SCIRT Rebuilding Infrastructure

LEARNING LEGACY

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

SCIRT Investigations presentation

Story: Asset Assessment

Theme: Programme Management

A PowerPoint presentation prepared for the Christchurch City Council and CPG New Zealand, providing an overview of the investigation work completed.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit www.scirtlearninglegacy.org.nz

Programme funded by Christchurch City Council New Zealand Government

city care Our people. Making it work. Downer Relationships creating success Fulton Hogan McCONNELL DOWELL CREATIVE CONSTRUCTION Fletcher

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SCIRT INVESTIGATIONS

Patrick Cantillon

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SCIRT Investigations

- Purpose
  - Provide an overview to the extent of investigation work undertaken by the SCIRT Investigations Team over the last 10 months and our successes

- Focus of the Presentation
  - Physical Investigations
    - Geotechnical Investigations
  - Asset Assessment Investigation
    - Polecam
    - Profilometer

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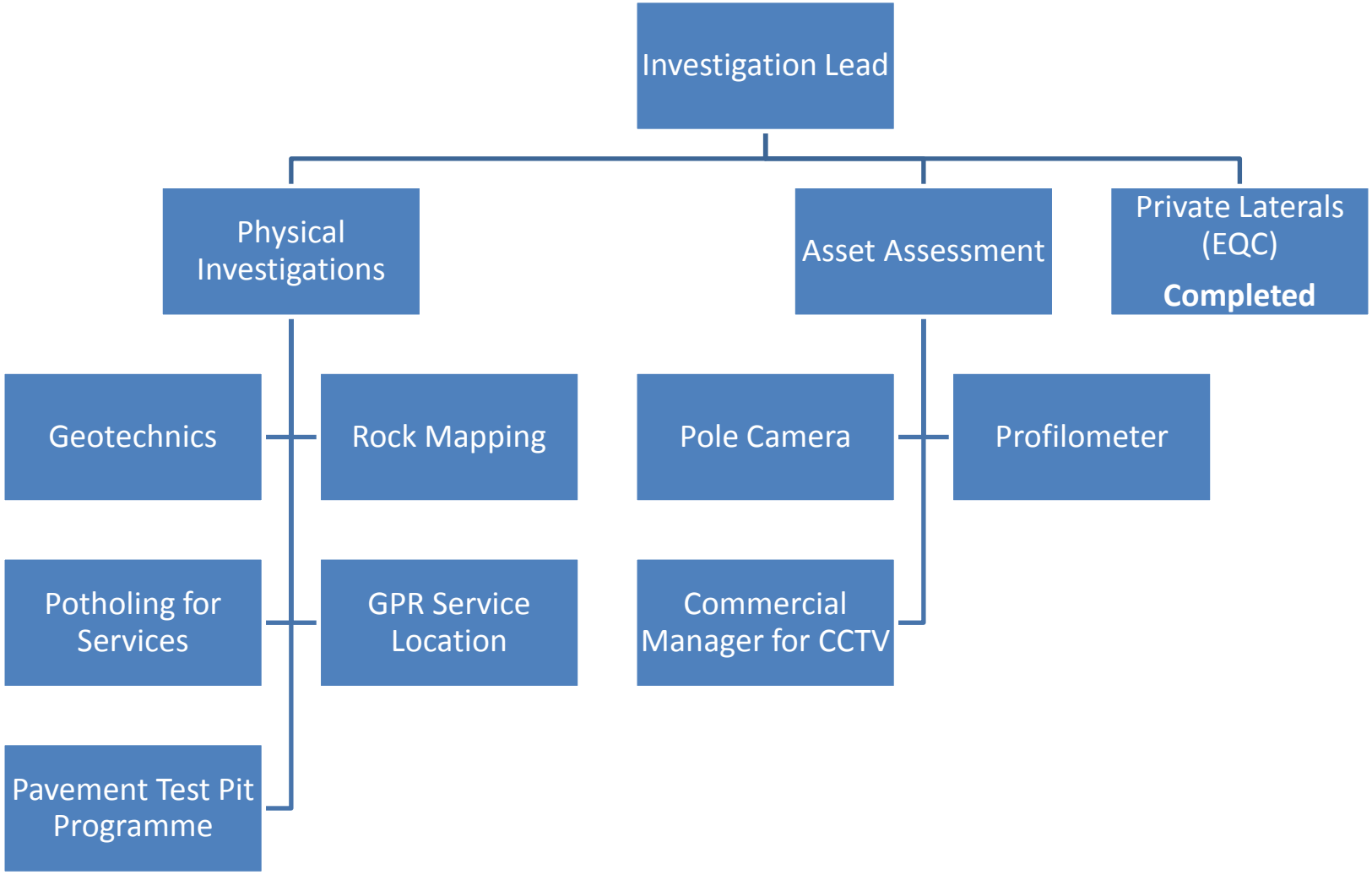
The Role of the Investigations Team



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The Investigation Family (100+)

- SCIRT Engineering Geologists current core team of 3, peaked at 5
- Head Contractor(s) - Downers, Fulton Hogan, Macdow, Fletchers, City Care
  - Site Health & Safety & Management
  - Traffic Management Plans
  - Utility services avoidance (Plans, CAT, GPR)
  - Potholing (Hand dug, Hydro Excavation)
  - Site Preparation (Con Cut, Connetics, etc.)
  - Fencing
  - Site reinstatement
- Laboratories for Pavement Test Pit Programme
  - Downers, Fulton Hogan, City Care
- Drilling Companies
- Archaeologist (Over Under Archaeology)
- Hydrotech - Polecam
- Geotechnics – Profilometer
- SCIRT Communications Team
- SCIRT Planners covering resource consents
- SCIRT Traffic Management Team
- SCIRT GIS Team
- SCIRT Surveyors

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Geotechnical Investigations – Who do we use

CPT – Cone Penetration Test

Company			Prodrill	McMillans	Geotechnics	McNeils	Ground Investigation	OPUS	Lankelma	DCN	Boart Longyear	Griffiths	Fugro	Perry Drilling
			Current Suppliers							Potential Suppliers				
Office in Christchurch			Y	Y	Y			Y	Y					
Boreholes	Deep holes	Roto-sonic	Y	Y						Y	Y			
		Duel Tube		Y										
		Rotary Coring	Y	Y		Y				Y		Y		Y
	Shallow holes	Window(less) Sampling			Y		Y							
		Hand Held			Y									
In-situ testing	CPT	Small tracked CPT	Y				Y							
		Large tracked CPT												Y
		Truck CPT		Y				Y	Y				Y	
		Sesimic Cone						Y						Y
		Dilatometer					Y							
	Other	Dynamic Probing (DPSH)			Y		Y							

Other investigation techniques include:

- Hand Auger
- Hand/Hydro Excavation/Excavator dug trial pit
- Scala Penetrometer test
- Hand shear vane test

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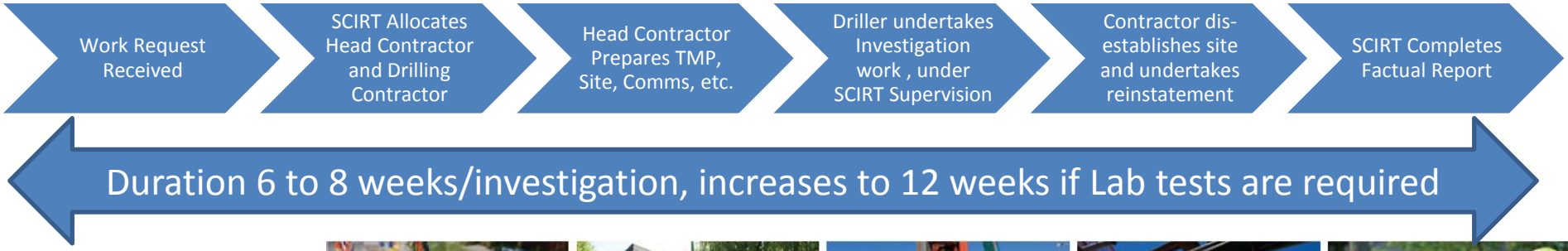
Geotechnical Investigations – How do we do it

- Traditional Framework Arrangements too slow!
- All work appointed through Head Contractors Downers and Fulton Hogan
  - Collaborative approach with Contractor,
    - Head Contractor engages Drilling Contractor through their own supplier framework agreement
    - Contractor responsible for all Health and Safety, site management over the course of the investigation
    - SCIRT instructs Head Contractor on which Drilling Contractor to use
  - Multiple sites can be sequenced, improving efficiency and increases quantity of physical investigations completed



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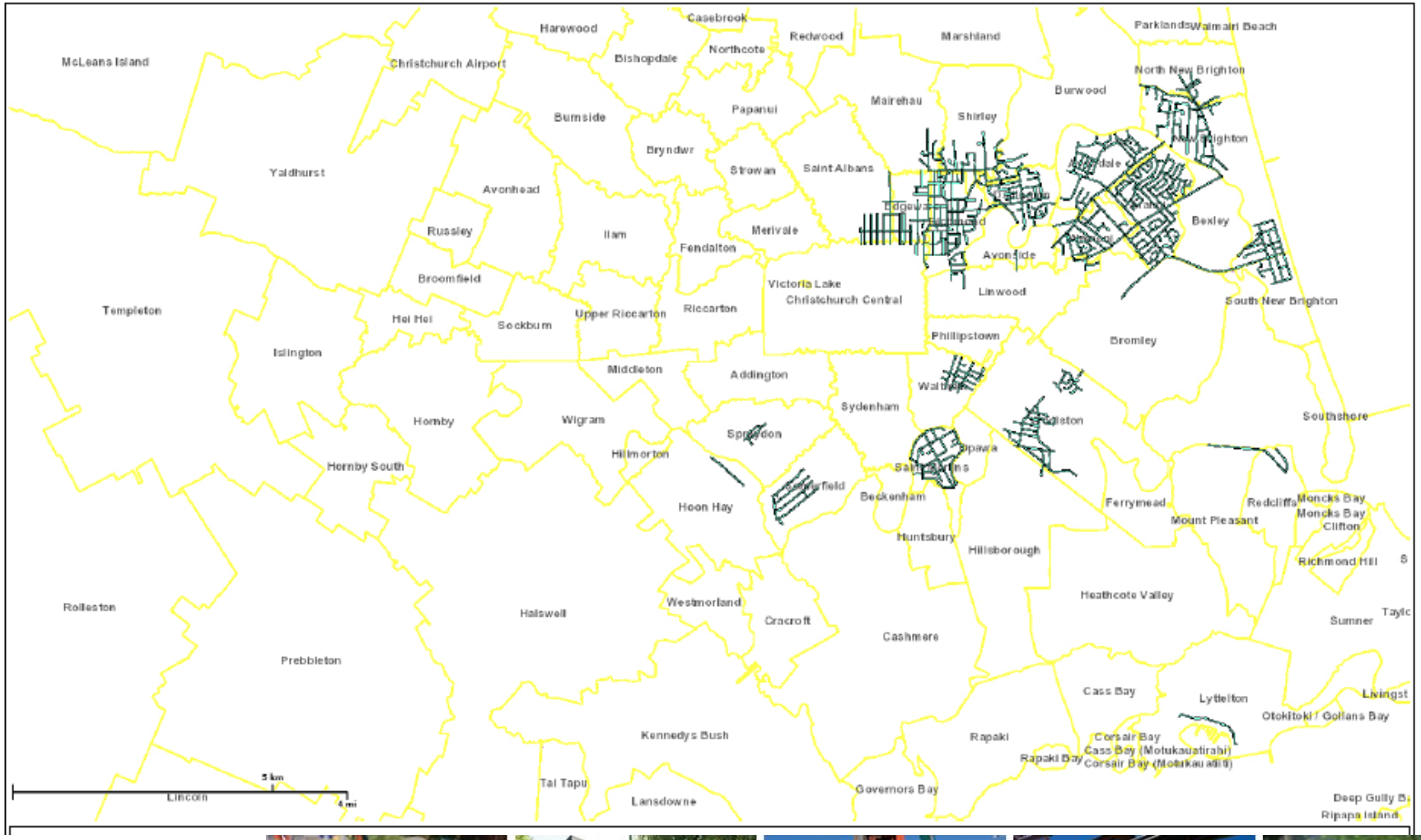
Where have we been – Pavement Test Pits



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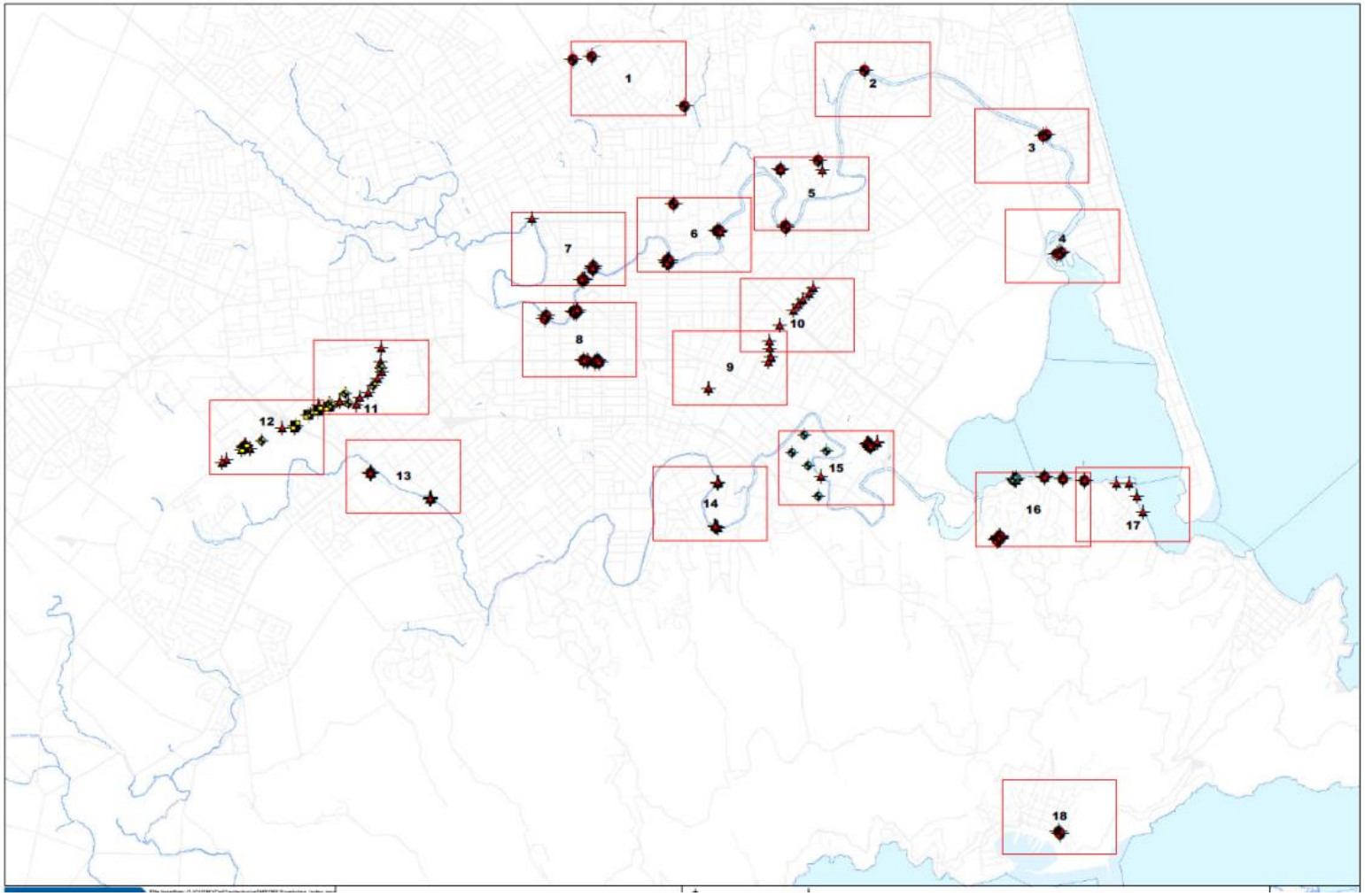
Where have we been – Geotechnical



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Investigation Achievements

- Geotechnical Investigations

Geotechnical Investigation	Nr of Test Locations	Average Length (m)	Total Length (km)
Boreholes	100	25	2.5
Cpt's	300	20	6
Pavement Test Pits incl. Coal Tar	1155	Ave. 1 pit every 200m	231

Borehole 10836-BH-01, 20.60m – 23.60m

Borehole 10836-BH-01, 23.60m – 26.60m

- Borehole/CPT's from over 100 work requests
- Cost of Investigations to date $4.1m
- A dedicated Investigation Team has saved an estimated 6 months off the Design Programme

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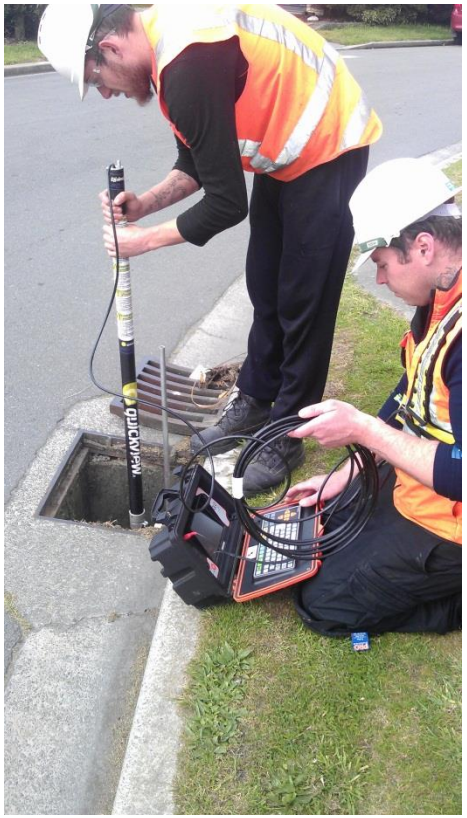
Asset Assessment Achievements - Polecam

- Assets requested/survey (15m max Length Storm water only)
  - 3219 (26km) requested
  - 1491 (12km) received
- Survey Work Commenced December 2011
- Commercial Benefits
  - Estimated savings to date using Polecam against CCTV $130k to $155k



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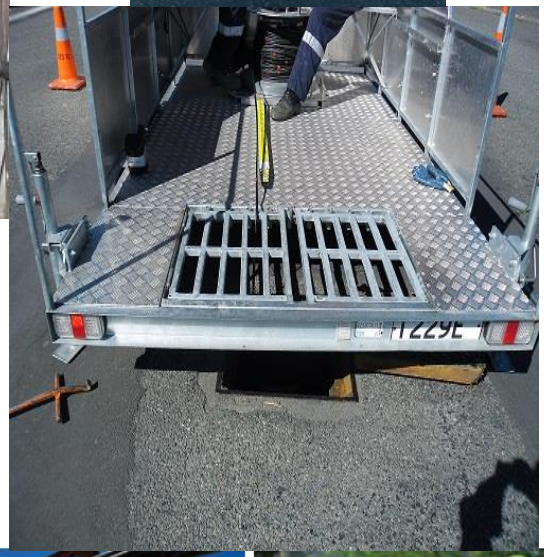
Asset Assessment Achievements - Profilometer

- Measures the longitude vertical displacement of a sewer pipe
- Assets requested/survey
  - 1769 (107km) requested
  - 1006 (59km) received
- Survey Work Commenced December 2011



Geotechnics – Winners of the October 2012 Bill Perry Award for Health and Safety

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Investigation Achievements - Legacy

- Beyond SCIRT
  - Reciprocal Agreements in place to share Geotechnical Factual Reports with:
    - Christchurch City Council
    - Port Hills Geotechnical Group
    - Tonkin and Taylor
    - EQC
    - CERA
  - Assisting EQC/T&T in relation to the Canterbury Geotechnical Data Base, through the supply of data.

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PHOTOS

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Fitzgerald Ave – Sonic Rig

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Pressure Main 105 – Cone Penetration Test (CPT)

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Pressure Main 105 – Window(less) Sampling (Terrier Rig)

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Quarry Road – Window Sampling (Hand Held)

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Rangatira Terrace – Rock Mapping and Drilling

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Rangatira Terrace – Rock Mapping and Drilling

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Key Success Areas – Being Smarter Not Faster

1. Adoption of a strong "**Family**" culture across the team:
   - No rework required to date
   - Positive Communication Policy resulting in no negative feedback from either the Design Teams or General Public
   - ECan Monitoring Officer comment on last borehole audit:

     "Appeared to be well sealed by an organised drill team"

2. **High Performance Team** providing an effective and efficient delivery vehicle for all investigations requested, which has assisted the Design Teams in their ability to achieve a $40m/month output.

3. The use of **Early Contractor Involvement** (ECI) in the delivery of the investigations resulted in an increase turnover of investigation requests that would **NOT** normally occur in a BAU environment

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