

G P Friel Ltd

The Terrace Sewer &
Stormwater Renewal

CCNZ Award Entry

March 2018

G.P. FRIEL LTD
UNDERGROUND INFRASTRUCTURE

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Project Summary

REFERENCE	D1260
PROJECT NAME	The Terrace Sewer & Stormwater Renewals
CUSTOMER	Wellington Water Ltd.
VALUE	\$1,700,000 – delivered within the customer's budget
PROGRAMME	September 2016 – June 2017 – delivered within the programme



Overview

Wellington Water had been investigating causes of sewer contamination in the harbour and had found that a large section of their network in The Terrace might be contributing and needed a major upgrade. Aecom were engaged to design the upgrade and manage the project for the asset owner.

The Terrace is known throughout New Zealand as an iconic street in the heart of the capitals business precinct, with government departments, head offices and large corporations side by side with each other down each side of this 19th century street. The footpaths are bustling with business professionals and civil servants the last thing anybody would want there, including the asset owner, would be major civil works like an underground infrastructure upgrade.

Under this busy road laid aged sewer and stormwater pipes with insufficient capacity, some dating over 120 years old, now buried deep under layers of thick asphalt, reinforced concrete sub-base and overlaid with spaghetti-like networks of important communication, electricity, gas and water services that keep the city going.

The design called for a total of 680m of drainage renewal and associated manholes and laterals:

- 260m of wastewater renewal, upsizing from 150mm to 250mm through pipe bursting
- Relaying 116m of 375mm RC stormwater with 400mm HDPE
- Open cut trenching of approximately 180m of 525mm and 450mm RC stormwater
- 130m of open cut 250mm HDPE stormwater.

The tender attracted a poor response from the market due to the complexity and risks in this kind of work. This job would have a high profile and would be a major inconvenience to the public. The contractor undertaking this work would be in the spotlight every day while dealing with the usual traffic management issues, health and environmental hazards posed by working in live sewer and stormwater networks, high peak-flows of wastewater, over-pumping, high-flow laterals from commercial buildings, trenching at depth

and pipe bursting, as well as congested utility services and errors in service records.

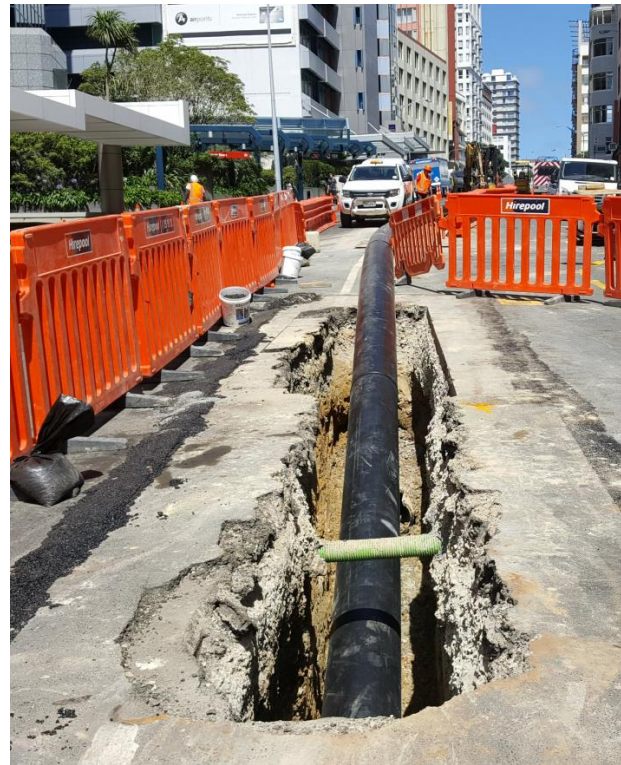
G P Friel Ltd consider this type of complex work to be their forte and enjoyed the opportunity to demonstrate their ability and strengthen their brand reputation.

Construction

There are a number of elements of this project that make it stand out from normal contract work. These are described in more detail in the following sections.

A section of stormwater main, 375mm RC pipe had to be replaced with 400mm HDPE. This size is often considered too large for pipebursting but GPFL offered this option to Aecom. We use our own high spec equipment for all the bursting work, supplied by our friends TT Technologies from Germany. This equipment and GPFL's expertise allowed Aecom to approve the use of the method for this section as well.

This large pipe bursting work generated a lot of interest from the Transpower head office and we obliged them by keeping their engineers updated with our techniques and progress. We ended up with a small but dedicated fan club. (Obviously they don't get out much so this was very exciting to them.)



Pipe Bursting, 400 OD HDPE down the centre of The Terrace, the first section of two, totalling 116m



Trench shoring with hydraulic struts was used often



Constant tension winch set up inside manhole to pull burster through pipe

Planning and Execution

Design Issues

On the first day of work, GPFL conducted additional potholing to check constructability and identified that the proposed open-cut section of 525mm and 450mm stormwater on a new alignment would clash with a bank of over 40 Chorus ducts. These ducts were not placed at the same level as the nearby ducts that were found during design investigations, as they had been dipped to avoid other underground obstructions.

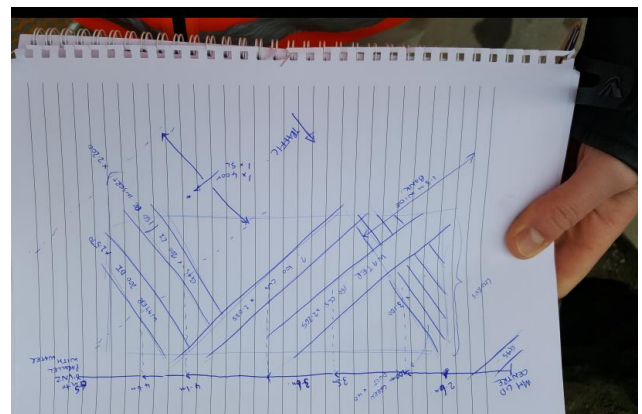
GPFL worked quickly with Aecom to redesign and implement an alternative pipe alignment, inline with the existing stormwater. This option had been ruled out in the design phase, due to heavy concrete encasement and difficulties finding an alignment between fibre optic cables and 33kva electricity cables.

A swift solution was needed as we had already notified the street of the impending works and did not want our client or ourselves to be accused of crying wolf about disruption to the intersection of Bolton St and The Terrace. G P Friel Ltd, Aecom and WWL were agile and worked together to quickly achieve the necessary changes to the scheme in a cost effective way that minimised interruption to the program and maintained the integrity of notifications and the reputations of the whole project team.

Underground Services

Our team worked hard but carefully to trench 3m deep through a heavily congested section of corridor, breaking out concrete encased pipe and laying both stormwater and sewer as they proceeded.

During the demolition of an existing stormwater manhole we discovered an old buried scour valve off a large 525mm watermain that had been braced against the chamber. There was no record of this valve and it had now been damaged and was leaking so of course it became an urgent issue. We are also an approved contractor to the Wellington Water operations team, we worked with the maintenance contractor and Royce Haxton of WWL to plan and test a complex water shutdown, and then performed the repair.



Health and Safety

Critical Hazards

The critical hazards to avoid on this project were service strikes and traffic and pedestrian management.

Potential issues with services were proactively investigated, found and solved. We know it's not enough to rely on design processes to locate all services.

Traffic Management

GPFL and ATMS worked together to plan and carry out the on-site work. Consultation with WCC traffic signals team, the RCA and NZTA continued throughout the project to give everyone confidence that we had this complex work covered.

Pedestrian management was successfully managed using standard fences and having traffic control personnel specifically assigned to spotting and assisting pedestrians when needed.

Health and Safety Management

We use a cloud-based construction management system called ProCore that facilitates our key quality control functions. It allows us to provide visibility to our customers and other key stakeholders so that projects can be delivered efficiently and transparently. It allows all parties of the contract to remotely view and manage project documents, drawings and plans, RFI's and health and safety.

This system is used by the whole company, site crew, engineers and managers, to share work records with each other and, within reason, the client; including handwritten site records, progress notes and photos, daily machinery checks, and regular company audits. This information can all be updated and viewed from the office or through our phones when onsite.

Subcontractor Safety

We used subcontractor UPG for pipe welding and recorded a Safety Audit in ProCore.

Reporting

We use our ProCore system on all projects, using it to report on safety, quality and environmental checks and events.

This Observation is Closed.

Safety - Risk Observation #16: Live power in drainage concrete encasement

General | Related Items (0) | Details (0) | Change History (0)

GENERAL INFORMATION

Type	Safety - Risk	Status	Closed			
Title	Live power in drainage concrete encasement	Created By	Gerry Friel GFLP Project Lead			
Assignee	David Phillips GFLP Field Lead	Observed By				
Notification Date		Priority				
Location	Terrace	Trade	UG/CM Services			
Due Date	15/10/18	Private	Yes			
Task Section						
Contributing Condition		Contributing Behavior				
Hazard						
Linked Drawings in the Current Set						
Description	Live power cables exposed to concrete surrounding drainage to carefully be removed. No live power aware of issue and present on site. Please refer to photos.					
Attachments	Download All % photo, 1.jpg % photo, 2.jpg					
ACTIVITY						
Insert ID Change Status						
David Phillips 15/10/18 10:00 AM Closed						

Staff Training

Aside from standard training qualifications such as Traffic Control, Confined Space Entry, Machinery Operating, etc, four of the GPFL crew were working towards achieving qualification as Infrastructure Pipelaying Technicians Level 3 (Connexis) during this project and used it as Practical Assessment Evidence.

Earthquake

A 7.8M earthquake struck Kaikoura in the early hours of the 14th of November and which caused considerable damage on The Terrace. We were working outside a historic building which was undergoing re-strengthening work so we stopped this portion of work and requested a structural assessment from the construction company.

Site Environment

Environmental Concerns

One section of drainage relay was identified early by GPFL as an environmental risk because the existing sewer and stormwater pipes were encased together in a large concrete surround. To prevent any sewerage going to ground or down the live stormwater to wellington harbour. The main sewer was over-pumped 24hrs a day and more than 20, very busy laterals from the large buildings were also managed individually. This element of the project was well controlled and was completed almost without incident, and within the conditions of the resource consent.

Over-Pumping

An over-pumping plan was prepared and submitted to the client. Once approved, we briefed all staff on the environmental risks associated with the work and then got everyone familiar with the plan and how to keep to it.

We used our own 100mm Super Silenced BBA pump to bypass the main sewer 24 hrs a day 7 days a week. The stormwater was bypassed when required using our own 100mm Sykes vacuum assisted pump, and laterals were bypassed one at a time using a 75mm Wacker diaphragm pump was used on laterals one at a time.

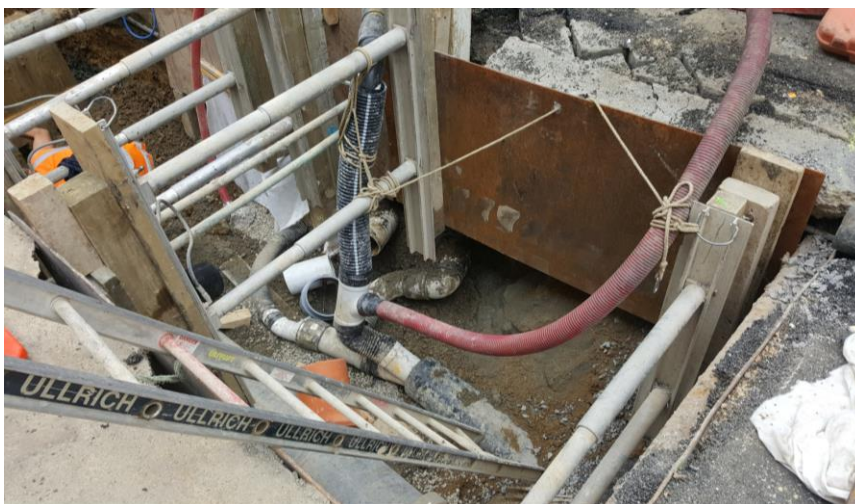
Pneumatic flow-through plugs were used carefully as the 14.5tn excavator was breaking out the pipe so it wouldn't be hard to damage them and they're expensive!

Construction Company Interfaces

Two large construction sites intersected our work site. These projects have many of the same issues as us, especially with programming and traffic. We extended our existing good relationships with both L.T. McGuinness Construction and Naylor Love Construction to manage our work through their WCC nominated loading zones, providing alternative, temporary loading zones and programming our work together, to accommodate their concrete pours and other important large deliveries.

The Naylor Love site had a temporary scaffold that was too close to our proposed trench line. We worked with the scaffolding company, the structural engineer and the main contractor to develop an alternative scaffold design that would allow us all to make progress amongst each other's work. We open short sections of trench, completed the work and closed them again, then had the scaffolders alter the supporting legs to allow us to proceed with the next section.

All work sites progressed well and we ended up providing new connections of water, stormwater and sewer for Naylor Love. It helped that all parties had a collaborative approach and quickly realised that all three projects were equally important and would benefit by working together. A great result!



“We briefed all staff on the environmental risks associated with the work and then got everyone familiar with the plan and how to keep to it.”

Customer Satisfaction

Wellington Water Tender Closure Review

Mike Check, Wellington Water Project Manager

The following worked well on this project:

- Potholing was carried out prior to contract being tendered and gave us a corridor. One issue was the telecom ducts were not laid at the same depth as we potholed (had a dip in them) required design change.
- The contractor was very proactive using Qpulse and communicating with the general public
- The contractor worked well with other building companies on the Terrace (scaffolding on footpath).
- Good design collaboration from Aecom

Public Interface

Working with the businesses and public on The Terrace presents different issues to most other streets. The engineering firms, law firms and government agencies are full of people who have high expectations from their council and infrastructure asset owners, and know what channels to use, and which buttons to push, if they are unhappy with something.

It was vital to the success of this project that we were heavily involved in the management of communications and notifications to all affected businesses, who are ultimately, of course, our customers. We received positive feedback from Transpower and Powerco staff, a written testimonial from the law firm, Brandons, and ongoing praise from the Road Controlling Authority for our management of what they recognised as a complex project in a very challenging downtown area.





BRANDONS

BARRISTERS • SOLICITORS • NOTARY

31 January 2017

Wellington Water
Private Bag 39804
Wellington Mail Centre 5045

Attention: Michael Check

Dear Michael

Stormwater and wastewater pipe renewals – The Terrace

I am writing to you today to pay compliment to the contractors (G.P. Friel Ltd) who have been undertaking the pipe work outside of our building at 32 The Terrace.

The scale and complexity of the work has surprised us and I think we all have a new appreciation for a running tap and flushing toilet!

Gerry Friel's staff have been absolutely fantastic to deal with while this work has been undertaken. They are a cheerful bunch of men who are polite, obliging and patient when we have needed access to and from our driveway.

We have quite a few very elderly clients who take advantage of our parking at the rear of the building and access for some of them has been challenging while this work has been carried out. Gerry Friel's staff have in some cases gone to extraordinary lengths to ensure they have entered and left our premises safely and with much assistance.

Please pass on our thanks to the contractor and his staff.

Kind regards

Yours faithfully
BRANDONS

Vicky Hays
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