enstruct

QANTAS FLIGHT TRAINING & SIMULATOR CENTRE

STATE SIGNIFICANT DEVELOPMENT APPLICATION – CIVIL

Prepared for: Qantas Airways Limited

By: enstruct group pty ltd

August 2019

QANTAS FLIGHT TRAINING & SIMULATOR CENTRE

STATE SIGNIFICANT DEVELOPMENT APPLICATION – CIVIL

ISSUE AUTHORISATION

PROJECT:
Project No:

Rev	Date	Purpose of Issue / Nature of Revision	Prepared by	Reviewed by	Issue Authorised by
A	12/04/19	SSDA Issue	PL	KH	PL
B	17/04/19	Revised for SSDA Issue	PL	KH	PL
C	24/05/19	Revised for SSDA Issue	PL	KH	PL
D	12/08/19	Revised for response to submissions	TH	KH	PL

1 Executive Summary

enstruct has been commissioned by Qantas Airways Ltd (Qantas) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSD 10154 for the development of a new flight training centre at 297 King Street, Mascot.

The planning approval will seek approval for a four-storey building and multistorey carpark. To support the building there will be new roads, car parking and footpaths. The works are proposed by Qantas.

This report will assess the requirements of the relevant SEAR's and review civil engineering issues such as: stormwater, erosion and sediment control and flood impacts.

1.1 Glossary

Term	Definition
The Site	Qantas Airways Limited owned land in Mascot to the north of Sydney Kingsford Smith Airport consisting of Lots 2-4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. Current site improvements include including at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility and Qantas tri-generation plant.
The Project	The construction of a new Flight Training Centre and ancillary uses to replace the existing facility on the Qantas Jetbase that will be impacted by RMS' Sydney Gateway Project.
Mascot Campus	Over 19ha of Qantas Airways Limited controlled land in Mascot to the north of Sydney Kingsford Smith Airport consisting of freehold and leased land. The following lots are owned by Qantas: Lot 133 DP 659434; Lots 4 & 5 DP 38594 Lot 23 DP 883548; Lots 1 & 2 DP 738342; Lot 3 DP 230355; Lot 4 DP 537339; Lots 2 & 4 DP 234489; Lot 4 234489; Lot 1 DP 81210; Lot 1 DP 202093; Lot 1 DP 721562; Lot 2 DP 510447; Lot 1 DP 445957; Lot B DP 164829 and Lot 1 DP 202747 and equates to 16.5ha of land. The following lots are leased by Qantas: Lot 14 DP 1199594 and Lot 2 DP 792885 and equates to 2.7ha of land.

1.2 Abbreviations

Acronym	Definition
AEP	Annual Exceedance Probability
BBLEP	Botany Bay Local Environmental Plan 2013
CEMP	Construction Environmental Management plan
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
ha	Hectares

Acronym	Definition
LEP	Local Environmental Plan
LGA	Local Government Area
NSW	New South Wales
OSD	On-site Stormwater Detention
PMF	Probable Maximum Flood
Qantas	Qantas Airways Limited
RMS	NSW Roads and Maritime Services
Simulators	Full Motion Flight Simulators
sqm	Square Metres
SQID	Stormwater Quality Improvement Device
SSD	State Significant Development
the Airport	Sydney Kingsford Smith Airport
the Department	Department of Planning and Environment
WSUD	Water Sensitive Urban Design

Contents

2 Introduction

enstruct group pty ltd has been commissioned by Qantas Airways Ltd (Qantas) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSD 10154 for the development of a new flight training centre at 297 King Street, Mascot.

2.1 Site Description

The site is located at 297 King Street, Mascot and comprises land known as Lots 2 & 4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. The site is identified in Figure 1.

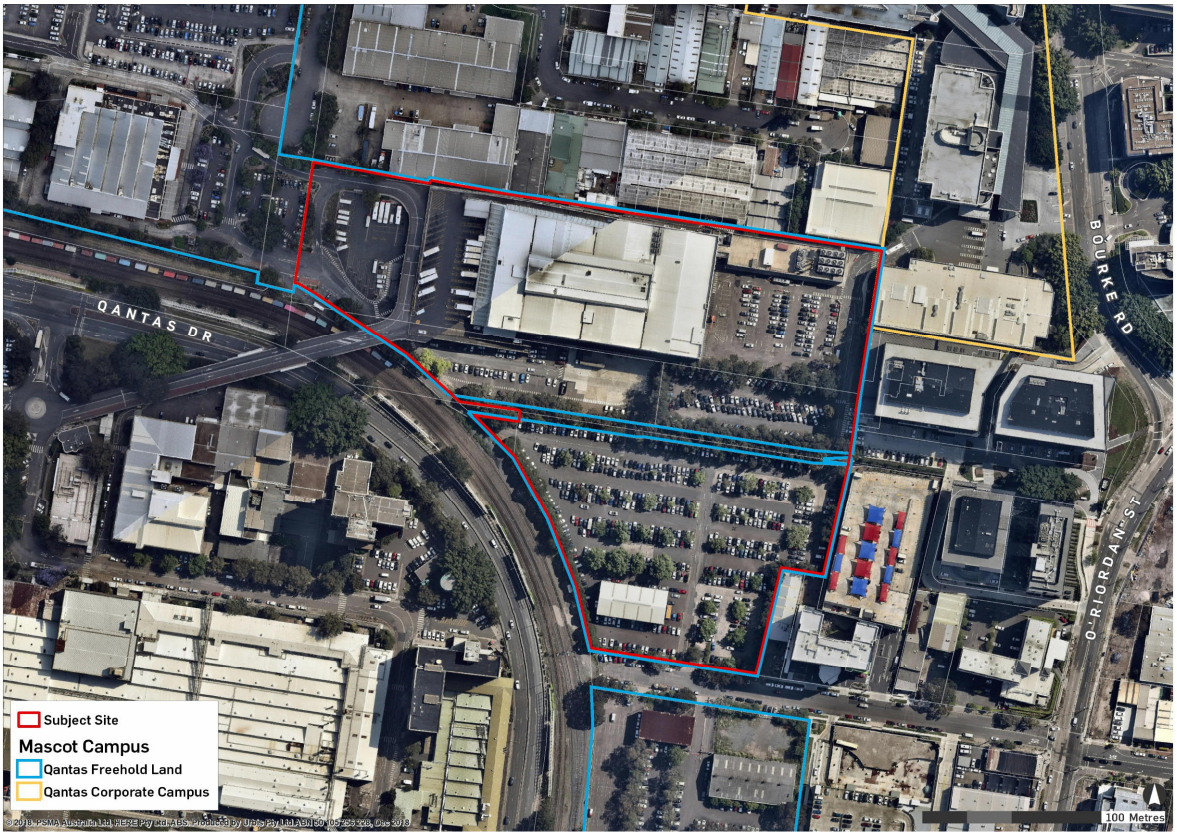

Figure 1: The Site

Key features of the site are as follows:

- The site is approximately 5.417ha and is an irregular shape. It is approximately 240m in length and maintains a variable width of between approximately 321m in the northern portion of the site and approximately 93m along the King Street frontage (refer to Figure 1).
- The site possesses a relatively level slope across the site. An open Sydney Water drainage channel bisects the northern portion of the site in an east-west direction. There are some isolated changes in level immediately adjacent to this channel. A Site Survey Plan accompanies the application which details the topographic characteristics of the site.

- Multiple mature trees are scattered throughout the site. A variety of native and exotic tress and vegetation also exist around the perimeter of the site which help screen the site from surrounding uses.
- Site improvements include an at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility, and Qantas tri-generation plant.
- The site forms part of a larger land holding under the ownership of Qantas that generally extends between Qantas Drive to the west, Ewan Street to the south, Coward Street to the north, with the Qantas "Corporate Campus" fronting Bourke Road.
- Vehicular access to the site from the local road network is available from King Street. The site has intra-campus connections along the northern boundary in the form of two connecting driveways in the north-eastern and north-western corner of the site along the northern boundary which link it to the broader Mascot Campus.
- The site is located within the Bayside LGA.

Key features of the locality are:

- North: The site is bounded to the north low scale industrial development, beyond which is Coward Street. Further north of the site is the Mascot Town Centre which is characterised by transport-oriented development including high density mixed-use development focussed around the Mascot Train Station.
- East: The site is bordered to the east by commercial development including a newly completed Travelodge hotel which includes a commercial car park. Additional commercial development to the east includes the Ibis Hotel and Pullman Sydney Airport fronting O'Riordan Street.
- South: The site is bounded to the south by King Street, beyond which is Qantas owned at-grade car parking and other industrial uses. Further south is the Botany Freight Rail Line and Qantas Drive beyond which is the Domestic Terminal at Sydney Airport.
- West: The site is bordered to the west by the Botany Freight Rail Line and Qantas Drive, beyond which lies Sydney Kingsford Smith Airport and the Qantas Jetbase (location of the current Flight Training Centre).

2.2 SEARs Requirements

The Civil Engineering Report is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 10154. This table identifies the SEARs and relevant reference within this report.

Table 2. SEARs requirements

SEARs Requirements		Related Report Sections
Key Issues	Soil and Water - a description of the proposed erosion and sediment controls during construction and operation; - a description of the surface and stormwater management system, including On-site Stormwater Detention, and measures to treat or re-use water; - an assessment of the impact of flooding on the proposed development for the full range of flood events up to the Probable Maximum Flood; - an assessment of the impact of the proposed development on flood behaviour; and details of impact mitigation, management and monitoring measures.	Section 5
Plans & Documents	Stormwater Drainage Plan	Appendix A

3 Project Description

Safety is Qantas' first priority. The flight training centre is a key pillar of this value. The facility enables pilots and flight crews to undertake periodic testing to meet regulatory requirements by simulating both aircraft and emergency procedural environments. The Project seeks consent for the construction and operation of a new flight training centre, and associated ancillary uses including a multi-deck car park. The Project is comprised of the following uses:

Flight Training Centre

The proposed flight training centre will occupy the southern portion of the site. It is a building that comprises 4 core elements as follows:

- An emergency procedures hall that contains;
  - cabin evacuation emergency trainers,
  - an evacuation training pool,
  - door trainers,
  - fire trainers
  - slide descent towers,
  - security room,
  - aviation medicine training and equipment rooms.
- A flight training centre that contains:
  - a flight training hall with 14 bays that will house aircraft simulators,
  - integrated procedures training rooms, computer rooms, a maintenance workshop, storerooms, multiple de-briefing and briefing rooms, pilot's lounge and a shared lounge.
- Teaching Space that contains
  - training rooms,
  - classrooms and two computer-based exam rooms.
- Office Space
  - Office space for staff and associated shared amenities including multiple small, medium and large meeting rooms, think tank rooms, informal meeting spaces, a video room and lunch/tea room.
- Ancillary spaces including the reception area at the ground floor, toilets, roof plant and vertical circulation. The external ground floor layout will include a loading dock, at-grade car parking for approximately 35 spaces and a bus drop-off zone at the northern site boundary.

Car Park

The proposed multi-deck car park will be located to the north-east of the flight training centre and adjacent the existing Qantas catering facility and tri-generation plant. The car park is 14 levels and will provide 2059 spaces for Qantas staff. Vehicle access to the car park will be provided via King Street, Kent Road and from Qantas Drive via the existing catering bridge.

4 Existing Conditions

4.1 Stormwater

The existing stormwater infrastructure within the site are owned by Qantas and drains through to the open drainage channel bisecting the site. The open drainage channel is owned by Sydney Water, as shown on Figure 2.

This open drainage channel runs from east /west across the site. A previous flood study (Mascot, Roseberry & Eastlakes Flood Study (WMA Water Ltd, 2015)) found that the northern portion of the site was impacted by the 1% AEP, while the southern portion of the site was not impacted by flood waters.

The flood impact to the northern portion was considered to be only Flood Fringe which places the site in a low hazard category.

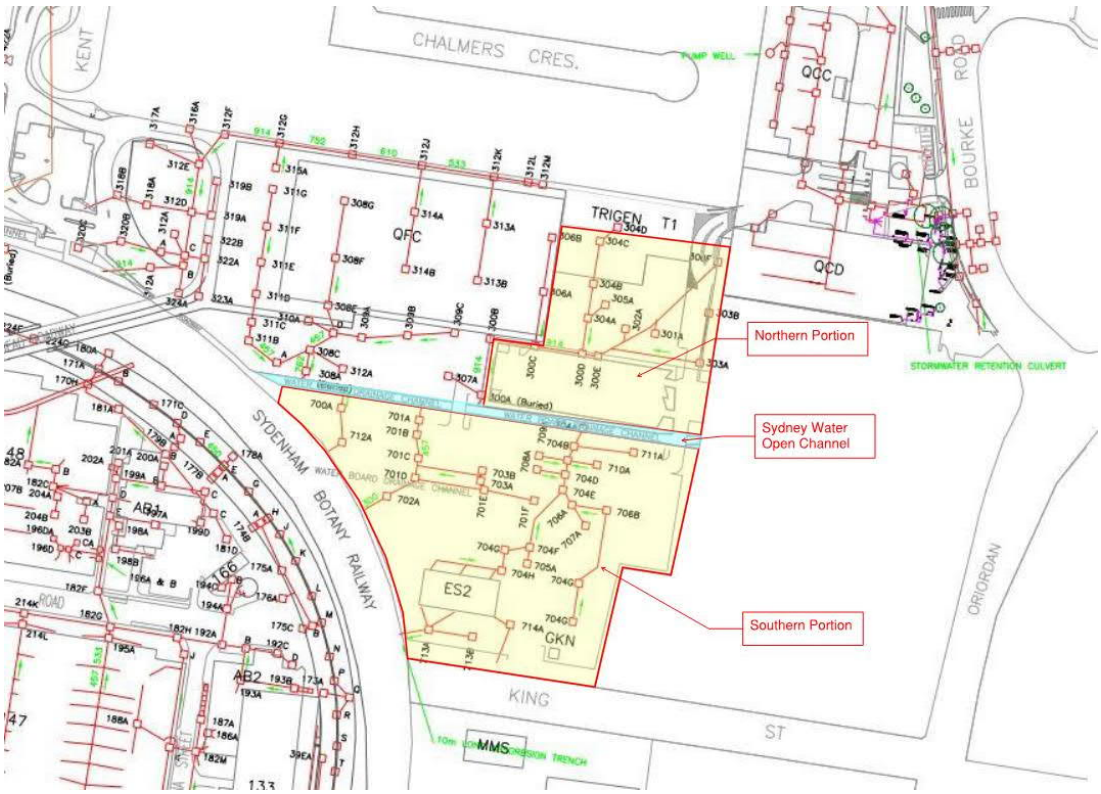

Figure 2. Existing site drainage

The open channel within the Qantas site, varies in size. The eastern end is a 1900 x 1300 brick wall concrete base channel widening out to a 2700 x 1500 brick wall concrete base channel to the western side of the site. The channel remains open until it discharges into Alexandria Canal except for a portion of roadway passing over the top. The channel appears to have a small base flow flowing as shown in Figure 3.

Local site drainage including pits, pipes and dish drains have also been identified at the site. These are assumed to discharge into the open channel.

Figure 3. Open Channel within the Qantas site

4.2 Flooding

The site is part of the Alexandria Canal catchment which consists of industrial and commercial developments in the Mascot area. The catchment consists mainly of a piped drainage system with developed flow paths through the urban areas.

Bayside Council have provided correspondence advising that a portion of the site is being affected by the 1% AEP. This correspondence was based on a previous flood study entitled Mascot, Roseberry & Eastlakes Flood Study undertaken by WMA Water Ltd in 2015.

Based on information provided by Bayside Council the northern portion of the site is subject to inundation due to flooding from overland flow in the 1% AEP events.

The information provided was based on the TUFLOW model developed by WMA Water Ltd in 2015.

Bayside Council provided flood levels for three points within the site as noted below:

Table 2. Flood Levels provided by Bayside Council

	10% AEP	5% AEP	2% AEP	1% AEP	PMF
Point A	3.95	3.97	4.00	4.03	4.41
Point B	2.24	2.44	2.52	2.60	3.91
Point C	3.43	3.45	3.46	3.47	4.21

Council's Flood Risk Exposure to the site was assessed as being Overland Flooding Floodway and Flood Storage within the Stormwater *Channel and remaining site notated as Flood Fringe*.

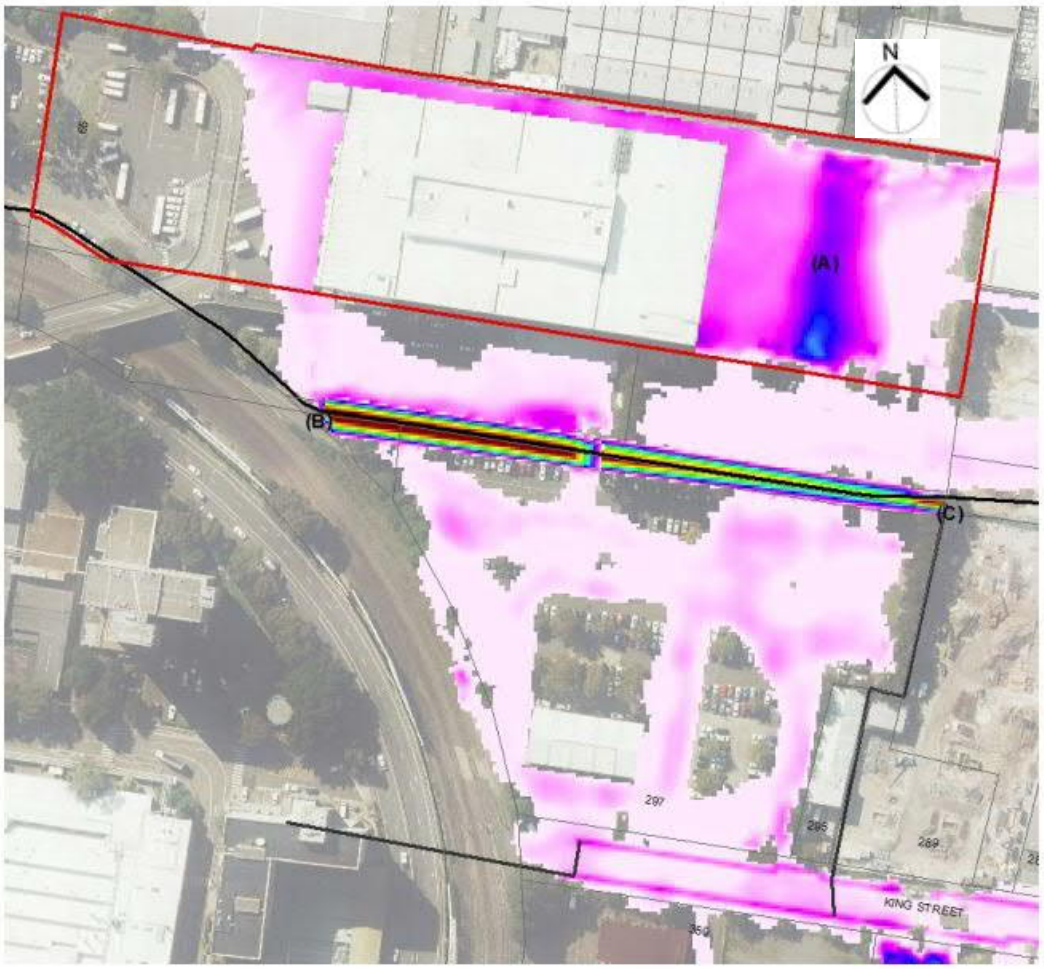

Figure 1: 1% AEP Flood extent map (dark brown indicates greater depth of water and pale pink indicates shallower depth, black line indicates approximate location of the existing drainage network)

Figure 4. Flooding with site (Source: Bayside City Council)

4.3 Groundwater

Douglas Partners undertook a geotechnical investigation to ascertain whether the level of the groundwater in the vicinity of the site.

Boreholes were drilled across the site from the surface level down to bedrock at depths of about 25 m.

The reports states groundwater observations made during drilling of the boreholes. These records show that groundwater is at depths ranging from about 0.9 m to 3.5 m or at levels of RL 1.4 m to RL 3.8 m AHD.

The report also states that from Douglas Partners previous reports around the airport, there is the potential for acid sulphate soil below the groundwater table. Douglas Partners recommended testing for acid sulphate soils.

5 Civil Engineering

5.1 Drainage

5.1.1 Stormwater

The proposed new building and multistorey carpark stormwater will be picked up and conveyed via pipe, and overland flow to the open channel in the centre of the site.

All roofs from the new building and multistorey car park will collect stormwater via gutters and downpipes and be connected to the in-ground system.

The proposed new on-grade car park stormwater will be collected by the kerb and gutter to the pits and conveyed via pipe, and overland flow to the open channel in the centre of the site.

Stormwater pipes and pits will be in accordance with AS3500 - National Plumbing and Drainage Code.

The stormwater design is to utilise Water Sensitive Urban Design measure to reduce peak outflows, a variety of detention systems may be used such as above ground storage tanks and/or water quality control devices.

The stormwater concept plan for the site is in Appendix A.

5.1.2 Flooding

The TUFLOW model developed by WMA Water Ltd. was provided by Bayside Council to enstruct in February of 2019 for revision. enstruct added the latest detailed survey of the existing site to the model to improve the accuracy of the model to include all the changes in the building locations.

The existing TUFLOW model has been updated to incorporate most recent surveyed data such as levels, sections of the channel and building outlines of the area that surrounds the site.

This “new existing” model was then modified to include the proposed development and review the impact on flooding.

For details of the model updates and detailed results, refer to enstruct’s Flood Impact Assessment Report, dated 12/08/2019.

5.1.3 Water Sensitive Urban Design

The stormwater design utilises Water Sensitive Urban Design measures to improve stormwater quality, including stormwater quality improvement devices (SQIDs) and rainwater storage tanks.

Stormwater has the potential to be reused onsite provided it is treated to a suitable standard. It is planned to collect the roof stormwater and store it in a water tank for reuse for irrigation of courtyards and gardens.

A 10,000 litre rainwater tank shall be provided within the proposed development. The non-potable water (recycled rainwater) shall be filtered and reticulated within the building for toilet flushing and irrigation

5.1.4 Water Quality

Bayside Council’s water quality treatment requirements are described in Council’s Stormwater Management Part 3G policy document which states the objectives and controls for stormwater management, water sensitive urban design and water quality. Section 3G.4 describes the Stormwater Quality objectives and requirements being to:

- To minimise the impacts of urban development on the environmental values of waterways, groundwater systems and bushland areas;
- To safeguard the environment by improving the quality of stormwater runoff;
- To ensure development has minimal impacts on the natural water cycle and the environment, including natural water systems, water quality and surface/groundwater flow regimes; and
- To minimise pollution from the development post construction.

In order to meet the above objectives, Council requires the water quality design to be in accordance with "Botany Bay & Catchment Water Quality Improvement Plan"

The captured stormwater must be treated to meet the following water pollution discharge requirements (post development) as summarised in **Table 4**. These targets reduce the loads of stormwater pollutants discharged to receiving waters to minimise the risk of an adverse impact on the ecological health of these waterways.

Table 4. Stormwater pollution reduction target (% of typical urban annual load)

Pollutant	Botany Bay & Catchment Water Quality Improvement Plan Performance Objective (%)	Sydney Water pollutant load reduction objective (%)
Gross Pollutants (GP)	90	90
Total Suspended Solids (TSS)	80	85
Total Phosphorous (TP)	55	65
Total Nitrogen (TN)	40	45

To demonstrate that the pollutant removal targets can be met, a MUSIC model (Model for Urban Stormwater Improvement Conceptualisation) has been prepared. Post-development stormwater quality is controlled by passing the stormwater through pollutant control devices to remove oil and suspended solids, nitrogen, phosphorous, and gross pollutants.

Pollution control devices will clean the stormwater to the level required prior to discharge from site. In addition, permeable paving has been proposed in the southern site car parking areas to reduce site runoff and minimise the impact on retained trees.

The pollution control devices will require on-going maintenance.

This will ensure both Bayside Council and Sydney Water's criteria are met.

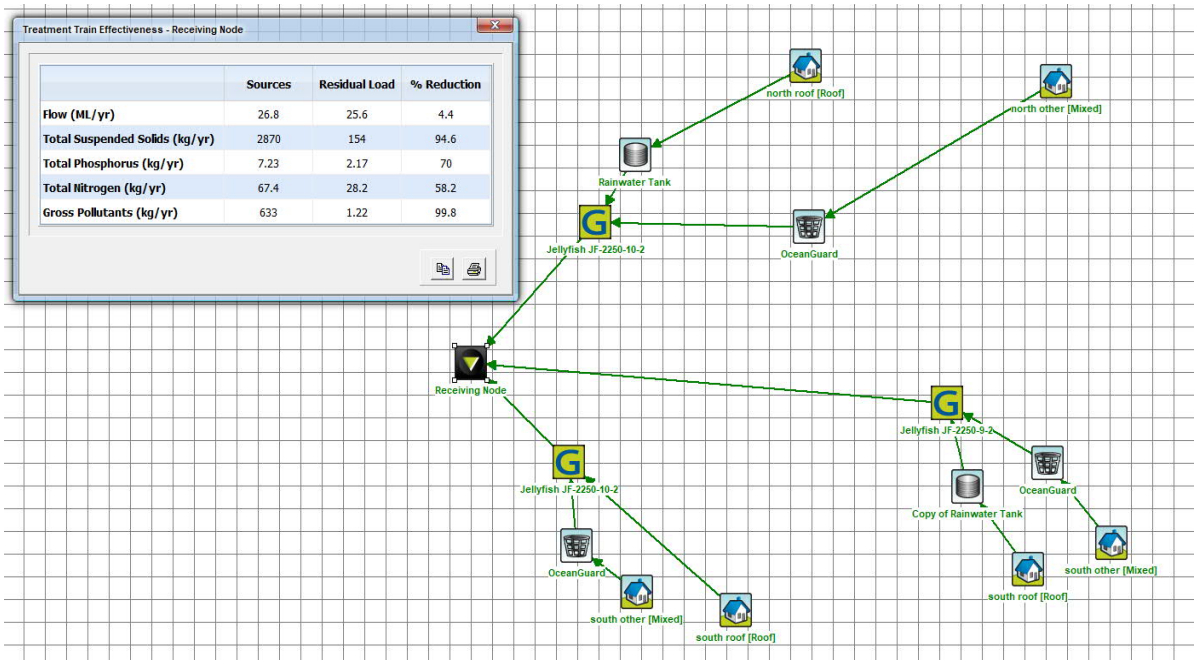

Figure 5. MUSIC model setup and results

Table 4. MUSIC model results

Pollutant	Pollutant load reduction objective (%)	Sydney Water pollutant load reduction objective (%)
Gross Pollutants (GP)	90	~99
Total Suspended Solids (TSS)	85	94
Total Phosphorous (TP)	65	70
Total Nitrogen (TN)	45	58

5.1.5 Hydrocarbon Capture

Bayside Council's submission notes:

> *Devices capable of removing oil shall be provided fall all car parking facilities proposed for the development. The device(s) shall be manufactured by a Quality Endorsed Company to the requirements of ISO 9001 and shall have a minimum oil storage capacity of 20 litres per 10 car spaces proposed or part thereof.*

The proposed development contains approximately 150 car spaces open to rainfall on the northern part of the site and 41 on the southern side, resulting in required oil storage volumes of 300L and 100L respectively. The selected stormwater quality devices "Jellyfish" contain approximately 2,000L of oil storage, which exceeds the Council requirement.

5.1.6 Erosion and Sediment Control

Erosion and sediment control devices and procedures and will be put in place with the aim that runoff water will be collected and diverted around the disturbed site or collected and sediments removed prior to discharge to the existing stormwater system.

It will be required that dust suppression, construction vehicle inspection and cleaning

systems are in place. Further, with regular inspections, maintenance and modifications, erosion and sediment control devices will need to be cleaned out after storm events.

Erosion control and sediment collection devices will need to be modified and adjusted to suit building work as it progresses.

All erosion and sediment control measures are to be designed in accordance with "Managing Urban Stormwater – Soils & Construction Volume 1 2004 (Landcom)" and "Approved Methods for the Modelling and Assessment of air pollutants in NSW (EPA).

The civil engineering components of the works will be designed in accordance with the following Australian standards and guidelines:

- Australian Rainfall & Runoff 2016
- NSW Government Floodplain Development Manual (2005)
- AS3500.3 Plumbing and Drainage: Stormwater Drainage
- Managing Urban Stormwater, Soils and Construction, Volume 1, 4th edition, Landcom, March 2004
- Concrete Pipe Selection and Installation - Concrete Pipe Association 1990

5.2 Groundwater Impacts

To assess the acid sulphate soil risk, environmental consultant Arcadis Australia Pacific Pty Ltd (Arcadis) undertook a site-specific Acid Sulphate Soil Investigation. During the investigation, groundwater was located at between 0.97m below ground level to 3.55m below ground level.

As part of the works described in Section 3 and there are two elements which may impact on the groundwater being:

- The inground pool within the Qantas Group Training Facility (QGFT) and
- The multi-storey carpark.

From the Arcadis report, three groundwater monitoring wells were placed in the vicinity of the QGFT. The wells measured the groundwater to be 3.4m, 2.2m and 3.5m below ground level.

The pool is located close to the well where the groundwater is RL 3.5m below ground level. The bulk earthworks plan indicates the pool will be at a depth of 2.7m below ground level indicating that the excavation of the pool will not extend into the groundwater.

In regard to the multi-storey carpark, Arcadis placed two groundwater monitoring wells were placed in the vicinity of the multi-storey carpark. The wells measured the groundwater to be 1.0m and 1.4m below the ground. The level of the ground floor of the multi-storey carpark is being raised by approximately 200mm to 800mm. The construction of the lift wells and services greater than a metre deep may penetrate the groundwater.

Therefore, to ensure the groundwater is not impacted by these works, the contractor is to construct all works in accordance with the Construction Environmental Management Report (CEMP) prepared by Arcadis.

6 Consultation

enstruct has held discussions with the following Authorities:

6.1.1 Sydney Water

enstruct has held discussions with Sydney Water to obtain approval to discharge into the open channel culvert. Sydney Water advised that On-site Stormwater Detention was not required for the site, however water quality measures are to be implemented to improve the quality of the water prior to entering the open channel. Refer to Section 5.1.4 for stormwater quality modelling.

6.1.2 Department of Water – Natural Resource Access Regulator

enstruct has sought confirmation from the NSW Department of Water to confirm that the Sydney Water open channel which traverses the site is not a recognised tributary by the Department. To date, we have received verbal confirmation on 17 April 2019 agreeing that the open channel is not a recognised tributary but as yet have not received written confirmation.

6.1.3 Bayside Council

enstruct has held discussions with Council's Strategic Floodplain Engineer to obtain flood levels within the site. Council provided the flood levels in a letter dated 24 January 2019. enstruct then provided additional information with the aim to reduce the flood level for the northern portion of the site. Council replied with an email dated 15 April 2019 advising that the flood levels initially provided are to remain at this stage.

Further work has been with respect to flooding post exhibition. Refer to enstruct's Flood Impact Assessment Report for further details.

6.1.4 ARTC

Post exhibition, enstruct have discussed flooding the ARTC and the impact on the ARCT corridor on the western end of the site. ARTC are satisfied that there is no impact with respect to flooding.

7 Mitigation Measures and Environmental Risk Assessment

The SEARs require an environmental risk analysis to identify potential environmental impacts associated with the proposal.

The following represents the standard way in which risks, impacts and mitigation measures across all reports will be identified and quantified. This should represent a comprehensive conclusion of all risks, impacts and associated mitigation measures identified across the project.

This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 Risk Management–Principles and Guidelines (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposed development prior to application of any mitigation or management measures.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for 'likelihood' and 'consequence'.

Table 5 – Risk Descriptors

LIKELIHOOD		CONSEQUENCE	
A	Almost certain	1	Widespread and/or irreversible impact
B	Likely	2	Extensive but reversible (within 2 years) impact or irreversible local impact
C	Possible	3	Local, acceptable or reversible impact
D	Unlikely	4	Local, reversible, short term (<3 months) impact
E	Rare	5	Local, reversible, short term (<1 month) impact

The risk levels for likely and potential impacts were derived using the following risk matrix.

Table 6 – Risk Matrix

CONSEQUENCE	LIKELIHOOD A	B	C	D	E
1	High	High	Medium	Low	Very Low
2	High	High	Medium	Low	Very Low
3	Medium	Medium	Medium	Low	Very Low
4	Low	Low	Low	Low	Very Low
5	Very Low	Very Low	Very Low	Very Low	Very Low

The results of the environmental risk assessment for the proposed development are presented in Table 7 and are based upon the range of technical and specialist consultant reports appended to this EIS.

The table has directly related mitigation measures responding to each impact (satisfying the SEAR for a consolidated summary of all proposed mitigation measures) also based upon the range of technical and specialist consultant reports appended to this EIS.

It is considered that with the mitigation measures required the impacts resulting from the proposal will be acceptable.

Table 7 – Risk Assessment and Mitigation Measures

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Proposed Mitigation Measures
High Water Table	Impact on the compaction of the existing materials at subgrade level	D	3	Low	Building contractor to dewater excavations locally to achieve the correct compaction of materials.
Soil and Water Management	Impact on open channel culvert	C	2	Medium	Contract to install an approved Construction Environmental Management Plan
Flood Planning Levels	Council not agree to lowering Flood Planning levels for Multistorey car park	B	5	Very Low	Site levels for the multistorey car park remain unchanged.
Stormwater blockage	Flood waters inundate SIMs building. High cost to SIMs machinery for replacement	D	1	Low	Provide adequate overland flowpath
Stormwater blockage	Flood waters inundate multistorey carpark. Inconvenience to drivers on ground floor.	D	4	Low	Provide adequate overland flowpath

APPENDIX A STORMWATER DRAINAGE DESIGN

A0

BREAK INTO EXISTING PIPE AND CONNECT TO PROPOSED STORMWATER LINE

IL 2.76
Ø375 @0.5%
IL 2.68
Ø450 @0.5% L=24.2m
IL 2.79
IL 2.81
Ø450 @0.5% L=21m
IL 2.92
IL 2.94
Ø450 @0.5% L=23.8m
IL 3.06
IL 2.67
IL 2.65
Ø450 @0.5% L=20m
IL 2.54
IL 2.52
Ø450 @0.5% L=22.4m
IL 2.38
IL 2.40
IL 2.28
%450 @.5% L=3.0m
IL 3.08
Ø450 @0.6% L=19.5m
IL 3.19
IL 3.21
Ø450 @0.7% L=30m
IL 4.31
DD
FFL 4.33
FFL 5.83
CARPRKING
EX Ø900
RL5.83
Ø375 @1%
IL 4.26
EXISTING SYDNEY WATER CHANNEL
Ø300 @1% L = 23.6 m
IL 3.61
IL 3.92
Ø375 @1% L=18m
IL 3.73
IL 3.65
Ø450 @.5% L=23.8m
IL 3.55
IL 2.921
Ø450 @.5% L=23.9 m
IL 3.040
IL 3.172
Ø450 @.5% L=13.6 m
IL 3.240
IL 3.84
IL 3.77
IL 3.82
IL 3.64
Ø450 @.5%
Ø375 @1.7% L=22.2m
BREAK INTO EXISTING PIPE AND CONNECT TO EXISTING STORMWATER LINE
DP 1 DP 2 DP 3 DP 4 DP 5 DP 6 DP 7 DP 8 DP 9 DP 10 DP 11 DP 12 DP 13 DP 14 DP 27 DP 28 DP 29
J 1 J 2 J 3 J 4 J 5 J 6 J 7 J 8
E 1 E 2 E 3
F 1 F 2
H 1 H 2 H 3 H 4
A B L

NOT FOR CONSTRUCTION

LEGEND

- SITE BOUNDARY
- PROPOSED GRATED PIT
- SS — PROPOSED SUBSOIL DRAINAGE
- ExSW — EXISTING STORMWATER LINE
- SW — STORMWATER LINE
- REDUNDANT STORMWATER LINE
- PROPOSED KERB INLET PIT
- PROPOSED GRATE PIT
- PROPOSED STORMWATER JUNCTION PIT
- EXISTING STORMWATER PIT
- D 2 — PIT NAME
- EMERGENCY OVERLAND FLOW
- EXISTING BUILDING OUTLINE
- PROPOSED BUILDING OUTLINE

INVERT LEVEL AND DIRECTION OF DISTURBED EXISTING PITS AND PIPES TO BE CONFIRMED ON SITE AND REPORTED TO STORMWATER ENGINEER PRIOR COMMENCING ANY WORK

Rev.	Date	Description
03	20.05.19	ISSUED FOR TENDER
02	13.05.19	ISSUED FOR INFORMATION
01	15.04.19	ISSUED FOR INFORMATION

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CLIENT
QANTAS

PROJECT NAME
QANTAS GROUP FLIGHT TRAINING CENTRE

PROJECT NUMBER 5728

DRAWING TITLE
STORMWATER DRAINAGE PLAN - SHEET 01

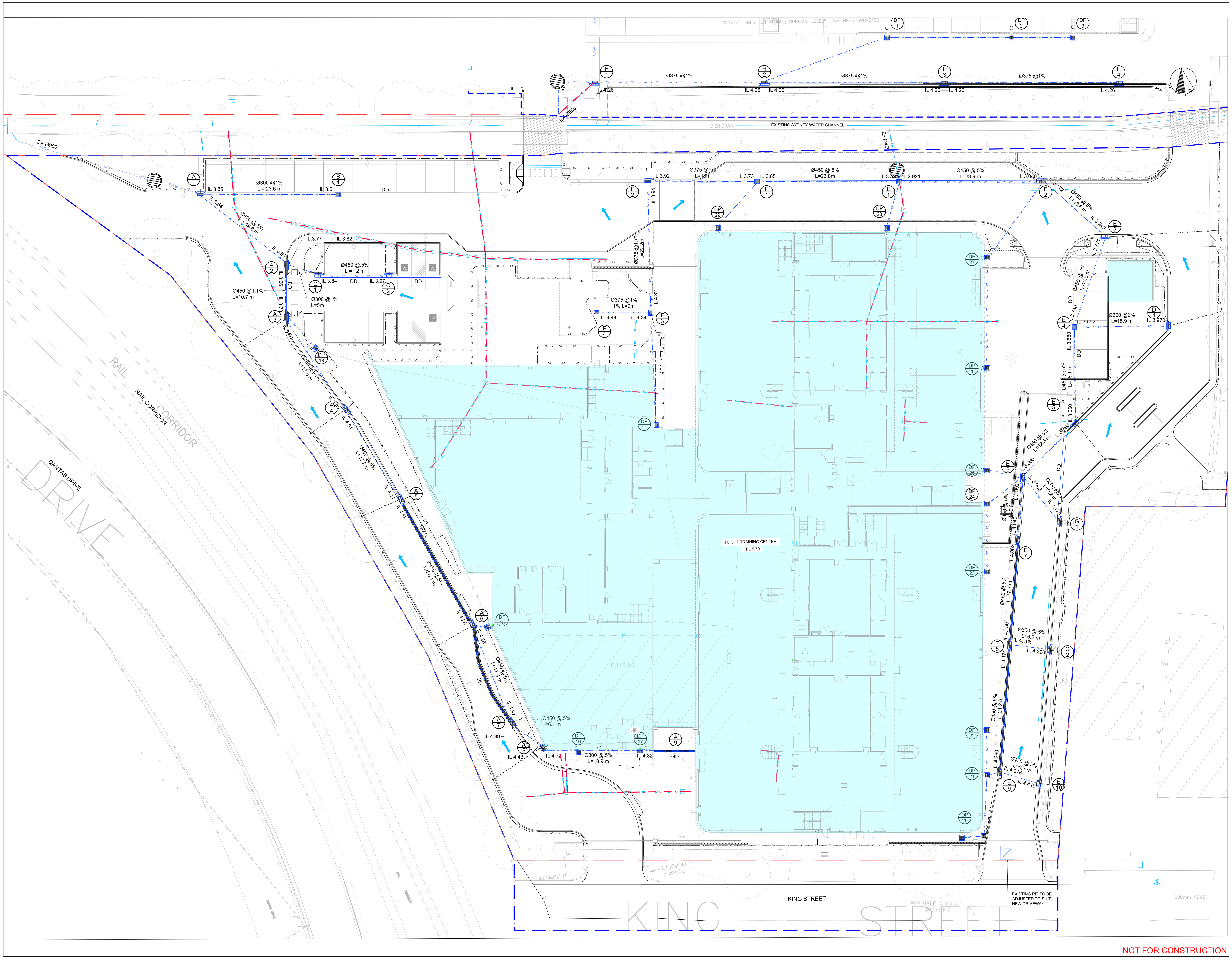
SCALE AT A0: 1:200
DRAWN BY: AW
CHECKED BY: PL

DRAWING STATUS
FOR INFORMATION ONLY

DRAWING NUMBER ENS-CV-0201
REV. 03

5/20/2019 7:16 PM ENS-CV-0201.DWG

A0



LEGEND

- SITE BOUNDARY
- PROPOSED GRATED PIT
- SS — PROPOSED SUBSOIL DRAINAGE
- ExSW — EXISTING STORMWATER LINE
- SW — STORMWATER LINE
- REDUNDANT STORMWATER LINE
- PROPOSED KERB INLET PIT
- PROPOSED GRATE PIT
- PROPOSED STORMWATER JUNCTION PIT
- EXISTING STORMWATER PIT
- D 2 — PIT NAME
- EMERGENCY OVERLAND FLOW
- EXISTING BUILDING OUTLINE
- PROPOSED BUILDING OUTLINE

INVERT LEVEL AND DIRECTION OF DISTURBED EXISTING PITS AND PIPES TO BE CONFIRMED ON SITE AND REPORTED TO STORMWATER ENGINEER PRIOR COMMENCING ANY WORK

Rev.	Date	Description
03	20.05.19	ISSUED FOR TENDER
02	13.05.19	ISSUED FOR INFORMATION
01	15.04.19	ISSUED FOR INFORMATION

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CLIENT
QANTAS

PROJECT NAME
QANTAS GROUP FLIGHT TRAINING CENTRE

PROJECT NUMBER: 5728

DRAWING TITLE
STORMWATER DRAINAGE PLAN - SHEET 02

SCALE AT A0: 1:200
DRAWN BY: AW
CHECKED BY: PL

DRAWING STATUS
FOR INFORMATION ONLY

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