UTS

UTS Broadway Building

Drainage and Stormwater Report

REP/220377/0003

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Executive Summary

This report has been prepared to identify the implications of the proposed building development on the stormwater system in support of the Director General's Requirements for the construction of the new Broadway Building.

It addresses the following aspects:

- The implications of the relocation, realignment or augmentation of the affected stormwater services, and
- Potential impact on the storm water systems in the area and overland flow management.

Conclusion

Following analysis on the building's hydraulic services requirements there appears to be sufficient capacity in the authorities' stormwater system for the proposed building development.

- Adequate capacity in the stormwater systems has been identified for the Broadway Building.
- The design incorporates water sensitive urban design principles such as rainwater harvesting to minimise flows and prevent stormwater runoff together with onsite detention associated with new Broadway Building.

1 Introduction

This report is written in response to item 14 of the Director General's Requirements checklist in relation to the Broadway Building located on the UTS City Campus.

More specifically, the report addresses the key assessment requirements as detailed below:

14) – Drainage and Stormwater

Identify drainage and stormwater management regimes relating to the development

The DGRs do not include specific requirements for Erosion and Sediment Control. This assessment report covers the applicable considerations of an Erosion and Sediment Control assessment under the requirements of the City Of Sydney Council *"Guideline for Erosion and Sediment Control"*

The information in this report is based on available documentation and preliminary discussions with Sydney Water & City of Sydney Council.

Design development will be required to verify the assessments made in this report.

2 Stormwater

Water sensitive urban design principles such as rainwater harvesting will be implemented to minimise flows to the stormwater system as an alternative to stormwater on site detention.

2.1.1 Stormwater Design Proposal

Ground water at the perimeter of the underground car park will be directed to pump stations at the lowest level and pumped out to gravity stormwater system.

A gravity or syphonic roof drainage system will be installed to enable rainwater to be harvested from all areas of the main roof. A rainwater tank of approximately 100,000 litres (final volume to be determined based upon final cooling tower loads) is proposed to catch and store the rainwater within the roof plant room.

The stormwater from the Laneway glass roof will be collected via series of rainwater outlet and discharged to the rainwater tank located in the basement of the Broadway Building.

In addition to the collection of rainwater from the Broadway Building roof it is proposed the collection of runoff from portions of the existing Building 10 roof will also be harvested. This would require the existing rainwater downpipes in Building CB10 to be reconfigured to allow the rerouting of the rainwater to the new basement rain water tank (approx 100,000 litres dependent on potential uses) provided in the basement of the Broadway Building.

2.1.2 Existing Configuration

The existing site currently collects runoff into below ground drains and directs this storm water to existing Sydney Water / Council Stormwater system in Wattle Street through an existing ø300VC mm piped connection.

The existing connection in Wattle Street will remain in operation during and post construction and will attract no additional storm water load than that which currently exists on site.

2.1.3 Capability

Our preliminary calculations indicate that the existing stormwater drain in Wattle Street has sufficient capacity for the proposed building. (Refer to Appendix A)

2.1.4 Sustainability Initiatives

Collected rainwater will be used for:

- WC flushing
- Hose Tap wash down
- Landscape Irrigation requirements (TBC)
- Cooling Towers

Water Conservation measures to be incorporated include

- WELS star rated fixtures
- Dual Flush Toilets
- Water Less Urinals
- Rainwater storage / re-use tanks

2.1.5 On Site Detention

City of Sydney Council "Stormwater drainage connection information" notes the requirements for OSD in new properties.

ii) Requirements for On-Site Detention (OSD)

- Connection to Sydney Water or Other Public Utility Authority Drainage System

For development sites that connect directly to the Sydney Water or any other public utility authority drainage system, approval is subject to the owner complying with on-site detention conditions imposed by the owner of the drainage system.

-All other Development Sites and Subdivision Sites

For all sites generally greater than 250 m^2 OSD is required in accordance with the current Sydney Water guidelines. That is, the 100yr Average Recurrence Interval (ARI) post-development site run-off must be limited to the pre-development 5yr ARI site run-off. All run-off must pass through a silt trap located on the site, before entering the City's drainage system.
For sites < 1000 m^2 the applicant may make a case to the City for exemption from the OSD requirements based on site size, nature of development and proximity to the receiving waters.

City of Sydney Council "Stormwater drainage connection information" notes the requirements for OSD in new properties. OSD is required in accordance with the current Sydney Water guidelines. An application was submitted to Sydney Water to determine the OSD requirements.

The OSD requirements have been assessed and Sydney Water has no objection to the discharge of stormwater from the development to SW's stormwater system in Wattle Street. Sydney Water has determined maximum permissible discharge of 139l/s and a minimum on site storage of 70,000L is required for storage of the excess flow from a 100 year A.R.I design storm.

Final calculations and plans showing on site storage, size and volume are to be submitted for final approval to Sydney Water and City of Sydney Council.

The stormwater systems on site are performing adequately at present and this is taken as also confirming that the downstream drainage is adequate to service the redevelopment without requiring upgrade works.

Overland flow paths will be provided to ensure flows generated by local impervious surfaces and excess surface runoff will direct water away from the building. The overland flow paths will be collected within grated drains and pits and directed into the existing gravity drainage system.

3 Sedimentation and Erosion Control

An erosion and sedimentation plan will be formulated by the building contractor after detail design, staging and construction proposals have been completed.

3.1.1 Works Description

The contractor will be responsible for implementing the erosion and sediment controls as appropriate, the contractor will:

- Have responsibility for the installation and maintenance of erosion and sediment management controls. These controls shall be modified on site when required by construction schedules to ensure compliance with environmental legislation.
- Submit details of erosion and sediment management procedures for approval to Council at the same time as engineering drawings for each stage of the development. The site Erosion and Sediment Control Management Plan will include a schedule detailing the stages at which various management techniques will be in place.
- Stockpiled material will be protected to prevent them becoming a source of dust or sediment. Earth diversion banks upslope, cover crops of fast growing annual grass species or cereals, mulching and/or sediment containment measures shall be undertaken where stockpiles are to be located for more than 14 days. For periods of less than 14 days, the use of temporary perimeter banks and sediment fences is appropriate for daily protection.
- The contractor will be responsible for the restoration of the site and any adjoining affected lands where sediment deposition has occurred as a consequence of construction activity associated with the development.

3.1.2 Temporary Site Drainage

Stormwater runoff will be directed around or through the site in a non-erosive manner, using sandbags as appropriate.

As works progress, clean water from external catchments will be diverted around any disturbed areas of the site via catch drains. Runoff velocities and volumes will be controlled to prevent scour by the following methods:

- In the event of an imminent storm, sand bag barriers will be strategically placed at exposed areas, to eliminate the opportunity for scour.
- The reconfigured stormwater system will remain offline until the system is complete and the site is sufficiently stabilised. Swale sand / aggregate pillows in geotextile fabric will cover any existing stormwater inlets and gully inlets to prevent runoff entering the system prematurely.

3.1.3 Erosion Control (ESC)

A selection of the following measures is proposed to control erosion on the site:

- Straw bales wrapped in geo-textile woven fabric and fixed to the ground to withstand the erosive forces from a peak storm event (1:100yr 270mm/Hr) and shall be maintained by a cleaning program.
- Gully protection in the form of geotextile sand / blue metal filled fabric or filter socks across the grates of all gully inlets located directly downstream of the proposed construction works shall also be provided.

3.1.4 Sediment Control

It is proposed that site controls will be implemented within the property boundaries to control sedimentation as much as possible during construction, these controls generally include:

- Stockpiles will be set aside in protected areas of reduced grade
- Filter rolls at kerb-side inlets to include either crushed aggregate or coarse sand filtration and maintained by a cleaning program
- Water wetting of dust areas during dry weather
- Staged stripping of the site
- Sediment filters to retain solids coarser than .02mm
- The need for retention of runoff in sediment traps will be ascertained for each area of runoff depending upon the work methods and staging. Transport to and from site will be required to have covered loads.
- Water wetting of dust areas during dry weather
- Topsoil stockpiles and fill locations are to be bunded on the high side and runoff diverted to minimise the opportunity for scour and entrainment of sediment.
- The need for a Shaker Pad to remove excess spillage collected on construction vehicles is to be reviewed.

3.1.5 Pre-Construction Works

Before the commencement of construction activities, the following measures will be implemented to ensure minimal disturbance to the site:

- A Single site entry/ exit point to be established, sign posted, and agreed with Council's Designated Representative for the site;
- The need for a Shaker Pad to remove excess spillage collected on construction vehicles is to be reviewed.
- Define the location of any construction vehicle compound, site office and vehicle servicing area.
- Traffic routes to be established across the site;
- Establish diversion drain devices to divert runoff around potentially exposed areas and control site discharges.
- Sediment fencing to be erected.
- Sandbags to be placed along catch drains to slow flow, reduce scour and capture some coarse sediment from runoff in appropriate locations; and

- Educate site personnel to the importance of erosion and sediment control (ESC) measures and their maintenance.

3.1.6 During Construction

The Contractor is required to undertake a visual ESC monitoring and maintenance program for the site, to check that the ESC measures:

- Reflect this ESC Program (as approved by Council);
- Are maintained and fully operational at all times; and
- Are modified and/or supplemented as required to suit site conditions.

The nominated personnel should also obtain Bureau of Meteorology weather forecasts for the site and take appropriate action based on such forecasts.

A checklist for the monitoring and maintenance of the ESC program controls onsite is to be kept updated for the duration of works. The site supervisor, or a staff member chosen by the site supervisor, should undertake ESC inspections with the checklist on the following occasions during the works:

- At least weekly
- Prior to forecast rain
- At regular intervals not exceeding 14 hours during prolonged rainfall events
- Immediately after each rain event resulting in runoff from the site.

Should Council request additional erosion and sediment control measures be implemented during construction, these measures will be implemented in a timely fashion.

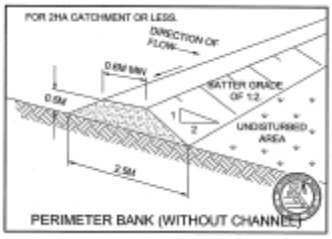
3.1.7 Post Construction

Following the completion of construction works, exposed areas where appropriate are to be turfed and landscaped in accordance with an Erosion and Sediment Control Plan for the site. Permanent stormwater mitigation devices will be brought online as early as possible.

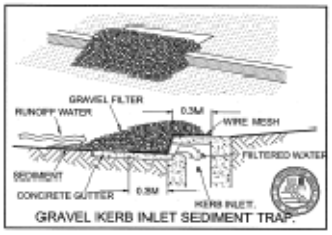
3.1.8 Typical sedimentation and erosion control measures

The final responsibility for erosion and sediment control measure will remain with the contractor; the following are a selection of examples that may be incorporated within the controls.

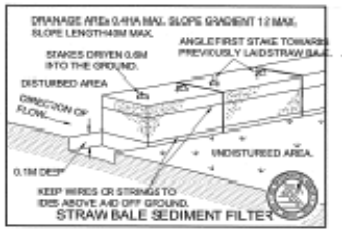
Final submissions will be made as the contractor develops the construction strategies.



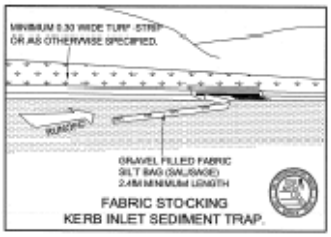
PERIMETER BANK (WITHOUT CHANNEL)



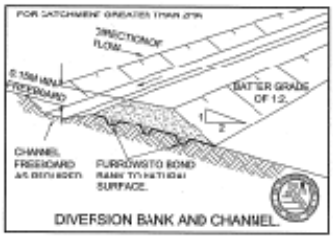
GRAVEL KERB INLET SEDIMENT TRAP.



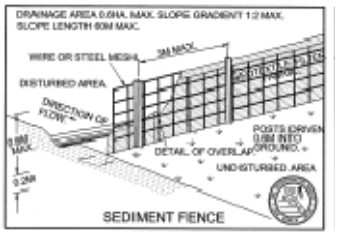
STRAW BALE SEDIMENT FILTER



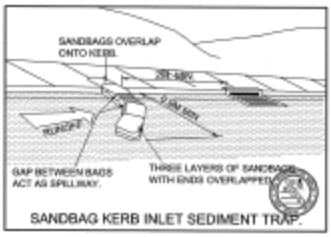
FABRIC STOCKING KERB INLET SEDIMENT TRAP.



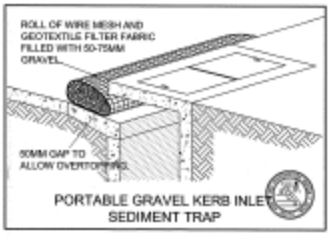
DIVERSION BANK AND CHANNEL



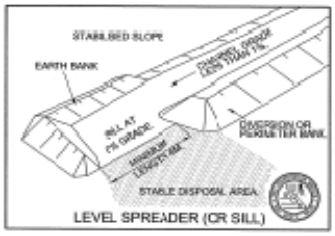
SEDIMENT FENCE



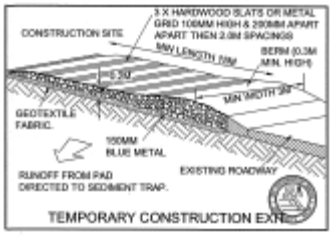
SANDBAG KERB INLET SEDIMENT TRAP.



PORTABLE GRAVEL KERB INLET SEDIMENT TRAP



LEVEL SPREADER (OR SILL)



TEMPORARY CONSTRUCTION EXIT

Appendix A

Stormwater Requirements

Sydney WATER

Telephone: 8849 4459
Fax: 8849 4228
Officer: John Hyde
Our Ref.: 2011/00354F

25 January 2011

Arup
201 Kent Street
Sydney

Attention: Mr Greg Kalisz

Dear Sir,

STORMWATER CONNECTION / ON SITE DETENTION REQUIREMENTS
University of Technology, Broadway, Ultimo

With reference to your email dated 25 January 2011 regarding the above subject.

Sydney Water would have no objection to the discharge of stormwater from the proposed development to Sydney Water's stormwater channel provided that the following conditions are fulfilled:

The requirements are to apply for a year from the date of this letter after which the requirements will be updated on reapplication.

1. An application fee of $375.90 is payable to Sydney Water.

2. On-Site Detention of stormwater will be required for stormwater connections. A maximum permitted site discharge (P.S.D.) of 139 litres/sec and a minimum on-site storage of 70 cubic meters is required for storage of the excess flow from a 100 year A.R.I. design storm (Total Site Area 3765 square meter).

3. The connection is to conform with Sydney Water's standard inlet conditions including provision of an appropriate silt arrestor and payment of appropriate inspection fees. Structural drawings showing the connection details should be submitted for comments prior to final approval.

4. Hydraulic calculations and plans showing on-site storage are to be submitted for final approval prior to commencement of any drainage works.

5. All costs associated with the proposal are at the applicant's expense.

6. Applicant should approach Council for their stormwater requirements including any floodway requirements.

7. Any structure within the zone of influence of stormwater channel require Sydney Water approval and should comply with "General Requirements for Building Adjacent to Stormwater Channel".

8. Any landscaping work within the zone of influence of the channel should consider the structural condition of the stormwater channel. If the stormwater channel is damaged as part of your proposed development work or landscaping work, then it is your responsible to repair the channel at your cost.

9. No machinery should be used within the zone of influence of stormwater channel which could affect the structural integrity of the stormwater channel.

Note: Upon completion of the work, the applicant is to submit a certified report from an appropriately qualified engineer or registered surveyor indicating that the OSD structure has been installed as per submitted plan.

Disuse of Stormwater on the Laneway

Sydney Water has no objection to the disuse of the stormwater pipe in the Laneway subject to the following conditions:

- Whole pipe in the laneway up to the pit on the Wattle Street must be disused
- You need to ensure that the pipe is only serving the UTS building and no other properties are connected to this pipe
- All the connections on the pipe need to be identified and redirected to the new private pipe.
- You need to engage Sydney Water accredited S2 constructor to disuse the pipe and property seal in the pit.
- Disuse of pipe is needed to be inspected by Sydney Water Civil Delivery. A schedule inspection fee is payable to Sydney Water prior to disuse the pipe.

If you have any questions about this Notice, you may contact the officer specified at the top of this notice.

Yours sincerely

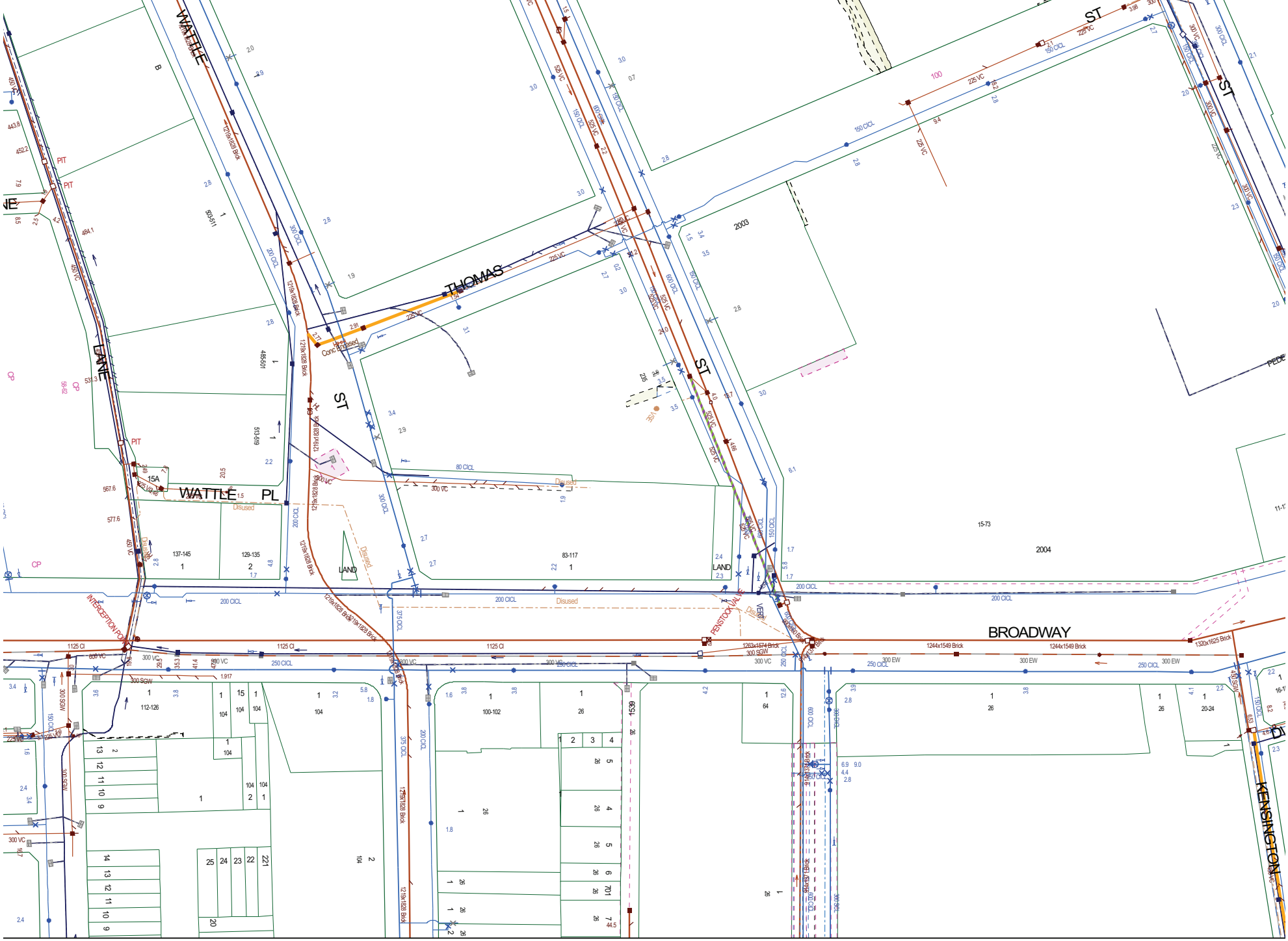
Jeyadevan

for John Hyde
Development Services Representative

Jeya Jeyadevan

Appendix B

Existing Stormwater Infrastructure



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