ROAD UPGRADE AND MAINTENANCE STRATEGY

Project Name:	**Silverton Wind Farm**
Level B1 Doc No.:	**B1-2-5**

CURRENT REVISION		
Revision:	**Reason for Revisions:**	**Date of Revision**
3	Issued for Construction	
Prepared by:	C. Patterson	07.08.17
Reviewed by:	P. Busolin	10.08.17
Approved by:	P. Busolin	10.08.17

Revision History:

Rev	Reason for Revision	Date	Prepared	Reviewed	Approved
B	Original issue	07.03.17	C. Patterson	P. Busolin	P. Busolin
C	Update Basis of Design, include record of consultation to Section 4.0, update Att A and B	17.03.17	C. Patterson	P. Busolin	P. Busolin
D	Incorporate Jacobs comments	23.03.17	C. Patterson	P. Busolin	P. Busolin
E	Incorporate Jacobs comments and issue for DPE approval	28.03.17	C. Patterson	P. Busolin	P. Busolin
F	Incorporate RMS comments and issue to DPE for approval	03.05.17	C. Patterson	P. Busolin	P. Busolin
0	Issued for Construction upon receipt of approval from DPE	05.05.17	C. Patterson	P. Busolin	P. Busolin
1	Incorporate RMS comments and works as approved by RMS	06.06.17	C. Patterson	P. Busolin	P. Busolin
2	Incorporate RMS comments	30.06.17	C. Patterson	P. Busolin	P. Busolin
3	Incorporate RMS comments, update Section 2.5	07.08.17	C. Patterson	P. Busolin	P. Busolin

Notes:

Circulation:

Name	Reason for Circulation	Date Issued	No. of Copies

Notes:

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1.0 PROJECT BACKGROUND

The Silverton Wind Farm is located in New South Wales on the elevated ridges of the Barrier Ranges with its southern boundary approximately 3.5km north of Silverton and approximately 25km north west of Broken Hill.

The Silverton Wind Farm is being developed by AGL who have in turn contracted GE/CATCON to carry out the design, supply and installation of 58 wind generator turbines and associated infrastructure (i.e. access roads and crane hardstands, WTG foundations, electrical reticulation, substation and switchyard, operation and maintenance facilities, upgrades of existing infrastructure) with the capacity to generate in excess of 250MW. The Silverton Wind Farm works also includes the construction of a transmission line from the Wind Farm to TransGrid's existing substation at Broken Hill (the Silverton Wind Farm Connection works).

1.1 Project Approval Requirements

The following Conditions of Approval have been addressed in this document:

Condition	Requirements	Addressed How?
CONDITIONS OF APPROVALS		
Schedule 3 Condition 24	Prior to carrying out any construction, or the decommissioning of the project, the Proponent must prepare a Road Upgrade and Maintenance Strategy for the project in consultation with RMS, DI Lands and Broken Hill City Council, to the satisfaction of the Secretary. The strategy must:	Section 4.0
	(a) identify the road upgrades required for the project; and	Section 2.2
	(b) include a program for: ○ the implementation of the road upgrades; and ○ the maintenance of the relevant sections of the road network following the upgrades.	Section 2.5
	Following the Secretary's approval, the Proponent must implement the Road Upgrade and Maintenance Strategy.	Section 1.2
Schedule 3 Condition 25	The Proponent must carry out all the road works identified in the Road Upgrade and Maintenance Strategy to the satisfaction of the relevant roads authority.	Section 2.4.1 and 3.1
STATEMENTS OF COMMITMENT		
SOC072	Provide a contact phone number to enable any issues or concerns to be rapidly identified and addressed, through appropriate procedures	Section 4.0
SOC073	Prepare road dilapidation reports covering pavement and drainage structures in consultation with roads authorities for the route prior to the commencement of construction and after construction is complete. Repair any damage resulting from the construction traffic (except that resulting from normal wear and tear) as required during and after completion of construction at the Proponent's cost or, alternately, negotiate an alternative for road damage with the relevant roads authority.	Section 2.1
SOC074	Assess the geometric layout of proposed intersections along the Silver City highway to ensure adequate turning paths are available to allow for safe turning of oversize loads and construction vehicles. For any intersection deemed to be unsuitable, provide necessary intersection widening in consultation with the RTA.	Section 2.3.1 Attachments A/B/C
SOC075	Upgrade and seal the initial section of Daydream Mine Road and subsequently request a review of the speed zone in consultation with the RTA.	Section 2.2.2
SOC076	To the extent that it would be extensively used for site access, upgrade and seal the initial section of Eldee Road and negotiate with roads authority to place a speed restriction on the road consistent with Silverton Road (90 kilometres an hour)	Eldee Road will not be extensively used for site access

1.2 Approval by the Secretary

This plan will be submitted to the Secretary for review and approval. Following the Secretary's approval, this Road Upgrade and Maintenance Strategy will be implemented.

1.3 Abbreviations and Definitions

Abbreviations, acronyms and definitions contained in this document are listed below:

1.3.1 Abbreviations

CHAIR	Construction Hazard Assessment and Implication Review
DI Lands	NSW Department of Industry – Lands
RAV	Registered Access Vehicle
RMS	Roads and Maritime Services
SiD	Safety in Design

1.3.2 Definitions

Client	The Principal, AGL
Client's Representative	Adam Mackett
Contractor	In this case, the Consortium, being the organisation responsible for the total performance of the works under the EPC Contract
Subcontractor	An organisation responsible for a subcomponent of the total work package employed by CATCON
Contract	Agreement between the Client and the Contractor
Project	The work stipulated by the Contract
Construction Area	Designated area within the project site where personnel must have had a formal site induction to enter and work unaccompanied. *Work* includes those involved in the delivery and/or off-loading of materials and equipment
Authorised Vehicles	Vehicles involved in work activity with the construction area

1.4 Document Review

This document is a live document and may be revised in consultation with RMS and other relevant authorities if enhancements are identified that will improve the effectiveness of the Road Upgrade and Maintenance Strategy.

2.0 UPGRADE WORKS

2.1 Dilapidation Survey of Existing Road Infrastructure

A pre and post construction dilapidation survey will be jointly undertaken by CATCON and Road and Maritime Services (RMS) to confirm the condition of the existing road infrastructure before and after the construction of the Silverton Wind Farm works. The dilapidation survey will include a drive-through and aerial survey of the existing road infrastructure.

The pre-construction dilapidation survey was completed on 13 March 17 with the report issued to RMS for information. A copy of the report can be made available on request.

2.2 Scope of Upgrade Works

2.2.1 Upgrade of the Broken Hill Bypass Road

Upgrade of the existing private unsealed Broken Hill Bypass Road between the Barrier Highway and Silverton Road will be required to enable over dimensional vehicles only to access the site.

The bypass is approximately 4km in length between the Barrier Highway and Silverton Road. The intersection of the bypass with the Barrier Highway is approximately 2.5km west from Broken Hill.

The Bypass Road will be for **over dimensional vehicles only under escort** for the duration of the turbine componentry deliveries (i.e. Nov 17 – Jun 18). The Bypass Road will allow over dimensional vehicles only to avoid built-up areas on the outskirts of Broken Hill including roads past the Burke Ward Public School. It will also provide an area for vehicles to stop to assist in managing traffic delays along the Silverton Road.

All other construction traffic is to access the site via Broken Hill. This requirement will be conveyed to project Employees, Subcontractors, Visitors, etc. via the site induction, Driver education, Pre-Start and Toolbox Meetings and the purchasing process.

At times where the Bypass Road is not in use, it will be sign posted directing traffic to access the site via Broken Hill.

Upon completion of the delivery, all vehicles which become road compliant (i.e. no longer require an escort) will exit the site via Broken Hill.

The proposed upgrade works will include the following:

- Construction and upgrade of the existing Broken Hill Bypass Road connecting Barrier Highway and Silverton Road for use by over dimensional vehicles only under escort for the durations of the turbine componentry deliveries (i.e. Nov 17 – Jun 18);
- Upgrade the intersections of the Bypass Road with the Barrier Hwy and Silverton Road to enable for swept path of a over dimensional vehicle to turn safely into/from the Bypass Road (refer to Attachment A and B).

Refer to Section 2.3.1 *Basis of Design* for further details of the proposed intersection upgrades.

On the completion of the works, the upgraded Bypass Road and any additional pavements added to the Barrier Highway and Silverton Road will be removed and rehabilitated (or will remain a private road), unless otherwise directed by the Principal or relevant authorities.

2.2.2 Upgrade Daydream Mine Road

Daydream Mine Road will provide the main access to the project site with upgrades as required to ensure safe access for the increase traffic volume entering the site and the delivery of turbine components. Daydream Mine Road will remain a gravel road, other than the upgrade to the intersection of Silverton Road, which will be sealed.

A survey of the existing road conditions has been completed, with the upgrade of Daydream Mine Road to include the following works, as agreed with RMS:

- The intersection of Daydream Mine Road and Silverton Road will be upgraded and resealed to accommodate light vehicles and the geometry altered to enable over dimensional vehicles to enter the site. It is proposed to increase the turn paths at the intersection to suit 19m semi-trailer vehicles (sealed section only);
- An additional swept path (with a radius of 150m) will be constructed to allow over dimensional vehicles only (namely blade deliveries) to turn safely onto Daydream Mine Road from Silverton Road (refer to the attached proposal at Attachment C);
    - The slip lane will enable to existing cattle grid to remain in place and will include a new 8.0m gate within the existing property fence.

- As a result of consultation with the Silverton Village Committee, no work is planned to the existing cattlegrid located on Silverton Road, just south of the Daydream Mine Road intersection;
- Upgrade sections of Daydream Mine Road as required, including reforming, gravel re-sheeting (the removal of corrugations (in areas of existing sufficient pavement materials, area will be graded) and placement and compaction of additional pavement material in areas of exposed rocks and sections of minor erosion), road widening, drainage construction and realignment works to improve the formation of the road as follows:

CHAINAGE	DESCRIPTION OF UPGRADE WORKS
CH0000	Daydream Mine Road/Silverton Intersection
CH0200	Hard cut, water, roll – remove corrugation and clean drain
CH0220	LHS shoulder box remove unsuitable materials and replace
CH0200 – CH0400	Hard cut, water, roll and clean drain
CH0400 – CH0450	Re-sheet exposed rock
CH0450 – CH0600	Hard cut, water, roll and clean drain
CH0600 – CH0800	Re-sheet exposed rock
CH0800 – CH1000	Hard cut, water, roll, top up as required and clean drain
CH1000 – CH1100	Hard cut, water, roll and clean drain (at CH1100)
CH1100 - CH1200	Hard cut, water, roll and clean drain
CH1200	Clean drain
CH1200 – CH1400	Hard cut, water, roll and clean drain (at CH1400)
CH1400 – CH1700	Hard cut, water, roll Four (4) drains to be cleaned
CH1700 – CH1800	Hard cut, water and roll
CH1800	Clean drain
CH1800 – CH2000	Hard cut, water and roll Construction new drain at CH2000
CH2000 – CH2300	Clean one (1) drain RHS box out shoulder CH2350 and reconstruct Hard cut, water and roll
CH2400	Start bitumen/sealed road
CH2500	Floodway check Vertical curve for entry and exit
CH2750	Cattle grid – Bypass or widen
CH2800	End bitumen - Remove step between bitumen and natural gravel
CH2800 – CH2950	Re-sheet exposed rock
CH3000	Clean drain
	Essential water crossing
CH3160 – CH3300	Light sheet over exposed rock
CH3450	Box center of road remove unsuitable and replace
CH3450 – CH3700	Hard cut, water, roll and clean drain
CH3700 – CH3950	Hard cut, water, roll and clean drain (at CH3950)
CH3950 – CH4100	Hard cut, water, roll and clean drain

CHAINAGE	DESCRIPTION OF UPGRADE WORKS
CH4150	Clean drain
CH4200	Wind Farm Entry – realign

- Appropriate non-legislative signage (i.e. construction signs, project notice boards) will be installed along the length of Daydream Mine Road in consultation with RMS.
- The existing 3m wide cattle grid located approximately 3km along Daydream Mine Road will be replaced with a new 6m wide trafficable grid to allow for two lanes of traffic and to accommodate for the over dimensional vehicles;
- Works will be undertaken to provide additional protection to the existing water supply pipe from traffic and the road works during the construction phase and traffic during the operational phase of the project in consultation with Essential Water; and
- The intersection of Daydream Mine Road and Silverton Wind Farm Access Road will be realigned and widened (where required) to allow for the swept path of an over dimensional vehicle to turn safely onto the Silverton Wind Farm Access Road. In addition, sections of a hill (located to the northeast of the intersection) will be removed to improve the line of sight of traffic exiting the site onto Daydream Mine Road. Refer to the attached proposal (Attachment D).

2.2.3 Upgrade of Silverton Road

Passing Bays

Two (2) passing bays will be constructed as detailed on Drawing STWF-CRI-CI-SK-0710 and 0711 (Attachment E) to allow larger vehicles to pull over to reduce the risk of side swipe crashes and to allow safe passage for over dimensional vehicles and background traffic along Silverton Road. The location of these passing bays has been developed in consultation with RMS with works to be completed in accordance with RMS specifications and requirements.

Floodways

CATCON have completed a survey of all floodways along Silverton Road between Broken Hill and Daydream Mine Road with survey provided typically at 10-15m intervals across the crossings.

CATCON's Civil Design Consultant (Wallbridge Gilbert Aztec (WGA)) have since completed a computer modelled road assessment and have confirmed that there are no requirements to upgrade the floodways along Silverton Road to ensure safe movement of over dimensional loads to and from the Silverton Wind Farm site. The assessment included the following checks:

- Check 1: Road Vertical Curve vs Min Delivery Vertical Curve Requirements:
  - Delivery vehicle specifications are detailed on Drawing STWF-CRI-CI-SK-0721, which includes the following two (2) critical vehicles identified by the Transport Subcontractor:
    - Tower Segment Delivery on a low loader: Minimum vertical curve requirement of 309m; and
    - Blade Truck Delivery: Minimum vertical curve requirement of 343m (note GE Specification 400m, which all internal roads have been design to as a minimum).
  - Each floodway/hill has been checked against the vertical curve requirement.
    - Where complainant (i.e. road vertical curve greater than 400m (min requirement)), location deemed to be acceptable.
    - Where existing vertical curve is less than 400m further assessment required. The road in locations dips which locally have vertical curves < 400m but are of a short distance, thus the truck vertical clearance needs to be checked.

- Check 2 – Truck Vertical Clearance Check:
  - Blade Truck Delivery on a low loader: 0.3m vertical clearance. When converted to a change in vertical grade between to two adjacent wheels = 8.2% (0.3m/(14.7/2) = 4.1%);
  - Blade Truck Delivery: 1.21m vertical clearance. When converted to a change in vertical grade between to two adjacent wheels = 8.1% (1.21m/(59.6/2) = 4.05%);
  - Hence a vertical road long sections have been reviewed, where change in grades are less than 8%, there are no vertical clearance issues.
  - In reviewing the ford crossings that failed the "Check 1" vertical curve <400m, they have passed "Check 2", the dips/ humps in the road are of a short distance and no vertical clearance issues expected.
- Check 3: Horizontal Alignment
  - Horizontal turning movement of the blade truck have been review (min 100m, desirable 150m). The section of Silverton Road is essentially straight and with deliveries under Police escort and delivery vehicles using the full pavement road width, no issues have been presented.

Refer to Appendix F for details of the above assessment.

2.3 Design of Upgrade Works

All works will be designed in accordance with:

- Project requirements;
- all applicable Local and State Road Legislative Requirements (RMS, Broken Hill City Council, DI Lands, Crown Land);
- GE's Transport Guidelines;
- Australian Standards and Guidelines;
- Austroads Guidelines (where applicable);
- applicable Environmental Guidelines including NSW Department of Primary Industries (Fisheries) *Policy and Guidelines for Fish Friendly Waterway Crossings* (2004) and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (2004); and
- all Landholders requirements.

All designs will be submitted for review and approval by relevant authorities, without limitation, agreements and permits must be obtained prior to commencement of work.

2.3.1 Basis of Design

Refer to Attachment A and B for further details on the Design Basis.

The geometric layout of the existing intersections has been reviewed and where required has been redesigned to ensure adequate turning paths are available to allow for safe turning of over-dimensional vehicles and construction traffic.

Intersection of the Bypass Road and the Barrier Highway:	▪ Intersection design will include compliant Safe Intersection Sight Distance (SISD) to the existing sign posted speed limit (i.e. 110km/hr) of 300m and as such no reduction in speed limit in the vicinity of the intersection will be required; ▪ To achieve compliant sight distances, the intersection has been relocated approx. 40m west of the original proposed location. The revised location is subject to

	confirmation from AGL that there are no heritage issues; ▪ A Basic Right (BAR) turn treatment with the widened shoulder to be sealed and designed for a 110km/hr speed environment to provide reasonable level of safety for vehicles turning right into the Bypass Road and to allow following vehicles an area to pass the right turning vehicle on the lefthand side; ▪ A Basic Left (BAL) turn treatment with the widened shoulder to be sealed and designed for a 110km/hr speed environment to accommodate the turning paths of over dimensional vehicles requiring access via the intersection; ▪ New 150m radius swept path design for the 65m long GE Blade Truck delivery – allows the vehicle to make a continuous swept path; ▪ The swept path will have an alternative appearance to the existing road network (i.e. the use of cement treated materials rather than sealing); ▪ The existing intersection to be reformed to cater for a 19m turning movement – oversize nacelle trucks may exist via this route on the return to Adelaide if under escort; ▪ The Bypass Road is to be sealed for a minimum of 40m from the edge of the Barrier Highway's eastbound travel lane; ▪ Erection of Size B Gateway "Turning Traffic" signs (by RMS) 300m either side of the intersection on the Barrier Highway; and ▪ Addition seal to be added at the intersection to accommodate the swept path of over dimensional vehicles.
Intersection of the Bypass Road and Silverton Road:	▪ Intersection design will include compliant Safe Intersection Sight Distance (SISD) to the existing sign posted speed limit (i.e. 90km/hr) of 214m and as such no reduction in speed limit in the vicinity of the intersection will be required; ▪ New 150m radius swept path design for the 65m long GE Blade Truck delivery – allows the vehicle to make a continuous swept path; ▪ The swept path will have an alternative appearance to the existing road network (i.e. the use of cement treated materials rather than sealing); ▪ The existing intersection to be reformed to cater for a 19m turning movement – oversize nacelle trucks may exist via this route on the return to Adelaide if under escort ▪ A Basic Right (BAR) turn treatment with the widened shoulder to be sealed and designed for a 90km/hr speed environment; ▪ An acceleration lane commencing at the intersection and adjacent to the westbound travel lane in Silverton Road providing sufficient length for westbound vehicles to accelerate to a speed of no less than 70km/hr; ▪ The Bypass Road is to be sealed for a minimum of 60m from the edge of the Barrier Highway's westbound travel lane;

	▪ Safe Stopping Distance (SSD) of 139m for a 90km/hr speed environment shall be provided and maintained from and to the east of the intersection; and ▪ Erection of Size B Gateway "Side Road Intersection" signs (by RMS) 200m either side of the intersection on the Barrier Highway.
Bypass Road	▪ 40km/hr; and ▪ Final road speed subject to final detailed design.
Intersection of Silverton Road and Daydream Mine Rd	▪ Silverton Road sign posted as 90km/hr; ▪ Daydream Mine Road sign posted as 60km/hr; ▪ Based upon traffic volumes where no slip lane is required; ▪ Turn paths to suit 19m semi (sealed section only); and ▪ Over dimensional vehicle via separate access road.
Daydream Mine Rd	The following road speeds are applicable to construction traffic only: ▪ 60km/hr on straights; ▪ 40km/hr on bends; and ▪ Final road speed subject to final detailed design.

2.3.2 Road Safety Audit

A Road Safety Audit has been completed by Tonkin Consulting on the existing conditions of a number of roads and intersection proposed to be upgraded and used as part of the transportation of material to the Silverton Wind Farm. A copy of this report can be provided upon request.

The purpose of this audit was to independently identify road safety concerns with the existing infrastructure and to determine any measures that should be undertaken to provide an adequate level of safety for the form and function of the road.

The findings of the Road Safety Audit have been used to develop the design arrangements proposed.

2.3.3 Safety in Design

As Safety in Design (SiD) review of the intersections will be completed by Wallbridge and Gilbert (W&G) as legally required under the *Work Health and Safety Act 2012* and Regulation 295 of the *Work Health and Safety Regulations 2012*.

A written register from the Design Consultant will be developed that specifies the known hazards within the design, as far as they are reasonably aware. The purpose of the SiD Risk Register will be as follows:

- Identify any risks or hazards associated with the particular design of this project;
- Summarise the design changes implemented to eliminate or minimise risks involved with the project; and
- Summarise the residual risks that need to be managed by the Consortium, Asset Owner, Operator, Maintenance Personnel, as appropriate.

It is noted the SiD process has already commenced with a project workshop chaired by GPA Engineering (held on 7 Mar 2017). The process was completed in accordance with NSW CHAIR requirements for SiD, representatives from the Design Consultant, Consortium and future Operators were present. Outcomes of this process will be formally documented in a self-contained report.

2.4 Construction of Upgrade Works

2.4.1 Methodology

All works will be completed in accordance with asset owner's (i.e. RMS, Local Council) construction requirements and specifications, to the satisfaction of the asset owner.

On completion of upgrade works, the asset owner will be requested to inspect and signoff the works.

Refer to Attachment G for a preliminary Methodology for the completion of the upgrade works.

2.4.2 Traffic Management

Traffic management during the completion of the upgrade works will be completed in accordance with the *Traffic Management Plan* and will include:

- Ensuring public safety and minimise disruption to the public (both local and tourist traffic);
- Advising affected local residents and businesses of any disruption to traffic flows and public transport services;
- Implementing traffic control system where required; and
- Providing adequate access to work sites.

2.4.3 Risk Management

Where identified risks cannot be controlled through engineering and design measures, administrative controls will be implemented in consultation with and approval from RMS.

Example of risks and the possible mitigation strategies are listed below:

Risk:	Poor sight distance towards Broken Hill at the intersection of the Bypass Road and Silverton Road due to existing road curvature and line of trees

Mitigation Strategies:

- Limit the use of the Bypass Road to over dimensional vehicles **only** for the duration of the turbine componentry deliveries (i.e. Nov 17 – Jun 18). All other construction traffic is to access the site via Broken Hill:
  - At times where the Bypass Road is not in use, signage directing Wind Farm Traffic Only to access the site via Broken Hill.
  - Upon completion of the delivery, all vehicles which become road compliant (i.e. no longer require an escort) will exit the site via Broken Hill.
- Use of escort vehicles to manage the egress/access of over dimensional vehicles to/from the Bypass Road onto the Barrier Highway and Silverton Road.
- Detailed engineering design of intersections to account for proposed traffic movements and sight lines;
- The installation of warning signs on Silverton Rd warning road users that construction traffic will be exiting from the Bypass Road.
- Trees will be pruned, rather than removed wherever possible to increase line of sight. Removal of vegetation, where required, will be in consultation and approval with RMS and Broken Hill City Council.
- Where required, the use of local traffic control.
- Community notification of the upcoming traffic movement via project notice boards, project website, etc.

Risk: Over dimensional vehicle access along Silverton Road.
Mitigation Strategies: ▪ Use of escort vehicles to manage the egress/access of over dimensional vehicles to/from the Bypass Road onto/from Silverton Road. ▪ Construction of passing bays to allow safe passage of over dimensional vehicles and background traffic. ▪ CATCON will control 5km (approx.) sections of Silverton Road at a time. Once an over dimensional vehicle reaches a passing bay, police/escort vehicles will determine if the over dimensional vehicle can progress to the next passing bay/control point or if the over dimensional vehicle is required to stop to allow those vehicles in the passing bays to proceed and/or allow those vehicles following to pass the stopped vehicle. The over dimensional vehicle will then be allowed to continue once the next 5km section is deemed safe. CATCON have undertaken a simulated trial from the Broken Hill Bypass Road, along Silverton Road to the turn off at Daydream Mine Road using a light vehicle whereby the light vehicle travelled at a speed of 55 – 60km/hr along the straights and 40km/hr on blind brows and floodways/dips. The simulated trial has predicted travel times of between 5 – 7 minutes per 5km section. ▪ The installation of warning signs on Silverton Rd warning road users that construction traffic will be exiting from the Bypass Road. ▪ Where required, the use of local traffic control. ▪ Community notification of the upcoming traffic movement via project notice boards, project website, etc.

2.5 Programme of Upgrade Works

The works will be completed in accordance with the approved Construction Programme as detailed below, noting that design associated with each element of works will be undertaken concurrently:

ITEM	START	FINISH
Design		
Daydream Mine Road and Silverton Road Upgrades		
Preliminary 15% Design	18 Feb 17	14 Jun 17
Client Review of Preliminary 15% Design	15 Jun 17	30 Jun 17
Detailed Design and Documentation to 80% Design	3 Jul 17	18 Aug 17
Client Review and Approval of 80% Design	21 Aug 17	1 Sep 17
Detailed Design and Documentation to 'Issued for Construction'	4 Sep 17	8 Sep 17
Broken Hill Bypass Road Upgrade		
Preliminary 15% Design	3 Jul 17	18 Aug 17
Client Review of Preliminary 15% Design	21 Aug 17	1 Sep 17
Detailed Design and Documentation to 80% Design	4 Sep 17	15 Sep 17
Client Review and Approval of 80% Design	18 Sep 17	29 Sep 17
Detailed Design and Documentation to 'Issued for Construction'	2 Oct 17	6 Oct 17
Construction		
Daydream Mine Road Upgrade		
Upgrade Daydream Mine Road/Silverton Road Intersection	18 Sep 17	12 Oct 17
Upgrade Daydream Mine Road including intersection of Daydream Mine Road and the Site Access Road	2 Oct 17	23 Oct 17

ITEM	START	FINISH
Silverton Road Upgrade		
Construction of the passing bays	13 Oct 17	3 Nov 17
Broken Hill Bypass Upgrade		
Clearing and Grubbing	24 Oct 17	6 Nov 17
Earthworks	26 Oct 17	9 Nov 17
Subgrade	30 Oct 17	11 Nov 17
Drainage	6 Nov 17	11 Nov 17
Base-course	6 Nov 17	15 Nov 17
Bitumen to Intersections at Barrier Highway and Silverton Road	16 Nov 17	22 Nov 17

3.0 MAINTENANCE WORKS

3.1 Overview

On completion of the upgrade works, maintenance will be completed as follows to the satisfaction of the asset owner (i.e. Local Council, RMS):

- Broken Hill Bypass Road: A private road for sole use by the project for the duration of the project, maintenance works will be completed by CATCON for the duration of the project, as detailed below;
- Silverton Road: A public road which will be maintained by RMS;
- Daydream Mine Road: A public road which will be maintained by CATCON for the duration of the construction works only (approx. 4.2km between Silverton Road and the Site Access Road) in consultation with RMS;

CATCON may be required to complete maintenance works on Silverton Road and Daydream Mine Road in consultation with the asset owner.

On completion of maintenance works, the asset owner will be requested to inspect and signoff the maintenance works.

3.2 Maintenance of the Broken Hill Bypass Road and Daydream Mine Road

Proper maintenance is of high importance as to limit the impact and inconvenience of road repairs on road users.

Maintenance will be completed as follows and in accordance with the relevant RMS specification (i.e. M220 *Formation Grading of Unsealed Roads* and M250 *Heavy Patching (Flexible Pavement)*):

3.2.1 Frequency of Maintenance

- Inspections of the road pavements will be completed every week by CATCON.
- Additional inspections will be completed by CATCON after significant rain events (typically after 1 in 20 year rain events, frequency to alter subject to observed resilience of site environment), farmers works that will affect or alter the bypass road, significant traffic movements and the like.

3.2.2 Maintenance Procedures

Inspection and maintenance should be undertaken in accordance with Attachment H *Maintenance Guidelines* and should include:

- Grading to rectify most defects identified by inspections;
- Repairs to any areas damaged during the construction period to be completed within an agreed timeframe as to not unreasonably impact on other road users;
- Maintenance grades should be followed by a smooth drum roller or grader roller attachment;
- Application of water during maintenance grades and rolling in dry periods to aid compaction to graded surfaces;
- Removal of any surplus material left by maintenance grades, ensure that drainage flows remain unobstructed;
- All inspections and maintenance are to be recorded in a Maintenance Log.

3.2.3 Road Pavement

The inspections of the road pavement should monitor the following:

- Potholes;
- Rutting;
- Corrugations;
- Scouring;
- Regrowth adjacent road network; and
- Ground cover general.

3.2.4 Drainage

Inspections and maintenance of the drainage network should be carried out in conjunction with that of the bypass road as outlined above at the above-mentioned frequency.

Drainage should be inspected for the following defect items:

- Sediment build up;
- Vegetation and other obstacles blocking drains and pipes;
- Scouring at pipe inlet and outlets; and
- Weed infestation.

4.0 CONSULTATION

The Roads and Maritime Services (RMS), Department of Industry – Lands (DI Lands), the Broken City Council and the Silverton Community Committee will be consulted during the design, construction and maintenance phases of the upgrade works to ensure compliance with RMS and Local Council specifications and requirements in a proactive move to assist in the reduction the risks associated with the road upgrades required to enable over dimensional vehicle and general construction traffic to access the works.

Contact details have been forwarded to community and stakeholder groups to enable any issues or concerns to be rapidly identified and addressed.

4.1 Record of Community and Stakeholder Consultations

A summary of consultation with the above-mentioned groups is included in Attachment I. These records can be provided upon request.

5.0 ATTACHMENTS

Attachment A *Proposed Upgrade of the Broken Hill Bypass Road/Barrier Highway Intersection*

Attachment B *Proposed Upgrade of the Broken Hill Bypass Road/Silverton Road Intersection*

Attachment C *Proposed Upgrade of the Daydream Mine Road and Silverton Road Intersection*

Attachment D *Proposed Upgrade of the Daydream Mine Road and Silverton Wind Farm Access Road Intersection*

Attachment E *Proposed Silverton Road Passing Bays*

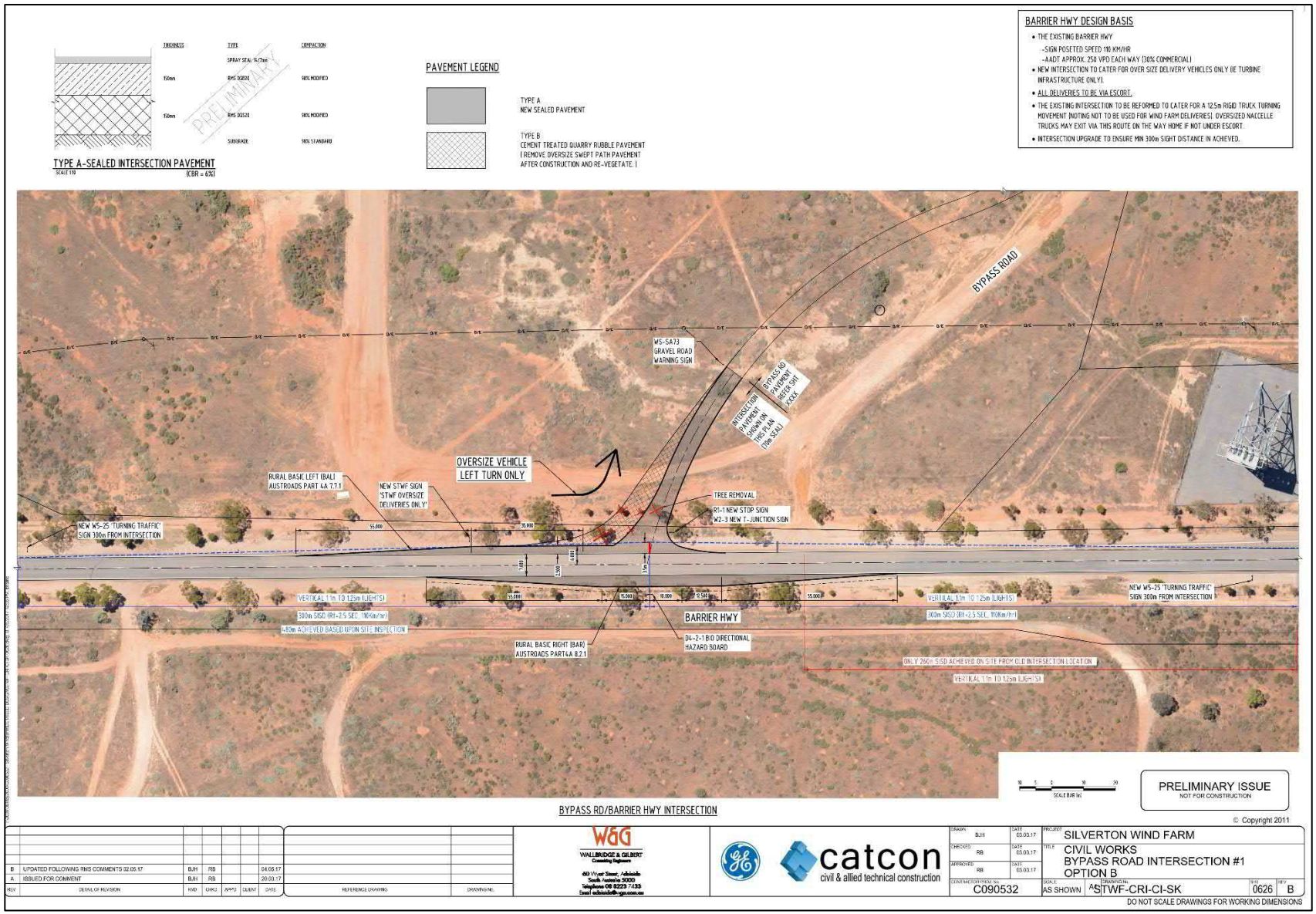
Attachment F *Silverton Road Floodways Assessment*

Attachment G *Methodology Statement – External Road Works*

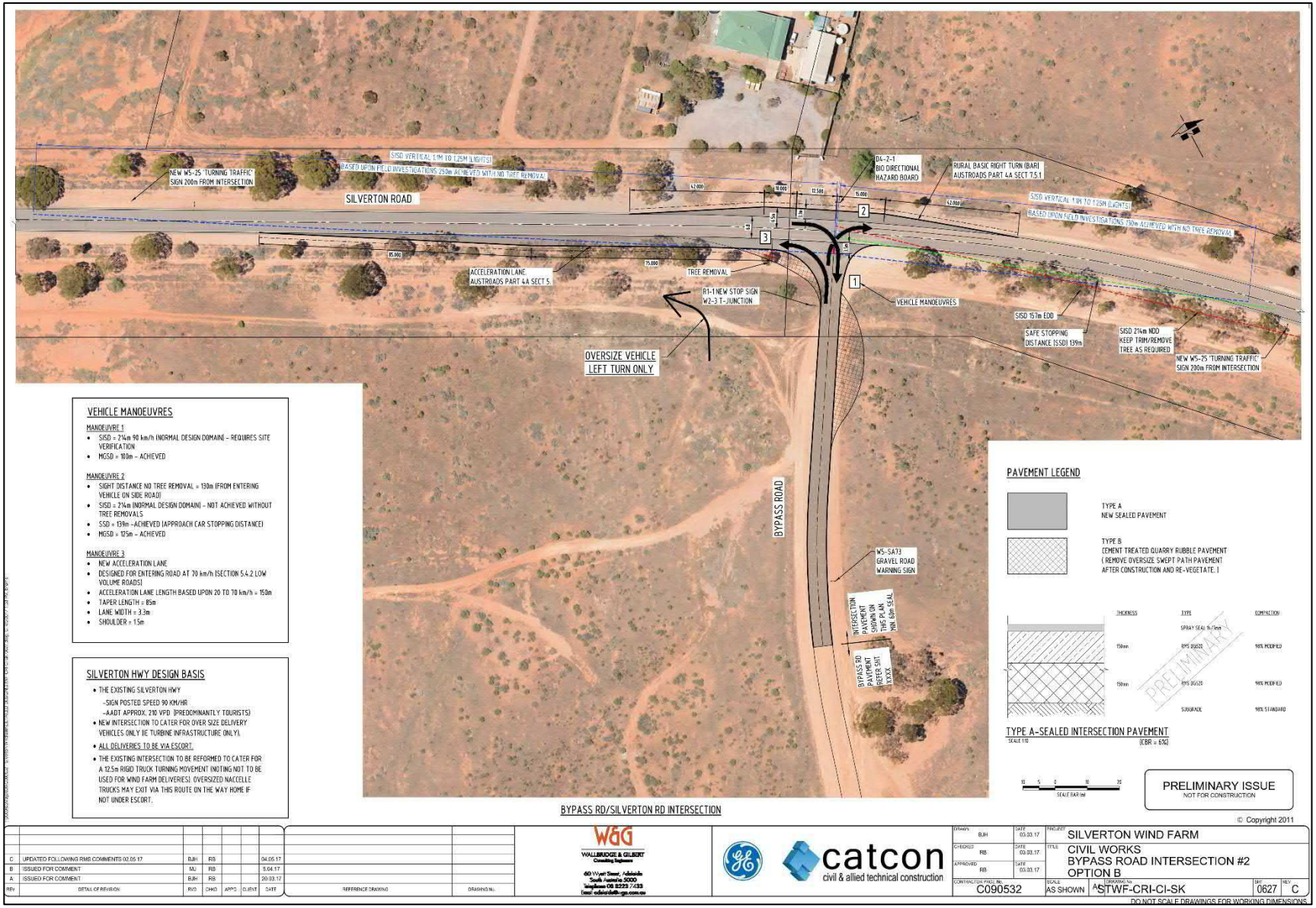
Attachment H *Maintenance Guidelines*

Attachment I *Record of Community and Stakeholder Consultation*

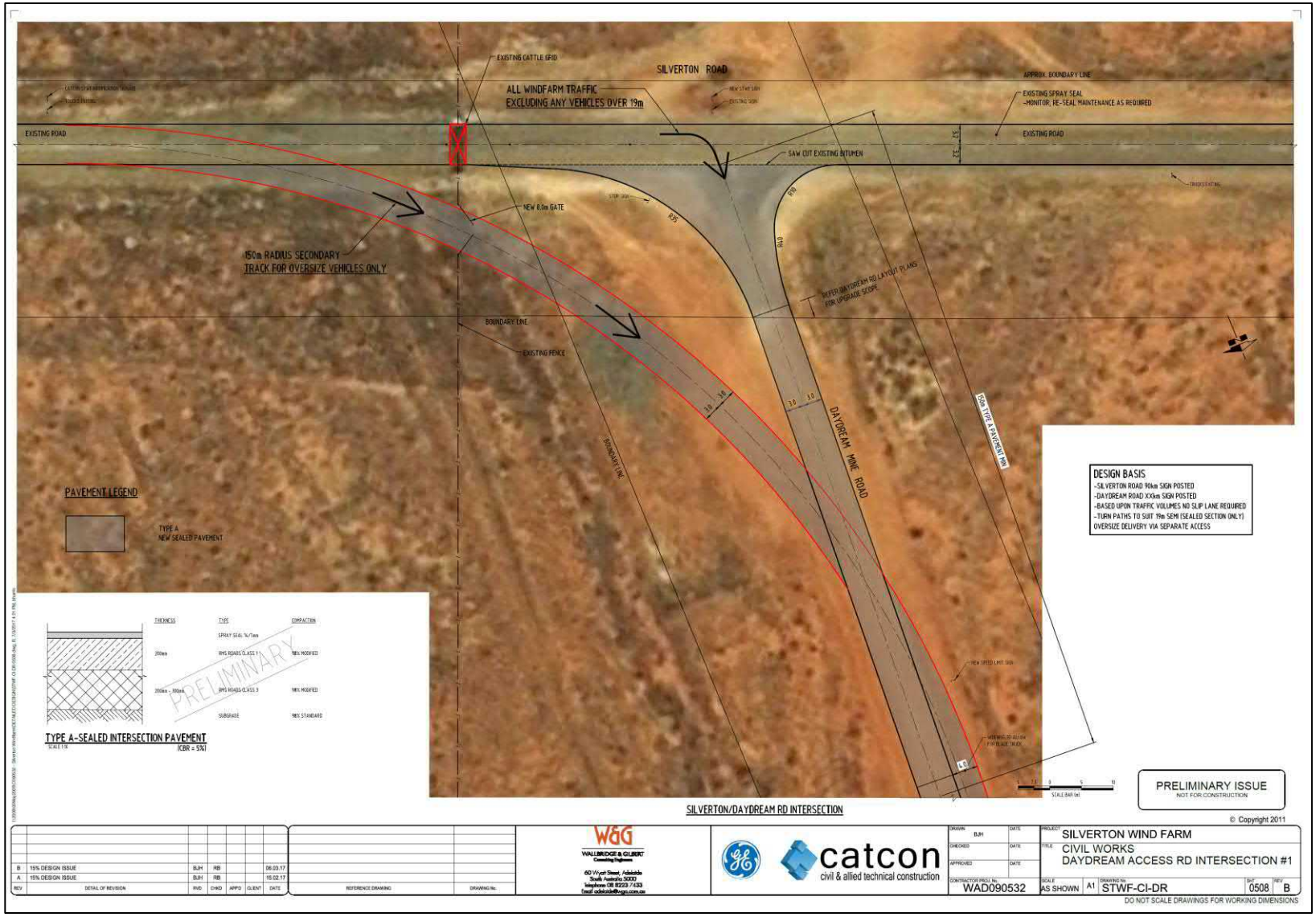
ATTACHMENT A: Proposed Upgrade of the Broken Hill Bypass Road / Barrier Highway Intersection

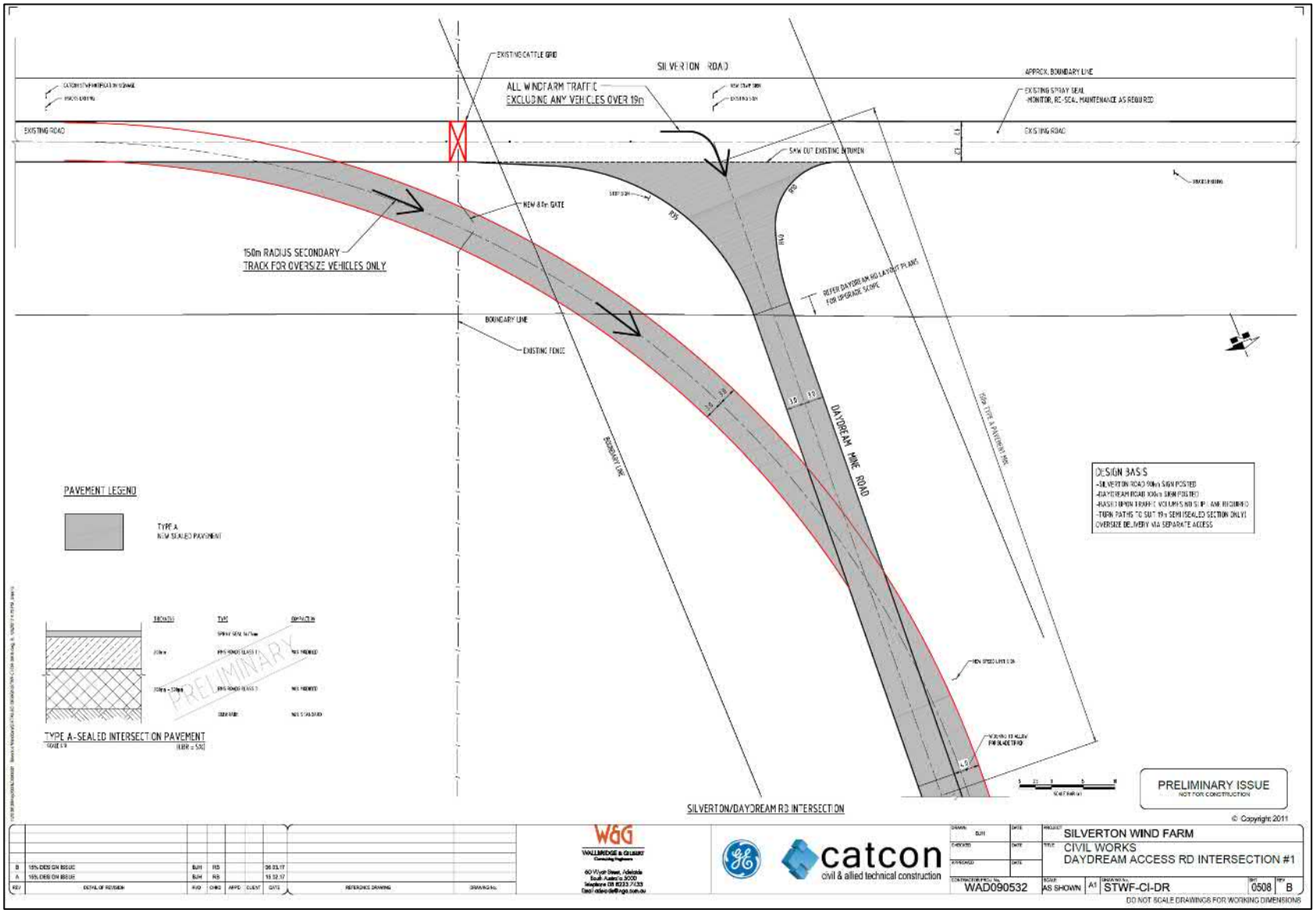


ATTACHMENT B: Proposed Upgrade of the Broken Hill Bypass Road / Silverton Road Intersection

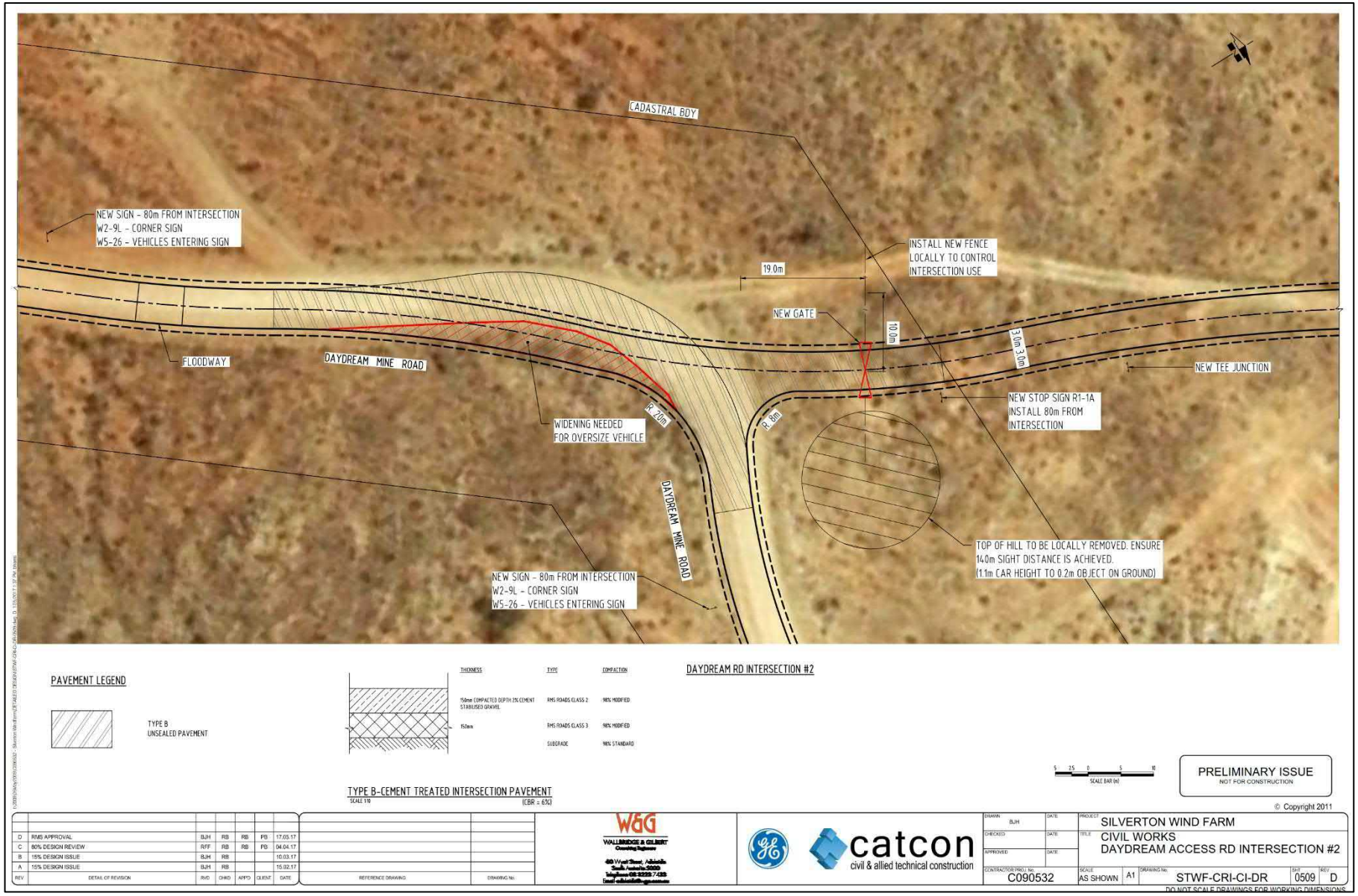


ATTACHMENT C: Proposed Upgrade of the Daydream Mine Road and Silverton Road Intersection

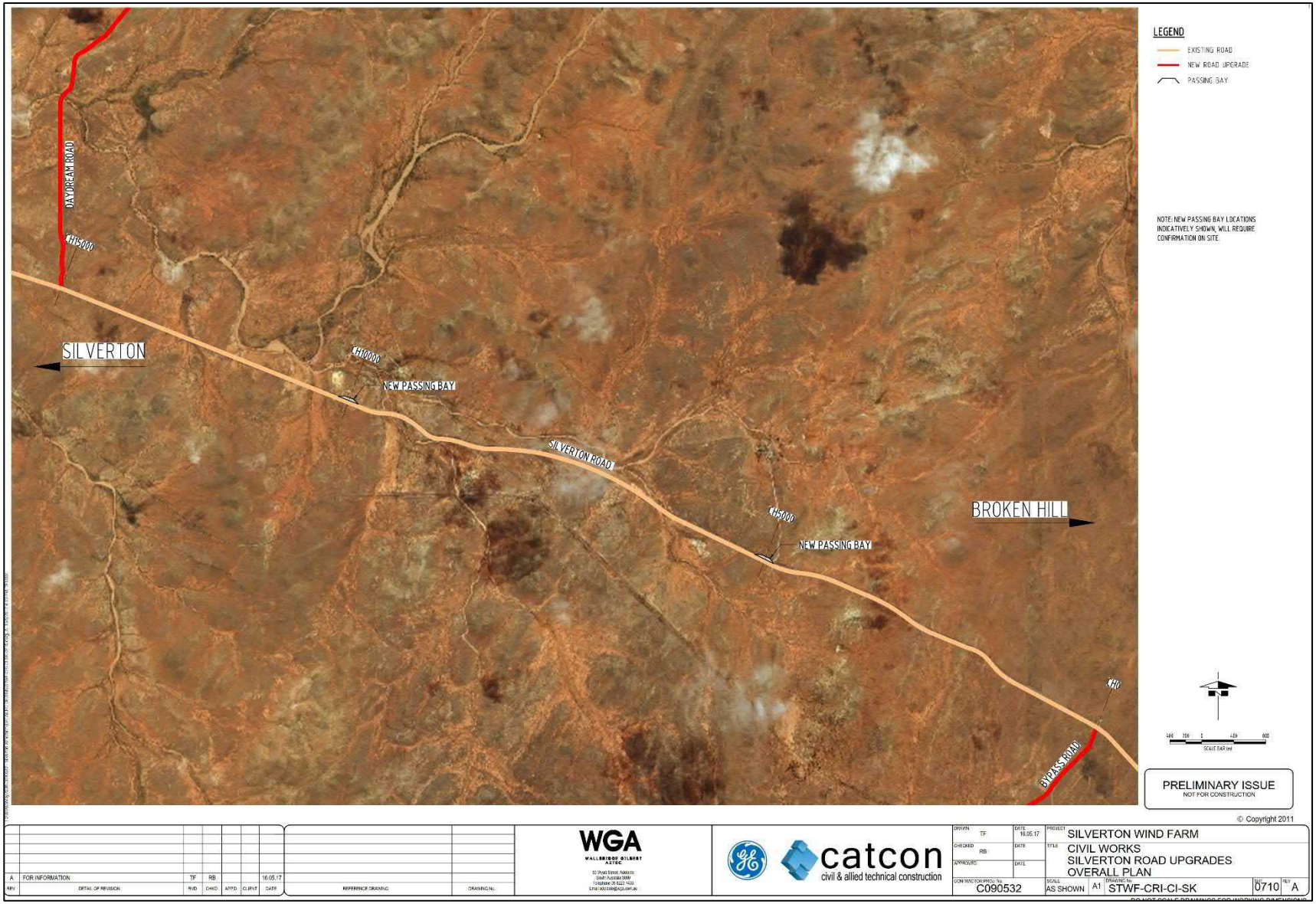


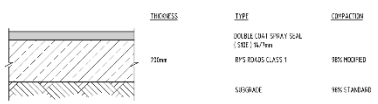

SILVERTON ROAD
EXISTING CATTLE GRID
ALL WINDFARM TRAFFIC
EXCLUDING ANY VEHICLES OVER 19m
APPROX. BOUNDARY LINE
EXISTING SPRAY SEAL
-MONITOR, RE-SEAL, MAINTENANCE AS REQUIRED
EXISTING ROAD
SAW CUT EXISTING BITUMEN
NEW 8.0m GATE
150m RADIUS SECONDARY
TRACK FOR OVERSIZE VEHICLES ONLY
REFER DAYDREAM BIG LAYOUT PLANS
FOR UPGRADE SCOPE
BOUNDARY LINE
EXISTING FENCE
DAYDREAM MINE ROAD
150m TYP. A PAVEMENT MIN.
PAVEMENT LEGEND
TYPE A
NEW SEALED PAVEMENT
TYPE A-SEALED INTERSECTION PAVEMENT
DESIGN BASIS
-SILVERTON ROAD 90km/h SIGN POSTED
-DAYDREAM ROAD 100km/h SIGN POSTED
-BASED UPON TRAFFIC VOLUMES NO SLIP LANE REQUIRED
-TURN PATHS TO SUIT 19m SEMI (SEALED SECTION ONLY)
OVERSIZE DELIVERY VIA SEPARATE ACCESS
PRELIMINARY ISSUE
NOT FOR CONSTRUCTION
© Copyright 2011
SILVERTON/DAYDREAM RD INTERSECTION
SILVERTON WIND FARM
CIVIL WORKS
DAYDREAM ACCESS RD INTERSECTION #1
WAD090532
AS SHOWN
STWF-CI-DR
0508
B
DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS

ATTACHMENT D: Proposed Upgrade of the Daydream Mine Road and Silverton Wind Farm Access Road Intersection

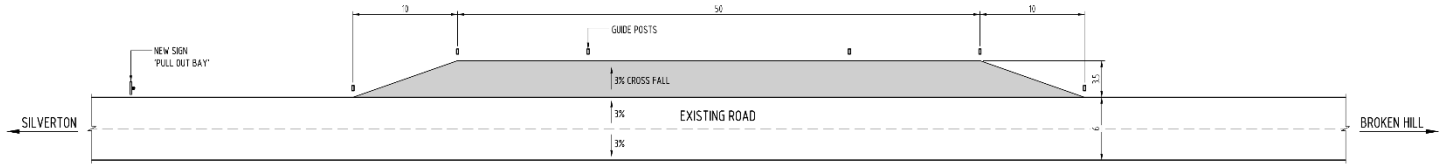


ATTACHMENT E: **Proposed Silverton Road Passing Bays**





TYPE A-SEALED INTERSECTION PAVEMENT
SCALE 1:10
(CBR = 6%)



SILVERTON ROAD PASSING BAY DETAIL
SCALE 1:20

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV	DETAIL OF REVISION	DRN	CHKD	APPD	CLIENT	DATE
A	FOR INFORMATION	TP	RB			19.05.17

REFERENCE DRAWING | DRAWING No.

WGA WALLBRIDGE GILBERT AZTEC

catcon civil & allied technical construction

DRAWN TP 19.05.17
CHECKED RB
APPROVED

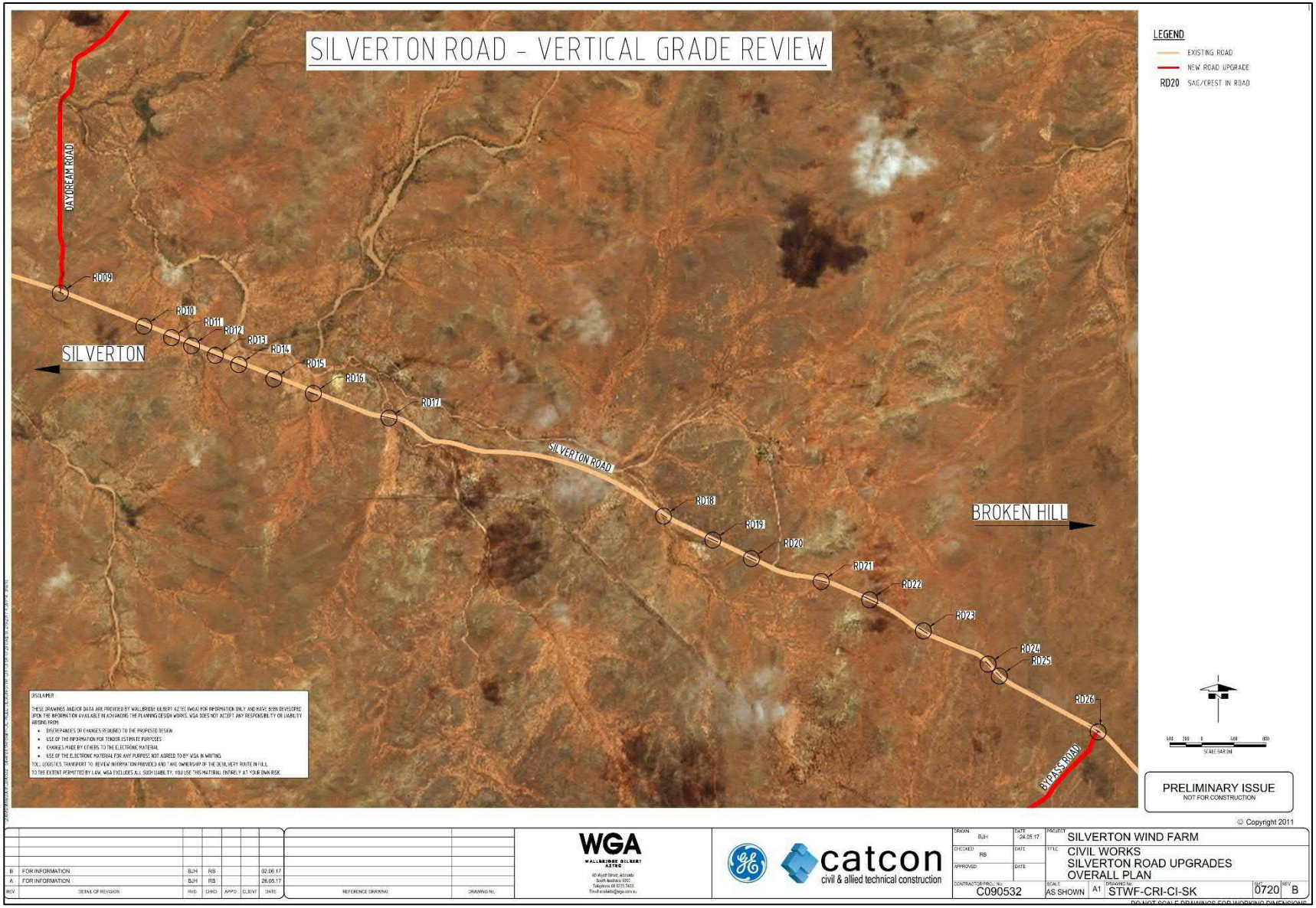
CONTRACTOR PROJ. No. C090532

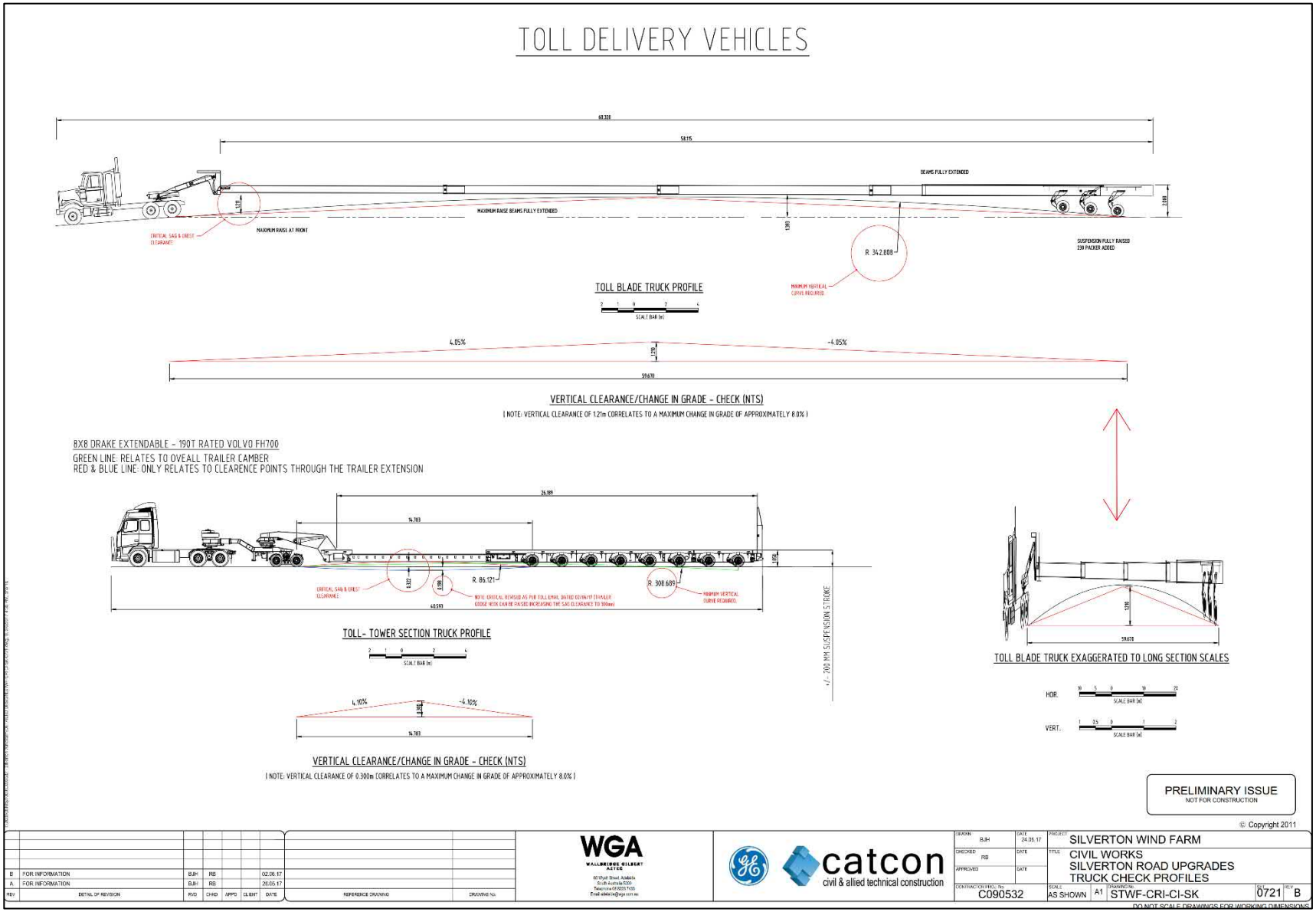
PROJECT SILVERTON WIND FARM
TITLE CIVIL WORKS
SILVERTON ROAD UPGRADES
DETAILS SHEET

SCALE AS SHOWN | A1 | DRAWING No. STWF-CRI-CI-SK | SEQ 0711 | REV A

DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS

ATTACHMENT F: Silverton Road Floodways Assessment




TOLL DELIVERY VEHICLES
68.320
58.115
BEAMS FULLY EXTENDED
MAXIMUM RAISE BEAMS FULLY EXTENDED
MAXIMUM RAISE AT FRONT
CRITICAL SAG & CREST CLEARANCE
1.393
R: 342.808
SUSPENSION FULLY RAISED 230 PACKER ADDED
MINIMUM VERTICAL CURVE REQUIRED
TOLL BLADE TRUCK PROFILE
SCALE BAR (m)
4.85%
-4.85%
1.210
59.670
VERTICAL CLEARANCE/CHANGE IN GRADE - CHECK (NTS)
(NOTE: VERTICAL CLEARANCE OF 1.21m CORRELATES TO A MAXIMUM CHANGE IN GRADE OF APPROXIMATELY 8.0%)
8X8 DRAKE EXTENDABLE - 190T RATED VOLVO FH700
GREEN LINE: RELATES TO OVEALL TRAILER CAMBER
RED & BLUE LINE: ONLY RELATES TO CLEARENCE POINTS THROUGH THE TRAILER EXTENSION
26.189
14.700
R. 86.121
R. 308.689
MINIMUM VERTICAL CURVE REQUIRED
+/- 700 MM SUSPENSION STROKE
TOLL- TOWER SECTION TRUCK PROFILE
SCALE BAR (m)
4.10%
-4.10%
0.300
14.700
VERTICAL CLEARANCE/CHANGE IN GRADE - CHECK (NTS)
(NOTE: VERTICAL CLEARANCE OF 0.300m CORRELATES TO A MAXIMUM CHANGE IN GRADE OF APPROXIMATELY 8.0%)
TOLL BLADE TRUCK EXAGGERATED TO LONG SECTION SCALES
HOR.
VERT.
SCALE BAR (m)
PRELIMINARY ISSUE
NOT FOR CONSTRUCTION
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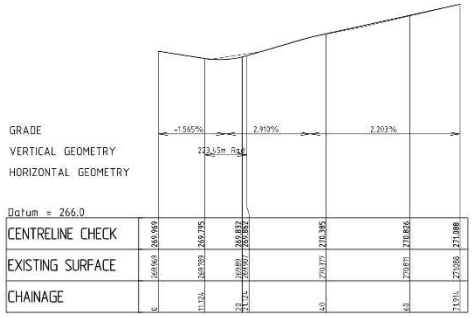
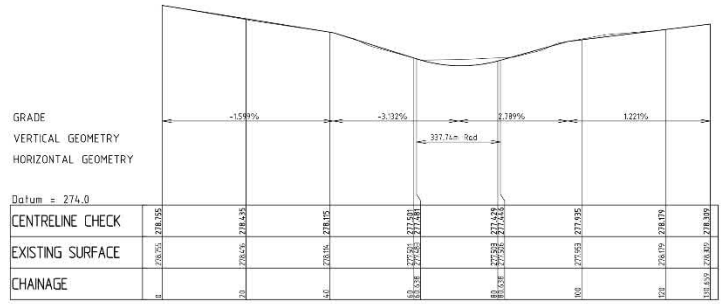
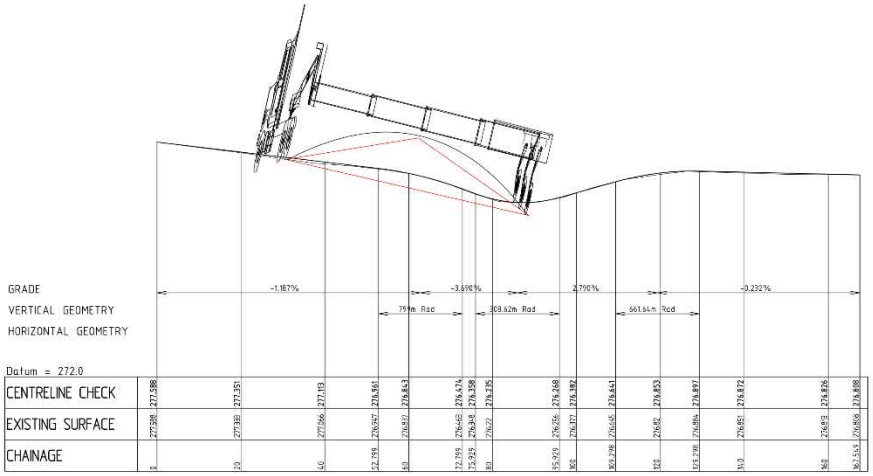
B FOR INFORMATION BJH RB 02.06.17
A FOR INFORMATION BJH RB 26.05.17
WGA WALLBRIDGE GILBERT AZTEC
catcon civil & allied technical construction
DRAWN BJH DATE 24.05.17
CHECKED RB
APPROVED
PROJECT SILVERTON WIND FARM
TITLE CIVIL WORKS
SILVERTON ROAD UPGRADES
TRUCK CHECK PROFILES
CONTRACTOR PROJ. No. C090532
SCALE AS SHOWN A1
DRAWING No. STWF-CRI-CI-SK
REV 0721 B
DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS



RD09



RD10



RD11

VERTICAL CURVE CHECKING

1. CHECK THE EXISTING ROAD VERTICAL CURVE
   - A) IF RADIUS > R.342m OK NO FURTHER ASSESSMENT REQUIRED.
   - B) IF RADIUS < R.342m CHANGE IN GRADE CLEARANCE TO BE CHECKED.
2. CHECK CHANGE IN GRADE WHERE MINIMUM VERTICAL CURVE NOT ACHIEVED.
   - A) IF CHANGE IN GRADE < 8.0% OK.
   - B) IF CHANGE IN GRADE > 8.0% NOT OK - ACTION REQUIRED TO FACILITATE DELIVERIES.

HOR. SCALE BAR (m)

VERT. SCALE BAR (m)

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV	DETAIL OF REVISION	BJH	RB			DATE
B	FOR INFORMATION	BJH	RB			02.06.17
A	FOR INFORMATION	BJH	RB			26.05.17

REFERENCE DRAWING | DRAWING No.

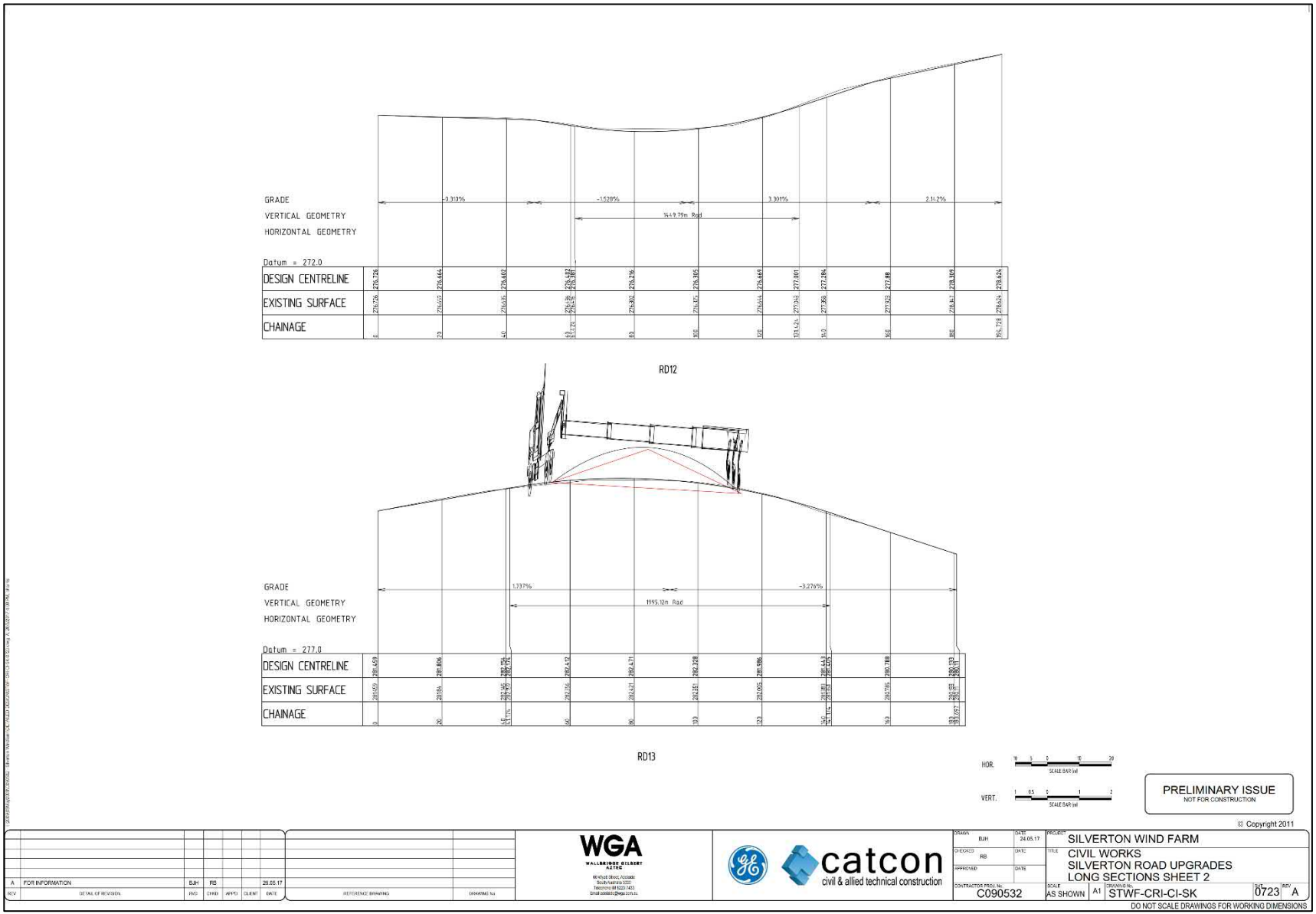
WGA WALLBRIDGE GILBERT AZTEC

catcon civil & allied technical construction

DRAWN BJH	DATE 24.05.17	PROJECT	SILVERTON WIND FARM
CHECKED RB	DATE	TITLE	CIVIL WORKS SILVERTON ROAD UPGRADES LONG SECTIONS SHEET 1
APPROVED	DATE		
CONTRACTOR PROJ. No. C090532	SCALE AS SHOWN	A1	DRAWING No. STWF-CRI-CI-SK

SHT 0722 REV B

DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS


GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 272.0
DESIGN CENTRELINE
EXISTING SURFACE
CHAINAGE
-0.319%
-1.528%
3.301%
2.112%
1449.79m Rad
RD12
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 277.0
DESIGN CENTRELINE
EXISTING SURFACE
CHAINAGE
1.337%
-3.276%
1995.12m Rad
RD13
HOR.
VERT.
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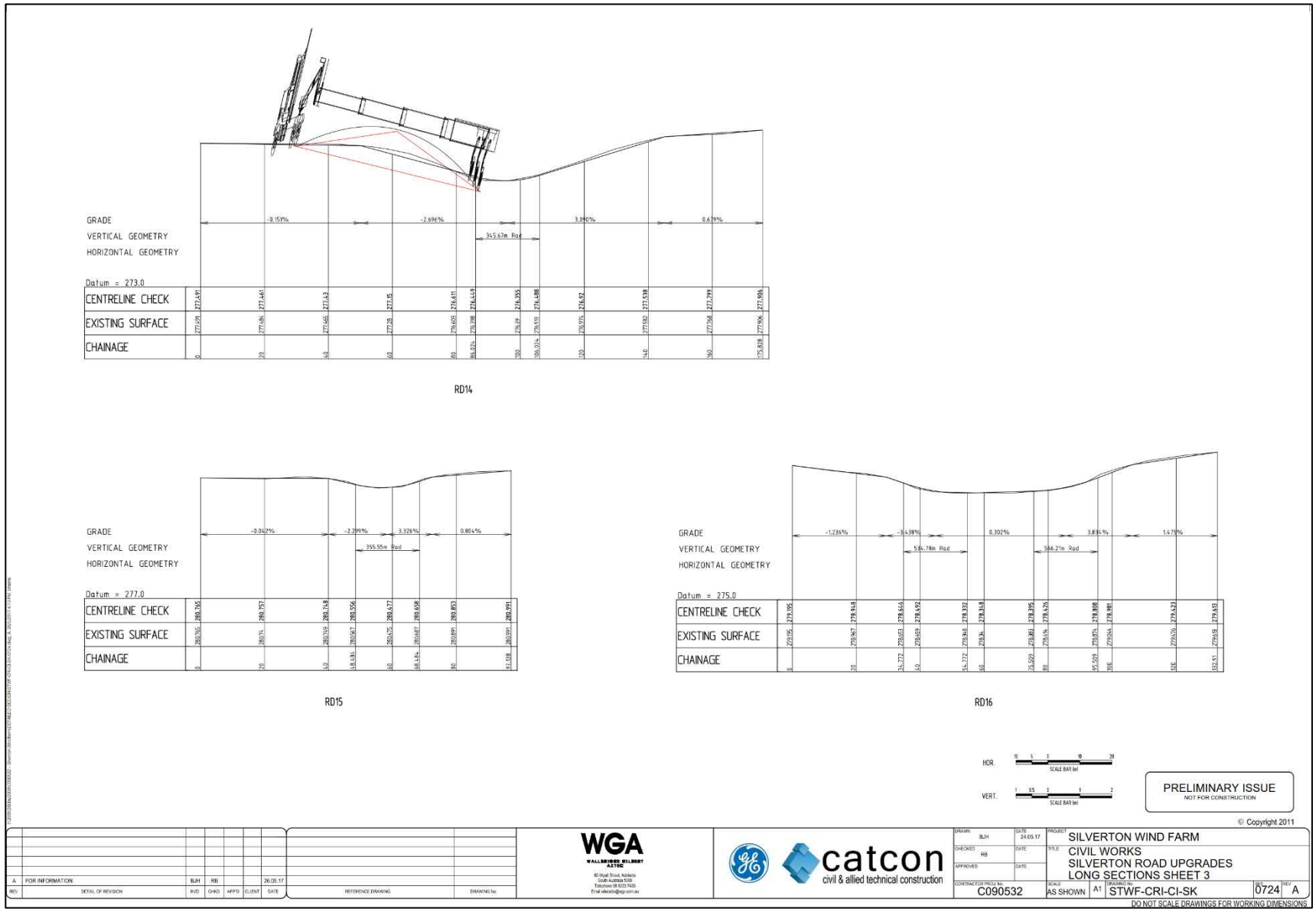
catcon civil & allied technical construction
PROJECT SILVERTON WIND FARM
TITLE CIVIL WORKS
SILVERTON ROAD UPGRADES
LONG SECTIONS SHEET 2
CONTRACTOR PROJ. No. C090532
SCALE AS SHOWN
A1
DRAWING No. STWF-CRI-CI-SK
REV 0723 A
DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS


GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
-0.151%
-2.696%
345.67m Rad
3.990%
0.679%
Datum = 273.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
RD14
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
-0.042%
-2.299%
3.326%
0.804%
355.55m Rad
Datum = 277.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
RD15
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
-1.236%
-3.438%
0.302%
3.834%
1.475%
534.78m Rad
564.21m Rad
Datum = 275.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
RD16
HOR.
SCALE BAR (m)
VERT.
SCALE BAR (m)
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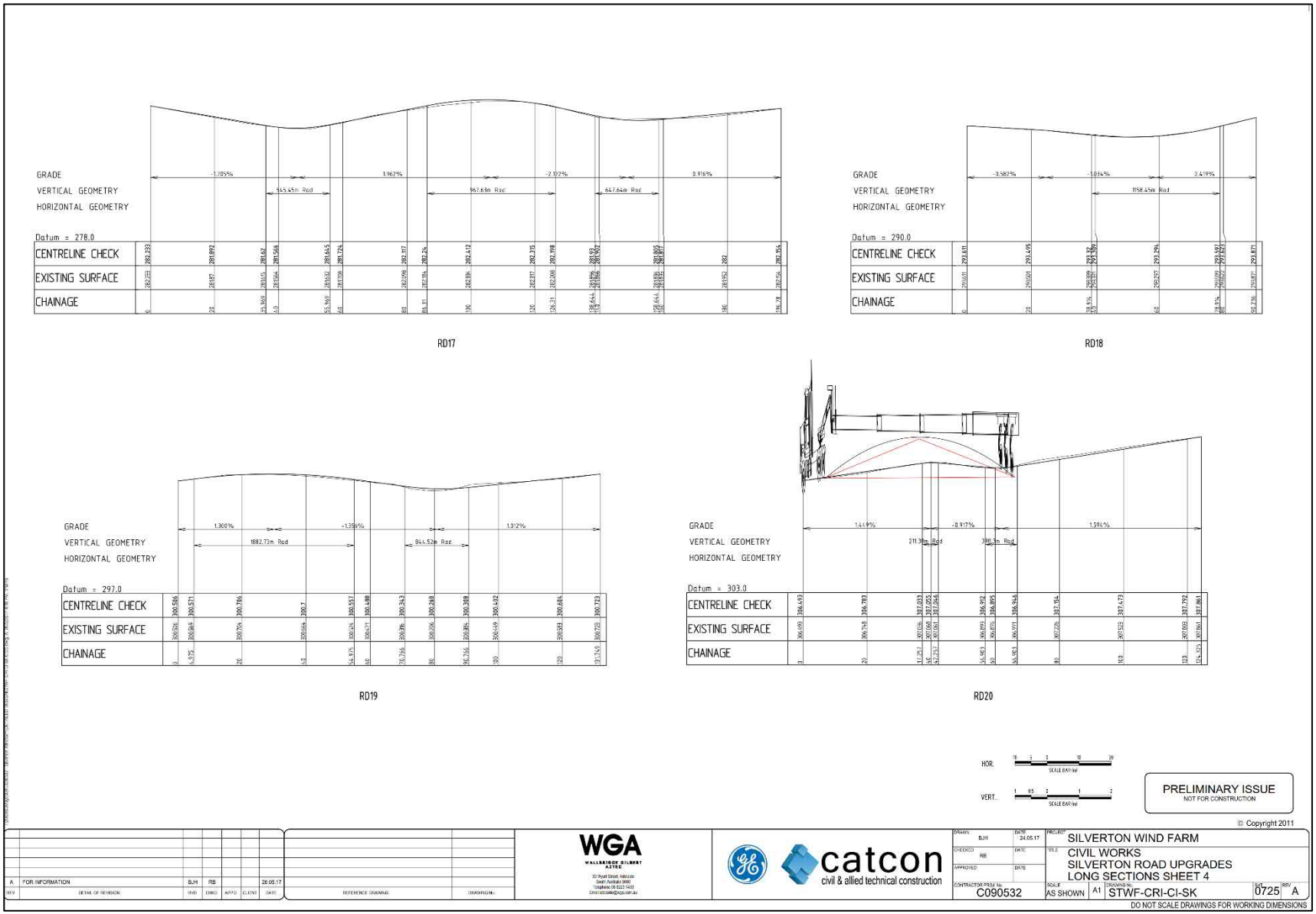
A FOR INFORMATION BJH RB 26.05.17
REV DETAIL OF REVISION INVD GHAD APPD CLIENT DATE
REFERENCE DRAWING
DRAWING No.
WGA WALLBRIDGE GILBERT AZTEC
catcon civil & allied technical construction
DRAWN BJH 24.05.17
CHECKED RB
APPROVED
CONTRACTOR PROJ. No. C090532
PROJECT SILVERTON WIND FARM
TITLE CIVIL WORKS
SILVERTON ROAD UPGRADES
LONG SECTIONS SHEET 3
SCALE AS SHOWN A1
DRAWING No. STWF-CRI-CI-SK 0724
REV A
DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS


GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 278.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
-1.105%
1.962%
-2.102%
0.916%
545.45m Rad
967.63m Rad
647.64m Rad
RD17
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 290.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
-3.582%
-1.034%
2.419%
1158.45m Rad
RD18
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 297.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
1.300%
-1.396%
1.012%
1882.73m Rad
844.52m Rad
RD19
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 303.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
1.419%
-0.917%
1.594%
211.38m Rad
395.3m Rad
RD20
HOR.
VERT.
SCALE BAR (m)
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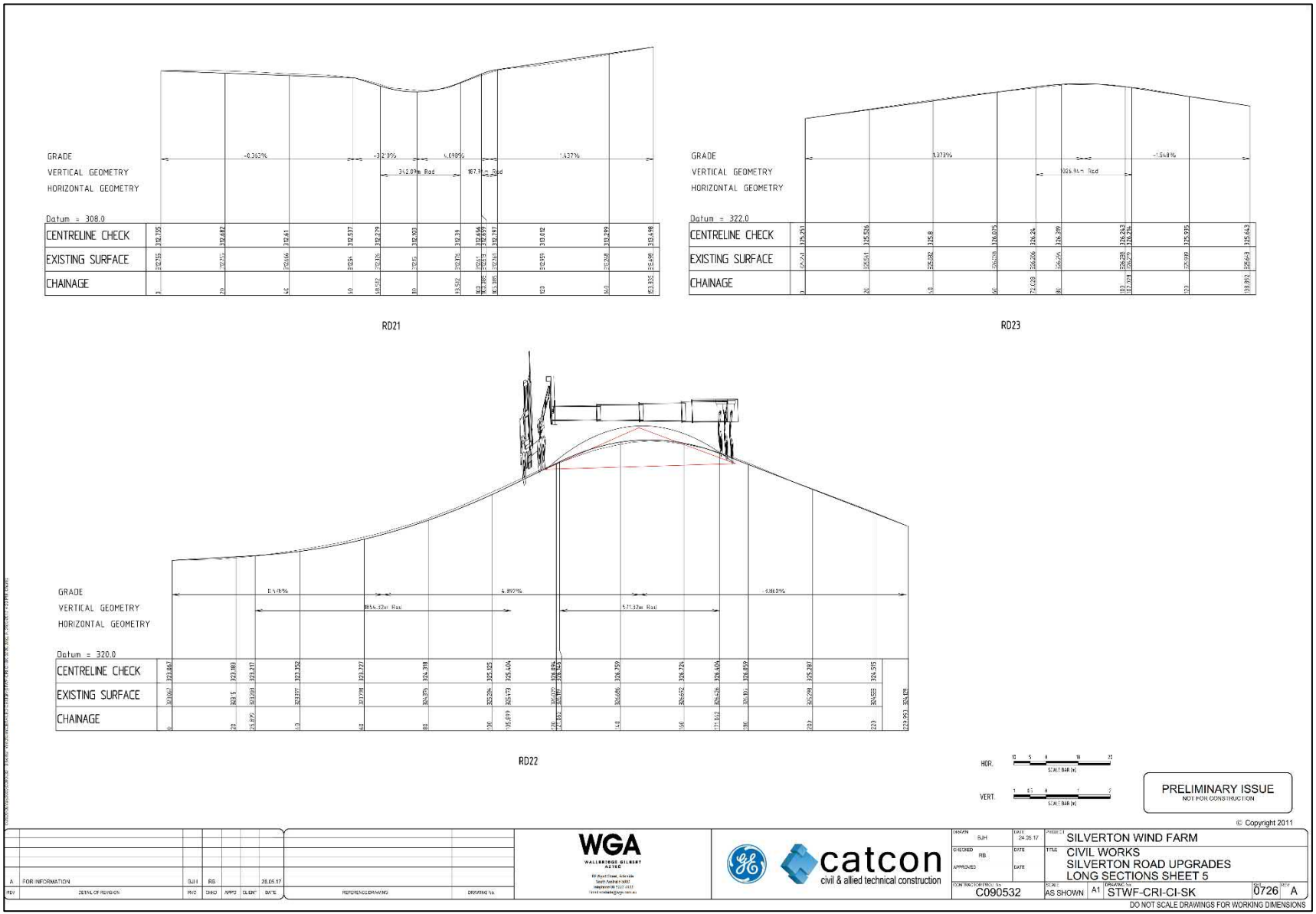
DETAIL OF REVISION DWD CHKD APPD CLIENT DATE
REFERENCE DRAWINGS
DRAWING No.
WGA
WALLBRIDGE GILBERT AZTEC
catcon civil & allied technical construction
DRAWN BJH DATE 24.05.17
CHECKED RB DATE
APPROVED DATE
CONTRACTOR PROJ No. C090532
PROJECT SILVERTON WIND FARM
TITLE CIVIL WORKS
SILVERTON ROAD UPGRADES
LONG SECTIONS SHEET 4
SCALE AS SHOWN
A1
DRAWING No. STWF-CRI-CI-SK
REV 0725
REV A
DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS


GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 308.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
RD21
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 322.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
RD23
GRADE
VERTICAL GEOMETRY
HORIZONTAL GEOMETRY
Datum = 320.0
CENTRELINE CHECK
EXISTING SURFACE
CHAINAGE
RD22
HOR.
VERT.
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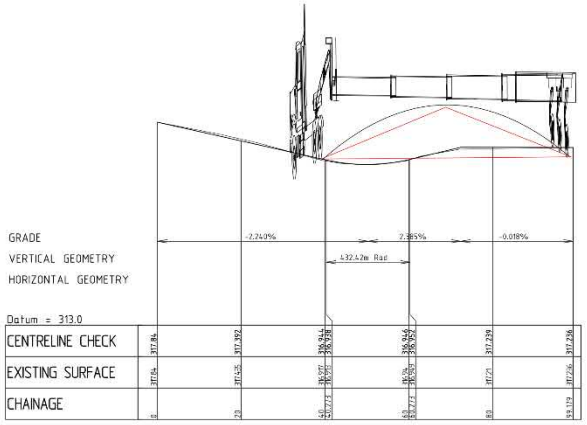
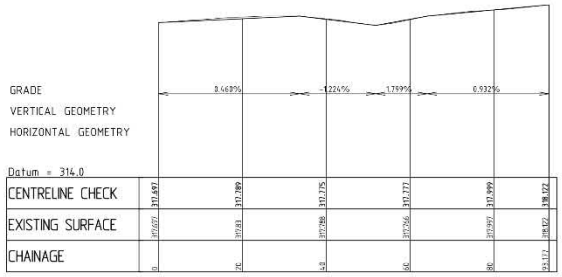
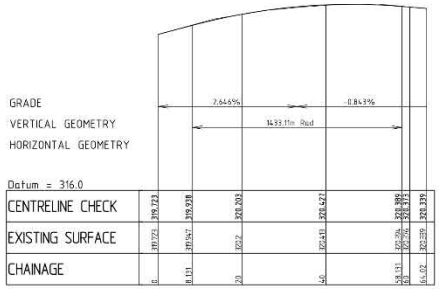
SILVERTON WIND FARM
CIVIL WORKS
SILVERTON ROAD UPGRADES
LONG SECTIONS SHEET 5
C090532
AS SHOWN
STWF-CRI-CI-SK
0726
A
DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS



RD24



RD25



RD26

HOR.
VERT.
SCALE BAR (M)

PRELIMINARY ISSUE
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REV	DETAIL OF REVISION	BJH	RS			DATE
A	FOR INFORMATION	BJH	RS			28.08.17

REFERENCE DRAWING | DRAWING No.

WGA WALLBRIDGE GILBERT AZTEC

catcon civil & allied technical construction

DRAWN: BJH	DATE: 24.08.17	PROJECT: SILVERTON WIND FARM	
CHECKED: RS	DATE	TITLE: CIVIL WORKS SILVERTON ROAD UPGRADES LONG SECTIONS SHEET 6	
APPROVED	DATE		
CONTRACTOR PROJ. NO.: C090532		SCALE: AS SHOWN A1	DRAWING NO.: STWF-CRI-CI-SK 0727 REV: A

DO NOT SCALE DRAWINGS FOR WORKING DIMENSIONS

ATTACHMENT G: Methodology Statement – External Road Works

Activity:
- Upgrade of the Broken Hill Bypass Road and Intersections at Silverton Road and Barrier Highway
- Upgrade of Daydream Mine Road and Intersections at Silverton Road and the Silverton Wind Farm Access Road

Project: Silverton Wind Farm

Material: Top soil, granular material

Equipment:
- Vibrating Pad Foot Roller
- Smooth Drum Roller
- 30T Excavators
- Dump Trucks
- Side Tippers
- Water Carts
- Graders
- Dozers
- Scrapers
- Laser Levels

Introduction: The Work Method Statement for External Road Works is in accordance with the drawings, project requirements, RMS specifications and Industry Standards.

Warning: Prior to commencing work ensure that a Safe Work Method Statement (SWMS) has been developed and that all hazard controls raised in the SWMS are fully implemented.

CEMP Provisions: Works to be completed as detailed in the CEMP.

Work Method:

1. Traffic Management

a. Setout approved traffic management control system.

2. Programming

a. Upgrade works may need to be completed in two (2) sections (i.e. west side of the Bypass Road, followed by the east side) in order to maintain limited vehicle access at all times.

Some works may need to be completed out of hours to limit disruption to other road users, construction traffic and deliveries to site.

b. Confirm location of all existing and new services prior to works commencing.

3. Road Survey Setout (by GLC)

a. Data (coordinates and chainages) shown on drawings will be made to GPS coordinate format by licensed surveyor.

b. Road set out to be pegged out at intervals to give continual line of sight to Plant Operators.

c. Drainage (culverts) works will be set out (where detailed) and will be completed prior to the commencement of road upgrade works.

4. Clearing and Grubbing (if required to widen road)

a. Clearing and grubbing shall consist of the removal of all vegetation, loose material, rubbish and existing structures including fences, tree stumps, etc., where required.

b. All stumps, roots, refuse and obstructions shall be removed to a depth of not less than 200mm below the:
- formation surface; and
- stripped surface in areas of fill.

Unless specified otherwise by the Principal, grubbed holes (and any area requiring filling due to the removal of a structure) shall be backfilled with compacted site won material.

5. Removal of Topsoil (if required to widen road)

a. If ambient conditions require, pre-soak topsoil prior to stripping and provide a light vehicle mounted water tank located within work area for fire control.

b. Strip topsoil to expose insitu subgrade level (200mm min) and move topsoil to each side of road formation using grader for reuse on completed batter slopes and eventual site rehabilitation.

c. Topsoil to be stripped wide enough to form environmental control barriers and fire break.

d. Excess topsoil to be spread in adjacent paddocks and seeded where required.

6. Strip Existing Road Surfacing

a. Strip existing road surfacing (to a min. of 250mm) and base gravel to expose the natural subgrade.

b. Excess material to be stockpiled or removed from site to a location as agreed with the Principal.

7. Cut and Fill Activities

a. Carry out cut and fill earthworks using Dozers, Excavators or as required.

8. Subgrade Preparation

a. Trim subgrade with Grader to level and check grade using slope meter.

b. Check cross fall is in accordance with the drawings.

9. Proof Roll Subgrade

a. Proof rolling shall be carried out within two (2) days of stripping in areas of fill or completion of cut and prior to any trafficking over the prepared area.

b. Proof rolling shall be conducted using four (4) passes of a loaded water cart or equivalent.

c. Any areas identified as wet/weak will require remedial works and subsequent proof rolls/reworks until passed by the Principal.

CATCON has the option to complete a Benkleman Beam Deflection Test rather than replacing, reworking and re-proof rolling areas which failed the initial proof roll.

d. Proof rolling to be witness by the Principal's Representative.

e. Proof rolling to be signed-off on *Proof Roll Record* (form QF-39) and within the corresponding *Inspection and Test Plan* (ITP) (form QF-32).

f. Complete compaction testing on subgrade.

g. Subgrade testing results to be kept within ITP folders.

10. Provision of Granular Material

a. Granular material will be provided in accordance with the drawings.

11. Place and Compact Granular Base Sub-base Layer

a. Granular base material will be place in two (2) layers of varying thicknesses as follows:

Pavement Type	Sub-base Layer	Base Layer
A – Sealed	Varies	180mm
B - Unsealed	200 – 300mm	200mm

b. Place granular material in max 200mm loose material thickness layers via Trucks and/or Side Tippers.

c. Granular material layer to be spread, watered, graded and rolled into maximum layer thickness (as detailed above) ready for compaction.

d. Compact granular material layer using a 12T Smooth Drum Roller.

e. Subbase layer to reach a compaction of 98% SDD.

12. Proof Roll Granular Base Subbase Layer

a. Proof rolling shall be conducted using four (4) passes of a loaded water cart or equivalent.

b. Any areas identified as wet/weak will require remedial works and subsequent proof rolls/reworks until passed by the Principal.

CATCON has the option to complete a Benkleman Beam Deflection Test rather than replacing, reworking and re-proof rolling areas which failed the initial proof roll.

c. Proof rolling to be witness by the Principal's Representative.

d. Proof rolling to be signed-off on *Proof Roll Record* (form QF-39) and within the corresponding *Inspection and Test Plan* (ITP) (form QF-32).

13. Place and Compact Granular Base Layer

a. Granular base layer material will be place in layers of varying thicknesses as detailed in Item 12 above.

b. Place granular material in max 200mm loose material thickness layers via trucks and/or side tippers.

c. Granular material layer to be spread, watered, graded and rolled into maximum layer thickness (as detailed above in Item 12) ready for compaction.

d. Compact granular material layer using a 12T Smooth Drum Roller.

e. Base layer to reach a compaction of 95% SDD for Pavement Type A and 98% SDD for Pavement Type B

14. Proof Roll Granular Base Layer

As for Item 13 above.

15. Final Trim

a. The road surface will be trimmed to finished level using a grader and rolled with a 12T Smooth Drum Roller.

16. Preparation for Wearing Course Layer (Pavement Design B only)

a. Obtain approval for seal design.

b. Confirm road geometry is in accordance with the drawings.

c. Placement of asphalt shall not occur when the surface of the road is wet or while rain appears imminent.

d. Confirm that the road surface is dry, clean and free from any loose stones or foreign matter.

17. Finished Pavement Properties

a. Confirm finished pavement thickness, level and shape are within the specified tolerances.

18. Survey

a. CATCON to complete As-built Survey.

19. Completion

a. All fences and gate ways to be reinstated to suit access tracks where required.

b. ITP completion and sign-off by Principal.

c. Complete hand over.

ATTACHMENT H: Maintenance Guidelines

ELEMENT	TEST FOR ACTION	ACTION
BYPASS ROAD		
Potholes	▪ Where an individual pothole or a series of potholes develop to a depth equal to the base thickness ▪ Where potholes result in roads being impassable by 2-wheel drive vehicle ▪ Where it becomes unsafe to traffic the access roads at the adopted speed limit	▪ Fill and compact individual potholes with material similar to base material **Or** ▪ Regrade and re-compact area of potholes. Add equivalent base material as necessary
Rutting / Scouring	▪ Where an individual rut or a series of ruts develop to a depth equal to the base thickness ▪ Where ruts/scouring result in roads being impassable by 2-wheel drive vehicle ▪ Where it becomes unsafe to traffic the access roads at the adopted speed limit	▪ Fill and compact individual potholes with material similar to base material **Or** ▪ Regrade and re-compact area of ruts/scours. Add equivalent base material as necessary
Corrugations	Where it becomes unsafe to traffic the access roads at the adopted speed limit	Regrade and re-compact area of corrugations. Add equivalent base material as necessary
Base thickness	Where the thickness of the access road base is reduced to below 50mm	Scarify existing base, add additional equivalent base material & regrade and re-compact
Re-growth/ ground cover adjacent access roads	Where the re-growth/groundcover becomes substantially less than the surrounding landscape, and where minimal root growth exists	Revegetate
DRAINAGE		
Sediment Build-Up	To a point where adequate functioning of the drain is impeded	Clear drain of sediment
Vegetation or other obstacles blocking drains and pipes	To a point where adequate functioning of the drain is impeded	Clear drain of excessive vegetation and obstacles
Scouring of open drains	When scour affects drain performance such that it causes or will cause damage to infrastructure	Fill scours or regrade drain to hard surface material. Consideration to be had for revegetation or other forms of scour protection
Weed infestation	To a point where adequate functioning of the drain is impeded	Clear drain of excessive weed infestation
SIGNAGE		
Visibility of road signage	When readability of signs is reduced to such an extent that it is deemed a safety issue	Clean affected signs

ATTACHMENT I: Record of Community and Stakeholder Consultation

Silverton Wind Farm Community Consultative Committee	
8 Mar 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev B) (to Peter Price) for review and comment.
14 Jun 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev 1) (to Peter Price) for review and comment.
3 Jul 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev 2) (to Peter Price) for review and comment.
	Ongoing consultation
DI – Lands	
7 Mar 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev B) (to Michael Isaacs) for review and comment.
17 Mar 17	Letter received (Ref DOC17/051911) outlining that the Department has no further comments regarding this matter provided the methods and mitigation measures described in the plan are followed.
Broken Hill City Council	
7 Mar 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev B) (to Andrew Bruggy) for review and comment, followed up with a phone call.
14 Mar 17	Confirmation from BHCC (Andrew Bruggy) that the Engineers had accepted the preliminary designs.
15 Mar 17	▪ Meeting between the Consortium and the BHCC to discuss the Broken Hill Bypass Road intersection designs (this meeting was held after the meeting with RMS) ▪ Comments by BHCC: ○ BHCC are reluctant to approve the removal of approx. 15 – 20 trees located to the east of the Silverton Road/Bypass Road intersection, required in order to achieve compliant sight distances at the current sign posted speed limit. ○ BHCC would prefer to adopt the design of the Silverton Road/Bypass Road intersection as detailed in the *Road Upgrade and Maintenance Strategy* (Rev B) with a reduction in the speed limit to 60km/hr in the vicinity of the intersection.
21 Mar 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev C) (to Andrew Bruggy) for review and comment.
23 Mar 17	Phone call between Andrew Bruggy and Paul Busolin with the BHCC in favour of reducing the speed limit at the approach to the Bypass Road/Silverton Road intersection rather than removing trees.
14 Jun 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev 1) (to Andrew Bruggy) for review and comment.
3 Jul 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev 2) (to Andrew Bruggy) for review and comment.
RMS	
8 Mar 17	Submitted copy of *Road Upgrade and Maintenance Strategy* (Rev B) (to Andrew McIntyre) for review and comment, followed up with a phone call.
15 Mar 17	▪ Meeting between the Consortium and RMS to discuss the Broken Hill Bypass Road intersection designs. ▪ Comments by RMS: ○ Sight distances need to be achieved without the reduction of current speed limits in the vicinity of the intersections. ○ RMS are seeking a compliant intersection designs for post-construction access for accidental use by the general public. ○ If the swept path is to be implemented, it must not look like a conventional road (i.e. cement treated rather than sealed).

	○ If the swept path is to be implemented, it is to be removed and the area rehabilitated at the end of construction. ○ The Consortium is to confirm how it will manage its personnel and Subcontractors for using the Bypass Road for anything other than over dimensional vehicles. ▪ Actions by the Consortium: ○ The Consortium confirmed that personnel, Subcontractors, Visitors, etc. will be informed of the use of the Bypass Road (i.e. over dimensional vehicles only) via site inductions, Toolbox meetings, Pre-Start meetings and the purchasing process. ○ The Consortium physically confirmed the actual sight distances at each intersection post meeting and it was determined that: • the intersection of the Barrier Highway and the Bypass Road will be relocated approx. 40m west to achieve complaint sight distances at the existing sign posted speed limit (i.e. 100km/hr). - AGL to confirm with their Archeologist that there are no heritage sites that will impede the proposed relocation of the intersection. • in order to achieve compliant sight distance of 214m (at the current sign posted speed limit of 110km/hr) at the Silverton Road/Bypass Road intersection, approx. 15 – 20 trees located to the east of the proposed intersection would need to be removed.
21 Mar 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev C) (to Andrew McIntyre) for review and comment.
5 Apr 17	Correspondence between CATCON Civil Designer (Wallbridge & Gilbert (W&G)) with RMS with regards to the Broken Hill Bypass intersection designs
12 Apr 17	Email from W&G to RMS to further define the concept intersection design in seeking endorsement from RMS.
2 May 17	Letter received from RMS providing comments on the submitted *Road Upgrade and Maintenance* for review and action by CATCON.
15 May 17	Meeting with RMS to review the proposed scope of works for the upgrade of Daydream Mine Road
18 May 17	Email from RMS approving proposed scope of works for the upgrade of Daydream Mine Road
14 Jun 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev 1) (to Andrew McIntyre) for review and comment.
28 Jun 17	Comments received from RMS on the submitted *Road Upgrade and Maintenance Strategy*.
29 Jun 17	Phone conference held between CATCON and RMS to discuss the comments raised by RMS on the submitted *Road Upgrade and Maintenance Strategy*.
3 Jul 17	Submitted a copy of *Road Upgrade and Maintenance Strategy* (Rev 2) (to Andrew McIntyre) for review and comment.
31 Jul 17	Received comments from RMS (Andrew McIntryre) providing feedback on the *Road Upgrade and Maintenance Strategy* (Rev 2)
	Ongoing consultation
NSW Department of Planning and Environment	
29 Mar 17	Submitted a copy of the *Road Upgrade and Maintenance Strategy* (Rev E) for review and comment.
5 May 17	Letter received from DPE providing approval of the *Traffic Management Plan*.
8 May 17	Submitted a copy of the *Road Upgrade and Maintenance Strategy* (Rev 0) for information.
14 Jun 17	Submitted a copy of the *Road Upgrade and Maintenance Strategy* (Rev 1) for review and comment.