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23 December 2020

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Our ref: *D2020/133730*

Greater Sydney Place and Infrastructure
NSW Department of Planning, Industry and Environment
GPO BOX 39
Sydney NSW 2000

Dear Sir/Madam,

RE: Draft Mamre Road Development Control Plan

I refer to Draft Mamre Road Development Control Plan (DCP) package currently on public exhibition. The DCP package includes the Draft DCP for Mamre Road and supporting documents including a Flood, Riparian Corridor and Integrated Water Cycle Management Strategy. It is understood that the package supports the rezoning of the Precinct, which occurred in June under State Environment Planning Policy (western Sydney Employment Area) 2009 (WSEA SEPP). The draft DCP provides detailed design controls across the entire Mamre Rd Precinct, including built form controls, an indicative road network, drainage strategy, landscaping and environmental controls.

The Mamre Road Precinct rezoning has potential implications for the Warragamba Pipelines Corridor, which WaterNSW owns and manages. The Corridor borders the northern boundary of the Structure Plan and lies immediately downstream of the Precinct. The Corridor contains two pipelines which transfer water from Warragamba Dam to the Prospect Water Filtration Plant and neighboring Prospect Reservoir, and provide approximately 80% of Greater Sydney's water supply. The Corridor is a Controlled Areas declared under the *Water NSW Act 2014* and *Water NSW Regulation 2013* where public access is prohibited. WaterNSW has produced *Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines* (the Guidelines) to protect the Warragamba Pipelines Corridor and associated infrastructure from impacts associated with new development.

WaterNSW strongly supports the provisions of Clause 2.12 within the DCP that protect the Warragamba Pipelines Corridor from new development. These provisions will assist in reducing the risk of environmental impacts arising from nearby development, and allow WaterNSW to continue to maintain the serviceability of this critical water supply infrastructure. However, we hold a residual concern that the expected flooding impacts on the Corridor arising from development of the Precinct may be underestimated.

Our detailed comments on the DCP and the supporting Flood, Riparian Corridor and Integrated Water Cycle Management Strategy (Flood Strategy) are provided in Attachment 1. This includes suggestions to further refine the DCP provisions to improve their effectiveness in protecting the Corridor from new development and potential flooding impacts. We also make a number of observations regarding the associated Flood Strategy and potential implications of the Warragamba Pipelines (Attachment 2).

If you have any questions regarding the issues raised in this letter, please contact Stuart Little at stuart.little@waternsw.com.au.

Yours sincerely

CLAY PRESHAW
Manager Catchment Protection

ATTACHMENT 1 – WaterNSW comments – Mamre Road Development Control Plan (DCP)

General

It is difficult to assess the DCP provisions without the benefit of a masterplan. The DCP does not give effect to any master planning arrangement for the Precinct or for particular areas within it. Also, the potential flooding impacts implicate land areas outside the Precinct, particularly as the adopted 1% AEP flood extent of Kemps and South Creeks defines the western boundary of the Precinct (page 12). Land west of western boundary lies within the Wianamatta-South Creek Precinct of the Aerotropolis causing a disjunct between the development of the Mamre Road Precinct and the areas where flooding effects are likely to be hardest felt. While the development will impact on the floodplain and potentially rely on supplementary flood mitigation measures within it, the DCP is limited in its powers to control development on the floodplain and outside the Precinct boundary.

Structure Plan

The Mamre Road Precinct Structure Plan (Figure 2 of the DCP, page 11) is given effect by clause 2.1 and includes the location of critical infrastructure including the Warragamba Pipelines Corridor. While the Structure Plan shows the location of the pipelines, the objectives and controls of clause 2.1 do not currently protect the Corridor in any meaningful way. To this end, we believe that there needs to be an additional objective added to clause 2.1:

- To protect environmental, heritage, amenity, and existing critical infrastructure in the Precinct

We also ask that Control 2 be reframed to take into account impacts on *existing* infrastructure (e.g. the Warragamba Pipelines) as well as planned infrastructure. We request that Control 2 be reworded to read:

- When assessing development applications, the consent authority will consider the extent to which the proposed development is consistent with the Structure Plan, including cumulative and precedent implications *on existing and* planned infrastructure, and services and amenities.

In terms of the Structure Plan map itself (Figure 2), we request that:

- The term ‘Warragamba Pipeline’ which is positioned above the Corridor be amended to read ‘Warragamba Pipelines’ (plural). This is because there are two pipelines within the Corridor.
- An additional call-out box be added to the Structure Plan (Figure 2) pointing to the Warragamba Pipelines and stating ‘**Warragamba Pipelines Corridor** transferring water from Warragamba Dam to Prospect Filtration Plan and Reservoir’.

Development Adjacent to the Warragamba Pipelines

Clause 2.12 (page 40) concerns ‘Development Adjacent to the Warragamba Pipeline’. It includes one objective and seven controls, and is tied to any development occurring adjacent to the Pipelines as depicted on Figure 9 of the DCP. WaterNSW is strongly supportive of these provisions as they will help ensure the ongoing security and safety of the Pipelines during the future development on the Mamre Road Precinct. We particularly note and support the requirements of Control 1 which require consultation with WaterNSW, to ensure development is consistent with Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines, and requires any written requirements of WaterNSW to be submitted with the development application (DA), including provisions for how such requirements have been addressed. We note and support the other controls that apply to access, stormwater, fencing, earthworks and landscaping.

We only make minor suggestions for refinement, these being:

- Reference to the former Sydney Catchment Authority could be removed from Control 1 as the Guidelines are published by WaterNSW
- Throughout this clause and the wider DCP, the Warragamba Pipeline should be referred to as the Warragamba Pipelines (as there are in fact two pipelines within the Corridor) or Warragamba Pipelines Corridor (of which there is one)
- Control 6 should be reworded as road crossings of the Pipelines and Corridor should actually be avoided and discouraged. We suggest the following wording:
    - Road crossings should be designed to avoid the Warragamba Pipelines Corridor. Any proposed road crossing shall be designed and located in accordance with WaterNSW requirements.

We also ask that an additional control be added regarding design and seeking road reserve or public open space to adjoin the Warragamba Pipelines Corridor. We suggest the following wording paraphrased from the Guidelines:

- *New Control 8*: Developments including subdivision should be designed to make provision for a local road or street to be located between new development areas and the Warragamba Pipeline Corridor boundary. A soft landscaped verge, and/or footpath/bicycle path should be provided as a further buffer between the corridor boundaries and the local road carriageway. Subdivisions should not locate residential lots backing directly onto the Warragamba Pipelines Corridor.

We believe that the inclusion of this provision is critical in facilitating development designs that allocate a perimeter road abutting the Warragamba Pipelines Corridor and to avoid individual housing lots and buildings directly backing onto the Corridor. Without this provision, developer designs are reliant on building setback provisions (Table 10, discussed below) and the Guidelines which are secondary in their effect to any direct provisions contained in the DCP.

Building Setbacks

Clause 4.2.2 (page 61) discusses building setbacks. Control 1 makes reference to standards outlined in Table 11 (we believe that this should read Table 10). For 'Lots adjoining Warragamba Water Supply Pipeline (unless specified elsewhere in this DCP)', Table 10 identifies a 5 m building setback. We note that this is a building setback (i.e. building envelope) and not a setback for the building lots. We would ask that:

- the 5 m building setback for the Warragamba Water Supply Pipelines be adjusted to 20 m as provided for lots fronting designated roads and proposed Intermodal Terminal; and
- that the requirement for the building setback for the Warragamba Pipelines Corridor contain a footnote cross-referring to our new proposed Control 8 for 2.1.2 (described above) to ensure that developers first design their subdivisions with a perimeter road design in mind to buffer the Corridor from private housing impacts.

Other - Waterway Health and Water Sensitive Urban Design

We are generally supportive of the inclusion of specific provisions for waterways health and Water Sensitive Urban Design (WSUD), which also addresses stormwater management.

Under Control 1 (page 27), development must demonstrate how the proposed site design and WSUD measures contribute to the interim 'NSW Government stormwater catchment flow objectives for Wianamatta-South Creek Catchment'. Is this an actual document or objectives within a document? If the latter, then that document should be referenced here. This part of the DCP would also benefit by a weblink or a footnote indicating where these objectives can be found.

Control 1 also specifies that the combined effect of site design and site water sensitive urban design measures (including on-lot, on street and end of pipe measures) to contribute up to 1.9 ML/ha/year in mean annual runoff at any discharge point. Two points are relevant here:

1. The stormwater runoff objective of 1.9 ML/ha/yr has been derived from the Risk based Framework. This seems generous when the stormwater modelling delivered a discharge of 1.4 ML/ha/yr. This matter is discussed further in our comments on the Flood, Riparian Corridor, Integrated Water Cycle Management Strategy (below).
2. As discharge points appear not to be fixed, this potentially allows large volumes of water to be generated from development and then dispersed through multiple discharge points, potentially defeating the purpose of the control in retaining water on development sites.

There is no requirement or objective for post-development flows from a development site to be the same or less than pre-development flows.

Flood Prone Land – downstream impacts

Flood Prone Land provisions are provided under Clause 2.7.

Objectives

To better protect the Warragamba Pipelines from flooding impacts, WaterNSW requests that a new objective be included:

- To ensure development in the Precinct does not increase flood risk to downstream properties, land uses, and infrastructure.

Alternatively, Objective (f) could be modified to read:

- To reduce the impact of flooding on individual landholders and occupiers, *and on downstream properties, land uses, and infrastructure*.

Controls

The DCP provisions for Flood Prone Land (Clause 2.7) includes provisions for on-site stormwater detention (OSD). We support Control 16 which requires all flood detention to be accommodated on-lot within the development site. This will help preserve pre-development flows within the Precinct. This supports the assumptions made in the flood modelling of the supporting *Flood, Riparian Corridor and Integrated Water Cycle Management Strategy* prepared by Sydney Water (hereon, referred to as the Flood Strategy) which are is based on lot-based OSD provisions being incorporated into commercial/industrial areas. We encourage the department to liaise with Sydney Water to see if the provisions of Table 6 of the Flood Study also need to be incorporated into the DCP as design performance criteria.

Control 17 states that OSD must be sized to ensure no increase in the 50% and 1% AEP at the Precinct boundary or at Mamre Road culverts. However, allowance is made for local roads that bypass OSD and any vegetated trunk drainage system that increases peak flows through the precinct (Control 17). The Warragamba Pipeline lies under Mamre Road and we are concerned that this allowance may contribute to additional flooding and scouring of the Pipelines corridor in this vicinity.

We note that the flood modelling is based on culverts being upgraded and expanded to accommodate flows under Mamre Road. If flood risk is to be minimised and kept at levels stated in the Flood Study, then it is essential that the culverts are appropriately sized to the requirements of Table 15 of Appendix B of the Flood Study. To this end, Control 17 needs to be supplemented by provisions that facilitate this at the development application stage. We are also concerned that culverts passing beneath the Warragamba Pipelines have been assumed not to warrant upsizing (discussed later).

Riparian Land

Clause 2.5 addresses the objectives and controls for Riparian land. Control 21 states that 'water holding structures (e.g. farm dams)' of certain dimensions within 3 km of the approach boundary to the Western Sydney Airport, are to be avoided. It is unclear whether this is directing developers to avoid developing these dams (i.e. leading to the retention of these dams in the landscape) or seeking developers to avoid retaining them in the landscape. More clarity is required.

Farm dams

The DCP gives very little guidance as to whether farm dams are to be retained in the landscape or any requirements for geotechnical investigation as to whether they are fit for purpose. The flood modelling is based on farm dams being removed from the landscape and presents an argument that this reduces the area of land subject to inundation. The DCP might benefit by including an additional clause for farm dams identifying that any dams proposed for retention for water storage or stormwater management purposes be subject to a geotechnical report to determine the safety of the structure with respect to the change of use intended and taking into account current and future land-uses of the upstream catchment.

ATTACHMENT 2 - Flood, Riparian Corridor and Integrated Water Cycle Management Strategy

General

The exhibition of the *Flood, Riparian Corridor and Integrated Water Cycle Management Strategy* (hereon, referred to as the Flood Strategy) alongside the draft DCP has been beneficial to help provide an understanding of the stormwater and flood modelling undertaken, the assumptions used, and a broader context for water management and impacts likely to arise from development of the Precinct.

Warragamba Pipelines

The Warragamba Pipelines are influenced by several drainage features in the Mamre Road Precinct. Moving west to east, the Warragamba Pipelines pass over South Creek and then pass beneath Mamre Road. Areas of the Precinct that lie to the west of Mamre Road are flood prone and affected by the PMF (page 12). Further east, several drainage features pass beneath the Pipelines through several culverts (WP01 to WP04, see Figure A-7). The report notes that 'at the WaterNSW Warragamba Pipeline, overland flow crosses beneath the pipes despite there being several transverse culverts' (Page 38). Surface waters that are not directed through the many culverts, flow freely beneath the pipelines as overland flows.

As raised in our submission for the Mamre Road Precinct Rezoning Discussion Paper and Structure Plan (Our Ref D2019/148523; 18 December 2020), stormwater, flooding and floodwaters can impact on the Pipelines by eroding and undermining the supporting anchor blocks, damaging access roads, blocking and damaging existing stormwater management devices, and by generally preventing maintenance and management in flood affected areas. As the Pipelines are critical water supply infrastructure, it is essential they are safeguarded from stormwater and flooding impacts. Unmanaged overland flows are impacting pipeline assets in other locations and it is WaterNSW's preference for overland flows to be directed to dedicated drainage systems, without escalating the risk of failure to pipeline infrastructure. This is likely to also require upsizing of culverts (discussed later).

Section 6.6.3 (page 39) of the Flood Strategy discusses the 'WaterNSW Pipelines'. This section would be better entitled 'Warragamba Pipelines'. Also, there are two pipelines within the Warragamba Pipelines Corridor rather than one as inferred by the term 'pipeline'.

This section identifies that the Pipelines occur along the northern boundary of the site and require 'protection from erosion and scour at the four locations where local stormwater generated from the Precinct crosses into the easement'. It would be useful for this report to also identify that the Pipelines occur immediately downstream of the Mamre Road Precinct.

The report notes that flow velocities for the 5% and 1% AEP flood scenarios are similar in both pre-developed and post developed scenarios. It is recognised that peak velocities may increase and flow durations will be extended under 'developed' conditions. In terms of volumes, the report also notes that twice the volume of stormwater runoff under the proposed Parkland mitigation strategy rather than four times the runoff, as would be expected under a business as usual stormwater management arrangement (page 39). The information appears to draw from the outputs of Table 10. This statement needs to be justified by reference to appropriate tables or modelling. The issues of flooding and stormwater are discussed in more detail below.

WaterNSW requests that the actual expected velocity, volume, and flow rates pre- and post-development be included in the report (or otherwise provide to WaterNSW) for the location where South Creek flows under the Pipelines. This information is required to fully understand the expected impacts of the development on the Pipelines and to provide a baseline against which later monitoring and modelling can be conducted.

Flooding - Implications of Mamre Road Precinct Development to Flooding Risk for Warragamba Pipelines

It is difficult to ascertain the full impact of development of the Mamre Road Precinct on the flooding risk with respect to the Warragamba Pipelines Corridor. The Mamre Road Precinct includes land in the Ropes Creek catchment, but excludes Ropes Creek where it crosses the Warragamba Pipelines Corridor east of the Precinct. The hydraulic modelling also excludes Ropes Creek where it crosses the Corridor. The effect of the development on flood velocities, flow rates, duration and levels on Ropes Creek where it intersects with the Warragamba Pipelines Corridor is therefore unknown. Consequentially, it is unknown whether the proposed mitigation strategies will be sufficient to buffer the Pipelines from potential erosion and scour impacts potentially generated by development areas in the Ropes Creek catchment.

In the west, development of the Precinct influences the catchment of South Creek and the Kemps Creek tributary. This in turn potentially influences the flooding risk of South Creek where it intersects with the Warragamba Pipelines Corridor. The adopted 1% AEP flood extent of Kemps and Wianamatta South Creeks defines the western boundary of the Precinct (page 12). However, the 'Hydraulic Model Boundary' for the flood modelling appears to include land below the 1% AEP flood extent, extending beyond the western boundary of the Precinct and including areas of Kemps Creek and South Creek where it interests with the Warragamba Pipelines Corridor (see Figures A-7 to A-30 of Appendix A). Several points are relevant here:

- The modelling excludes the downstream confluence of South and Cosgroves Creeks. Development of the Mamre Road Precinct on the Warragamba Pipelines may have consequential impacts at this conjunction, rather than just at the location where South Creek crosses the Pipeline corridor.
- Curiously, most of the relevant hydraulic modelling maps (Figures A-9 to A-26 and A-29 to A-30 of Appendix A) carry the caveat that the flooding is depicted only for local catchments and 'is not shown in South, Kemps or South Creek' when the mapping itself appears to show it has been conducted for these areas. Also, is the double reference South Creek a double-up or should the caveat include the name of another Creek (e.g. Ropes Creek)? This inconsistency casts doubt over whether the maps can be relied upon for the South Creek and Kemps Creek locations outside the Precinct boundary. The text and Figures need to be clearer in articulating the area of modelling coverage.

The rest of this submission assumes that the modelling outputs includes the areas of South and Kemps Creek west of the Precinct boundary and up to the western boundary of Hydraulic Model Boundary. We have also assumed that the developed scenarios are based on the inclusion of On-Site Detention (OSD) measures unless otherwise stated.

Based on the flood risk modelling and comparison of 'existing condition' to 'developed conditions' maps (Appendix A, Figures A-9 through to A-30), the following implications are observed for the Warragamba Pipelines Corridor:

- As a general matter, the flood modelling associated with the 'developed' scenario is based on upsizing the culverts within the Precinct, including along the Pipelines, to the dimensions specified in Table 15 of Appendix B. If flows are not directed by trunk drainage to the culverts, and the culverts are not upsized, then the flood modelling cannot be relied upon. The DCP needs to include a mechanism that ensures developers provide trunk drainage and upgrades to culverts as per the location, size and other requirements of Appendix B.
- Flood depth, as based on modelling for the 5% and 1% AEP, and 1 in 500 AEP (i.e. 0.2% AEP) flood events, does not appear to be significantly altered in the South Creek area in terms of the depth or areas affected by flooding. However, the development appears to reduce the area of flooding in the vicinity of Mamre Road (see Figures A-9 cf A-18; A-10 cf A-19; Figure A-12 cf Figure A-20)

- Flood velocity, as based on the 5% and 1% AEP, and 1 in 500 AEP (i.e. 0.2% AEP) flood event does not appear to be significantly altered in the South Creek area. We note that for the 5% and 0.2% AEP scenarios, the area of land affected by flood velocities in the vicinity of Mamre Road is generally decreased although there appears to be an increase in flood velocity south-west of Mamre Road between Bakers Lane and Mamre Road near where the Pipelines cross under Mamre Road for (see Figure A-12 cf Figure A-21; Figure A-13 cf Figure A-22; Figure A-14 cf Figure A-23).
- Provisional flood hazard, as based on the modelling for the 5% and 1% AEP scenarios, appears to be largely unchanged except for a slight decrease in the area of affectation in the vicinity where the Corridor crosses beneath Mamre Road (Figure A-15 cf Figure A-24; Figure A-16 cf Figure A-25).

The Flood, Riparian and Integrated Water Cycle Management report also includes flood level differences (based on the 1% AEP) for scenarios where development occurs without and with OSD (see Figures A-27 and A-28, respectively). It is difficult to tell the full implication of these maps, as large areas of the floodplain are depicted as white which may either mean a Flood Level Difference of -0.01 m to 0.01 m or that they were beyond the modelling conducted. This throws confusion as to whether 'white' areas depict land where predicted flood levels are unchanged or whether they are simply unmapped

For development without OSD, the flood level for South Creek and the eastern areas of the floodplain are expected to rise from 0.01 to 0.05 m in the vicinity of the Pipelines Corridor. Development with OSD appears to make little change in the floodplain affectation areas of South Creek. However, the inclusion of OSD makes a significant difference to the drainage feature downstream of the Oakdale West Estate in where the drainage line crosses beneath the Pipeline (culverts WP01 and WP02), significantly reducing flooding risk in this area. With OSD, flood depths of this drainage feature are actually expected to decrease both north and south of the Pipelines. Inclusion of OSD is therefore a positive outcome for the management of the Pipelines at this location.

More broadly across the Precinct, the flood modelling shows that many areas will no longer be inundated, primarily from removing farm dams and chanellising flows. This is attributed to changes to the underlying terrain rather than a reduction in flow or volume. Again, this will depend on trunk drainage and upsizing of culverts.

Maps are also presented with 'people hazards' based on the 1% AEP scenario for developed conditions. Figure A-29 is based on the 'People Hazard ZPA' and Figure A-30 'People Hazard ZAEM'. The report would benefit by providing definitions for the ZPA and ZAEM acronyms and what the categories H1 to H6 stand for with regard to Figure A-30. The report would also benefit by explaining if these Figures are based on development with or without OSD. It would also benefit by providing baseline pre-development modelling for 'People hazard'.

Stormwater

With regard to the Warragamba Pipelines, we acknowledge the statement on page 33 which identifies that without stormwater detention within the Precinct, peak 1% AEP flows will increase in tributaries crossing the Precinct boundary and existing infrastructure including the Warragamba Pipelines. We are therefore generally supportive of the 'Parklands approach' stormwater provisions being proposed in the DCP. That said, several issues arise regarding the stormwater targets and modelling conducted, and the relationship of the stormwater management measures to the flood mitigation measures, particularly with respect to approaches to on-site detention (OSD).

The Flood Strategy adopts a stormwater runoff objective of 1.9 ML/ha/yr measured at any legal discharge point or estate boundary. This figure is carried across and adopted as a runoff objective in the DCP. The document states that this has been derived from the Risk Based Framework.

However, there is no evidence or documentation in the Flood Strategy report as to how this figure of 1.9 ML/ha/yr has been derived.

In contrast, the stormwater modelling compares a Business As Usual (BAU) traditional Water Sensitive Urban Design (WSUD) approach with a 'Parklands approach' to stormwater management, the latter deriving a 1.4 ML/ha/yr figure for residual runoff (Table 10). This figure is supported by MUSIC modelling (page 50) and the various hydrology scenarios before and after development as presented on Table 10 (page 51). The modelling for the Parklands approach is based on parkland typologies, rainwater tanks, street trees and infiltration, open water, wetlands and storages, stormwater detention basins, bypass pipelines, and baseline hydrology (Figure 7-5, p 50). The modelling suggests that a 1.4 ML/ha/yr is a more feasible target and that the 1.9ML/ha/yr may be allowing industrial development to potentially undersize onsite OSD, increasing the reliance on other treatment measures (e.g. bioretention basins) in the floodplain for stormwater retention and treatment. This is also of concern as the adopted 1% AEP flood extent of Kemps and South Creeks defines the western boundary of the Precinct (page 12), meaning that any stormwater management measures, or indeed flood mitigation measures, on the floodplain is potentially beyond the provisions of the DCP.

The stormwater modelling and flood modelling are also based on different assumptions including imperviousness (Table 3, page 20). Both also refer to OSD, although they are talking about different structures for different purposes. This could have ramifications for OSD requirements in the DCP which may need to distinguish between OSD for flood detention and OSD for stormwater retention, or use different terms for the different measures and their respective purpose. The document needs to clarify how the 'Parklands approach' to stormwater management sits with the OSD measures proposed and used in the flood modelling. Are the two modelling processes relying on the same land for different functions? Are they proposing different measures in different areas? Are some measures in some areas critical for the desired outcomes and modelling used and thereby warrant greater emphasis in the DCP? These questions need to be addressed.

Risk of Impacts

Modelling of stream flow volumes at the Kemps and South Creek confluence indicates increasing volumes despite a relatively low increase in catchment development and the use of water sensitive urban design (WSUD) in new development (Page 53). The Flood Strategy further states that even with 'traditional WSUD approaches (BASIX rainwater tanks, biofiltration and detention to achieve stormwater pollution reductions and the Stream Erosion Index), the forecasted urban growth in the catchment will likely result in double the Mean Annual Runoff Volume in Kemps, Ropes and South Creeks, and generate more than five times the runoff volume in first and second order waterways' (Page 53). Such changes in volume can have major long-term implications for the Warragamba Pipelines and the stability of anchor blocks during large runoff and flood events. Based on the flood maps, this change in volume is not projected to result in any significant change in flood height at the confluence (See Figure A-28). In fact, there appears to be an overall reduction in flood height in South and Kemps Creeks adjacent to the Mamre Road Precinct. This suggests that the increase in volumes are likely to be accommodated by longer flood durations. More information is required regarding the relationship between flood volume, height and duration to help substantiate the stated increases in volumes and the projected decreases in flood level as modelled.

Further to the above, the Hydraulic Model Boundary stops just before the confluence of South Creek and Cosgroves Creek. This junction lies in close proximity to the Warragamba Pipelines. This confluence will be subject to the combined effect of the development of the Mamre Road Precincts, the Aerotropolis precincts and potential dry and wet weather flows from the proposed South Creek Advanced Water Recycling Centre. Due to the assigning of the Mamre Road Precinct to the WSEA SEPP and the Aerotropolis Precincts to the Western Sydney Aerotropolis SEPP, we are concerned that we are unlikely to see flood modelling of the cumulative effect of these Precinct development on the Pipelines at this confluence.

Regional Wetland facilities

Section 7.5 (page 57) notes that the most cost-effective way to achieve stormwater volume load reductions is via open water bodies. This section advocates that master planning of the Wianamatta South Creek Precinct will be able to integrate regional wetlands and waterbodies and thereby offset the need for wetlands and open water to be distributed through the Precinct on private lands. This approach seems be in conflict with the DCP's approach to requiring OSD to be kept on-site. Further, this section recommends that such waterbodies not be implemented until at least 80% of the catchment is developed. This section would benefit by better describing the relationship between the wetlands and open water measures proposed and the need for OSD advocated elsewhere in the Flood Strategy for stormwater and flood risk management purposes. It would also benefit by clarifying that wetlands interim sediment detention basins are generally used during the development process for stormwater management and that the artificial wetlands are not created earlier due to risk of sedimentation. The report would also benefit by describing how responsibilities for flood and stormwater management will be managed between the Wianamatta South Creek Precinct Plan the Mamre Road Precinct DCP for the management of flood and stormwater flows originating from the Mamre Road Precinct.

Culverts

The Flood Modelling allows for the upsizing of the culverts at Mamre Road in the vicinity of where Mamre Road crosses the Warragamba Pipelines (Culvert XD 17). However, it does not allocate any increase in size for the culverts crossing the Warragamba Pipelines (WP01, WP02, WP03, WP04) (Table 14 cf Table 15, Appendix B). It is unclear why the post-development flood risk for most other areas of the Precinct, including Mamre Road, is reliant on upsizing of culverts, but the culverts along the Pipelines are not upsized in the modelling? WaterNSW seeks further advice on why the developed scenario would not require upsizing of the culverts along the pipelines.

We believe that the development of the Mamre Road Precinct is likely to increase the water volumes received at the Pipelines Corridor. As such, we believe that the flooding and stormwater risk at the Pipelines has been underestimated and as a consequence infrastructure augmentation (i.e., to upsize to culverts) is likely to be required. We are concerned that this has not been factored into the modelling or related DCP provisions. Any cost to upgrade the culverts to accommodate changes in flows resulting from the development of the Mamre Road Precinct should be borne by developers and not WaterNSW.

Draft South Creek Floodplain Risk Management Study

Reference is made to 'Recommended changes to the DCP by the FRMP' (Page 16). It is very ambiguous what this section is actually requesting. The FRMP and FRMS are not defined and presumably relate to the Draft South Creek Floodplain Risk Management Plan and Study, respectively. The relevant DCP is also not defined, so it is unclear whether the stated recommendations of the FRMS are intended for incorporation into the Mamre Road DCP or not.

The FRMS only refers to recommended changes to the Penrith DCP. The FRMS also lists additional recommended criteria for the DCP ('the flood liability and flood hazard of surrounding land is not adversely affected by the development'; 'no local drainage flow/runoff problems are created by the development'; pages 132 and 133 of the exhibited Draft FRMS). Of the recommended changes, only 'the potential for cumulative effects of possible development proposals in that area is minimal' appears to have been adopted in the Mamre Road DCP (see Control 19 of Clause 2.7). WaterNSW recommends that DPIE approach Sydney Water to clarify whether the flood controls listed on page 16 of the Flood Study and pages 132 and 133 of the exhibited Draft FRMS should be incorporated as additional controls into Clause 2.7 Flood Prone Land of the Mamre Road DCP.

Large Dams

The Flood Strategy briefly discusses the presence of large farm dams in the floodplain. It identifies that the Kemps Creek Dam (24.7 ha) as being a significant hydrologic feature in the catchment which likely contributes baseflow to the downstream reach by retaining wet weather flows and recharging the groundwater table. It also identifies that the Wianamatta South Creek Dam, another significant structure, has been 'partly demolished leaving a breach in the dam wall that allows the passage of stream flows' (page 11). The base of the dam still provides retention of water and has significant capacity to retain stream flow and recharge groundwater (page 11).

In our correspondence of 18 December 2019 on the Draft Mamre Road Structure Plan and Mamre Road Precinct rezoning (Our Ref: D2019/148523), WaterNSW raised concerns about the risk of the Industrial rezoning and development contributing to increased flows into the Kemps Creek Farm Dam, and the potential risk of farm dam failure. We asked that this be assessed as a priority and prior to rezoning proceeding. This risk is also relevant to other downstream land uses and users. We ask that the Department make provision for a geotechnical assessment of both the Kemps Creek and Wianamatta South Creek Dam to ensure they are structurally sound given the expected change in upstream land uses and that this occur prior to any development occurring in the Mamre Road Precinct. While this is probably a matter outside the scope of the DCP, it is directly relevant to the management of the overall Mamre Road and Aerotropolis precincts.

Other

Page 16 uses the acronyms 'FRMP' and 'FRMS' seemingly synonymously and without defining what either means. The report would benefit by stating full terms and then placing the relevant acronym in brackets. Presumably, these relate to the draft South Creek Floodplain Risk Management Plan and Study, respectively.

In Appendix A, Figures A-13 and A-21 appear identical. These figures show the existing flood velocities for existing and developed conditions, respectively. Based on comparison to Figures A-12 and A-14, we suspect Figure A -13 is erroneously showing flood velocities for developed conditions. Please check these maps.

Table 15 Appendix B appears to be missing information for culvert XD33 and includes an additional culvert XD25b. The location of various culverts is also missing from a number of the 'developed conditions' maps. Thus, there appears to be an inconsistency in modelling requiring upsizing of certain culverts but with the maps suggesting that such culverts are not needed (e.g. XD 27, XD 28, XD30, XD32, XD33 (see maps A-18 to A-20 by way of example).