

In August 2005, a storm exceeding a 1-in-100 year return frequency, hit the City of Toronto with over 150 mm of rainfall within a three hour period. While surface flooding was apparent throughout the City, the storm most impacted North York – an area developed during the 1950s and 1960s when drainage systems were designed for a 1-in-2 or 1-in-5 year storm. Over 4,200 basement flooding complaints were received. The Insurance Bureau of Canada estimated the damages to public and private property at \$400-\$500 million – making it the largest natural disaster in southern Ontario and the second-largest in Canada.

The Toronto Basement Flooding Protection Program is implementing a major storm drainage system within built-up communities. The program is attempting to “shoehorn” in infrastructure that will provide 1-in-100 year protection in neighbourhoods that have not been designed for it. Construction of these works inevitably caused considerable upheaval to residents and businesses.

As Program Manager, CH2M HILL’s responsibilities included Program Management, Pre-Design, Detailed Design, Services During Construction, and Post-Construction Services.

It was critical to the program that projects get into construction as quickly as possible. However, the quality of the work could not be compromised in an effort to “make the schedule”. CH2M HILL proposed to streamline delivery by using a Task Order Contracting approach that included: Consolidating projects to expedite delivery and reduce design and construction inspection costs; Creating standardized design packages using standard details and specifications to reduce design time; Prequalifying contractors to simplify the procurement process and shorten timeframes; and Including contractor performance as part of the bid process to encourage quality and meet schedules.

Task Order Contracting manages common reconstruction projects through a multi-year contract in partnership with multiple contractors. Contractors were selected by the City through a General Services Contract (GSC) procurement process.

Under a GSC, all task orders for an assignment use a single technical specification with appropriate details. Drawing packages are prepared for each task order. Individual task orders specify the scope, time of performance, and value of work to be performed. In the traditional design, bid, build approach for conveyance work, the design is completed, tender documents are developed, and then contractor bids are sought. A single contractor is selected with negotiation of the contract. Under the approach for this program, a wide prequalification of contractors was performed based on the GSC.

Once contractors were pre-qualified, they were selected in parallel with the design process with Task Orders assigned at 95% design. This early engagement allows for better alignment of the design intent with a contractor’s means and methods. Pre-construction activities and construction submittals process can begin prior to Order to Commence and Task Orders can be executed within a week of having all approvals in place.

The Task Order Contracting approach saved time by eliminating multiple bid cycles – one tender call was used to select multiple contractors – and reduced procurement time by 40%.

In order to ensure bidder commitment and secure competitive pricing for the General Services Contract, a decision was made that each contractor selected would be assigned Task Order Contracts with a cumulative minimum value of \$500,000. This minimum value needed to be significant enough to convince bidders that they would secure enough work and to ensure that all pricing was competitive. This also provided a means for the City to limit the assignment of Task Order Contracts to those contractors who did not perform well.

Good contractor performance becomes a prerequisite of additional Task Order awards. The City can withhold award of Task Orders from poor performing contractors. An active performance evaluation process is part of the Task Order approach which provides for flexibility in packaging and scheduling work to allow better management of traffic congestion and complaints from residents.

On such a complex and fast-moving program, real-time communication is key to effective delivery. To better understand and respond to the City's needs, Program Manager Denise Costa co-located with the City's team in their offices at Metro Hall. By being physically accessible, Denise was able to participate in City meetings, advise on progress, assist with decisions regarding contractors, and manage all aspects of the program hand-in-hand with City staff.

CH2M HILL's Field Ambassador Program demonstrated how a single additional staff member during construction can significantly mitigate community issues. Field Ambassador Shakha Vasdani was on-site during construction and available to personally connect with residents, providing information on the construction program and quickly resolving issues. The program also provided a phone number on construction signage and public information flyers that was routed to the Field Ambassador's cell phone. Queries were responded to within 24 hours. Over 250 calls were received by the Field Ambassador – over 99% have been successfully resolved.

Site teams used a GPS-enabled camera and a GIS tool developed by CH2M HILL to automatically place and plot site construction photographs. Added as an information layer on site plans, each photograph shows the precise location and orientation (direction of view). By effectively documenting site conditions, contractor claims are reduced.

The program has achieved fast, visible progress. In October 2009, once project designs were completed and approvals were in place, the City entered into negotiations with each of the selected contractors to award the Task Order Contracts. For General Services Contract 1 (\$30 million in construction value), assignments ranged from \$2 million to nearly \$10 million.

All construction work (including 2,795 m watermain, 1,560 m sanitary sewer, and 6,346 m storm sewer with 871 homes directly affected by construction) was substantially completed within 12 months. Based on actual schedule across 8 Task Orders, the program had an average early completion of 41 days and cumulative early completion of 332 days.

The Toronto Basement Flooding Protection Program (General Services Contract 1) has been enormously successful. The City has been able to deliver on its commitment to the community – delivering significant infrastructure upgrades to combat climate change. Through the use of an innovative contracting approach, the program was delivered on-budget and consistently ahead of schedule. As such, this program sets important precedents on how the City delivers projects and programs.

The program has received significant industry recognition. In 2010, the program was awarded a Watershed Award from the Insurance Bureau of Canada and Federation of Canadian Municipalities recognizing the immense efforts that Toronto had gone to (and continues to do) on behalf of its citizens to protect the built environment, the natural environment, and quality of life in the City. The Program will also receive an award from the Consulting Engineers on Ontario in June 2011.



2011 Canadian Consulting Engineers Awards

Task Order Contracting: Saves Time, Streamlines Delivery, Creates Partnerships

May 2011

CANADIAN CONSULTING
engineer





The Toronto Basement Flooding Protection Program Has Delivered \$30M of Infrastructure Improvements Ahead of Schedule and with Strong Stakeholder Endorsement

Toronto Basement Flooding Protection Program

In August 2005, a storm exceeding a 1-in-100 year return frequency, hit the City of Toronto with over 150 mm of rainfall within a three hour period. While surface flooding was apparent throughout the City, the storm most impacted North York – an area developed during the 1950s and 1960s when drainage systems were designed for a 1-in-2 or 1-in-5 year storm. Toronto's 311 call centre received over 4,200 basement flooding complaints. The Insurance Bureau of Canada estimated the damages to public and private property at \$400-\$500 million – making it the largest natural disaster in southern Ontario.

In the wake of this massive flood, the City began the Toronto Basement Flooding Protection Program – a significant effort to define appropriate flood mitigation solutions to protect residents and relieve basement flooding. This precedent-setting program will provide 100 year level of protection in the implementation areas. CH2M HILL was selected as the prime program management consultant to lead this large, complex undertaking requiring fast results, innovative delivery approaches, and stakeholder endorsement.

Assignments under the \$110 million program involved sanitary sewer, storm sewer, and watermain replacement works located within road right-of-ways. The City received \$200 million in federal infrastructure stimulus funding with a portion of this funding (\$30 million) directed to the program. This federal funding placed added pressure on the City to find the means and consider innovative delivery methods to meet the deadlines/schedule imposed by the Federal government for the infrastructure stimulus funding program.

At the same time, residents were demanding action. Eight extreme weather events over a 20 year period had resulted in severe surface and basement flooding throughout North York. Due to

the amount of flooding in certain areas, residents were unable to get basement flooding or damage insurance. Understandably, residents were less interested in discussion of the issues or the planning process; they wanted to see work started to FIX the issues. The program needed to show immediate results in order to demonstrate that the City was making flooding relief a high priority.

To make the program effective, the City needed unique but proven strategies to streamline project delivery, control risk, and honour the public trust, ultimately leading to satisfied stakeholders. As such, this program sets important precedents on how the City delivers projects and programs.

General Services Contract 1

In an effort to get work underway as quickly as possible, the City launched the program in phases. The objective of Phase 1 of the program was to implement basement flooding protection works for Study Areas 14, 28, 29 and 30 to provide protection against basement flooding events during a 100 year storm event.

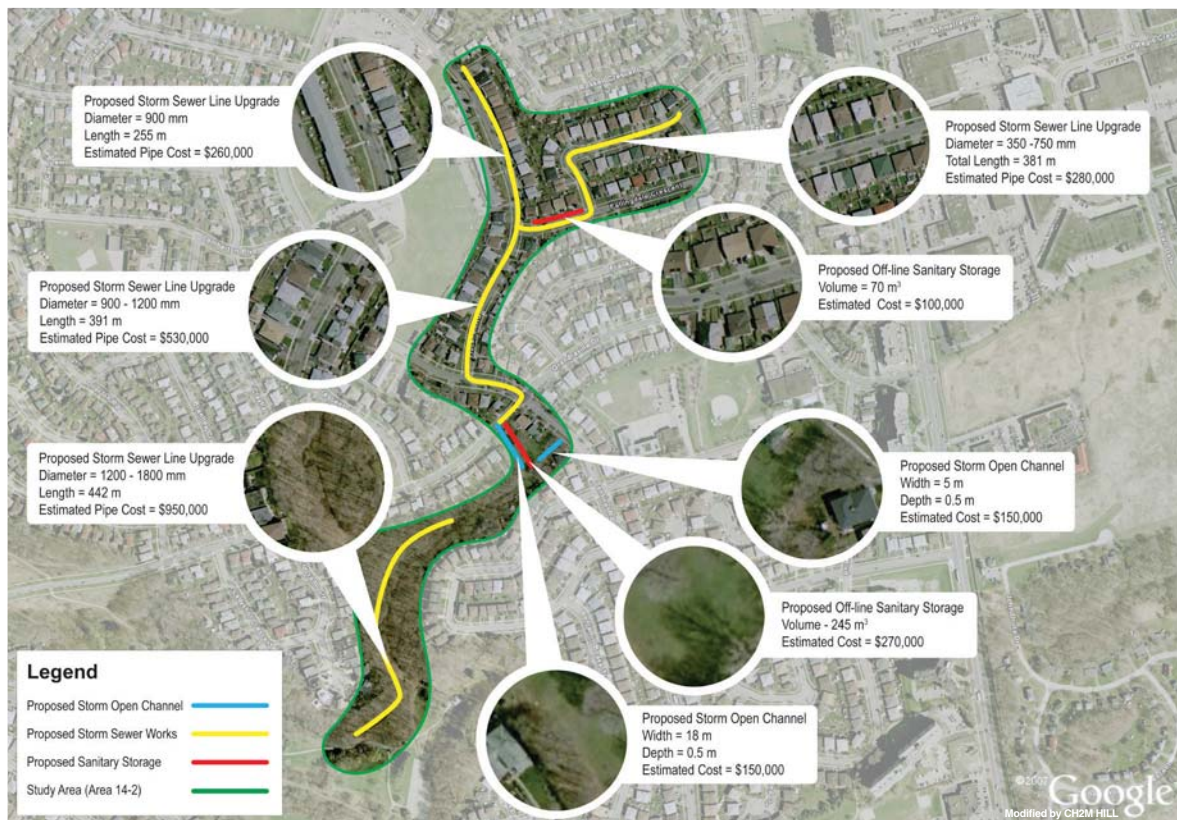
While the initial scope of this program included sanitary sewer and storm drainage system improvements, the City made the decision during the planning phase to include watermain replacement work as part of the program. This decision was made in an effort to minimize the impact to area residents and businesses from construction activities by combining all sanitary sewer, storm drainage, and watermain works.

As Program Manager, CH2M HILL's responsibilities included Program Management, Pre-Design, Detailed Design, Services During Construction, and Post-Construction Services.



Program Achievements

- **Fast, Visible Progress** – In October 2009, once project designs were completed and all approvals were in place, the City entered into negotiations with each of the selected contractors to award the Task Order Contracts. For the initial General Services Contract (\$30 million in construction value), assignments ranged from \$2 million to nearly \$10 million. In December 2010, major construction activities were completed for General Services Contract No. 1 which included 8 Task Orders with a total contract value of \$30 million. All construction work associated with General Services Contract No. 1 was substantially performed within a 12 month period.
- **Reduced Cycle Time** – Reduced procurement time by 40% using Task Order Contracting under a General Services Contract
- **Public Support** – Successful resolution of 99% of inquiries by Field Ambassador
- **Industry Recognition** – The Toronto Basement Flooding Protection Program received a 2010 Watershed Award from the Insurance Bureau of Canada and Federation of Canadian Municipalities recognizing the immense efforts that Toronto had gone to (and continues to do) on behalf of its citizens to protect the built environment, the natural environment, and quality of life in the City. We recently learned that the Program will also receive an award from the Consulting Engineers on Ontario in June 2011.



Assignment 14-2: Individual projects were bundled into assignments within each of the four study areas.

Streamlining Delivery

It was critical to the program that projects get into construction as quickly as possible. However, the quality of the work could not be compromised in an effort to “make the schedule”. CH2M HILL proposed to streamline the delivery approach to finish the work on schedule and on budget using several innovative ideas to streamline delivery including:

- 1) Consolidating projects to expedite delivery and reduce design and construction inspection costs;
- 2) Creating standardized design packages using standard details and specifications to reduce design time;
- 3) Prequalifying contractors to simplify the procurement process and shorten timeframes; and
- 4) Including contractor performance as part of the bid process to encourage quality and meet schedules.

Task Order Contracting

Task Order Contracting is a method of construction delivery which manages common reconstruction projects through a multi-year contract in partnership with multiple contractors. This approach allowed the City to complete common watermain, storm and sanitary sewer reconstruction projects through a multi-year contract in partnership with several contractors. Contractors were selected by the City through a General Services Contract (GSC) procurement process. In October 2009, once designs were completed and all approvals in place, the City entered into negotiations with each of the selected contractors to award the Task Order Contracts, which for the initial General Services Contract (\$30 million in construction value) ranged from \$2 million to nearly \$10 million.

GSC1 Delivers Results

- 871 homes directly affected by construction
- 2,795 m watermain installed
- 1,560 m sanitary sewer installed
- 6,346 m storm sewer installed

Using the GSC allowed the City to establish the total value of anticipated task orders in advance. As part of the GSC, the City could define a minimum amount to be awarded to each Contractor. This helped ensure that the City continued to receive enough competitive bids and also rewarded the Contractors enough work that they continue to engage with the program.

Task Orders Simplify the Contracting Process for Everyone

Under a GSC, all task orders for an assignment use a single technical specification with appropriate details. Drawing packages are prepared for each task order. Individual task orders specify the scope, time of performance, and value of work to be performed. An RFQ can be established for non-standard items. In the traditional design, bid, build approach for conveyance work, the design is completed, tender documents are developed, and then contractor bids are sought. A single contractor is selected with negotiation of the contract. Under the approach for this program, a wide prequalification of contractors was performed based on the GSC.

Task Orders Promote Early Engagement of Contractors

Once contractors are pre-qualified, it is possible to select contractors in parallel with the design process and to assign Task Orders at 95% design. This early engagement allows for better alignment of the design intent with a contractor's means and methods. Pre-construction activities and construction submittals process can begin prior to



Order to Commence. Task Orders can be executed within a week of having all approvals in place. Task Order Contracting saves time by eliminating multiple bid cycles – one tender call to select multiple contractors.

Task Orders Create Partnerships

Using Task Orders provides flexibility to better match a scope of work with the Contractor's resources and capabilities. This flexibility allows the City to control the amount of work that goes to each contractor. Contractors strive for good performance and timely completion to be assigned next Task Order. This flexibility benefits Contractors as well – they can provide performance and payment bonds by Task Order instead of entire General Services Contract. The overall give-and-take in this approach creates a partnership between the City and the Contractor which tends to generate fewer claims and change orders.

Task Orders Promote Quality Construction

Good contractor performance becomes a prerequisite of additional Task Order awards. The

City can withhold award of Task Orders from poor performing contractors. An active performance evaluation process is part of the Task Order approach. The Task Order approach provides for flexibility in packaging and scheduling work to allow better management of traffic congestion and complaints from residents.

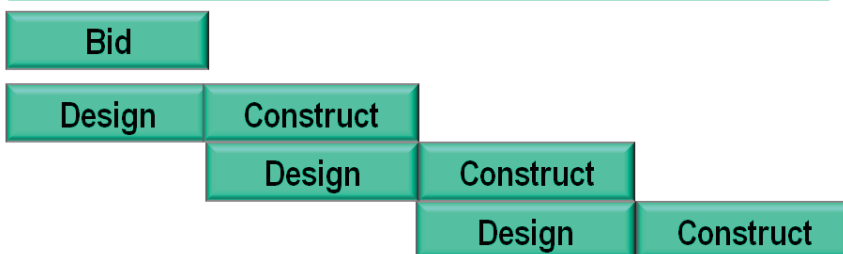
Task Order Contracting Creates Effective Partnerships

- Task Orders create flexibility to better match scope of work to the Contractor's resources and capabilities
- Contractors can provide performance and payment bonds by Task Order instead of entire General Services Contract
- Creates a partnership between the City and the Contractor which tends to generate fewer claims and change orders
- Contractors strive for good performance and timely completion to be assigned next Task Order

Traditional Procurement (8 Construction Tenders - 24 Months)



Task Order Contracting Method (8 Task Orders - 11 Months)



Comparison of Procurement Methods: Task Order Contracting significantly accelerates project delivery without compromising quality.

Effective Contracting

The development of the contract documents for both the General Services Contract and the Task Order Contract began with the City's standard unit price contract used for sewer and watermain projects. A period of 3 months and more than 10 meetings was required for the development of the General Services Contract document to make certain that the contract language addressed all of the City's legal and procurement requirements. As a result, the development of the General Services Contract template involved representatives from the City's Technical Services, Legal Services, and Procurement and Material Management divisions. The City's contractual language in the standard unit price contract documents was modified in the General Services Contract and Task Order Contract documents for the following elements:

Number of Contractors Selected

During the pre-design phase, a decision was made to group 10 of the 72 assignments into eight (8) Task Order Contracts with a total estimated construction value of \$30 million. Up to 5 bidders would be selected, with the final number being based on the best value to the City. Once the bids had been received, three (3) contractors were selected (all 3 bids were within the City's pre-tender estimate). This decision considered the pricing submissions as well as the volume of work. It was essential to have the right number of contractors to complete the work within the term of the contract and also for each of the contractors selected to be awarded a significant portion of the work provided that they had available resources to perform the work and produce high quality work right from the very first Task Order Contract.

Term of the General Services Contract

The General Services Contract required that each of the contractors selected hold their unit prices submitted for all pay items for the term of the

contract. Initial estimates on the amount of time required to complete all of the work was estimated at thirty (30) months based on an estimate of traditional construction timelines for each of the Task Order Contracts.

Assignment of Task Order Contracts

It was important that the contractor selection via General Services Contract No. 1 complied with the City's procurement policies. It was therefore decided that the initial Task Order Contract for each of the contractors would be assigned from lowest to highest bidder based on the Total Bid Price which would align with the City's procurement policies. The assignment of subsequent Task Order Contracts to each of the contractors would then be based on performance, availability of resources, the ability to meet defined project schedules, the ability to pass construction and quality control testing, cooperation with the City, and timely and satisfactory restoration once the sewer reconstruction and watermain replacement works were complete.

GSC1 By the Numbers

- 43 RFQs sent (either as part of TOC negotiation or issues in the field)
- 343 individual pricing items created
- 41 separate specifications written
- 51 Change Directives Issued
- 93 Change Orders Issued
- 73 RFIs responded to
- Average turn around time: 2.5 days

Value of Work Assigned to Each Contractor

In order to ensure bidder commitment and secure competitive pricing for the General Services Contract, a decision was made that each contractor





Infrastructure Improvements Will Relieve Basement Flooding in North York Neighbourhoods



Program Manager Denise Costa Visited Construction Sites Regularly to Monitor Progress

selected would be assigned Task Order Contracts with a cumulative minimum value of \$500,000. This minimum value needed to be significant enough to convince bidders that they would secure enough work and to ensure that all pricing was competitive. This also provided a means for the City to limit the assignment of Task Order Contracts to those contractors who did not perform well. In addition, the maximum value of Task Order Contracts assigned to each contractor is determined by the number of contractors selected and provides the City the ability to assign the majority of the Task Order Contracts to those contractors with performance and resource availability to match the

complexity of the work and the project completion milestones established. The maximum value was set at \$20 million which would allow the City to award Task Order Contracts to one contractor up to this maximum value by seeking approval from the City's Bid Committee and not having to seek Council approval, which would add a minimum of 6 weeks to the contract award period. This allowed the City to take the fullest advantage of all Federal economic stimulus money allocated to the Toronto Basement Flooding Protection Program to complete construction within the deadlines imposed by the Federal government.



Contractor Performance Was an Integral Part of Task Order Contracts



Managing Construction Sites in Residential Neighbourhoods was a Continuous Challenge

Innovative Approaches to Program Delivery

Co-Location to City Offices

On such a complex and fast-moving program, real-time communication is key to effective delivery. To better understand and respond to the City's needs, Program Manager Denise Costa co-located with the City's team in their offices at Metro Hall. By being physically accessible, Denise was able to participate in City meetings, advise on progress, assist with decisions regarding contractors, and manage all aspects of the program hand-in-hand with City staff.

High-Tech Site Documentation Reduces Contractor Claims

Site teams used a GPS-enabled camera and a GIS tool developed by CH2M HILL to automatically place and plot site photographs. Added as an information layer on site plans, each photograph shows the precise location and orientation (direction of view). By effectively documenting site conditions, contractor claims are reduced.

Engage Stakeholders to Build Public Trust and Goodwill

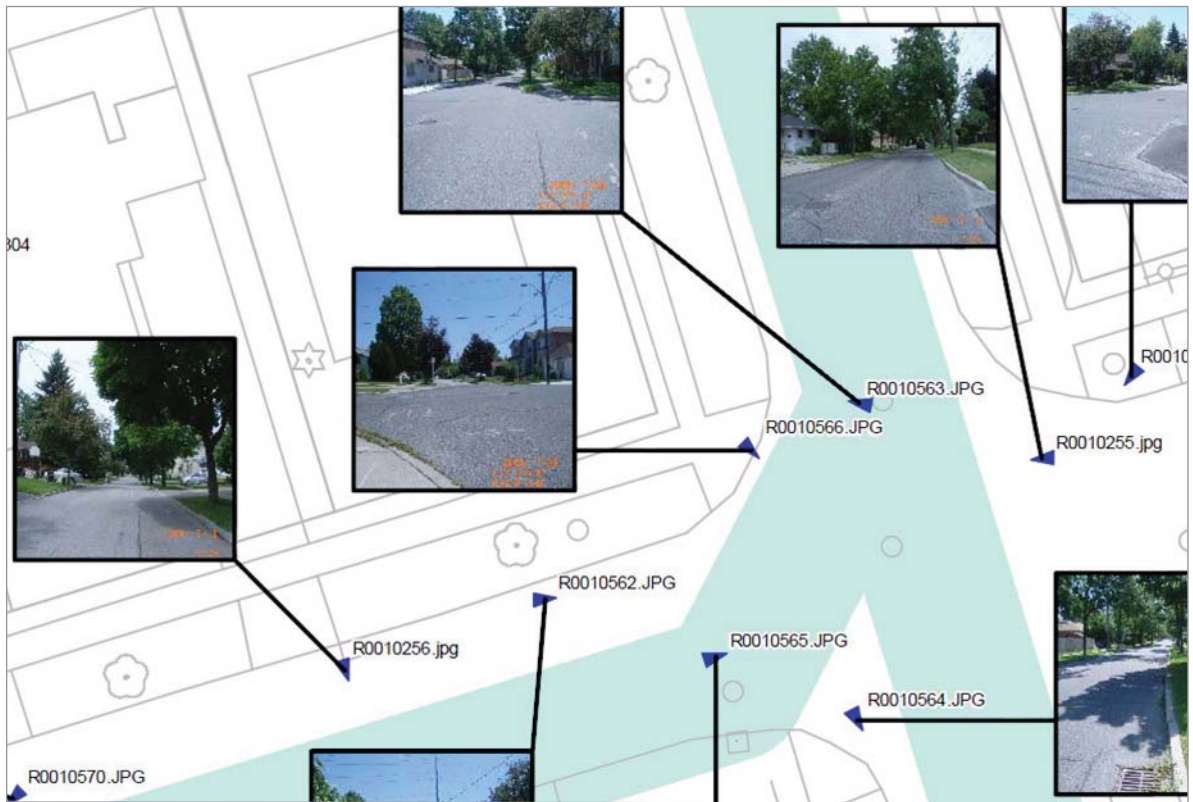
At the heart of this program was a need to assist the City in honouring its commitment to the affected communities. It was essential that the consultation process address stakeholder concerns, while meeting City and regulatory agency requirements. The team sought to encourage public understanding of – and commitment to – the projects, foster a community feeling of being part of the solution, and provide consultation at the appropriate level necessary to address each problem or opportunity.

Field Ambassador Provides a Single Point-of-Contact on Construction Sites

CH2M HILL's Field Ambassador Program demonstrated how a single additional staff member during construction can significantly mitigate



GPS-Enabled Camera for Site Photographs: Hundreds of site photographs are automatically logged and organized to assist with construction inspections.



GIS Software Enables Accurate Site Documentation: Precise location and heading of each photograph are notated on site plans (blue triangles indicate direction of view).



Dedicated Field Ambassador Resolves Public Concerns: On-Site Field Ambassador Shakha Vasdani Personally Connected with Residents to Resolve Public Inquires and Concerns.

community issues. Field Ambassador Shakha Vasdani was on-site during construction and available to personally connect with residents, providing information on the construction program and quickly resolving issues. The program also provided a phone number that was routed to the Field Ambassador's cell phone. Queries were responded to within 24 hours. Over 250 calls were received by the Field Ambassador – over 99% have been successfully resolved.

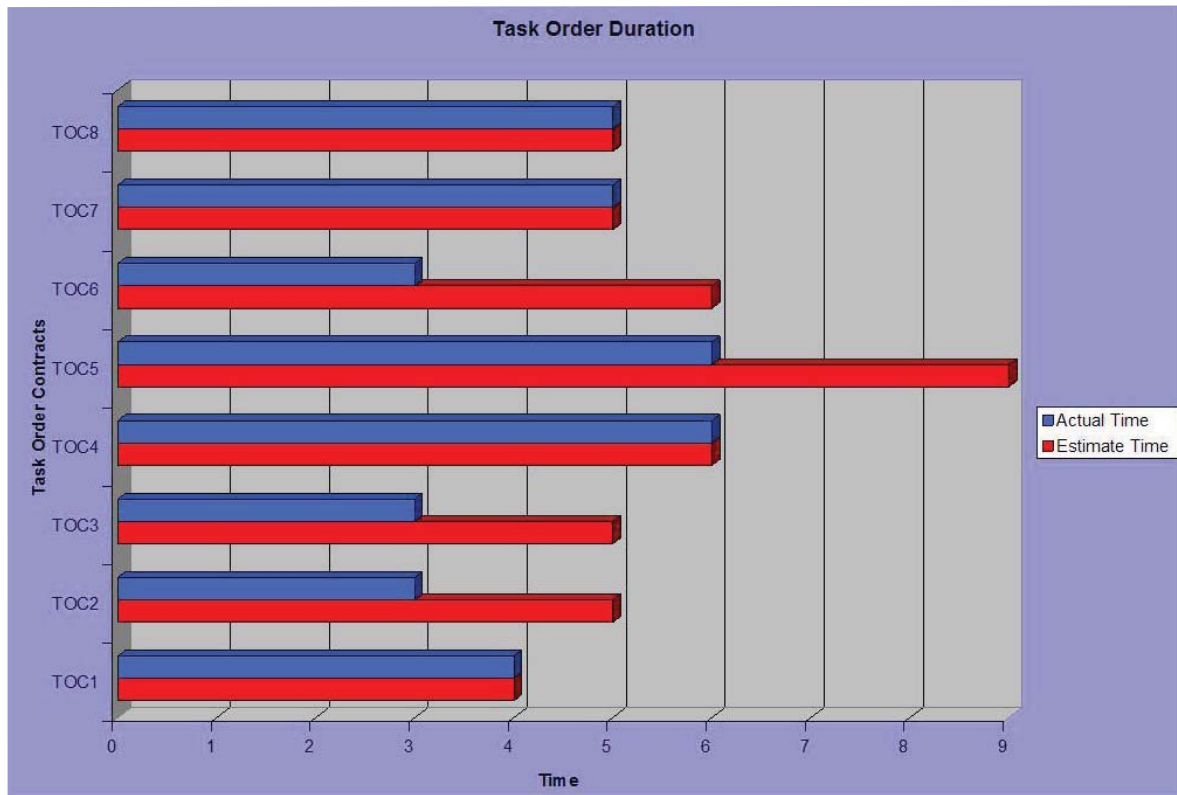
In fact, Field Ambassador Shakha has become such a trusted part of this community that he continues to receive calls from residents on issues of any neighbourhood construction – issues that are entirely unrelated to the Basement Flooding Protection Program. The community is appreciative of his dedication to serving their needs.

In a letter commending CH2M HILL's performance on the Basement Flooding Program, the City noted:

"The Field Ambassador role (identified by CH2M HILL as an innovative option) implemented for this program to deal with complaints/concerns raised by area residents has been instrumental in mitigating issues and may serve as a model for other large scale initiatives within the City of Toronto."

GSC1 Field Ambassador

- Dedicated Field Ambassador
- On-site to personally connect with residents
- 258 inquiries received
- Queries responded to within 24 hours
- >99% issue resolution
- Reduces public involvement required by Contractor and construction delivery staff



The Task Order Contracting approach reduced procurement time by 40% and has set a new precedent for delivery of City of Toronto projects and programs.

Exceeding Expectations

The Basement Flooding Protection Program has been enormously successful. The City has been able to deliver on its commitment to the community – delivering \$30M of infrastructure upgrades to combat climate change. The program was delivered on-budget and consistently ahead of schedule.

All construction work (including 2,795 m watermain, 1,560 m sanitary sewer, and 6,346 m storm sewer) was substantially completed within 12 months. Based on actual schedule across 8 Task Orders, the program had an average early completion of 41 days and cumulative early completion of 332 days.

The response from community residents has been overwhelmingly positive. Even though neighbourhoods had their streets torn up for months, had their front yards turned into a construction zone, they were very appreciative of the work being done on their behalf and the commitment shown by the Program team. When one resident called a City Councillor with concerns about construction at 5:30 on Friday afternoon, the issue was resolved that night.

GCS1 On-Schedule

- 8 Task Orders comprising 10 assignments
- All construction work substantially performed within 12 months
- 332 cumulative days early delivery (based on actual schedule)
- 41 average project early completion (days)

Construction Manager Tony Petrucci commented, “People have been so understanding. We come into a neighbourhood – we need to tear up the streets and turn people’s water off to make repairs. You’d think they’d be annoyed by us disrupting their lives like this. We had this one gentleman. We showed up with the construction team and told him we had to turn his water off for the day. He says no problem, hops in his car and runs down to Tim Horton’s. He brought back coffee for the whole site team. You don’t mind working hard for people like that. You feel like you’re helping. Like you’re making a difference.”



Neighbourhood residents endorse the Toronto Basement Flooding Protection Program.

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File No.: W0054-1078.1020-40

March 21, 2011

CH2M Hill Canada Limited
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Toronto, ON M2J 5B6

Attention: Denise Costa
Project Manager

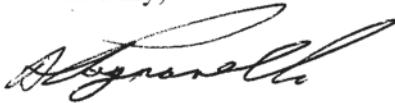
Dear Ms. Costa:

Re: Toronto Basement Flooding Protection Program General Services Contract 1

This is a letter of support regarding the award submission for the Consulting Engineers of Ontario for Toronto Basement Flooding Protection Program. This program is a significant project for the City, requiring delivery of multiple projects on an accelerated schedule, extensive stakeholder consultation, management of multiple, simultaneous construction works and dealing with concerns raised by residents during construction. General Services Contract No. 1 for this program was completed in November, 2010.

I can attest that CH2M Hill effectively delivered program management services for this assignment on time and on budget. The City of Toronto has been entirely satisfied with the work delivered. The results of the program speak for themselves; most importantly how public concerns/issues were addressed as they arose in the field. The field ambassador which was identified by CH2M Hill as an innovative option has been instrumental in mitigating issues with the local area residents – this has been a success with the residents and the local Councillors.

Yours truly,

A handwritten signature in black ink, appearing to read "A. Pagnanelli", written in a cursive style.

Anthony Pagnanelli, P. Eng.
Director, Design and Construction
Major Works Facilities