

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.

#### Central City Delivery Plan and Risk Workshop Presentation

#### Story: Central City Infrastructure Rebuild

#### Theme: Programme Management

A detailed presentation outlining the approach to the central city rebuild and associated risk management.

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















This work is licensed under a Creative Commons Attribution 3.0 New Zealand License.

The authors, and Stronger Christchurch Infrastructure Rebuild Team (SCIRT) have taken all reasonable care to ensure the accuracy of the information supplied in this legacy document. However, neither the authors nor SCIRT, warrant that the information contained in this legacy document will be complete or free of errors or inaccuracies. By using this legacy document you accept all liability arising from your use of it. Neither the authors nor SCIRT, will be liable for any loss or damage suffered by any person arising from the use of this legacy document, however caused.



Programme funded by
New Zealand Government







Fulton Hogan



## **CENTRAL CITY**

### **Delivery Management Plan**



### **Project Progress - WW**



#### Project Progress – WS,SW,RD













#### **Project Progress - Bridges**













#### Wastewater Proposals



#### Water Supply Proposals



#### **Stormwater Proposals**



#### **Roading Proposals**



#### Work Summary

- \$156M Estimated total \$40M completed to date (26%)
- 25 Crews currently, peak in March-May 2014
- 25km Wastewater Relay, 18km reline
- 8km Water supply renewal (potential additional ring-main)
- Stormwater repairs and sectionalised relays
- 45km road repair, 14km restoration/rebuild
- Multiple defers/delays due to Anchor Project Overlap (not yet out of scope).











## **PROGRAMME ALIGNMENT**

### **Delivery Management Plan**



#### Programme Alignment – Anchor Projects



#### **Programme Alignment – Other External Projects**



#### **Schedule Prioritisation & Flexibility**



#### **Schedule Updates**

- Process Name: CENTRAL CITY SCHEDULE Weekly Reporting Process
- Owner: Richard Topham
- Frequency: Ongoing
- Purpose:

![](_page_15_Picture_5.jpeg)

![](_page_15_Figure_6.jpeg)

#### Programme Alignment Risk

					Owner of the			Consequence		Likelihood		Scor	Controls or Mitigation
Туре	No	Subject	Risk Description	Status	Risk SCIRT	Risk Other	Consequence of risk		Rating (C)		Rating (L)	= C x L a colour ra	nd ing
Programme	1	Design	Anchor projects have public realm or road alignment proposals	Emerging	SCIRT R.Topham		SCIRT infrastructure repair superceded by the Anchor project proposals. IRTSG repairs may no be suitable or inappropriate for the final design. Value opportunities for economic delivery missed	Threat - Cost - + \$500k to \$5M - Major	70	Probability - 10 - 20% - Unlikely	3	210	Where interaction identified through weekly planning meetings, SCIRT works held or deferred as appropriate until final design known, then a Governance decision sought for continuation of the work or complete deferral from SCIRT scope.
Anchor Project Coordination	5	Design	CCDU anchor project lacking clear servicing requirements	Live	SCIRT D.Bain		SCIRT rebuild work made redundant within Anchor project areas, require new service connections at a later date or require rework.	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 20 - 50% - Quite Common	4	160	SCIRT/CCDU//CCC/NZTA meet weekly to discuss the development of infrastructure and anchor project development. Where details not known, or an interaction identified, a hold point is placed on delivery of the work. Once Anchor Project sufficiently progressed, workshop held between the interacting design teams.
Programme	7	Delivery	Commencing construction works in build up to Canterbury Show Week and Christmas break	Emerging	SCIRT A.Bargh		Complaints from public. Late notice given to Delivery Team on traffic management restrictions which result is a delay to the baseline programme.	Threat - Stakeholder Interest - Ministerial Questions or 3rd party investigation - Medium	40	Probability - 20 - 50% - Quite Common	4	160	Early identification of work on Show weekend and Xmas periods. Communication with businesses and Clients, transport optimisation through the TIM's group.
Programme	8	Delivery	Damaged buildings fenced of blocking footpaths and road, whole sections of the roads in the CBD Closed off streets - no access	Live	SCIRT Delivery Teams		Delay to programme	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 20 - 50% - Quite Common	4	160	Delivery Team to work closely with CCDU to ensure the programme of the SCIRT works is clearly communicated to identify whether there will be any clashes with restricted or fenced or buildings and roads.
3rd Party	15	Delivery	Damage is sustained to completed rebuild works from third party reconstruction/ demolition works within the CBD	Live	SCIRT R.Topham		Repairs are required at additional cost	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 10 - 20% - Unlikely	3	120	Delivery Teams to endeavour to protect works from third part interference using best practice. CCDU Construction Management Office support with Developers. Client specified hold point on road related repairs in areas with significant vertical rebuild.
Anchor Project Coordination	16	Delivery	Assessable City - alignment of sewer on Manchester	Live	SCIRT R.Topham		Additional works to realign the sewer on Manchester Street, delay to the baseline programme	Threat - Time - Months - Medium	40	Probability - 10 - 20% - Unlikely	3	120	CCDU to Liaise with CMT to provide instruction to SCIRT once the Accessible City Plan is signed off.
Anchor Project Coordination	17	Delivery	Assessable City - Tuam Street being converted to a one way WEST to EAST	Live	SCIRT R.Topham		CCDU deadlines to complete this project effect the SCIRT programme.	Threat - Time - Months - Medium	40	Probability - 10 - 20% - Unlikely	3	120	CCDU to Liaise with CMT to provide instruction to SCIRT once the Accessible City Plan is signed off.
Anchor Project Coordination	18	Delivery	Accessible City - Changes to line marking, signals, intersections and k&C alignments - various areas	Live	SCIRT R.Topham		Delay to SCIRT repair works, or proposals superceded SCIRT repairs resulting in unneccessary work.	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 10 - 20% - Unlikely	3	120	Hold point on roading repair delivery for any area affected by the Central City Plan. Weekly meetings with Accessible City team and sCIRT.
Anchor Project Coordination	20	Roading	CERA/NZTA/CCDU/CCC projects result in permanent street closures and road corridor boundary adjustments.	Live	SCIRT R.Topham		Infrastructure is designed or built in a compromised location, possible requirement to relocate services at additional cost	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 1 - 10% - Unusual	2	80	SCIRT and Clients kept upto date with Anchor Project Proposals. Where abandonment possible/likely, SCIRT works deferred until details known.

![](_page_16_Picture_2.jpeg)

![](_page_16_Picture_3.jpeg)

![](_page_16_Picture_4.jpeg)

![](_page_16_Picture_8.jpeg)

![](_page_16_Picture_10.jpeg)

#### Programme Alignment Risk

						0	Owner of the		Consequence		Likelihoo	d	Sco	e Controls or Mitigation
	Туре	No	Subject	Risk Description	Status	Risk SCIRT	Risk Other	Consequence of risk		Rating (C)		Rating (L)	= C x L colour r	and ting
F	rogramme	25	Delivery	Interaction with live tram and construction of new sections of tram tracks	Emerging	SCIRT R.Topham		Delay to programme	Threat - Time - Weeks - Minor	10	Probability - > 50% - Likely	5	50	SCIRT to work closely with CCC as to when the tram will begin operating to ensure it fits in with the programme. SCIRT to investigate whether the new sections of tram track installation can be delayed until after our works.

![](_page_17_Figure_2.jpeg)

![](_page_17_Picture_3.jpeg)

![](_page_17_Picture_4.jpeg)

![](_page_17_Picture_5.jpeg)

![](_page_17_Picture_7.jpeg)

Fletcher

#### Requirements

- Attendance at fortnightly CCDU Operational Meetings
- Weekly updates to Schedules
- Liaison with other programme Holders
- Reprioritisation of Schedules through formal process only
- Provide support to the CCDU CMO for coordination
- Management of overlaps (scope, timing and details)

![](_page_18_Picture_7.jpeg)

![](_page_18_Picture_8.jpeg)

![](_page_18_Picture_9.jpeg)

![](_page_18_Picture_10.jpeg)

![](_page_18_Picture_13.jpeg)

## **TRANSPORT MANAGEMENT**

### **Delivery Management Plan**

![](_page_19_Picture_2.jpeg)

#### **Conflict Management**

![](_page_20_Figure_1.jpeg)

#### **3 Tier Traffic Assessment**

• Tier 1 => Available Lanes Across CBD

• Tier 2 => Route capacity across wider central city

• Tier 3 => 'Cluster' index of work and accessibility

![](_page_21_Picture_4.jpeg)

![](_page_21_Picture_5.jpeg)

![](_page_21_Picture_6.jpeg)

![](_page_21_Picture_10.jpeg)

#### **Traffic Impact Assessments**

![](_page_22_Figure_1.jpeg)

#### **CTOC** Interaction

![](_page_23_Figure_1.jpeg)

#### **Traffic Management**

- Need for Schedule Accuracy:
  - 3 month locked in (only amended due to speed of progression)
  - 3-6 month Accuracy target
  - 6 month + Indicative (best foot forward)
- Consequences of Short term reactive changes
  - Conflict management with other programme holders
  - Pre-booking system used by CTOC
  - Likely to need Governance decisions where Min LOS breached
  - Risk of TMP's not approved
  - Reputation and media issues
  - Business Impact Management (Stakeholder Comms)

![](_page_24_Picture_12.jpeg)

![](_page_24_Picture_13.jpeg)

![](_page_24_Picture_15.jpeg)

![](_page_24_Picture_17.jpeg)

Fuiton Hog

#### **Transport Risk**

					Owner of the	Owner of the		Consequence		Likelihoo	d	Score		Controls or Mitigation
Туре	No	Subject	Risk Description	Status	Risk SCIRT	Risk Other	Consequence of risk		Rating (C)		Rating (L)	= C x L colour i	and ating	
ттм	3	Delivery	Site TTM Conflicts between programme holders or access to the road corridor restricted by others.	Emerging	SCIRT A.Bargh		Delay to programme. Ineffective programme delivery	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - > 50% - Likely	5	200		Jointly developed processes with CCDU/CCC and CTOC for management of conflicts. Communication with Private Development community. Use of the LINZ SDI Tool.
ттм	4	Delivery	Traffic Minimum levels of service are not maintained affecting traffic flow and haulage routes	Emerging	SCIRT A.Bargh		Congestion, business impact, delays to the programme	Threat - Stakeholder Interest - Ministerial Questions or 3rd party investigation - Medium	40	Probability - > 50% - Likely	5	200		SDI tool and SCIRT Transport Impact assessment and reporting used for optimisation of the work sequencing. TIM's group review of long term programmes.
ттм	11	Delivery	Poorly deployed traffic management, redundant traffic management.	Emerging	SCIRT A.Bargh		Complaints from the public and driver frustration	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 20 - 50% - Quite Common	4	160		Traffic management arrangements to be managed at SCIRT level (TM reps and Delivery Teams). Continued monitoring, reporting and improvement initiatives. Rationalisation of COPTTM requirements agreed by Road Controlling Authorities. Collaboration with CTOC. Integration between construction sites and various programme holders
ттм	12	Delivery	Haulage routes and access compromised by bridge weight restrictions or insufficent road-space to negoliate turns	Emerging	SCIRT A.Bargh		Increased construction costs or delay to construction. Impact on transport network efficiency	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 20 - 50% - Quite Common	4	160		Jointly developed processes with CCDU/CCC and CTOC for management of haulage routes and bridge repair programme. Communication with Private Development community. Use of the LINZ SDI Tool.
ттм	13	Delivery	Conflicting detour routes installed by separate contractors	Emerging	SCIRT A.Bargh		Limited access, business impact, impact to transport network efficiency	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 20 - 50% - Quite Common	4	160		SDI tool and SCIRT Transport Impact assessment and reporting used for optimisation of detours. TIM's group review of long term programmes and coordinate across all rebuild programmes and projects.
ттм	23	Delivery	Hospital Access	Emerging	SCIRT Delivery Teams		Emergency services access into the building is comprised due to SCIRT works	Threat - Cost - + \$500k to \$5m - Major	70	Probability - < 1% - Rare	1	70		Delivery Team to communicate with the hospital on the works that will be carried out. Also confirm what access points they use and if alternative are available.

![](_page_25_Picture_2.jpeg)

![](_page_25_Picture_3.jpeg)

![](_page_25_Picture_4.jpeg)

![](_page_25_Picture_6.jpeg)

![](_page_25_Picture_8.jpeg)

#### Requirements

- Provide schedule accuracy (3 months Min)
- Lead the monthly 3-month look ahead site walkovers
- Planned and early submission of TMP's (3 weeks Min)
- Traffic impacts accurate on schedule information
- Support integrated TTM planning with other delivery teams (including diversion routes)
- Minimisation of TTM redundancy

![](_page_26_Picture_7.jpeg)

![](_page_26_Picture_8.jpeg)

![](_page_26_Picture_9.jpeg)

![](_page_26_Picture_11.jpeg)

![](_page_26_Picture_13.jpeg)

## COMMUNICATION

### **Delivery Management Plan**

![](_page_27_Picture_2.jpeg)

#### How - communication

- Face to face briefings
- Project overviews
- Work notices
- E-newsletters
- Email/hotlines
- Website.

![](_page_28_Picture_7.jpeg)

![](_page_28_Picture_8.jpeg)

![](_page_28_Picture_9.jpeg)

![](_page_28_Picture_10.jpeg)

city/care #Downer

NZ TRANSPORT AGENCY

# Central City hard copy newsletter

# We're repairing the wastewater system near you

![](_page_28_Picture_13.jpeg)

![](_page_28_Picture_14.jpeg)

![](_page_28_Picture_15.jpeg)

DOWELL

SCIRT

**Fulton Hogan** 

Christcharch Men Zealand Government

#### Project overview

Fletcher

### How - business impact support communication

- "Go the extra mile" campaign to raise awareness
  - Advertising
  - Awareness at events
  - Signage at Central City perimeters
  - Supporting collateral (icon, stickers, bags)
- Help businesses keep customers informed
  - Business pack
  - Stickers
  - A5 flyer and poster
  - Onsite signage.

![](_page_29_Picture_11.jpeg)

![](_page_29_Picture_12.jpeg)

![](_page_29_Picture_14.jpeg)

![](_page_29_Picture_17.jpeg)

#### How - communication

![](_page_30_Picture_1.jpeg)

Central City perimeter signage – entry

![](_page_30_Picture_3.jpeg)

![](_page_30_Picture_4.jpeg)

![](_page_30_Picture_5.jpeg)

![](_page_30_Picture_6.jpeg)

![](_page_30_Picture_9.jpeg)

Fuiton Hogo

### How - business impact support communication

Rebuilding Infrastructure

City Council

![](_page_31_Picture_1.jpeg)

Fletcher

### How - business impact support communication

![](_page_32_Picture_1.jpeg)

![](_page_32_Picture_2.jpeg)

![](_page_32_Picture_3.jpeg)

Christchurch

![](_page_32_Picture_4.jpeg)

NZ TRANSPORT AGENCY

![](_page_32_Picture_5.jpeg)

![](_page_32_Picture_6.jpeg)

#### **Communication Risk**

						Owner of the		Consequence		Likelihoo	d	Score	Controls or Mitigation
Туре	No	Subject	Risk Description	Status	Risk SCIRT	Risk Other	Consequence of risk		Rating (C)		Rating (L)	= C x L and colour rating	
Communication		Consultation	Communication is not coordinated between Client Organisations or Programme Holders	Live	SCIRT R.Topham		Misrepresentation of the rebuild programmes, inefficient planning, conflict between organisations and poor communication to affected parties	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 20 - 50% - Quite Common	4	160	CCDU CMO tasked with centralisation of coordination between programme holders. Weekly Liaison meetings. Integration of communication systems such as Salesforce. Use of Silverfish database. Combined Communications Group oversee comms management, key messaging and comms strategy
Communication	21	Community	Community questions why works are being undertaken in areas where works were recently completed (such as emergency works).	Live	SCIRT A.Mora		SCIRT is portrayed negatively	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 1 - 10% - Unusual	2	80	Start work notice SCIRT Communications Plan to advise public appropriately.
Communication	22	Delivery	Public perception of "One Pass" approach	Emerging	SCIRT A.Mora		The public may have a different perception of what "one pass" is.	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 1 - 10% - Unusual	2	80	SCIRT to communicate clearly with the public, residents and developers on what 'one pass' looks like including the situations where one pass is not appropriate

![](_page_33_Picture_2.jpeg)

![](_page_33_Picture_3.jpeg)

![](_page_33_Picture_4.jpeg)

![](_page_33_Picture_8.jpeg)

![](_page_34_Picture_0.jpeg)

### **Delivery Management Plan**

![](_page_34_Picture_2.jpeg)

#### Parking

![](_page_35_Figure_1.jpeg)

- Short-term Parking Strategy development
- Parking network planning required
- Contractor Alternative Parking
- Identification of spaces affected
- Parking within TTM sites

CASHFIELDS

Fletcher

- Parking Signage
- Communication to businesses

#### Parking Risk

					Owner of	Owner of the		Consequence		Likelihoo	d	Score	Controls or Mitigation
Type	No	Subject	Risk Description	Status	the Risk SCIRT	Risk Other	Consequence of risk		Rating (C)		Rating (L)	= C x L and colour ratin	
Parking	2	Delivery	Construction site footprint and TTM affects number of on-road parking spaces. Parking spaces taken up by contractors stalf	Emerging	SCIRT Delivery Teams		Lack of parking for consumers and CBD residents	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - > 50% - Likely	5	200	Delivery Team to work with CCDU to find a central area where site staff can park and be vaned to site. Minimise construction footprint where possible to support parking. Regular reviews with IST and Delivery team staff. Communication of alternative parking with additional signage/managed access for pusinesses.

![](_page_36_Picture_2.jpeg)

![](_page_36_Picture_3.jpeg)

![](_page_36_Picture_4.jpeg)

![](_page_36_Picture_5.jpeg)

![](_page_36_Picture_8.jpeg)

### **CONSTRUCTION SITE MANAGEMENT**

### **Delivery Management Plan**

![](_page_37_Picture_2.jpeg)

#### **Site Footprint and Access**

- Footprint kept to a minimum
  - Sites waiting for reinstatement are redundant TTM sites poor public image
  - Reduce the amount of parking spaces affected
  - Access to businesses must be maintained, kept clean and signed appropriately
  - Consider access from alterative parking areas (signage, line of site, safe access – mobility, tripping hazards, detritus etc)

![](_page_38_Picture_6.jpeg)

![](_page_38_Picture_7.jpeg)

![](_page_38_Picture_8.jpeg)

![](_page_38_Picture_12.jpeg)

#### **Flow Diversion and Dewatering**

- Flow Diversion:
  - Continuity of service
  - Impact on the network including overflows
  - On-going maintenance & operational requirements (CityCare will have a nominated representative to work with Delivery Teams)
  - Effect on other delivery teams
  - Risk areas/weak points in the network active control measures such as tagging MH's with bungs, alarms at overflows, visual monitoring points, monitoring draw down of surcharged pipes)
- Dewatering
  - Private developers
  - SCIRT Delivery teams
  - Effect on downstream work

![](_page_39_Picture_11.jpeg)

![](_page_39_Picture_12.jpeg)

![](_page_39_Picture_14.jpeg)

![](_page_39_Picture_16.jpeg)

Fulton Hog

#### Lateral Investigation & Repair

- Design Approach:
  - No change to the property IRTSG repair standards applied to existing lateral connection
  - Vacant Lot (no building consent) Repair one lateral connection at the property boundary and where a property is accessible from multiple street frontages (i.e. corner section) provide an on-line capped junction on the additional street frontages outside the property.
  - Vacant Lot (with building consent) As above. Rebuild Central liaise with the Developer to support the development.
  - Anchor Projects Liaison between SCIRT and the Anchor Project team to review infrastructure requirements.

![](_page_40_Picture_6.jpeg)

![](_page_40_Picture_7.jpeg)

![](_page_40_Picture_8.jpeg)

![](_page_40_Picture_12.jpeg)

#### Lateral Change Process

Process Name: Central City WW Laterals Owner: Richard Topham Frequency: Ongoing Purpose: Date: September 2013

![](_page_41_Picture_2.jpeg)

![](_page_41_Figure_3.jpeg)

![](_page_41_Picture_4.jpeg)

![](_page_41_Picture_5.jpeg)

![](_page_41_Picture_6.jpeg)

![](_page_41_Picture_7.jpeg)

![](_page_41_Picture_10.jpeg)

#### Utilities

![](_page_42_Picture_1.jpeg)

![](_page_42_Picture_2.jpeg)

![](_page_42_Picture_3.jpeg)

![](_page_42_Picture_4.jpeg)

![](_page_42_Picture_5.jpeg)

![](_page_42_Picture_7.jpeg)

				Owner of	Owner of the	e	Consequence		Likelihood		Sco	Controls or Mitigation	
Type	No	Subject	Risk Description	Status	the Risk SCIRT	Risk Other	Consequence of risk		Rating (C)		Rating (L)	= C x L colour r	nd ting
Services	9	Wastewater	Wastewater laterals being incorrectly sized. Number of laterals to reinstate unknown.	Live	SCIRT D.Bain		Additional WW laterals required by building developer resulting in new streetscapes being spoiled by trench reinstatements	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 20 - 50% - Quite Common	4	160	All lateral proposals provided to Rebuild Central for discussion with private developers. When changes identified, formal instruction provided through the CMT for additional works. CCC then invoice Developer directly.
Services	10	Water supply	Plan for Water Submains replcement being revised by CCC after construction drawings have been issued	Live	SCIRT Delivery Teams		Additional cost to rebuild and reduced resilience of water network	Threat - Cost - + \$100k to \$500k - Medium	40	Probability - 20 - 50% - Quite Common	4	160	Water submains required to be replaced or rebuilt are to be confirmed by the Delivery Team with IST at least 8 weeks prior to construction
Services	19	Utilities	Damaged utilities owned by other organisations are not replaced at the same time as the proposed works. Potential district energy scheme.	Live	SCIRT D.Bain		Area is excavated twice. Missed opportunity	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 10 - 20% - Unlikely	3	120	Early liaison with utility organisations through D. Bain and UDA process.
Services	26	Wastewater	Wastewater laterals within Anchor projects that are redundant being rebuilt/ reconnected unnecessarily	Live	SCIRT Delivery Teams		Additional cost to rebuild and reduced resilience of Wastewater network due to leaking lateral connections	Threat - Cost - + \$10k to \$100k - Minor	10	Probability - 10 - 20% - Unlikely	3	30	Anchor project laterals (shown on SCIRT plans as 'CCDU', 'MSF', or 'STAD') required to be reconnected or rebuilt are to be confirmed by the Delivery Team with CCDU at least 4 weeks prior to construction
3rd Party	24	Delivery	Management of private development dewatering	Emerging	SCIRT Design Teams		Private developers discharge dewatering into the sewer network where the Delivery Team is working.	Threat - Time - Weeks - Minor	10	Probability - > 50% - Likely	5	50	Delivery Team to communicate with private construction works to influence where they discharge their dewatering, i.e. away from the waste water construction works.
Business Impact	6	Community	Central city reconstruction works have an adverse impact on businesses.	Emerging	SCIRT R.Topham		Slower business growth and economic recovery, poor public perception of rebuild	Threat - Image / Reputation - Regional Media Cover or Short Term National Cover - Medium	40	Probability - 20 - 50% - Quite Common	4	160	Implement a Business Impact Minimisation Strategy across the whole rebuild, jointly developed with CCDU and CCC. CTOC input for transport LOS.

![](_page_43_Picture_2.jpeg)

![](_page_43_Picture_3.jpeg)

![](_page_43_Picture_4.jpeg)

![](_page_43_Picture_8.jpeg)

# **BUSINESS IMPACT MANAGEMENT**

### **Delivery Management Plan**

![](_page_44_Picture_2.jpeg)

#### Summary

- A significant reduction to the impact on operating businesses can therefore be made through:
  - Providing Minimum LOS to the Transport network
  - Early and comprehensive communication
  - Minimise the impact on the parking network
  - Effective and considerate construction site management

![](_page_45_Picture_6.jpeg)

![](_page_45_Picture_7.jpeg)

![](_page_45_Picture_8.jpeg)

![](_page_45_Picture_9.jpeg)

![](_page_45_Picture_12.jpeg)

# QUESTIONS & OUTSTANDING ISSUES?

![](_page_46_Picture_1.jpeg)