

CITY OF COOS BAY CITY COUNCIL
Agenda Staff Report

MEETING DATE September 15, 2015	AGENDA ITEM NUMBER
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TO: Mayor Shoji and City Councilors

FROM: Jim Hossley, Public Works Director *JH*

THROUGH: Rodger Craddock, City Manager *RC*

ISSUE: Consider Award of Sanitary Sewer Pipe Survey from Ocean Boulevard to Plant 1

BACKGROUND:

In 2014 the City contracted with the Dyer Partnership to prepare a report titled "Regional Sewer Study – Sewer Basins I, K, L, M, N, Q and T". This study examined approximately 14,000 lineal feet of pipe. The study extended from the old K-Mart site (Cascade Farm and Outdoor) located on Ocean Boulevard, to Woodland Drive, up Thompson Road, down to North 8th Street and finishes at Wastewater Treatment Plant 1. This study was performed because of the potential for development and re-development of (Ocean Grove) property adjacent to Ocean Blvd. The report concluded that the existing sewer system is overburdened during high rainfall events due to inflow and infiltration. Because the system is over capacity during heavy rainfall events, it would not be able to accommodate additional flow from new development. For new flows to be introduced into the system, substantial improvements are needed to the existing sewer system including improvements to pump stations and force mains.

It would be negligent for City staff to approve any significant development that would adversely impact this portion of the sewer system knowing that it is currently over loaded. Before adding any new sewer burdens, repairs to downstream portions of the sewer system must occur. Most of the repairs are not on the City's current 20-year "takedown" project list. These needed repairs can deter potential developers due to magnitude and cost, thus staff needs a way to more accurately quantify the positive impact of repairs to sections of the sewer system. If this was possible Staff could create a list of segments that could be repaired to make room in the system for future sewer flows.

Currently, to check for deficiencies in sewer pipes, the Public Works Department utilizes a camera that enters the sewer pipes and takes a video of the interior of the pipe. The camera system provides the viewer a visual check of the pipe, which is mandatory for dye testing investigations and is more than adequate for the majority of sewer investigations; however the TV system does not guarantee that all deficiencies are noticed, especially in dry weather conditions, nor can it define the deficiency's impact to the system.

Staff has investigated a system that utilizes water and voltage to test for voids in the pipe walls and can read the voltage through any deficiency in the pipe wall through the flow of water. The amplitude of the voltage at the probe will allow the software to determine the size of the deficiency. Using the deficiency size and a groundwater depth, an inflow rate can be calculated. A company called Electro Scan came to Coos Bay earlier this year and demonstrated this technology. They analyzed a

pipe in Empire area and compared their analysis to the video investigation of the same pipe. They presented a report that they would typically provide to any client that categorizes the size and location of each deficiency. Using this report Staff was then able to not only see the deficiencies from the previous camera investigation, but quantify them as well. This data could be used to prioritize repairs based on infiltration rates for each segment.

Staff recommends surveying the sewer lines from Ocean Blvd to Plant 1 (approx. 2 ½ miles) using the Electro Scan system. Along this route Staff will install groundwater monitoring devices that will give data points of groundwater depths for key points along the route. Then, using these ground water measurements, staff will be able to use the software to determine which segments of pipe have the biggest inflow impact to the system. Once the segments have been evaluated by severity and quantity of inflow, the City could put together a cataloged list of these segments as mentioned above and this list could then be given to developers as possible mitigation segments for new development or re-development. This is a more attractive approach for developers as opposed to having to fix the entire downstream system up front.

ADVANTAGES:

The advantages will be in the data that is available from the survey. Since the Electro Scan system is accurate in determining sources and quantity of infiltration, the City will be able to:

- Identify and prioritize the segments that need fixing the most.
- Offer new development or re-development projects a list of possible mitigation areas to offset new sewer connections and flows as opposed to fixing the entire system.
- Reduce the likelihood of future Sanitary Sewer Overflows (SSOs) in this system by being able to focus on the worst pipe sections and being more efficient at reducing inflow and infiltration (I/I). (SSOs can occur during high rain events when the excessive rainwater makes its way into the sewer system through infiltration points.)
- Reduce I/I into the system more efficiently and therefore add capacity to gravity lines, force mains, pump stations and treatment plants.

DISADVANTAGES:

Staff sees no disadvantages.

BUDGET IMPLICATIONS:

The cost of the survey from Ocean Blvd to Plant 1 is \$36,500. However this does not include traffic control or the groundwater monitoring equipment. Staff estimates that these two additional items will cost an additional \$25,000 total. If approved, Staff will do a Request for Quote for these services. Funding for this survey will come equally from the Wastewater Expenditures Fund 3, Plant 1 Department 351-520-2108 and Collection Systems/Sanitary Department 353-520-2108 (\$30,750 from each).

The Electro Scan device can also be purchased. If the City decides to have Electro Scan perform this survey and then purchase a unit in the future Electro Scan has agreed to discount the cost of the survey from the unit total by \$1 for every lineal foot scanned during this survey (approximately \$14,000), this offer is valid for one year from the time of the survey.

As another option the Council could approve the purchase of the Electro Scan system. The total cost of a new unit is \$172,500. If the Council was to approve the purchase of new unit, the City's capabilities would not be limited to just this area of the sewer system. For example, an evaluation of

the sewer system in the Front Street area will be needed as a large grant has been obtained to assess the infrastructure in that area and this technology could be used for that report. The cost for a survey of the Front Street sewer and storm lines would cost approximately \$15,000 (traffic control and groundwater monitoring not included). This unit could also be included for master planning. The City's sewer master plan is 9 years old. It is conceivable that DEQ may require the City to update the plan when it reaches 10 years of age. Also to qualify for further loans a more recent plan may be required.

With minor modifications the Electro Scan unit can work with the City's existing TV truck and requires no further specialized training apart from software training for the City's operators. If Council elects to perform the survey for \$36,500 and then at a later date elects to purchase the unit, the total cost for the unit would raise by \$22,500 for the services of the Electro Scan staff. If the City were to have Electro Scan perform surveys, the mobilization and scanning costs for the proposed area from Ocean Boulevard to Plant 1 and for the Front St area would equal approximately 30% (almost a third) of the total cost of purchasing the unit. Funding to purchase the unit would come from the Wastewater Improvement Fund 29, Department 810.

ACTION REQUESTED:

If it pleases the City Council approve the Sanitary Sewer Pipe Survey from Ocean Boulevard to Plant 1 for an amount not to exceed \$61,500 without prior approval from Council.

Or

If it pleases the City Council approve the purchase a new Electro Scan unit for an amount not to exceed \$172,500 without prior approval from Council. Furthermore, approve the traffic control and groundwater monitoring equipment for an amount not to exceed \$25,000 for a total approved amount of \$197,500.

Attachments:

Electro Scan Technical Services Agreement

**PROPOSAL TO CONDUCT AN ELECTRO SCAN PILOT PROJECT
AS A TECHNICAL SERVICES AGREEMENT FOR
THE CITY OF COOS BAY, OREGON**

1. INTRODUCTION

Electro Scan Inc. is delighted to provide this Proposal to Conduct an Electro Scan Project as a Technical Services Agreement for the City of Coos Bay, Oregon ("City").

Electro Scan Inc. ("Contractor") understands the challenges of assessing underground sanitary sewer, stormwater, and water infrastructure and determining their remaining life. Given limited budgets, Contractor understands the importance of identifying and prioritizing its critical sewers to assess the efficiency and effectiveness of recommended repairs, rehabilitation, and replacements to optimize its capital expenditures, minimize service disruptions, and maintain a consistent and sustainable conveyance network.

The Contractor also understands that the City prides itself on identifying new processes, procedures, and equipment that can support its growing infrastructure. As a result, the Contractor is pleased to provide this Technical Services Agreement to conduct an Electro Scan Project to systematically assess its problematic subbasin(s).

Notable awards and achievements for Electro Scan Inc., and its products, include:

- Finalist, Europe's GreenTec Award for Water & Sewage, December 2013
- The New Economy CleanTech Award for Water & Wastewater Solutions, 2013
- PURE Award for Innovation, South West Water, England, 2013
- WEF Innovative Technology Award, 2013
- Sierra Nevada Innovation Challenge CleanTech Award, 2013
- NASTT/No-Dig, Joseph L. Abbott Jr., Award for Best Product Innovation, 2013

Additionally, Innovation Bulletins covering the Electro Scan technology, used to assess both pre- and post-CIPP projects, were published in 2014 by two of the top ranking water utilities in England, including Severn Trent Systems Plc. and United Utilities Plc.

B. PROJECT TEAM

Electro Scan Inc. shall serve as Prime Contractor for this project, with its headquarters in Sacramento, California. Currently, Electro Scan offers its products and services from international offices in Dublin (IRELAND), London (ENGLAND), Frankfurt (GERMANY), and Melbourne (AUSTRALIA), recently supplying the largest sewer contractor in Japan with entire suite of products.

C. WHAT IS ELECTRO SCAN?

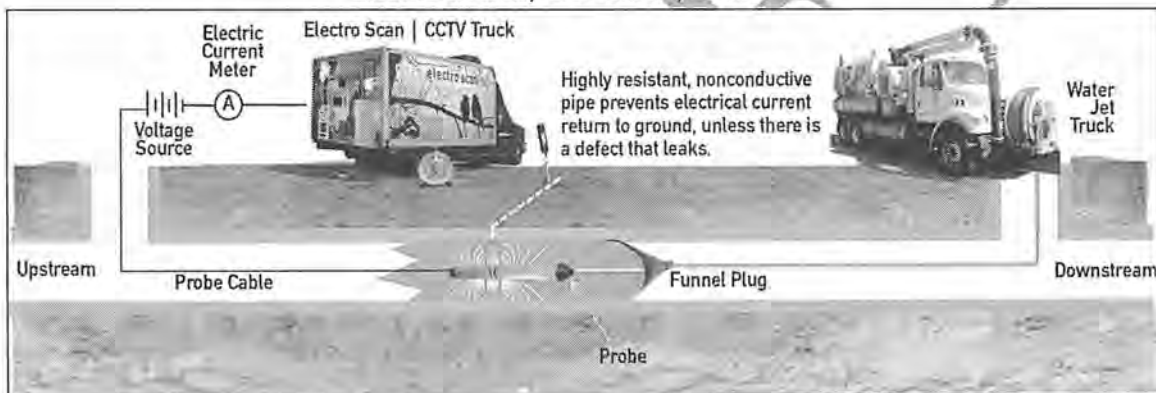
Electro Scan is an innovative technology that automatically locates defects and measures estimated leaks in liters per second (gallons per minute). Successfully tested and benchmarked in US EPA field verification studies, for both Sewer Mains and Laterals, the Electro Scan technology represents the first condition assessment tool that does not rely on visual interpretation or independent analysis to determine estimated infiltration rates.

While most sewer utilities have relied on closed-circuit television (CCTV) inspection to see, interpret, and catalog pipeline defects, in dry-weather conditions, in contrast, Electro Scan simulates the performance of sewer mains in wet-weather conditions simulating conditions when pipes are full of water.

Electro Scan's patent-pending technology releases a focused array of low voltage, high frequency electrical current of only 10 volts and 40 milliamps (i.e. approximately the equivalent of six (6) AA batteries), to locate and quantify all defects in non-conductive (e.g. asbestos, brick, cement, plastic, reinforced concrete or cement, vitrified clay, etc.) sewer mains and laterals.

Non-conductive materials naturally prevent electricity from passing through, or along, the wall of a pipe. As a result, no electrical current should ever be able to "leak" or escape from inside a pipe unless there is a crack or break in the pipe. A defect in the pipe that leaks water will also leak electrical current. For a constant applied voltage, the larger the defect, the greater the electric current.

Figure 3
Electric Circuitry of a Sanitary Sewer Main



Electro Scan testing is carried out by pulling an electrode or probe, through a pipe and measuring the variation of electric current flow through the wall of the pipe, then through the ground to an electrode on the surface – a metal stake serving as grounding.

Electro Scan locates defects and corrosion by consistently monitoring the electrical continuity of the pipe. Most sewer pipe materials are electrical insulators. A defect in the pipe that leaks water will also leak electrical current. Therefore, given a constantly applied voltage, monitored by the system, the larger the defect, the greater the electric current reading. As well documented in the field of geophysics and described in ASTM F2550-13 (Appendix A), the larger the hole, the greater the water flow or leak.

D. HOW DOES ELECTRO SCAN COMPARE TO TRADITIONAL CCTV INSPECTION?

Electro Scan finds defects that are typically not seen by television inspection. While CCTV inspection relies on visual identification of pipe defects and problems, Electro Scan is a new process that automatically identifies, locates, and measures all defects that have the potential to allow for infiltration. Infiltration is a key factor causing Sanitary Sewer Overflows (SSOs) and Combined Sewer

Overflows (CSO) caused by cracks & defects found in manholes, sewer mains, service connections, and laterals.

A key limitation of CCTV is its inability to visually see most leaks, especially if the inspection is conducted in dry weather conditions. In contrast to CCTV inspection, Electro Scan can work year-round, in dry or wet weather conditions. Moreover, Electro Scan provides more complete information--it locates every defect to the closest 1 cm and provides an estimate of the potential peak amount of infiltration caused by each defect, and the pipe as a whole. In addition to finding defects in existing pipes, another major capability of Electro Scan is its ability to find all leaks in newly installed or recently repaired pipes, including lining projects, to ensure contractors deliver "leak free" projects.

Table 1 – Comparison of CCTV and Electro Scan

<i>How Does CCTV and Electro Scan Compare?</i>		CCTV	Electro Scan
1	Finds Potential Sources of Infiltration	No	Yes
2	Finds Leaks Inside Joints	No	Yes
3	Finds Leaks At Service Connections	No	Yes
4	Finds Possible Points of Infiltration At Cracks & Fissures	No	Yes
5	Finds Leak Locations - Automatically (i.e. within 0.4 inches or 1 centimeter)	No	Yes
6	Measures Size of Leak - Automatically (i.e. Gallons or Liters per Minute)	No	Yes
7	Finds Defects That Leak from Bad Couplings and Fittings (See Notes)	No	Yes
8	Finds Defects That Leak After Repairs	No	Yes
9	Finds Defects That Leak in Liner Projects (See Notes)	No	Yes
10	Finds Defects After Service Re-Connections (See Notes)	No	Yes
11	Finds Leaks When Silt on Bottom of Pipe	No	Yes
12	Able to Conduct Inspection When Sewer Pipe Is Full of Water	No	Yes
13	Able to Determine Size of Potential Leak if Roots Are Present (See Notes)	No	Yes
14	Find Leaks at Joint If Grease Is Present (See Notes)	No	Yes
15	Able to Determine Size of Leak if Pipe Has Encrustation (See Notes)	No	Yes
16	Requires Active Infiltration to Identify Defect as Source	Yes	No
17	Contains Moving Parts That May Get Clogged with Silt or Debris and Cause Malfunction	Yes	No
18	Requires Bypass During Inspection, If Pipe Full	Yes	No
19	Requires Special Training and Certification to Identify Defects	Yes	No
20	Relies on Visual Observations to Record Type and Magnitude of Defect	Yes	No
21	Pipe Condition Required to Conduct Inspection	Empty	Full, Partial, or Empty
22	Possible Length (Meters) of Inspection	Same	Same
23	Average Speed of Operation - # of Meters/Minute	3	15
24	Average Time to Convert from CCTV to Electro Scan or Electro Scan to CCTV (In Min.)	5	5
25	Weather Required at Time of Operation	No Rain	Rain or Shine

E. PROJECT TEAM

<p>Project Manager</p>	<p>Mark Grabowski Mr. Grabowski will be in-charge of all aspects of the Project, including project kick-off, day-to-day administration, data collection and analysis, report delivery, and formal project presentation. Mark has overseen all aspects of the design, development, and production of the Electro Scan patent-pending technology ensuring full compliance with ASTM F2550-06. Mark has managed over 700,000 feet of scanning since joining the company in May 2012.</p> <p>Prior to joining Electro Scan, Mr. Grabowski served as Product Manager and Project Engineer at Aries Industries, where he was in charge of product management for pipeline rehabilitation and inspection products. Mr. Grabowski was also Water and Wastewater Project Manager at C.W. Purpero, Inc. (Milwaukee, WI), where he was involved with numerous underground infrastructure projects, including design & construction of flood/runoff control systems, lift stations, innovative pollutant removal systems, installation of major water, sanitary sewer, storm sewer, and force main systems utilizing both open cut and trenchless technology methods.</p> <p>A member of the National Association of Sewer Service Companies (NASSCO) and OSHA Certified for Confined Space Entry, Mark received his Bachelor of Science in Mechanical Engineering and Construction Management from the University of Central Florida (2004).</p>
<p>Senior Advisory</p>	<p>Charles Wilmut, P.E. Mr. Wilmut will be a Special Advisory to Electro Scan Inc. for this project. Prior to joining the Company, Mr. Wilmut was Director of Texas operations for Burgess & Niple, Inc. from January 2009 to December 2012. He served as Principal-In-Charge for more than 200 successful Sewer System Evaluation Surveys (SSES) and Inflow/Infiltration Studies (I/I). He has authored several I/I analyses and SSES reports, including the first approved by State and Environmental Protection Agency authorities throughout the southeastern United States.</p> <p>Mr. Wilmut was an early adopter of the Electro Scan technology during his tenure with Burgess & Niple, completing over 300,000 feet of scanning projects using predecessor versions of the electro scan technology.</p>
<p>Field Technician</p>	<p>Macy Grubbs, Field Technician Mr. Grubbs will be in-charge of all field equipment set-up and teardown. Macy has been Lead Field Technician and Manager of over fifty (50) Electro Scan projects, completing over 400,000 feet of scanning in 2013.</p>

Detailed resumes available upon request.

F. SCOPE OF WORK

This project will consist of an Electro Scan of approximately 25,000 feet of 6"-10" gravity sanitary sewer pipe pre-selected by the Owner.

The investigation will be achieved through a four (4) part work plan, including:

- Part 1 – Preparatory Work and Mobilization
- Part 2 – Sewer Electro Scan Testing
- Part 3 – Project Administration, Management, Supervision and QA/QC
- Part 4 – Data Evaluation, Analysis, and Reporting

Part 1 – Preparatory Work and Mobilization

1. Collect and review existing information including: reports, maps, flow records, maintenance records and other pertinent information. Information to be provided by the Owner to the Contractor at a minimum of 2 weeks prior to the commencement of the project.
2. Preparation of equipment to be assigned and transported to the project site.
3. Hold a project kick-off meeting prior to commencement of any work to ensure that all work is conducted in the most efficient and economic manner; with proper liaison between Contractors and Owner personnel.
4. Plan for traffic and pedestrian control to ensure public safety and convenience (if necessary).

The compensation for this task is charged at a flat rate price, see Table 1, Task 1.

Part 2 – Sewer Electro Scan Testing

General

The Electro Scan test is carried out by pulling an electrode, called a probe, through the pipe and measuring the variation of electric current flow through the wall of the pipe, then through the ground to an electrode on the surface – a metal stake driven into the ground.

Utilizing an existing CCTV truck's cable and reel, swapped out in just a few minutes in the field, Electro Scan will locate defects and corrosion by checking the electrical continuity of each sewer main in the identified pilot area.

The Owners Jet Truck and Operator will lightly flush the pipes and to pull the Electro Scan probe through the pipe while surrounding it with water. Operator should also be allowed to refill truck from any local hydrant.

Identifying current trace defects associated with pipe joints is an essential part of the Electro Scan analysis. By identifying Joint Defects, other defects due to structural defects such as corrosion, service connections or pipe cracks can be readily categorized. Joint Defects are identified as Defects along the current trace occurring at a regular interval that corresponds with the pipe segment length.

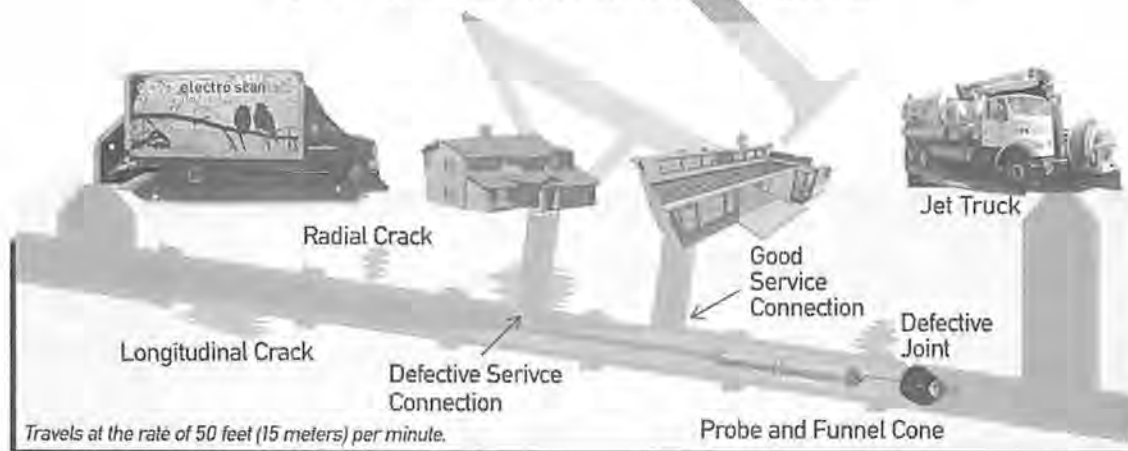
Structural defects will be most easily distinguished in a processed electrode current plot is corrosion in a concrete pipe. The processed electrode current in this case tends to remain above the threshold and appears quite irregular in appearance. This is because the electrode current easily passes through a thinner wall of concrete.

Field Operation

For each sewer main, the Electro Scan procedure begins with a light flushing of the sewer line and then using the hydraulic jet hose and reel to pull the Electro Scan probe through the pipe from the downstream manhole to the upstream manhole where the Combo CCTV/Electro Scan truck is positioned.

The sewer line will be flushed from the downstream manhole, the nozzle removed at the upstream manhole, a Sliding Funnel Plug will be attached to the hose, and the Electro Scan probe will be attached to the Sliding Funnel Plug. The hydraulically powered jet truck would then pull the probe through the pipe while simultaneously providing the water necessary for the probe to electrically examine the pipe walls.

Figure 1. Typical Field Set-Up for Sewer Main Electro Scan



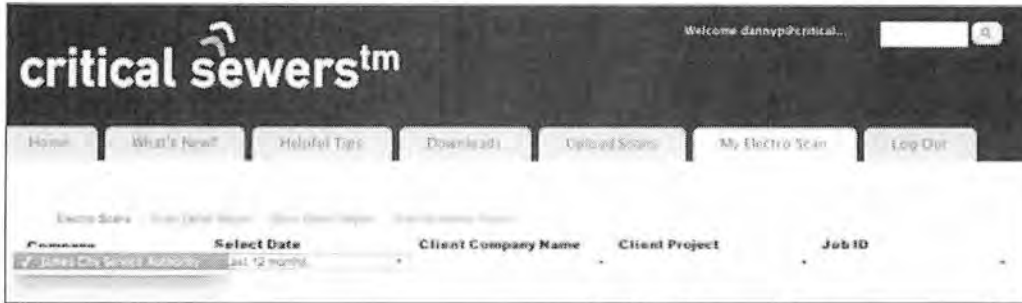
It should be noted that while water is used to surround the Electro Scan probe, only a small portion of the probe must technically be surrounded in 360° of water to allow electrical current to conduct or reach the wall of the pipe. While only a portion of water is required, Electro Scan recommends maintaining a 6-10 ft. column or reservoir of water be maintained behind the full cone to allow sufficient water to surcharge 24-36 inches up each sewer lateral. By allowing water to surround the entire service connection, Electro Scan will be able to successfully test all elements of the connection for defects.

Should a pipe segment be surcharged to the point where flushing isn't appropriate, other techniques and equipment will be used, including, but not limited to, float lines, parachutes, and immediate-area flow restriction.

All data will be fed back to the Electro Scan Combo CCTV truck via the standard CCTV coaxial cable. Once the data is collected on the truck's laptop computer, it will all be uploaded to Coos Bay's Critical

Sewers Cloud-Based portal where it will be instantly processed and available for Electro Scan engineers and staff to view.

A temporary software user license will be provided to allow one person to access the Electro Scan Critical Sewers™ cloud application, where data from the field will either be uploaded directly from the Combo CCTV/Electro Scan truck using a remote Wi-Fi connection or uploaded when a stable connection to the Internet can be established at the end of the days.





Electro Scan’s custom and proprietary algorithms are used to grade the size and type of each leak, structural defects, and graphically display the defect grade size, corrosion, type and frequency for each manhole-to-manhole pipe section. In addition, Electro Scan’s software will provide an estimated **Gallons Per Minute** infiltration rate per defect and for also for the entire pipe segment. The Electro Scan traces have a resolution of less than 0.1ft. This information can be readily used to qualitatively identify the corrosion problems, highest potential infiltration sections and assist with the selection of the most cost effective repair method.

The compensation for this task is included in the “per foot” price as shown below in Table 1, Task 2.

Part 3 – Project Administration, Management, Supervision and QA/QC

This task consists of supervision of field personnel, project administration, and management, scheduling of field tasks, general management and supervision of field personnel, and quality assurance/control of fieldwork and data management activities. Additionally, it will include:

1. General administration and periodic meetings as necessary with OWNER.
2. Internal project control procedures on schedules, budget, quality control review and invoices.

The compensation for this task is included in the “per foot” price as shown below in Table 1.

Part 4 - Data Evaluation and Analysis

This task consists of evaluating and analyzing the collected data and presenting the results in the form of a report. This data will be presented in both tabular and graphic formats to facilitate a comparative condition assessment of line segments.

Data collected in the field will include:

- Length of sewer line
- Pipe defect locations

- Classification of all Defects as Large, Medium, and Small
- Classification of all Defects as Minor, Moderate, and Severe Peak Estimated Flow.
- A Total Estimated Peak Gallons per minute (GPM) will be provided for each defect and pipe segment, as a whole (*the City will provide groundwater levels to Electro Scan for this estimation/calculation*)
- If CCTV inspection reports and videos are available, and as time permits, significant anomalies identified through the electro scanning process will be compared to corresponding defects displayed from previously available CCTV video or reports, provided by the City to Contractors at least two weeks prior to beginning field work, made available in digital format (i.e. mpg for video and pdf for reports).

No additional CCTV shall be performed as part of this scope of work.

For an additional fee, the City may purchase a temporary site license to view Electro Scan data on its cloud-based Critical Sewers® application. Otherwise, data may be viewed in the field as data is collected for the sewer mainlines only.

In addition, the following will be provided as a final deliverable:

- **Three (3) copies of the draft report** will be prepared for submittal to Coos Bay for review and comments.
- **Three (3) copies of the Final Report** incorporating the comments from the review of the draft report will be furnished. **Final Report in Microsoft Office 2010 and in PDF** format will be included.

The compensation for this task will be included in the “per-foot” price as shown below in Table 1.

C. SCHEDULE

The work will be initiated within the Month of November 2015 and upon the receipt of Authorization to Proceed, and is estimated to be completed within ten (10) working days. **To receive the per linear foot price as indicated in Table 1, a minimum of 10,000 linear feet must be scanned and the project must be completed no later November 30, 2015.**

D. COMPENSATION AND PAYMENT TERMS

The compensation for this task will be based on a “Flat Rate” for Preparation Work and Mobilization and Traffic Control, in addition to “Per Linear Foot” basis. We estimate that approximately **25,000** linear feet of the sewer lines in study area will be electro scanned and tested.

The total price to cover all services described under the Scope of Work will be computed based on the unit prices shown in Table 1 and quantities of work completed as authorized by the CITY including the lump sum tasks amounts being established by percent of completion. Tasks listed as “per each” or “L.F.” are estimated. Quantities found in field investigation may vary and will be performed and charged by the unit price shown in Table 1 in an amount not to exceed the total proposal cost. Invoices will be rendered monthly and are due within thirty (30) days of receipt. Table 1 delineates the unit price for each task.

**Table 1
Estimated Quantities and Price**

Task	Task Description	Unit	Unit Price	Estimated Quantity	Total Price
1.	Preparatory Work & Mobilization				\$2,200.00
2.	Electro Scan Leak Testing of Sewer Lines 8 inches	L.F.	\$2.45	14,000 (Min 14,000)	\$34,300.00
3.	N/A			N/A	
4.	Project Administration and Management, Supervision & QA/QC			INCLUDED	
5.	Data Evaluation and Analysis			INCLUDED	
	TOTAL				\$36,500.00

E. INFORMATION AND SERVICES TO BE PROVIDED BY THE OWNER

The OWNER shall provide the following information and services:

1. Jet Truck and Operator to lightly flush the pipes and to pull the Electro Scan probe through the pipe while surrounding it with water. Jet truck should be equipped with a hose with a minimum length of 500 feet, and minimum diameter of ¾". Operator should also be allowed to refill truck from any local hydrant at no charge to the contractor.
2. Assistance with Traffic Control, if necessary
3. Any and all permits, if necessary
4. GIS map, preferably hardcopy and digital format of existing sewer system showing sewer lines and manhole numbers.
5. CCTV Inspection reports and videos for all segments of pipe Electro Scanned prior to the commencement of the project.
6. Liaison with officials to provide effective coordination and cooperation between police, utility departments, and the Engineer, as necessary during execution of field.
7. Assistance by knowledgeable staff member of manhole and cleanout locations, in locating buried or hidden manholes or cleanouts.
8. Expose and/or open manholes that require excavation, cutting of pavement, and/or have lids fastened or frozen in place.

F. NOTICE TO PROCEED

The completion of the proposed work shall be contingent upon receipt of Authorization to Proceed by the ENGINEER and a signed copy of this proposal.

Electro Scan Inc.

City of Coos Bay, OR

Mark Grabowski, Vice President

Signature

Date

Title

Date

DRAFT

APPENDIX

The following documents explain of the effectiveness of Electro Scan Technology when used for pipeline condition assessment, rehabilitation planning, and rehabilitation certification.

Follow link to documentation:

<https://www.hightail.com/download/UJRUYURBNDRiV3hFQmRVa6>

01_ASTMF2550-13

The ASTM standard governing Electro Scan.

02_The Need to Quantify Pre- and Post-Rehabilitation Effectiveness

Document has generated over a dozen sewer utilities in the United States, Canada, UK (AMP6), and Switzerland to change their specifications to accept CIPP.

03_Miami-Dade_CIPP_Addendum

After purchasing their own Electro Scan Truck, the City's Chief of Sewers quickly focused his efforts entirely on recently CIPP lines. Based on his crews findings he published this addendum for all future CIPP projects.

04_Miami-Dade_SSES_CMOM_Specification

Electro Scan is replacing CCTV as the main assessment tool for this specification to be issued in early 2015 for 1 million ft (305 km or 190 miles), per year.

05_HTMA_Sharon Purnell_Owner Perspective

This open letter was penned for PMAA Magazine by Sharon Purnell, Manager, of Hamilton Township Municipal Authority, explaining the reasoning behind the unanimous decision from board members to purchase Electro Scan and intended use of the technology. Sharon also co-authored a paper with Mark Grabowski, VP, of Electro Scan which will be presented at the No-Dig in Denver, March 2015.

06_Canada_Surrey_BC_Report_11-2014_A4

Recently completed project in Canada; note the total scope of work and time to complete.

07_North Wales_PA_Report_11-2014

Report delivered after completed demonstration where defects that were missed by CCTV inspection were identified with Electro Scan in VCP and CIPP pipes.

08_Danville_IL_Report_9-2014

Report delivered after completed demonstration where defects that were missed by CCTV inspection were identified with Electro Scan.

09_MSW_JCSA Problem Solution_11-2014

Article in Municipal Sewer & Water shows how Electro Scan identified a defective liner in while it was still under warranty, which was replaced at no charge to the municipality.

10_UK_WP2014_WXW_A4

Recent publication including paper from Julian Britton, Manager of Rehabilitation of Wessex Water.

11_Nashville_Tennessee Project

Findings from a 67,000ft project completed by CES, one of the largest sewer contractors in the United States. CES was paid \$4.50 per foot x 67,000 on this project – their first after buying their own Electro Scan Truck. CES owns 12 CCTV Trucks, including six IBAK rigs. Note their daily production.

12_CCTV_v_Electro Scan

A side-by-side comparison highlighting Electro Scan's superior ability to find and measure infiltration.

13_US_ES_Manual

Represents Electro Scan's new chapter in the US EPA-endorsed, Wastewater Collection Operations and Maintenance Manual (over 95,000 copies in print) -- the 'holy grail' of the U.S. sewer industry.