

9 September 2020

NL200900

Japrico Developments Pty Ltd
C/- Willow Tree Planning
Rachel Client Surname
Suite 4, Level 7, 100 Walker Street
North Sydney NSW 2060

Dear Rachel,

Re: 10 Young Street, West Gosford – Concept Engineering Design

Northrop Consulting Engineers have been engaged by Japrico Developments Pty Ltd to complete concept engineering design for the proposed mixed-use development at 10 Young Street, West Gosford. This correspondence has been prepared for submission to Central Coast Council (CCC) to support the Development Assessment (DA) application and considers the following:

- Concept Stormwater Management Strategy.
- Concept Utilities Servicing.

This correspondence should be read in conjunction with the concept engineering drawings (reference NL200900) for the development site.

A Flood Assessment Report has also been prepared for the development by Northrop (reference NL200900_E01) and should be read in conjunction with this concept report as part of the DA submission for the proposed development.

		Date
Prepared by	JH	09/09/2020
Checked by	AB	09/09/2020
Admin	BBR	09/09/2020

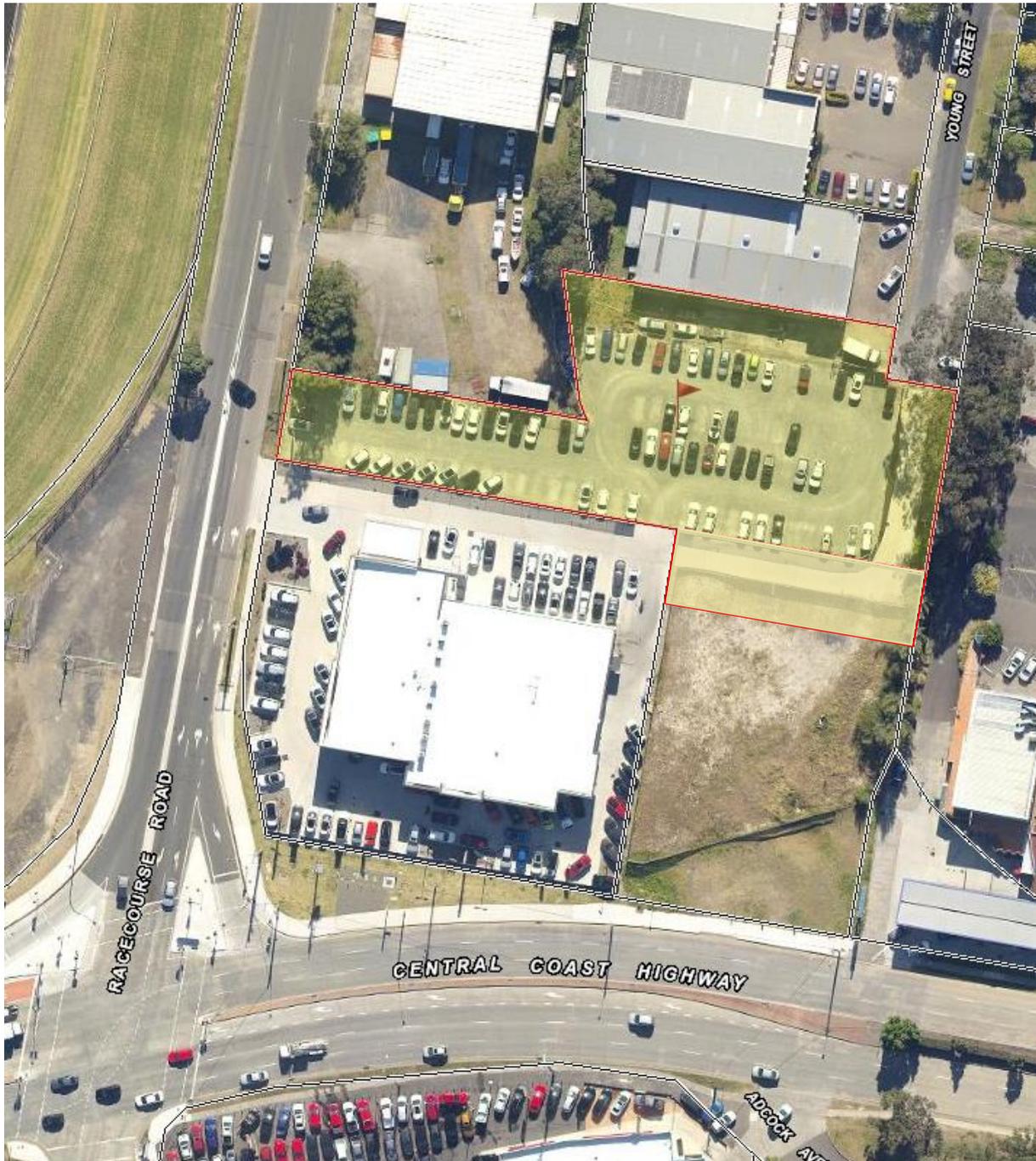


Figure 1. Proposed Site – 10 Young Street, West Gosford

The proposed development site, herein referred to as the 'subject site' can be seen above, highlighted yellow, and is occupied by hardstand pavement improvements to support the adjacent commercial car sales. The site is bordered by existing commercial premises on all sides and has a frontage to Racecourse Road to the west, as well as Young Street to the north. The Central Coast Highway can be seen along the bottom of the above aerial image (to the south of the site). The proposed architectural concept for DA is depicted below:



Figure 2. Architectural Concept (from Marchese Partners) – 10 Young Street, West Gosford

The above figure (provided by Marchese Partners) shows the proposed development looking north east towards the site from the western side of Racecourse Road.

The following Concept Stormwater Management Strategy is for the proposed mixed use development, including runoff from the roofed, paved and landscaped areas within the site, as well as the proposed upgrades to the roads along the eastern and southern sides of the site.

Existing Conditions and Infrastructure

The proposed development site is currently used primarily for storage of surplus vehicles from the nearby car sales yards. The site is also used for access to the adjacent mechanics through a right of way easement along the northern portion of the site, as well as vehicular pavement for through traffic along the eastern portion of the site. The natural topography of the site grades generally from north to south and east to west, towards Racecourse Road, at a gentle grade of around 1%. Detail survey confirms there is existing stormwater drainage infrastructure within the site. The existing site is predominantly compacted gravel hardstand pavement, with some areas of concrete hardstand pavement.

There is a significant amount of stormwater infrastructure within and surrounding the subject site. Council's GIS information suggests this infrastructure drains the subject site and surrounding upstream lots to the Central Coast Highway.

Site attendance and onsite investigation was undertaken to ground truth the detailed survey and Council GIS information. The following observations were made following multiple site visits:

- There is a high standing water level in the stormwater infrastructure both within and downstream of the site. Based on survey levels of existing stormwater pits, it is estimated that the standing water level within the stormwater infrastructure at the site boundary is approximately RL 1.0m AHD.
- No evidence of a stormwater pipe discharging the subject site to the Central Coast Highway was observed either during the site attendance by Northrop, or during the detail survey's undertaken by Delfs Lascelles Consulting Surveyors (16.09.2014) and by Cashmere Marler & Cavanagh Pty Ltd (17.08.2010).
- Piped stormwater is observed to discharge from the site near the north western corner to infrastructure within the adjacent lot to the north west. It is considered that this stormwater infrastructure conveys runoff to Racecourse Road.

A schematic summary of the stormwater infrastructure upstream, within and downstream of the site based on detailed site survey, Council GIS information and onsite investigation is appended to this report (please refer Appendix A).

Proposed Development

The proposal is for a mixed-use development of the site, including car showroom, hotel apartments and residential units. There will be a new access constructed to extend Young Street, along the eastern and southern boundaries, to Racecourse Road on the western site boundary. There is a right of way along the northern boundary of the site that is currently utilised as access to the mechanics on Young Street. It is proposed this will be maintained as part of the development proposal and will also be utilised by the development for access. These areas of hardstand pavement are defined by the orange hatch below. The top level of each building tower is proposed to include landscaped gardens and hardstand areas (noted pink on the below figure), as well as roof over (noted purple on the below figure). For the purpose of the below stormwater calculations, these have been considered as impervious areas. The deep soil pervious areas are generally defined as the green areas in the below figure.

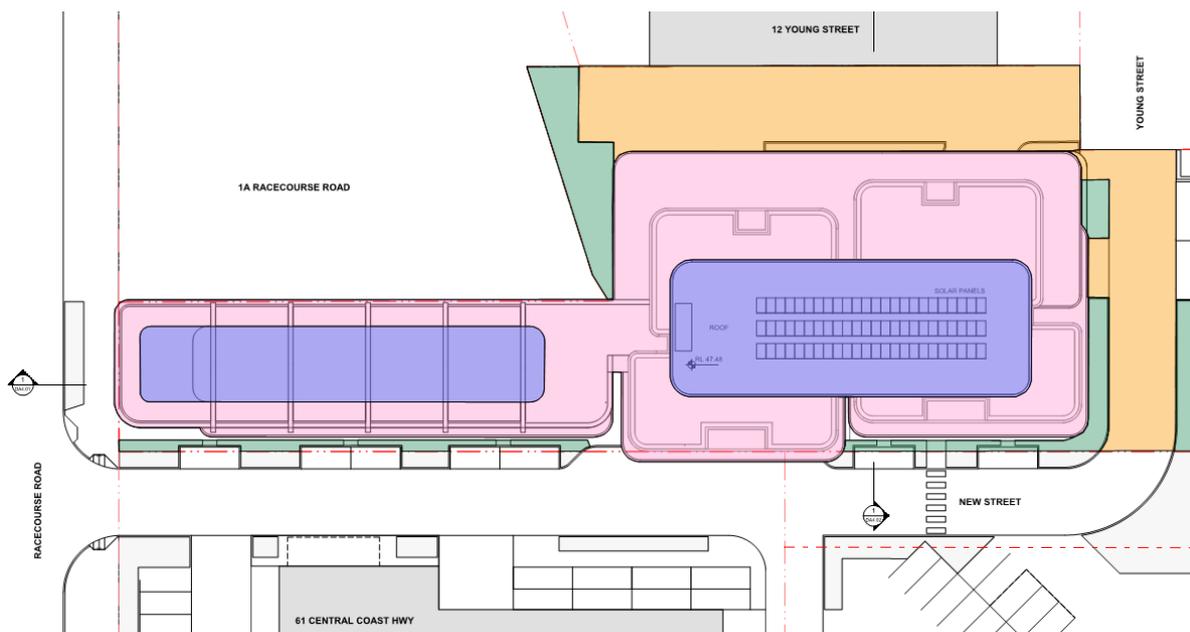


Figure 3. Proposed development

Stormwater Management Strategy

As part of the proposed development, new stormwater infrastructure is proposed to manage runoff from the mixed-use development and surrounding pavements. This new infrastructure is proposed to be provided to complement the existing stormwater infrastructure to improve the existing amenity of the stormwater drainage for not only the subject lot, but also the surrounding lots.

A Concept Stormwater Management Strategy has been developed to ensure stormwater pollutants within runoff from the proposed development are treated onsite to mitigate impacts on the downstream system.

In line with Chapter 6.7 of Council's DCP, rainwater reuse has been provided as a method of retention of stormwater runoff. The intention of stormwater harvesting is to maintain the natural catchment hydrology. To satisfy the intent of the retention targets it is proposed to incorporate stormwater source controls to the impervious catchments for the site. Sizing of controls is described in The Hunter & Central Coast Water Smart Model Planning document (HCCREMS, 2012). Sizing is based on the concept of mitigation of increased stormwater runoff arising from impervious surfaces, for rainfall events with an average recurrence interval of 3 months.

The depth of stormwater runoff that must be captured by the stormwater source controls in order to achieve frequent discharge mitigation is termed the mitigation depth. The mitigation depth for various soil types is shown below in Table 1.

Table 1: Mitigation Depth

Soil Texture	Mitigation Depth (mm)
Sand	14
Sandy Loam	14
Clay Loam	10
Clay	7

Based on visual observations onsite, as well as soil landscape information retrieved from the Office of Environment & Heritage NSW, the most comparable soil profile for the site is a Clay soil texture.

The volume of stormwater runoff that must be captured by a source control to achieve frequent discharge mitigation relative to the impervious surfaces that drain to the control is referred to as the mitigation storage and is calculated as shown below:

$$MS = (MIC \times MD) / 1000$$

where: *MS* = mitigation storage (m³)

MIC = managed impervious catchment (m²)

MD = mitigation depth (mm)

Using this method, the following mitigation storage for the impervious areas of the proposed development is calculated as shown below:

Mitigation depth = 7mm (clay soil type)

Mitigation area = 2,988m²

Mitigation Storage = [(2,988) x 7] / 1,000

= 20.9 m³

In accordance with the HCCREMS guidelines, the mitigation storage is typically doubled for rainwater tanks to ensure there is adequate storage available during rain events. However, given the relatively small roof area (approx. 850m²) available for capture of “clean” water able to be retained onsite, it is not proposed the mitigation storage is doubled in this instance. A total volume of 30kL of rainwater reuse is proposed to be provided onsite. This volume for reuse is proposed to be provided beneath the vehicle ramp from the ground floor to the first floor, near the northern right of way driveway.

Captured rainwater is proposed to be reticulated within levels 5, 6 and 7 of the residential units for use as toilet flushing. Based on guidance from Table 3-12 of the NSW MUSIC Modelling Guidelines (BMT), it is expected each 2 bedroom unit have a daily reuse demand of 0.125kL/day, which will result in a daily re-use demand of 3kL/day for the development. We note, by providing a 21kL reuse tank, the reuse demand can be achieved approx. 48% of the time (based on water balance information from MUSIC modelling). Should the mitigation storage volume be doubled (to 42kL, as suggested in HCCREMS), then the re-use demand will still only be met 55% of the time. This small increase in ability to meet the reuse demand can be contributed to the relatively small roof area compared to the reuse demand volume, and as such doubling the re-use volume is not considered appropriate. A volume of 30kL of rainwater reuse volume has been proposed to meet BASIX requirements.

Runoff from the remainder of the roof area will be captured in floor wastes and conveyed to the stormwater system at ground level.

Runoff from the new access driveway along the eastern and southern side of the development will be captured by a new stormwater system and conveyed to Racecourse Road.

Runoff from the access driveway along the northern part of the site will be captured by a combination of existing and proposed infrastructure and conveyed to the existing pit within the adjacent lot at 1A Racecourse Road, as per existing conditions.

It is proposed all new stormwater inlet pits within the development will be fitted with a proprietary pit insert for primary treatment of stormwater pollutants prior to discharge to Racecourse Road. As the site is currently occupied by existing hardstand pavements with no observable stormwater treatment devices. Providing the proposed proprietary pit inserts is considered a significant improvement on the existing site treatments. A significant amount of gross pollutants was observed during site visits within the existing stormwater pits, and it is expected the provision of pit inserts would be effective in reducing the volume of gross pollutants and other stormwater pollutants from entering downstream watercourses.

While it is noted Council would typically require additional stormwater quality improvement devices to achieve Council's pollution reduction targets identified in Table 11.1 of Council's Civil Works Specification Design Guideline, it is considered these devices would not be practical for the site given the high standing water level. Any infiltration, biofiltration or proprietary treatment device would require treatment below the water table. If there is constantly water in the treatment device, then treatment would not be able to be effective and the infrastructure would become a maintenance issue. As such, rainwater reuse onsite has been proposed as the most suitable means to mimic the existing conditions and provide retention for stormwater runoff.

Part of the proposed development works includes the realignment of existing stormwater infrastructure within the development site. The below modifications are proposed to be completed to facilitate the proposed development as well as improve the overall amenity for stormwater system that is currently treating the surrounding lots:

- Existing stormwater pipe that bisects the subject site and enters the adjacent site to the north and west (being 1A Racecourse Road) is proposed to be realigned. New infrastructure is proposed to be provided to realign this stormwater pipe along the new street to the south of the development directly to Racecourse Road. This is considered an improvement on the

current condition, as it will relieve the existing infrastructure to the north (which was observed to be heavily sediment laden) of additional catchment, as well as reduce the piped length for discharge of the subject site, as well as site immediately to the south, to Racecourse Road.

- The existing stormwater infrastructure that enters the site near its south-eastern corner and connects to the stormwater pit near the mechanics in the north is proposed to be redirected to the new stormwater infrastructure that runs along the southern accessway directly to Racecourse Road.
- The existing stormwater pipe that currently runs south down Young Street before heading east along the northern right of way towards Young Street is proposed to be realigned to convey the runoff entering the site from Young Street along the eastern and southern side of the development to Racecourse Road. This has been completed to alleviate the flooding impacts on the adjacent properties. Please refer to flooding report for additional information.
- The majority of the existing infrastructure (pit, outlet and inlet) was observed onsite to be overgrown and burdened by excessive amounts of sediment. It is proposed that this infrastructure is cleaned out and appropriate methods formalized onsite to minimize future sediment build up and improve conveyance of the downstream system.

It is expected the above modifications will provide formalisation and improvement to the existing stormwater infrastructure. Please refer to stormwater concept plans and Flood Impact Assessment for additional information on the proposed stormwater upgrades.

Pre-DA comments from Council required onsite detention to be provided to limit post development flows back to pre-development flows for all storms up to and including the 1% AEP storm event. Based on an extended period of site investigation, it was determined the existing standing water level for stormwater within the site and at the site boundary is approximately RL 1.0m AHD. Based on this observation, it is unclear what benefit providing onsite detention for even small events would have on the downstream stormwater infrastructure, given the invert level for an onsite detention tank would likely be in the order of RL 0.2m AHD. The onsite detention volume provided as part of the adjacent car dealership was observed during each site visit to have stormwater pooled within the tank, even on times when a rain event had not occurred in recent days.

Given the location of the site being at the bottom of the catchment, there is the potential that detaining stormwater onsite would result in stormwater being discharged from the site to coincide with the peak runoff from the upstream catchment, which could have the opposite effect of the intent of the onsite detention.

As noted above, 30kL of rainwater reuse is proposed to be provided onsite for rainwater reuse onsite, which will mimic the existing retention behaviour of the small portions of the existing site that are pervious.

Following the above, it is considered that providing onsite detention would not be practical for the proposed site or beneficial for the downstream infrastructure, and as such onsite detention has not been provided as part of the development proposal. The detailed modelling completed as part of the flood assessment has not included any onsite detention. Please refer to the Flood Impact Assessment prepared by Northrop for flood afflux as a result of the proposed development.

Concept Utilities Servicing

Pre-DA advice from Council (being the Service Authority) has confirmed there is water and sewer available to the proposed development site.

There is an existing Council water main that enters the site from Young Street which is expected to be maintained to service the proposed development.

There is an existing Council pressure sewer main that enters the site in the middle of the eastern boundary, and exists the site in the middle of the southern boundary. As the building footprint extends over a small portion of the existing Council sewer main, sewer relocation is proposed as part of the mixed-use development. The existing sewer main is understood to be a low pressure main (from information provided by Council). It is expected all works will be completed to Council requirements (as the service authority). Please refer to the concept civil services plan for proposed works and alignment.

Preliminary advice from Power Solutions has confirmed there is multiple connection points to the HV Ausgrid network for electrical servicing of the proposed development. Due to the increased demand, the development will require a substation, and provision has been allowed for a kiosk substation within the north eastern corner of the concept layout.

Flood Assessment

A Flood Information Letter (dated 28/05/2020) was obtained from Central Coast Council to identify the flooding behaviour for the site, as well as the flood related development controls which may be relevant for the property. Information provided by Council indicates the 1% AEP Flood Level for the site is RL 2.09m AHD, with the Minimum Floor Level being RL 2.59m AHD. It is understood these levels are driven by flooding from Narara Creek. Existing levels on-site range from 1.08m AHD to 2.59m AHD.

The above flood levels were observed when considering the finished floor levels for the mixed-use development. Following this, the proposed floor levels have been proposed for the following reasons:

- **Car Showroom – RL 2.09m AHD:** As the showroom is a commercial premise with no habitable areas, it is considered appropriate that the finished floor level may be set at the 1% AEP level. This floor level allows for better activation of the street frontage to Racecourse Road as well as the new street along the southern boundary of the development. There is onsite refuge above the PMF event available for all patrons and staff. Also, as the Narara Creek event is a regional event, it is considered there would be appropriate warning time to allow for a site evacuation or onsite refuge in an event. The critical 1% level from Narara Creek has a relatively low velocity at the showroom frontages.
- **Hotel Lobby – RL 2.28m AHD:** As the hotel lobby and reception is a commercial premise with no habitable areas, it is considered appropriate that the finished floor level may be set below the flood planning level. This floor level allows for better activation of the street frontage to the new street along the southern boundary of the development. Given patrons of the hotel are likely transient, there is onsite refuge above the PMF event available for all patrons and staff. Also, as the Narara Creek event is a regional event, it is considered there would be appropriate warning time to allow for a site evacuation or onsite refuge in an event.
- **Residential Lobby – RL 2.47m AHD:** The residential lobby has been provided with 380mm freeboard to the 1% AEP event from Narara Creek. We note, there is no habitable areas within the ground floor of the residential section of the building. This floor level allows for better activation of the street frontage to the new street along the eastern boundary of the development. Onsite refuge above the PMF event is available for all residents. Freeboard is also provided to the adjacent overland flow paths to the east and north.

A detailed Flood Impact Assessment has been completed by Northrop to review the impacts of the proposed development on surrounding flood levels. Flood events from Narara Creek, Brisbane Waters and the local Gosford City Centre were modelled to analyse the impacts of the surrounding sites. Please refer to NL200900 E01 Flood Impact Assessment prepared by Northrop for additional information.

On the basis of the above, it is considered the intent of the DCP is satisfied. We trust this meets your requirements, however, should you require anything further, please do not hesitate to contact the undersigned.

Yours sincerely,

Prepared By:



Jordan Hoey
Civil Engineer
BE (Civil) B Surv

Reviewed By:



Andrew Brown
Principal | Civil and Environmental Manager
BE(Environmental Hons) MIEAusT CPEng
NPER(Environmental and Civil)

Appendix A

NOTES

1. FEATURES SHOWN TO SCALE ACCURACY
2. THIS PLAN IS SUITABLE FOR DETAILED PLANNING AND DESIGN AT THE SCALES STATED. THE PLAN MAY NOT BE SUITABLE FOR ANY OTHER PURPOSE OR FOR USE AT ANY OTHER SCALES.
3. SERVICES LOCATED ONLY WHERE VISIBLE
4. THE LOCATION OF ALL UNDERGROUND SERVICES WHETHER SHOWN ON THE PLAN OR NOT, SHOULD BE PRECISELY DETERMINED BEFORE ANY CONSTRUCTION WORK COMMENCES AND MEASURES TAKEN TO PROTECT THESE SERVICES FROM DAMAGE
5. CONTOUR INTERVAL - 0.5m
6. THE BOUNDARIES SHOWN ARE APPROXIMATE ONLY. THE BOUNDARIES SHOULD HAVE BEEN COMPILED FROM THE RELEVANT DEPOSITED PLANS. FURTHER SURVEY WILL BE REQUIRED IF CONSTRUCTION IS TO TAKE PLACE ON OR ADJACENT TO THE BOUNDARIES
7. SURVEY BEYOND EXTENT OF SUBJECT BOUNDARIES HAS BEEN COMPLETED BY OTHERS

EASEMENTS

- (A) RIGHT OF CARRIAGEWAY 8.0 M (VIDE 9134361)
- (B) EASEMENT FOR SERVICES 8.0 M (VIDE 9134361)
- (C) EASEMENT TO DRAIN WATER 1.8 M 4.0 M (VIDE D.P. 101761)
- (D) EASEMENT TO DRAIN WATER 1.5 M (VIDE D.P. 1051029)
- (E) EASEMENT TO DRAIN WATER OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (VIDE D.P. 1103260)
- (F) EASEMENT TO DRAIN WATER OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (VIDE AC593239)
- (G) EASEMENT TO DRAIN WATER OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (VIDE AC593238)
- (H) EASEMENT TO DRAIN WATER OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (VIDE D.P. 1103260)
- (I) RIGHT OF CARRIAGEWAY 6.6 M 6.15 M (VIDE D.P. 1194024)
- (J) EASEMENT FOR SIGNAGE 4.0 M (VIDE D.P. 1194024)
- (K) EASEMENT FOR SERVICES 2.0 M (VIDE D.P. 1194024)
- (L) EASEMENT FOR SERVICES 2.0 M (VIDE D.P. 1194024)
- (M) EASEMENT FOR SERVICES 4.0 M (VIDE D.P. 1201057)
- (N) EASEMENT FOR SERVICES 2.0 M (VIDE D.P. 1201057)

LEGEND :

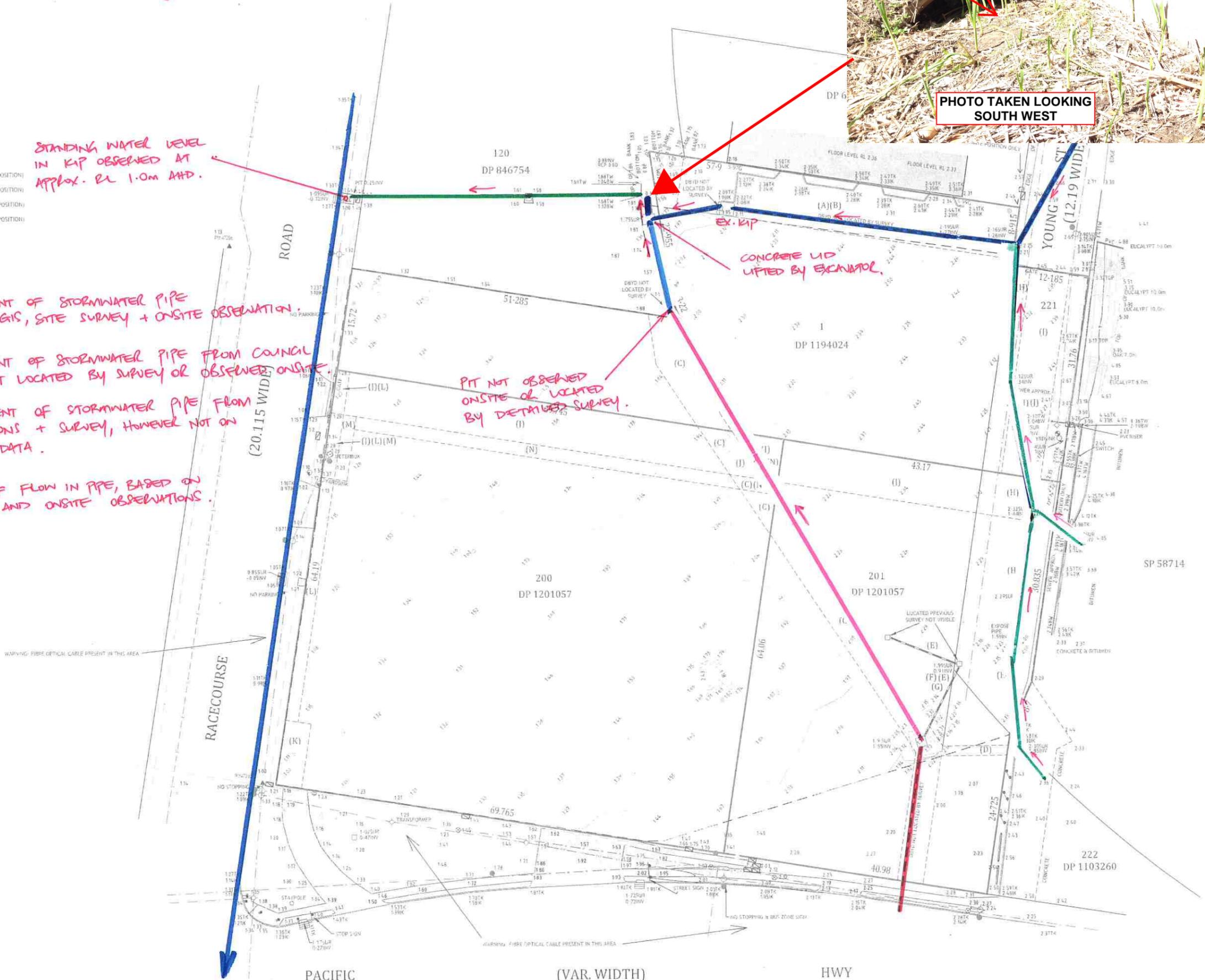
- DENOTES ALIGNMENT OF STORMWATER PIPE FROM COUNCIL GIS, SITE SURVEY + ONSITE OBSERVATION.
- DENOTES ALIGNMENT OF STORMWATER PIPE FROM COUNCIL GIS, HOWEVER NOT LOCATED BY SURVEY OR OBSERVED ONSITE.
- DENOTES ALIGNMENT OF STORMWATER PIPE FROM ONSITE OBSERVATIONS + SURVEY, HOWEVER NOT ON COUNCIL'S GIS DATA.
- DENOTES DIRECTION OF FLOW IN PIPE, BASED ON DETAILED SURVEY AND ONSITE OBSERVATIONS.

NL200900 - STORMWATER INFRASTRUCTURE FROM SURVEY AND SITE OBSERVATIONS.
 10 YOUNG ST, WEST GOSFOLD
 JH - 05.08.20



LEGEND

—	BOUNDARY LINE
- - -	ADJACENT BOUNDARY
- - -	DRAINAGE LINE
- - -	WATER LINE (DOMESTIC)
- - -	STORMWATER
- - -	OVERHEAD POWER LINE
- - -	ELECTRICAL LINE
- - -	TELSTRA LINE
- - -	OPTICAL FIBRE
- - -	SEWER LINE
- - -	GAS LINE
- - -	FENCE LINE
- - -	TOP & TIE OF BANKS
- - -	EASEMENT
- - -	MINOR CONTOUR LINE
- - -	MAJOR CONTOUR LINE
○	POWER POLE
○	LIGHT POLE
○	VENT
○	KERB INLET PIT
○	DRAINAGE PIT
○	STOP VALVE
○	HYDRANT
○	WATER METER
○	MONITORING WELL
○	SEWER MAN HOLE
○	SEWER INSPECTION POINT
○	NATURAL GAS MARKER
○	TELSTRA PIT
○	TELSTRA PILLAR
○	DENOTES TREE
○	DENOTES SIGNAGE
○	TS - TOP OF WINDOW SILL
○	BS - BOTTOM OF WINDOW SILL
○	G - GUTTER



STORMWATER PIPE DISCHARGES TO ADCOCK PARK
 STORMWATER CHANNEL IMMEDIATELY ADJACENT
 TO ENTRY ROUNDABOUT.