's asset management documentation to support field evaluations
Lighting	All lighting along corridor to intended to provide visibility and safety.	▪ Light poles do not have visible structural damage that show significant deformation or cause the pole to lean and function per their intended purpose ▪ Light bulbs function properly	▪ Conduct field survey to assess poles/cabinets and light bulbs

Element	Description	State of good repair definition	Assessment methods
Utilities[3]	All supporting elements to a utility, box, or pipe including the mountings, grates, or any additional part of the utility that can impact the pavement, curb, or concrete. This element is not intended to address the condition or function of a utility to meet its purpose.	▪ Condition of surface utility feature, such as manhole covers and valve covers, shows little to no wear and non-slip surfaces are not smooth ▪ Pavement around surface utility feature is smooth with minimal cracks ▪ Frames and slabs show no holes or cracks that affect function ▪ Frame positions are flush to the surface ▪ Metal grates are functional and have minimal damage	▪ Conduct field survey to assess existing surface utility features
Existing Sidewalks	The hard, smooth surface located along the roadway, sometimes separated by a curb and/or a planting strip and swale.	▪ No trip hazards that are 0.5 inch or greater ▪ No cracks or openings that are 0.5 inch or greater ▪ No chipping or general deterioration that creates a depth 0.5 inch or greater	▪ Conduct field survey to assess substandard sidewalks

[3] In general, utilities are not ODOT-owned assets, but most are located on ODOT right-of-way by permit. Utilities are generally privately or publicly owned by other agencies. Power drops, fiber optic lines, or communications associated with ODOT-owned signals or ITS are not included in this element because they service a definable ODOT asset.

Element	Description	State of good repair definition	Assessment methods
Drainage	All stormwater collection, conveyance, treatment, and disposal facilities including: ▪ curb and grate inlets ▪ catch basins and manholes ▪ sedimentation manholes ▪ underground injection controls (UICs or sump systems) ▪ water quality facilities such as stormwater planters, rain gardens and swales ▪ storm sewer pipe	▪ The drainage facility operates properly ▪ Functional amount of sediment accumulation ▪ Functional amount of rust, pitting, or erosion on pipes	▪ Review ODOT Maintenance log of identified stormwater runoff locations ▪ Conduct field survey to inspect existing surface drainage
Structures	All features designed to physically support a roadway, features designed to retain and protect a roadway, and features designed to withstand a required loading including: ▪ bridges ▪ walls ▪ sound walls ▪ traffic and lighting structures	▪ Structural ratings meet expected functionality for existing features ▪ No visible structural damage that shows significant deformation ▪ No excessive out of plane deflection ▪ No excessive corrosion ▪ No excessive concrete deterioration	▪ Review ODOT maintenance logs of identified issues ▪ Review in-service inspection report ▪ Review ODOT load ratings and structural deficiencies, if available ▪ Conduct a field survey to inspect condition of structural elements, if needed

Step 4. Understand and inventory current maintenance responsibilities

Given the history of the state highway system in Oregon, maintenance responsibilities are nuanced and important to understand. In some instances, ODOT owns the highway right-of-way, but specific elements may be owned or maintained by the local jurisdiction. For example, ODOT owns curb-to-curb on US 26 (Inner Powell), but the City of Portland owns the sidewalks and maintains the vegetation, medians, some signs, and some lighting. If a given roadway element is already maintained or owned by the receiving local jurisdiction, a cost estimate to transfer that element is not necessary because the local jurisdiction already maintains those responsibilities.

Step 5. Conduct an existing inventory and assess SOGR conditions

After SOGR is defined, inventory the existing roadway elements. This involves field visits during which qualified field engineers physically inspect each element to determine its condition. Collect data spatially to ensure that specific geographic constraints (e.g., the presence of historic buildings or protected habitats) are considered and that future proposed upgrades are not in conflict with each other. A geographic information system (GIS) application is an effective tool to record data geospatially. Include pictures and detailed notes from field work to ensure the appropriate upgrade and cost estimate can be applied and verified.

As the roadway elements are inventoried, rate the data based on the defined SOGR as “good,” “fair,” or “poor.” If an element is rated “good,” it meets or exceeds the established SOGR definition. If an element is rated “fair,” it does not meet the SOGR definition and requires minor repair. If an element is rated “poor,” it does not meet the SOGR definition and requires moderate or major repair or replacement. For example, sidewalk would be rated “fair” if it has a crack that exceeds the allowed thickness, but only requires minor crack repair and does not require full replacement. It would be rated “poor” if the crack is such that a full sidewalk replacement is required.

Step 6. Determine upgrades

Determine upgrades based on the roadway element’s rating. This requires determining necessary upgrades for each of the “fair” and “poor” roadway elements to bring that element to a SOGR. For example, when evaluating pavement markings an upgrade for striping that is rated as “fair” because it is generally faded but recognizable could be a spot treatment. An upgrade for striping that is rated as “poor” because it is missing or illegible could be a remove and restripe. Document a description of each proposed upgrade, including any details crucial for the cost estimate such as areas of repair (e.g., length of repaved pavement), anticipated work components, and potential impacts to other elements. For consistency, use corridor-based upgrades. Corridor-based upgrades are standardized work packages with a consistent set of upgrades needed to bring an element up to “good” SOGR. The corridor-based upgrades are defined such that they can be applied to reoccurring deficiencies along the corridor. This will simplify the applied upgrades and avoid unique upgrades for each deficiency. After identifying each of the proposed upgrades, document the quantities.

Step 7. Assess upgrade costs

Determine upgrade costs using an agency’s programmatic-based estimates for specific elements or corridor-based unit costs. Programmatic estimates are commonly used by agencies to scope projects and forecast upcoming work such as resurfacing roadways. These programmatic estimates can be used to address identified upgrades. Corridor-based unit costs identify typical conditions along the corridor, define the required work for an upgrade and use unit bid prices to determine a total unit cost for the upgrade. The cost estimator should apply a cost to each of the identified treatments and provide a description of work and assumptions included in each upgrade cost. The cost estimator should also

include costs to implement the upgrades. Implementation costs are typically defined as a percentage of the total upgrade costs and include the following:

- Mobilization: cost for a contractor to mobilize crews, equipment and materials to a project site
- Traffic control: cost for the contractor to maintain traffic during construction
- Preliminary engineering: cost to design proposed upgrades
- Utility relocations: cost to relocate utilities that have prior rights such as easements or past agreements that would require an agency to pay for or reimburse the utility to relocate any conflicts
- Right-of-way: cost of permanent and temporary impacts to right-of-way for proposed upgrades
- Construction management: cost to provide management and inspection during construction
- Contingency: general contingency to account for known and unknown costs that have not been identified or defined including hazardous materials
- Inflation: cost of the natural reduction in the value of a dollar over time

2.2 Capital Needs

In addition to state of good repair, it is important to account for capital needs identified in regional and local plans, programs, needs assessments or safety audits, per mutual discussion between ODOT and local jurisdictions. These identified, but unfunded, improvements require consideration as the agencies estimate and negotiate the costs associated with transfer. For example, in the 2018 RTP, local jurisdictions identified approximately $800 million in capital projects on ODOT highways in the region. Each local jurisdiction used an identified RTP "allocation" to prioritize a larger list of capital projects identified in the 2018 RTP. The following capital needs are common local priorities to consider when estimating the cost to transfer:

- Crossings and lighting near key community places (e.g., schools, libraries, community centers)
- Medians at high crash locations
- Enhanced transit stops or safety improvements around transit stops
- Missing connections or gaps in the bicycle and pedestrian networks
- Improvements identified for safe routes to school and the Safe Routes to School (SRTS) program
- Other modernization improvements

In addition to the list of common capital needs, ODOT and the local jurisdiction may consider the costs associated with Americans with Disabilities Act (ADA) compliance. ADA compliance can be assessed by reviewing ODOT ADA inventory data and conducting ADA compliance assessments. It includes the following:

- ADA ramp compliance
- ADA clear width compliance
- ADA running grade and lateral grade compliance
- ADA sidewalk compliance

2.3 Maintenance and operation costs

This section describes the methodology to determine likely long-term maintenance costs for a corridor segment. Cost considerations include routine inspections of the corridor, basic maintenance of existing conditions, long-term improvement needs and contingency costs associated with potential asset damage due to unforeseen events or conditions. Maintenance and operation costs provide a forecast for future costs after a highway jurisdictional transfer is complete and should be considered during

negotiations. Local jurisdictions may consider contracting maintenance and operation responsibilities to other agencies. Costs associated with these arrangements should be considered.

As described in Table 2, maintenance and operation costs are categorized by (1) inspection and maintenance costs, (2) staff training, (3) operational costs, and (4) unforeseen repairs and replacements.

Table 2. Maintenance and operation costs

Cost	Description
Inspection and maintenance costs	Inspecting and maintaining pavement, structures, signals, and other roadway elements requires time, equipment, and expertise. The local jurisdiction will be responsible for inspection and maintenance and all costs associated with them, including equipment. Develop an inspection and maintenance schedule for the corridor elements based on expected useful life. The schedule must include inspection frequency, inspection time, and inspection equipment needed as well as short-term and long-term maintenance projects.
Staff training	Operating and maintaining certain corridor elements may require focused training. Local jurisdictions may acquire elements that they have not used or maintained in the past, and they will need to invest in staff training time and equipment to effectively maintain these elements. Identify any new skills needed to inspect and maintain corridor elements, determine the number of staff that need the new skills, and determine costs for training.
Operational costs	Long-range operation costs come with new elements and need to be considered by local jurisdiction. Operation costs could include electricity costs to power specific elements, traffic management operation costs to manage additional signals along the segment corridor, or incident response costs to handle the increase in traffic and potential collisions caused by that traffic.
Unforeseen repairs and replacements	Additional costs will occur when an unforeseen event requires the repair or replacement of roadway elements. For example, a jurisdiction will need to have available funds for a full signal replacement in the event that a collision destroys it.

2.4 Ownership costs

This section describes the methodology used to determine non-physical soft costs of owning the corridor segment. These costs are overarching, indirect costs associated with the acquisition of any new roadway to effectively manage it consistent with the local jurisdiction's defined policies and goals. While these costs do not directly inflate the cost of transferring a highway from ODOT to a local jurisdiction, they need to be considered for the increase in staff time and skills required to own them.

As described in Table 3, ownership costs are categorized by (1) increase in liability, (2) access management reviews, (3) programming and planning, and (4) reporting obligations.

Table 3. Ownership costs

Cost	*Description*
Increase in liability	Receiving a major roadway may increase the liability of the jurisdiction that owns and maintains them and therefore will increase costs associated with that increase in liability. Liability costs manifest mostly as insurance costs that protect the local jurisdiction from these sorts of events.
Access management reviews	With a new roadway, the local jurisdiction will likely have increased demand for access management. This will increase the level of effort that the local jurisdiction's current access management department undertakes, and, given the functional class of the transferred roadway, could have higher costs attached to it.
Programming and planning	Planning and programming for a major corridor can increase the ownership costs associated with the roadway. Major roadways often have specific corridor plans to go along with their specific needs. Staff time and expertise are necessary to create the plan; design of the roadway elements, and updated maps.
Reporting obligations	Some corridors may have certain designations that require monitoring and reporting to ODOT or federal agencies such as freight corridors or "life-line" corridors. The local jurisdiction should understand those designations and the staff time needed to properly manage them.

3 Conclusion

Developing costs to support a highway jurisdictional transfer includes many considerations. This methodology establishes a baseline approach to determine costs that is founded on fundamental agreements between a local jurisdiction and ODOT. This approach will provide the costs and necessary supporting information for decision-makers to engage in negotiations for a highway jurisdictional transfer.

Appendix A. List of Acronyms

ADA	Americans with Disabilities Act
CIP	Capital Improvement Project
GIS	Geographic Information System
ITS	Intelligent transportation system
ODOT	Oregon Department of Transportation
RTP	Regional Transportation Plan
SOGR	State of good repair
SRTS	Safe Routes to School
STIP	Statewide Transportation Improvement Program