INFRASTRUCTURE COMMITTEE MEETING

MINUTES

19 APRIL 2022

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REPORT OF THE INFRASTRUCTURE COMMITTEE MEETING HELD AT COUNCIL CHAMBERS, 232 BOLSOVER STREET, ROCKHAMPTON ON TUESDAY, 19 APRIL 2022 COMMENCING AT 9:05AM

COMMITTEE RESOLUTION

9:06AM
That Councillor Ellen Smith be nominated as Chairperson

Moved by: **Councillor Wickerson**
Seconded by: **Councillor Mathers**
MOTION CARRIED

9:06AM Councillor Ellen Smith assumed the Chair

1 OPENING

1.1 Acknowledgement of Country

2 PRESENT

Members Present:

The Mayor, Councillor A P Williams
Deputy Mayor, Councillor N K Fisher (via Video Link)
Councillor S Latcham
Councillor C E Smith
Councillor M D Wickerson
Councillor D Kirkland
Councillor G D Mathers

In Attendance:

Mr E Pardon – Chief Executive Officer
Mr P Kofod – General Manager Regional Services (Executive Officer)
Mr M Crow - Manager Infrastructure Planning
Ms M Prasad - Senior Infrastructure Planning Engineer - Floodplain Management
Mr S Harvey - Coordinator Infrastructure Planning
Mr J Meyer - Infrastructure Planning Engineer
Mr A Collins - Manager Project Delivery
Mr M O'Keeffe - Manager Rockhampton Regional Waste and Recycling
Ms K Walsh – Acting Senior Committee Support Officer

Via Video Link:

Mr R Cheesman – Deputy Chief Executive Officer
Ms M Taylor – Chief Executive Officer
Mr D Morrison – Manager Office of the Mayor
Ms K Roberts – Coordinator Property and Insurance
Mr J Buckenham – Coordinator Local Laws
Mr J Polin – GHD
Mr J Kafoa - GHD
Mr M Box - GHD

3 APOLOGIES AND LEAVE OF ABSENCE

The meeting was informed that the Mayor, Councillor Tony Williams has a prior commitment and will attend at conclusion of the commitment.

Councillor Cherie Rutherford tendered her apology and will not be in attendance.

4 CONFIRMATION OF MINUTES OF PREVIOUS MEETING

COMMITTEE RESOLUTION

THAT the minutes of the Infrastructure Committee of 15 March 2022 be confirmed.

Moved by: **Councillor Latcham**
Seconded by: **Councillor Kirkland**
MOTION CARRIED

5 DECLARATIONS OF INTEREST IN MATTERS ON THE AGENDA

"Councillor Fisher informed the meeting that he has a declarable conflict of interest in **Item 8.1 – Rockhampton Airport Levee Feasibility Study.** This declarable conflict of interest arises as with anything dealing with the General Aviation area of Rockhampton Airport, also he is a member of Peace Christian Church which operate a hangar, Peace Aviation at Rockhampton Airport and his wife Sherrie Fisher is an administrator for Peace Christian Church.

Councillor Fisher will deal with this conflict by staying away from the place where the meeting is being held while this matter is being discussed.

"I, Councillor Smith inform the meeting that I have a declarable conflict of interest in **Item 8.1 – Rockhampton Airport Levee Feasibility Study**. This declarable interest arises as my niece, Jacqueline Lebish and her husband Ross Lebish own properties at 48 Hunter Street and 60 Hunter Street. I propose to leave and stay away from the place where the meeting is being held while this matter is discussed and voted on.

"I, Councillor Smith inform the meeting that I have a prescribed conflict of interest in **Item 8.3 – Mount Morgan Rail Trail Feasibility Study – Second Round of Consultation.** This prescribed conflict of interest arises as my brother John McEvoy owns land at 148 Kabra Road that joins the proposed Rail Trail. I will deal with the conflict by leaving the room and staying away from the place where the meeting is being held when this matter is being discussed and voted on."

"I, Councillor Smith inform the meeting that I have a prescribed conflict of interest in **Item 8.4 – Capital Project Report – March 2022 - Mount Morgan Water Security**. This prescribed conflict of interest arises as my nephew Adam John McEvoy is a partner in MTC Industries who recently commenced a contract with FRW to cart potable drinking water to Mount Morgan. My brother John James McEvoy is employed by MTC Industries to drive the water tanker. I will deal with the conflict by leaving the room and staying away from the place where the meeting is being held when this matter is being discussed and voted on."

6 BUSINESS OUTSTANDING

Nil

7 PUBLIC FORUMS/DEPUTATIONS

Nil

8 OFFICERS' REPORTS

COMMITTEE RESOLUTION

9:11AM
That Councillor Shane Latcham be nominated as Chairperson.

Moved by: **Councillor Wickerson**
Seconded by: **Councillor Kirkland**
MOTION CARRIED

9:11AM Councillor Shane Latcham assumed the Chair.

9:12AM Councillor Smith, having earlier informed the meeting of a prescribed conflict of interest and her decision to not participate in the decision, left the place at which the meeting was held, including any area for the public and stayed away while the matter was discussed and voted on.

8.1 ROCKHAMPTON AIRPORT LEVEE FEASIBILITY STUDY

10:01AM The Mayor, Councillor Williams assumed the Chair.

File No: **1743**

Authorising Officer: **Martin Crow - Manager Infrastructure Planning**
Peter Kofod - General Manager Regional Services

Author: **Monishaa Prasad - Senior Infrastructure Planning Engineer - Floodplain Management**

SUMMARY

Rockhampton Regional Council has engaged the consultant, GHD, to undertake a feasibility study to assess the viability of a flood mitigation levee for the Rockhampton Airport. This report provides a brief overview of the study activities to-date, to complement the consultant's presentation at the meeting.

COMMITTEE RECOMMENDATION

THAT this report, and the Airport Levee Feasibility Study presentation be received.

Moved by: **Councillor Kirkland**
Seconded by: **Councillor Latcham**
MOTION CARRIED UNANIMOUSLY
Councillors Kirkland, Latcham, Williams, Mathers and Wickerson voted in the affirmative
Councillors Smith and Fisher did not participate in the vote.

10:13AM Councillor Smith returned to the meeting room

8.2 WALKING AND CYCLING STRATEGY

10:15AM Councillor Fisher attended the meeting via video link.

File No:	**14429**
Authorising Officer:	**Stuart Harvey - Coordinator Infrastructure Planning** **Martin Crow - Manager Infrastructure Planning** **Peter Kofod - General Manager Regional Services**
Author:	**Jamie Meyer - Infrastructure Planning Engineer**

SUMMARY

This report seeks endorsement of the Rockhampton Regional Council Walking and Cycling Strategy.

COMMITTEE RESOLUTION

THAT Council adopts the Rockhampton Regional Council Walking and Cycling Strategy 2021 – 2031.

Moved by: **Councillor Smith**
Seconded by: **Councillor Kirkland**
MOTION CARRIED UNANIMOUSLY

Meeting Adjourned

COMMITTEE RESOLUTION

10:36AM
That the meeting be adjourned for a short recess.

Moved by: **Councillor Wickerson**
Seconded by: **Councillor Mathers**
MOTION CARRIED

Meeting Resumed

COMMITTEE RESOLUTION

10:47AM
That the meeting be resumed.

Moved by: **Councillor Wickerson**
Seconded by: **Councillor Mathers**
MOTION CARRIED UNANIMOUSLY

Members Present:

The Mayor, Councillor A P Williams (Chairperson)
Deputy Mayor, Councillor N K Fisher (via Video Link)
Councillor S Latcham
Councillor C E Smith
Councillor M D Wickerson
Councillor D Kirkland
Councillor G D Mathers

In Attendance:

Mr E Pardon – Chief Executive Officer
Mr P Kofod – General Manager Regional Services (Executive Officer)
Mr M Crow - Manager Infrastructure Planning
Mr S Harvey - Coordinator Infrastructure Planning
Mr A Collins - Manager Project Delivery
Mr M O'Keeffe - Manager Rockhampton Regional Waste and Recycling
Ms K Walsh – Acting Senior Committee Support Officer

Via Video Link:

Mr R Cheesman – Deputy Chief Executive Officer
Ms M Taylor – Chief Financial Officer
Mr D Morrison – Manager Office of the Mayor

8.3 MOUNT MORGAN RAIL TRAIL FEASIBILITY STUDY - SECOND ROUND OF CONSULTATION

10:48AM Councillor Smith attended the meeting room

10:48AM Councillor Smith, having earlier informed the meeting of a prescribed conflict of interest and her decision to not participate in the decision, left the place at which the meeting was held, including any area for the public and stayed away while the matter was discussed and voted on.

File No:	**14498**
Authorising Officer:	**Martin Crow - Manager Infrastructure Planning** **Peter Kofod - General Manager Regional Services**
Author:	**Jamie Meyer - Infrastructure Planning Engineer**

SUMMARY

Preliminary drawings have been completed as part of the Mount Morgan Rail Trail Feasibility Study. The preliminary drawings will be made available for the second round of public consultation planned to commence Monday 25 April 2022.

COMMITTEE RESOLUTION

THAT Council undertake public consultation on the preliminary drawings for the Mount Morgan Rail Trail.

Moved by: **Councillor Latcham**
Seconded by: **Councillor Wickerson**
MOTION CARRIED UNANIMOUSLY

Councillors Latcham, Wickerson, Williams, Fisher, Mathers and Kirkland voted in the affirmative.
Councillor Smith did not participate in the vote.

8.4 CAPITAL PROJECT REPORT - MARCH 2022

Councillor Smith remained out of the meeting room having earlier declared a conflict in **Item 8.4 - Mount Morgan Water Security**

File No:	**7028**
Authorising Officer:	**Peter Kofod - General Manager Regional Services**
Author:	**Andrew Collins - Manager Project Delivery**

SUMMARY

Monthly status reports on all projects currently managed by the Project Delivery unit.

COMMITTEE RESOLUTION

THAT the Project Delivery Monthly Report for March 2022 - Mount Morgan Water Security be received.

Moved by: **Councillor Kirkland**
Seconded by: **Councillor Mathers**
MOTION CARRIED UNANIMOUSLY

Councillors Kirkland, Mathers, Williams, Wickerson, Fisher, and Latcham voted in the affirmative
Councillor Smith did not participate in the vote

11:02AM Councillor Smith returned to the meeting room.

COMMITTEE RESOLUTION

THAT the Project Delivery Monthly Report for March 2022, excluding Mount Morgan Water Security, be received.

Moved by: **Councillor Kirkland**
Seconded by: **Councillor Smith**
MOTION CARRIED UNANIMOUSLY

Councillors Kirkland, Smith, Williams, Mathers, Latcham, Wickerson and Fisher voted in the affirmative.

8.5 FITZROY BARRAGE NORTHERN BANK FISH LADDER

11:23AM The Chief Executive Officer left the meeting room.

File No:	**5338**
Authorising Officer:	**Peter Kofod - General Manager Regional Services**
Author:	**Martin Crow - Manager Infrastructure Planning**

SUMMARY

Rockhampton Regional Council has been approached by Sunwater to collaborate on the construction of a fish ladder on the northern banks of the Fitzroy Barrage.

COMMITTEE RESOLUTION

THAT Council:

1. Support the ongoing discussions between Council and Sunwater in relation to the proposal to establish a fish ladder on the northern bank of the Fitzroy Barrage; and
2. Support the issuing of a letter of intent to Sunwater indicating the collaborative discussions held to date with Council and Council's support for continued discussions around the proposal to establish a fish ladder on the northern bank of the Fitzroy Barrage.

Moved by: **Mayor Williams**
Seconded by: **Councillor Wickerson**
MOTION CARRIED UNANIMOUSLY

8.6 COASTAL AND ESTUARINE RISK MITIGATION PROGRAM FUNDING SUBMISSION

File No:	**12534, 1864**
Authorising Officer:	**Peter Kofod - General Manager Regional Services**
Author:	**Martin Crow - Manager Infrastructure Planning**

SUMMARY

Rockhampton Regional Council has been approached by the Department of Environment and Science seeking nominations of expressions of interest for projects under the Federal Government's Coastal and Estuarine Risk Management Program.

COMMITTEE RESOLUTION

THAT Council support the submission of an expression of interest to the State Government under the Federal Government's Coastal and Estuarine Risk Management Program for the technical studies and business case for the Barrage Raising Project at an estimated cost of $750,000 and seeking a 50% contribution from the Federal Government.

Moved by: **Councillor Kirkland**
Seconded by: **Councillor Mathers**
MOTION CARRIED UNANIMOUSLY

9 NOTICES OF MOTION

Nil

10 QUESTIONS ON NOTICE

Nil

11 URGENT BUSINESS\QUESTIONS

Nil

12 CLOSED SESSION

In accordance with the provisions of section 254J(3) of the *Local Government Regulation 2012,* a local government may resolve to close a meeting to the public to discuss confidential items, such that its Councillors or members consider it necessary to close the meeting.

COMMITTEE RESOLUTION

THAT the meeting be closed to the public to discuss the following items, which are considered confidential in accordance with section 254J(3) of the *Local Government Regulation 2012,* for the reasons indicated.

13.1 Recyclables Processing Service Contract Update

In accordance with section 254J(3)(g) of the *Local Government Regulation 2012* it is considered necessary to close the meeting to discuss negotiations relating to a commercial matter involving the local government for which a public discussion would be likely to prejudice the interests of the local government.

Moved by: **Councillor Latcham**
Seconded by: **Councillor Mathers**
MOTION CARRIED UNANIMOUSLY

COMMITTEE RESOLUTION

11:44AM
THAT pursuant to s5.12 *Council Meeting Procedures* the meeting moves into Closed Session and be closed to the public.

Moved by: **Councillor Smith**
Seconded by: **Councillor Kirkland**
MOTION CARRIED UNANIMOUSLY

12:01PM The Chief Executive Officer returned to the meeting room

COMMITTEE RESOLUTION

12:01PM
THAT pursuant to s5.12 *Council Meeting Procedures* the meeting moves out of Closed Session and be opened to the public.

Moved by: **Councillor Kirkland**
Seconded by: **Councillor Wickerson**
MOTION CARRIED UNANIMOUSLY

13 CONFIDENTIAL REPORTS

13.1 RECYCLABLES PROCESSING SERVICE CONTRACT UPDATE

File No: **1857**

Authorising Officer: **Peter Kofod - General Manager Regional Services**

Author: **Michael O'Keeffe - Manager Rockhampton Regional Waste and Recycling**

In accordance with section 254J(3)(g) of the *Local Government Regulation 2012* it is considered necessary to close the meeting to discuss negotiations relating to a commercial matter involving the local government for which a public discussion would be likely to prejudice the interests of the local government.

SUMMARY

The purpose of this report is to provide Council with an update on the recyclable processing services.

COMMITTEE RESOLUTION

THAT the Recyclables Processing Services Contract Update report be received.

Moved by: **Councillor Latcham**
Seconded by: **Councillor Fisher**
MOTION CARRIED UNANIMOUSLY

14 CLOSURE OF MEETING

There being no further business the meeting closed at 12:02pm.

_____

CHAIRPERSON

_____

DATE

MEETING
ATTACHMENTS

19 APRIL 2022

ANNEXURE A

Documents presented to Councillors for their reference during the Infrastructure Committee meeting when dealing with:

Item 8.1 Rockhampton Airport Levee Feasibility Study

Rockhampton Airport Levee Feasibility Study

Presentation to Council 19th April 2022

Welcome

Agenda

Agenda	Time	Who by
Welcome / Introductions	2 mins	MB
Background and context	2 mins	MB
Phase 1 & 2 - Levee Alignment and Concept Options Development	15 mins	JP
Phase 3 - Preliminary Design	15 mins	MB
Phase 4 - Preliminary Business Case	10 mins	JP / MB
Questions	15 mins	All

Welcome / Introductions

Rockhampton Regional Council

- Martin Crow – Project Director
- Monishaa Prasad – Project Manager

GHD

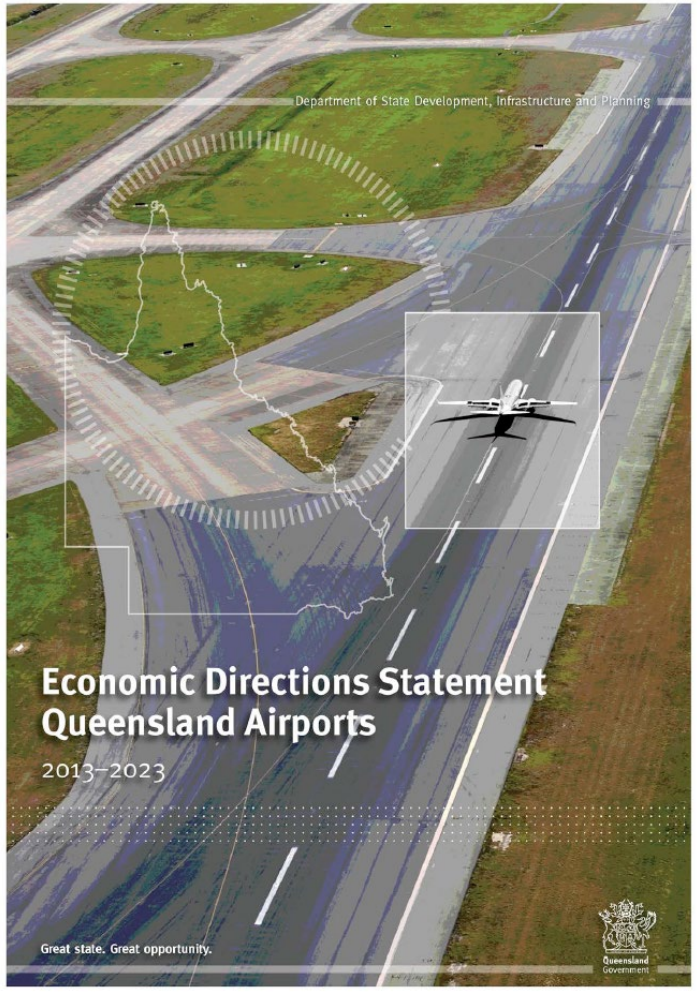
- John Polin – Project Director
- Matt Box – Project Manager
- Jack Kafoa – Technical Lead

Background and context

→ Matt Box, GHD

Rockhampton Airport

- **Critical** piece of QLD's regional infrastructure which supports the economy of Central QLD
- Rockhampton Airport is a commercial business unit of Council and is a major Australian Regional Airport (services the City of Rockhampton and Central Queensland, with flights to Brisbane, Gladstone, Mackay, Townsville and Cairns).
- The Airport is used by both domestic and international airlines (including B747 to B777 and A340 types)
- Rockhampton Airport is responsible for the operation and maintenance of Airport assets totaling approximately **$149.1 million (replacement value).**
- Airport also serves as a base for Royal Flying Doctor service and RACQ rescue helicopter
- Provides gateway to Central QLD, with >24,000 aircraft movements, >400,000 passengers annually.
- The Shoalwater Bay Training Area (SBTA) located north east of Rockhampton is one of the Australian Defence Force's largest training areas with in excess of 30,000 personnel.



- EDSQA Rockhampton Airport identified Rockhampton Airport as an Airport of economic significance.

- Continued growth an expansion of the airport is forecast as per Council's adopted Rockhampton Airport Masterplan (2017 to 2037) including:

  - Terminal enhancement
  - Defence precinct development
  - Freight Facilities development
  - Rockhampton Airport Gateway Project
  - Central Queensland Regional Plan

Airports of economic significance

Of Queensland's 191 airports, there are 40 metropolitan and regional airports which have strategic significance for economic growth (see Map 1 and Table 1). These airports link Queensland industries to workforces and national and international supply chains, markets and customers. They have been identified based on a threshold of activity in functions that are integral to the state's economy, such as the volume of aircraft and passenger movements, and hosting of aerospace activities such as maintenance and training for fixed and rotary wing aircrafts, both civil and military.

Fitzroy River Flooding

- Catchment area = 142,000km^2
- Major tributaries: Dawson, Nogoa-Mackenzie and Connors-Isaac Rivers
- Long well documented history of flooding:

January 1918	– 8.66mAHD
February 1954	– 7.95mAHD
January 1991	– 7.85mAHD
January 2011	– 7.75mAHD
April 2017	– 7.45mAHD

Floodplain inundation can result in:

- Significant property and infrastructure damage
- Closure of the Airport
- Inundation of Bruce Hwy, Capricorn Hwy and North Coast Rail Line

Major floods can last for several weeks, resulting in extensive disruption to road, rail and air traffic.

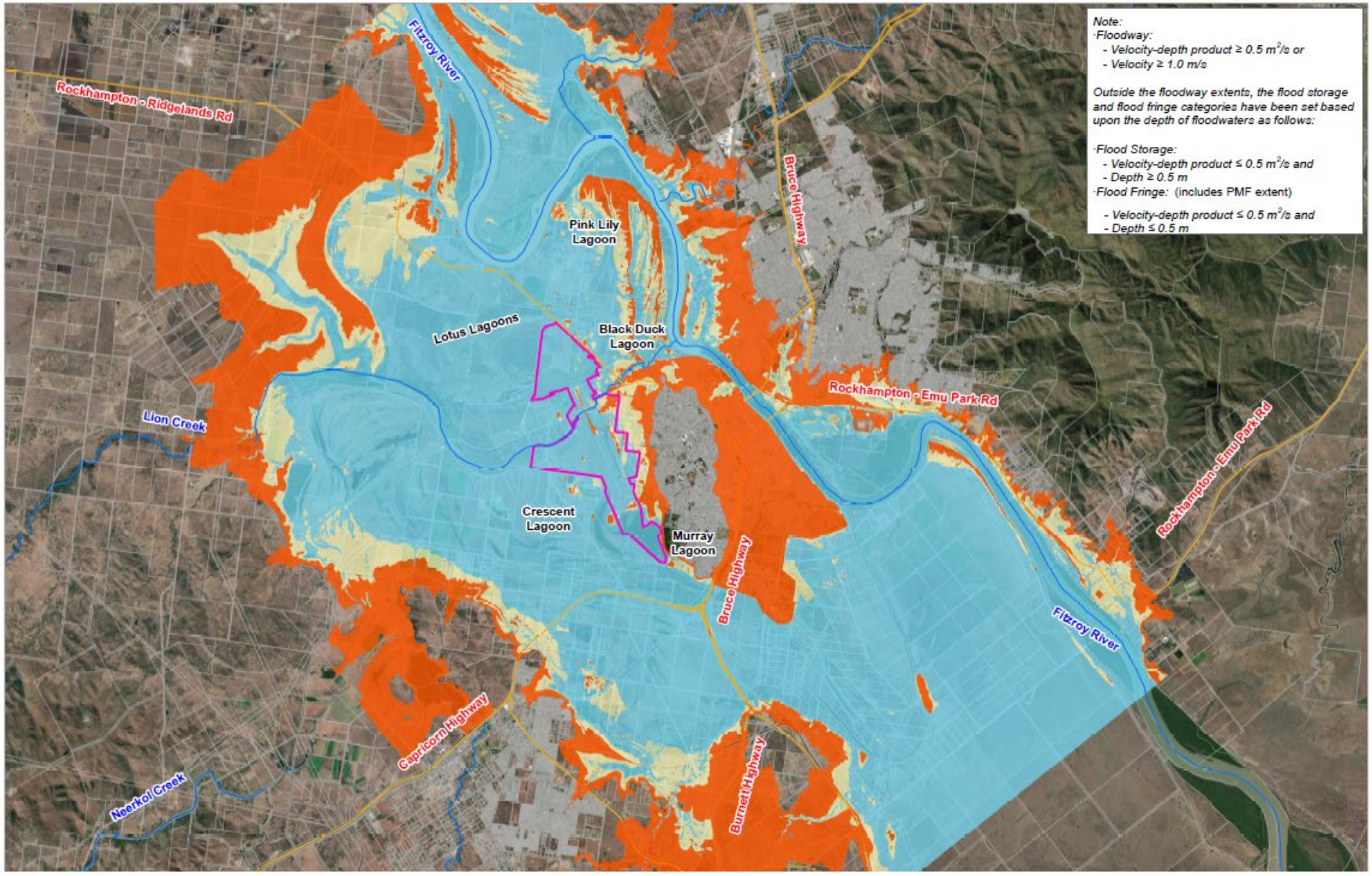
➡ Constrains Development Potential of Airport

2011 Flood Event

Key Impacts:

- Closure of Airport for 3 weeks resulting in regional economic loss of approx. $0.8M/day.
- Closure of Hwy's for 13 days
- Isolation of the community

Fitzroy River Regional Flood and Airport

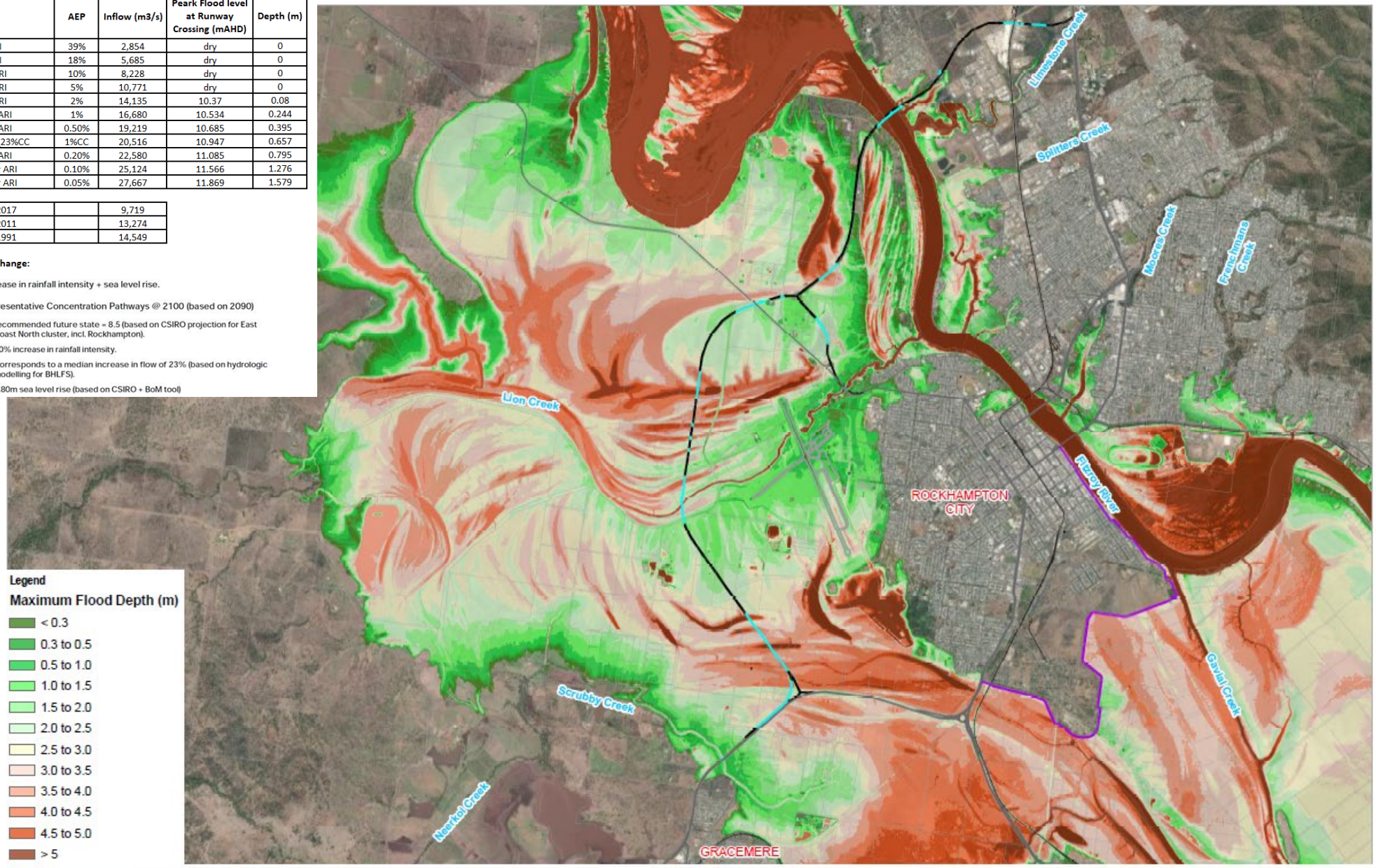


Event	AEP	Inflow (m3/s)	Peark Flood level at Runway Crossing (mAHD)	Depth (m)
2 year ARI	39%	2,854	dry	0
5 year ARI	18%	5,685	dry	0
10 year ARI	10%	8,228	dry	0
20 year ARI	5%	10,771	dry	0
50 year ARI	2%	14,135	10.37	0.08
100 year ARI	1%	16,680	10.534	0.244
200 year ARI	0.50%	19,219	10.685	0.395
100 year_23%CC	1%CC	20,516	10.947	0.657
500 year ARI	0.20%	22,580	11.085	0.795
1000 year ARI	0.10%	25,124	11.566	1.276
2000 year ARI	0.05%	27,667	11.869	1.579

2017		9,719
2011		13,274
1991		14,549

Climate Change:

- Increase in rainfall intensity + sea level rise.
- Representative Concentration Pathways @ 2100 (based on 2090)
  - recommended future state = 8.5 (based on CSIRO projection for East Coast North cluster, incl. Rockhampton).
  - 20% increase in rainfall intensity.
  - Corresponds to a median increase in flow of 23% (based on hydrologic modelling for BHLFS).
  - 0.80m sea level rise (based on CSIRO + BoM tool)



1% AEP

(1 in 100 year)

Flood Depths (m)

Investment Logic Mapping (ILM)

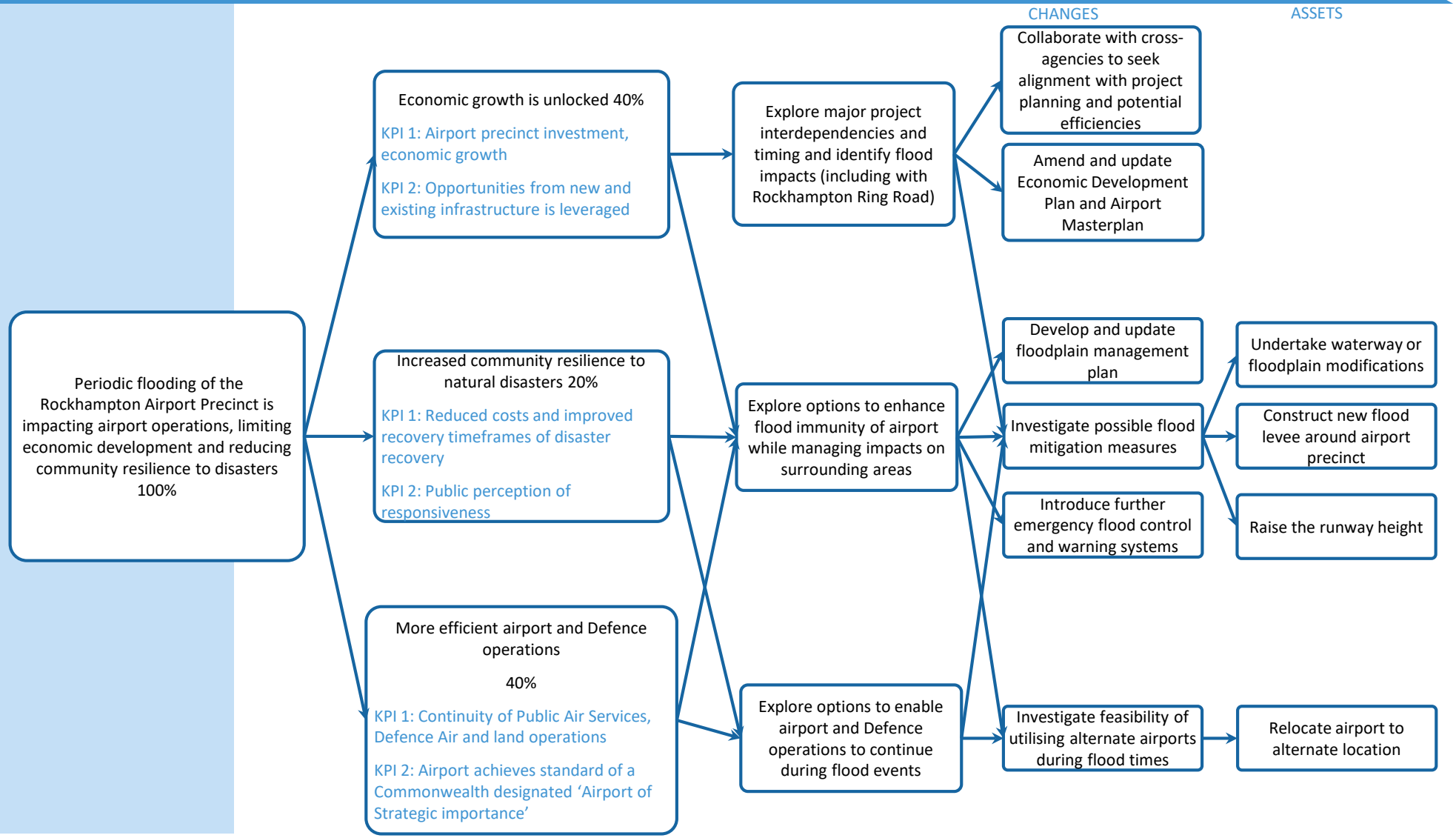
Rockhampton Regional Council

Enabling future economic growth and community resilience

Improving the flood resilience of the Rockhampton Airport

Investment Logic Map

PROBLEM ▶ **BENEFIT** ▶ **RESPONSE** ▶ **SOLUTION**



Problem Statement

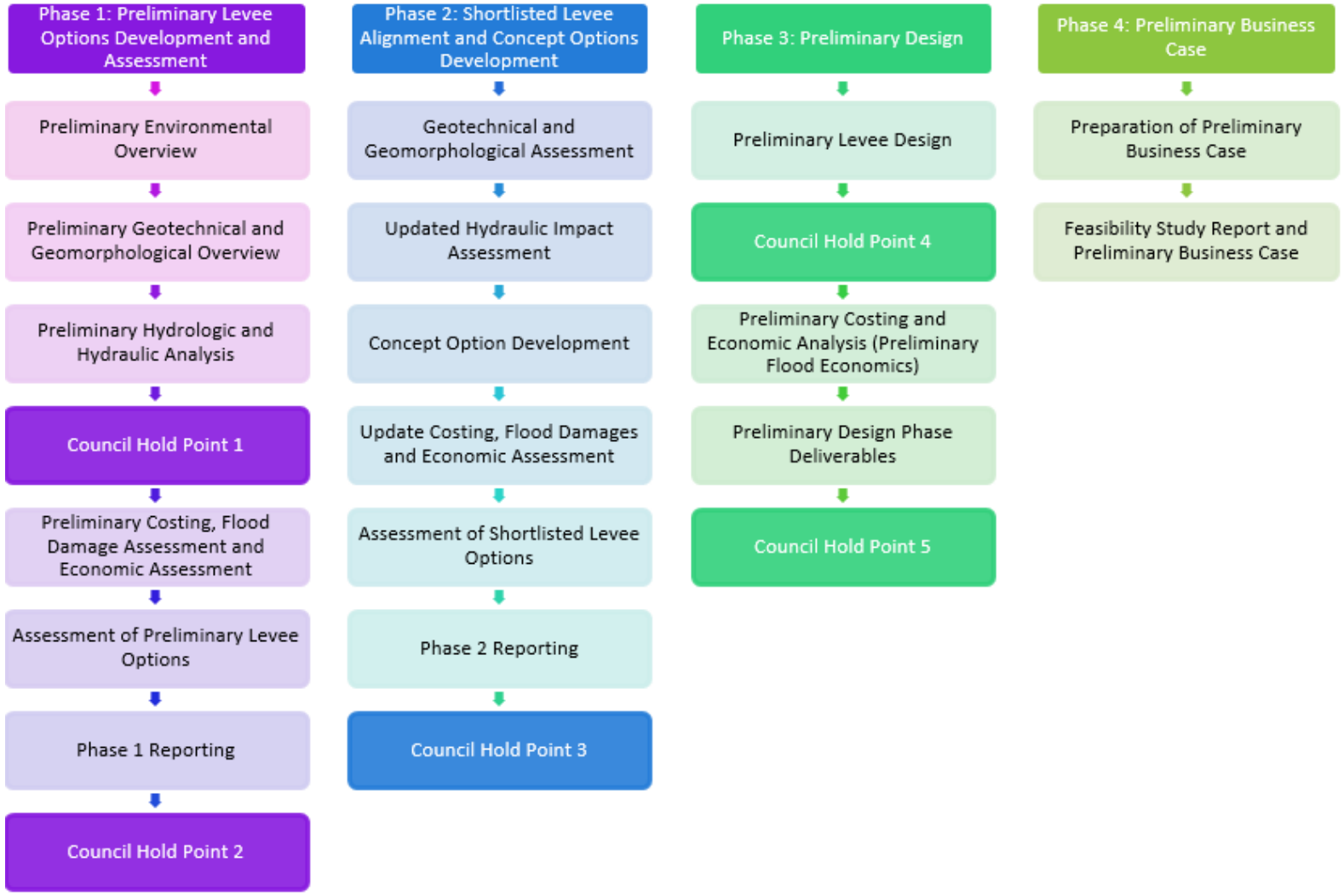
The problem statement identified for this assessment is as follows

Periodic flooding of the Rockhampton Airport Precinct is impacting airport operations, limiting economic development and reducing community resilience to disasters.

Rockhampton Levee Project Objectives

- Provide safe and efficient airport operations in compliance with aviation legislation
- Minimise the closure time of the airport and surrounding business precinct during flood events.
- Increase the resilience of the Rockhampton Airport to future flood events.
- Incorporate adaptive design features to ensure the levee's stability, functionality, and service level in current and future climatic conditions
- Reduce the cost of flood response, recovery and reconstruction.
- Minimise adverse impacts on the local and state economies due to flood-related airport closures.

Project Phases



Phase 1 & 2 - Levee Alignment and Concept Options Development

→ John Polin, GHD

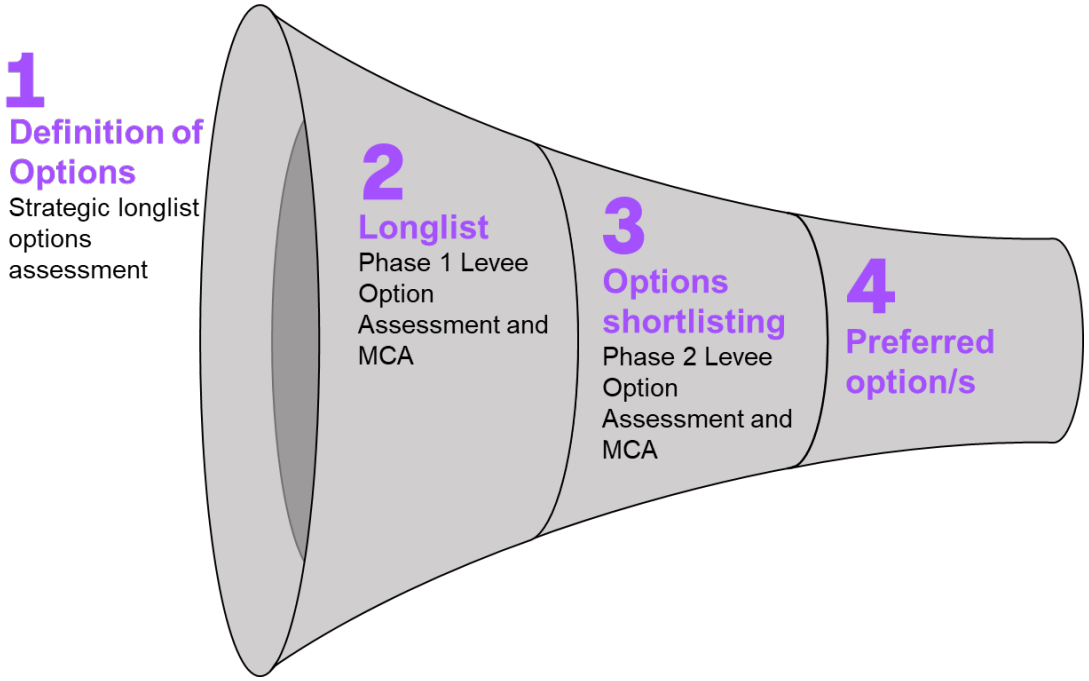
Options Longlist to Shortlist

The MCA options analysis undertaken for this project is as follows:

Phase 1 Initial Levee Option Assessment – Longlist: Review and confirmation of longlist of levee option alignments based on previous studies and agreement with RRC; review and assessment of alignments with consideration of key criteria using a Multi Criteria Assessment to determine the preferred options to progress to Phase 2 Assessment

Phase 2 Levee Option Assessment – Options Shortlisting: Further analysis of infrastructure requirements from shortlisted options identified in Phase 1 Assessment. This phase of options assessment further explores the feasibility of options, along with a Multi Criteria Assessment process to determine the preferred option/s to progress to a detailed investigation in the Options Assessment.

Technical assessments were carried out as part of Phase 1 and 2



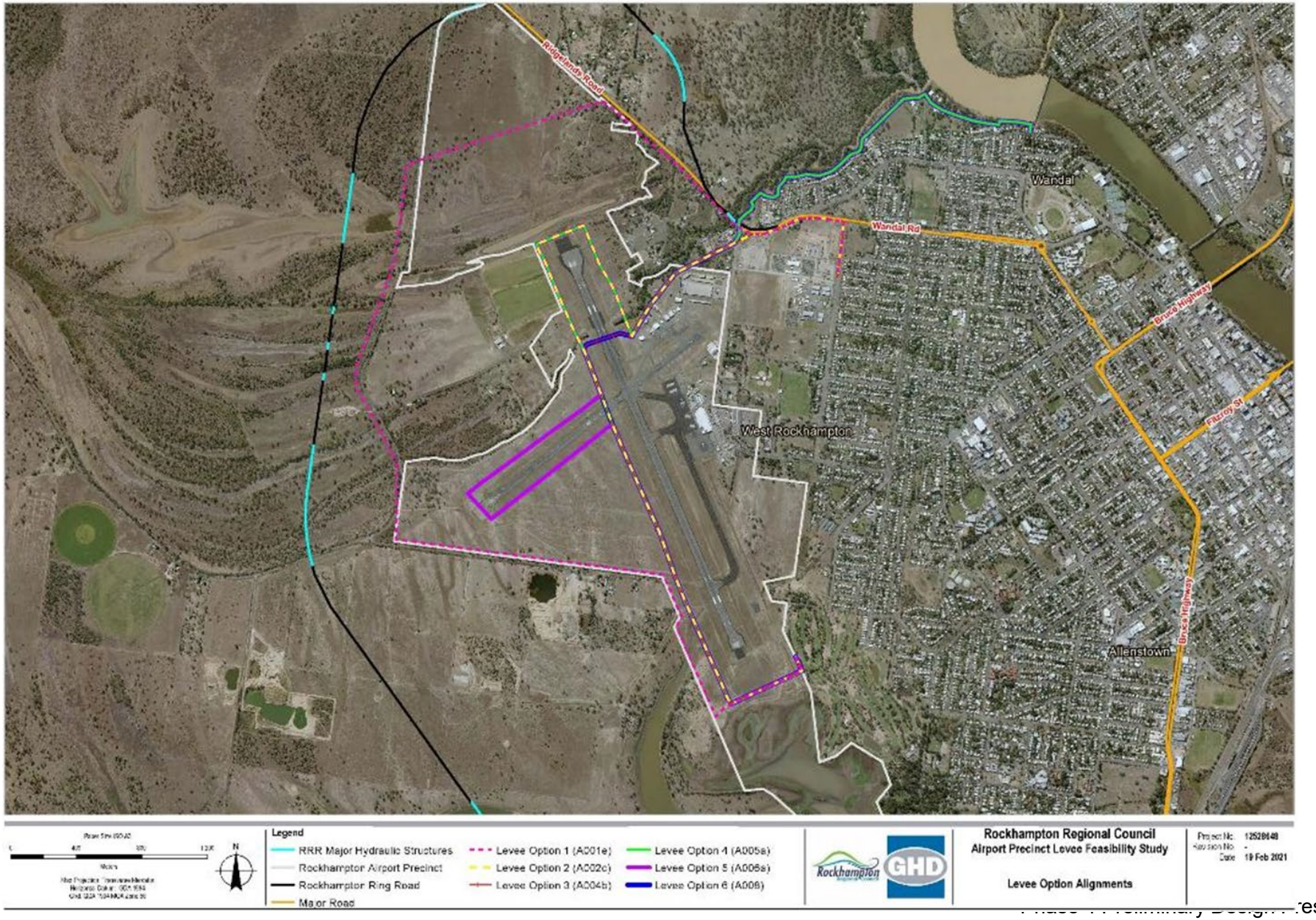
Phase 1 – Initial Levee Options Longlist

A total of 10 preliminary levee alignment options were developed as part of the Phase 1 Preliminary Options Development and Assessment.

Levee options were developed through consideration of:

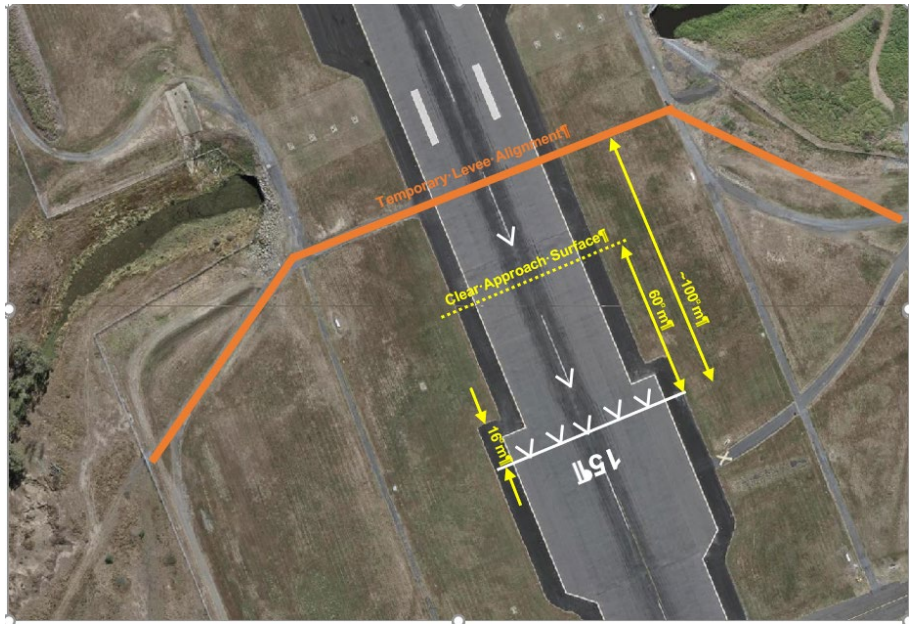
- The extent of the RAP and surrounding community to be protected.
- Existing property ownership and land use constraints.
- Existing topographic features including existing ground elevations, location of creek banks and wetlands.
- Existing infrastructure including roads, buildings, drainage infrastructure and other assets.
- Environmental and cultural heritage constraints
- Available geotechnical and geomorphological information
- Hydrologic and hydraulic analysis
- Preliminary quantity and cost estimates
- Cap Highway Duplication
- South Rockhampton Ring Road

Phase 1 – Initial Levee Options Longlist



Rockhampton Airport Operations

Main Runway Displaced Threshold



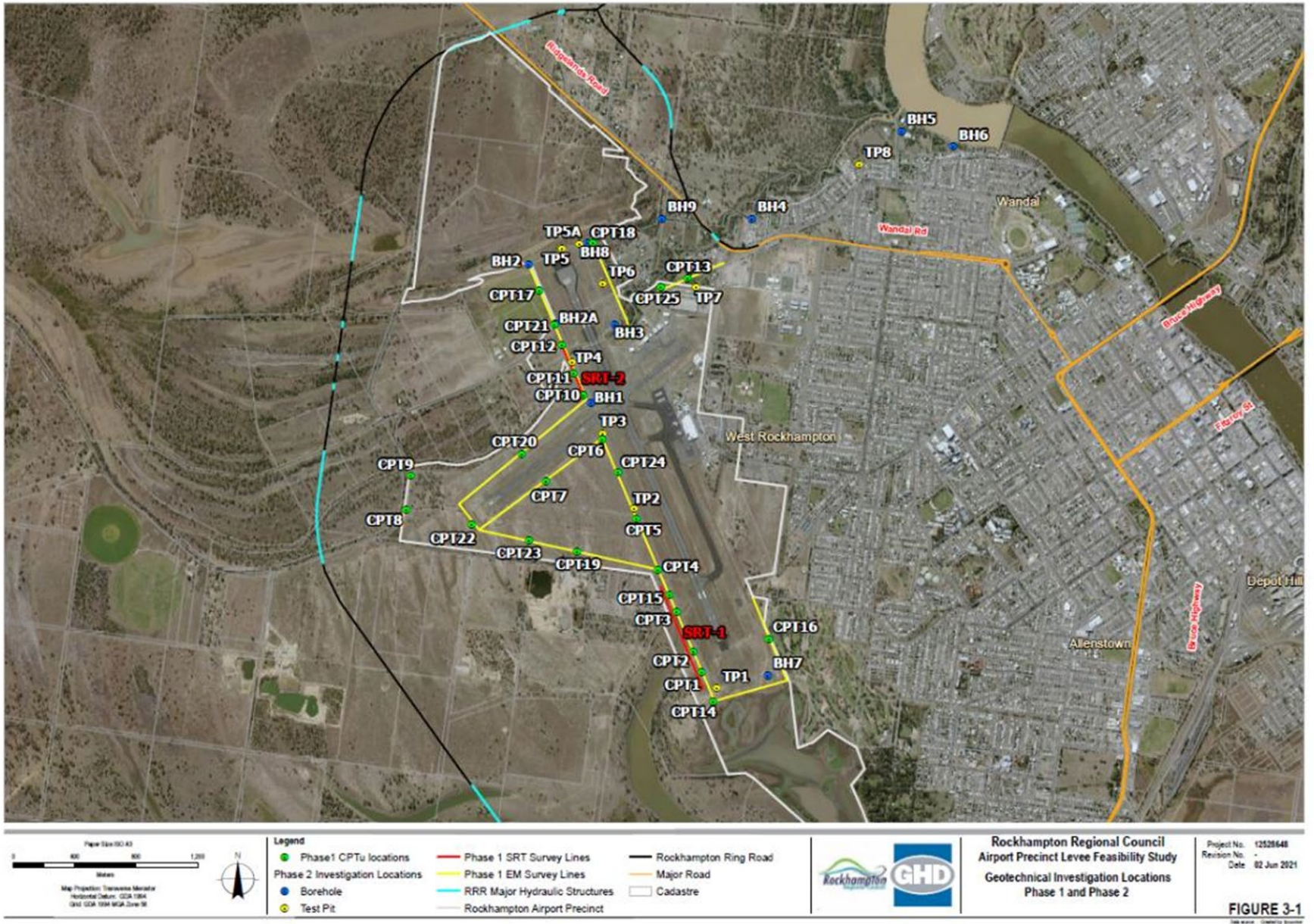
Airline	Aircraft	Seats	AFRL (m)	Suitable
Qantas Link	DASH-8 Q400	74	1354	Yes
	Boeing 717	115	2295	Yes – with conditions
Virgin Australia	Boeing 737-700	128	22561	Yes – with conditions
	Boeing 737-800	176	2256	Yes – with conditions
Alliance Airlines	Fokker 70	80	1300	Yes
Hinterland Aviation	Cassna 208	14	296	Yes
Military	Lockheed C-130 Hercules	-	1100	Yes
	Lockheed C-5 Galaxy	-	1646	Yes
	Boeing C-17 Globemaster	-	2499	Yes – with conditions
RFDS	Beechcraft King Air B200	-	592	Yes

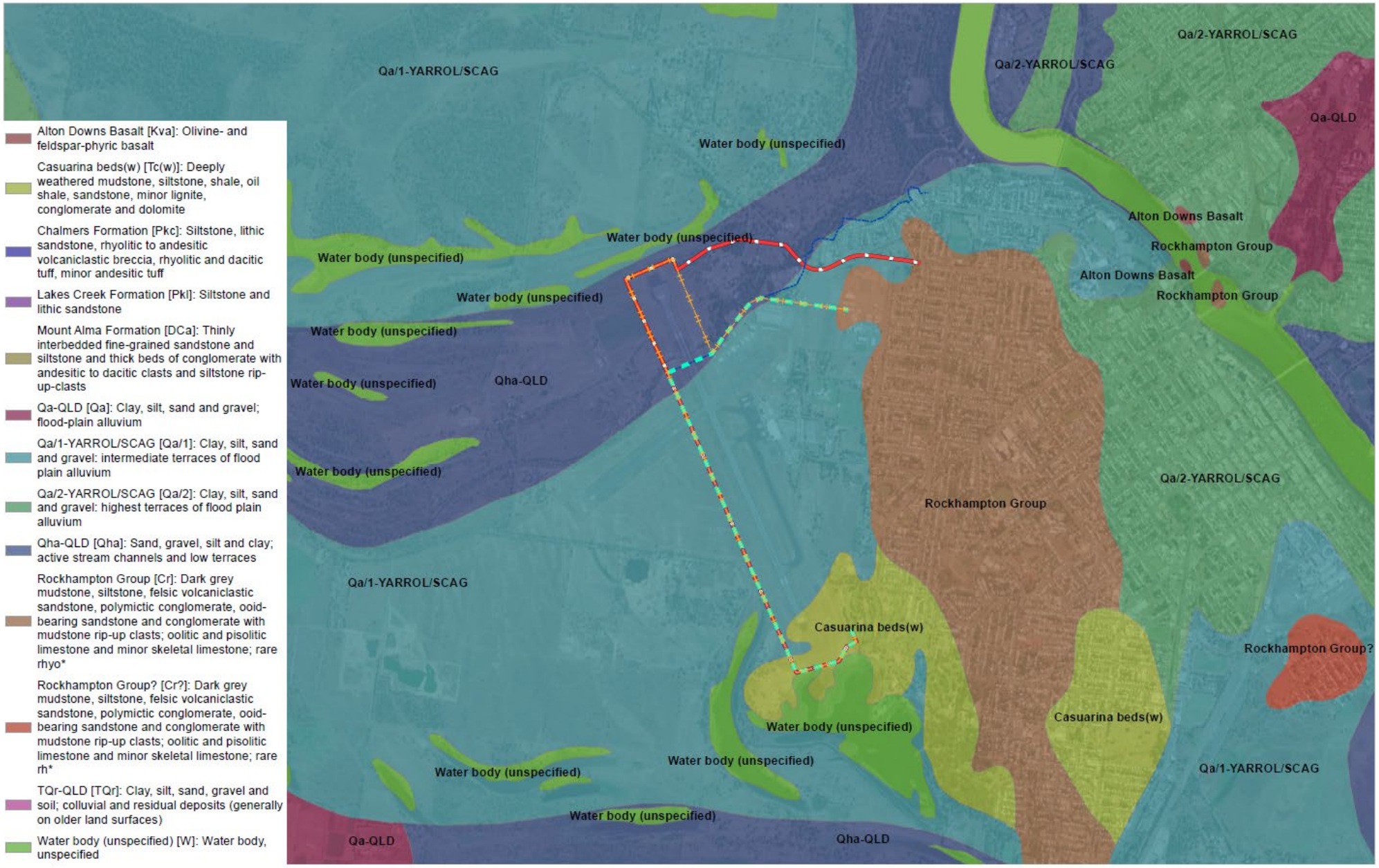
Geotechnical Assessment

Geotechnical investigations have been carried out along the proposed levee alignment options to determine any major potential geotechnical constraints that may impact the viability of specific levee options, such as soft soils, highly permeable zones, and areas of uncontrolled fill:

- Drilling of a total of nine (9) geotechnical boreholes;
- Excavation of a total of eight (8) geotechnical test pits;
- Conducting a suite of laboratory testing on samples taken from the boreholes and test pits;

Generally, the materials encountered comprised of interbedded sands and clays typical of alluvial profiles (more expensive to build on).




Alton Downs Basalt [Kva]: Olivine- and feldspar-phyric basalt
Casuarina beds(w) [Tc(w)]: Deeply weathered mudstone, siltstone, shale, oil shale, sandstone, minor lignite, conglomerate and dolomite
Chalmers Formation [Pkc]: Siltstone, lithic sandstone, rhyolitic to andesitic volcaniclastic breccia, rhyolitic and dacitic tuff, minor andesitic tuff
Lakes Creek Formation [Pkl]: Siltstone and lithic sandstone
Mount Alma Formation [DCa]: Thinly interbedded fine-grained sandstone and siltstone and thick beds of conglomerate with andesitic to dacitic clasts and siltstone rip-up-clasts
Qa-QLD [Qa]: Clay, silt, sand and gravel; flood-plain alluvium
Qa/1-YARROL/SCAG [Qa/1]: Clay, silt, sand and gravel: intermediate terraces of flood plain alluvium
Qa/2-YARROL/SCAG [Qa/2]: Clay, silt, sand and gravel: highest terraces of flood plain alluvium
Qha-QLD [Qha]: Sand, gravel, silt and clay; active stream channels and low terraces
Rockhampton Group [Cr]: Dark grey mudstone, siltstone, felsic volcaniclastic sandstone, polymictic conglomerate, ooid-bearing sandstone and conglomerate with mudstone rip-up clasts; oolitic and pisolitic limestone and minor skeletal limestone; rare rhyo*
Rockhampton Group? [Cr?]: Dark grey mudstone, siltstone, felsic volcaniclastic sandstone, polymictic conglomerate, ooid-bearing sandstone and conglomerate with mudstone rip-up clasts; oolitic and pisolitic limestone and minor skeletal limestone; rare rh*
TQr-QLD [TQr]: Clay, silt, sand, gravel and soil; colluvial and residual deposits (generally on older land surfaces)
Water body (unspecified) [W]: Water body, unspecified
Qa/1-YARROL/SCAG
Qa/2-YARROL/SCAG
Qa-QLD
Water body (unspecified)
Alton Downs Basalt
Rockhampton Group
Qha-QLD
Casuarina beds(w)
Rockhampton Group?
Paper Size ISO A3 - Scale 1:25,000
0 500 1,000 1,500
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56
N
Legend
Option 2a
Option 3a
Option 6a
Option 10
Rockhampton Regional Council
Airport Precinct Levee Feasibility Study
Geotechnical Analysis
Regional Geology
Project No. 12528648
Revision No. -
Date 24 Jun 2021
FIGURE B1

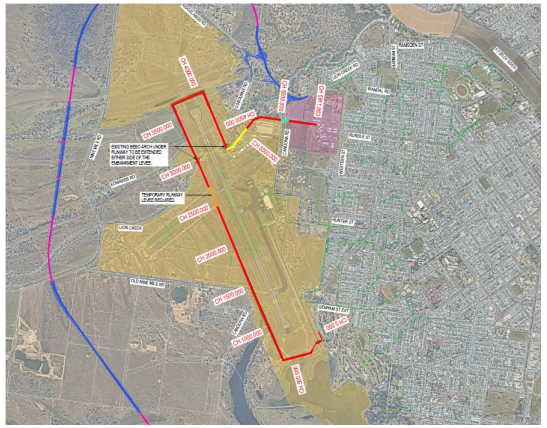
MCA Framework

Criteria	Metric	Weights			Rank
		Theme	Criteria	Effective	
Theme 1:	Constructability				
CON 01	Sheet Pile Walls	25%	7.00%	1.75%	7
CON 02	Earth Embankment		4.00%	1.00%	8
CON 03	BEBO Arch Culvert Works		16.00%	4.00%	3
CON 04	Temporary Runway Levees		14.00%	3.50%	4
CON 05	Major Gated Hydraulic Structures		17.00%	4.25%	2
CON 06	Stormwater / Culvert Interfaces		4.00%	1.00%	8
CON 07	Ground Treatment for Unfavourable Geotechnical Conditions		19.00%	4.75%	1
CON 08	Road Crossings		10.00%	2.50%	5
CON 09	Services Clashes		9.00%	2.25%	6
Theme 2:	Flood Impacts				
FL 01	Airport Infrastructure and Operations (runway serviceability)	30%	27%	8.00%	2
FL 02	Residential and Commercial Buildings (Significant Impacts as per DNRME Levee Guidelines)		20%	6.00%	3
FL 03	Agricultural Properties (greater than 50mm afflux)		7%	2.00%	5
FL 04	Other Major Infrastructure Projects (i.e. RRR, Capricorn Highway Duplication, SRFL)		33%	10.00%	1
FL 05	Department of Defence Infrastructure (i.e. Western St Barracks)		13%	4.00%	4
Theme 3:	Social Impact				
Theme 4:	**Environment & Cultural Heritage**				
ENV 01	Waterway Crossings Traversed	15%	14%	2.10%	4
ENV 02	Wetlands Traversed		19%	2.85%	3
ENV 03	MSES Regulated Vegetation (Category B - Remnant Vegetation)		10%	1.50%	5
ENV 04	MSES Regulated Vegetation (Category R - GBR Regrowth)		5%	0.75%	6
ENV 05	Permits and Approvals Process		28%	4.20%	1
ENV 06	Cultural Heritage and Native Title Impacts		24%	3.60%	2
Theme 5:	Economics				
ECO 01	Direct Tangible Benefits (i.e. land value, improved business outcomes, reduced clean-up costs)	20%	50%	10.00%	1
ECO 02	Direct Tangible Costs (i.e. total turnout costs)		50%	10.00%	1

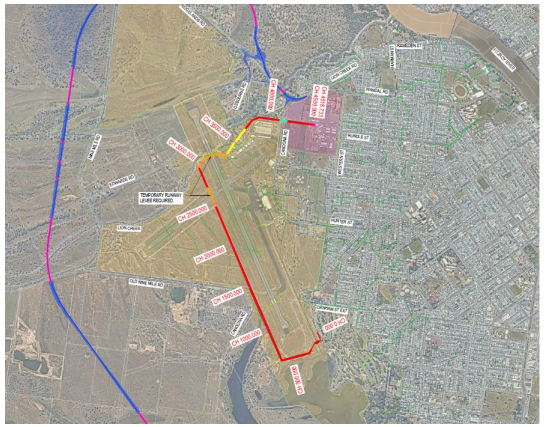
Phase 2 Levee Alignment Options

- The following four options were shortlisted in consultation with Council from Phase 1:

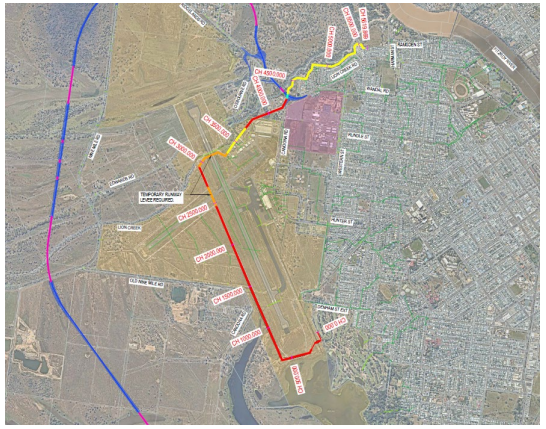
Option 2a



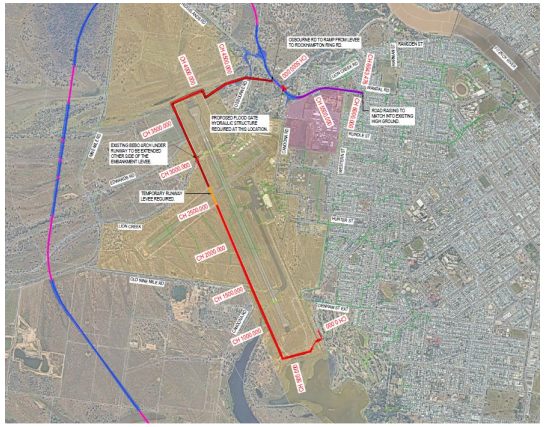
Option 3a



Option 6a



Option 10



Preferred Options

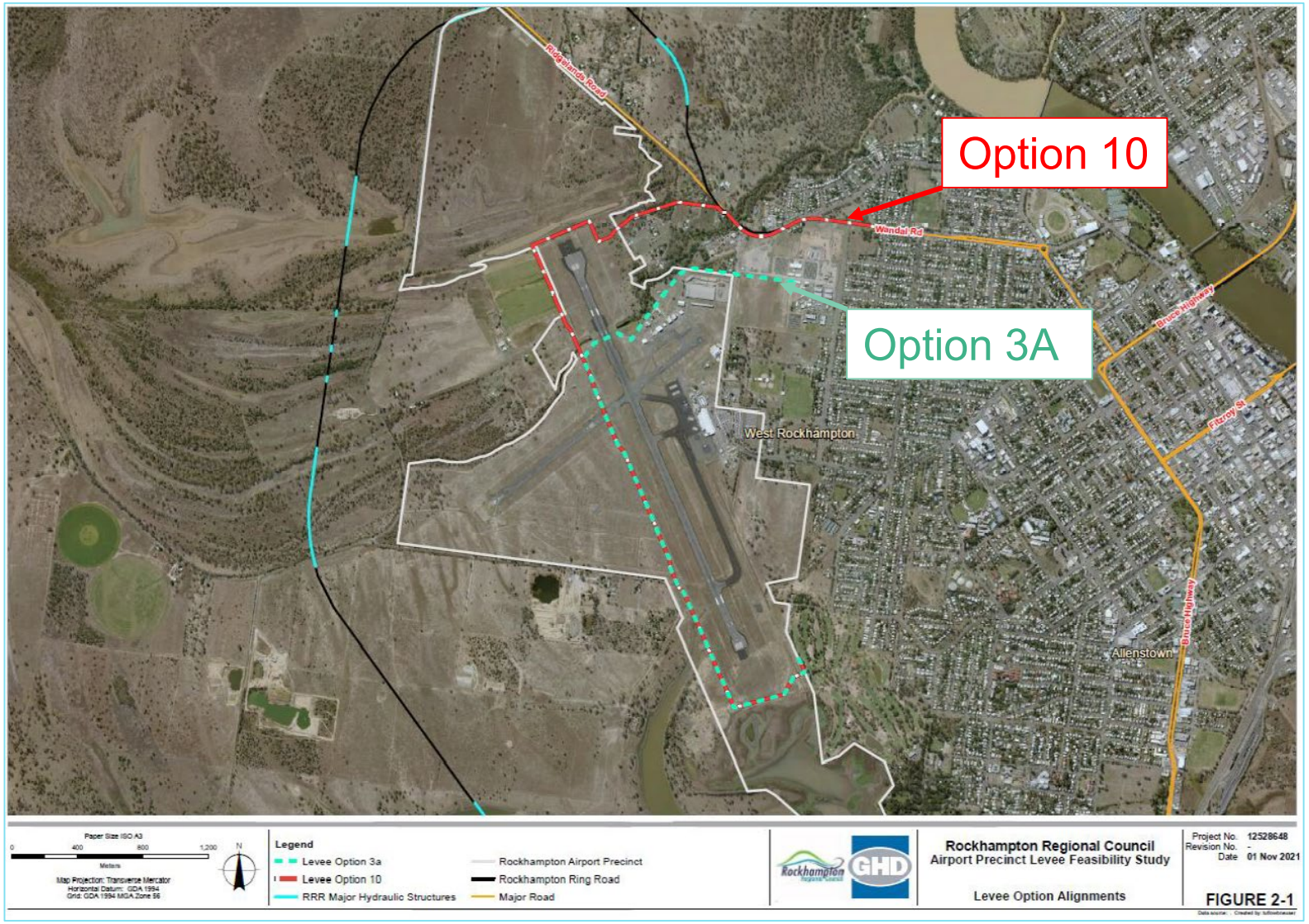
Based on the analysis undertaken as part of MCA process, Option 3a and Option 10 were determined as the preferred options within the Phase 2 of the assessment and were included for later analysis within this report. Key findings include:

- Option 3a and Option 10 aligns well with the strategic objectives of RRC and the project, facilitating Rockhampton Airport's objective of a Commonwealth designated 'Airport of Strategic Importance' and enabling defence services as per the Economic Directions Statement.
- Option 3a has the lowest direct tangible costs while Option 10 scores 1st in the Economics theme. These are supported by strong results for the direct tangible benefits criteria
- Option 3a and Option 10 ranked 1st and 2nd in terms of Constructability with low to no requirements for sheet pile walls and low services clashes.
- Option 10 ranked 1st in the Flood Impact theme, with the lowest flood impact to Department of Defence infrastructure and airport infrastructure and operations.
- Option 3a and Option 10 ranked 1st and 2nd in the Social Impact theme, likely meaning there would be relatively low impacts to amenity and high alignment with stakeholder and community expectations

Phase 3 – Preliminary Design

→ Matt Box, GHD

Phase 3 levee options and alignments
Option 3A and 10



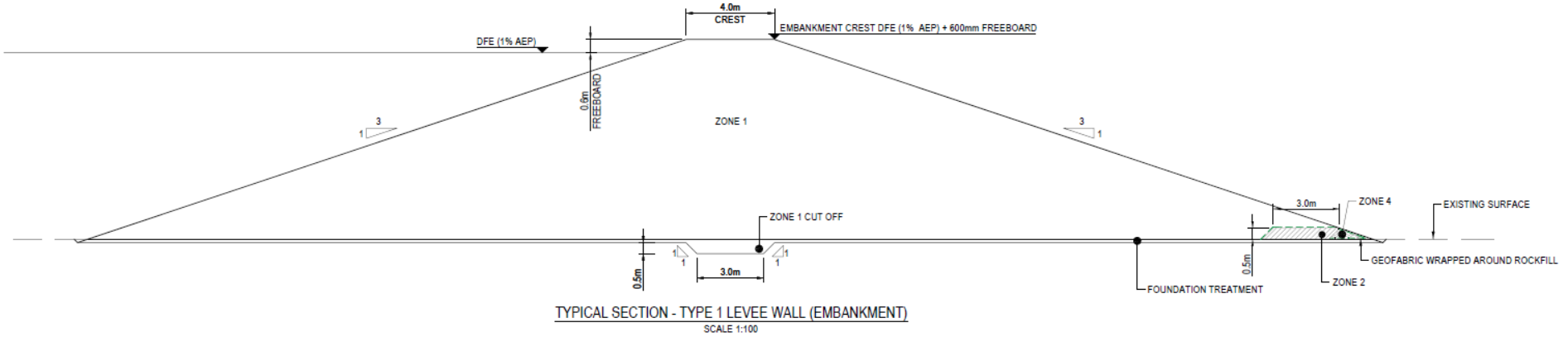
Rockhampton Levee Options Details

Summary of option components

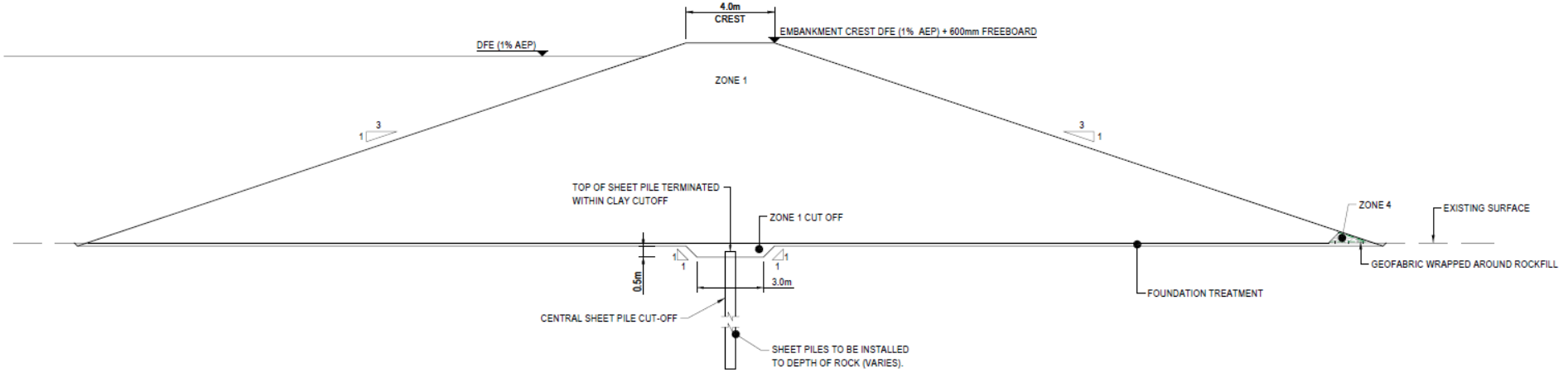
- Permanent levee types
  - Embankment
  - Embankment with sheet pile cutoff
  - Sheet pile wall
- Temporary levee types
  - Runway crossing (ground slab with cutoff and demountable wall)
  - Road crossing (ground slab with cutoff and retractable wall)
- Levee drainage structures
  - Cross drainage structures (various throughout alignments)
  - Lion Creek gated drainage structures (Option 10)
- Spillway
- Pump Stations

Rockhampton Levee – Levee Types

- Permanent Levee –Type 1 and 2 Embankment



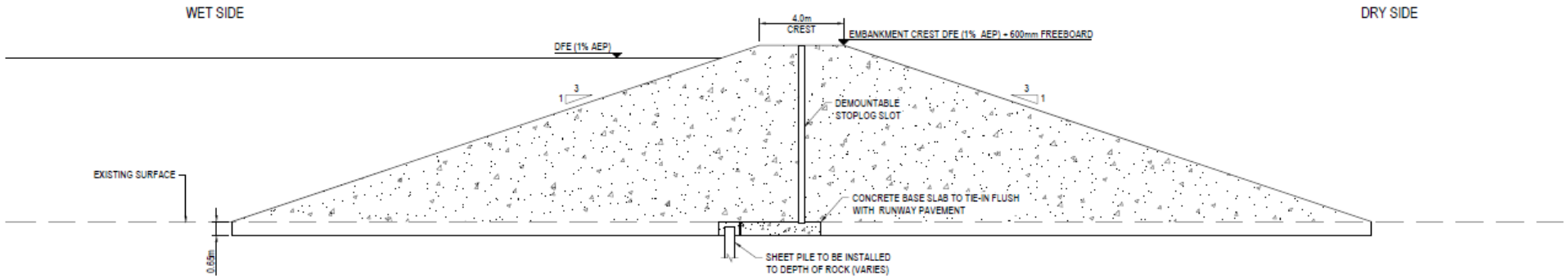
TYPICAL SECTION - TYPE 1 LEVEE WALL (EMBANKMENT)
SCALE 1:100



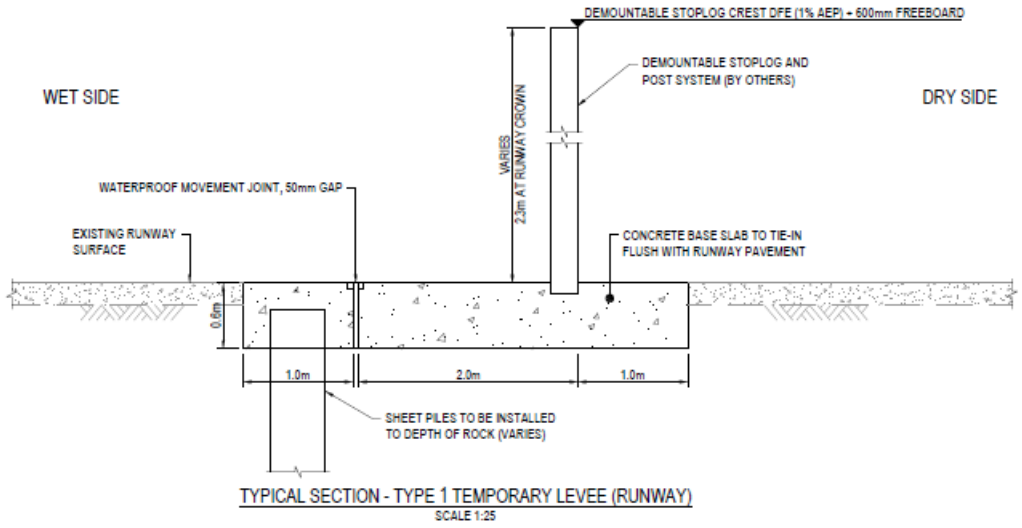
TYPICAL SECTION - TYPE 2 LEVEE WALL (EMBANKMENT)
SCALE 1:100

Rockhampton Levee – Levee Temporary Structures

- Temporary Levee – Type 1 Runway Crossing



TYPICAL SECTION - CONCRETE ABUTMENT TYPE 1 TEMPORARY LEVEE (RUNWAY)
SCALE 1:100

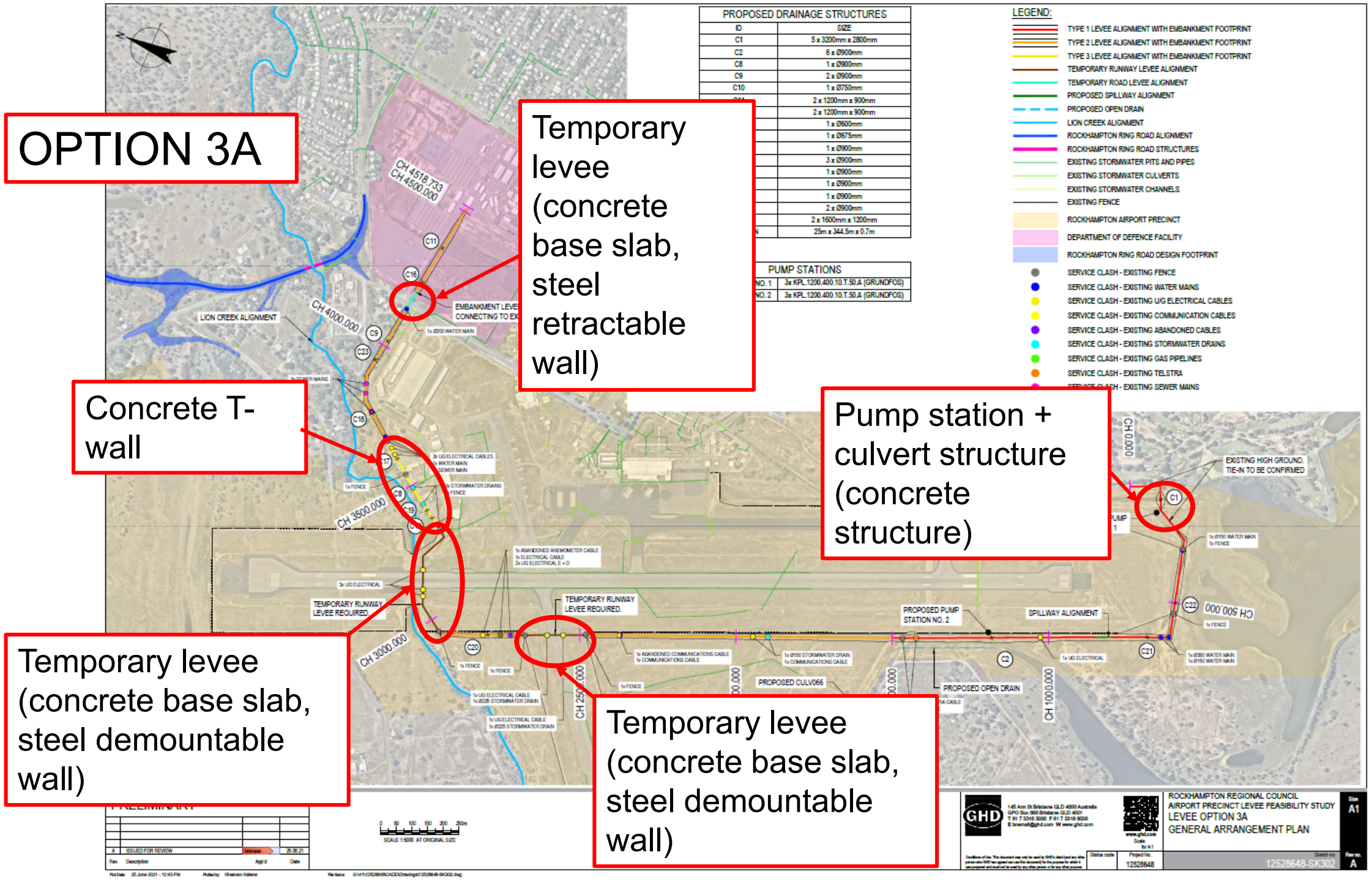


TYPICAL SECTION - TYPE 1 TEMPORARY LEVEE (RUNWAY)
SCALE 1:25

Typical Temporary Levee

Type 1 Temporary Levee

- ***Type 2 Temporary Levee***


OPTION 3A
Temporary levee (concrete base slab, steel retractable wall)
Concrete T-wall
Pump station + culvert structure (concrete structure)
Temporary levee (concrete base slab, steel demountable wall)
Temporary levee (concrete base slab, steel demountable wall)
PROPOSED DRAINAGE STRUCTURES
ID
SIZE
C1
5 x 3200mm x 2800mm
C2
6 x Ø900mm
C8
1 x Ø900mm
C9
2 x Ø900mm
C10
1 x Ø750mm
2 x 1200mm x 900mm
2 x 1200mm x 900mm
1 x Ø600mm
1 x Ø675mm
1 x Ø900mm
3 x Ø900mm
1 x Ø900mm
1 x Ø900mm
1 x Ø900mm
2 x Ø900mm
2 x 1600mm x 1200mm
25m x 344.5m x 0.7m
PUMP STATIONS
NO. 1
3x KPL.1200.400.10.T.50.A (GRUNDFOS)
NO. 2
3x KPL.1200.400.10.T.50.A (GRUNDFOS)
LEGEND:
TYPE 1 LEVEE ALIGNMENT WITH EMBANKMENT FOOTPRINT
TYPE 2 LEVEE ALIGNMENT WITH EMBANKMENT FOOTPRINT
TYPE 3 LEVEE ALIGNMENT WITH EMBANKMENT FOOTPRINT
TEMPORARY RUNWAY LEVEE ALIGNMENT
TEMPORARY ROAD LEVEE ALIGNMENT
PROPOSED SPILLWAY ALIGNMENT
PROPOSED OPEN DRAIN
LION CREEK ALIGNMENT
ROCKHAMPTON RING ROAD ALIGNMENT
ROCKHAMPTON RING ROAD STRUCTURES
EXISTING STORMWATER PITS AND PIPES
EXISTING STORMWATER CULVERTS
EXISTING STORMWATER CHANNELS
EXISTING FENCE
ROCKHAMPTON AIRPORT PRECINCT
DEPARTMENT OF DEFENCE FACILITY
ROCKHAMPTON RING ROAD DESIGN FOOTPRINT
SERVICE CLASH - EXISTING FENCE
SERVICE CLASH - EXISTING WATER MAINS
SERVICE CLASH - EXISTING U/G ELECTRICAL CABLES
SERVICE CLASH - EXISTING COMMUNICATION CABLES
SERVICE CLASH - EXISTING ABANDONED CABLES
SERVICE CLASH - EXISTING STORMWATER DRAINS
SERVICE CLASH - EXISTING GAS PIPELINES
SERVICE CLASH - EXISTING TELSTRA
SERVICE CLASH - EXISTING SEWER MAINS
CH 4518.733
CH 4500.000
CH 4000.000
CH 3500.000
CH 3000.000
CH 2500.000
CH 1000.000
CH 500.000
CH 0.000
LION CREEK ALIGNMENT
TEMPORARY RUNWAY LEVEE REQUIRED.
TEMPORARY RUNWAY LEVEE REQUIRED.
PROPOSED PUMP STATION NO. 2
SPILLWAY ALIGNMENT
PROPOSED CULV065
PROPOSED OPEN DRAIN
EXISTING HIGH GROUND. TIE-IN TO BE CONFIRMED
PRELIMINARY
A ISSUED FOR REVIEW 25.06.21
Rev Description App'd Date
SCALE 1:5000 AT ORIGINAL SIZE
GHD
ROCKHAMPTON REGIONAL COUNCIL
AIRPORT PRECINCT LEVEE FEASIBILITY STUDY
LEVEE OPTION 3A
GENERAL ARRANGEMENT PLAN
Size A1
Project No. 12528648
12528648-SK302
Rev no. A

OPTION 10

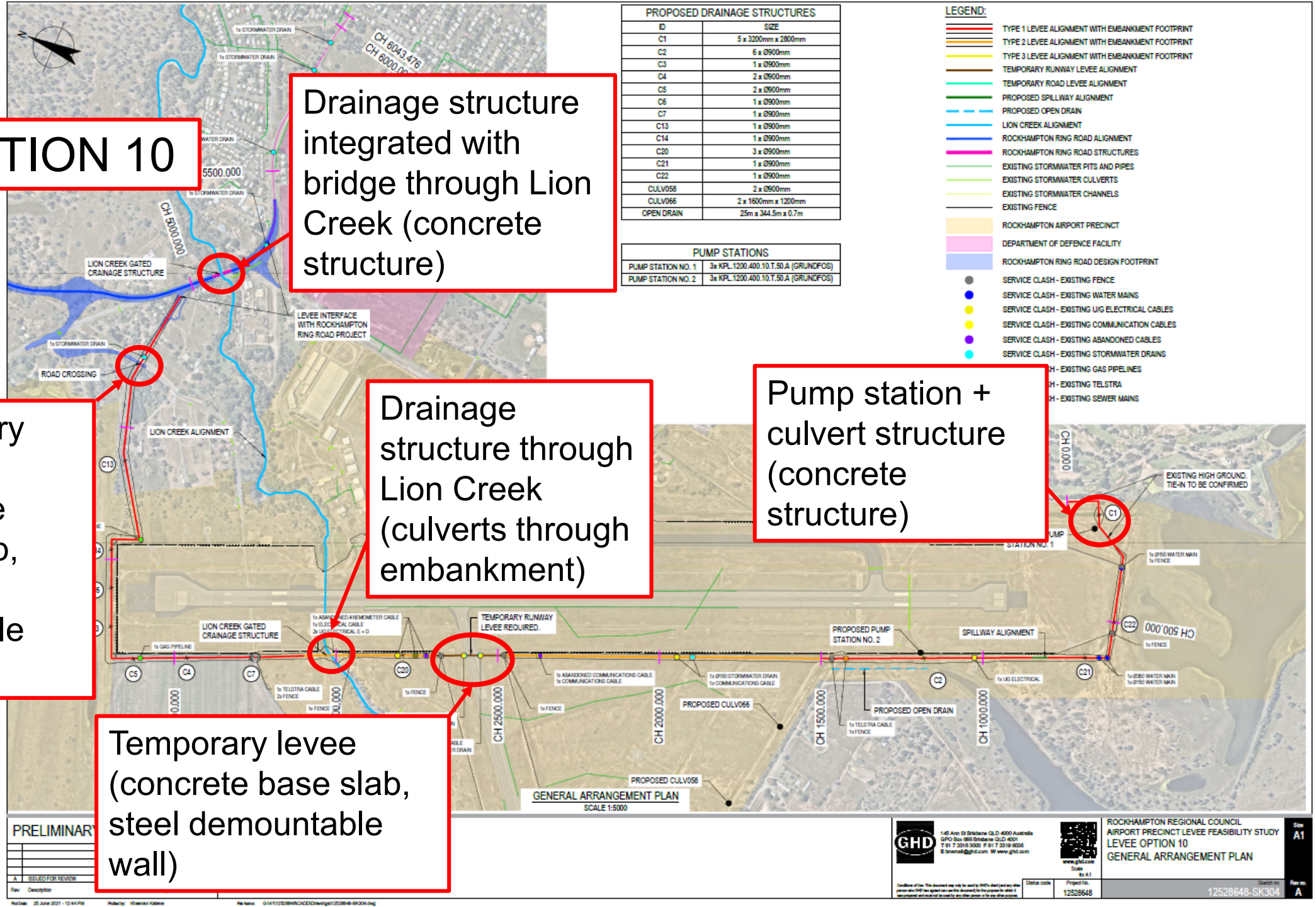
Drainage structure integrated with bridge through Lion Creek (concrete structure)

Temporary levee (concrete base slab, steel retractable wall)

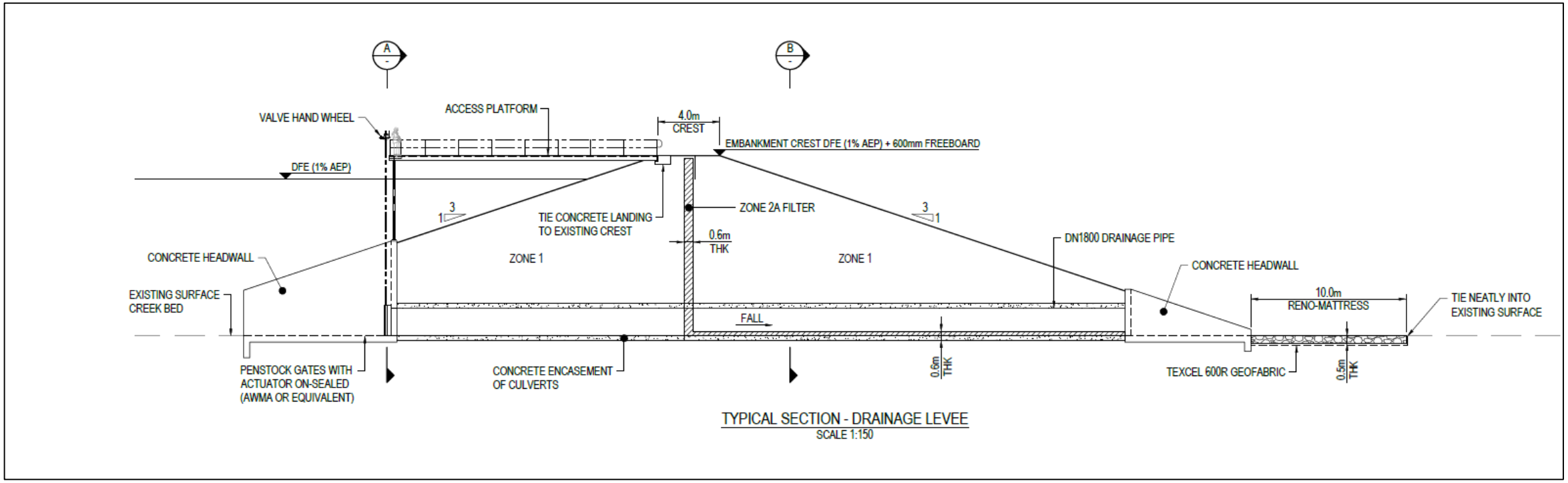
Drainage structure through Lion Creek (culverts through embankment)

Pump station + culvert structure (concrete structure)

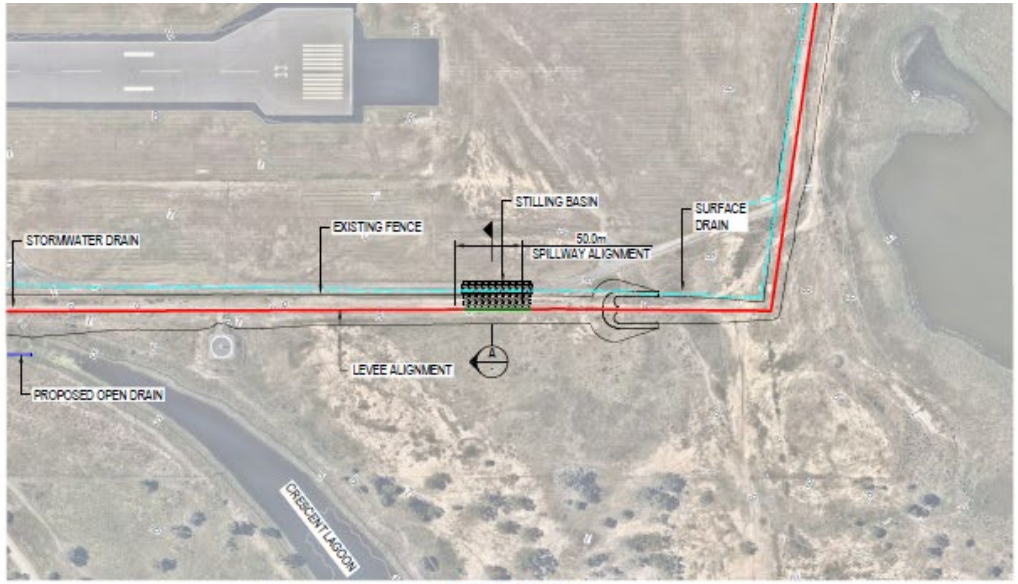
Temporary levee (concrete base slab, steel demountable wall)



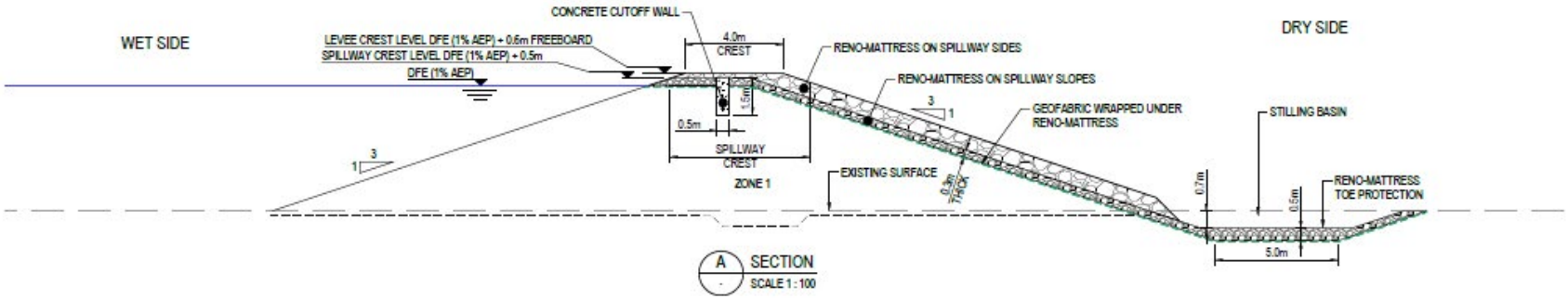
Lion Creek Hydraulic Structure Cross Section



Spillway Cross Section

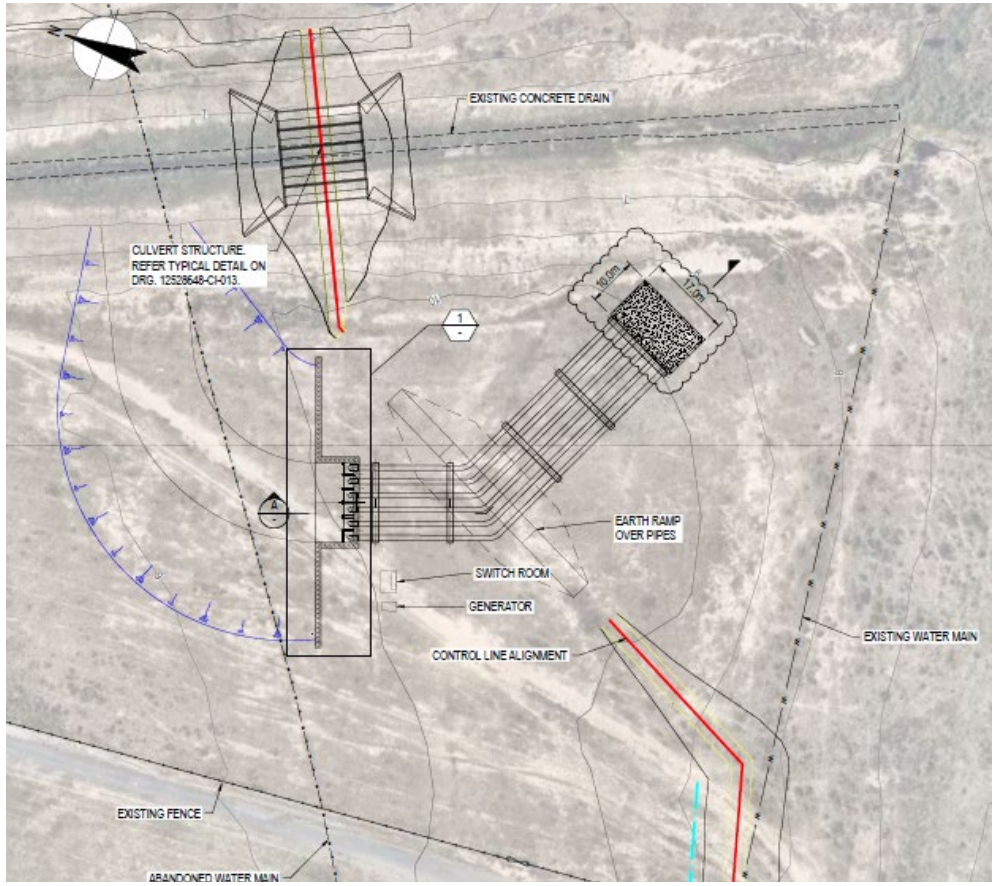


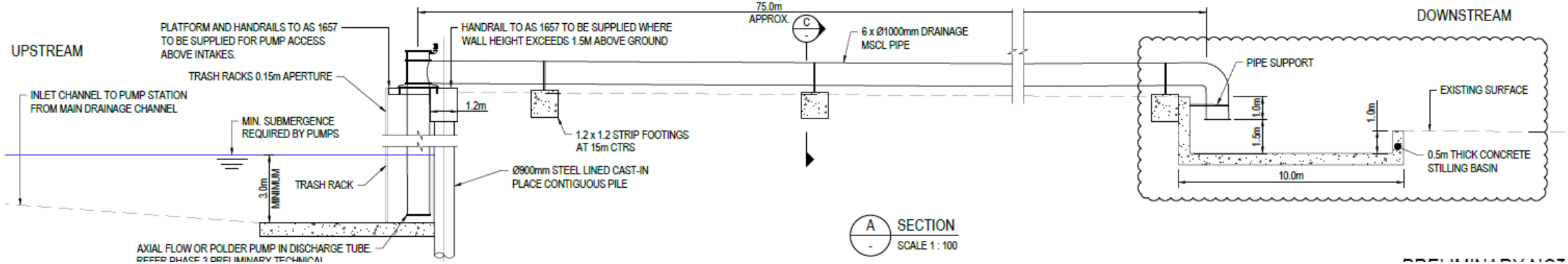
PLAN - SPILLWAY
CH.800 - CH.850
SCALE 1:2000



Pump Station Overview

- The pump station has been sized to accommodate six independent submersible pumps, each operating to achieve a peak duty of 3 m3/s (combined duty of 18 m3/s).
- The size of the pump station, number of pumps, pump duty and associated infrastructure have been designed to mitigate the impacts of a coincident 10 year ARI storm event on airport infrastructure when the levee is ‘closed’ to prevent Fitzroy River flood ingress





Failure Mode Examples

- Overtopping (embankment / structural walls)
- External erosion (embankment / foundation)
- Piping (through embankment, foundation, interfaces of levee types)
- Slope instability (embankment / walls)
- Structural failure (sliding and/or overturning of walls / failure of components)
- Settlement (embankment / walls)

Failure Mode Examples

- Overtopping (embankment / structural walls)

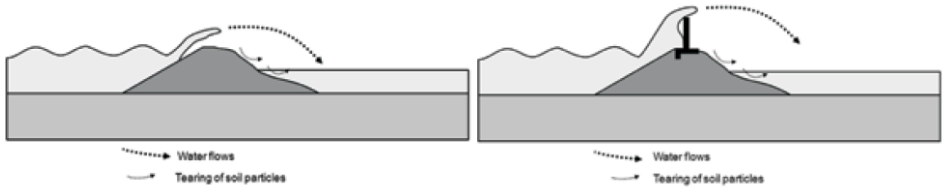


Figure 3.169 External erosion of the landward side of a levee due to overtopping (courtesy Y Deniaud, CETMEF)

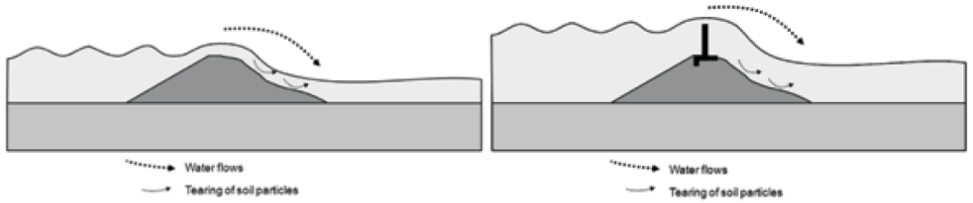


Figure 3.170 External erosion of the landward side of a levee due to overflowing (courtesy Y Deniaud, CETMEF)

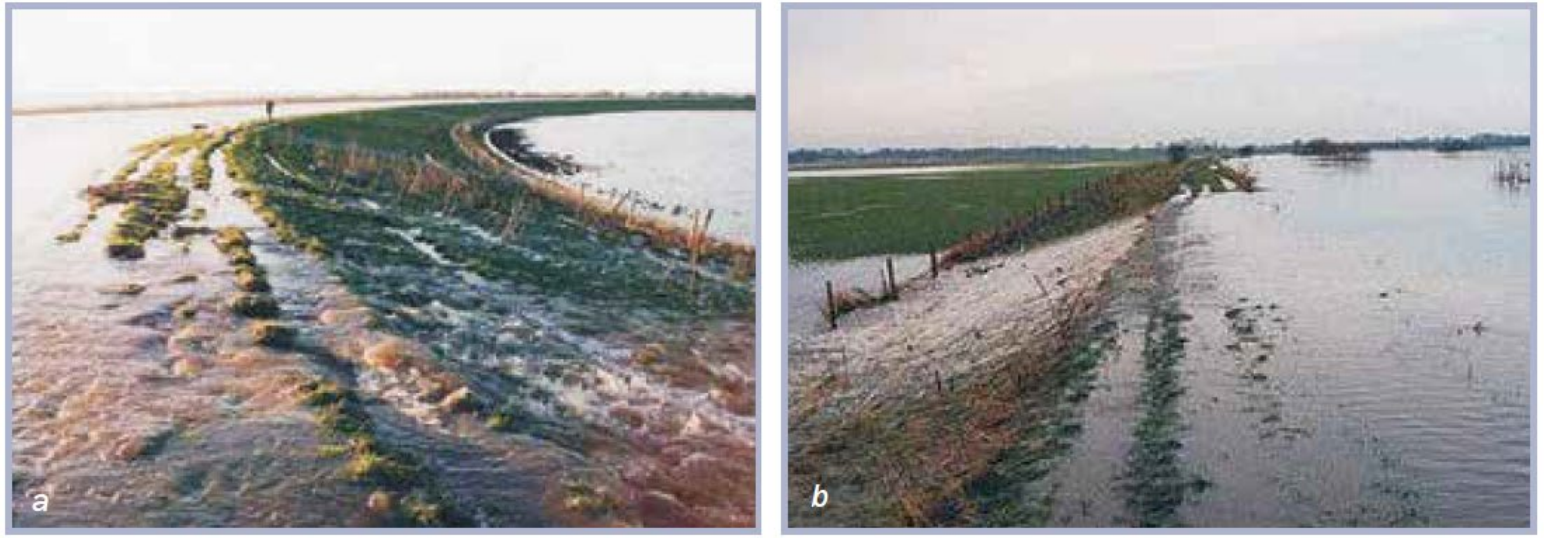


Figure 3.156 Localised overtopping (a) and overflowing (b) (courtesy Defra)

Images source: International Levee Handbook (CIRIA, 2013)

Failure Mode Examples

- External erosion (embankment / foundation)

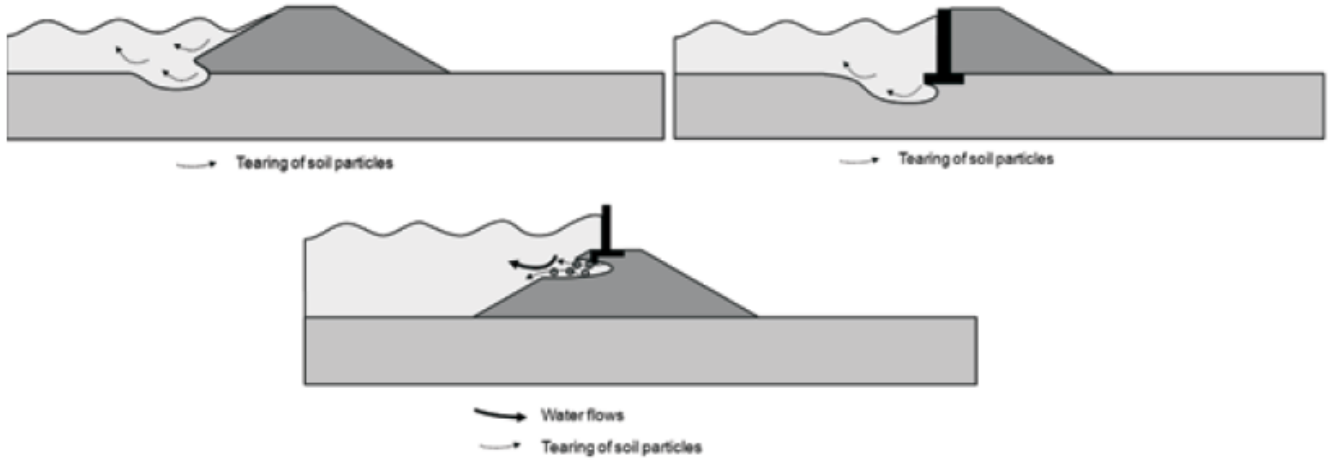


Figure 3.168 External erosion of the toe and foundation of a levee (bank caving) (courtesy Y Deniaud, CETMEF)

Figure 3.171 External erosion of the landward side (courtesy G Degoutte, Irstea)

Images source: International Levee Handbook (CIRIA, 2013)

Failure Mode Examples

- Piping (through embankment, foundation, interfaces of levee types)

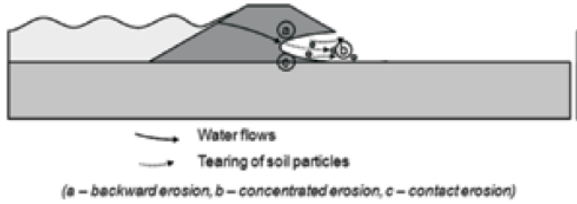


Figure 3.176
Internal erosion of the body of a levee (courtesy Y Deniaud, CETMEF)

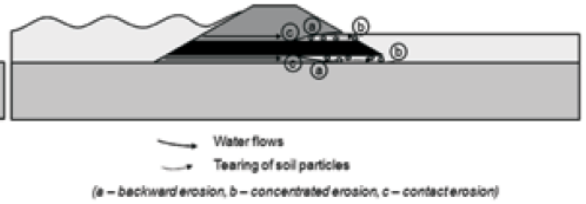


Figure 3.177
Internal erosion along a penetrating structure (courtesy Y Deniaud, CETMEF)

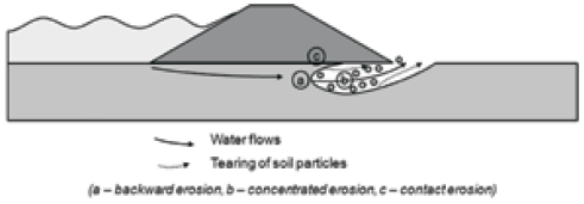


Figure 3.178
Internal erosion of the foundation soils of a levee (courtesy Y Deniaud, CETMEF)

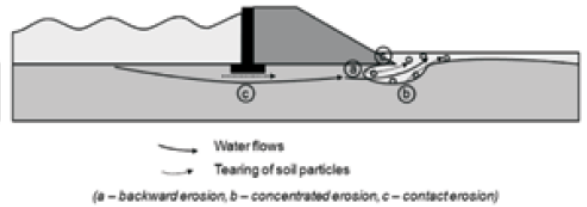


Figure 3.179
Internal erosion of a levee under a waterside wall (composite structure of levee) (courtesy Y Deniaud, CETMEF)

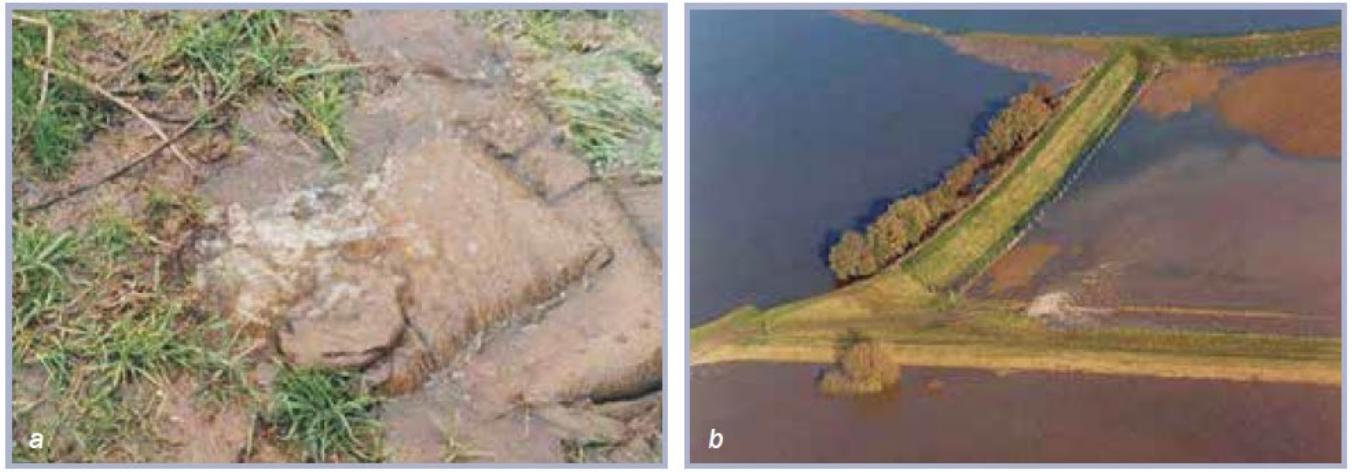


Figure 3.158 Seepage (a) and major release of water in leveed area (b) (courtesy Defra)

Images source: International Levee Handbook (CIRIA, 2013)

Figure 9.65 New Orleans levee scour at transition with a flood wall (courtesy USACE)

Failure Mode Examples

- Slope instability (embankment / walls)

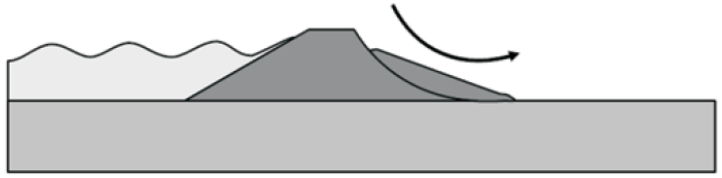


Figure 3.181 Shallow rotational sliding of the landside of a levee (courtesy Y Deniaud, CETMEF)

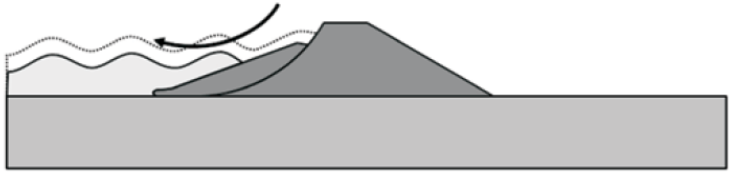


Figure 3.182 Shallow rotational sliding of the waterside of a levee during rapid draw-down (courtesy Y Deniaud, CETMEF)

Figure 3.184 Deep rotational sliding of a levee (courtesy Y Deniaud, CETMEF)

Figure 3.160 Translational sliding in Wilnis Levee (courtesy STOWA)

Images source: International Levee Handbook (CIRIA, 2013)

Failure Mode Examples

- Structural failure (sliding and/or overturning of walls / failure of components)

Figure 3.189 Tilting of walls in composite levee due to differential settlements (courtesy Y Deniaud, CETMEF)

Images sources: International Levee Handbook (CIRIA, 2013), (USACE, 2005)

Failure Mode Examples

- Settlement (embankment / walls)

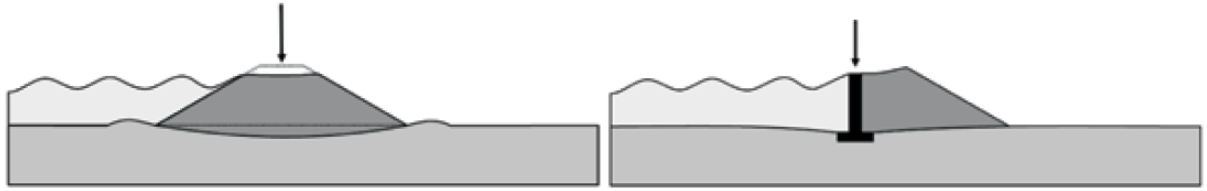


Figure 3.187 Settlement of a levee on a soft soil foundation (courtesy Y Deniaud, CETMEF)

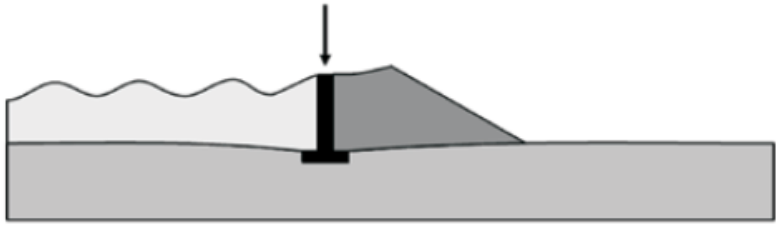


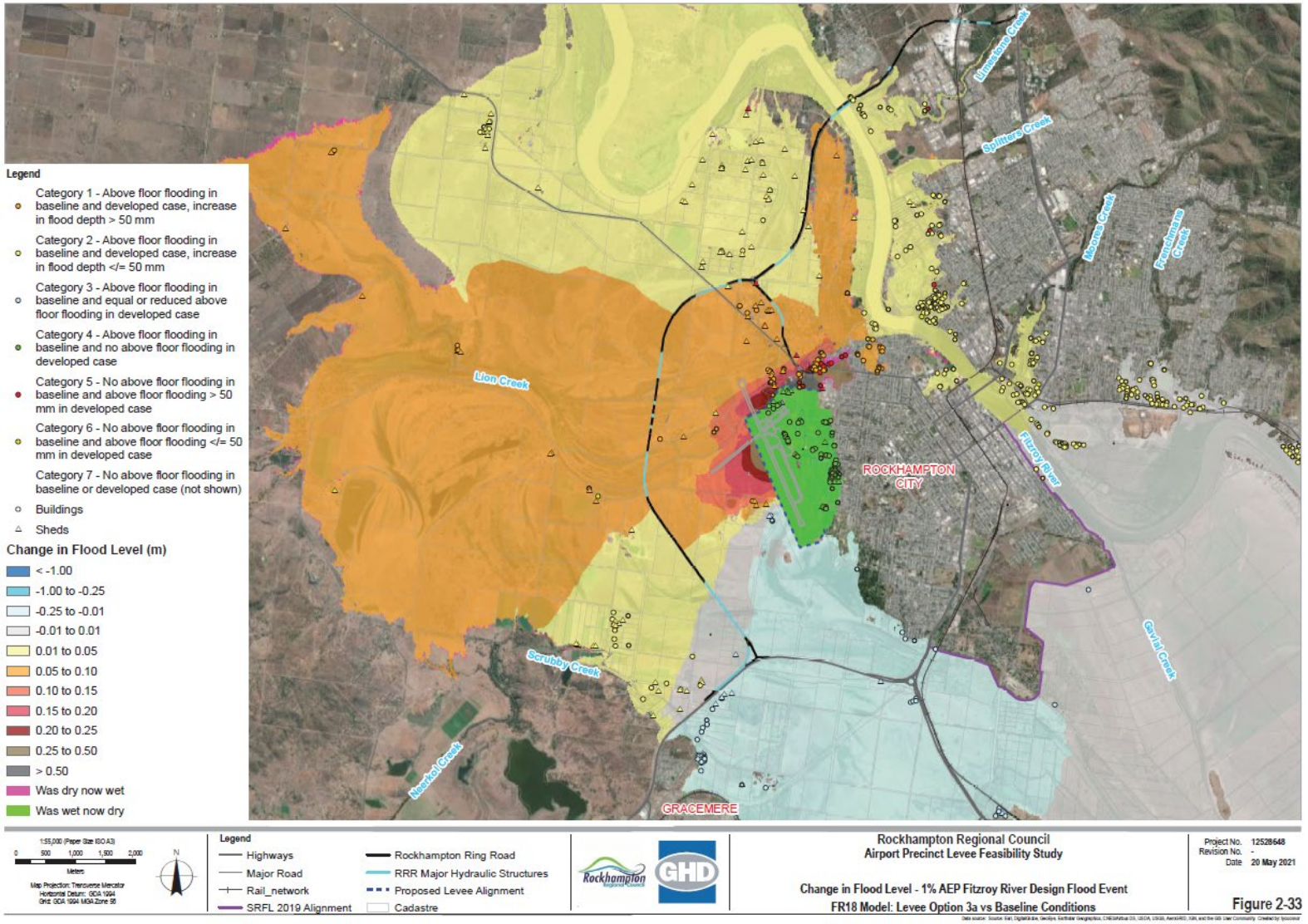
Figure 3.192 Settlement of an edge wall in a composite levee due to low bearing capacity

Figure 9.148 Differential movement between pre-cast crest wall units (courtesy Mike Wallis)

Images source: International Levee Handbook (CIRIA, 2013)

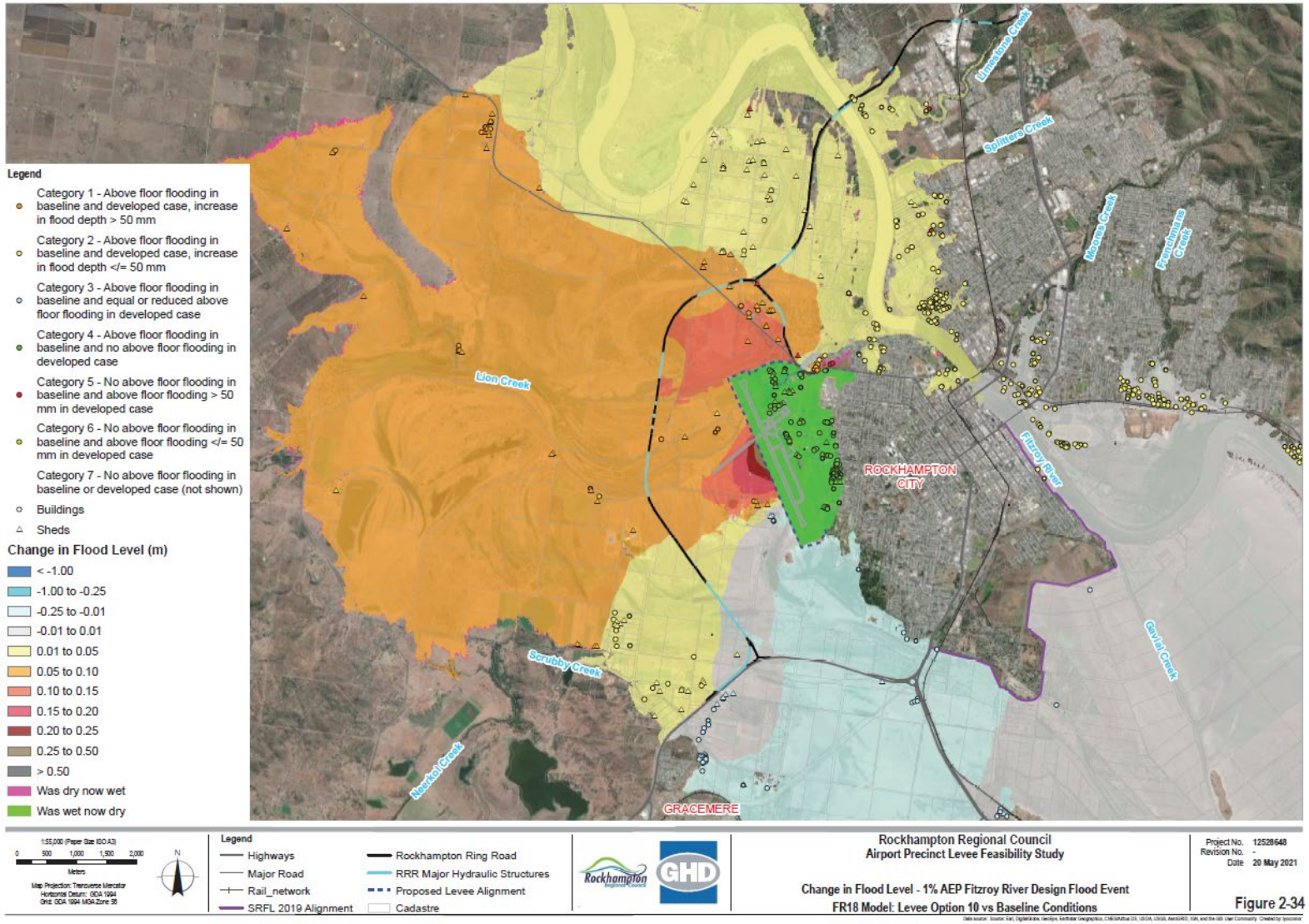
Phase 3 levee options and alignments

Flood Inundation Maps – Option 3A vs Baseline (1% AEP)



Phase 3 levee options and alignments

Flood Inundation Maps – Option 10 vs Baseline (1% AEP)



Phase 4 – Preliminary Business Case

→ John Polin and Matt Box, GHD

Benefits of the project

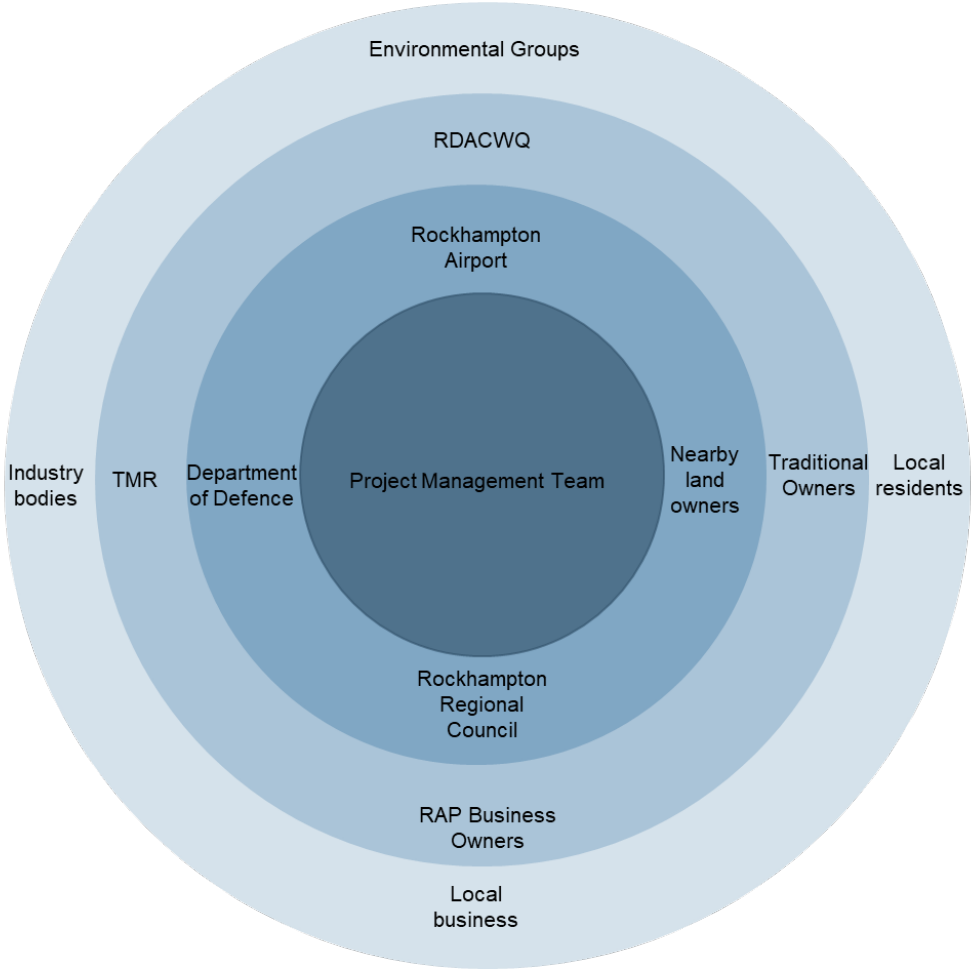
Benefit	Description	KPI's
Benefit 1: Economic growth is unlocked	Greater economic growth and development as a result of continued airport operations	– Investment in RAP and investment reliability and certainty – Growth in high value products, tourism, and mining sectors – Opportunities from new and existing infrastructure is leveraged – Increase in number of business and other worker travellers through Rockhampton Airport
Benefit 2: Increased community resilience to natural disasters	Providing flood mitigation strategies for Rockhampton increases the ability of the region to defend themselves against flooding events and reduce social impacts should flooding occur	– Reduced costs of disaster recovery – Improved disaster recovery timeframes – Improved public perception of responsiveness
Benefit 3: More efficient airport and Defence operations	Proving flood resilience to the RAP will further allow defence operations to operate year-round and will reduce the risk of airport shutdown	– Continuity of Public Air Services – Continuity and reliability of Defence air and land operations – Improved health outcomes

Social Impact

A social impact evaluation was undertaken which identifies the stakeholders who will be affected by or have an interest in the project, as well as the social impacts which may potentially arise from construction and operation of the proposed levee. Figure 1.2 below categorises stakeholders by their relative importance, from most affected (inner ring) to least affected (outer ring).

The negative social impacts that were identified were as follows.

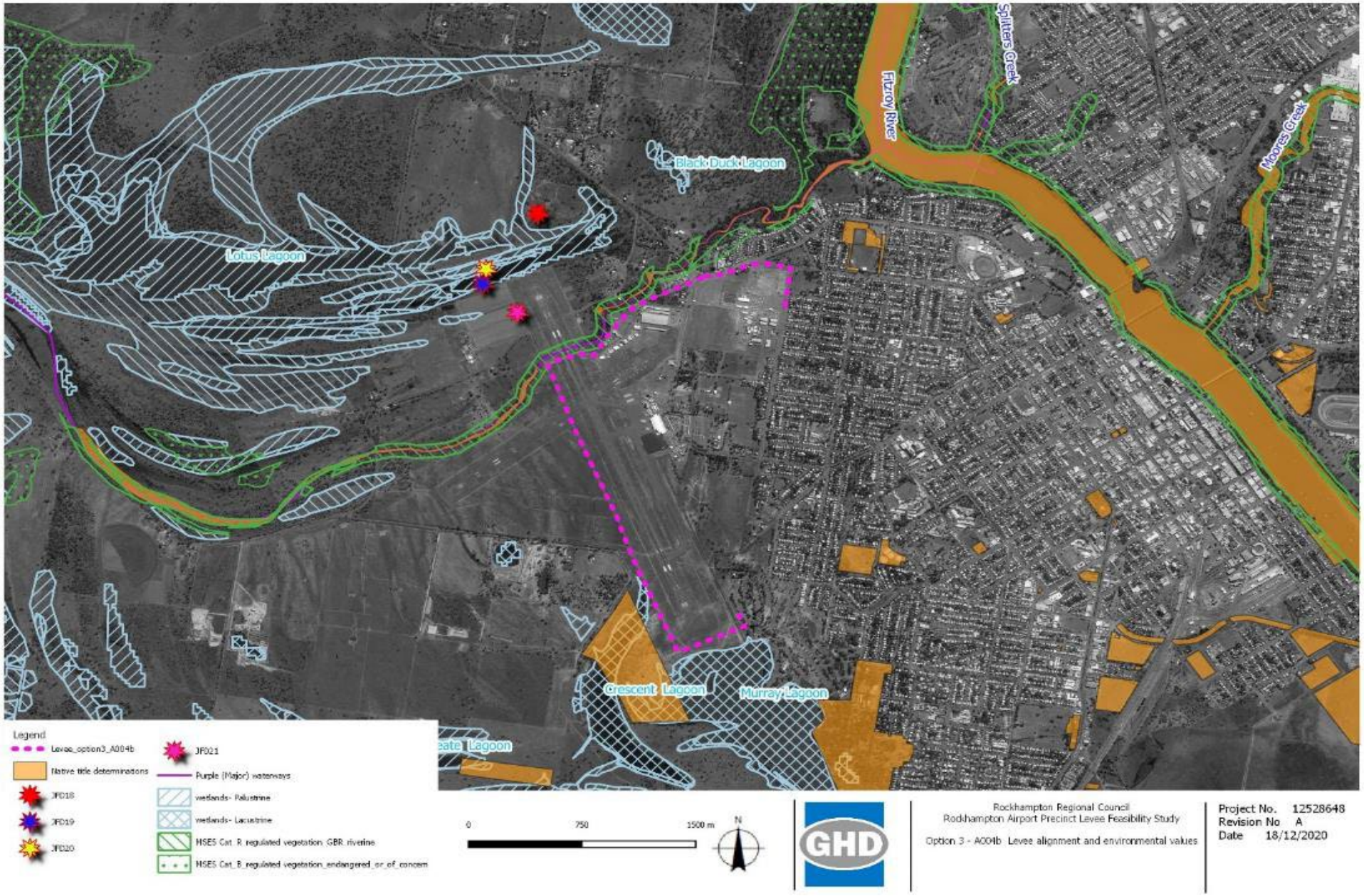
- Potential to create conflict between members of the local community in-favour-of or opposed to the project;
- Acquisition of private property is perceived poorly by the community and the media, diminishing the social license to operate;
- The indirect afflux area that will have an increase of water inundation due to the levee may inundate heritage sites, as well as having additional impacts to the wider community, as some residences that previously were not a flood risk now sit on afflux areas; and
- Biodiversity impacts of clearing vegetation to accommodate levee infrastructure.



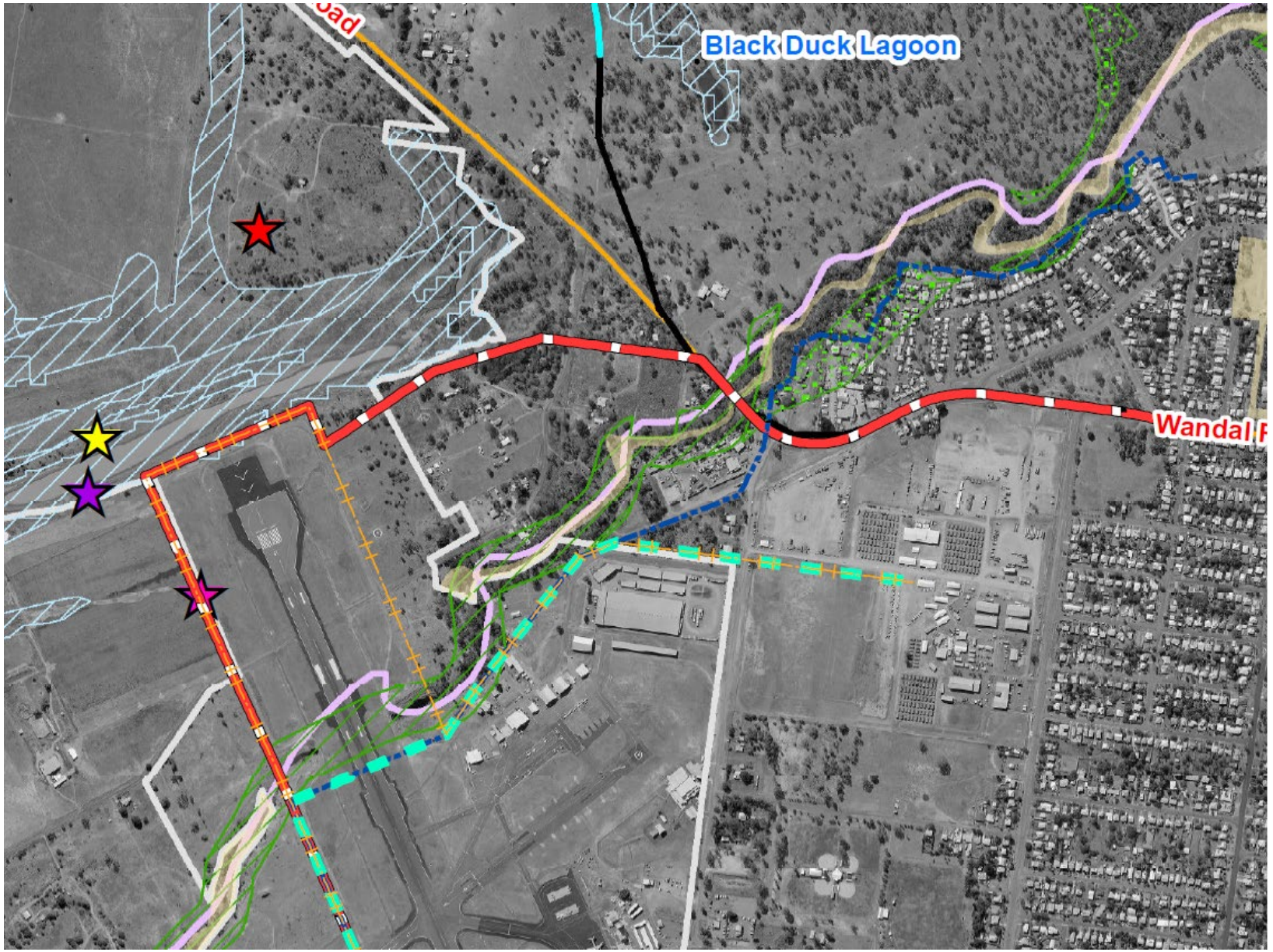
Environmental Assessment

- Levee Option 3a has been determined to have less impact on environmental values than option 10. The levee has reduced impacts to Lion Creek and Lotus lagoons as well as native vegetation and fish passage and avoids the residential areas to the east of the airport.
- Levee Option 10 provides for an increase in flood immunity, however, presents a greater risk to environmental values including biodiversity, waterways and cultural heritage. Impacts to native vegetation, fish passage, watercourses and wetlands are anticipated to be greater from Option 10. There are likely to be additional approvals constraints and timeframes associated with Option 10. Therefore, Option 3a is preferred from an environmental perspective.
- A search of the project area identified three culturally significant places in the vicinity of each of the proposed levee options:
  - Rockhampton Botanic Gardens
  - Rockhampton War Memorial
  - St. Aubins, a heritage listed detached house demonstrating the history of Rockhampton's build environment at a time of significant growth.

Environmental Assessment



Environmental Constraints



Economic Assessment – Cost Benefit Analysis

Project Out-Turn Costs

- Option 3A – P50 $76.2M
- Option 10 – P50 $125M

Project Operating Costs

- Option 3A –$17.1M
- Option 10 – $29.5M

Over 50 years Council would be required to fund $94M and $155M of total cost for Option 3a and 10 respectively

Impact	Option 3A (NPV)	Option 10 (NPV)
Costs		
Capital Expenditure ($M)	$60.18	$99.26
Operational Expenditure ($M)	$3.98	$6.57
Total Costs ($M)	**$64.16**	**$105.82**
Benefits		
Avoided Direct Building Damage ($M)	$(2.52)	$(0.44)
Land Values ($M)	$12.39	$14.95
Continued Airport Operations ($M)	$7.76	$7.76
Avoided Clean Up Costs ($M)	$0.04	$0.09
Avoided Disaster Management Costs ($M)	$0.21	$0.22
Reduced Risk of Injury and Death ($M)	$0.04	$0.05
Tourism Benefit ($M)	$0.19	$0.19
Total Benefits ($M)	**$18.11**	$22.87
Net Project Benefit ($M)	$(46.06)	$(82.95)
BENEFIT COST RATIO	**0.28**	0.22

Economic Assessment – Cost Benefit Analysis

- Option 3a is estimated to increase total economic output in the Rockhampton region by **$200.959** million over the first 10-year period. From this direct expansion in the economy, flow-on supply-chain effects in terms of local purchases of goods and services are anticipated, and it is estimated that these indirect impacts would result in a further increase to output valued at $73.606 million, $16.033 million more paid in wages and salaries, and a gain of $28.189 million in terms of value-added.
- Option 3a is additionally expected to support 226 FTEs of employment throughout the 2 years of its construction, and an additional 3 FTEs annually once commissioned.
- Option 10 is estimated to increase total economic output in the Rockhampton region by $331.388 million over the first 10-year period. From this direct expansion in the economy, flow-on supply-chain effects in terms of local purchases of goods and services are anticipated, and it is estimated that these indirect impacts would result in a further increase to output valued at $121.380 million, $26.438 million more paid in wages and a gain of $46.485 million in terms of value-added.
- Option 10 is additionally expected to support 374 FTEs of employment throughout the 2 years of its construction, and an additional 3 FTEs annually once commissioned.

Business Case – Key Conclusions

BCR is low, often typical of levee projects) however with a project of state significant, the BCR should be considered alongside the additional qualitative benefits that were not able to be monetised for inclusion in the CBA framework, and the broader economic impact of the development of the levee to ascertain the economic viability of the project. These considerations include:

- *Government policy whereby Rockhampton Airport achieves the standard required to meet the objectives of a Commonwealth designated 'Airport of Strategic Importance' as an alternate international airport, and function as an airport of economic significance and enable defence services as per the Economic Directions Statement for Queensland Airports (2013);*
- *Broader positive implications and benefits to the Rockhampton region with intangible benefits such as improved social wellbeing, ongoing Defence operations, and the catalytic effect of the project that will contribute to community uplift, improve reputation for the region and enable major economic development through tourism and other industries;*
- *Wider economic benefits where the preferred options will create an additional 256 jobs for Option 3a and 419 job for Option 10 over the first 10 year period. The short term construction phase of the project will deliver approximately $244.56 million in additional GRP output for Option 3a and $398.39 million in additional GRP output for Option 10.*

Business Case – Key Conclusions Continued

Defence Ability to Operate

Urban Renewal Opportunities

Improved Social Wellbeing

- Social, psychological and economic impact
- Interruption of services and lifestyles
- Employment related impacts
- Impact on community wellbeing

Support of Emergency Operations

Catalytic Effect of the Project

* Thank You

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