

7 September 2021

The Star Key Site Master Plan – Civil and Flood Impact

The existing site is flood affected in the 100 year storm event and the Probable Maximum Flood Event. A report addressing the effect on flooding of proposed Public Domain changes is to be submitted with a development application to demonstrate that the existing flood risk to the Star development or the adjacent developments is not worsened as a result of the development.

We recommend amplification of the Council Street Drainage system and review of the flood risk to the basement entry points to ensure compliance with Council's DCP and a suitable treatment resolved.

1.0 Introduction

This report has been prepared on behalf of The Star Entertainment Group (The Star) in support of its Key Site Master Plan under the Pyrmont Place Strategy.

The Master Plan is developed under the framework established under the Pyrmont Peninsula Place Strategy (PPPS), where The Star has been identified as one of four 'key sites'. The PPPS creates a 20-year vision and planning framework to support the NSW Government's vision to transform the Pyrmont Peninsula to "*be an innovative, creative and cultural precinct and an engine room of the Eastern Harbour CBD*" while meeting the aspirations of the business, industry, visitors, local and future residents.

The Master Plan ultimately seeks to inform updated planning controls related to 20-80 Pyrmont Street and 37-69 Union Street, Pyrmont to facilitate redevelopment of both sites and enable the Star's contribution to the Precinct as "a renowned and treasured cultural and entertainment precinct".

In particular this report discusses the existing flood condition and the recommended upgrades required to ensure the flood impact is no worse than the existing condition

It should be acknowledged this report has been prepared based on the provided information in the PPPS and the technical consultant reports that accompany the document. Assumptions have had to be made in order to make a reasonable assessment of the precinct-wide matters related to precinct wide Public Domain changes with respect to Road works and infrastructure upgrades

1.1 Pyrmont Peninsula Place Strategy

The PPPS provides a 20-year framework that identifies areas that can accommodate growth in Darling Island, Blackwattle Bay, Tumbalong Park and Ultimo sub-precincts, while enabling more growth in the Pyrmont Village and Wentworth Park sub-precincts. The PPPS is implemented in the statutory planning system by a Ministerial Direction that requires all land use and planning proposals to be consistent with the Place Strategy.

The first phase in implementing the PPPS is the preparation of master plans for each of the seven sub-precincts that make up the Peninsula (**Figure 1**). As a 'Key Site' located in the Darling Island sub-precinct, The Star has been identified to progress its own Master Plan for its 'Key Site' alongside the broader Precinct-wide master planning being undertaken by the Department, in consultation with the City of Sydney.







Figure 2 The Star Key Site

1.2 The Star

The Star is an ASX 100 listed company that owns and operates The Star Sydney, Treasury Brisbane and The Star Gold Coast.

The Star Sydney is Sydney's leading entertainment, dining and tourism destination. More than 11 million people, including locals, domestic visitors and international tourists visit The Star annually, facilitated by a workforce of approximately 4,500 people (pre-COVID). As Sydney's only integrated resort, The Star Sydney focuses on the development of tourism and entertainment products across four key segments – accommodation, F&B, gaming and entertainment.

1.3 The Proposal

The Star Key Site Master Plan is proposing to rezone 20-80 Pyrmont Street and 37-69 Union Street, Pyrmont to establish new planning controls to enable redevelopment on the site to accommodate future mixed uses including retail, commercial uses, hotel and residential. The site is outlined in **Figure 3**.



Site Boundaries

Figure 3 Site Aerial

Source: Nearmap/Ethos Urban

The rezoning and proposed planning controls have been informed by detailed site planning considerations as well as existing and future local context analysis. The proposed new controls that comprise amendments to the Sydney Local Environmental Plan 2012 (Sydney LEP 2012) and a Design Guide, respond to the objectives for The Star site Master Plan as listed in the PPPS as well as the Strategy's directions, big moves and place priorities.

It should be noted that subsequent development applications will be required in line with the relevant provisions of the *Environmental Planning & Assessment Act 1979* to deliver the proposed developments.

The key development outcomes sought to be achieved for The Star site from the proposed Master Plan include:

Northern Site (20-80 Pyrmont Street)

- A new 27 storey six star hotel (capped at RL 110) on Pirrama Road (North Tower) comprising;
 - 6 storey podium that retains the existing ground level setback on The Star site
 - 21 storey tower with 1.5m street setback from podium and increased minimum 7m street setback to the north in line with wind advice and view sharing principles
 - Total gross floor area of 26,000m² (excluding through-site link)
 - New porte-cochere drop off servicing hotel
- Additional built form to Level 5 rooftop of the main Star site comprising:
 - A collection of indoor and outdoor spaces with complementary functions such as indoor/outdoor dining
 opportunities, recreational spaces, wellness spaces and hotel amenities, including an existing hotel pool
 - Total of approximately 3,000m² (additional to existing)
- Opening up of Pirrama Road frontage to reveal light rail and to provide improved connectivity to public realm and waterfront including:
 - Active uses such as retail, food and beverage and wellness uses at street level; and
 - Total GFA of approximately 200m² (additional to existing).

- New through-site link connecting Jones Bay Road and Pirrama Road
- Re-configured and expanded entry to the Lyric Theatre
- Façade upgrades to existing Astral Towers

Southern Site (37-69 Union Street)

- A new 37 storey mixed use building (capped at RL 140) on Union Street (South Tower) comprising:
 - 5 storey podium mixed use podium with a 3m ground level setback along the Pyrmont Bridge Road boundary to increase footpath width, comprising uses such as retail, residential and hotel amenities and/or dedicated hotel levels
 - 32 storey tower generally setback 5-7m from the podium, comprising uses such as retail, residential and hotel amenities and/or dedicated hotel levels and 2 plant levels
 - Total GFA of approximately 32,000m²

Public Realm

- Upgrades to corner of Edward Street and Union Street
- Upgrades to corner of Union Street and Pyrmont Street
- Improvements to public domain along Edward Street
- Improvements to public domain along Pirrama Road
- · Upgrades to Union Street with potential for shared zone, including upgrades to walkway and cycleway

Once new planning controls are adopted, The Star will progress with the detailed design and planning of the future development on the site, including progressing with a design competition and securing development approval for the winning design.

1.4 General Requirements

This report has been prepared with reference to the *General Requirements for Preparing Key Site Master Plans under the Pyrmont Peninsula Place Strategy* and the alignment review prepared by the Department of Planning, Industry and Environment (DPIE) dated 26 April 2021.

2.0 Flood Analysis

The appended flood impact assessment uses the Darling Harbour catchment flood model provided by City of Sydney Council and confirms that overland flooding occurs around the site and is generally contained within the road network, with greater flood depths at trapped low points.

To mitigate the flood hazard and risk at the proposed basement vehicle entrance on Pyrmont Street proposed works include amplification of the existing Council stormwater pits and pipes, with flood gates installed along the basement entrance. The flood impact assessment also identified flood risk to the existing basement vehicle entrance on Edward Street. No works are proposed at this entrance as part of this modification application, however the provision of flood gates at this entrance reduces future flood risk and provides the required level of flood protection in accordance with City of Sydney Council guidelines. The proposed mitigation works reduce the 100-year ARI flood depth and reduces flood risk to the development, adjacent properties, and the general public.

The points below are an extract of the OEH submission regarding flooding. The full submission document is included in Appendix A:

OEH has reviewed the Flood Impact Assessment (TTW, January 2018) for the modification proposal and provides the following comments:

- The Planning proposal includes a new vehicle access on Pyrmont Street.
- The updated modelling is acceptable and shows a decrease in flood inundation at Pyrmont Street.
- As stated in section 6 table 11, the Flood Planning Level for Below Ground Parking is the 100 year ARI flood level +0.5m
- Planning levels such as the above are normally only applied to flooding above 100mm (confirmation with City of Sydney should be sought on this). Therefore, the planning level at the new vehicle access should be the level at which at least 100mm of flood occurs plus the 0.5m. Interpreting the report the flood planning level at the Pyrmont Street vehicle access would be 7.01m (6.51+0.5m). Confirmation on this level should be sought from City of Sydney.
- If City of Sydney confirms the new flood planning level at this location and protection is required a flood gate is proposed. Further details on the flood gate need to be provided including:
 - How would this flood gate operate?
 - Would it be automatic or manual?
 - Who is responsible for the operation of the gate? etc.
- The design is not compliant until the exact details of how the flood gate will operate is shown.

2.1 Existing Flood Condition

The existing site is flood affected in the 100 year storm event and the Probable Maximum Flood Event. A report addressing the effect on flooding of proposed Public Domain changes is to be submitted with a development application to demonstrate that the existing flood risk to the Star development or the adjacent developments is not worsened as a result of the development



100-Year Flood Model - Council Model



PMF Flood Model - Council Model

2.2 Assessment of existing stormwater infrastructure and proposed upgrades to be confirmed.

Current Design Overview

- · Coordination with proposed road usage and pedestrian treatment design and public domain strategy
- Coordination with final architectural design
- Coordination with Public Domain design required
- · Flood planning level compliance in accordance with Council Policy
- Stormwater Detention in accordance with Sydney Water
- · Stormwater Quality Treatment in accordance with Council DCP

Key Risks

- Effects of Public Domain Works on Flood Risks
- Effects of Public Domain Works on Existing Services
- Effects of potential future Metro station and Public transport system changes on Public Domain and Existing Development
- Infrastructures Upgrades to be identified

2.3 Development Risks to be addressed

Current Flood Impacts

• Current flood impacts the light rail tunnel and the entrance to the basement parking in Pirrama Road, Pyrmont Street and Edward Road

- Stormwater system upgrades may be required to comply with Councils DCP policy on flood
- Coordination with Public Domain design required with respect to not worsening the flood risk

2.4 Key Risks

Effects of Public Domain Works on Flood Risks Compliance of current development with current flood DCP

This requires basements to be protected up to the PMF flood level or the 100-year plus 500mm freeboard (whichever is greater)

There are stormwater system upgrades and care with the public domain works which could reduce the risk as shown by council's model



Upgrade Works Required

Recommended upgrades are as follows:









Reduced 100-year extents

3.0 Conclusion

The existing site is flood affected in the 100-year storm event and the Probable Maximum Flood Event. A report addressing the effect on flooding of proposed Public Domain changes is to be submitted with a development application to demonstrate that the existing flood risk to the Star development or the adjacent developments is not worsened as a result of the development.

We recommend amplification of the Council Street Drainage system and review of the flood risk to the basement entry points to ensure compliance with Council's DCP and a suitable treatment resolved

Prepared by TTW (NSW) PTY LTD

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EIRIAN CRABBE Associate Director

Authorised By TTW (NSW) PTY LTD

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STEPHEN BRAIN Technical Director

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Appendix A. 2018 STAR Flood Study

THE STAR

FLOOD IMPACT ASSESSMENT ADDENDUM: RESPONSE TO SUBMISSIONS

PREPARED BY TAYLOR THOMSON WHITTING NOVEMBER 2018



THE & STAR TABLE OF CONTENTS

1.0	INTRODUCTION	. 3
1.1	NSW OFFICE OF ENVIRONMENT AND HERITAGE SUBMISSION (FLOOD)	. 3
1.2	RESPONSE TO SUBMISSION	. 3
	1.2.1 Flood Planning Level	. 4
	1.2.2 Protection to Flood Planning Level	. 6
	1.2.3 Proposed Flood Gates	. 6

2 APPENDIX A – OEH SUBMISSION

3 APPENDIX B – RECORD OF CORRESPONDENCE

4 APPENDIX C – FLOOD GATE DETAILS

Date	Revision	Issue/Description of Amendment	Prepared By	Approved By	Signature
07.11.2018	D	Final	Eirian Crabbe	Stephen Brain	Dilak

1.0 INTRODUCTION

A Section 75W modification for the project approval for the Star City Casino Pyrmont (MP08_0098 MOD 13 'Construction of a new hotel and residential tower and alterations to existing building') was lodged with the NSW Department of Planning in August 2018.

TTW prepared a Flood Impact Assessment (January 2018) that formed part of this lodgement and this addendum report provides a response to submissions regarding flooding issues raised by NSW Office of Environment and Heritage. There were no comments or objections regarding flooding, raised by City of Sydney Council

The flood impact assessment uses the Darling Harbour catchment flood model provided by City of Sydney Council and confirms that overland flooding occurs around the site and is generally contained within the road network, with greater flood depths at trapped low points.

To mitigate the flood hazard and risk at the proposed basement vehicle entrance on Pyrmont Street proposed works include amplification of the existing Council stormwater pits and pipes, with flood gates installed along the basement entrance. The flood impact assessment also identified flood risk to the existing basement vehicle entrance on Edward Street. No works are proposed at this entrance as part of this modification application, however the provision of flood gates at this entrance reduces future flood risk and provides the required level of flood protection in accordance with City of Sydney Council guidelines. The proposed mitigation works reduce the 100-year ARI flood depth and reduces flood risk to the development, adjacent properties and the general public.

1.1 NSW OFFICE OF ENVIRONMENT AND HERITAGE SUBMISSION (FLOOD)

The section below is an extract of the OEH submission regarding flooding, the full submission document is included in Appendix A:

Flood

OEH has reviewed the Flood Impact Assessment (TTW, January 2018) for the modification proposal and provides the following comments:

- The Planning proposal includes a new vehicle access on Pyrmont Street.
- The updated modelling is acceptable and shows a decrease in flood inundation at Pyrmont Street.
- As stated in section 6 table 11, the Flood Planning Level for Below Ground Parking is the 100 year ARI flood level +0.5m
- Planning levels such as the above are normally only applied to flooding above 100mm (confirmation with City of Sydney should be sought on this). Therefore, the planning level at the new vehicle access should be the level at which at least 100mm of flood occurs plus the 0.5m. Interpreting the report the flood planning level at the Pyrmont Street vehicle access would be 7.01m (6.51+0.5m). Confirmation on this level should be sought from City of Sydney.
- If City of Sydney confirms the new flood planning level at this location and protection is required a flood gate is proposed. Further details on the flood gate need to be provided including:
 - $\circ \quad \mbox{How would this flood gate operate?}$
 - Would it be automatic or manual?
 - Who is responsible for the operation of the gate? etc.
- The design is not compliant until the exact details of how the flood gate will operate is shown.

1.2 RESPONSE TO SUBMISSION

The proposed new vehicle access on Pyrmont Street provides access to existing below ground car parking within Star site. Council Flood Study and Flood Risk Management Plan identifies significant depth of ponding during the 100 year ARI Flood at the trapped low point in Pyrmont Street.

Under the NSW Government's flood prone land policy the City of Sydney is required to manage flooding issues and put plans into place to safeguard flood-prone areas. TTW are not aware of any plans by City of Sydney to provide flood mitigation for this area.

As part of the modification application to Major Project Approval MP08_0098 (Modification 13), flood mitigation is proposed to reduce the depth of ponding in Pyrmont Street and Edward Street. The mitigation measures include amplification of the existing Council Stormwater system to provide greater inlet and pipe capacity.

The flood mitigation on Pyrmont Street reduces the peak 100 year ARI flood depth from 0.42m (6.71m AHD) to 0.22m (6.51m AHD), and reduces the flood risk to the development site, the general public and 3rd Party property along Pyrmont Street. The PMF level with the proposed flood mitigation is 6.60m AHD. The proposed vehicle entrance on Pyrmont Street (approximate RL 6.70m AHD) will be located above the PMF and 100 year ARI Flood level.

The flood mitigation on Edward Street reduces the peak 100 year ARI flood depth from 0.23m (2.77m AHD) to 0.13m (2.67m AHD), and reduces the flood risk to the development site, the general public and 3rd Party property along Edward Street. The PMF level with the proposed flood mitigation is 2.89m AHD. The existing vehicle entrance on Edward Street (approximate RL 2.70m AHD) is located above the 100 year ARI Flood level.

1.2.1 Flood Planning Level

The flood planning level for a development is a combination of design flood levels and freeboard. The freeboard is a factor of safety, expressed as the height above the design flood level, to compensate for uncertainties in the estimation of flood levels across the floodplain. (*reference; City of Sydney interim Floodplain Management Plan*)

In accordance with Council DCP and Interim Floodplain Management Policy, below ground parking requires a flood planning level of the 100 year ARI level +0.5m freeboard or the PMF (whichever is higher). Across the site, including the low point in Pyrmont Street, the 100 year ARI level +0.5m freeboard is higher than the PMF.

OEH states that flood planning levels are normally applied to depths of flooding greater than 100mm. However, the NSW Floodplain Development Manual states that the area of land below the flood planning level is subject to flood related development controls. There is no mention of flood controls or the flood planning level only applying to depths of flooding greater than 100mm.

Further correspondence was made with Sandeep Thorat, Senior Engineer (Public Domain City Infrastructure & Traffic Operations) at City of Sydney, refer to Appendix B for record of correspondence. Sandeep confirmed that flood planning levels are not limited to those areas with flood depths greater than 100mm, but rather that flood planning controls are applicable to all areas of land below the flood planning level, in accordance with the Council's Interim Floodplain Management Policy.

The flood planning level for the entrances to basement car park entrances should be taken as the 100 year ARI level +0.5m freeboard.

For Pyrmont Street, the peak 100 year ARI flood level at the proposed vehicle entrance is 6.94mAHD, refer to fig a) below (extract of Fig 16 from the Flood Impact Study). The Flood Planning level for the proposed Pyrmont Street basement vehicle entrance is therefore 7.44m AHD.



Figure a) Proposed 100 Year ARI Flood Depth on Pyrmont Street (flood depth<100mm not shown)

For Edward Street, the peak 100 year ARI flood level at the existing vehicle entrance is approximately 2.67m AHD, refer to fig b) below (extract of Fig 17 from the Flood Impact Study). **The Flood Planning level for the existing Edward Street basement vehicle entrance is therefore 3.17m AHD.**



Figure b)

Proposed 100 Year ARI Flood Depth on Edward Street (flood depth<100mm not shown)

1.2.2 Protection to Flood Planning Level

In order to meet the requirement of a flood planning level of 7.44m AHD at the new vehicle entrance on Pyrmont Street, a flood gate is proposed across the full width if the entrance. The only alternative to a flood gate is to raise the internal access to the ramp down to the existing basement car park. However, due to the structure of the existing building there is insufficient vertical clearance for the access to be raised to the Flood Planning level before ramping down to the basement car park. The architectural section of the new ramp showing ramp grades, levels, and existing structure is shown in figure b) below.



Figure c) Proposed new ramp to carpark (extract from DWP drawing MOD13-2703)

Flood gates area also proposed for the existing basement vehicle entrance on Edward Street to meet the requirement of a flood planning level of 3.17m AHD.

Although City of Sydney raised no objections or comments regarding flooding (ref: R/2016/1/C, 9 October 2018). Sandeep Thorat of City of Sydney Council has since confirmed that a merit-based approach can be applied to development proposals that include the use of flood gates. Examples of where flood gates have been approved by City of Sydney are the Darling Harbour redevelopment, Young and Loftus Precinct and the Wanda Circular Quay development. The following points reiterate the benefits and merits of flood gates for this proposed development:

- Council have completed flood modelling and reporting that identifies existing flood risk in Pyrmont Street, but there are no know Council plans to mitigate or reduce this flood risk at this location.
- The proposed development will reduce the flood risk to the development, the general public, and adjacent properties by upgrading the Council stormwater system in Pyrmont Street. These upgrades will reduce the flood depth, and flood hazard in Pyrmont Street.
- The proposed basement carpark entrance will be above the PMF level and the 100 year ARI flood level.
- Providing an access to the basement carpark above the flood planning level is not possible due to the existing structure above the ramp.
- The proposed flood gate is located above the PMF and 100 year ARI flood level and only provides protection for the freeboard element of the flood planning level.
- Flood gates are identified as typical floodplain risk management measures in the NSW Floodplain Development Manual (Table 2.1).

1.2.3 Proposed Flood Gates

Details of the proposed flood gates are as follows; the principle of the flood gate is shown in figure c) and are included in Appendix C.

- The proposed flood gates will be the Hyflo SFCB[™] or similar, (Self Closing Flood Barrier) by Flooding Solutions Advisory Group, refer to Appendix C for product brochure.
- The flood gate will be concealed below ground until flood water rises toward the vehicle entrance. The flood water level would need to be above the PMF and 100 year ARI before the flood gate is activated.
- No flood warning system or warning time is required for the floodgate to operate.

- This flood gate operates automatically under hydrostatic pressure, with no manpower or electrical power required.
- The flood gate will continue to rise as the flood water rises, providing protection up to the 100 year ARI flood level + 500mm (7.44m AHD on Pyrmont Street and 3.17m AHD on Edward Street).
- The flood gate has a 100 year design life and requires minimal maintenance.
- The flood gate will be installed within the boundary of the development site and not within the Council footpath.
- The flood gate will require annual testing and maintenance checks. The operation and maintenance and testing will be the responsibility of the developer (Star Entertainment Group Limited).

Principle of the Hyflo SCFB™





APPENDICES

2 APPENDIX A - OEH SUBMISSION



Our ref: DOC18/644883 Your ref: MP08_0098 MOD13

> Brendon Roberts Key Sites Assessments NSW Department of Planning and Environment GPO Box 39 SYDNEY NSW 2001

Attention: Matthew Rosel

Dear Mr Roberts

The Star City Casino – 20-80 Pyrmont Street, Sydney (MP08_0098 MOD13) – Environmental Assessment

Thank you for your letter of 20 August 2018 received by the Office of Environment and Heritage (OEH) requesting comments on the Environmental Assessment the above modification application.

OEH has reviewed the relevant documents and provides recommendations and comments in Attachment A.

If you have any queries regarding this matter, please contact Janne Grose on **t** :8837 6017 or **e**: janne.grose@environment.nsw.gov.au

Yours sincerely

S. Hannison 19/09/18

SUSAN HARRISON Senior Team Leader Planning Greater Sydney <u>Communities and Greater Sydney Division</u>

PO Box 644 Parramatta NSW 2124 Level 2, 10 Valentine Ave Parramatta NSW 2150 Tel: (02) 9995 5000 Fax: (02) 9995 6900 ABN 30 841 387 271 www.environment.nsw.gov.au

Attachment A

The Star City Casino – 20-80 Pyrmont Street, Sydney (MP08_0098 MOD13) – Environmental Assessment

The Office of Environment and Heritage (OEH) has reviewed the following documents:

- Environmental Assessment (EA) report Modification 13 to MP08_0098 -13 August 2018
- Secretary's Environmental Assessment Requirements for MP08_0098 (MOD 13) 9 May 2016
- Arboricultural Impact Assessment Report (AIAR) March 2018
- The Star Modification 13 Landscape Design Report 20 March 2018
- Aboriginal and Historical Archaeological Assessment
- Flood Impact Assessment January 2018

and provides the following comments.

Landscaping

The EA indicates the proposal requires the removal of 24 existing exotic and non-local native trees including Bangalow Palms, London Plane Trees, Honey Locust, Cabbage Tree Palms, Little Gem Magnolia and Hill's Weeping Fig (see pages 220- 221 of EA and page 7 of AIAR). It indicates the trees will be replaced with 13 *Angophora Costata*, 5 Little Gem Magnolias and six Cabbage Tree Palms (page 221). The AIAR notes the dominant locally-indigenous tree species formerly occurring in this area included *Angophora Costata* (Sydney Red Gum), *Corymbia gummifera* (Red Bloodwood) *and Eucalyptus haemastoma* (Scribbly Gum) and it lists other native species that would have once occurred (section 2, page 5). OEH supports the proposed replacement of removed trees with the locally-indigenous *Angophora Costata* and recommends rather than plant exotic species, such as Little Gem Magnolia (which is native to the US) the proposed landscaping incorporates and plants other local provenance native trees listed in the AIAR.

It is noted other landscaping associated with the proposal includes roof planting (Section 4.15, page 88). Rather than plant exotic and non-local native species, OEH recommends any proposed landscaping associated with the proposal uses a diversity of local provenance native trees, shrubs and ground covers from the relevant local native vegetation community.

<u>Flood</u>

OEH has reviewed the Flood Impact Assessment (TTW, January 2018) for the modification proposal and provides the following comments:

- The planning proposal includes a new vehicle access on Pyrmont Street
- The updated modelling is acceptable and shows a decrease in flood inundation at Pyrmont Street.
- As stated in Section 6 table 11, the Flood Planning Level for Below Ground Parking is the 100 year ARI flood level +0.5m
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- If City of Sydney confirms the new flood planning level at this location and protection is required a flood gate is proposed. Further details on the flood gate need to be provided including:
 - How would this flood gate operate?
 - Would it be automatic or manual?
 - Who is responsible for the operation of the gate? etc.

The design is not compliant until the exact details of how the flood gate will operate is shown.

Aboriginal cultural heritage

The Aboriginal and Historical Archaeological Assessment indicates a total of 34 relevant stakeholders were contacted and 10 stakeholders registered an interest in the project (page 14). It

notes a copy of the consultation log with relevant Aboriginal stakeholders is attached to the document (see section 2.1.6, page 15) but it does not appear to have been provided. It is recommended a copy of the consultation log is provided.

(END OF SUBMISSION)

3 APPENDIX B - RECORD OF CORRESPONDENCE

FLOOD IMPACT ASSESSMENT PREPARED BY TTW Taylor Thomson Whitting

18 October 2018

The Star – Record of Telephone Conversation

Conversation with: Sandeep Thorat, City of Sydney, Senior Engineer –-Public Domain City Infrastructure & Traffic Operations 02 9246 7212

This Record of Telephone Conversation confirms the discussion regarding The Star development, Pyrmont, the proposed flood gates and the OEH submission stating that flood planning levels should only be applied where flood depths exceed 100mm. The telephone conversation was made at 12.47pm on 18 October 2018.

The following description to Sandep Thorat was made of the current situation regarding the submission by OEH to the Section 75W modification for the project approval for the Star City Casino Pyrmont (MP08_0098 MOD 13).

The existing flood characteristics were explained around The Star site. The existing Darling Harbour flood model results were explained that show significant flood depth at the low point in Pyrmont Street. It was explained that stormwater upgrades are proposed as part of the development to reduce the flood depth, however flooding would still occur at the low point in Pyrmont Street. I explained that OEH had stated that generally flood planning controls only apply to those areas where the flood depth exceeds 100mm.

Sandeep Thorat confirmed that City of Sydney Council apply flood planning controls to any areas at risk of flooding and not just those where the depth of flooding is greater than 100mm.

The use of flood gates as part of the proposed development was also explained. It was stated that due to the existing road and footpaths levels, and the exiting building structure a ramped access above the flood planning level could not be achieved, and that flood gates would provide a suitable solution.

Sandeep Thorat confirmed that City of Sydney Council can review development proposals for flood gates on a merit-based approach.

Prepared by: TAYLOR THOMSON WHITTING (NSW) PTY LTD

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EIRIAN CRABBE Associate

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Structural

Civil

Traffic Facade

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4 APPENDIX C - FLOOD GATE DETAILS



Born in the Dutch tradition and now the world's most successfull solution against floods





11 meter SCFB 1000

Solid and simple solution

We are proud to introduce to you the HYFLO Self Closing Flood Barrier SCFB™, a unique effective flood defense system to protect people and property from inland waterway floods caused by heavy rainfall, gales or rapid melting snow. This system has been developed to provide optimal protection against extreme high water levels. The HYFLO Self Closing Flood Barriers SCFB™ can be built in the top of a dike or quay to protect inhabited as well as industrial or other strategic areas. The Barrier systems have already been built and installed in many countries around the globe.

Key benefits

- NO WARNING SYSTEM and WARNING TIME REQUIRED the Self Closing Flood Barrier SCFB™ rises instantly through the rising water level
- NO MANPOWER REQUIRED the Self Closing Flood Barrier SCFB™ is not energy driven and operates without any human intervention
- SHORT CLOSING TIME with a fast flood the barrier will close within a minute
- NO STORAGE NEEDED in resting position the barrier is invisible and fully self protected
- FULL PROTECTION to commercial and residential communities
- **MAINTENANCE FREE** all applied elements represent the highest quality, with a unlimited time length
- EASY TO TEST By filling up the pit the barrier is lifted automatically and ready for inspection
- UNLIMITED LENGTHS -The HYFLO system can be built at any required length: 1 m 10 m 100 m 1000 m and more
- EASY TO INSTALL
- THE BEST PRICE / PERFORMANCE COMPACTION: without ongoing associated costs involving deployment, storage and maintenance.

Principle of the Self Closing Flood Barrier SCFB™





Following installation and in non-flood conditions, alL operational parts of the barrier are invisibly concealed in the ground inside its basin.





When floodwater rises to within 10cm below flood level, the enclosed basin, which houses the floating wall, starts to fill up through an inlet pipe from the adjacent service pit. The flood wall floats and rises. When the basin is totally filled, the angled support block will ' lock the barrier into position making it watertight.





The floodwater can now continue to rise without flooding the protected area.

As the water subsides , the flood water in the basin is drained by drain pipes with one way check valves. As the water continues to drain from the basin, the flood wall returns to its resting position within the basin and the lid seals the barrier to prevent the barrier of waste and debris.

Innovative, effective and proven defence.

This award winning concept has been acclaimed as the world's most effective protection against floods. The Self Closing Flood Barriers SCFB[™] have now become the leading flood defence device in its field. It has been in operational use around the globe since 1998 with a 100% success rate. The HYFLO barriers have already been operating more than 2.000 times in 14 years without worthy of mentioned maintenance.









Flooding Solutions Advisory Group, Australia

Various application possibilities of side locations.











123 meter SCFB 1000 protection of the town Cockermouth in the UK



123 meter SCFB 1000

"No more flood worries!"



Flooding Solutions Advisory Group 14 Page Street, Moruya NSW 2537

Phone: (+612) 44744711 Email: <u>info@floodingsolutions.com.au</u> Web: <u>www.floodingsolutions.com.au</u>