

MANAGING CENTRAL AUCKLAND'S URGENT STORMWATER WORKS IN A COLLABORATIVE AND EFFICIENT WAY

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ABSTRACT

Downer Group was awarded the Auckland Council Stormwater Maintenance Contract for the Central region for a four-year term in 2013. This contract covers both planned and reactive maintenance for all types of stormwater assets from manholes, pipes, soakholes, ponds and watercourses, to more complex assets such as treatment devices.

From time to time urgent works requiring a quick engineering resolution are identified in response to a customer service request, or as a result of a local network failure. Getting the right balance of engineering support to fast track implementation can be a challenge. It is critical that the appropriate option and risk analysis, design and quality control is undertaken to ensure a successful outcome. Stormwater Operations (Central) established an Urgent Works Team (UWT) consisting of representatives from the Contractor, Consultants and Council. Team members were selected based on network knowledge, stormwater reticulation and urgent or emergency works experience, balanced with financial authority to expedite the decision making process.

Once the team was selected a workshop was held to identify methods and processes that could be made applicable to the UWT to gain time efficiencies and quality control. A simple risk matrix was developed using Likelihood x Severity. Once the scoring is completed, dependent on the Risk Score, the project moves to the design phase. As part of the design phase, a spreadsheet with Engineering Design parameters typical of Stormwater Operations projects is used to provide the initial scope and design cost estimate.

A scoping document providing background and options is provided to the Contractor (Downer) along with the Risk Matrix and Design Cost estimate. Downer then submits an overall works package, effectively a 'one stop shop' for design and build. Council Operations review the work package submitted as a matter of urgency and approve, escalate or request more information.

This paper summarises how this collaborative approach has provided a streamlined method to over 20 small urgent work projects since its inception in March 2014 and has become a pivotal operational tool for responding to failures, improved customer service, project planning and budget phasing.

KEYWORDS

Stormwater Operations, urgent works, maintenance, collaboration

1 INTRODUCTION

The Stormwater Unit of Auckland Council's Infrastructure and Environmental Services is responsible for the region's stormwater drainage and flood protection/control. Stormwater Operations, in conjunction with other Council Controlled Organisations (CCOs), are responsible for maintaining and managing the following:

- 6,000 km pipeline
- 140,000 manholes
- 9,000 km of streams/drains
- 400 ponds
- 200 other treatment devices

Several contractors across the region are responsible for maintaining and managing the stormwater assets. Downer Group was awarded the Auckland Council Stormwater Maintenance Contract for the Central region for a four-year term in 2013. This contract covers both planned and reactive maintenance for all types of stormwater assets, including those listed above.

From time to time urgent works requiring a quick engineering resolution are identified in response to a customer service request, or as a result of a local network failure. Getting the right balance of engineering support to fast track implementation can be a challenge. It is critical that the appropriate option and risk analysis, design, and quality control is undertaken to ensure a successful outcome. Auckland Council established a collaborative working group consisting of representatives from the Contractor, Council and key Consultants, which became known as the Urgent Works Team (UWT).

The UWT provides continuity and cost effective solutions for Aucklanders. Communication channels are streamlined from both an Auckland Council and public perspective as they are essentially dealing with one entity.

2 URGENT WORKS TEAM

2.1 URGENT WORKS DEFINITION

Urgent Works in this instance are defined as those that require urgent attention and need to be actioned immediately, but require engineering design input (as opposed to immediate action by the contractor alone). It is important to clarify the difference between Urgent Works and Emergency Works. Emergency Works are actioned under a different escalation process that could typically involve Civil Defence, Emergency Services, and Lifelines, for example. Urgent Works are instead derived from Aucklanders identifying an issue and contacting the Auckland Council call centre where an issue is logged and sent to the Contractor. Downer then respond dependent on priority and either programme, complete, or escalate the issue to the UWT should it meet the criteria.

2.2 UWT SELECTION AND TEAM

Prior to Auckland Council being established, urgent operational stormwater works in the Central area was undertaken by Metrowater on behalf of Auckland City Council's Environmental and Utility Management division (EUM). Works were actioned under an annual fee proposal giving streamlined communication channels with specific reporting

and escalation points. This process was well documented and used as the starting point for UWT.

The current UWT consists of key industry specialists who were selected by Council based on the following key attributes:

- Stormwater reticulation experience;
- Local network knowledge;
- Operations and maintenance experience;
- Urgent or emergency works experience; and
- Strong understanding of engineering issues from a wider perspective i.e. flood models; waste water infrastructure, capital works programme.

The current UWT is represented by the key personnel identified in Table 1.

Table 1 Current Urgent Works Team (UWT) members

Company/ Organisation	Position	UWT Role
Auckland Council	Stormwater Operations & Planning Manager	Project overview, Signoff
Auckland Council	Stormwater Operations Central Team Manager	Review, Contractor Liaison, Signoff
AECOM	Associate Director	Risk Management, Project Management
Downer	Contracts Manager - Stormwater	Contract management
Downer	Operations Manager Central Stormwater	Physical works implementation
Morphum Environmental	Operations Director	Risk Management, Project Management
Morphum Environmental	Engineering Design Director	Design review, Quality Control

2.3 CONTRACT MANAGEMENT

Downer has a four year (with the possibility of extensions up to a further four years) maintenance contract that commenced in July 2013. Under this contract Downer are able to undertake minor capital works up to a value of \$100,000 under the terms, conditions and rates of the main contract. This allows for an efficient route of procurement for the client, effectively reducing tendering costs. In order to implement these projects efficiently and to mitigate design risk, Morphum Environmental Ltd (Morphum) has been subcontracted by Downer to provide professional services. In order to maintain service

levels and consistency Morphum's contract duration is aligned with the maintenance contract, which ends in 2017.

In 2013, Auckland Council requested professional service suppliers to provide discounted sole source rates. It was agreed between Downer and Morphum that these rates would also apply for the purposes of this contract thereby meeting one of Council's key objectives - value for Aucklanders.

2.4 COLLABORATION

The key to the UWT's success has been its ongoing commitment and continued collaboration between all parties and stakeholders. A fortnightly collaboration meeting is held where any recently added projects are discussed, issues raised, risk assessment carried out and actions assigned.

A project database is used to track: status, cost estimates, assigned resources, roadblocks (potential or otherwise), and a weekly update comment from the assigned Project Manager. Any additional action is logged and sent out to the assignee that day.

2.5 GENERAL SCOPE AND NATURE OF SERVICES

Issues that are typically escalated to the UWT include:

- Pipes identified during CCTV projects that have a high risk of failure;
- Localised erosion on public watercourses that may have H&S implications
- Localised flooding due to soakage limitations or network failure; and
- Urgent connectivity investigations for enabling works.

The nature of these issues generally requires professional engineering support (in particular design) but are of low enough value that setting up individual contracts for each issue would be impractical and inefficient. For larger issues or those which will require a significant time investment from a consultant, individual professional services contracts are awarded to consultants outside of the UWT.

Downer and the subcontractor responsible for design, work together to implement a solution and follow the UWT collaboration model until project completion. For individual issues an initial desktop investigation is carried out using tools such as GIS to gain a wider perspective on the catchment, network, other services, etc. This is then quickly followed by an onsite investigation where a prescribed checklist is used to ensure as much as possible the appropriate information is gathered. This helps maintain a consistent and efficient design process and reduces the risk of multiple site visits. However, as every project is different the checklist is not a catch-all and the team are encouraged to use it as a starting point and add to or build on the list.

Integral to the UWT success is the onsite collaboration between design engineer and the physical works crew. Typically a range of practical design options will be discussed onsite to provide an engineering design platform that makes for a fast turnaround. This assists in the elimination of impractical solutions that would typically take too long to scope and design and not suit the urgent requirements of the project. However, wherever practical, the works may be phased to treat the urgent component immediately with a more

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traditional approach adopted once the initial risk has been treated. Typical deliverables to the contractor include design plans, engineering estimates, design estimate/scope and any applicable survey or field data.

2.6 RISK ASSESSMENT

It was recognised early on within the UWT that each project must undertake some form of risk assessment. Once a project has been escalated to the UWT a round table discussion is held where likely project risks are identified, discussed, and analysed. This information is recorded and passed onto the assigned Project Manager for populating the UWT Project Scope template. This is a 4 tab spreadsheet that includes the following:

1. Instructions Tab – How to correctly complete the template
2. Risk Assessment – Risk analysis (see Table 2 for detail)
3. Design Brief – Design schedule of works that requires key tasks to be populated
4. Design Summary – Finalises cost estimation

The simple risk analysis criteria was developed based on Likelihood (L) and Severity (S) can be scored from 1 to 3 (where 3 = High). The Risk Factor is produced by multiplying (L) and (S). As a guide anything >40% has a medium Risk Factor and should be dealt with before proceeding.

Table 2 demonstrates the information required when populating the risk assessment tab.

Table 2 Risk Assessment Template

	Project Name				
	Prepared By		Date		
	Approved By		Date		
Risk	Likelihood (1-3)	Severity (1-3)	Risk 0-9	Proposed Treatment	Description
Capacity/Flooding					
Water Quality					
Structures					
Geotech					
Consents					
Stakeholder					
Political					
		Risk Factor			

2.7 GATEWAY ALIGNMENT

Auckland Council has implemented a Project Gateway system. The UWT recognised early on that this process needed to be taken into consideration and have tried to align wherever possible. For example, once a project is initially identified an Issue Report (Gateway 0) is used to provide Council with the necessary information, such as:

- Priority
- Issue Type
- Risk Indicators
- Approval Checklist
- Document Control
- Cost Scale
- Issue Description
- Legal/Consent
- Stakeholders

The UWT, having been implemented prior to the finalisation of Project Gateway, adopted draft Gateway documents and is currently in the process of updating to the latest versions.

3 CASE STUDY

3.1 BACKGROUND

The UWT were presented with CCTV footage provided for an asset in Newmarket, Auckland (Figure 1). Stormwater pipe ND4462 was shown to be in poor repair and at risk of failure (Figure 2). The objective of this UWT project was to determine the extent of disrepair, whether or not the pipe could be abandoned, and if so, the steps required for abandoning the pipe.

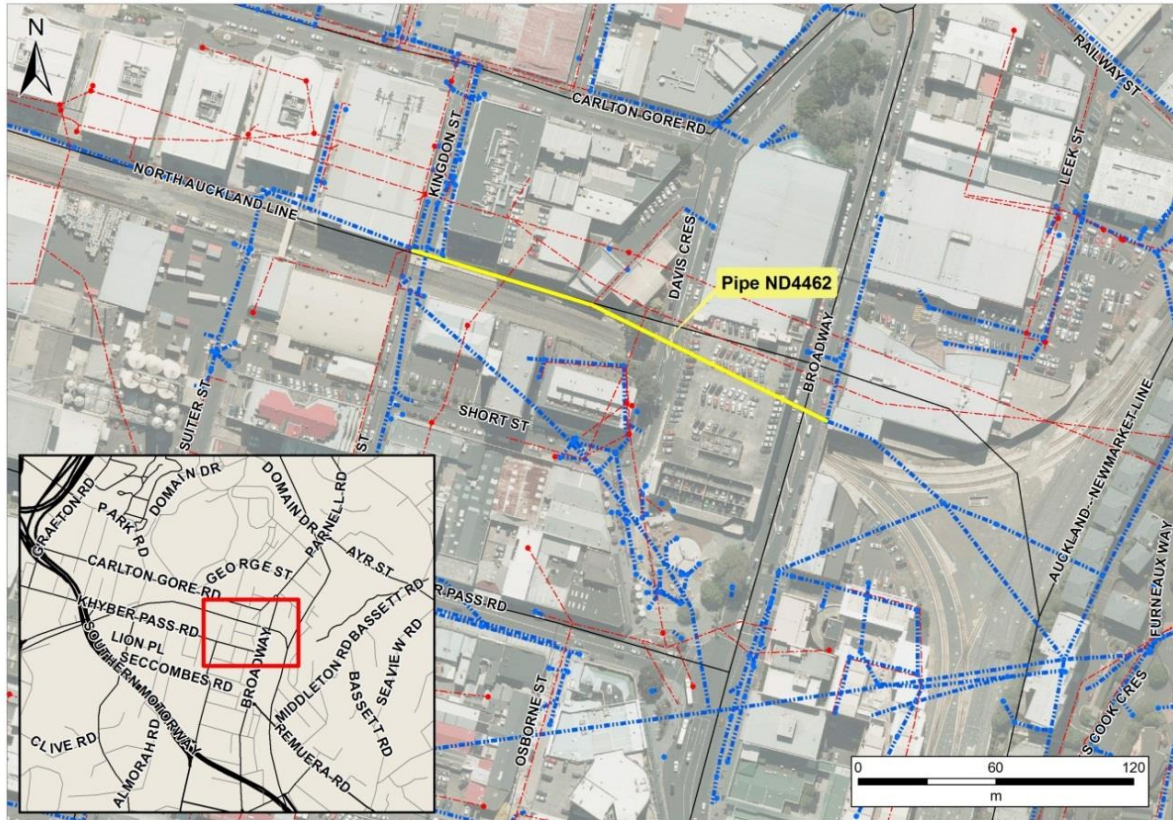


Figure 1 Location of pipe being investigated by UWT



Figure 2 Longitudinal/circumferential failure



Figure 3 Fat Deposits

Additional to the pipe's state of disrepair was evidence of a combined sewer that prevented the CCTV from going any further due to fat deposits (Figure 3). These deposits

lead to potential capacity and water quality issues. Investigation was required to determine if options are available to separate or redirect wastewater flows.

3.2 PROJECT INITIATION

Once the UWT received the Davis Crescent project an action team was formed and the assigned design engineer started the project scope process.

The first step was to briefly review the provided information, in this instance CCTV footage, and summarise the proposed project scope supplementing the provided CCTV footage with an overview of the site using available GIS information and requesting any records of service requests for the effected assets from the Auckland Council Stormwater Response Team. A risk assessment was subsequently carried out.

3.2.1 RISK ASSESSMENT

The Risk Factor identified for the Davis Crescent Condition Assessment was 30%, indicating the project risk is 'low' (<40%). Representatives from each of the key contributors to the UWT (Council, Contractor, and Consultants) approved the Risk Assessment (and Scope), thus enabling the project to proceed. Table 3 provides a breakdown of the Risk Assessment for this particular project.

Table 3 Davis Crescent Risk Assessment

	Project Name	Davis Crescent Condition Assessment		
	Prepared By	EA	Date	20/03/2014
	Approved By	DW/MDL/PJ/XC	Date	14/04/2014

Risk	Likelihood (1-3)	Severity (1-3)	Risk 0-9	Proposed Treatment	Description
Capacity/Flooding	2	1	2	None	No reported flooding issues, although fat deposits in pipe impede flow
Water Quality	2	2	4	Abandon or repair	Abandoned connections poorly sealed, WW connection, and sediment ingress through cracks and displaced joints
Structures	2	3	6	Abandon or repair	Pipe ND4462 at risk of failure, significant risk due to rail corridor and adjacent buildings
Geotech	1	1	1		No known geotech risk
Consents	2	1	2	Consultation with Watercare re connection	Watercare & Earthworks, dependent on recommendation (i.e. abandon or repair)
Stakeholder	2	1	2	Communication, especially regarding possible interruptions to transport	Landowner, Transport (roading & rail corridor), Watercare.
Political	1	2	2	Local board communication	Section of network in highly visible location
Risk Factor			30%		

3.3 INVESTIGATION METHODOLOGY

The project methodology incorporated significant collaboration between UWT members, with the general process as follows:

1. Review existing information
 - a. CCTV footage
 - b. Current AC GIS – assess network connectivity

- c. Phone Watercare Services to confirm connectivity of combined network and if separation is planned (current combined line, with no plans to separate)
 - d. Meet with SW Operations staff with extensive knowledge of the area – review legacy plans of the network and as-built plans for the adjacent Lumsden Green Drainage Upgrade
2. Request Downer clean & re-CCTV ND4462 to film entire length
 - a. Downer inspect asset and determine pipe condition too poor to risk cleaning
 3. Difficulty accessing lower section of network due to pipe blockage and lack of access points
 - a. Entry points within KiwiRail site (difficult access), buried, or siphons present preventing CCTV camera entry
 - b. Meet Downer’s field crew on site for connectivity investigations and for upstream and downstream manhole opening
 4. Gap analysis on existing information reported back to UWT fortnightly meeting
 - a. Discussion at UWT meeting identified an access point not registered on AC GIS or available plans enabling filming of the downstream extent of network
 5. Meet Downer’s field crew on site to utilise CCTV to confirm upstream connectivity
 - a. Multiple laterals vary from current AC GIS records, unable to ascertain connectivity by manhole opening alone
 6. Confirm ultimate discharge location
 - a. Site visit with UWT team to likely discharge location
 - b. Dye testing confirmed combined line discharges to Newmarket Stream
 7. Memo produced summarising findings to date for UWT and recommending proposed Stage 2 works

The UWT structure benefitted this project greatly. Significant uncertainties around network connectivity were resolved through the network knowledge of the UWT members, and collaboration between the design engineers, contractors, and field teams. Regular meetings enabled communication of project status, key concerns, and updates to the wider UWT. This collaboration, in particular onsite meetings and UWT update meetings, enabled practical discussion, accurate and specific data collection, and fast tracked investigation findings by reducing the need to wait for information to be conveyed between parties. Discussion onsite prevented any lack of clarity in the information conveyed, as uncertainty was immediately discussed and resolved.

3.4 PROJECT OUTCOMES

The project outcome has confirmed connectivity of the network, identified both new assets and abandoned assets not accurately represented in the current Auckland Council GIS, and identified a portion of existing pipe at risk of failure that is suitable for abandonment.

Stage 2 works to abandon the section of ND4462 upstream of the combined sewer connection and provide as-built drawings to update AC GIS for the established network connectivity are programmed for early 2015.

Future works recommend liaison with Watercare to discuss feasibility regarding redirecting flows from the current combined line to nearby WW assets. Options for remediation or abandonment of the section of ND4462 downstream of the combined sewer connection are to be assessed pending discussion with Watercare and investigation into one unknown lateral connection.

4 UWT LEARNINGS

The UWT structure has implemented a process allowing a quick engineering solution to fast-track implementation of solutions in response to customer service requests or local network failures, while maintaining risk analysis and quality control. Implementation of the process has identified a number of learnings that, as refinements are made, will improve the overall delivery quality and timeliness of projects under the UWT structure:

- Communication across the wider team is essential, enabling knowledge transfer
 - Refining process and method to improve methodologies and outcomes for future works
 - Regular team updates and meetings are valuable in progressing projects, but project management costs need to consider the time cost to update tracking spreadsheets and attend meetings
- On site meetings between design and field teams proved invaluable
 - Practical solutions
 - Multiple perspectives to a project
 - Reduced the need to rely on the transfer of all relevant information (at times by a third party, further increasing the risk of data gaps or lack of clarity)
- Multiple parties responsible for projects can mean delays in information review and project progression
 - Regular meetings with minuted actions reduced the risk to project timeliness
- Template scope good for typically repeatable projects but can be restrictive for atypical projects

5 CONCLUSIONS

Downer Group was awarded the Auckland Council Stormwater Maintenance Contract covering both planned and reactive maintenance for stormwater assets. Under this contract Downer are able to undertake minor capital works up to a value of \$100,000. Urgent Works (as opposed to Emergency Works) requiring engineering design input may be identified in response to a customer service request, or due to a local network failure.

In order to ensure appropriate option and risk analysis, design, and quality control are maintained, while providing solutions in a timely manner, Auckland Council established an Urgent Works Team (UWT) consisting of representatives from the Contractor, Council Water New Zealand's 2015 Asia Pacific Stormwater Conference

and key Consultants. Team members were selected based on network knowledge and stormwater reticulation and urgent or emergency works experience, balanced with financial authority to expedite the decision making process.

The outcome of creating the UWT structure is a highly collaborative approach enabling integration between council, consultant, and contractor representatives to provide high quality, practical outcomes to small urgent works projects. A number of learnings have been identified to improve this operational tool; however, the overall structure has proved effective at responding to failures and improving customer service, project planning, and budget phasing.

REFERENCES

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