

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 requirements for utility location and protection

Story: Utilities Location and Protection

Theme: Programme Management

A document which describes the processes and procedures SCIRT designers and delivery teams had to follow to locate and protect utilities.

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



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Memorandum

To	Delivery Leadership Group (Previously Tactical Leadership Group)
From	Tim Mason, Greg Slaughter
CC	Safety Leadership Group
Date	26/02/15
Subject	NOR0023[8]SCIRT Requirements for Utility Location and Protection

This latest version contains amendments to

Page 9&10

- Updated Contact details for utilities

Regards

Greg Slaughter

Tim Mason



**Stronger Christchurch Infrastructure
Rebuild Team**

DELIVERY GUIDELINE

Number :
Design Group: GEN
Revision : 26/02/15
Original: 24/01/13

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|-------------------------------------|---|---|---------------------------------------|
| <input type="checkbox"/> Wastewater | <input checked="" type="checkbox"/> Utilities | <input type="checkbox"/> Stormwater | <input type="checkbox"/> Geotechnical |
| <input type="checkbox"/> Structures | <input type="checkbox"/> Roading | <input type="checkbox"/> Water Reticulation | |

Subject: Utilities Coordination and Sub Surface Utilities Information

Original: Design Management

Approved: Paula Lock
Ilan Campbell
Tony Gallagher

Updated by : Dave Bain

Keywords:

Utilities, Services, Power, Telecommunication, Gas

The purpose of this guideline is to:

1. Describe the process for ensuring the involvement of utilities in the design process through all SCIRT gates
2. Provide for the accurate mapping, location and depiction of utilities in three dimensions

Background

A working group led by SCIRT (Utilities Review Panel) has been established and formal agreement reached to facilitate coordination between utility owners, CCC and SCIRT Design and Delivery teams. Additionally the NZUAG Code of Practice, DOL Guideline and other utility specific regulations include these requirements when working with utilities.

This guideline is consistent with NZ regulations, Australia Standard AS5488 (Draft) for Sub Surface Utility Information and the USA's ASCE 38-02 Standard Guideline for the Collection and Depiction of Subsurface Utility Data. For the avoidance of doubt, section 2.8. of the NZUAG Code of Practice contains the framework and NZ context for these requirements

Key objectives include

- Ensuring technical issues and costs associated with utilities are incorporated into SCIRT designs.
- Taking a one pass approach to complete utility planned maintenance, upgrades or future proofing at the same time as a SCIRT project where practicable

Requirements

Concept Design Stage.

- The Delivery Team ECI Coordinator is to Include discussion with Designer from the allocated Design Team on the utility component of ECI in relation to the project

Detailed Design Stage

- Where risk of a conflict was identified by the Design Team, then in conjunction with the utility location providers, locations must be confirmed to positively identify the utility and provide locations accurate to a minimum of Level B below. For constructability issues, this process is to include the Delivery Team ECI Coordinator and Project Engineer.
- Utility location providers to provide information on any potentially relevant features or unidentified services.
- Engage directly with affected Utility(s) companies and gain agreement on the design requirements and construction methodology required to protect or relocate the affected utility, The utility's agreement to this protection or relocation must be detailed on the UDA form in Project Centre.
- If a utility chooses to extend or upgrade their network in as part of a SCIRT project then a commercial agreement for this work must be negotiated and agreed by the IST Utility Coordinator.
- Detail for the protection/relocation/upgrade for all affected utilities must be included in the Methodology as part of the ECI documentation

Delivery Stage

- Delivery Team Project Engineer to provide construction methodology for protection/relocation/upgrade of all affected utilities as part of the ECI Documentation, for consideration in TOC development.
 - Delivery Team Project Engineer to contact affected utilities and confirm their approval of detailed design
 - Delivery Team Project Engineer must obtain as built service plans from each utility using the contact details below
 - Do not use as built that were issued by the utility more than 30 days ago.
 - Delivery Team to complete Permit to Excavate and record in permit register
 - Locations to be marked out to SCIRT approved standards

To ensure best practice and to provide a focus for reducing strikes on utility networks, the following service location and protection procedures should be applied by all Delivery Teams and subcontractors:

- **Training and Education**

- Project Managers, site engineers, supervisors, operators and spotters must be provided with appropriate training in reading service plans and locating services.
- Training must be provided to a standard and in a manner approved by the Delivery Team Leader.
- Site toolbox meetings must include the procedures below for locating, exposing and working around services.

- **Consequences**

- A Non Compliance Report will be raised for each network strike where process and/or procedure has not been followed.
- Where a network strike has occurred, the site will be closed and the crew stood down until an investigation is completed and the Delivery Team Leader has authorised the reopening of the site.
- Compulsory drug and alcohol testing is required after hitting any live service.
- It is expected that that each company would follow its own internal disciplinary procedures where a Non Compliance Report has been issued. This includes both direct and subcontract personnel.

NOTE: Section 8 of the Utilities Access Act 2010 provides for the following penalty where "... a person is subject to an order made under [section 7](#), fails to comply with the order,..... commits an offence and is liable on conviction to a fine not exceeding **\$200,000**".

- **Technical/Physical Initiatives**

- Hydro or vacuum excavation is the default method for positively identifying services on all SCIRT sites.
- The SCIRT Best Practice Guidelines for Hydro Excavation and Subsurface Utility Location outline the key considerations required for efficient and cost effective hydro excavation and location by GPR.
- In circumstances where hydro or vacuum excavation is not practical or excessively expensive, the project engineer shall undertake a formal risk analysis and the document the reasons not to hydro/vacuum excavate in the JSEA.
- The work crew, led by the project engineer shall ensure the appropriate tools and methodology for locating services are applied on their project. As a minimum, pipe and cable tracers must be present on site for use by trained personnel
- Use of "goalposts" to physically stop machines being able to come into contact with overhead lines. Where a project engineer determines goalposts are not practical, sleeved cones or signage warning of the presence of overheads are a minimum requirement on all sites where overhead lines are present.
- Use engineered standard support and protection solutions for services which are exposed, particularly those that span across trenches. This includes the replacement requirements for AC pipes

- **Process**

- Permits allowing machinery or hand digging within 1.5 metres of a service that is indicated on a drawing shall not be issued unless a formal risk analysis has been undertaken and the reasons behind the decision are documented on the JSEA.
- GPR or RF Cable and Pipe Tracers* are to be used to locate the service indicated and hydro or air excavation is the default method to visually identify the service as determined by the Project Engineer. The service must be positively identified and its attributes recorded as above before excavation as specified in the pre dig documentation is commenced within 1.5 metre of that service.
- The minimum number of potholes/slot trenches required each day must be specified by the Site Engineer and recorded on the daily Pre Dig documentation. When deciding on where to slot trench or pothole and the frequency of slot trenches or potholes, consideration must be given to local conditions and the potential for crossovers and deviations from standard alignments.

Utility Survey for Design and Construction

This guideline is consistent with NZ regulations, Australia Standard AS5488 (Draft) for Sub Surface Utility Information and the USA's ASCE 38-02 Standard Guideline for the Collection and Depiction of Subsurface Utility Data. For the avoidance of doubt, section 2.8. of the NZUAG Code of Practice contains the framework and NZ context for these requirements

Quality Level D

Utility attribute information from SCIRT WebMaps spatial viewer shall include—

- (a) utility owner;
- (b) an indication of the utility type; and
- (c) an indicative location of the visible and subsurface features of the utility.

Tolerance does not apply to an indicative location that is attributed to quality level D.

Quality Level C

Quality level C is described as a surface feature correlation or an interpretation of the approximate location and attributes of a subsurface utility asset using a combination of existing records (and/or anecdotal evidence) and a site survey of visible evidence. The minimum requirement for quality level C is geo spatial position in the local coordinate system**.

Attribute information

Quality level C attribute information shall include—

- (a) utility owner;
- (b) an indication of the utility type;
- (c) an interpolation of the location and direction of the subsurface utility using visible features or SURVEY ACCURATE coordinates if available, as points of reference;
- (d) feature codes of visible features including but not limited to pits, access chambers, poles, valves and hydrants; and
- (e) the location of visible features measured in terms of spatial positioning with a maximum horizontal tolerance of ± 200 mm.

Utility Survey for Design and Construction (cont)

Quality Level B

Quality level B provides relative subsurface feature location in three dimensions. The minimum requirement for quality level B is geo spatial position in the local coordinate system and datum**.

Attribute information

Quality level B attribute information shall include—

- (f) utility owner;
- (g) an indication of the utility type;
- (h) the location of visible features measured geospatially with a maximum horizontal tolerance of ± 100 mm; and
- (i) the location of subsurface features measured geospatially with a maximum horizontal tolerance of ± 100 mm and maximum vertical tolerance of ± 100 mm.
Where there are contiguous services (e.g. a cluster of Chorus ducts) an indication of the horizontal extent of these shall be recorded to a minimum of Level C

Quality Level A

Quality level A is the highest quality level and consists of the positive identification of the attribute and location of a subsurface utility at a point to absolute geospatial accuracy in three dimensions. It is the only quality level that defines a subsurface utility as 'validated'.

Where the whole line segment cannot be verified by line of sight, quality level A shall not be attributed to the line segment between validated points.

Attribute information

Quality level A attribute information shall include—

- (j) utility owner;
- (k) the utility—
 - (i) type;
 - (ii) status (in service or unknown)
 - (iii) material;
 - (iv) size; and
 - (v) configuration,
- (l) feature codes of visible and subsurface features including but not limited to pits, access chambers, poles, valves, hydrants; and
- (m) the location of points surveyed on visible surface and subsurface features measured in terms of absolute spatial positioning with a maximum horizontal and vertical tolerance of ± 50 mm.

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Local Coordinate System SCIRT: New Zealand Geodetic Datum 2000 - Mt Pleasant projection (NZGD2000 MT PLEAS)

Local Vertical Datum SCIRT: CHCH Drainage Datum (CDD)

3. Approving, invoicing and payment of costs

Design Stage

- Designer liaises directly with utility owner and ECI Coordinator to identify best design for protection or relocation of the utility.
- Designer raises work request for utility location through Asset Assessment Team or Survey Manager.
- Designer requests assessment/design and cost estimate from utility owner using UDA form or general correspondence in Project Centre
- Where the utility owner has chosen to extend or upgrade their network in as part of a SCIRT project then a commercial agreement for this work must be negotiated and agreed by the IST Utility Coordinator.
- Where work is for protection or relocation as a result of SCIRT design, utility owner completes assessment/design and invoices SCIRT for this work
- Designer includes relocation of utility in Detailed Design Drawing
- Design Team codes invoice to Design as follows:

Design Stage	Project Number	Full Code
Concept Design	10xxx	10xxx 10.8500
Detailed Design	10xxx	10xxx 15.8500
For example:	10234	10234 10.8500

1. Invoice is approved by Design Manager

Delivery Stage

1. Project Manager/Site Engineer liaises directly with Utility to schedule the work shown on Drawings
2. Where utility has chosen to extend or upgrade their network in as part of a SCIRT project then a commercial agreement for this work must be negotiated and agreed by the IST Utility Coordinator.
3. Where work is for protection or relocation as a result of SCIRT design, Utility completes the work and invoices directly to the Delivery Team
4. Delivery Team codes the invoice to Construction and approves the invoice

NB: Construction Coding must include Project Number 10XXX, GL code 8500, Full code 10XXX 850

Plan Requests

When requesting plans, please ensure you provide:

- ✓ A clear description of the area concerned, preferably with a copy of the street layout
- ✓ Where 33kv or 66kv electrical cables are present, Orion representatives must be notified directly

Service Authority	Phone Number	Fax / E-mail/website
<u>Orion NZ Ltd</u>	All requests to be made via the web page.	Underground requests at: www.oriongroup.co.nz
<u>Chorus/ Telecom NZ Ltd</u> (including old Gas lines which are on CD)	BeforeUdig 0800-248 344 0800 248 747	< www.beforeudig.co.nz planrequest@beforeudig.co.nz
<u>Gas - Rockgas</u> Plans and notifications: Project Engineer: Wai Yu	All requests via email to 373-6448	LPGAsBuiltAdminRequest@contactenergy.co.nz wai.yu@contactenergy.co.nz
<u>Enable Networks</u>	0800 434 273	www.beforeudig.co.nz
<u>Vodafone</u>	BeforeUdig 0800-248344 0800 248 747	www.beforeudig.co.nz planrequest@beforeudig.co.nz
Plan interpretations	0508-651-050 option 2	
Liquigas (Lyttelton to city) Les Nelson	033842481	les.nelson@liquigas.co.nz

Project Centre User Details

- Orion Mike Miles ORN-MM DDI: 03 363 9824
 Fiona Ngakuru ORN-FM DDI 03 363 9826
- Chorus Vienna Jacobs CHS - VJ DDI: 03 339 3412
 Richard Clark CHS – RC DDI: 03 375 0667
- Enable Nicholas Latham ENN-NL DDI: 03 741 3878
- Vodafone Richard Schoeman VOD –RS DDI: 03 982 6596
 Eddie Smit VOD – ES DDI: 03982 6023
- Contact Wai Yu CTE- WY DDI: 03 373 6413
- Two Degrees Ron Bush TDM-SS DDI: 0220605662

CONTACT DETAILS

Company	Utility	Full Name	Business Phone	Mobile Phone	E-mail
Chorus	Telecommunications	George Condon(Transfield)	(03) 375 1026	027 647 0509	richard.clark@transfieldservices.co.nz
Chorus	Telecommunications	Vienna Jacobs (Downers)	033393412		vienna.jacobs@downer.co.nz
Connetics	Street Lighting	Tony Walker	033537246	0274380758	walkera@connetics.co.nz
Connetics	Street Lighting	Steve Muir	033537341		muirs@connetics.co.nz
Contact Energy	Gas	Wai Yu	033736413		wai.yu@contactenergy.co.nz
Enable Networks	Ultrafast Broadband	Nicholas Latham	037413878	+64 22 060 9462	nicholas.latham@enable.net.nz
Kiwirail	Rail Crossings	Wayne Ramsay	033393978		wayne.ramsay@kiwirail.co.nz
Orion	Electricity Network	Mike Miles	033639824	0274326830	mike.miles@oriongroup.co.nz
Orion	Electricity Network	Fiona Ngakuru	033639826		fiona.ngakuru@oriongroup.co.nz
Vodafone	Telecommunications	Richard Schoeman	039826596	0299826596	richard.schoeman@vodafone.com
Vodafone	Telecommunications	Eddie Smit	039826023	0299826023	eddie.smit@vodafone.com
Vodafone Spark	Mobile	Mark Hamlin		021 413 727	mark.hamlin@vodafone.com
	Mobile	Jim McGregor	0274741512		jim.mcgregor@spark.co.nz
Two Degrees	Mobile	Ron Bush	<u>0220605662</u>		ron.bush@2degreesmobile.co.nz