

The Northern Road Stage 5: Response to Issues Raised

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Acknowledgement of Country

Transport for NSW pays respects to Elders past and present and recognises and celebrates the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of NSW.



Executive Summary

Property owners along Stage 5 of the Northern Road Upgrade project have raised concerns about the impact of the works with the MP for Mulgoa. Stage 5, between Littlefields Road, Luddenham and Glenmore Parkway, Glenmore Park opened in late 2021. Remediation and property reinstatement works continue to a limited extent along this stage of construction during 2022.

Key issues raised have been separated into four categories:

- flooding and drainage
- property adjustments
- project design
- noise impacts.

This report summarises the issues raised, outlines Transport for NSW's response to the issues and indicates the next steps.

Flooding and drainage

The Environmental Impact Statement for the project committed to design and mitigation measures to protect proposed operations and not worsen existing flooding characteristics during construction and operation. The independent preconstruction report in November 2020 included flood investigation and drainage modelling. Post-construction analysis in March 2022 largely indicated that water flows were aligned with the earlier modelling and occurred as predicted. However, some areas have been identified as requiring rectification, including the area of the TransGrid site.

Property adjustments

Transport considers that property adjustments for The Northern Road Stage 5 have been completed to the scope and standards set out in property adjustment plans agreed with owners at the beginning of the project. Transport acknowledges that property adjustment processes can be complex for major projects and will learn lessons for future projects around clear and ongoing engagement with owners.

Design issues

Many issues raised by residents are outside the scope of the project including issues on Defence Establishment Orchard Hills site (Defence site), Council land or Council Roads. Transport continues to discuss issues around asset handover and maintenance with Penrith City Council.

Noise issues

Pre- and post-construction noise monitoring is a regulatory requirement for this project. A post construction noise assessment was completed in August 2022 which showed that the noise levels predicted pre-construction have not been exceeded when the project is operational. This means that no further noise abatement is required as part of the project. All affected property owners have been contacted regarding final noise monitoring readings.

Next steps

Transport will commence additional works in early 2023, weather permitting and pending access. This includes:

- Works on the TransGrid site at 2047 The Northern Road, Glenmore Park will include the removal of soil to bring the property back to the original level, as well as additional treatment to verges south of the area
- Add steel plates on culvert on eastern side of The Northern Road, Glenmore Park, to improve drainage system performance
- Following engagement with residents, remediate the area around the crossroad culverts, including installation of turf strip alongside the swale immediately south of the TransGrid site and remove rubble as required to facilitate property maintenance
- Cut narrow drainage lines upstream of identified driveways to allow trapped overland flows to drain into the adjacent swale on the road reserve

Introduction

Background

The NSW and Australian Governments have invested \$1.7 billion to upgrade The Northern Road improving connectivity between the growing communities across Western Sydney, as well as to the future Nancy-Bird Walton Airport and Aerotropolis.

Construction of the 36-kilometre upgrade began in 2016 and was completed late 2021.

The upgrade was delivered in six sections to minimise the impacts on customers during construction and to deliver benefits earlier through a staged approach.

Stage 1: The Old Northern Road, Narellan and Peter Brock Drive, Oran Park

Stage 2: Peter Brock Drive, Oran Park, and Mersey Road, Luddenham

Stage 3: Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith

Stage 4: Mersey Road, Bringelly and Eaton Road, Luddenham

Stage 5: Littlefields Road, Luddenham and Glenmore Parkway, Glenmore Park

Stage 6: Eaton Road, Luddenham and Littlefields Road, Luddenham

The upgrade provided:

- Two lanes in each direction with a median allowing for an increase to three lanes, when required.
- Kerbside bus lanes
- Shared pedestrian and cycle paths
- Diversions around Luddenham and Bringelly Townships
- Landscaping along the entire length of the upgrade.

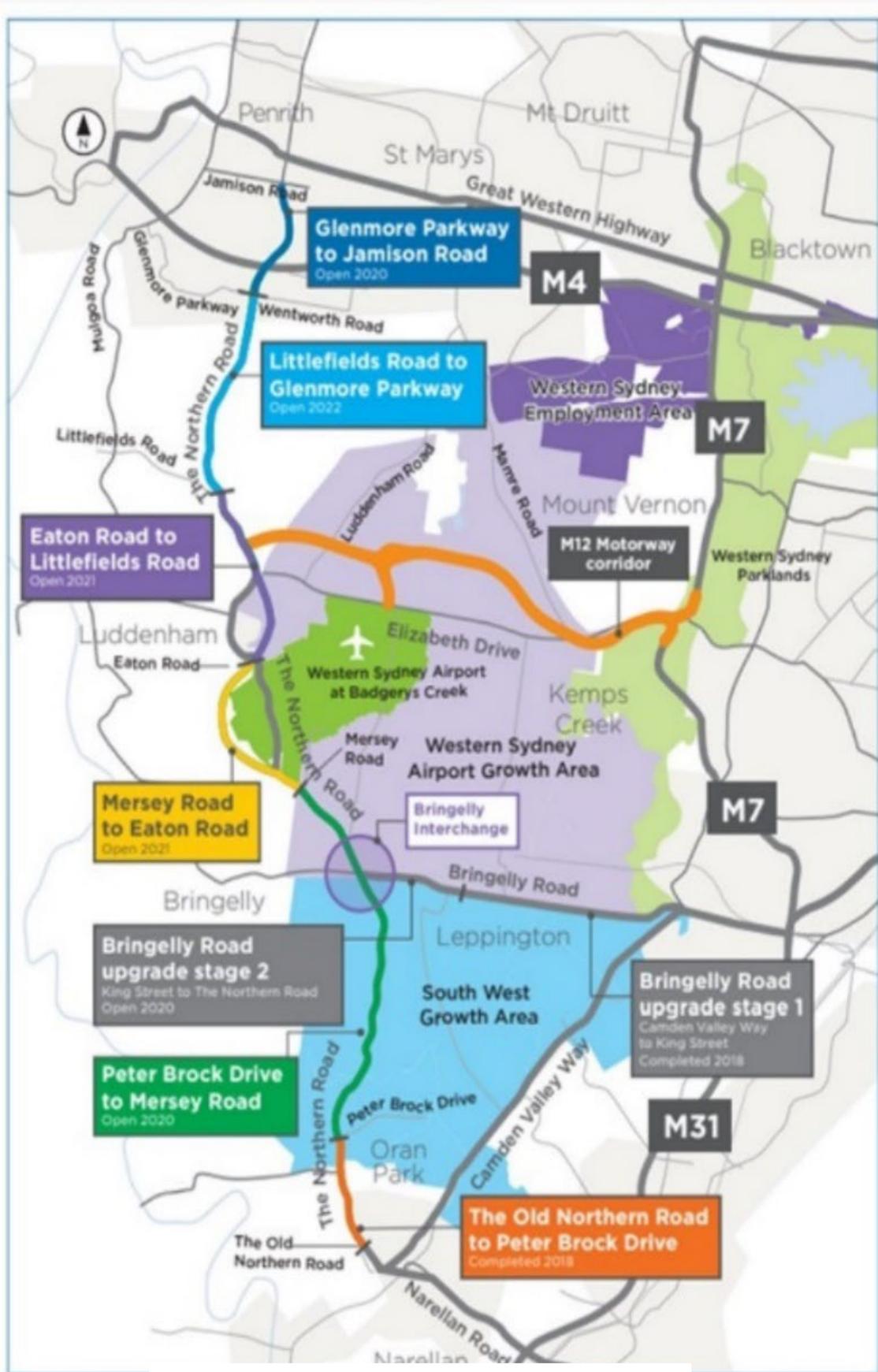


Figure 1: The Northern Road Upgrade project Map

Project Overview

The Northern Road Stage 5 is a seven-kilometre section of the project between Littlefields Road, Luddenham and Glenmore Parkway, Glenmore Park. Key features of the upgrade included:

- Two lanes in each direction with median allowing for widening to six lanes, when required
- Three lanes in each direction with median and dedicated kerbside bus lanes between Bradley Street and Glenmore Parkway
- Three new traffic lights at Littlefields Road, Kings Hill Road and Chain-O-Ponds Road
- Two new U-turn bays and two new roundabouts for ease of access
- Access to Defence Establishment Site Orchard Hills with traffic lights and a U-turn facility
- Upgraded intersection at Bradley Street with U-turn facility
- Bus priority lanes at all traffic lights
- A three-metre-wide off-road shared pedestrian and cyclist path.

The project is a Critical State Significant Infrastructure (CSSI) project assessed as application SSI-7127. The project's Environmental Impact Statement (EIS) was assessed by the Department of Planning and determined, with Ministers Conditions of Approval, by the Minister for Planning in May 2018.

The contract for delivery of this project was awarded to CPB Contractors in 2019 and the project was open to traffic in November 2021.

As part of the project, Transport for NSW (Transport) and CPB Contractors engaged with stakeholders throughout the life of the project. This includes nearly 6,000 interactions via several communication methods, as follows:

Method of communication	Number of interactions
Community Updates	180
Doorknock	84
Email (incoming)	659
Email (outgoing)	1731
Letters (Outgoing)	200
Meetings	447
Phone (incoming)	459
Phone (Outgoing)	1371
Phone (outgoing)	160
SMS	385

Table 1: The Northern Road Upgrade Stage 5 Methods of Communication

Consultation Approach

Consultation objectives

Since project completion in November 2021, residents living along The Northern Road Upgrade Stage 5 have raised concerns about the project’s impact on properties and the wider area.

Some of these concerns have also been raised with the Local Member for Mulgoa, Tanya Davies. Transport has engaged with the local member and residents to address issues raised.

The purpose of this engagement was to:

- Obtain feedback from the community about project impacts
- Consider the need for further mitigation measures
- Keep residents informed of Transport’s activities and proposed next steps.

How engagement was completed

Transport has engaged with residents directly. Residents have also raised issues via the Member of Mulgoa, Tanya Davies. Feedback from the following engagement activities is included in this report:

Engagement Activity	Details	Participants
Face to face meeting	Wednesday 27 July 2022	<ul style="list-style-type: none"> • Eleven residents/ community members • Representatives from the Minister for Metropolitan Roads • Member for Mulgoa and Electorate Office staff • Representatives from Transport
Correspondence from residents via the Member for Mulgoa	Tuesday 30 August – Tuesday 6 September 2022	<ul style="list-style-type: none"> • Four property owners
Onsite meeting	Friday 28 October 2022	<ul style="list-style-type: none"> • Two property owners • Member for Mulgoa and Electorate Office staff • Representatives from Transport • Independent flood consultant

Table 2: Engagement Activities

Summary of Issues

Since the upgrade was completely open to traffic in November 2021, the project team has continued to engage with stakeholders and community members, as necessary. Residents on eastern side of The Northern Road, on approach to the intersection of Glenmore Parkway, have had ongoing engagement with Transport to outline their concerns with the project during delivery and post completion, including the 2021 and 2022 major weather events. The main issues raised include:

- Flooding and Drainage
- Property Adjustments
- Project Design
- Noise Impacts.

This report provides details of the issues raised, Transport's responses to the issues and outlines next steps. Transport has avoided identifying residents and their specific concerns in this report and therefore some responses are generic in nature.

Flooding and Drainage

Residents' concerns about flooding and drainage have been raised during the engagement period. Concerns raised included impacts of civil works on water flows, drainage design and remediation, requests for clarification of design rationale, and resolution of damage caused by water from the 2021 and 2022 major rain events.

Flood Investigation and Drainage Modelling

The environmental impact of the Northern Road Upgrade outlined in the project's Environmental Impact Statement (EIS) submitted to Department of Planning for assessment and approved by the Minister for Planning in May 2018, is to provide design and mitigation measures to protect proposed operations and not worsen existing flooding characteristics during construction and operation. This includes the area in and around the creek flowing past the Orchard Hills Water Filtration plant west towards the Northern Road through 2047 The Northern Road (the TransGrid site) and continuing north-east toward Glenmore Park.

The project entailed significant waterflow investigation and engineering. The preconstruction report by Lyle & Associates included flood investigation and drainage modelling. Following construction completion and after the period of heavy rainfall experienced in 2021 and 2022, the consultants performed post construction analysis in March 2022, which largely indicated that water flows were aligned with the earlier modelling and occurred as predicted, except in the area in the Trans Grid site, which has been identified by Transport for remediation work in early 2022. This was communicated to the residents in the face-to-face meeting held Wednesday 27 July 2022.

Flood issues status

Flood modelling investigations have revealed that flooding conditions have not been worsened by the Northern Road Upgrade project, in line with the commitment provided in the project's EIS. The project team as well as an independent flood consultant found that the design and construction of water management features has been effective and did not contribute to flooding in the area during the major weather events in 2021 and 2022.

However, to alleviate localised water accumulation on neighbouring properties, the excess soil on the TransGrid site at 2047 The Northern Road, Glenmore Park will be removed to avoid runoff from the site, and small water diversion swales will be constructed to divert flowing water from identified driveways.

Following engagement with residents, Transport has committed to remediate the area around the crossroad culverts, including installation of turf strip alongside the swale immediately south of the Trans Grid site, and remove rubble as required to facilitate property maintenance

More detailed information on issues is included in the table below:

Question/ Concern	Transport Response
Confirm original location of the culverts.	Appendix 1 shows existing culvert (Ch 6280 & 6340) and the new culvert (Ch 6300, 6380 & 6450) that was constructed as part of the project (north of Bradley Street).
Provide detail as to why the proposed swale is shaped, sized, and located as it is.	The swale has been shaped to manage the flow which discharges from the driveway culvert in such a way as flooding conditions in the adjacent residential properties are no worse than occurred under pre-upgrade conditions.
Clarify the strategy for the design of the two transverse drainage structures – please include commentary on impact to velocity.	The aim of the transverse drainage strategy is to mimic as closely as practical flooding patterns under pre-upgrade conditions. The project has implemented this strategy though the design of the southern transverse drainage structure is aimed at matching as closely as practical the rate of flow which discharged across the old two-lane road via the old transverse drainage structure. The northern transverse drainage structure conveys the balance of flow which previously discharged over the old two-lane road further to the north.
	As the rate of flow discharging from the southern transverse drainage structure is similar to that which was conveyed by the old transverse drainage structure, flow velocities in the existing watercourse downstream of its location would be similar to pre-upgrade conditions.
Provide historic flood information for this area.	No historic localised flood data (of actual floods inundation) were available during the preparation of the EIS and detailed design of the project.

Question/ Concern	Transport Response
<p>Confirm whether size of pipes forming the culvert under The Northern Road were smaller than the current ones. Concerns that the culvert is larger and at a 45-degree angle under The Northern Road which means any water flow is now larger and faster than it was its north. See Appendix 2 before</p>	<p>Surveys shows that prior to the upgrade of The Northern Road, the existing transverse drainage structure comprised 3 x 2.4 m wide by 1.5 m high box culverts which had a waterway area of 10.8 m² and were orientated at an angle of about 45° to the centreline of the road. An additional 0.675 m diameter pipe which had a waterway area of 0.36 m² also crossed the old two-lane road a short distance to the north. See Appendix 2</p> <p>By comparison, the new southern transverse drainage structure comprises 1 x 3.6 m wide by 1.5 m high box culvert which has a waterway area of 5.4 m² and is oriented at the same angle as the old transverse drainage structure (i.e., at about 45° to the centreline of the road), noting that the old 0.675 m diameter pipe was demolished and removed as part of the road upgrade.</p> <p>The new northern transverse drainage structure comprises 1 x 3.6 m wide by 1.5 m high box culvert has a waterway area of 5.4 m².</p> <p>Based on the above, the total waterway area of the new transverse drainage structures (i.e., 2 x 5.4 m² = 10.8 m²) is slightly less than that of the old transverse drainage structures (10.8 + 0.36 = 11.16 m²). The waterway area of the transverse drainage system is less than half that which was present under pre-upgrade conditions (i.e., 5.4 m² versus 11.16 m²).</p>
<p>The detention basin on the Defence side of The Northern Road was moved northward from the previous dam location.</p>	<p>This placement of the detention basin is consistent with the EIS Vol 4 Appendix K2 Figures 4.1 and 6.1.</p>
<p>Defence broke the banks of the detention basin before the project started.</p>	<p>Transport notes this is outside of the project scope. Please consider contacting the Australian Defence Force directly for a response.</p>
<p>The swale is insufficient in its design</p>	<p>The proposed swale has been shaped to manage the flow which discharges from the driveway culvert in such a way such that flooding conditions are no worse than occurred under pre-upgrade conditions.</p>
<p>PFAS meant dams on the eastern side of The Northern Road needed to be remediated. What impact has this had on the water movement and flooding on properties?</p>	<p>The old dams would have had the effect of reducing the average annual volume of water discharging to the downstream watercourse due to evaporation losses. They would also have had a minor attenuating effect on the flow which would have been greater for the more frequent storm events. However, during more intense (i.e., less frequent) storm events, the dams would fill and their attenuating effects on the rate of flow discharging to the downstream watercourse would reduce. Studies completed as part of</p>

Question/ Concern	Transport Response
<p>Water is now backing up to properties that had never previously been flooded</p>	<p>the project have shown that the removal of the dams in combination with the project (which includes the construction of a stormwater detention basin) would not exacerbate flooding conditions in existing residential development. [The Environmental Assessment documents defined flood behaviour under pre-and post-upgrade conditions for storms that occur once every 2, 10 and 100 years on the average (i.e., not day-to-day type rainfall events)].</p> <p>Transport investigated residents' concerns and advised residents at site meeting held on Friday 28 October 2022, that this will be addressed as part of remediation works to be completed early 2023. Transport will cut small swales on the upstream site of the driveways to allow trapped overland flows to drain into the adjacent swale located on the road reserve.</p>
<p>Two fences have been weakened by standing water at the fence line.</p>	<p>Transport has investigated and advised residents at site meeting held on Friday 28 October 2022, that standing water will be drained from around the fence lines. Transport will cut small swales on the upstream site of the driveways to allow trapped overland flows to drain into the adjacent swale located on the road reserve. These properties are consistent with those currently experiencing localised driveway flooding, which will be remediated in the same manner.</p>
<p>In heavy rain periods driveways are flooding due to increased water velocities and volumes from upstream redirected by the Northern Road upgrade. Access to properties has been affected by additional water flows directed into the water channel by the new culvert constructed by the Northern Road Upgrade to the south of our properties.</p>	<p>The studies have identified that the project would not exacerbate flooding conditions in the residential properties that are located on the western (downstream) side of the road corridor. The 2022 calendar year has been reported by the Australian Bureau for Meteorology as the wettest year on record for the Greater Sydney area since records began in 1858. The area has experienced several major weather events in 2021 and 2022 that were of an intensity that studies show would have resulted in the surcharging of the existing driveway drainage structures prior to the construction of the project. (See Appendix 2.)</p>
<p>Water floods properties as water directed from the new under driveway culvert directs water to the front of properties.</p>	<p>The need to maintain driveway access to the raised section of The Northern Road resulted in the removal of the low point that was located on the eastern side of the existing bridge crossing. The provision of 2 x 3 m wide by 0.6 m high box culverts beneath the raised section of driveway is to maintain the flow of water which previously surcharged the low point in the driveway.</p>

Question/ Concern	Transport Response
<p>At one location, property has not been restored to its original levels and land has been built up approximately 600mm, causing water from the front swale to cause flooding. This build-up of land is also taking up volume that would otherwise be taken up by water flows, causing a build-up of water in the swale and flooding</p>	<p>Transport met with residents on Wednesday 27 July 2022 and on-site on Friday 28 October 2022 Transport committed to remove material from the TransGrid site to reinstate the property to former levels.</p>
<p>The concrete slabs used as storage by Sydney Water and CPB Contracting works on the north-eastern corner of one location have not been removed and have been filled over further causing water redirection from the normal flows causing local flooding.</p>	<p>Transport met with residents on Wednesday 27 July 2022 and on-site on Friday 28 October 2022. Transport will remove material and reinstate the site.</p>
<p>Water volume and velocity redirected through properties by the Northern Road Upgrade must be reduced to stop the flooding that has now been created by the removal of the ponds that existed on the eastern side of the Original Northern Road. The removal of these ponds has reduced the amount of water retention that existed prior to the Northern Road Upgrade.</p>	<p>It is accepted that the removal of the dams and the increase in hard stand areas will result in an increase in the volume of water discharging to the watercourse which runs through the residential properties that are located along the western side of the road corridor in smaller rain events. The design criteria are to model and design to various intensity storms, with the aim to not increase the existing flooding. Events less than these larger storm (i.e. 1 in 100 storms) can be accommodated within the designed (installed) stormwater system. For the larger events that cause flooding in the area, the studies have shown that flooding conditions for these properties have not been exacerbated by the project. [The Environmental Assessment documents defined flood behaviour under pre-and post-upgrade conditions for storms that occur once every 2, 10 and 100 years on the average (i.e., not day-to-day type rainfall events)].</p>
<p>Provision of sufficient table drain or Stormwater pipe capacity to accommodate storm water discharge and prevent overland flow onto private properties, including capacity associated with approved drainage plans for construction certificate CCX09/0009.</p>	<p>Surface runoff generated by the new road surface is controlled by a new pit and pipe drainage system, while a toe drain has been provided along the western side of the road corridor. This manages water flow that discharges off the adjacent road batter and from privately-owned land.</p>

Question/ Concern	Transport Response
<p>Flooding is immersing a water meter and contaminating the water supply to the dwelling</p>	<p>Transport understands there is no inlet at the meter, that would allow contamination of the water supply.</p> <p>Transport met with residents on site for a meeting on Friday 28 October 2022 and advised that standing water will be drained from around the fence lines, Transport will cut small swales on the upstream site of the driveways to allow trapped overland flows to drain into the adjacent swale located on the road reserve.</p>
<p>Repair driveway damage caused by road reserve stormwater flooding backing up and flooding the driveway.</p>	<p>Transport has investigated and concluded that driveways were prone to flooding under similar conditions prior to construction. No further action will be taken by Transport regarding this request.</p>
<p>Provision of safe and suitable driveways that extend up to the property boundary to align with driveway within the property.</p>	<p>Transport has reviewed the pre-project condition of driveway and considers the work as installed along the former driveway alignment is already an improvement to the pre-project conditions. No further work at this location will be completed by Transport.</p>
<p>Provision of flood free driveways.</p>	<p>Studies have shown that the project has not exacerbated flooding conditions, with the exception of specific localised impact to identified properties. The project has replaced sections of driveways with like for like options and in line with agreed personal property adjustment plans, maintaining the flood resilience of the original driveway from the road to property boundary</p>
<p>Urgent rectification of lack of drainage connections at the Jilondalee Way intersection that is causing overland flow to flood the first east bound lane after small rain showers.</p>	<p>Transport has reviewed requirements and investigated the concern. Due to the proximity of the intersection, and the lack of impact from The Northern Road project this work is not recommended.</p>
<p>Open culvert across the front of properties is an unsafe eyesore, why can it not be enclosed the same as culverts at nearby properties?</p>	<p>The Transport design standard meets flooding requirements. This culvert has been assessed to comply with safety requirements including the fitment of handrails.</p>
<p>Increased flooding since The Northern Road upgrade.</p>	<p>An analysis of the rainfall that has been recorded at the nearby Orchard Hills Treatment Works dating back to 1971 shows that over the 29-year period 1991 to 2019, annual rainfall totals were just above or below the long-term average, indicating the prevalence of relatively dry conditions, which shows the annual totals the average annual depth of rainfall (Appendix 3).By contrast, the annual rainfall in the last three years is above the average, with this year being the wettest on record for Sydney.</p>

Question/ Concern	Transport Response
	<p>An analysis of the rainfall that was recorded earlier this year found that three bursts of rain occurred that would be expected to occur only once every 5-10 years on the average, noting that these storms would have caused flooding in the residential properties that are located along the western side of the road corridor under pre-upgrade conditions.</p>
<p>Photographs of the highest level of waters in approx. 2001 show water levels far lower than experienced since The Northern Road upgrade.</p>	<p>Below average rainfall was experienced in 2000 and 2001 indicating that ground conditions would have been relatively dry and hence infiltration and evapotranspiration losses would have been greater than has been the case over the past three years. Flood records by the Bureau of Meteorology indicated the last time the Penrith LGA, including Orchard hills experienced similar flood conditions to the 2021 and 2022 major weather events was in 1978.</p>
<p>The creek that flows through properties is constantly flooding with the slightest amount of rain, due to the fact that the excessive amount of water runoff from The Northern Road, water from the culvert which flows south down to the Sydney Water site, which then flows into the creek and back up to properties. The water run off on the eastern side of the Northern Road then comes under the Northern Road and then into the creek across properties. Plus, the water that was normally held in the water retention area which is no longer also flows into the creek and through and over properties.</p>	<p>A stormwater detention basin has been constructed on the eastern (upstream) side of the road corridor to attenuate flows generated by the upstream catchment. The effect is that the rate of flows discharging through the residential properties located along the western (downstream) side of the road corridor are no greater than occurred under pre-upgrade conditions.</p> <p>The last three years have been wetter than average, with 2022 seeing record rainfall events on saturated catchments. The storms that occurred earlier this year would normally be expected to occur once every 5-10 years on the average and that studies have shown that flooding would have occurred in the properties during these storms under pre-project conditions.</p>
	<p>It is accepted that the removal of the dams and the increase in hard stand areas will result in an increase in the volume of water discharging to the watercourse which runs through the residential properties that are located along the western side of the road corridor in smaller rain events. However, for the larger events that cause flooding in the area, the studies have shown that flooding conditions for these properties have not been exacerbated by the project. The Environmental Assessment documents defined flood behaviour under pre-and post-upgrade conditions for storms that occur once every 2, 10 and 100 years on the average (i.e., not day-to-day type rainfall events)].</p>

Table 3: Transport’s response to issues raised around Flooding and Drainage

Property Adjustments

Transport has agreed to property adjustment plans with owners who have been affected by the project. As is typical with major projects, circumstances change during construction and in some cases the property adjustment plans required minor updates. Transport acknowledges that information provided to owners about property adjustment, both prior to and during construction, could have been written in more plainly and with less technical information. This improvement is being implemented in new projects.

Transport considers that property adjustments have been completed to the scope and standards set out in property adjustment plans agreed with owners. Details of these concerns are provided in the table below (noting that for privacy reasons, individual properties are not identified).

Question/ Concern	Transport Stakeholder Response
There is a mound of soil outside a property that is yet to be removed.	Transport has reviewed the site and the completed works. Sydney Water has essential potable water supply assets buried at this location(a combination of 450mm, 750mm and 1050mm pipes as well as associated air valves, stop valves and other fittings). The soil mound cannot be removed as the installed mains require this material (cover) to ensure stability and protection.
Question the need for rock and rip rap	Transport has installed rip rap to protect the surface from erosion. This protection is a typical treatment employed on Transport projects.
Batter landscaping and planting has been poorly undertaken. Plants cannot survive on a 45-degree angle.	Transport has installed a landscaping mix designed for local growing conditions. This landscaping will grow as conditions permit. The project has maintained this area for the establishment period and is in the process of handing the management of landscaping over to Penrith City Council. The batter slope cannot be altered as it would spill into the drainage swale, reducing flows and increase flooding.
Concerns about the aesthetic appearance of landscaping in front of some properties.	Transport has installed landscaping, maintained for an establishment period and is in the process of handing the management of landscaping over to Council. Transport advised during the on-site meeting held on Friday 28 October 2022, that this will be addressed as part of the remediation works, with the installation of a turf strip adjacent to the fence north of the driveway.

Question/ Concern	Transport Stakeholder Response
Concerns about lack of maintenance of the site since completion in 2021, including safety issues.	Transport has installed landscaping designed specifically for the local growing conditions and maintained for an establishment period. Transport is in the process of handing the management of landscaping over to Penrith City Council. Transport advised residents at the on-site meeting held Friday 28 October 2022, that this will be addressed as part of the remediation works. In early 2023, rubble and debris in the grass will be removed to allow for future landscape maintenance.
Requests to replace damaged boundary fencing and re-grading of the property boundary and road reserve to remove silt, impacted by excessive silt deposits from construction work and flow from the road reserve.	Waterflow remediation works will take place.
Requests for more permeant anti scouring solutions in the road reserve.	Transport considers the scour protection as appropriate and adequate.
Requests for grading and filling of all redundant areas of the road reserve to enable safe effective mowing for bushfire hazard purposes and for Endeavor Energy's to access poles and wires.	Transport has installed landscaping, maintained for an establishment period and is in the process of handing the management of landscaping over to Penrith City Council. Transport advised residents in the on-site meeting held on Friday 28 October 2022 that the Endeavor Energy (EE) adjustments were designed and installed by EE and EE has accepted handover.
Repair of damage to driveways used by construction equipment.	Transport notes that the driveways referred to were not used as part of the construction of The Northern Road Upgrade Stage 5.
Provision of fencing to a quality previously provided.	Transport notes that fences have been replaced like-for-like.
Rectification of the unlawful damage by Transport/CPB to Council-approved construction road works in Jilondalee Way at 1-15 Bradley Steet which is the subject of an Easement.	Transport noted this issue in the on-site meeting held on Friday 28 October 2022 and requested further information. No information has been provided.
Provision of entry gates that permit the gates turn inwards; at present they swing into Bradley Street nearly blocking the first lane	Transport notes this work has been completed and closed out with the property owners.

Question/ Concern	Transport Stakeholder Response
Concerns that due to landscaping and new fencing, it is difficult for large vehicles to enter properties without holding up traffic on the road.	The implementation of additional turning lanes would impact the bus lane. Additionally, the presence of the bus lane will facilitate turns onto the property, providing a more suitable entrance angle.
Increased slope prevents maintenance and grass cutting.	Transport has installed landscaping, maintained for an establishment period and is in discussions with Penrith City Council regarding ongoing asset maintenance.
Concerns that some culverts are being poorly maintained.	Transport has installed landscaping, maintained for an establishment period and is in discussions with Penrith City Council regarding ongoing asset maintenance.
Concerns about the aesthetic quality of fences.	Transport noted. No further action proposed by Transport.
Concerns that increased flooding is damaging driveways, fences and properties	Post-construction flood analysis has shown that The Northern Road Upgrade did not exacerbate the flooding conditions in the driveway, which was previously prone to flooding.
House numbers to boundary fences were never installed nor the house number signage.	Where requested house numbers have been installed.
Residents will not be able to maintain the revised landscaping due to steep slopes.	Transport has installed landscaping, maintained it for the establishment period and is in the process of handing the management of landscaping over to Penrith Council. In some areas Transport will remove, rubble and debris to allow for easier future landscape maintenance.
Driveways have been reconstructed in ways that restrict vehicles from passing each other at entry and exit.	The driveway at the property boundary has been reconstructed like for like width and as previous arranged.

Table 4: Transport's response to issues raised around property adjustments

Project Design

Residents have raised concerns about works or planning outside the scope of the Northern Road Upgrade Project, including local road issues, Sydney Water infrastructure and Australian Defence site works. Transport suggests these issues be raised directly with Penrith Council, Sydney Water or the Australia Defence Force.

Other concerns have related to the design of the upgrade. Transport engaged with the community through all stages of the project lifecycle. Community members were encouraged to provide feedback through various formalised consultation processes as well as informally throughout the project. Transport and delivery partners were contactable via a publicly available phone number and email during the project and a project website was updated at regular intervals. The Northern Road Upgrade Project was assessed as a State Significant Infrastructure Project (application number SSI-7127). The Minister for Planning determined the project in April 2018, subject to the Minister's conditions of Approval outlined on the Department of Planning and Environment website.

Question/ Concern	Transport Stakeholder Response
The detention basin on the Defence side of The Northern Road was moved northward from the previous dam location.	This is consistent with the EIS Vol 4 Appendix K2 Figures 4.1 and 6.1.
Defence broke the banks of the detention basin before the project started.	Transport notes this is outside of the project scope. Please consider contacting the Australia Defence Department directly for further information.
Provision of a U-turn/roundabout facility in Glenmore Parkway to facilitate south bound travel.	Transport noted there is an existing round-a-bout on Glenmore Parkway at Glengarry Drive.
Prevention measures to address the excessively high speed of traffic in the Street eight subsequent crashes in the east bound lane in Bradley Street at The Northern Road intersection (to date). a. Tube Count data prior to and post upgrade was recorded by our Traffic Consultants and provided to Transport, together with proper risk safety audit advice; and design Note: GTA are engaged by Transport as major traffic consultants on the M4 East Motorway design elsewhere	Traffic-modelled design has been undertaken to meet safety requirements. The enforcement of traffic laws, remains a primary responsibility of the NSW Police Force. This includes motorists disobeying road rules and/or speeding. Please consider contacting Penrith Police Area Command who will determine whether targeted enforcement activities may be appropriate.
Provision of omni directional Bus access in with the Planning Consent the former Glenmore Park Stage 2 VPA design; or the roundabout proposed by GTA.	Transport has reviewed requirements for suitable intersections at Jilondalee Way intersection. Due to the proximity of The Northern Road/Bradley intersection, a roundabout is not recommended at this location.
Rectification of the Bradley Street intersection with Jilondalee Way, identified by survey and Penrith City Councils engineering team.	Residents with concerns about this intersection or other council roads should contact Penrith City Council. These roads are outside the scope of The Northern Road Upgrade Project.

Table 5: Transport's response to issues raised around project design

Noise

Pre- and post-construction noise monitoring is a regulatory requirement for this project. All impacted property owners have been contacted to coordinate final noise monitoring readings.

Question/ Concern	Transport Stakeholder Response
Concerns were expressed about the increase of traffic noise from the upgraded road as well as the lack of noise monitoring.	Transport has conducted a post-construction noise assessment (final Report completed in August 2022). The assessment indicated that operational noise does not exceed the operational noise levels predicted in the EIS, once the project was completed. Therefore, under the Minister of Planning’s Conditions of Approval and consistent with the EIS, no additional noise mitigation will be offered.

Table 6: Transport’s response to issues raised around noise

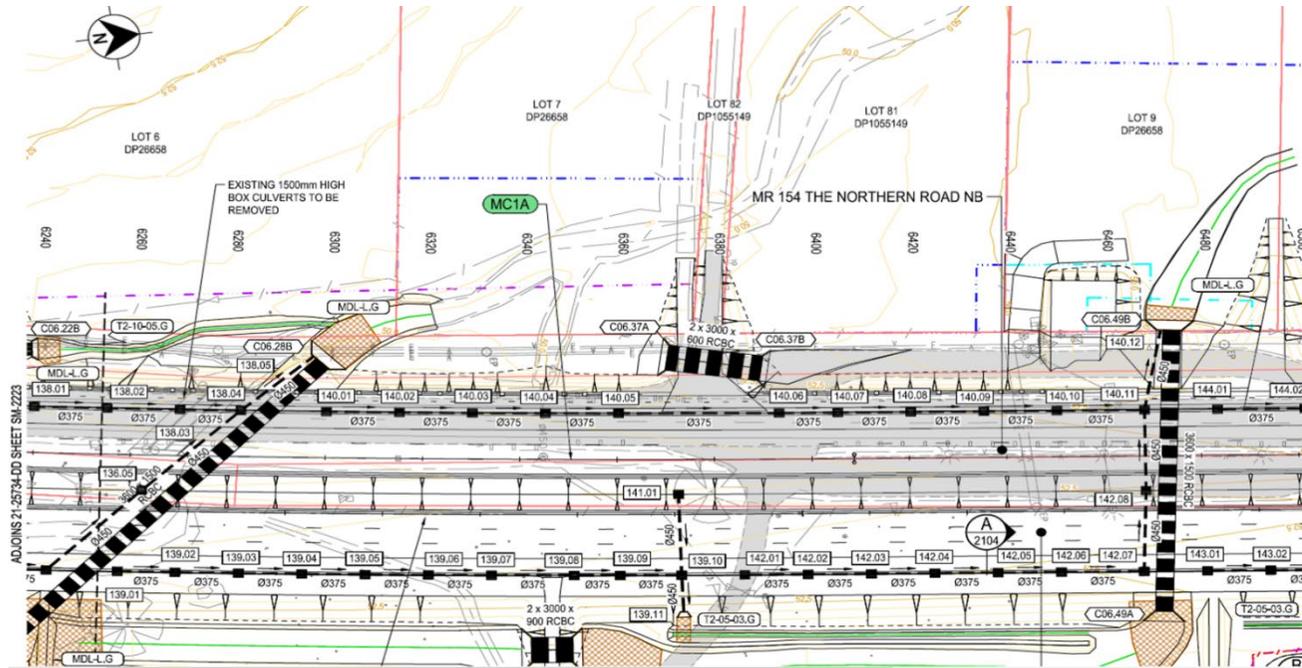
Next Steps

Transport will complete the following remediation works. It is anticipated these works will take place early 2023, weather permitting and subject to discussions with property owners.

- Works on the TransGrid site at 2047 The Northern Road, Glenmore Park will include the removal of soil to bring the property back to the original level, as well as additional treatment to verges south of the area
- Add steel plates on culvert on eastern side of The Northern Road, Orchard Hills, to improve the performance of the drainage system
- Cut narrow drainage lines upstream of identified driveways to allow trapped overland flows to drain into the adjacent swale on the road reserve to allow standing water to be drained from around the fence lines at the property north of Bradley Street to avoid water damage to fences.
- Following engagement with residents, remediate the area around the crossroad culverts, including installation of turf strip alongside the swale immediately south of the TransGrid site and remove rubble as required to facilitate property maintenance

Appendices

Appendix 1 – Culvert location north of Bradley Street

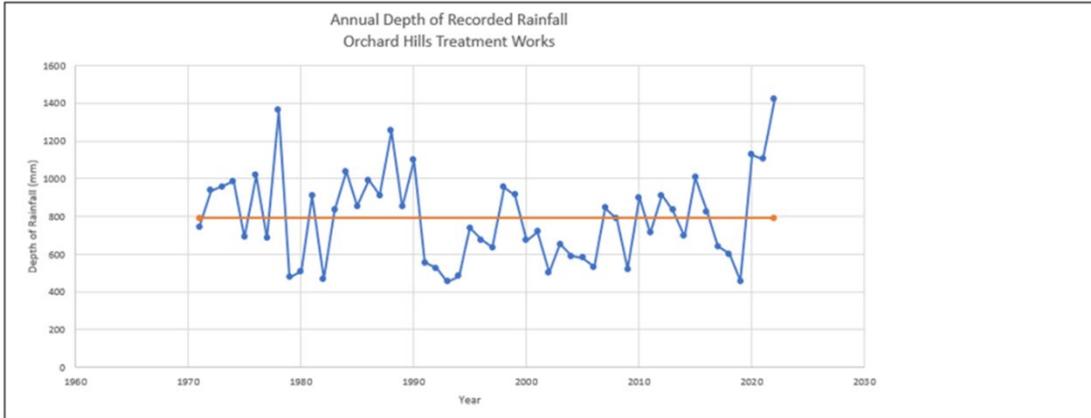


Appendix 2 – Old and new transverse drainage pipe size



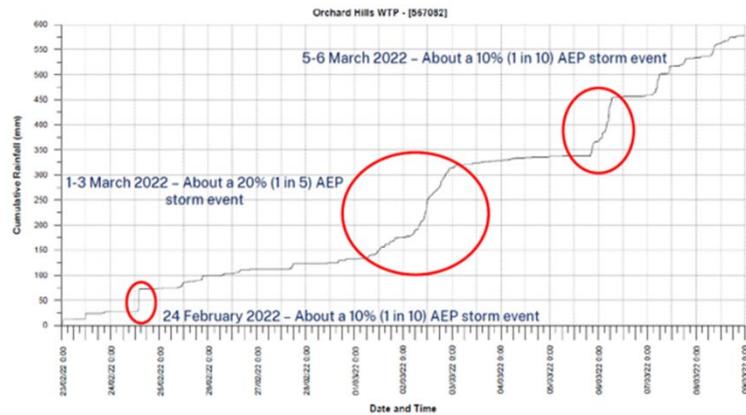
Comparison of old and new transverse drainage structures

Appendix 3 – Annual depth of recorded rainfall at Orchard Hills



Annual Depth of Recorded Rainfall – Orchard Hills Treatment Works

Recorded Rainfall – 23 February – 8 March 2022



Month	Average Depth of Recorded Rainfall (millimetres)
Jan	99.4
Feb	114.5
Mar	109.2
Apr	63.6
May	55.4
Jun	55.6
Jul	35.8
Aug	40.2
Sep	36.3
Oct	55.1
Nov	80.5
Dec	74.5
Annually	820.1



Source of Recorded Rainfall Data: Bureau of Meteorology

Figure A1
CUMULATIVE RAINFALL
23 FEBRUARY - 8 MARCH 2022

Cumulative Rainfall for the Period 23 February – 8 March 2022

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