Council Meeting Date: December 4, 2017 **Agenda Item:** 7(c)

CITY COUNCIL AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Authorize the City Manager to Execute an Agreement with LPK, Inc., dba Innovative Vacuum Services, in the Amount of $429,303 for the Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment Project
DEPARTMENT:	Public Works
PRESENTED BY:	Daniel Sinkovich, Utility Operations Specialist Uki Dele, Surface Water and Environmental Services Manager
ACTION:	____ Ordinance ____ Resolution __X_ Motion ____ Discussion ____ Public Hearing

PROBLEM/ISSUE STATEMENT:

The Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment Project will complete the City's initial pipe condition assessment efforts that began in 2013 with the Basin Plans. This project will include closed circuit television (CCTV) pipe inspections, GIS mapping updates and a comprehensive condition assessment. This will inform the Surface Water Utility of recommendations for maintenance, repair, or replacement of stormwater pipes in the Thornton Creek drainage basin.

The Thornton Creek drainage basin, the largest in the City, contains 33% of the City-operated stormwater pipes. For this project, the basin is divided into priority areas and phases to work within budget appropriation. The first phase will focus on areas that inform on-going projects, including the Sound Transit light rail track and station areas and projects along the 175th and 145th Street corridors. This project is necessary to identify and correct deficiencies in the stormwater system, reducing the potential for unanticipated infrastructure failures and informing development activities.

Tonight, staff is recommending that Council authorize the City Manager to enter into a contract with LPK Innovative Vacuum Systems for Phase 1 of the Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment Project.

RESOURCE/FINANCIAL IMPACT:

Funding for this project will come from the Surface Water Capital Fund and the Surface Water Operations Fund. The total cost for the Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment is $1,933,630. The project is being phased to accommodate priority areas, budget and schedule. The total cost of Phase 1 of the project is $450,000 and is scheduled to be completed in 2018. Phase 1 will be funded from the Surface Water Capital Fund and the Surface Water Operations Fund. Phase 2 is scheduled to begin in 2019 and funding for this phase will be evaluated in the 2019 Surface Water operations budget. The cost of the Phase 1 contract will be paid based on the following schedule:

EXPENDITURES	2017	2018	Total
Staff and other Direct Expenses	$6,097	$14,600	$20,697
Phase 1 Contract (LPK Inc.)	***$143,903***	***$285,400***	***$429,303***
Total Project Cost	$150,000	$300,000	$450,000

REVENUE	2017	2018	Total
Surface Water Capital Fund	$150,000		$150,000
Surface Water Operations Fund		$300,000	$300,000
Total Funding	$150,000	$300,000	$450,000

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute an agreement with LPK Innovative Vacuum Systems for $429,303 to provide consultant services including a surface water infrastructure condition assessment for the Puget Sound Drainages Surface Water Basin Plan.

Approved By: City Manager ***DT*** City Attorney ***MK***

BACKGROUND

In 2009 the City completed its first basin plan, the *Thornton Creek Watershed Plan (TCWP)*. While the TCWP provided the City with a list of prioritized capital projects to address drainage issues, it did not incorporate stormwater pipe condition assessments as did subsequent basin plans. As part of the Stormwater Master Plan Update in 2011, the City Council approved an asset management plan carried out through the Basin Planning effort which included assessing the conditions of the stormwater pipes in the City.

The Thornton Creek drainage basin, the largest in the City, contains 33% of the City-operated stormwater pipes. The basin is divided into priority areas driven by other projects including the Sound Transit Lynnwood Link Extension Project, the 175th Street overlay, and the 145th Street corridor improvements (Attachment A). Phase 1, shown in Attachment B, will consist of areas where transit projects and the Shoreline South/145th Street light rail station design are underway. Phase 2 will encompass the Shoreline North/185th station and nearby track and the remaining basin area. This project is necessary to identify and correct deficiencies in the stormwater system, which will benefit the City by reducing the potential for unanticipated infrastructure failures and inform development activities. This condition assessment will complete the initial condition assessments in support of the City's drainage basin planning efforts.

DISCUSSION

In June, the City solicited consultants to provide their qualifications for the Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment Project. Three submittals were received from the following consultants:

Consultant Name
LPK Innovative Vacuum Services (Innovac)
Professional Pipe Services (ProPipe)
Interactive Pipe Inspections (IPI)

Staff reviewed the consultant submittals and selected Innovac as the most qualified for the condition assessment project. Innovac scored highest in both the technical approach and in related project experience. Innovac, and their sub-consultant (Osborne Consulting), have worked on previous condition assessments for the City (Puget Sound Basin Plan) as part of basin planning projects. The results have provided good quality products as well as good technical analysis of the City's drainage system. Staff is confident that the City will continue to receive similar service through this project.

LPK Innovative Vacuum Services' scope of work (Attachment C) consists of the following major tasks:

- Update the City's stormwater infrastructure GIS mapping.
- Perform CCTV inspections of stormwater drainage pipes.
- Obtain stormwater structure elevation data.

- Provide condition assessment of stormwater drainage pipes and identify condition-based maintenance and/or repair needs as prioritized using City-provided criteria.

COUNCIL GOAL ADDRESSED

This project supports Council Goal #2 to improve Shoreline's utility, transportation, and environmental infrastructure. This project will meet this goal by assessing the surface water piped conveyance system within basin boundaries, identifying deficiencies, assessing the probability and consequence of failure, and recommending the appropriate rehabilitation.

RESOURCE/FINANCIAL IMPACT

Funding for this project will come from the Surface Water Capital Fund and the Surface Water Operations Fund. The total cost for the Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment is $1,933,630. The project is being phased to accommodate priority areas, budget and schedule. The total cost of Phase 1 of the project is $450,000 and is scheduled to be completed in 2018. Phase 1 will be funded from the Surface Water Capital Fund and the Surface Water Operations Fund. Phase 2 is scheduled to begin in 2019 and funding for this phase will be evaluated in the 2019 Surface Water operations budget. The cost of this Phase 1 contract will be paid based on the following schedule:

EXPENDITURES	**2017**	**2018**	**Total**
Staff and other Direct Expenses	$6,097	$14,600	$20,697
Phase 1 Contract (LPK Inc.)	***$143,903***	***$285,400***	***$429,303***
Total Project Cost	$150,000	$300,000	$450,000

REVENUE	**2017**	**2018**	**Total**
Surface Water Capital Fund	$150,000		$150,000
Surface Water Operations Funds		$300,000	$300,000
Total Funding	$150,000	$300,000	$450,000

RECOMMENDATION

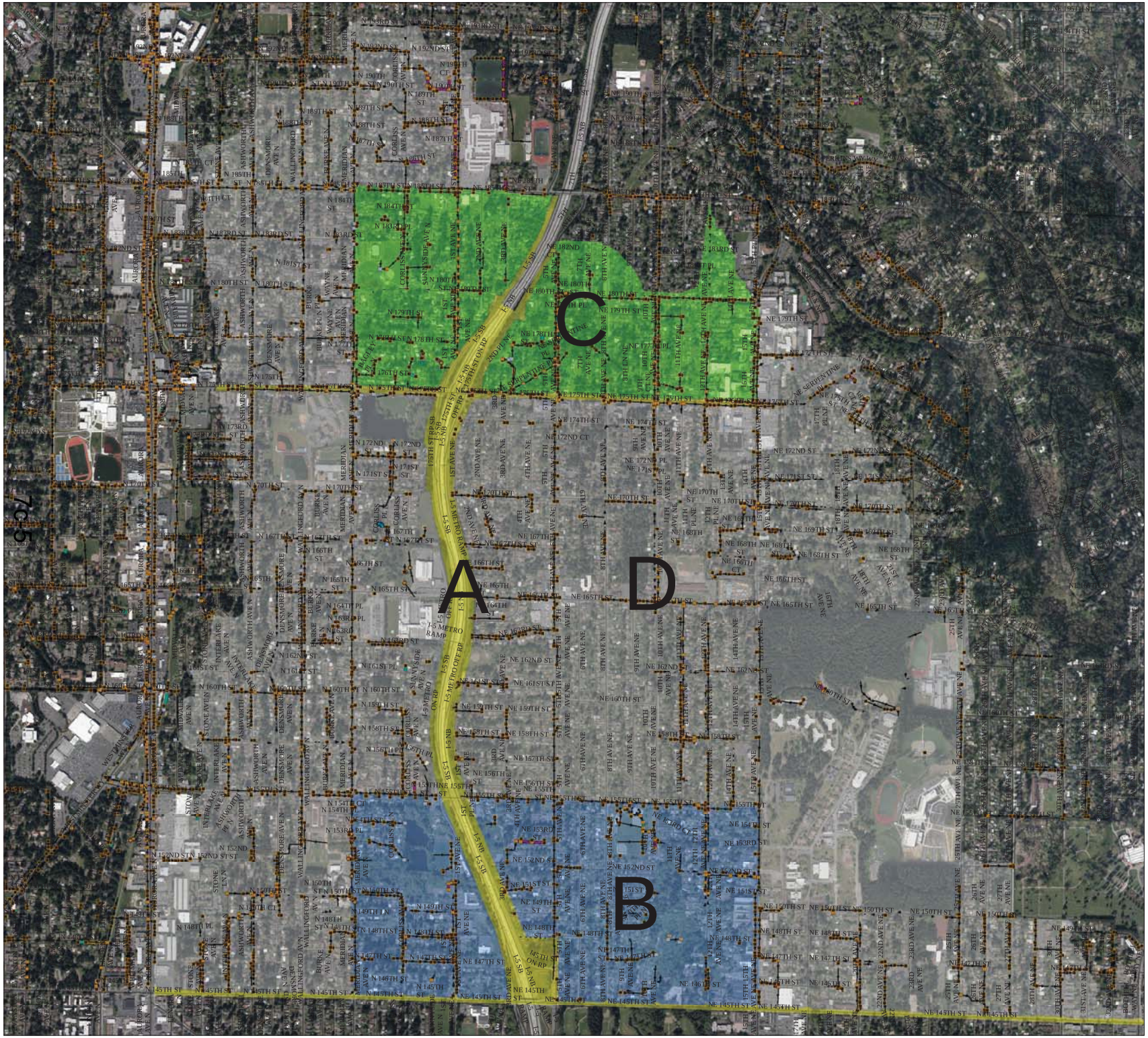
Staff recommends that Council authorize the City Manager to execute an agreement with LPK Innovative Vacuum Systems for $429,303 to provide consultant services including a surface water infrastructure condition assessment for the Puget Sound Drainages Surface Water Basin Plan.

ATTACHMENTS

Attachment A: Thornton Creek Drainage Basin Areas
Attachment B: Phase 1 Thornton Creek Condition Assessment Areas
Attachment C: Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment - LPK Innovative Vacuum Systems Scope of Work

Attachment A

Thornton Creek Pipe Inspection and Condition Assessment Areas



Condition Assessment Areas

- Area A - 145th St, 175th St, LRT Corridors
- Area B - 145th St LRT Station
- Area C - 185th St LRT Station
- Area D - Thornton Creek (Outside of Areas A-C)

N

0 0.1 0.2 0.4 Miles

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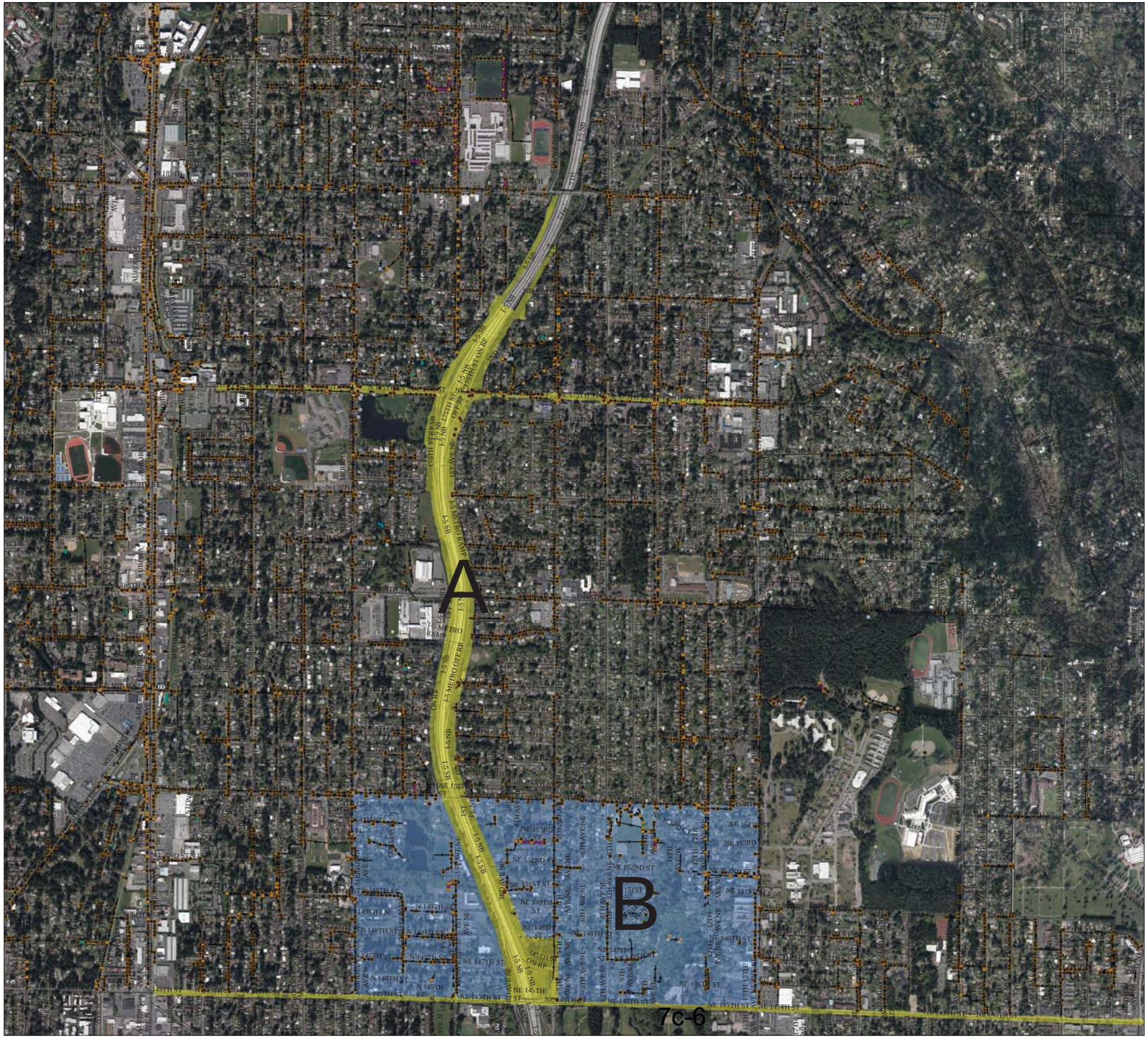
Attachment B

Thornton Creek Pipe Inspection and Condition Assessment Areas - Phase 1



Condition Assessment Areas

- Area A - 145th St, 175th St, LRT Corridors
- Area B - 145th St LRT Station

N

0 0.1 0.2 0.4 Miles

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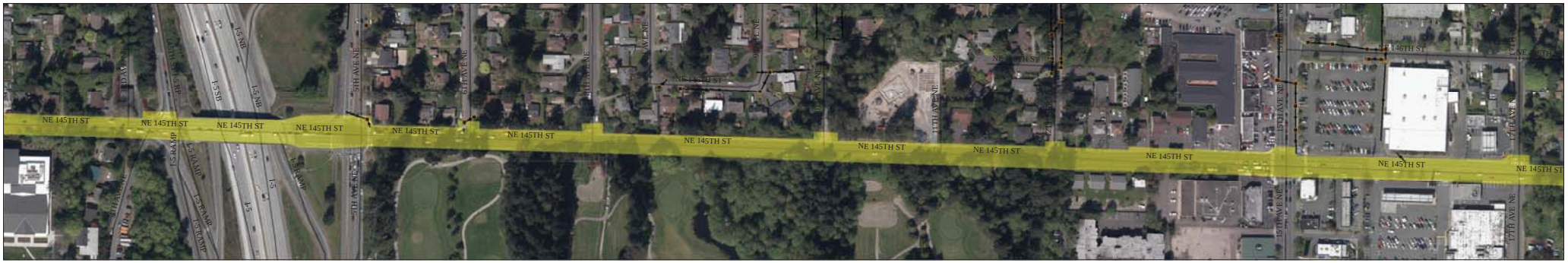
Attachment B

Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment
Area A - N/NE 145th St Corridor

Aurora Ave N to 1st Ave NE

1st Ave NE to 17th Ave NE



17th Ave NE to 36th Ave NE

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N

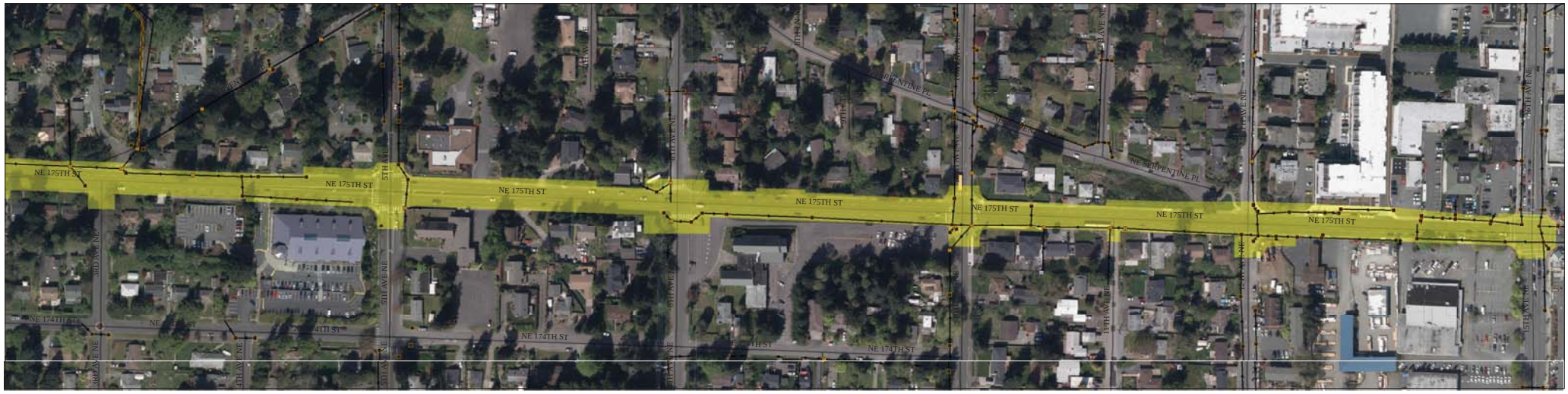
0 0.04 0.08 0.16 Miles

Attachment B

Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment
Area A - N/NE 175th St Corridor

Ashworth Ave N to 1st Ave NE

1st Ave NE to 15th Ave NE



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N

0 0.0275 0.055 .11Miles

Attachment B

Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment
Area A - Sound Transit Light Rail Corridor

N 165th St to N 185th St

N 145th St to N 165th St

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N

0 0.075 0.15 0.3 Miles

Attachment B

Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment

Area B - 145th St Light Rail Station Area

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N

0 0.045 0.09 0.18 Miles

Attachment C
Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment
Scope of Work

Introduction and Background

The City of Shoreline (City) is embarking on its final Condition Assessment basin. This Condition Assessment will encompass the Thornton Creek Drainage Basin located in the southeast corner of the City of Shoreline and will focus primarily on the pipe inspection, condition assessment, repair prioritization and GIS updates for the storm/surface water infrastructure. The City's intention is to utilize a Task Order type of contract to complete this project in a timely fashion.

Goals and Objectives

The primary objectives of the inspections and condition assessment are to:

- Update the City's stormwater infrastructure GIS mapping inventory
- Perform inspections of stormwater drainage pipes
- Obtain structure elevation data as directed by the City
- Provide condition assessment of stormwater drainage pipes and identify condition-based maintenance and/or repair needs as prioritized using City-provided criteria

Project Tasks & Project Duration

Thornton Creek Drainage Basin is a large basin with over 3,000 pipes. As a way to prioritize the data collection and provide the City with periodic submittals, the work will be broken down into geographic regions, and deliverables provided for each of the submittal packages described in the table below.

A written notice to proceed will be issued by the City for each submittal package prior to any work (beyond scoping and contracting) being performed. Project duration and number of submittals for each submittal package assumed for the scoping of this project are noted in the table below. Submittal package D will be broken into three separate submittal packages, and Submittal package E will be broken into two separate submittal packages.

Phase 1 includes areas A, B, and E1, and will last up to 12 months in duration. Phase 2 includes areas C, D, and E2, and will last up to 24 months in duration upon execution.

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PHASE 1						
Areas	**Title**	**Areas Included**	**Total LF of Pipe**	**Total Number of Pipes**	**Project Duration**	**Number of Submittals**
A	Corridors	1. N/NE 175th St Corridor 2. N/NE 145th St Corridor 3. Light Rail Transit Corridor	11,202	179	November 2017 – November 2018	Up to 5
B	145th Subarea	145th Street Station Subarea	36,693	461	November 2017- November 2018	Up to 9
E1	Heavy Cleaning A-B	Pipes flagged for heavy cleaning in Submittal Packages A-B	Up to 3,831	Up to 51	November 2017- November 2018	Up to 2

PHASE 2						
Areas	**Title**	**Areas Included**	**Total LF of Pipe**	**Total Number of Pipes**	**Project Duration**	**Number of Submittals**
C	185th Subarea	185th Street Station Subarea	35,928	496	Up to 24 months	Up to 7
D	Thornton Creek Basin - Remaining	All City assets within the Thornton Creek basin outside Submittal Packages A-C.	154,632	2,138	Up to 24 months	Up to 21
E2	Heavy Cleaning C-D	Pipes flagged for heavy cleaning in Submittal Packages C-D	Up to 15,244	Up to 211	Up to 24 months	Up to 4

The tasks below describe the general work flow and elements that will be conducted to accomplish the project goals. Innovac and Osborn Consulting, Inc. (OCI) specific roles are described in each task.

Task 1- Project Management

Project management will include communications with the City of Shoreline project manager and the consultant team; project scheduling and oversight of the various project activities; budget tracking and oversight, including preparation of monthly invoices and progress reports, and project coordination. The primary consultant point of contact for this project will be Innovac's project manager, Nirpaul Kang.

Innovac will develop a Project Charter jointly with the City project manager, outlining scope, schedule, budget, responsibilities and communication for the project duration. The Project Charter will cover both phases of work.

Innovac will schedule project meetings, create the agendas, lead the meetings as well prepare and distribute the meeting minutes. Innovac will prepare monthly status reports, attend project kick-off, provide weekly progress update participate in weekly phone check-ins as necessary with the City project manager, and hold check-in meetings at City Hall as needed (no more than 6 per 6 month period along with a project closure meeting). OCI will assist Innovac in developing the Project Charter, and project coordination.

Assumptions:

The following assumptions are associated with this task for Phase 1

- Phase 1 will be up to 12 months in duration, from November 2017 through November 2018. Phase 2 will be up to 24 months in duration upon execution.
- Project kick-off and closure meetings will be held with key team members and City staff. The meetings will last no more than 2 hours each. Three staff from Innovac and three staff from OCI will attend the project kick-off and closure meetings. Innovac will prepare the agendas, lead the meetings, and prepare and distribute meeting minutes.
- The project kick-off meetings will be held at the beginning of each phase, and the project closure meetings will be held at the end of each phase.
- Innovac will provide monthly status reports to the City project manager by the end of the 5th day of each month, which will consist of but not be limited to:
    - Invoice for all work done (including City voucher – Exhibit B)
        - Invoices to be itemized based on task
    - Tracking of budget updates
- Conduct weekly phone check-in meetings between Innovac and OCI that will last no more than 30 minutes each.
- Check-in meetings will be held on an as-needed basis at City Hall (no more than 6 hours of meetings per 12-month period and include key team members and City Staff. One staff from OCI will attend the check-in meetings. Meeting duration will be as needed, typically assumed to be one hour. Innovac will coordinate with the City to prepare the agendas, lead the meetings, and prepare and distribute meeting minutes.
- OCI will assist Innovac in creating a Project Charter. The Project Charter will identify points of contact, roles and responsibilities, and priorities. It will include processes for sharing GIS data, CCTV data, cleaning protocol, database management standards, and the QA/QC process. It will also include the final scope, schedule, and budget. The Charter is required to be completed prior to the start of any field work.

- Project Coordination includes scheduling and oversight of project activities as well as budget tracking and oversight.

Innovac Deliverables:

- Weekly progress reports to reflect work performed including field notes, access/locate issues, light and heavy pipe cleanings, and a list of new or modified infrastructure.
- Project Charter.
- Kick-off meeting agendas and minutes.
- Closure meeting agendas and minutes.
- City check-in meeting agendas and minutes.
- Monthly status reports/invoices.

OCI Deliverables:

- Monthly status reports/invoices.

Task 2- Pipe Inspections

Stormwater infrastructure will be assessed through a video inspection survey of the City-operated owned and maintained piped conveyance system. This includes CCTV inspection of pipes or culverts eight inches in diameter and larger.
Innovac's tasks include:

- Schedule and perform pipe inspections, light cleaning, and traffic control, including traffic control plans where necessary.
- Track and verify CCTV inspections are performed as scheduled, and correct any data gaps in completed inspections. Provide videos and reports of the CCTV inspections.
- Prepare an initial PACP compliant MS Access database of inspection data in (NASSCO PACP version 6.0), including (but not limited to):
    - Measurement from upstream structure rim to outlet pipe invert
    - Measurement from downstream structure rim to inlet pipe invert
    - Measurements from upstream structure grade to outlet pipe invert
    - Measurement from downstream structure grade to inlet pipe invert
    - Measurements from upstream structure rim to grade
    - Measurement from downstream structure rim to grade

Assumptions:

- The City will build an ArcOnline Application to be used in conjuncture with the ESRI Collector App which will include maps files (database) which will be used by Innovac's field team for pipe identification and location.
- The City will coordinate with property owners to obtain Right of Entry (ROE), and update map files (database) to be used by Innovac's field team.
- Innovac's inspection teams will not be restoring access to any paved-over or buried structures; any such inaccessible structures encountered will be reported to the City in the weekly progress reports.
    - City will report to Innovac once the City has restored access to the structure, so that pipe inspections can be completed (if necessary). An exception to this assumption is if

Innovac requires access to a buried structure to recover a stranded tractor/camera unit. In such situations, Innovac will uncover the access to retrieve a stranded camera unit.

- Pipe inspections, cleaning, and traffic control to be performed by Innovac.
- Traffic control plans to be prepared by Innovac and submitted to the City traffic control engineer.
- Pipe inspection videos, pictures and reports will be provided by Innovac.
- Initial pipe inspection data in NASSCO PACP compliant version 6.0 MS Access Database to be prepared by Innovac. The CCTV data files will be in the PACP (Pipeline Assessment and Certification Program) Export in Microsoft Access database format for input into the City's asset management program, Cityworks.
  - Monthly video and database submittals will include only pipes which have complete inspections and pipes where inspections were started, but were abandoned due to heavy cleaning, structural, or other obstructions.
- Pipes will be inspected when a pipe can be accessed from the ROW, but crosses over to private property:
  - If a pipe can be accessed from a structure in the ROW then the pipe should be inspected in its entirety, unless the survey is abandoned due to obstruction.
  - The City will identify and obtain Right of Entry from private property owners. The City will identify pipes which cross into private property in the GIS database. Prior to entering any property with ROE permission obtained, Innovac shall have a copy of that ROE on hand.
  - Right of Entry (ROE) permission shall be obtained from the resident/owners of the property where the pipe crosses over into private property, if there is no drainage easement. The need for ROE permission is not limited to crews entering a property; ROE is also required for the tractor/camera traveling through the pipe onto private property with no other property entry occurring.
  - Drainage Easements
    - Innovac shall consult City GIS drainage easement layer to determine if an easement exists for pipes on private property.
    - Where a drainage easement exists, the property owners should be <u>notified at time of inspection</u> if access to a pipe is through a structure on private property. Notification can consist of a "door knock" and leaving a door hanger printed notice if no one answers the door. ROE permission is <u>not</u> necessary to access the structure through the easement.
    - In the case where the pipe and structure are in a drainage easement, but access is through private property where an easement does not exist. ROE permission shall be obtained to access the structure and pipes.
  - For cases when pipe inspection requires entering private property with drainage easement access or ROE permission, entering private property shall occur at Innovac's risk. If conditions to enter private property seem unsafe or otherwise unadvisable, Innovac shall record these conditions as justification for not completing the inspection.
  - If the pipe is solely on private property with no access from the ROW and no known easement, ROE permission will not be requested, and the pipe will not be inspected.
- Pipes that cannot be inspected without heavy cleaning will be noted in the weekly progress report and may be incorporated in Task 5.

- Once 8 hours of cleaning is accumulated, light cleaning may commence (multiple submittal package areas that overlap can be completed in conjunction with one another to avoid additional crew mobilization).
- Light cleaning will be performed under the following definitions:
  - Limited to three passes per pipe in attempts to remove any material collected within the pipe preventing the completion of the camera inspection
  - Spot removal of fine hair-like roots only
  - Removal of all sediment collected within the structure's sump upon completion of pipe jetting.
  - Light cleaning will be performed for pipes where material is greater than 1 inch in depth but less than 4 inches.
- Once light cleaning has been completed, the inspection team will complete the inspection and submit only the post-cleaning videos and reports to OCI for condition assessment and prioritization in Task 4, and to the City for removal from the cleaning list.
- Upon completion of the light cleaning and inspection efforts, if two videos and reports are necessary, the video and report PDF files will be stitched together by Innovac, linked to PACP MDB file within WinCan software to make one complete inspection and then submitted to OCI for condition assessment and prioritization in Task 4.
- A finished inspection shall be defined as having made good faith attempts to complete the inspection from both U/S and D/S structures/pipe ends and only after it has been determined that light cleaning was unable to clear the line or if there is a structural reason due to the survey being abandoned then it would be determined to be a finished inspection. Only one finished (video inspection, light cleaning, and rim elevation data) inspection will be invoiced per pipe.
- The City will provide GIS support as needed by Innovac's field crews during the duration of the project.
- The City will generate two named user accounts for the City's ArcOnline Portal for use by Innovac and OCI. .
- The field crew will utilize ArcGIS Collector in the field to view and collect/update the maps & information. No physical maps will be provided.
- Video inspection in MP4 format and inspection data in PACP compliant Microsoft Access format for all City-owned structures and pipes 8 inches in diameter and larger within the Thornton Creek Basin to be provided by Innovac.
- OCI will not perform any work associated with this task.
- Deliverables listed below will be submitted to the City monthly.

Innovac Deliverables:

- Video in MP4 format and PDF format inspection reports for all City-operated pipes inspected 8 inches in diameter and larger.

Task 3- GIS Update

This task includes updating the City's stormwater GIS layers with newly identified assets and attribution data. This task also includes collection of elevation data at the rims of catch basins and manhole structures using a handheld GPS. The total number of structures for each area are listed in the table below:

PHASE 1			
Area	**Title**	**Areas Included**	**Total Number of Structures**
A	Corridors	1. N/NE 175th St Corridor 2. N/NE 145th St Corridor 3. Light Rail Transit Corridor	125 6 20
B	145th Subarea	145th Street Station Subarea	386

PHASE 2			
Area	**Title**	**Areas Included**	**Total Number of Structures**
C	185th Subarea	185th Street Station Subarea	369
D	Thornton Creek Basin - Remaining	All City assets within the Thornton Creek Basin outside Submittal Packages A-C.	1,566

Innovac's tasks include:

- Rim elevation field data collection and GIS update.
- Update the City's GIS layers using ArcCollector with new and modified infrastructure.
- Compile a summary of all new infrastructure added to the City's GIS and updates made to pipe diameters, pipe materials, etc. in MS Excel format.
- Verify field crews' GIS updates with CCTV video and PACP database information.

The City's tasks include:

- Coordinate with field crew to resolve any discrepancies between data sources.

Assumptions:

- Innovac will complete rim elevation data collection and update City's GIS.
  - Horizontal - Datum to be on is WA State Plane Coordinates, North Zone, NAD83 HARN GCS 4602 in Survey Feet (City to Confirm)
  - Vertical - NAVD 1988, feet (City to Confirm)

- The unit manufacture's specifications are +/- .10' maximum, using the WSRN and checking into a local monument has proven to be within + /- .03' to .05' depending on the overhead canopy and the GPS constellation availability at the time

- City will provide reserved asset IDs in blocks of 50 for the Consultant team to use when new infrastructure (pipe or structure) are identified. GIS layers will be updated with new infrastructure by the field team. Innovac will draw new infrastructure into the field maps and record relevant data. .
  - Innovac will update and maintain the list of new infrastructure to avoid multiple uses of the same new asset ID's.
  - Updated new asset lists will be transferred from the Innovac field crew to OCI weekly via portable hard drives.
- The City will provide Consultant with two log-in accounts for City's ArcOnline Portal.
- The City will create and maintain a map service for the duration of this project. This map service will include three editable layers. These data sets will be versioned copies of the City's production data.
  - Pipe
  - Catch Basins
  - Manholes (surface water only)
- The City will build an ArcOnline Application to be used in conjuncture with the ESRI Collector App.
- The City will provide an additional map service that will be used to provide non-editable layers. This map service will also be configured in an ArcOnline application for use in the ESRI collector application. This map service will be used for base-map data such as:
  - Parcels
  - Additional utility layers as needed
  - The submittal Package boundaries for each of the 6 packages
  - The City's production Easement layer for Surface Water
  - Aerial imagery from 2015
  - Additional layers as needed/requested (Streets, Parks, City Limits, etc.)

  *These data sets may generate large caches in offline mode. Where possible we will limit the coverage area to a minimum 100ft beyond the boundaries of the submittal packages.
- The City shall provide either an editable table accessible through the collector application that has two additional attributes as needed or will configure the layers themselves to have these additional attributes.
  - Field Notes
  - Right of Entry Status
  - Asset Modified. This field will be used to track if the asset is modified by Innovac field crews.
- With each submittal, the City will post and reconcile the editing version with our production data. The date of the post and reconcile will be agreed upon by both parties prior to posing each month. This will insure that the edited data is complete and ready for production.

- Innovac will verify field crews' GIS updates with CCTV video and PACP database information.
- New assets and modified assets will be tracked weekly and will be provided to the City.
- OCI will not perform any work associated with this task.
- Deliverables listed below will be submitted to the City monthly.

Innovac Deliverables:

- Updated structure rim elevation data in PACP MS Access database.
- Field data collected in ESRI's collector application will synced from mobile devices with the City's ArcOnline application.

Task 4- Pipe Condition Assessment and Prioritization

This task involves providing a technical analysis of pipe inspections and preparing lists of assets for maintenance, repair, and replacement prioritization, based on City provided Prioritization Tool.

Prior to beginning the condition assessments, a Prioritization Workshop will be held at City Hall. During this workshop, the City will provide the consultant team with the final prioritization matrix for use during this project. The City will also provide detailed instruction on how to assign a Condition Rating to each pipe and how to use the criticality data provided by the City. By the end of the Prioritization Workshop, the City will provide the Consultant Team with clear agreed upon definitions of each of the following lists:

- Priority Open Cut Replacement
- Second Tier Open Cut Replacement
- Priority Trenchless Repairs
- Second Tier Trenchless Repairs
- Utility Connections
- Storm Drain Connections
- O&M by City Crews
- Jetting

Steps to be completed by OCI for this task include:

- Work with the City to prepare the agenda for the Prioritization Workshop, attend and participate in the Prioritization Workshop, and prepare and distribute the minutes for the workshop.
- Import all pipe data into MS Excel Spreadsheet weekly.
    - CCTV video files, PDF reports, new and modified asset list, and weekly progress updates (list of pipes inspected, length inspected, and length cleaned) will be transferred from the Innovac field crew to OCI weekly via portable hard drives.
    - New and modified asset information and field crew notes will be downloaded from the City's ArcOnline Portal.
- Review CCTV inspection videos and reports to determine if inspection is complete and/or finished.
    - QC to resolve any data inconsistencies.

    - Review notes taken by field crews.
- Import City provided Criticality Scores and Criticality Factors.
- Provide pipe condition assessment using video, field crew notes, and PACP information to:
    - Assign Condition Rating and Condition Rating Justification.
    - Record number and type of utility connections.
    - Record voids and possible damage from other utilities.
    - Denote new and modified assets
    - Identify maintenance and repair that can be performed by City Crews.
    - Identify pipes that require additional cleaning (both those that are completely blocked and camera cannot access or continue, and those which are camera passable but have sediment, gravel, debris, etc. obscuring the view of the bottom of the pipe.
    - Analyze City provided Criticality Scores on pipes with a Condition Score of 5.
    - Determine PVAL numbers and PSCORE ratings based on City provided criteria.
    - Determine optimal method of repair: trenchless or open cut
    - Using the PSCORE ratings and repair, replacement or maintenance type, create a list for each of the following categories:
        - Priority Open Cut Repair & Replacement
        - Second Tier Open Cut Repair & Replacement
        - Priority Trenchless Repairs
        - Second Tier Trenchless Repairs
        - Utility Connections
        - Storm Drain Connections
        - O&M by City Crews
        - Jetting

Steps to be completed by Innovac for this task include:

- Attendance at the Prioritization Workshop.
- Modify preliminary MS Access Database with post condition assessment changes to data as needed.

Assumptions:

- The Prioritization Workshop will be held at City Hall. The workshop will be 4 hours in duration, and attended by the City project manager, City Surface Water Utility and Environmental Services Manager, City Surface Water Engineer, Innovac's project manager, and three OCI team members. OCI will work with the City to prepare the agenda and OCI will prepare the minutes for the workshop. The workshop will be held prior to beginning the condition assessment for the first monthly submittal.
- By the end of the Prioritization Workshop, the City will provide the Consultant Team with clear agreed upon definitions of each of the following lists:
        - Priority Open Cut Repair & Replacement
        - Second Tier Open Cut Repair & Replacement
        - Priority Trenchless Repairs
        - Second Tier Trenchless Repairs
        - Utility Connections
        - Storm Drain Connections
        - O&M by City Crews

        - Jetting
- Innovac will track pipes inspected to ensure that all pipes scoped to be inspected are inspected.
- CCTV video files, PDF reports, new and modified asset list, and weekly progress updates will be transferred from the Innovac field crew to OCI weekly via portable hard drives.
- Pipe inspections paused for light cleaning will not be provided to OCI or reviewed by OCI. After light cleaning attempts, pipes will be reinspected by Innovac and pre-cleaning noted in the report by Innovac, and only the post light cleaning attempt videos and reports will be provided to OCI for review and inclusion in prioritization. OCI will not record the percent blocked prior to cleaning.
- One CCTV video file and one pdf report, named per City of Shoreline standards, will be provided by Innovac per "finished" inspection
    - The exception to this is when an obstruction prohibits the camera from continuing through the pipe, the pipe is then inspected from the opposite end. In this case, two videos and two pdf reports, named per City of Shoreline standards, will be stitched together by Innovac prior to submittal to OCI.
- OCI to review all pipes inspected, or attempted to be inspected.
        - For example, a pipe that cannot be completely inspected due to a blockage in the middle that cannot be cleaned with three or less jetting attempts needs to be reviewed by OCI and added to a prioritized list for cleaning. If the pipe is completely blocked in the middle of the pipe, there is a significant defect that must be addressed by the City. For this example, all Tasks deliverables would be provided to City and billed accordingly.
- For the purposes of the Condition Assessment task,
    - A "complete inspection" refers to the inspection of a pipe when a CCTV camera can travel from one end to the other, even if sediment, gravel, debris, etc. is present and the bottom of the pipe is not visible.
    - An “incomplete inspection” is a finished inspection where entire pipe length cannot be inspected due to an obstruction or debris.
    - A “finished inspection” refers to the inspection of a pipe which has a “complete inspection” or has been inspected according to PACP standards, but is an “incomplete inspection” according to definition for this task. A “finished inspection” will be considered billable to the City
    - While the coding and reporting of observed defects will be PACP compliant, the inspection is not PACP compliant. For the inspection to be PACP compliant, the pipe would have to be completely clean and free from debris, which is not the intent of this condition assessment.
    - Only videos and reports prepared under the Thornton Creek Drainage Basin Pipe Inspection and Condition Assessment will be reviewed by OCI.
    - If the CCTV operator determines a pipe cannot be cleaned in three jetting attempts or less, it will not be attempted to be cleaned in Task 2, but will be flagged for heavy cleaning in Task 5. The videos and reports of this incomplete inspection will be provided to OCI by Innovac for review and inclusion in a prioritization list.

- City will provide the final prioritization matrix, based on the file, "Pipe Conditions Master_Thornton Creek_Assessment.rev1.xlsx" provided by Daniel Sinkovich via email on August 22, 2017.
- The City will provide a Criticality Score for each pipe, as well as the criticality components ART (Within 30' buffer of arterial), Cross (Within 5' buffer of railroad or Pavement), SLOPE (>=23%), FSEArea (Within 5' buffer of slide, erode, or flood), SFLOW(Intersection of Stream, no buffer), INFRA(Critical Infrastructure Parcels within 20' buffer), and MISC (1 if SLOPE, FSEArea, SFLOW and INFR are 1, Max 1). No other criticality components will be reviewed.
- OCI will assess the City provided Criticality Score for pipes with a Condition Score of 5 by visually zooming in on the pipe in GIS with the City Provided Criticality Layers active. It is assumed that approximately 10% of the pipes inspected will have a Condition Score of 5.
- OCI will assign a Condition Score to each pipe based on criteria provided by the City at the Prioritization Workshop. Based on the Condition Score determined by OCI and the Criticality Score provided by the City, the pipes will be placed onto a list of the following categories:
    - Priority Open Cut Repair & Replacement
    - Second Tier Open Cut Repair & Replacement
    - Priority Trenchless Repairs
    - Second Tier Trenchless Repairs
    - Utility Connections
    - Storm Drain Connections
    - O&M by City Crews
    - Jetting
- Pipes may be placed onto one of the above lists. Pipes are not to be placed onto more than one list with the exception of jetting. In cases where the jetting only needs to be done to accomplish the structural repair, then those pipes should only live on the structural repair list. However, if pipe cleanings should be done regardless of the structural repair, then those pipes should be on both lists.
- The lists provided to the City with each submittal will not be ordered, ranked, or prioritized, but will be grouped according to the City's Condition Assessment Program manual.
- No cost estimates will be provided.
- Innovac QA/QC team to perform post condition assessment changes to data as needed for updating the MDB, video and picture files.
- Deliverables listed below will be submitted to the City monthly, as well as at the end of each submittal package.

Innovac Deliverables:

- Condition Assessment stormwater pipe inspection data in MS Access format.
    - NASSCO Validated PACP 6.0 MDB Export file for import into CityWorks.

OCI Deliverables:

- Stormwater pipe conditions assessment in MS Excel format.
- Prioritization Workshop agenda and minutes.

Task 5- Heavy Cleaning

This task involves cleaning, re-inspecting, performing a condition assessment, prioritizing, and updating the MS Access Database and GIS files for up to 3,832 LF, or 51 pipes (approximately 8% of the total in areas A & B) for Phase 1, and 15,244 LF, or 211 pipes (approximately 8% of the total in areas C & D) for Phase 2, which were flagged for heavy cleaning during Task 2. All lines shortlisted for heavy cleaning will need to be approved by the City prior to any cleaning being performed.

Assumptions:

- Up to 3,832 LF or 51pipes (approximately 8% of the total in submittal packages A&B) will require heavy cleaning in Phase 1. Up to 15,244 LF or 211 pipes (approximately 8% of the total in areas C & D) will require heavy cleaning in Phase 2.
- Pipes that cannot be inspected without cleaning and pipes that cannot be cleaned with three jetting attempts or less (defined as light cleaning for this contract) will be flagged for heavy cleaning, and that list will be provided to the City for approval.
- All heavy cleaning efforts will be performed upon issuance of a written NTP from the City.
- Heavy Cleaning efforts will be performed under the definition of:
  - The amount of material to be removed is approx. 30% - 95% of the diameter of the pipe
  - The threshold limited to the cleaning of one pipe will be no longer than one hour of continuous pipe jetting efforts or two full tanks of water
  - Upon reaching that threshold, the operator then will candle the pipe (to the best of their ability given the conditions at that time) to assess if additional cleaning efforts will be required and contact the City PM and the Consultant PM to provide a status update and direction.
  - The City will provide direction on lines involving medium (1/2") to larger tap (1") roots and masses to be removed by the means of root cutting blades, brushes and other means while limiting any potential damage to the pipe through means of continuous PSI regulation during the cleaning efforts
  - Heavy amounts of fine sand, grit, gravel, pea rock and smaller quarry spalls (up to 6" diameter) will be removed as part of the heavy cleaning efforts.
- Once heavy cleaning has been completed then the inspection team will complete the inspection and submit the videos and reports to OCI.
- If new or modified assets are encountered during heavy cleaning, Innovac and the City will update GIS as described in Tasks 2 and 3.
- Deliverables listed below will be submitted to the City once at the end of each submittal package.

Innovac Deliverables:

- Post-cleaning video in MP4 format and PDF format inspection reports for each pipe cleaned in this task.
- Field data collected in ESRI's collector application synced from mobile devices with the City's ArcOnline application.
- Condition Assessment stormwater pipe inspection data in MS Access format.
  - NASSCO Validated PACP 6.0 MDB Export file for import into CityWorks.

OCI Deliverables:

- Stormwater pipe conditions assessment in MS Excel format.

Task 6- Management Reserve

This task includes a management reserve for additional tasks or out of scope items requested during this project.

Assumptions:

- The management Reserve will not be used without written authorization from the City's project manager.

Budget

The estimated budget for this project is $1,844,530.45. See table below for summary.

PHASE 1			
Area	**Task**	**Budget**	**Total**
A	1A	$34,351.47	$123,498.52
	2A	$30,774.70	
	3A	$10,300.00	
	4A	$48,072.35	
B	1B	$52,251.93	$265,244.13
	2B	$96,268.55	
	3B	$22,750.00	
	4B	$93,973.65	
E1	5A	$10,771.85	$40,559.85
	5B	$29,788.00	
TOTAL PHASE 1			**$429,302.50**
PHASE 2			
Area	**Task**	**Budget**	**Total**
C	1C	$40,185.73	$252,617.63
	2C	$92,380.80	
	3C	$22,750.00	
	4C	$97,301.10	
D	1D	$114,363.18	$972,251.98
	2D	$407,785.20	
	3D	$54,200.00	
	4D	$395,903.60	
E2	5C	$28,720.95	$140,358.35
	5D1, 5D2, 5D3	$111,637.40	
TOTAL PHASE 2			**$1,365,227.96**
Management Reserve (MR)			$50,000.00
TOTAL PHASE 1 + 2 + MR			**$1,844,530.46**