UGL REGIONAL LINX

Civil Technical Maintenance Plan

CRN-STD-CVL-713026361-2109

CRN CS 100

LINKING COMMUNITIES. CONNECTING CUSTOMERS.

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Document Control

Function	Position	Name	Date
Approver	Principal Track & Civil Engineer	Muhammad Haque	29.11.2023
Sponsor	Head of Asset and Engineering	Luke Cunningham	29.11.2023

Revision	Issue Date	Revision Description
1.10	27.01.2022	UGLRL Operational Standards Template applied
2.0	27.01.2022	First approved and issued UGLRL version
3.0	24.03.2022	UGLRL reference added in section 5
4.0	15.12.2022	Formatting updates and minor change to frequency of non-operational inspections
5.0	20.12.2023	Formatting change, ultrasonic rail testing frequency change and add Westdale line
5.4	06.02.2024	Appendix 0 updated – Loop Pinecliffe, Bumberry and Maryvale added

Summary of changes made from previous version

Section	Summary of change
Various	Formatting fixes
Various	Reference INFOR changed as HxGN
C11.2, Appendix 0 & Appendix 2	Ultrasonic rail testing frequency change as below: • Bowenfels to Dubbo and Orange to Parkes from 6 monthly to 4 monthly • Werris Creek to Tamworth from 1 yearly to 6 monthly • The Rock to AWB from 4 yearly to 2 yearly Westdale line operations after commissioning: All PM schedules as TMP for a class 3 line
Appendix 0	Rearranged the table in ascending order for AK Car Code; added Loop Pinecliffe, Bumberry & Maryvale which were commissioned in 2021 and PM schedules were implemented in the asset management system

1 Scope and Application

The Technical Maintenance Plan (TMP) specifies maintenance policy for assets within the Track and Structures application. This document is provided for the use of personnel responsible for implementing these policies and programming preventive maintenance work.

The TMP lists items when:

- they are repairable, or
- they have a defined maintenance policy (i.e., the item has a scheduled maintenance activity at a defined interval), or
- they require some special maintenance management input and thus will need certain information to be recorded.

The TMP specifies:

- which items are to be maintained;
- what maintenance is carried out;
- when maintenance is required.

The maintenance tasks and minimum frequencies defined in this document are mandatory for all CRN managed civil infrastructure.

Any proposed reduction in task scope or frequency (lengthening time between tasks) must be authorised, as appropriate, by CRN's Principal Track and Civil Engineer in a location specific Tailored TMP.

Tailored Technical Maintenance plans, where approved, are listed for reference in Appendix 4.

Maintainers shall also review any atypical situations and consider if more stringent requirements are appropriate and ensure appropriate defect management is carried out.

2 References

2.1 Australian and International Standards

Nil

2.2 CRN Documents

CRN CS 200 - Track System

CRN CS 210 - Track Geometry and Stability CRN CS 215 - Transit Space

CRN CS 220 - Rail and Rail Joints

CRN CS 230 - Sleepers and track support CRN CS 240 - Ballast

CRN CS 250 - Turnouts and Special Trackwork CRN CM 101 – Civil Service Schedules

CRN CM 111 – Maintenance plan - First generation wrought iron lattice truss underbridges

CRN CM 112 – Maintenance plan - 'Hybrid' girders for railway overbridges

CRN CM 203 – Track Inspection

CRN CM 302 – Structures Examination

2.3 Other References

Nil

3 Definitions and Abbreviations

The following definitions are used within this standard.

Mainline track:	As defined in CRN Engineering Standard CRN CS 200 “Track System”: “Main lines include crossing loops, refuge loops and "sidings" where operating speed in excess of 25km/hr is permitted”.
Passenger Services:	Regularly scheduled passenger trains excluding ad-hoc special services.
Seasonal lines	Lines that are generally not in use on a seasonal basis, this may be due to drought conditions, or when grain is cleared from the line. In the event of no planned train movements, • Track Patrol and Front of Train Examination may be cancelled • All other Examinations are to be undertaken at the frequencies stipulated in this document, unless a risk assessment has been completed and documented in a District Waiver
Non-operational	Lines (including sidings) that are no longer in use. These lines have been disused for many years and there is little likelihood that they will be re-opened. In any event it is recognised that they could not be re-opened without extensive inspection and upgrading. The risk management and inspection requirements have been specified to ensure that at locations on lines or sidings in this category where there is a public involvement, the infrastructure does not pose a risk to their safety. Additionally, where UGLRL has statutory obligations, minimum inspection requirements have been established.

4 Maintenance concept

4.1 General

The maintenance concept provides for preventive maintenance schedules to minimise or avoid disruption to services, commensurate with UGLRL Rail (CRN)’s safety and reliability objectives. There are two types of maintenance to support the system:

- Preventive maintenance
- Corrective maintenance

4.2 Preventive maintenance

Preventive maintenance is undertaken to keep an item in a specified operating condition through regular maintenance tasks and through systematic examination to detect and prevent potential failures. The former of these includes routine servicing and regular scheduled maintenance based on time or traffic. The latter comprises surveillance examinations, condition monitoring and functional checks. The Technical Maintenance Plan details periods at which preventive maintenance is performed.

4.3 Corrective maintenance

Corrective maintenance is undertaken to restore items to a specified condition by repairing or replacing items. Corrective maintenance is carried out as a result of failures or unsatisfactory conditions detected during preventive maintenance examinations and checks. Corrective maintenance tasks are not detailed in the TMP.

5 Safety importance

Not all safety related tasks are of equal importance and hence necessitate differing compliance regimes for cost-effective management. UGLRL CRN has divided its assessed safety tasks into two categories, safety critical and safety significant. There are other tasks that are not directly safety related.

The difference in importance between safety critical tasks and safety significant tasks is the failure characteristic of the condition being assessed by the examination task.

The failure characteristics of safety critical tasks are generally rapidly developing and adverse following the breach of defined conditional criteria. There is a significant increase in risk associated with safety critical tasks being extended beyond the specified task period without defined and approved risk mitigation measures in place.

The failure characteristics of safety significant tasks are slower to manifest themselves and less likely to be adverse following the breach of defined conditional criteria.

6 Competency

All maintenance inspection, assessment, monitoring and review functions must only be carried out by authorised persons with relevant competencies.

7 Management and reporting

The Track and Civil Manager shall establish and maintain systems to ensure that the following requirements for the completion of Safety related tasks are met:

1. Safety Critical Tasks shall be completed within the defined planning latitude. An Engineering Waiver shall be sought for those tasks exceeding the planning latitude.
2. Safety Significant Tasks should be completed within the defined planning latitude unless a District Waiver is sought.

The Civil Maintenance Engineer shall:

1. Arrange for immediate notification by inspection staff in the event that any Safety Critical inspections become overdue. Such inspections need to be specially managed. Monthly review is insufficient.
2. Review the compliance of Safety Significant, and other, tasks at the end of each month.
3. Review any task that becomes overdue beyond its planning latitude during the month, but has been completed before the end of the month. The review should establish if management action is required to ensure that future inspections will comply with scheduled task requirements.
4. Establish a District Waiver within 7 days if any Safety Significant task is overdue beyond its planning latitude at the end of the month. A District Waiver may only be authorised up to a period 50% greater than the task period, at which time an Engineering Waiver shall be obtained.
5. Arrange for a risk assessment to be undertaken if track recording examination does not meet the requirements of a District Waiver (i.e., it cannot be completed at a time no more than 50%

greater than the task period). The risk assessment shall consider current track condition and defect history.

6. Establish a District Waiver for ONE missed track recording inspection ONLY for a small section of track (less than 5km) or for track that is considered to be in good condition. If, however, the next scheduled examination is delayed beyond its latitude, an Engineering Waiver shall be obtained.

WARNING
Failure to secure the appropriate Waiver will require IMMEDIATE (same day) action to bring the risk back to acceptable levels. This action may include seeking an Engineering Waiver for an extension, removal of the asset from service or placement of service restrictions on the particular asset.

7. Include a documented risk mitigation process with each waiver. The risk mitigation shall be designed to manage the increase in risk of extending the task period.
8. Document all District waivers. The records, including risk assessment, shall be maintained for audit purposes.
9. Where inspection requirements listed in chapter 12 are to be determined or varied by the Civil Maintenance Engineer, a risk assessment shall be carried out considering current asset condition, configuration, location, degradation rates between subsequent inspections and potential impacts on the public when setting inspection frequencies. The records, including risk assessment, shall be maintained for audit purposes.
10. Arrange for review of seasonal lines for inspection requirements. Where there are no trains planned obtain agreement with Operations on the measures to be taken to exclude rail traffic, these measures may include a Track Occupancy Authority for shorter durations or Infrastructure Booking Authority for the line with a stop block installed and advertised in a Safe Notice for longer durations.
11. Arrange for Track Patrol of seasonal lines which have had inspections ceased prior to allowing rail traffic.

8 Technical Maintenance Plan User Information

The TMP table has the following elements:

- Asset group description
- Brief description of the preventive maintenance/service to be performed
- Safety Importance
- Applicability of the Service to specified asset configurations or operating environments
- Service Schedule reference
- Minimum task frequencies or periods (including latitudes)
- Explanatory comments

8.1 Asset

This element details relevant groups of assets within the Civil application that share similar maintenance requirements e.g., Track System, Rail, Ties/Support.

8.2 Service Description

This column provides a brief description of preventive maintenance tasks or sets of tasks defined in the Service Schedule.

8.3 Safety Importance

Some scheduled examination tasks have been categorised as Safety Critical (C) or Safety Significant (S). Tasks that are unscheduled (ON EVENT tasks) or have no safety implications are shown as NA.

8.4 Applicability

This column provides information about how preventive maintenance tasks are to be applied across various asset configurations and/or within specific operating environments. For example, the frequency of Track Patrols varies according to the asset type and traffic pattern.

8.5 Service Schedule Reference

This column provides the alpha-numeric reference code of the Service Schedule applicable for the maintenance tasks.

8.6 Period

The “Period” column defines the minimum frequency at which relevant maintenance should be carried out for each asset and configuration. Period references include:

ON EVENT:	Maintenance or examination is to be carried out when the relevant event occurs.
ATI	Maintenance or examination is to be carried out At the Time of Installation

Any reduction in the minimum recommended frequencies (lengthening time between tasks) must be authorised, as appropriate, by the Principal Track and Civil Engineer.

Where criteria overlap the most stringent is to apply. For example, if a section of track carries passengers services and freight traffic less than 1 MGT per annum, two different track patrol frequencies might be seen to apply (two patrols per week and every 14 days). In this case the more stringent (two patrols per week) will apply.

8.7 Latitude

This column specifies any latitude that may be allowed for scheduling purposes. Inspection schedules shall be based on planned inspection dates, not “last performed” date.

Latitudes are generally expressed in days. That is, a task with a period of 4 months and scheduling latitude of 12 days should be completed within a period of 120 + or - 12 days.

9 Tailored Technical Maintenance Plans

Approved Tailored Technical Maintenance Plans are detailed in Appendix 4. The information includes:

- Document Reference
- Location
- Asset Class to which the Tailored TMP applies
- Task to which the Tailored TMP applies (and a summary of its application)
- Document Control Officer

10 Structures on Non-Operational Lines

All underbridges, overbridges and footbridges that are not in normal usage on non-operational lines shall be inspected in accordance with service schedules CSS 402 or CSS 404.

Bridges determined as being in public areas need to be examined to ensure that components such as rails, fastenings bolts, fixings, etc. are secure and not in danger of falling and causing injury.

The following guidelines are to be used in making an assessment of which bridges are deemed as being within public areas:

- The bridge is located within a station yard which is easily accessible by the public.
- The bridge is in close proximity to public areas (houses, parks, etc) and no barrier (fencing) is in place to prevent access.
- The bridge is located in close proximity to a roadway (including private roads) and there is no barrier between the roadway and bridge.
- The bridge spans either a public or private road.
- The bridge spans a river or creek where access to the bridge is available either along the riverbank or by boat.
- The bridge is located across a paddock or farmland and spans an access track.

As inspections are undertaken, any change or potential changes to land use must be reviewed to determine if the structure is to remain listed within a public area. Third party applications to alter the land use around non-operational corridors are to be reviewed for the impact on inspections of nearby assets.

11 Technical Maintenance Plan

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
11.1 Track System						
Track patrol	C	Lines with passenger services Lines carrying more than 10 MGT per annum Refuges and loops adjacent to tracks which meet the above criteria	CSS 001 CSS 002	Two per week	N/A	Maximum of 3 calendar days between days of examination
		Lines carrying from 1 MGT to 10 MGT per annum Refuges and loops adjacent to tracks which meet the above criteria		7 days	1 day	Maximum of 8 calendar days between days of examination
		Lines carrying less than 1 MGT per annum Refuges and loops adjacent to tracks which meet the above criteria		14 days	1 day	Maximum of 15 calendar days between days of examination
		Seasonal only freight lines, crossing loops and refuges		On event	N/A	Event trigger: Examine within 48hr period prior to running a train and thereafter at relevant freight line period while line is in operation
		Lines without regular passenger services, prior to an adhoc passenger train		On Event	N/A	Maximum of 72 hours prior to passenger train

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
Wet Weather Patrol	NA	All track	CSS 005	On event	N/A	Event trigger: heavy rain, (dependent on infrastructure susceptibility)
Heat Patrol	NA	Welded track	CSS 006	On event	N/A	Event trigger: During WOLO conditions and at times of high rail temperature or when there is concern for the stability of welded track To be carried out once only during the hottest part of the day
Front of train examination	S	All Lines where speed > 50kph	CSS 007	1 month	10 days	On Freight only lines, if trains run only at night, the effectiveness of this type of examination should be determined by the Civil Maintenance Engineer by Risk assessment
		Seasonal lines				Only when services are operating
Detailed walking examination	S	Lines with passenger services Lines carrying more than 10 MGT per annum	CSS 008	3 months	9 days	
		Lines carrying from 1 MGT to 10 MGT per annum		6 months	18 days	
		All other lines		12 months	72 days	
Detailed Walking Examination in sidings	NA	Sidings on Lines carrying more than 1 MGT per annum Sidings carrying passenger trains	CSS 016	6 months	36 days	
		All other sidings		12 months	36 days	
Post Irregularity examination	NA	All track	CSS 009	On event	N/A	Event trigger: Any event that may potentially cause track system damage e.g. derailment, collision, flood or fire, earthquake, high wind, (dependent on infrastructure susceptibility) or a "call out" based on reports from train drivers or the public
Welded Track Stability Examination	S	Welded track (Main Lines and Main line Crossing Loops) -	CSS 011	12 months	N/A	Measurements for Primary WTSA analysis to be completed by end of September each year. Where seasonal factors prevent completion of examination/analysis a preliminary assessment must be made of any outstanding track. The locations of any previous misalignments from the last 3 years must be examined in detail prior to the end of September"
Welded Track Stability Analysis	S	Welded track (Main Lines and Main line Crossing Loops)	CSS 012	12 months	N/A	Primary WTSA Analysis to be completed by end of September each year. The locations of any previous misalignments from the last 3 years must be examined in detail prior to the end of September. All secondary analysis, repair works and subsequent re-measurement and analysis are to be completed by 30 November each year. Where seasonal factors prevent completion of examination/analysis a preliminary assessment must be made of any outstanding track.
Non Welded Track Examination	S	Lines with non welded rail	CSS 013	1 year	N/A	Identification of High Misalignment Risk locations to be completed by end of September each year.
Pre-Summer Inspection	S	Main Lines and Main line Crossing Loops	CSS 015	1 year	N/A	as the Summer approaches each year (to be completed between 1 August and 31 October).

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
Track recording examination (Track Recording Car)	S	Werris Ck to Armidale, Lithgow – Dubbo, Joppa Jct – Canberra	CSS 021	4 months	14 days	As listed in Appendix 0
	NA	Orange – Parkes, Narromine – Cobar, Stockinbingal – Griffith, Junee – Griffith		6 months	1 month	As listed in Appendix 0
	NA	All other operational main lines		12 months	2 months	As listed in Appendix 0
Track recording examination (Manual Recording Trolley)	S	Crossing Loops that do not have power operated points Crossing Loops with maximum speed 25kph.	CSS 024	Varies	N/A	As listed in Appendix 1 Twice frequency (ie 1/2 as often) of adjacent main lines
Track clearances examination	S/C	Passenger Lines and lines carrying >10 MGT pa Safety critical issues should be classified as a defect in high exposure areas and managed in HxGN	CSS 022	1 year	36 days	Not required for tracks with solid concrete roadbed.
		Other lines Safety critical issues should be classified as a defect in high exposure areas and managed in HxGN		2 years	72 days	
	S	Sidings		2 years	72 days	
	N/A	All track		On event	N/A	Event trigger: Suspected change in track geometry which could affect track clearances
Track Centres Examination	S/C	Passenger lines with adjacent tracks (main line, loop or siding) Lines carrying >10 MGT and speed >25kph with adjacent tracks (main line, loop or siding	CSS 023	12 months	36 days	Optional where the design track centres exceed 4300mm
		Other lines with speed >25kph with adjacent tracks (main line, loop or siding)		2 years	72 days	Not required where the design track centres exceed 4300mm
	NA	Sidings		On event	N/A	Event trigger: Suspected change in track geometry which could affect design clearance requirements
	NA	All track		On event	N/A	Event trigger: Suspected change in track geometry which could affect track centre clearances
11.2 Rail						
Ultrasonic rail examination	S	Track as listed in Appendix 2	CSS 031 CSS 032	4 months	24 days	Detailed listing of lines and testing frequencies is shown in Appendix 2
		Track as listed in Appendix 2		6 months	1 month	Detailed listing of lines and testing frequencies is shown in Appendix 2
		Track as listed in Appendix 2		1 year	2 months	Detailed listing of lines and testing frequencies is shown in Appendix 2

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
		Track as listed in Appendix 2		4 years	144 days	Detailed listing of lines and testing frequencies is shown in Appendix 2
		Regularly used crossing loops (as listed in Appendix 2)		Variable		Every second cycle of adjacent main line Detailed listing of lines and testing frequencies is shown in Appendix 2
Visual Examination of VSH Rail Defects	NA	All Vertical Split Head defects	CSS 034	On Event	Varies	If found at night and full requirements for inspection cannot be carried out, defects classified as Medium (M) or larger shall be reinspected in daylight hours the next day. Similarly Small (S) defects shall be reinspected in daylight hours within 7 days.
	S	Small Vertical Split Head defects		14 days	NIL	To commence at end of 5 week period after detection
Rail wear and condition examination	S	All main lines and crossing loops on Class 1 and Class 2 lines	CSS 033	1 year	36 days	
		All tracks		On event	N/A	Event Trigger: Suspected rail condition issue
Rail corrosion examination	S	Rail in Tunnels and other wet locations	CSS 035	1 year	36 days	Other locations where corrosion is an actual or potential problem (including electrolytic corrosion).
Test Weld	S	All new aluminothermic field welds	CSS 036	14 days	NIL	to be tested after installation Test ATI where possible
		All new wirefeed welds	CSS 037	14 days	NIL	to be tested after installation Test ATI where possible
Cleaning Rail head	NA	All rails in track circuited areas	NA	On Event		Event Trigger: Clean or grind at time of installation
Grind Rail	NA	All new rail installed on Class 1 and 2 mainline tracks as part of re-railing (and not as closures for replacement of defects) Existing rail on Class 1 and 2 mainline tracks when concrete sleepers are installed or when substantial back canting is corrected Cascading or transposing of rail on Class 1 and 2 mainline tracks	NA	ATI	N/A	Standard Carbon rail to be ground within 7.5 MGT of installation (or 20% of the grinding cycle for preventive grinding (whichever is the larger) following the re-railing Head Hardened rail to be ground within 10 MGT of installation (or 20% of the grinding cycle for preventive grinding (whichever is the larger) following the re-railing
		Preventative Grinding **Nominal Grinding Cycle (MGT)** **Track Curvature (m)** / **Tracks with Heavy Freight (25TAL) Traffic** / **Tracks with General Freight (<25TAL) Traffic** / **Tracks with predominately Passenger Traffic** **Std** / **HH** / **Std** / **HH** / **Std** / **HH** **450 or less**: 7.5 / 15 / 10 / 20 / 20 / 30 **> 450 to 1000**: 15 / 30 / 20 / 40 / 20 / 40 **> 1000**: 30 / 45 / 40 / 60 / 30 / 50			3MGT or up to 20% recommended grinding frequency whichever is greater	For full details for grinding management see CRN CM 225 Applicable for Class 1 and Class 2 Lines only, other Class lines shall adopt corrective grinding on an as needs basis

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
Insulated joint examination	S	All	CSS 038	1 year	36 days	Includes redundant Insulated Joints
Mechanical Joints Examination	S	Welded track	CSS 039	1 year	36 days	May be completed in conjunction with Welded Track Stability Examinations.
		Loose Rail		1 year	36 days	May be completed in conjunction with Detailed Walking Examinations
Rail lubricator examination	NA	All lubricators	CSS 040	6 months	18 days	
Rail lubricator service	NA	All lubricators	CSS 041	As required	N/A	Event trigger: to be re-filled and serviced at an appropriate interval to ensure service is carried out prior to lubricator running empty
Rail lubricator check of rail head	NA	All lubricators	CSS 042	On Event	N/A	Event trigger: Review lubrication prior to ultrasonic rail testing.
11.3 Ties/support						
Detailed tie examination	S	Lines with fully concrete sleepers/slabs or fully steel sleepers	CSS 046	2 years	72 days	May be completed in conjunction with Detailed Walking Examinations
		Lines with timber sleepers		1 year	36 days	
		Sidings with fully concrete sleepers/slabs or fully steel sleepers		5 years	180 days	
		Sidings with timber sleepers		2 years	72 days	
11.4 Ballast						
Ballast Examination	S	Welded Track	CSS 048	1 year	36 days	As part of Welded Track Stability Examination May be completed in conjunction with Detailed Walking
11.5 Drainage						
Surface drain examination	S	All operational lines	CSS 091	1 year	36 days	Prior to period of greatest rainfall includes functioning of drainage structures such as trash racks, sedimentation basins and flow control structures
	NA	All sidings		1 year	36 days	
Sub-surface drain examination	S	All lines		1 year	36 days	May be completed in conjunction with Earthworks Examination
	NA	All sidings		1 year	36 days	
Wet weather - special examination	NA	All operational lines		On event	N/A	Event trigger: at times of heavy rain or potential flooding (includes functioning of special drainage structures such as trash racks, sedimentation basins and flow control structures)
11.6 Turnouts						
Turnout examination (including catchpoints)	S	Lines with passenger services Lines carrying > 10 MGT per annum	CSS 052	1 year	36 days	
		Other lines and all Sidings		2 years	72 days	

<table>
<tr><th colspan="7">Technical Maintenance Plan</th></tr>
<tr><th>Service Description</th><th>Safety Importance</th><th>Applicability</th><th>Service Schedule</th><th>Period</th><th>Latitude</th><th>Comments</th></tr>
<tr><td rowspan="2">Special Turnout examination</td><td rowspan="2">S</td><td>Similar flexure turnouts on lines with passenger services and lines carrying > 10 MGT per annum</td><td rowspan="2">CSS 053</td><td>6 months</td><td>18 days</td><td rowspan="2">Particular attention is drawn to any similar flexure turnouts (i.e., where the outside rail nominally the 'high rail' is the stockrail) which are subject to curve wear. For such cases, the fit of the switch against the stockrail, the condition of the switch, the stockrail and the switch tip height, width and angle should be assessed</td></tr>
<tr><td>Similar flexure turnouts on other lines and all Sidings</td><td>NIL</td><td></td></tr>
<tr><td>Special Switch Timber Examination</td><td>NA</td><td>Interlocked points on timber bearers (locations with a history of points failures)</td><td>CSS 054</td><td>On Event</td><td>N/A</td><td>Event trigger: Prior to periods of extreme temperature such as Summer or Winter</td></tr>
<tr><td rowspan="3">Inspection of Crossing condition</td><td rowspan="3">NA</td><td>Lines carrying >10 MGT per annum</td><td>CSS 055</td><td>6 months</td><td>18 days</td><td>After installation: Each 2 weeks till first grind then each 2 months for 12 months
After repair (building up): each 1 month until first grind</td></tr>
<tr><td>Lines carrying ≤10 MGT per annum</td><td>CSS 055</td><td>On Event</td><td>N/A</td><td>Event trigger: After installation: Each month till first grind then each 3 months for 6 months
After repair (building up): each 2 months until first grind in service: as part of Turnout Examination</td></tr>
<tr><td>All manganese and vanadium crossings</td><td>CSS 055
CSS 063</td><td>3 months</td><td>9 days</td><td>Additional examination due to ultrasonic examination being of limited effectiveness</td></tr>
<tr><td rowspan="3">Ultrasonic Examination of Turnouts</td><td rowspan="3">S</td><td>Werris Creek to Tamworth, Lithgow to Parkes,
Orange to Dubbo
(Main Lines ONLY)</td><td rowspan="3">CSS 060</td><td>6 months</td><td>18 days</td><td rowspan="3">Testing of crossing and turnout rails including, catchpoints, diamonds and slips. Includes dye penetrant testing of the switch tip</td></tr>
<tr><td rowspan="2"></td><td>Wallerawang to Kandos, Tamworth to Armidale, Goulburn to Canberra, Stockinbingal to Griffith, Junee to Griffith
(Main Lines ONLY)</td><td>1 year</td><td>36 days</td></tr>
<tr><td>All other main lines</td><td>2 years</td><td>72 days</td></tr>
<tr><td rowspan="2">Grind turnout rails</td><td rowspan="2">NA</td><td>All new turnouts installed on Class 1 and
Class 2 mainline tracks as part of renewal (and not part of component refurbishment)</td><td>NA</td><td>ATI</td><td>NA</td><td>Turnouts with Standard Carbon Rail and/or Manganese crossings are to be ground within 8 MGT (or 20% of the grinding cycle for preventive grinding (whichever is the larger) following installation. Turnouts with Standard Carbon Rail and/or Manganese crossings are to be ground within 10 MGT for Head Hardened rails (or 20% of the grinding cycle for preventive grinding (whichever is the larger) following installation.
New turnouts with cant and profile built-in excluded from initial grind</td></tr>
<tr><td colspan="3">Preventative Grinding
<table>
<tr><th rowspan="2">Rail Type</th><th colspan="3">Nominal Grinding Cycle (MGT)
Turnout Type</th></tr>
<tr><th>1:8.25</th><th>1:10.5</th><th>1:15 or higher</th></tr>
<tr><td>Head Hardened</td><td>13</td><td>18</td><td>25</td></tr>
<tr><td>Standard Carbon</td><td>8</td><td>13</td><td>18</td></tr>
</table></td><td>up to 20% recommended grinding frequency whichever is greater</td><td>For full details for grinding management see CRN CM 225 Applicable for Class 1 and Class 2 Lines only, other Class lines shall adopt corrective grinding on an as needs basis</td></tr>
<tr><td colspan="7">11.7 Earthworks</td></tr>
<tr><td></td><td>S</td><td>All operational lines</td><td>CSS 092</td><td>1 year</td><td>36 days</td><td>In conjunction with drainage examination</td></tr>
</table>

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
Earthworks examination		All operational sidings		1 year	36 days	
Detailed Examination Geotechnical risk sites	S	All risk category 1 sites without EWS	CSS 093	Continuous on Event	None	Event trigger: Prior to and during passage of trains in dry weather
		All risk category 1 sites with EWS		1 day	None	
		All risk category 2 sites without EWS in wet weather		1 day	None	During periods of heavy rain or prolonged wet weather
		All risk category 2 sites without EWS		Twice weekly	None	In dry periods
		All risk category 2 sites with EWS in wet weather		Twice weekly	None	During periods of heavy rain or prolonged wet weather
		All risk category 2 sites with EWS		1 month	6 days	In dry periods
		All risk category 3.1 sites without EWS in wet weather		Twice weekly	None	During periods of heavy rain or prolonged wet weather
		All risk category 3.1 sites without EWS		1 month	6 days	In dry periods
		All risk category 3.1 sites with EWS in wet		1 month	6 days	During periods of heavy rain or prolonged wet weather
		All risk category 3.1 sites with EWS		various		In dry periods, In conjunction with Detailed Walking Examination
		All risk category 3.2 sites without EWS in wet		1 month	6 days	During periods of heavy rain or prolonged wet weather
		All risk category 3.2 sites without EWS		various		In conjunction with Detailed Walking Examination
		All risk category 3.2 sites with EWS in wet				
		All risk category 3.2 sites with EWS				
		All risk category 4 & 5 sites without EWS				
Geotechnical risk site review	S	All risk category 1 sites without EWS	CSS 094	weekly	None	
		All risk category 1 sites with EWS		1 month	6 days	
		All risk category 2 sites without EWS in wet weather		1 month	6 days	During periods of heavy rain or prolonged wet weather
		All risk category 2 sites without EWS		6 months	18 days	In dry periods
		All risk category 2 sites with EWS in wet		6 months	18 days	During periods of heavy rain or prolonged wet weather
		All risk category 2 sites with EWS		6 months	18 days	In dry periods

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
		All risk category 3.1 sites without EWS in wet		6 months	18 days	During periods of heavy rain or prolonged wet weather
		All risk category 3.1 sites without EWS		6 months	18 days	In dry periods
		All risk category 3.1 sites with EWS in wet		6 months	18 days	During periods of heavy rain or prolonged wet weather
		All risk category 3.1 sites with EWS		6 months	18 days	In dry periods
		All risk category 3.2 sites without EWS in wet		6 months	18 days	
		All risk category 3.2 sites without EWS		12 months	36 days	
		All risk category 3.2 sites with EWS in wet		12 months	36 days	
		All risk category 3.2 sites with EWS		12 months	36 days	
		All risk category 4 & 5 sites without EWS		12 months	36 days	
		All risk category 4 & 5 sites with EWS	-	-	-	Nil requirement
		AANR	-	-	-	Yet to be determined
11.8 Level crossings						
Level crossing examination	S	Level crossings and track vehicle take offs on lines with passenger traffic or > 10 MGT per annum rail traffic.	CSS 101	1 year	36 days	Note – includes all signs and road markings
		All level crossings on highways, main roads and major arterial roads on lines with freight only traffic ≤10 MGT per annum		1 year	36 days	
		All other level crossings on lines with freight only traffic ≤10 MGT per annum		2 years	72 days	
Sight distance Assessment	NA	All level crossings on operational lines	NA	On Event	N/A	Event Trigger: Changes to sight distance standards, notification of changes in road or rail traffic patterns (volume, speed, vehicle type)
Steel Sleeper Examination	S	All steel level crossings with steel sleepers	CSS 103	6 years	216 days	Removal of steel LX panels for steel sleeper corrosion assessment
11.9 Track on Non Operational Lines						
General Track Inspection	NA	All lines	NA	Nil		
Rail & Fastening Inspection	S	Track on underbridges spanning public areas	CSS 402	12 months	36 days	Examine security of rails and rail fixings on underbridges
	NA	Track on other underbridges	NA	Nil		

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
Level crossing examination	NA	Road crossings - All lines (Public level crossings ONLY)	CSS 102	1 year	36 days	Examination of condition of road surface and signage where rails remain in-situ
		Pedestrian crossings - All lines (includes combined road and pedestrian crossings)	CSS 102	1 year	36 days	Examination of condition of surface and signage
Earthworks examination	NA	All known geotechnical risk sites which may affect people and property	CSS 411	Variable	N/A	Civil Maintenance Engineer must determine inspection requirements by Risk Assessment
		All lines		1 year	36 days	Examine to ensure that no degradation such as slips and rockfalls are occurring that would be a hazard to public and neighbours May be varied by Civil Maintenance Engineer by Risk Assessment
				On event	N/A	Event Trigger: After major flooding or rainfall event
General Drainage Inspection	NA	All lines		1 year	36 days	May be varied by Civil Maintenance Engineer by Risk Assessment
Pre-operational Inspection	NA	Track and Structures infrastructure	NA	Nil		major investigation required
11.10 Structures						
Detailed Structures Examination	S/C	All timber underbridges on operational lines Safety critical only if on a shortened cycle due to bridge condition otherwise a statistically managed class of bridges.	CSS 200	2 years	72 days	Including steel and concrete components of timber bridges and timber components of steel or concrete bridges
	S/C	Wrought Iron lattice truss underbridges at Tamworth, Wellington, Woolbrook Safety critical only if on a shortened cycle due to bridge condition otherwise a statistically managed class of bridges.	CSS 201	1 year	36 days	See Appendix 3
	S/C	Other wrought iron, cast iron and nominated steel bridges Safety critical only if on a shortened cycle due to bridge condition otherwise a statistically managed class of bridges.	CSS 200	Variable		See Appendix 3 for locations and examination frequencies
	S/C	All other steel or concrete underbridges, Goulburn to Canberra, Bowenfels to Dubbo, Orange to Parkes, Wallerawang to Kandos, Werris Ck to Tamworth, Safety critical only if on a shortened cycle due to bridge condition otherwise a statistically managed class of bridges.	CSS 200 CSS 204	2 years	72 days	Concrete includes reinforced and prestressed concrete, brick, and stone bridges. and underbridges of compressed fibro, PVC, or similar Underbridges includes culverts and undertrack pipes greater than 300mm opening

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
	S/C	All other steel or concrete underbridges, on all other operational lines Safety critical only if on a shortened cycle due to bridge condition otherwise a statistically managed class of bridges.	CSS 200 CSS 204	4 years	145 days	
	S	All timber overbridges on operational lines	CM 112 CSS 210	2 years	72 days	including steel and concrete components of timber bridges and timber components of steel or concrete bridges
		All steel or concrete overbridges on operational lines	CSS 210	4 years	145 days	Concrete includes reinforced and prestressed concrete, brick, and stone bridges. and overbridges of compressed fibro, PVC, or similar
		All timber footbridges and step ways on operational lines	CSS 213	2 years	72 days	including steel and concrete components of timber bridges and timber components of steel or concrete bridges
		All steel or concrete footbridges and step ways on operational lines	CSS 213	4 years	145 days	
		All signal bridges	CSS 220	4 years	145 days	
		All Tunnels	CSS 222	4 years	145 days	
		All cattle stops, ash/sand traps, traffic barriers, bridge balustrades, sedimentation basins storm water flow controls and similar structures)	CSS 224	4 years	145 days	
		All Lighting Towers, Service Crossings, Platforms, Loading Banks, and Stages, Turntables, Cranes, and Weighbridges, Retaining Walls	CSS 223 CSS 224	4 years	145 days	
		Timber poles without preservative impregnation - Durability class 1 species	CSS 225	3 years	180 days	
		Timber poles with preservative impregnation - All species		4.5 years	180 days	
		All fixed buffer stops and lower order protection devices	CSS 224	4 years	145 days	
		All energy absorbing buffer stops	CSS 226	1 year	36 days	Includes friction and combination hydraulic/friction buffer stops
	S	Steel lattice communications tower and Steel pole communications tower	CSS 250	4 years	145 days	
		Timber pole communications tower	CSS 225	4 years	145 days	

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
License Compliance Inspection	NA	All communications towers	CSS 251	1 year	36 days	May be completed in conjunction with Detailed Structures Examination
Transom Examination	S	All timber transoms on steel or concrete transom top underbridges NOT on the following lines - Goulburn to Canberra, Bowenfels to Dubbo, Orange to Parkes, Wallerawang to Kandos, Werris Ck to Tamworth	CSS 206	2 years	72 days	To be undertaken midway between 4 year Detailed Structures Examination (CSS 200)
Temporary Supports Examination	S	Temporary supports on all underbridges on operational lines	CSS 208	3 months	9 days	
		Temporary supports on all overbridges and footbridges on operational and non-operational lines		3 months	9 days	
Inspection of Underbridge Inspection Gantry	S	Permanent underbridge inspection gantries on wrought iron lattice truss underbridges at Tamworth and Woolbrook	CSS 209	1 year	36 days	
				On event		Event Trigger: to be inspected before each use
Detailed bridge examination of timber piles below ground	S	All timber piles	CSS 231	6 years	216 days	
	NA	All timber piles		On event		Event Trigger: cross-sectional area of a pile is degraded to 50% of its original cross-sectional area, must then have 2 yearly cyclic examinations carried out
		All spliced timber piles		On event		Event Trigger: splice shows signs of vertical or sideways movement,
Deflection Test	NA	All timber spans longer than 4m on operational lines	NA	On event		Event Trigger: Detailed or Visual Structures examination indicates potential excessive deflection, or as requested
Underwater examination	S	All underbridges with pier/column bases permanently underwater	CSS 230	6 years	216 days	Depending on deterioration shown at the previous examination, or if major scouring is suspected
Special Underwater testing	S	Wrought iron lattice truss underbridges at Tamworth and Wellington	CSS 236	12 years	360 days	In conjunction with CSS 230, undertake graphitisation testing of the cast iron caissons
Broad flange beam Examination	S	All broad flange beams over roadways	CSS 203	1 month	6 days	
Special examination	NA	All structures	CSS 232 CSS 235	On event		Event Trigger: during periods of heavy rain, of flooding, or following damage by road or rail vehicles,
Special Examination and Testing	S	Wrought iron lattice truss underbridges at Tamworth, Wellington, Woolbrook	CSS 207	2 years	72 days	In conjunction with CSS 201: See Appendix 3
Special Structures Defect Examination	S	All structures	CSS 237	Variable		See Appendix 3 for locations and examination frequencies Wrought iron lattice truss underbridges at Tamworth, Wellington, Woolbrook. Other locations and frequencies are as nominated by the Structures Superintendent

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
Visual Structures Examination	S	All timber underbridges, overbridges and footbridges on operational lines	CSS 202 CSS 212 CSS 215	2 years	72 days	At least once in the period between Detailed Structures examinations.
		All wrought iron, cast iron and nominated steel bridges on operational lines	CSS 202	1 year	36 days	At least once in the period between Detailed Structures examinations See Appendix 3 for locations
		All other steel or concrete underbridges, Goulburn to Canberra, Bowenfels to Dubbo, Orange to Parkes, Wallerawang to Kandos, Werris Ck to Tamworth		2 years	72 days	At least once in the period between Detailed Structures examinations Concrete includes reinforced and prestressed concrete, brick, and stone bridges and underbridges of compressed fibro, PVC, or similar Underbridges includes culverts and undertrack pipes greater than 300mm opening
		All steel or concrete underbridges, on all other operational lines	CSS 202 CSS 205	4 years	145 days	At least once in the period between Detailed Structures examinations. Concrete includes reinforced and prestressed concrete, brick, and stone bridges and underbridges of compressed fibro, PVC, or similar Underbridges includes culverts and undertrack pipes greater than 300mm opening
		All steel or concrete overbridges on operational lines	CSS 212	4 years	145 days	
		All steel or concrete footbridges and stepways on operational lines	CSS 215	4 years	145 days	
Roadside Inspection	S	All public overbridges on ARTC lines All overbridges on CRN Non-Operational lines	CSS 216	6 months	18 days	Inspection not required on CRN Operational lines
Heritage Roadside Inspection	NA	All structures that are listed or within a precinct that is listed on the State Heritage Register	CSS 240	Variable	N/A	The frequency is the lesser of yearly or the frequency of CSS 420 if applied to this structure. May be completed in conjunction with visual examination or detailed inspection.
Structural bridge assessment	S	All timber bridges on operational lines	CSS 234	2 years	72 days	To follow Detailed Structures examinations.
		All wrought iron, cast iron and nominated steel bridges on operational lines		1 year	36 days	To follow Detailed Structures examinations. See Appendix 3 for locations
		All other steel or concrete underbridges Goulburn to Canberra, Bowenfels to Dubbo, Orange to Parkes, Wallerawang to Kandos, Werris Ck to Tamworth		2 years	72 days	To follow Detailed Structures examinations. Concrete includes reinforced and prestressed concrete, brick, and stone bridges and underbridges of compressed fibro, PVC, or similar Underbridges includes culverts and undertrack pipes greater than 300mm opening
		All steel or concrete underbridges, on all other operational lines		4 years	145 days	
		All steel or concrete overbridges, footbridges and		4 years	145 days	

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
		step ways on operational lines				
Fatigue assessment	NA	Underbridges and overbridges with wrought iron or steel superstructures on operational lines	NA	On event	N/A	Event Trigger: the extent of cracks indicates the bridge may be approaching its fatigue limit.
Structure damage assessment	NA	All	NA	On event	N/A	Event trigger: Any irregular event potentially affecting the integrity of the structure. e.g. Rail or road vehicle impact, flood, land slide/slip etc.
11.11 Structures on Non-Operational Lines						
Detailed Structures examination	S	All timber, steel and concrete overbridges & footbridges that are in normal usage.	See comment	Variable	Variable	In accordance with frequencies for similar structures on Operational lines
		Tunnels, retaining walls and other miscellaneous structures potentially affecting the public.	See comment	Variable	Variable	In accordance with frequencies for similar structures on Operational lines
Visual Structures Examination	S	All timber, steel and concrete overbridges & footbridges that are in normal usage	See comment	Variable	Variable	In accordance with frequencies for similar structures on Operational lines
	S	All culverts which are identified as high risk in case of failure	CSS 205	4 years	145 days	Culverts identified as high risk include those that in case of failure may cause flooding to a building or buildings
Structural bridge assessment	S	All timber, steel and concrete overbridges & footbridges that are in normal usage	See comment	Variable	Variable	In accordance with frequencies for similar structures on Operational lines
Component Security Inspection	S	All timber, steel and concrete underbridges, overbridges & footbridges that are not in normal usage but span public access areas.	CSS 402	1 year	36 days	Examine the security of components that could fall such as transom bolts, transoms, bracing, handrails and fixings May be varied by Civil Maintenance Engineer by Risk Assessment
General Visual Inspection	NA	All timber, steel and concrete underbridges, overbridges & footbridges that are not in normal usage and do not span public access areas.	CSS 404	4 years	145 days	May be varied by Civil Maintenance Engineer by Risk Assessment
		Tunnels, retaining walls and other miscellaneous structures not affecting public.	CSS 404	4 years	145 days	May be varied by Civil Maintenance Engineer by Risk Assessment
Waterway Inspection	NA	All waterways	CSS 405	On Event	N/A	Event Trigger - major flooding event if potential to damage to other people's property
Heritage Roadside Inspection	NA	All structures that are listed or within a precinct that is listed on the State Heritage Register	CSS 240	Variable	N/A	The frequency is the lesser of yearly or the frequency of CSS 420 if applied to this structure. May be completed in conjunction with visual examination or detailed inspection.

Technical Maintenance Plan						
Service Description	**Safety Importance**	**Applicability**	**Service Schedule**	**Period**	**Latitude**	**Comments**
General Visual Inspection		Tunnels, retaining walls and other miscellaneous structures (such as pump houses, weigh bridges and ash pits) not affecting public	CSS 403	4 yearly	145 days	May be varied by Civil Maintenance Engineer by Risk Assessment
11.12 Right of Way						
Right of Way examination	S	All operational lines	CSS 310	Variable	N/A	As part of Detailed Walking Examination (includes fencing, safety exclusion fencing and barriers, vegetation, access roads, firebreaks, vermin control, cattle grids, site litter control)
		All sidings		Variable	N/A	As part of Detailed Walking Examination in Sidings (includes fencing, vegetation, access roads, firebreaks, vermin control, cattle grids, site litter control)
Railway sign examination	S	All lines	CSS 311	Variable	N/A	As part of Detailed Walking Examination Includes Speed boards, Signals Advisory speed signs and Safety Signs
		All sidings		Variable	N/A	As part of Detailed Walking Examination in Sidings Includes Speed boards and Safety Signs
Permanent Speed sign examination	S	All lines	CSS 312	1 year	36 days	As part of Detailed Walking Examination - correctness of signs (for position, speed shown, track indicated etc.)
Examination of Safety Control Fencing	S	Temporary exclusion fencing erected around contaminated land sites.	CSS 420	Variable	N/A	To be conducted in conjunction with Right of Way Examination
		Temporary exclusion fencing and barriers erected around unsafe structures and other high safety risk locations.		Variable	N/A	Frequency to be determined by risk assessment at time of fence installation or after incident
11.13 Right of Way on Non-Operational Lines						
General Fencing Inspection	NA	All lines	CSS 403	Nil		
General Vermin Inspection	NA	All lines		Nil		
General Vegetation Inspection	NA	All lines		1 year	36 days	May be varied by Civil Maintenance Engineer by Risk Assessment
General Potential Safety risk inspection	NA	All lines		Nil		
Examination of Temporary Risk Control Devices	S	Temporary exclusion fencing erected around contaminated land sites.	CSS 420	Variable	N/A	To be conducted in conjunction with General Vegetation Inspection
		Temporary exclusion fencing and barriers erected around unsafe structures and other high safety risk locations.		Variable	N/A	Frequency to be determined by risk assessment at time of fence installation or after incident

Appendix 0 Track Recording Examination (Track Recording Car)

ID	Trackcode	Track Type	Description	KM From	KM To	Length (KM)	4 Months	6 Months	8 Months	12 Months	Changes from TMP baseline
1	714310	Single line	Joppa Junc (ARTC boundary) to Canberra	230.610	329.620	99.010	TMP				
2	714711	Single line	Yanco to Junee (ARTC/CRN boundary)	606.070	486.021	120.049		TMP			
3	714910	Single line	The Rock (ARTC Boundary) to Boree Creek	551.075	607.700	56.625				TMP	
4	717010	Single line	ARTC/CRN bndry Stockinbingal to Temora	454.906	489.433	34.527		TMP			
5	717011	Single line	Temora to Barmedman	489.433	525.860	36.427				TMP	
6	717012	Single line	Barmedman to West Wyalong	525.860	557.400	31.540				TMP	
7	717013	Single line	West Wyalong to Ungarie	557.400	597.810	40.410				TMP	
8	717014	Single line	Ungarie to Lake Cargelligo	597.810	669.170	71.360				TMP	
9	717111	Single line	Temora to Griffith	489.433	640.720	151.287		TMP			
10	717112	Single line	Griffith to Hillston	640.720	748.050	107.330				TMP	
11	717410	Single line	Ungarie to Naradhan	597.811	658.250	60.439				TMP	
12	717510	Single line	Griffith to Yanco	660.474	606.070	54.404		TMP			
13	721011	Single line	Bathurst to Newbridge	239.380	273.212	33.832	TMP				
14	721012	Single line	Murrobo to Spring Hill	287.300	308.433	21.133	TMP				
15	721013	Single line	Orange East Fork to Molong	320.813	360.660	39.847		TMP			
16	721014	Single line	Molong to Goobang Junction	360.660	446.950	86.290		TMP			
17	721015	Loop	Bumberry	405.323	407.156	1.833				TMP	
18	721016	Loop	Rydal	183.199	184.971	1.772			TMP		
19	721019	Loop	Georges Plains	251.938	253.756	1.818			TMP		
20	721020	Loop	Pinecliffe	367.965	370.005	2.040				TMP	
21	721021	Up main	Wallerawang to Bowenfels	171.476	158.800	12.676	TMP				
22	721022	Up main	Bathurst to Tarana	239.100	198.335	40.765	TMP				
23	721023	Up main	Murrobo to Newbridge	287.300	273.212	14.088	TMP				
24	721024	Up main	Orange East Fork to Spring Hill	320.800	308.433	12.367	TMP				
25	721031	Down main	Bowenfels to Wallerawang	158.800	171.476	12.676	TMP				
26	721032	Down main	Wallerawang to Bathurst	171.476	239.380	67.904	TMP				
27	721033	Down main	Newbridge to Murrobo	273.212	287.300	14.088	TMP				
28	721034	Down main	Spring Hill to Orange East Fork	308.433	320.813	12.380	TMP				
29	721035	Loop	Bathurst	240.930	239.350	1.580			TMP		
30	721081	Loop	Polona	299.900	298.775	1.125			TMP		

ID	Trackcode	Track Type	Description	KM From	KM To	Length (KM)	4 Months	6 Months	8 Months	12 Months	Changes from TMP baseline
31	721511	Single line	Kandos - Wallerawang	249.405	171.900	77.505	TMP			Reduced	Reduction in operations on line from 4 MGT to 1 MGT, partial closure of line between Airly to Charbon,
32	721610	Single line	Dubbo (ARTC Boundary) to Stuart Town	460.890	379.000	81.890	TMP				
33	721619	Loop	Maryvale	418.720	420.750	2.030			TMP		
34	721630	Single line	Stuart Town to Orange East Fork	379.000	320.813	58.187	TMP				
35	721710	Triangle	South West Fork Orange	322.112	324.416	2.304				TMP	
36	721910	Single line	Bogan Gate (ARTC boundary) to Tottenham	486.050	597.440	111.390				TMP	
37	726510	Triangle	Parkes to Parkes (ARTC boundary - south)	627.491	628.860	1.369				TMP	
38	726610	Single line	Coonamble to Troy Junction (ARTC BNDRY)	616.100	466.855	149.245		Increased		TMP	Operational enhancement on line provided increased TAL and/or speed due to configuration changes. Temporary increase in track recording frequency to monitor change in condition.
39	726711	Single line	Narromine (ARTC boundary) to Nyngan	497.809	622.500	124.691		TMP			
40	726712	Single line	Nyngan to Cobar	622.500	754.480	131.980		TMP			
41	726810	Single line	Warren to Nevertire	584.200	563.960	20.240				TMP	
42	735013	Triangle	NWS (ARTC I/F) to NBI North Junction	565.351	565.274	0.382			Increased	TMP	Operational enhancement on line provided increased TAL and/or speed due to configuration changes. Temporary increase in track recording frequency to monitor change in condition.
43	735015	Single line	Camurra West to Weemelah	679.040	762.500	83.460				TMP	
44	735209	Single line	West Tamworth to Westdale	452.392	457.220	4.828				TMP	
45	735210	Single line	Armidale to Werris Ck (ARTC boundary)	578.900	411.201	167.699	TMP				
46	735511	Triangle	Narrabri West to ARTC I/F South Junction	564.799	565.210	0.411			Increased	TMP	Operational enhancement on line provided increased TAL and/or speed due to configuration changes. Temporary increase in track recording frequency to monitor change in condition.
47	735512	Single line	Narrabri West to Burren Junction	565.210	648.480	83.270			Increased	TMP	Operational enhancement on line provided increased TAL and/or speed due to configuration changes. Temporary increase in track recording frequency to monitor change in condition.
48	735513	Single line	Burren Junction to Walgett	648.480	736.000	87.520			Increased	TMP	Operational enhancement on line provided increased TAL and/or speed due to configuration changes. Temporary increase in track recording frequency to monitor change in condition.
49	735610	Single line	Burren Junction to Merrywinebone	648.480	700.400	51.920				TMP	

Appendix 1 Track Recording Examination (Manual Recording Trolley)

ID	Asset	Track Type	Description	KM From	KM To	Length (KM)	4 Months	8 Months	1 Year	2 Years	Changes from TMP baseline
1	TRS80493A	Loop	Grain Loop Down Old Junee	493.055	493.817	0.762			TMP		
2	TRS50293A	Loop	Down Bungendore	293.312	294.017	0.705		TMP			
3	TRS50321A	Loop	Up Queanbeyan	321.333	321.721	0.388		TMP			
4	TRS54321A	Single line	Canberra Platform	329.300	329.663	0.363	TMP				Record platform (flat line zone)
5	TRW00322A	Loop	Up Orange	322.128	322.880	0.752		TMP			
6	TRW00379B	Loop	Up Stuart Town	379.370	380.933	1.563		TMP			
7	TRW00411A	Loop	Up Wellington	411.294	412.000	0.706		TMP			
8	TRW00434A	Loop	Up Geurie	434.260	435.050	0.790		TMP			
9	TRW00530B	Loop	Up Trangie	530.268	531.588	1.320			TMP		

Note: Track type and descriptions in table above may not be identical to HxGN descriptions.

Appendix 2 Ultrasonic Rail Examination (Plain Track)

ID	Asset	Track Type	Description	KM From	KM To	Length (KM)	4 Months	6 Months	1 Year	2 Years	4 Years	8 Years	Changes from TMP baseline
1	TRN00411A	Single line	Werris Creek to West Tamworth	411.201	453.389	42.188		Increased	TMP				Increased to allow axle load increase
			West Tamworth to Armidale	453.389	579.410	126.021			TMP				
2	TRN44453B	Single line	West Tamworth to Westdale	452.392	457.220	4.828			TMP				
3	TRN73410A	Single line	Camurra to Weemelah	679.040	762.746	83.706					TMP		
4	TRN80564A	Single line	Narrabri South Junction to Walgett	564.799	733.130	168.331				TMP			
5	TRN80565A	Triangle	Narrabri North Junction to Narrabri West Junction	565.351	565.733	0.382					TMP		
6	TRN82647A	Single line	Burren Junction to Merrywinebone	648.480	700.994	52.514					TMP		
7	TRS45550A	Single line	The Rock to Boree Ck	551.075	554.180	3.105				Increased	TMP		Increased due to increased axle load
			The Rock to Boree Ck	554.180	607.763	53.583					TMP		
8	TRS50230A	Single line	Joppa Junction to Queanbeyan	230.610	322.500	91.890			TMP				
9	TRS50293A	Loop	Down Bungendore	293.312	294.017	0.705				TMP			
10	TRS50321A	Loop	Up Queanbeyan	321.333	321.721	0.388				TMP			
11	TRS54321A	Single line	Queanbeyan to Canberra	321.665	329.663	7.998			TMP				
12	TRS70429A	Single line	Stockinbingal to Ungarie	454.906	597.811	142.905			TMP				
13	TRS70429A	Single line	Ungarie to Lake Cargelligo	597.811	669.175	71.364					TMP		
14	TRS78597A	Single line	Ungarie to Naradhan	597.803	658.251	60.448					TMP		
15	TRS80485A	Single line	Junee to Yanco	486.030	605.841	119.811		TMP					
16	TRS85605A	Single line	Yanco to Griffith	605.841	660.478	54.572		TMP					
17	TRS86489A	Single line	Griffith to Hillston	640.375	748.500	108.125					TMP		
18	TRS86489A	Single line	Temora to Griffith	489.433	640.375	150.942			TMP				
19	TRW00158A	Up main	Bowenfels to Wallerawang	158.800	171.476	12.676	Increased	TMP					Increased due to reporting of higher priority VSH defect
20	TRW00158B	Down main	Bowenfels to Wallerawang	158.800	171.476	12.676	Increased	TMP					Increased due to reporting of higher priority VSH defect
21	TRW00171B	Single line	Wallerawang to Tarana	171.476	198.355	26.879	Increased	TMP					Increased due to reporting of higher priority VSH defect
22	TRW00198B	Down main	Tarana to Bathurst	198.355	238.800	40.445	Increased	TMP					Increased due to reporting of higher priority VSH defect
23	TRW00198C	Up main	Tarana to Bathurst	198.355	238.800	40.445	Increased	TMP					Increased due to reporting of higher priority VSH defect

ID	Asset	Track Type	Description	KM From	KM To	Length (KM)	4 Months	6 Months	1 Year	2 Years	4 Years	8 Years	Changes from TMP baseline
24	TRW00239G	Single line	Bathurst to Newbridge	238.800	273.245	34.445	Increased	TMP					Increased due to reporting of higher priority VSH defect
25	TRW00239H	Loop	Down Bathurst	239.350	240.936	1.586			TMP				
26	TRW00183A	Loop	Rydal	183.199	184.971	1.772			TMP				
27	TRW00251A	Loop	Georges Plains	251.938	253.756	1.818			TMP				
28	TRW00273A	Down main	Newbridge to Murrobo	273.245	287.390	14.145	Increased	TMP					Increased due to reporting of higher priority VSH defect
29	TRW00273B	Up main	Newbridge to Murrobo	273.245	287.390	14.145	Increased	TMP					Increased due to reporting of higher priority VSH defect
30	TRW00287A	Single line	Murrobo to Spring Hill	287.390	308.433	21.043	Increased	TMP					Increased due to reporting of higher priority VSH defect
31	TRW00298A	Loop	Up Polona	298.790	299.900	1.110			TMP				
32	TRW00308B	Down main	Spring Hill to Orange East Fork Junction	308.433	320.800	12.367	Increased	TMP					Increased due to reporting of higher priority VSH defect
33	TRW00308C	Up main	Spring Hill to Orange East Fork Junction	308.433	320.800	12.367	Increased	TMP					Increased due to reporting of higher priority VSH defect
34	TRW00320A	Single line	Orange East Fork Junction to Stuart Town	320.800	379.000	58.200	Increased	TMP					Increased due to reporting of higher priority VSH defect
35	TRW00322A	Loop	Up Orange	322.128	322.880	0.752			TMP				
36	TRW00379A	Single line	Stuart Town to Dubbo	379.000	460.890	81.890	Increased	TMP					Increased due to reporting of higher priority VSH defect
37	TRW00379B	Loop	Up Stuart Town	379.370	380.933	1.563			TMP				
38	TRW00411A	Loop	Up Wellington	411.294	412.000	0.706			TMP				
39	TRW00434A	Loop	Up Geurie	434.260	435.050	0.790			TMP				
40	TRW00498A	Single line	Narromine to Nevertire	498.000	564.000	66.000			TMP				
41	TRW00530B	Loop	Up Trangie	530.268	531.588	1.320				TMP			
42	TRW00563A	Single line	Nevertire to Nyngan	564.000	622.462	58.462			TMP				
43	TRW20322A	Single line	Orange to Parkes	320.813	446.950	126.137	Increased	TMP					Increased due to reporting of higher priority VSH defect
44	TRW20323A	Triangle	West Fork Orange	323.030	324.416	1.386		TMP					
45	TRW20406A	Loop	Up Bumberry	406.077	407.147	1.070				TMP			
46	TRW32483A	Single line	Bogan Gate to Tottenham	486.050	598.446	112.396				Increased	TMP		Significant number of rail defects detected in recent Ultrasonic Inspections.
47	TRW34453A	Single line	Parkes East Fork (to Stockinbingal)	627.491	628.744	1.253			TMP				
48	TRW43563A	Single line	Nevertire to Warren	563.930	582.100	18.170					TMP		
49	TRW44622A	Single line	Nyngan to Cobar	622.462	754.698	132.236			TMP				
50	TRW50171A	Single line	Wallerawang to Charbon	171.920	244.750	72.830			TMP				Under review
51	TRW61461A	Single line	Troy Junction to Coonamble	466.231	616.175	149.944			TMP				

Note: Track type and descriptions in table above may not be identical to HxGN descriptions.

Appendix 3 Wrought Iron and Steel Bridges Nominated for Special Examination

Service Description	Applicability		Service Schedule	Period	Latitude	Comments
Detailed Structures examination	Wrought iron lattice truss underbridges at Tamworth, Wellington, Woolbrook		CSS 201	1 year	36 days	Detailed Structures examination with particular examination to the cross girder end connections, lattice truss splices, welding and the effectiveness of any packing under the ends of any timber stringers
Special Examination and Testing	Wrought iron lattice truss underbridges at Tamworth and Woolbrook		CSS 207	2 years	72 days	In conjunction with Detailed Structures examination: From a platform below the bridge, undertake a very close visual examination of the bottom flanges of cross girders Undertake magnetic particle testing of the cross girder end connections and lattice truss splices in accordance with AS 1171
	Wrought iron lattice truss underbridge at Wellington		CSS 207	2 years	72 days	In conjunction with Detailed Structures examination: Undertake magnetic particle testing of the lattice truss splices at the accessible areas of the top and bottom chords in accordance with AS 1171
Special Underwater Testing	Wrought iron lattice truss underbridges at Tamworth and Wellington		CSS 236	12 years	360 days	In conjunction with standard underwater examination, undertake graphitisation testing of the cast iron caissons
Special Structures Defect Examination	Wrought iron lattice truss underbridges at Tamworth, Wellington, Woolbrook		CSS 237			
	See CRN CM 111	Rolling defects, cracks in cross girder end connection angle cleats and cracks in caissons		1 year	36 days	In conjunction with Detailed Structures examination
		High severity cracks in cross girder end connection angle cleats		6 months	18 days	
Visual Bridge examination	Wrought iron lattice truss underbridges at Tamworth, Wellington, Woolbrook		CSS 202	1 year	36 days	At least once in the period between Detailed Structures examinations.
Structural bridge assessment			CSS 234	1 year	36 days	To follow Detailed Structures examination.
Detailed Structures examination	Wrought iron underbridges at all other locations on operational lines		CSS 200	1 year	36 days	Standard Detailed Structures examination
Visual Bridge examination			CSS 202	1 year	36 days	At least once in the period between Detailed Structures examinations.

Service Description	Applicability	Service Schedule	Period	Latitude	Comments
Structural bridge assessment		CSS 234	1 year	36 days	To follow Detailed Structures examination.
Detailed Structures examination	Steel underbridges older than 100 years on operational lines	CSS 200	1 year	36 days	Standard Detailed Structures examination
Visual Bridge examination		CSS 202	1 year	36 days	At least once in the period between Detailed Structures examinations.
Structural bridge assessment		CSS 234	1 year	36 days	To follow Detailed Structures examination.
Detailed Structures examination	Steel underbridge at Millthorpe	CSS 200	1 year	36 days	Standard Detailed Structures examination with special focus on welding (to be included on Work Order)
Visual Bridge examination		CSS 202	1 year	36 days	At least once in the period between Detailed Structures examinations with special focus on welding (to be included on Work Order)
Structural bridge assessment		CSS 234	1 year	36 days	To follow Detailed Structures examination.

Appendix 4 Tailored Technical Maintenance Plans

Document Reference	Location	Asset Class	Task
CM 111	Wellington, Tamworth, Woolbrook	Underbridges	Inspection and Maintenance of First Generation Wrought Iron Girder Underbridges
CM 112	Murwillumbah, Karangi	Overbridges	Inspection and Maintenance of Hybrid Girders