Memo

To:	Mike Birett Waste Diversion Ontario Continuous Improvement Fund Office 92 Caplan Avenue, Suite 511 Barrie, ON L4N 0Z7	From:	Christine Roarke Stantec Consulting Limited 3430 South Service Road, Suite 203 Burlington, ON L7N 3T9
File:	160930023 (1056447)	Date:	January 13, 2010

Reference: Route Optimization Software – Part 2

1 STUDY OVERVIEW

Stantec was retained to assist Waste Diversion Ontario (WDO) with identifying providers of collection route planning software. The preliminary research was documented in the memo regarding the *Route Optimization Software Review* submitted to WDO, dated August 28, 2009.

In Part 2 of the project, Stantec was requested to contact two users of each of the four software programs identified in the memo to obtain first-hand information about the software programs from municipalities currently utilizing the programs.

2 METHODOLOGY

The reference municipalities listed in the table (Summary of Software Providers) in the August 28, 2009 memo were contacted by phone and/or email. These municipalities were identified by the software providers as users of their programs. If contact was made with the reference municipality an attempt was made to receive answers to the following questions:

1. Are you using this vendor and software (e.g. Fleet Route by C2Logix)?
2. What do/did you use the software for?
3. How long have you been using it for?
4. What was your evaluation process in procuring this software?
5. Why did you select this vendor and software?
6. What were the costs to purchase and implement the program?
7. What are the program and vendors strengths and weaknesses?
8. Are you satisfied with the results? Do you plan to continue using the software?
9. Would you recommend this software and vendor?

2.1 Anomalies and Study Limitations

While contacting the reference municipalities, we determined that some of the information was out of date, as some municipalities had changed to a different software provider or they

couldn't verify if they had ever used the software vendors we had identified in the memo. An internet search was conducted to find additional reference municipalities that were using each of the four software providers identified in the memo. These municipalities were added to our list of contacts. A number of attempts were made to contact each of these municipalities. Table 3-1 includes a list of all the municipalities for which we obtained information on software usage.

- We were unable to make contact with anyone at any of the municipalities identified by the vendor of the eRoute Logistics software as using their program although we tried a minimum of three times to contact a user of the program. We were unable to find any other information about the program and/or users on the internet.

- We were unable to find any information on municipalities who use RouteFinder.

- Some municipalities were listed by the software provider as using the software but this information could not be verified, either because we could not find information on the internet or we could not reach a user of the software.

3 SUMMARY OF RESULTS

The two most popular software programs were Fleet Route and Route Smart based on the amount and type of information about the software (i.e. recommendations to council, awards, mentions in articles on collection providers and software used, and vendor references) found on the internet, and discussions with municipalities.

- With respect to Fleet Route, we were able to speak with one user of Fleet Route; found three recommendations to council for purchase of their software on the internet; and, found references to the software provider acting as consultants to municipalities in optimizing waste management programs. We attempted contact with other users a minimum of three times by phone and email.

- For Routesmart, we spoke to four users of Routesmart and found other mentions of Routesmart on the internet.

The following table outlines the users of the software outlined in the August 28, 2009 memo and supplemented by internet research. The municipalities listed under "Confirmed Users of Software" were verified by phone or by results of RFPs issued by the municipality. Not all municipalities/users of the software were contacted if it was felt that enough information had been gathered or the reference wasn't applicable to the project.

Reference: Route Optimization Software – Part 2

Table 3-1: Results of Contact with Users of Software

	Reference Municipality	Confirmed Users of Software (Y/N)	Source of Information					Notes
			Vendor Website	Council Recommendation	RFP Award	Internet Research	Phone Call	
Fleet Route	Ontario, CA	N (council resolution not found)		√				Recommendation to Council in 2005 Unknown if passed. Total cost $88,723 – included single license, installation of software, initial route optimization, training, and one-year of maintenance
	Nashville, TN	Don't use this program	√					Use Routesmart not FleetRoute.
	Edmond, OK	Y (phoned)	√				√	See details below in Section 3.1.
	Miami-Dade County, FL	N (phoned 3X – no response)	√				√	
	Stillwater, OK	N (phoned 4X, emailed – no response) (council resolution not found)		√			√	Recommendation to Council in 2008 Unknown if passed. Total Cost of $36,000 included single licence, system setup and configuration, 4 days of training, first year maintenance agreement, contract administration, online meetings, ArcGIS licence, Navteq street centerline data.
	Wilmington, NC	Y (phoned purchasing for award info) (council resolution not found)			√		√	Results of RFP – 2009. Total Cost $45,000. Details unknown.
	San Antonio, TX	Y (award listed on vendor website, phoned purchasing, award details not available)			√			Results of RFP – 2009. Cost unknown pending council approval.

Reference: Route Optimization Software – Part 2

	Reference Municipality	Confirmed Users of Software (Y/N)	Source of Information					Notes
			Vendor Website	Council Recommendation	RFP Award	Internet Research	Phone Call	
eRoute Logistics	South Oregon Sanitation, OR	N	√					Also listed on Fleet Route Website as a user of that program
	Houston, TX	N (phoned 3X – no response)	√				√	
	Memphis, TN	Don't use the program	√				√	Use Routesmart, not Fleet Route.
	Tallahassee, FL	N (phoned 4X, emailed – no response)	√				√	
	San Diego, CA	N (phoned 3X – no response)	√				√	
	Shreveport, LA	N (phoned 3X – no response)	√				√	
	Waco, TX	Y	√				√	Spoke to IT department, unable to speak to actual user of the program.

Reference: Route Optimization Software – Part 2

	Reference Municipality	Confirmed Users of Software (Y/N)	Source of Information					Notes
			Vendor Website	Council Recommendation	RFP Award	Internet Research	Phone Call	
RouteFinder	Granger Container Services, MI	Don't use the program	√				√	Use Backoffice and generate their own routes.
	Greater Vancouver Transportation Authority (aka Translink)	N	√					Reference on vendor website 9 years out of date – assumed no longer valid
	Quebec City, QC	N	√					no information re: usage found on internet

Reference: Route Optimization Software – Part 2

	Reference Municipality	Confirmed Users of Software (Y/N)	Source of Information					Notes
			Vendor Website	Council Recommendation	RFP Award	Internet Research	Phone Call	
Route Smart	Washington, D.C.	Y				√	√	See details below in Section 3.1
	Nashville, TN	Y					√	Confirmed usage during conversation with staff at Memphis, TN.
	Memphis, TN	Y				√	√	See details below in Section 3.1
	Folsom, CA	Y	√				√	See details below in Section 3.1
	Laredo, TX	N (recommendation to Council found on internet)		√		√		Recommendation to Council in 2007 Unknown if passed. Cost $75,900. Details unknown.
	Charlotte, NC	N (emailed – no response)	√				√	
	San Diego, CA	N (phoned 3X – no response)	√				√	
	Sacramento, CA	N (internet research)	√			√		
	Cleveland, OH	N	√					
	Belmont, CA	N (internet research)		√		√		

3.1 Summaries of Phone Conversations

Route Smart – City of Folsom, California

The City of Folsom has been using Route Smart for the last 6-7 years for routing their solid waste management fleet. Their IT department runs the software. The cost of the software was the standard rate plus annual fees.

They would recommend the software to other municipalities, especially due to the ease of available support services by the service provider and their prompt attention to resolving issues.

Strengths	Weaknesses
• updates are provided via a newsletter on a regular basis regarding changes to the software	• need for someone well versed in the software and hands-on training to use software properly
• efficient, detailed algorithms which allow for greater control over the data	

Route Smart – City of Memphis , Tennessee

Route Smart has been used by the City of Memphis to route garbage/recycling collection vehicles (210,000 stops) for the last 6 years.

Additional customer support was purchased by the City from Route Smart at $75.00/hr to do additional routing; a team of 3 people from Route Smart did the base routing which was further refined by City staff. This hourly purchase of customer support allowed additional improvements to the routes without resorting to a tendering process.

The user of this program is very satisfied with the software and would recommend it to other municipalities. The software was recommended to them by the City of Nashville.

Strengths	Weaknesses
• excellent technical support from the service provider	• inability of the program to automatically save files
• program can be used by non-GIS people	

Route Smart – City of Washington, D.C.

The software is used for routing collection vehicles for solid waste, recycling and bulky item pickup. Their bulky item pick up requires daily generation of routes. Routing is done by a GIS person. The software will generate routes/maps in .pdf format, which are copied into folders and made accessible via a network to other Public Works staff. The software will allow changing of parameters. These changes are made in consultation with other staff members, and may require staff to drive the route to see if it is feasible.

A yearly maintenance fee of $4500.00 is paid which entitles the user to software upgrades, phone support, and WebEx support. Overall, the City is satisfied with the software and would recommend it to other municipalities keeping in mind that it is not a one-size-fits-all program.

Strengths	Weaknesses
• effective for complex routing	• a complex program
• can enable many parameters	• not particularly user-friendly

Fleet Route – City of Edmond, California

The software is used for routing, safe and efficient operations of solid waste collection vehicles and has been used for the last 7 years.

The user is satisfied with the software. User feels software is not needed on a daily basis as routes do not change often, but is useful for new employees and any planning changes affecting routes. User has recommended software to San Antonio and San Francisco.

Strengths	Weaknesses
• sequence numbers which lets users monitor trucks and provide assistance to collections crews if needed	• none noted
• provides information on parameters such as speed limits, school zones etc. which are used to determine length of time per route	
• lets user know when trucks are approaching capacity so the route can be altered to accommodate dumping the material while expediting another truck to assist with route	

4 NEXT STEPS

In general, all the users that we spoke to were satisfied with their software, the vendor and the results obtained by using the software. Many cautioned that these programs are not a "one-size-fits-all" solution. Due to the cost and complexity of the programs, careful consideration to the needs of municipalities, the delivery of the program, and the user of the program is required before developing an RFP. The following are the recommended steps for WDO to follow before purchasing route optimization software.

4.1 Needs analysis of municipalities

WDO should consider the needs of the municipalities before developing a RFP. Each municipality using this software will have unique waste management program characteristics which need to be considered when defining which parameters the software must meet. The

following lists some of the parameters that need to be modeled by the software in order to optimize routes for a particular municipality.

- Size of municipality;
- Frequency of garbage, recycling, organics collection e.g. weekly, biweekly;
- Service provided – garbage, source separated organics, recycling, bulky item collection;
- Number of routes;
- Hours of work;
- Types of residences – single family, multi-family;
- Types of collection vehicles;
- Type of collection – single stream, two-stream, co-collection;
- Availability of GIS info;
- Potential need for updating routes;
- Software access and administration;
- Other reporting requirements (i.e. maintenance schedule, efficiencies, school zones, timing, distance travelled); and,
- Amount of customization needed.

4.2 Planning

Based on the needs analysis of municipalities, planning for the development of an RFP could commence.

It is recommended that the RFP request qualified vendors to supply information for both a service and software option. For the service option, the software provider will administer the program for the user. Under this scenario, the user will not be required to use the program directly. The software provider will develop the route maps. If any changes are required to the route maps they would be completed by the software provider, for a fee. The software option would require WDO or a specified municipality to purchase the software and administer the program in house, calling on the service provider for technical support as needed.

The following is a list of items to consider for inclusion in the RFP;

- Essential parameters to software;
- Delivery method of program - include both a service and software option;
- Administration of program;
- Number of training sessions needed and who attends;
- Approximate budget;
- Amount of data conversion;
- Amount of customization;
- Number of municipalities to include and how to add on others;
- Reporting requirements by municipalities to WDO; and,
- Program coordination by vendor or outside consultant

4.3 RFP Process

Following the planning process, the RFP can be developed. The following is a proposed process to be followed for obtaining route optimization software.

- Develop specifications;
- Develop evaluation criteria;
- Short-list of Vendors;
- Issue RFP or contact Vendors;
- Evaluate response;
- Clarify responses if needed; and,
- Award contract.

Attached is a summary of items found on other RFPs issued by municipalities recently. These are items for discussion as not all will be applicable to the scenario envisioned by WDO.

5 CLOSURE

If you have any questions or would like further clarification on our results, please contact me directly at 905-631-3916 or by email at Christine.Roarke@Stantec.com at your earliest convenience.

Sincerely,

STANTEC CONSULTING LIMITED

- Original Signed By -

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6 SOFTWARE REQUIREMENTS

1. Ability to route:
    a. Solid waste collection vehicles
    b. Recycling collection vehicles
    c. Organics collection vehicles
    d. Co-collection vehicles
2. Routing capabilities:
    a. Ability to optimize routes and stop sequences for:
        i. Low and high density housing
        ii. Single and multi-family residences
        iii. Bulky pickup
        iv. Leaf & Yard pickup
        v. Depots
        vi. Residential (automated, semi-automated, manual) collection
        vii. Commercial (automated, semi-automated, manual) collection
    b. Ability to partition geographically compact areas and balance routes for:
        i. Travel time to and from depot
        ii. Distance/Travel time to and from Transfer Station/MRF/SSO processing facilities/Landfill/Depots
        iii. Time
        iv. Load (type of material/co-collection)
        v. Vehicle capacity
        vi. Vehicle compaction
        vii. Number of routes desired
    c. Ability to optimize routes for individual collection vehicles taking into consideration:
        i. Minimum and maximum length of day for each route
        ii. Specific beginning and ending times for each route
        iii. Minimum and maximum weight or volume for each route
        iv. Minimum and maximum number of carts or containers for each route
        v. Minimum and maximum distance for each route
        vi. Minimum and maximum number of trips to transfer station/MRF/Landfill/SSO processing facility
        vii. Predefined or optimized beginning and ending facilities for each route
        viii. Individual vehicle preparation times at the beginning and end of day
        ix. Break times for each route
        x. Crew Size for each route
        xi. Material collected and type of collection vehicle
        xii. Wait and dump times at transfer and landfill facilities
    d. Ability to designate a location for a less-than-full partition or route
    e. Ability to generate partitions and routes that respect user-specified boundary streets/roads

f. Utilization of municipality or 3rd party street centerline data for developing routing models
g. Ability to maintain, import, add, change or customize street data
h. Ability to analyze street network for data problems including disconnected streets, false intersections, one-way streets that are miscoded etc.
i. Ability to customize with tools such as:
    i. Transportation attribute editing tools (one-way streets, alleys, turn exceptions)
    ii. Query /edit of map feature attribute data using point and click
    iii. Customized street editing functions for adding/deleting/changing street map data in ArcView.
    iv. Alley assignment or alternate collection point location editing of address geocode data
j. Ability to provide for travel path generation/optimization based on sequencing of service locations on a route
k. Ability to provide exception reports for the need to assign new service locations onto preexisting routes
l. Ability to manual swap service locations between routes
m. Ability to utilize side of street precision for route maps showing service locations and both sides of the street with street names and travel path arrows
n. Ability to optimize routes to accommodate special requirements including:
    i. Limiting U-turns
    ii. Time-restricted collection within any geographic area (e.g. school, hospital)
    iii. One way streets
    iv. Single-sided vs double sided collection
    v. Size/weight restrictions for streets/bridges etc.

3. Support Requirements
    a. Ability to provide experienced and professional staff for on-site end user training, customer support, unlimited telephone support and all in-version updates and utilities.
    b. Hourly rate for additional customer support
4. Display and Output Requirements
    a. Routing solutions shall be displayed using the ArcView mapping interface
    b. Predefined maps shall include service locations and both sides of the street with street names and travel path arrows
5. Report and Reporting Capabilities
    a. Ability to create route maps indicating:
        i. Route type
        ii. Route day
        iii. Route number
        iv. Maximum anticipated number of stops per route
        v. Average summer/winter tonnage anticipated per route
        vi. Driving patterns (e.g. utilizing right hand turns wherever possible)
    b. Ability to create summary reports including:

i. Total time
ii. Distance travelled
iii. Turning movements

c. Ability to provide route sequence reports showing details of servicing each service location along the route.
d. Ability to provide a detailed driving direction report with service locations (addresses) listed in sequence order.
e. Ability to provide a street route report containing street names, address ranges, postal codes and route numbers.
f. Ability to automate production of detailed maps sequenced over several interconnected pages at a user-specified scale (will facilitate driver training and enhance ability to reassign workload from broken-down collection vehicle).
g. Ability to position (drag-and-drop) individual collection vehicles to the area for which the vehicle should be utilized before the routes are created in order to assign drivers to areas that they are familiar with or create new routes in the same general area as existing routes.
h.

6. Data Systems/Integration
    a. Ability to export individual route paths as ESRI ArcView shapefiles
    b. Ability to use software e.g. Windows XP
7. Deployment
    a. Hosted or web-based
8. Support and Maintenance
    a. Provide comprehensive maintenance service for a Warranty Period of one year starting upon Date of Final Acceptance
    b. Standard Business hours 8 a.m. to 5 p.m. EST
    c. Provide optional 2-5 year warranty cost
9. End user and System Administration Training
    a. Provide a minimum of two training sessions on the entire route optimization system with a maximum of 8 attendees per session.