



The National Trust of Western Australia  
Collie Roundhouse - Services Assessment  
Services Assessment  
Project Number: 12536985

September 2020

# Executive summary

The following report has been prepared by GHD for the National Trust (WA) and provides a desktop review regarding the hydraulic and fire protection services required to enable the future development of the Collie Railway Roundhouse structure and associated grounds located on Coalfields Road on the western outskirts of the Town of Collie.

This is a preliminary review of existing Water Corporation authority assets in the vicinity, along with assessment of the potential locations for connection to service the future development for the site. The electrical supply connection has also been reviewed and a recommendation offered for a feasibility study to be lodged.

This report is subject to, and must be read in conjunction with, the limitations and basis for report set out in sections 1.3 and 1.4 respectively, and the assumptions and qualifications contained throughout the Report.

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# 1. Introduction

## 1.1 Background

The Collie Roundhouse is a post-World War Two building originally constructed to house 14 steam locomotives. It comprises a single storey concrete industrial locomotive Round house (circa 1956) building with associated turntable pit and turntable, all of which remains intact.

The unique design of the structure makes for an iconic landmark, located on crown reserve land at the western end of an extensive lot which covers over 60, 000m<sup>2</sup>, along Coalfields Road on the outskirts of the Town of Collie.

The National Trust of Western Australia (The Trust) has successfully applied for funding to the Collie Futures Industry Development Fund (CFIDF) for funding to enable remediation of the Collie Roundhouse site and conservation of the structure.

The vision for the future of the site includes:

- Remediation of the site
- Conserve the structure
- Provide long term use for the building and it's substantial curtilage and
- Enable visitation.

Thus, it will pave the way for future tourism related commercial development which will highlight the structure, it's heritage and it's historic connections to the town.

## 1.2 Purpose of this report

The purpose of this report is to provide a desktop review, assessing the Hydraulic service authority supplies in the area which would provide water, sewer, stormwater and fire protection services to the site.

The report will review the location and size of authority mains relevant to these services in the area and provide information on future connections and general system design requirements for the site in keeping with the Australian Standards.

## 1.3 Scope and limitations

This report has been prepared by GHD for the National Trust (WA) and may only be used and relied on by the Trust for the purpose agreed between these two parties. GHD otherwise disclaims responsibility to any person other than the Trust arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed and are subject to the scope limitations as set out within. The opinions, conclusions and any recommendations are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to this date. We have prepared this report on the basis of information provided by the National Trust (WA) and the Water Corporation which GHD has not independently verified or checked beyond the agreed scope of work. The information contained in this report is based on sources believed to be reliable. While every care has been taken in its preparation, GHD give no warranty that the said base sources are correct and accepts no responsibility for any resultant errors contained herein and any damage or loss, howsoever caused, suffered by any individual or corporation.

## 1.4 Basis for Report

- Dial Before You Dig plans (DBYD)
- Water Corporation Esinet database and maps
- 2019112 5070-RFQ-002 consultant architect SoW Rev A final.pdf
- Architectural drawings A.10; A.20; A.30; A.31; A.40; A.41; A.50; A.70; A.71.
- Liaison with Water Corporation Building Services Division regarding existing Water Corp sewer and water main assets.
- Data sourced from National Trust (WA)

## 2. Services

### 2.1 Existing Services

While no site investigation of existing services has been carried out to date, it is believed that the Roundhouse building has not been used for over 30 years. As such given the length of time the structure has been abandoned the assumption is that existing water reticulation and sanitary drainage infrastructure is beyond usable life, may not be in accordance with current regulations and therefore is of no value.

From correspondence with the Water Corporation, they have identified that the property is not rated in their information system, which indicates that there is no existing service connection available to the property. Therefore should any existing water services and sewer infrastructure be found on site, they are to be cut back to the authority mains and removed from site.

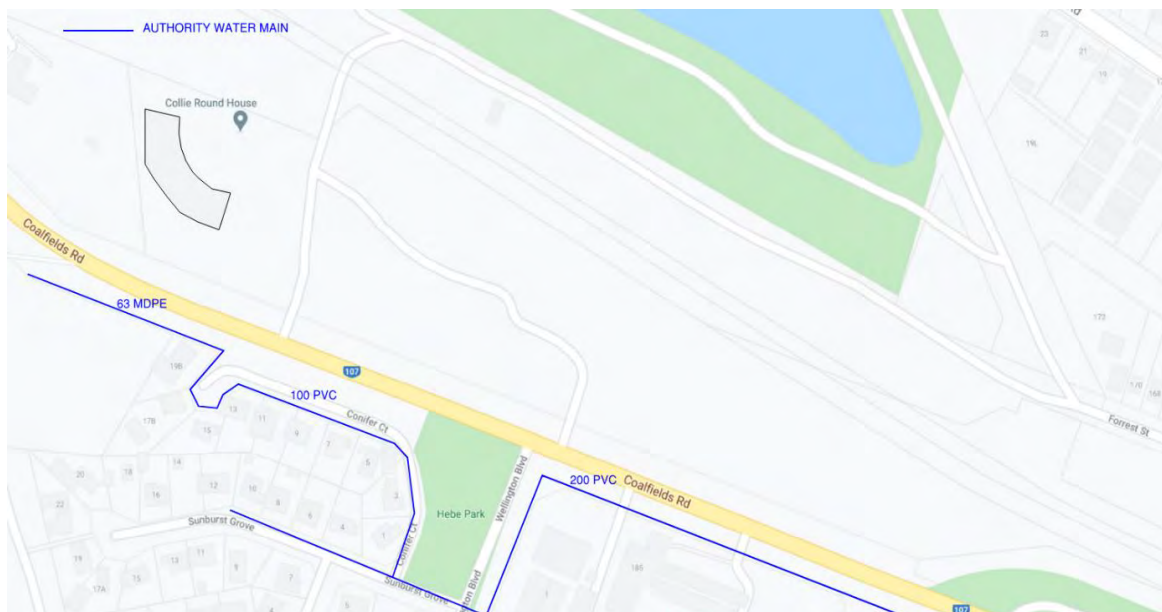
Existing stormwater drainage serving the roof consists of a series of rainheads with associated downpipes and sumps along the south / south western exterior of the building. These downpipes and rainheads appear to be in serviceable condition based on photographic evidence. What is not known is the discharge location and condition of soakwells (if this is the disposal method), or the condition of the roof and gutters.

### 2.2 Water Services

#### 2.2.1 Existing Assets

Based on available information the lot on which the Roundhouse occupies is extensive, covering more than 60, 000m<sup>2</sup>.

DBYD and information sourced from the Water Corporation indicates a water main running parallel to the site on the southern side of Coalfields road which varies in size from Ø200mm at the eastern end of the site to Ø63mm at the western end of the site. The main also reticulates through a residential area at a size of 100mm but this cannot be considered as a potential connection point given its location and the area it services.



**FIGURE 1: Water Corporation Authority Water Main\* – Indicative location**

(\*sourced from Water Corporation Esinet Database)

### 2.2.2 Option 1: Connection to Water Corporation 63mm Water Main

The existing 63mm water main runs parallel to the site on the southern side of Coalfield Road and sits within the closest proximity to the Roundhouse building structure. This would make for the easiest and most practical connection of a metered water service to the Roundhouse site.

Connection to the existing 63mm water main would allow for a metered service size of up to 50mm providing flow rates of either 180L/min or 230L/min.

### 2.2.3 Option 1a: Utilisation of Pumps and Tanks onsite

Should the water demand for the site be higher than what can be achieved via option 1, the inclusion of pumps and water storage tanks on site can allow for a higher water demand while still utilising the 50mm metered connection from the existing 63mm water main.

Although demand of the site is as yet unknown, there does appear to be sufficient space to allow for pumps, tanks and filtration requirements, making this a viable option depending on the water demand required.

### 2.2.4 Option 2: Connection to Water Corporation 200mm Water Main

The existing 200mm water main runs parallel to the site on the southern side of Coalfield Road at the eastern end of the site. It is approximately 350m from the Roundhouse to the intersection of Wellington Boulevard which is the nearest point of connection to the 200mm water main..

Given this distance a connection to the 200mm main would not be considered practical unless the water demand for the site exceeded what would be achievable via connection from a 50mm metered service (Option 1) and there was inadequate space to house water storage tank(s).

In addition, the pressure drop over the system from the water meter to the Roundhouse site may have a significant impact on the potable water service given the distance. Depending on the incoming pressure of the main, there may be a requirement for pumps and storage or break tanks on site to achieve required working pressure at the Roundhouse. Further investigation (by way of a flow and pressure test) would be necessary to determine the need for on-site pressure boosting.

Furthermore, once services requirements on site are known there would need to be discussions with the Water Corporation at the earliest stage possible, providing information on water demand for the site in order to seek approval to connect to this larger main.

### 2.2.5 Recommendation

Based on current available information compiled for this desktop analysis Option 1 would prove to be the most practical for supplying potable water to the Roundhouse site. Should the demand for water exceed that which a 50mm metered connection can supply, utilising storage water tanks and pumps (if necessary) can be implemented to allow for increased water demand.

Based on the size of the Roundhouse building, and assuming restaurant / micro-brewery type occupancy, we believe that there will be sufficient capacity from a 50mm water meter to meet the site requirements.

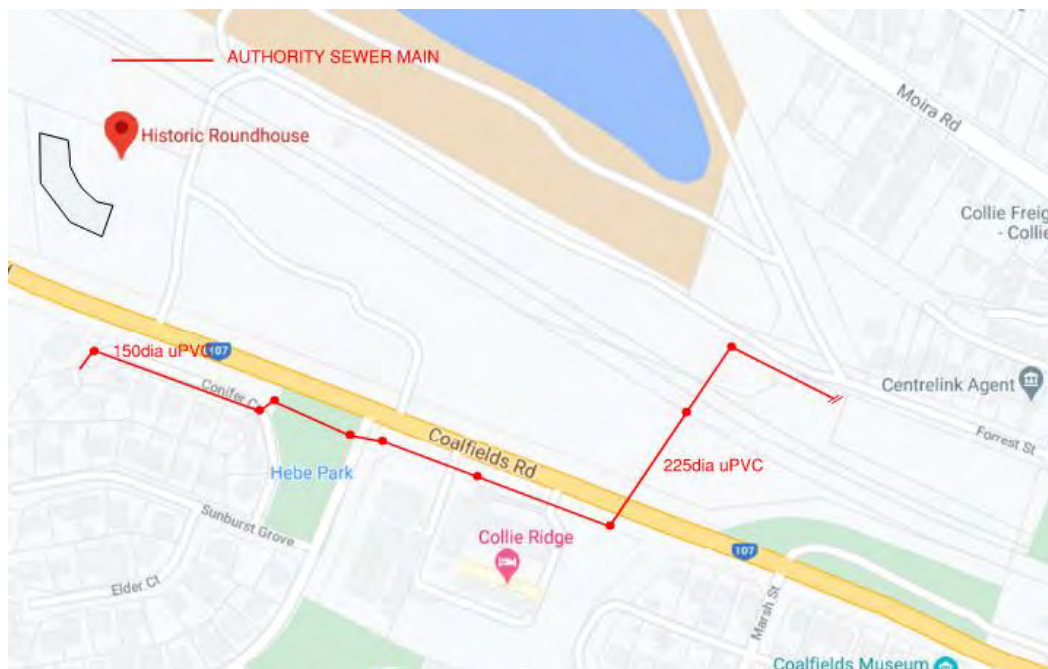
## 2.3 Sewer Infrastructure

### 2.3.1 Existing Assets

Information sourced from the Water Corporation's Esinet database indicates an existing 225mm authority sewer main running through the Eastern end of the site on which the Roundhouse is located and is situated approximately 500m from the building. The mains then extends to the

southern side of Coalfields Road and extends west , parallel to the road serving the residential area to the south of the site (refer to figure 2).

The size of the existing sewer main at this point which is closest to the Roundhouse is 150mm in diameter and sits approximately 150m away from the building.



**FIGURE 1: Water Corporation Authority Sewer Main\* – Indicative location**

(\*sourced from Water Corporation Esinet Database)

### 2.3.2 Option 1: Onsite Waste Water Disposal

Given the distances involved to allow for connection to the sewer mains the most viable recommendation would be utilisation of an onsite waste water disposal system such as an aerobic treatment unit or septic system whereby the treated waste water is disposed of via leaching fields.

Alternatively a waste water recycling system could be implemented whereby the treated water can be redistributed for irrigation purposes, reducing water demand.

Depending on the waste water load, the size of the units required can vary greatly and range from above ground to below ground, therefore, allowance would need to be made on site for the footprint of the treatment system and the leaching field should recycling option not be considered.

Before this option can be chosen, a geotechnical investigation will be required to determine the suitability for on-site disposal and to determine the required area to be set aside.

### 2.3.3 Option 2: Sewer Mains Extension of 150mm Authority Sewer Main to Lot Boundary with Disposal via Pump station

As mentioned, the distances associated with connecting the Roundhouse to the sewer mains are extensive and should a connection to either main be considered, waste water drainage could not occur via a gravity feed and would require the incorporation of a sewer pump station on site to allow for pumping of the effluent.

Based upon advice from the Water Corporation, should the existing 150mm authority main be utilised for disposal, this would require a mains extension to the lot boundary with a property



junction within the lot which could take the pumped effluent from the site. It would then discharge via a gravity feed from the property junction to the sewer main. Appendix A (Indicative Sewer Main Extension Locations With Junction Connections To Site) shows two indicative locations for the mains extension as advised by the Water Corporation.

The mains extension itself is generally considered a separate package of works and the developer would need to engage a consulting engineer to arrange design and installation of the new sewer main. All documentation will need to be approved and signed off by the Water Corporation who then retain ownership of the asset once completed.

The existing 150mm sewer main located closest to the Roundhouse, on the southern side of Coalfields Road, and within the residential area cannot be used as it appears to sit on a higher ground level than the Roundhouse site and as such a gravity feed could not be established from a property junction. The contour levels from which the information was taken (Water Corporation Esinet Database) are only approximate and confirmation of the existing levels would be required.

#### 2.3.4 Option 3: Connection to 225mm Authority Sewer Mains with Disposal via Pump Station

Connection to the existing 225mm sewer main which is located through the eastern end of the lot on which the Roundhouse sits would involve pumping effluent approximately 500m with the rising main traversing through the centre of the site. While this could hinder future development of the site, ie, building over the rising main or division of the lot, this option does not necessitate an extension of the sewer main and allows for connection via a junction to an existing manhole at the north eastern end of the site as shown in Appendix B (Indicative Pumped Rising Main Connection To Existing 225mm Authority Sewer Main).

The pumped rising main may also be routed to hug the property boundary to minimise future development impact, however this will increase the trenching costs.

#### 2.3.5 Recommendation

Given the location of the Roundhouse and the size of the surrounding area on site, Option 1 would be recommended for sewage disposal. An onsite waste water disposal system which could potentially use recycled waste water for irrigation purposes would be ideally suited for the development of the Roundhouse.

## 2.4 Stormwater Drainage

The existing building structure contains rainheads, downpipes and sumps which appear to be in relatively good condition (based on photo's supplied), and is an effective system given the design of the existing roof which is to be retained.

A full inspection of each rainhead, downpipe, gutters and sump is to be carried out to ensure there are no defects in materials (holes, cracks, rust), nor blockages in the system (via flushing) as part of the works.

#### 2.4.1 Option 1: Disposal of stormwater via existing onsite drainage infrastructure

Based on existing data (refer to Appendix C – Salient Features: Figure 6 and Appendix D – SWD Plan No 9806-5 Plan No 44032-5 Sheet No 1: Layout of Drainage for Roundhouse and Turntable), the in ground stormwater appears to reticulate via a series of manholes to the southern side of the roundhouse and connects to an existing main stormwater drain which then

runs to the north of the site. The condition of this pipework is unknown and therefore it's feasibility for re-use cannot be commented upon. In addition, it's apparent from the existing plans that this drainage network also captured washdown water from within the roundhouse facility which likely contained many contaminants. Assessment of the remaining contaminants is necessary prior to being considered suitable for stormwater disposal going forward. Therefore, further investigation is necessary to determine the suitability of the existing in-ground disposal system.

#### 2.4.2 Option 2: Disposal of stormwater via on-site soakage pits

Should the existing onsite drainage infrastructure be beyond it's usable life, it's recommended that stormwater drainage would be via onsite disposal in the form of soakwells or other below ground soakage system. Dependant on usage, the feasibility of rainwater harvesting may be investigated.

Prior to undertaking works, geotechnical investigations to determine permeability and water table levels will be required to ensure the suitability of this option.

## 2.5 Fire Services

The existing Collie Roundhouse structure exceeds 1000m<sup>2</sup> of internal area and as such will require fire hydrant protection.

Based on existing information, a separate fire water metered connection is required from the existing 63mm Authority water main and a full water storage system be allowed for on site, capable of serving at the very least two (2) fire hydrants while maintaining the required flow and pressure at the most hydraulically disadvantaged hydrant when both are required to operate simultaneously.

The fire hydrant protection system will consist of 2 x 288kL water storage tanks (as a minimum capacity, pumps (duty and standby), external twin head hydrants and a booster assembly.

Until the development and usage of the building is known and classification is assigned along with known areas of potential fire compartments within the structure, further methods of fire protection cannot be determined ie, sprinklers, fire hose reels or other forms of suppression.

## 2.6 Electrical Supplies

### 2.6.1 Existing Electrical Supply

Based on the overview provided of the Collie Roundhouse site and reviewing images available via the internet it is assume that the site is currently has no electrical service.

DBYD indicates the presence of high voltage overhead service along Coalfields Road that terminates at a pole just beyond the street line of the Collie Roundhouse. From this pole a high voltage feed enters the adjacent railway depot site and connects to a pole top transformer.

Another high voltage line runs along Moira Road to service another transformer entering the rear of the site on the opposite side of the rail line.

The DBYD is a high level representation of the electrical supply in the area. No details are provided on the level of the service, the availability of supply or even confirmation of the accuracy of the information. These details are required to be requested from Western Power via an application discussed in a later section.

## 2.6.2 Site Electrical Maximum Demand

Determination of the electrical maximum demand requires input from the client on the proposed useage of the site and operational hours. Without these details the calculation can only be an estimate based assumptions as outlined below.

The existing site is approximately 60,000 sq.m with the Collie Roundhouse structure as the central focus. The existing structure is estimated to be approximately 3000 sq.m. Assuming a commercial hospitality focus for the existing building, general carparking, open space for the rest of the site a maximum demand for the site may be in the order of 500kVA.

## 2.6.3 Proposed Electrical Supply

Based on the foregoing assumptions and calculation a transformer, switchgear and a switchboard will be required to be provided.

Supply to the incoming power supply compound will most likely derive from the Coalfield's Road high voltage line. A location for the incoming power supply compound would need to be agreed adjacent the lot boundary off Coalfield's Road. The incoming power supply compound requires a land area of approximately 6 metres by 4 metres dependent on the final supply arrangements. The incoming power supply compound may be open, encircled by screens, or enclosed in a building.

An application is required to Western Power to ascertain the existing infrastructure's capability to service the site and their preferred supply connection arrangement.

Assuming the Coalfield's Road high voltage supply is satisfactory then Western Power would install a lead in cable from pole top fuses to be installed for that purpose. The customer is responsible for installing underground pipes for Western Power's incoming cables and the preparation of the incoming power supply compound site. From this site main switchboard submain cables would be run to the building and other services on the proposed site.

Dependent on the proposed use of the site, the electrical supply may be submetered for commercial enterprises. Note that submeters become the responsibility of the client/owner to read and manage any accounts.

## 2.6.4 Western Power Application Process

In order to request Western Power's assistance a preliminary design has to be prepared including a single line diagram and site plan showing the building(s) and location of the supply point. A letter of authorisation addressed to Western Power is also required from the client permitting GHD to enquire on behalf of the client as owner of the property under question.

Following preparation of the foregoing, an application is made to Western Power for either a feasibility study or a formal application for connection.

A feasibility study is high-level determination from Western Power as to whether the site can be serviced with the power required, identifying any difficulties that may be incurred e.g. relocation of their assets and +/-50% construction cost. The cost of a feasibility study and the length of time for preparatoin depends on the complexity of the supply arrangements. Nominally, it will take about 8 weeks and cost \$1500 to \$3000.

A formal application will provide the client with an actual cost to construct the supply and the formal design of the incoming supply arrangements from Western Power that will connect to the client's site. This is not the infrastructure within the client's property that has to be separately designed but only the supply into site. The timeframe from application to provision of a formal quote and design is approximately 12 weeks and costs between \$1300 and \$6600 dependent on the complexity.

Fees for both types of application are non-refundable. A feasibility study is not a formal application for design and connection of the supply. It is only a high-level study to indicate it is possible for a connection to be made. A formal application still has to be lodged. Once a formal application is made and accepted by the client to proceed the cost of the application is deducted from the construction cost.

The difference between the two applications is that the feasibility study will inform the client if something can be done and how it might be achieved and a ballpark Western Power construction cost. At that time the design can be amended and submitted with a formal application with greater certainty of it being accepted knowing the approximate cost. Bypassing the feasibility study and immediately lodging a formal application provides a cost once the quote is returned along with the connection details. However, if the design lodged and costs prove unacceptable then another formal application and associated costs are required to determine a different solution. Both the feasibility or the formal application once lodged cannot be amended. Hence the recommendation to engage a consultant at the beginning to ascertain what may be the situation based on dial before you dig, site visit and knowledge of the general supply arrangements.



### 3. **Conclusion**

Based on the above detailed information, there are means for servicing the Collie Railway Roundhouse with the necessary Hydraulic Services infrastructure to cater for a tourism / hospitality venture to be located on the site.

The recommendation for water services is to provide a new connection to the Water Corporation authority main located on the south side of Coalfields Rd adjacent to the Roundhouse building, which provides sufficient flow and pressure to meet the potable water demand of the site.

The recommendation for sewer services is to provide on-site disposal via an aerobic treatment unit sized to suit the occupancy, with the potential for recycling

Stormwater infrastructure (above ground) appears to be in good working order, however thorough investigation shall be required to identify the suitability of below ground infrastructure. The preference is to utilize the existing below ground drainage network for disposal of roof and site drainage, based on condition of the infrastructure being acceptable.

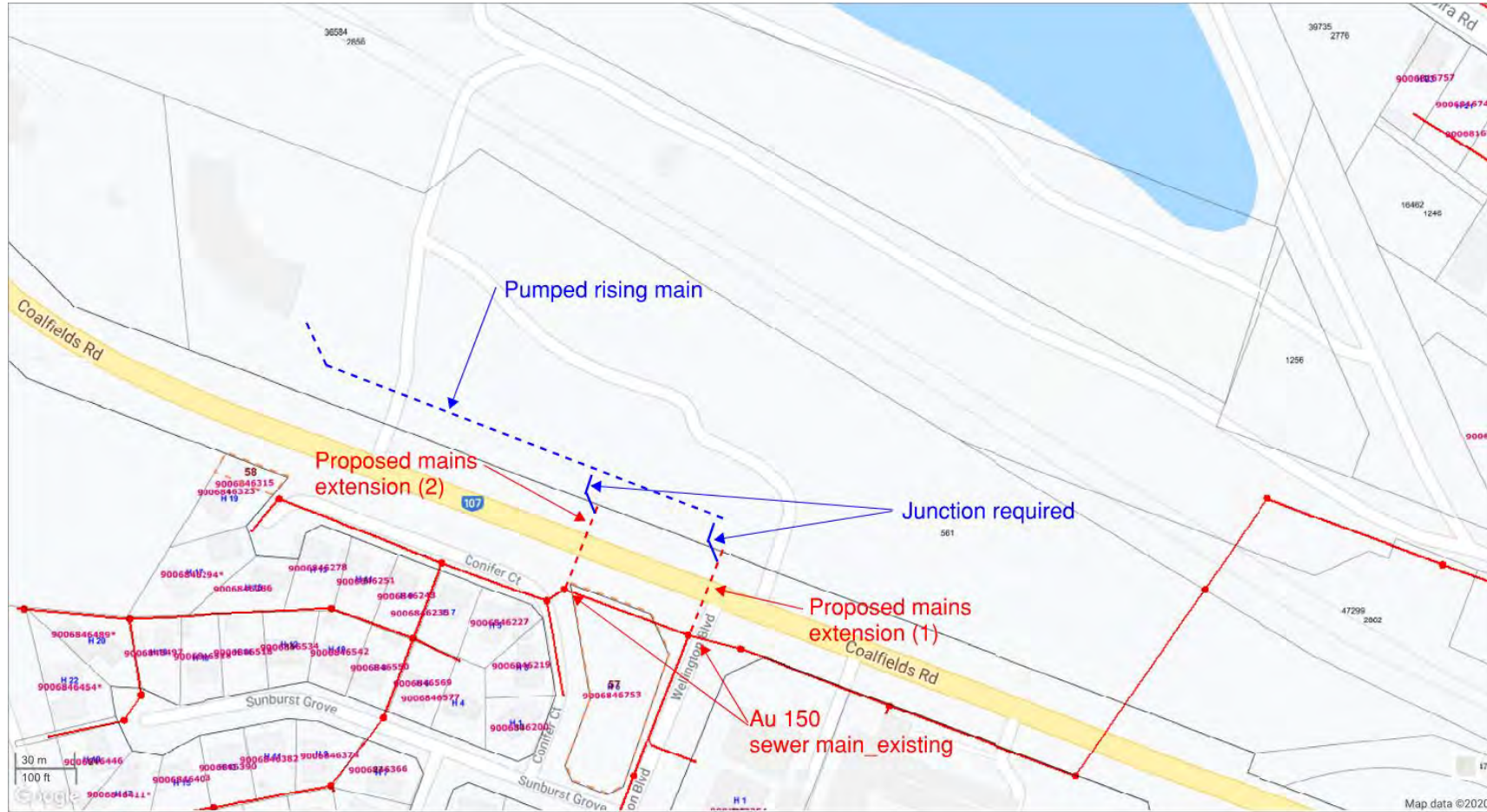
Fire services are proposed to be fed from the authority main (adjacent the water supply), provided with fire pumps and tanks, on-site fire hydrants, fire hose reels and a brigade booster cabinet.

Electrical supply may derive from the existing high voltage supply from Coalfield's Road. Based on the assumptions of this report an incoming power supply compound adjacent the site boundary will be required. A formal application to Western Power for a feasibility study is recommended in order to ascertain the feasibility of a supply connection, the type of connection and approximate cost.

# Appendices

# Appendix A

## INDICATIVE SEWER MAIN EXTENSION LOCATIONS WITH JUNCTION CONNECTIONS TO SITE



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# Appendix B

## INDICATIVE PUMPED RISING MAIN CONNECTION TO EXISTING 225MM AUTHORITY SEWER MAIN

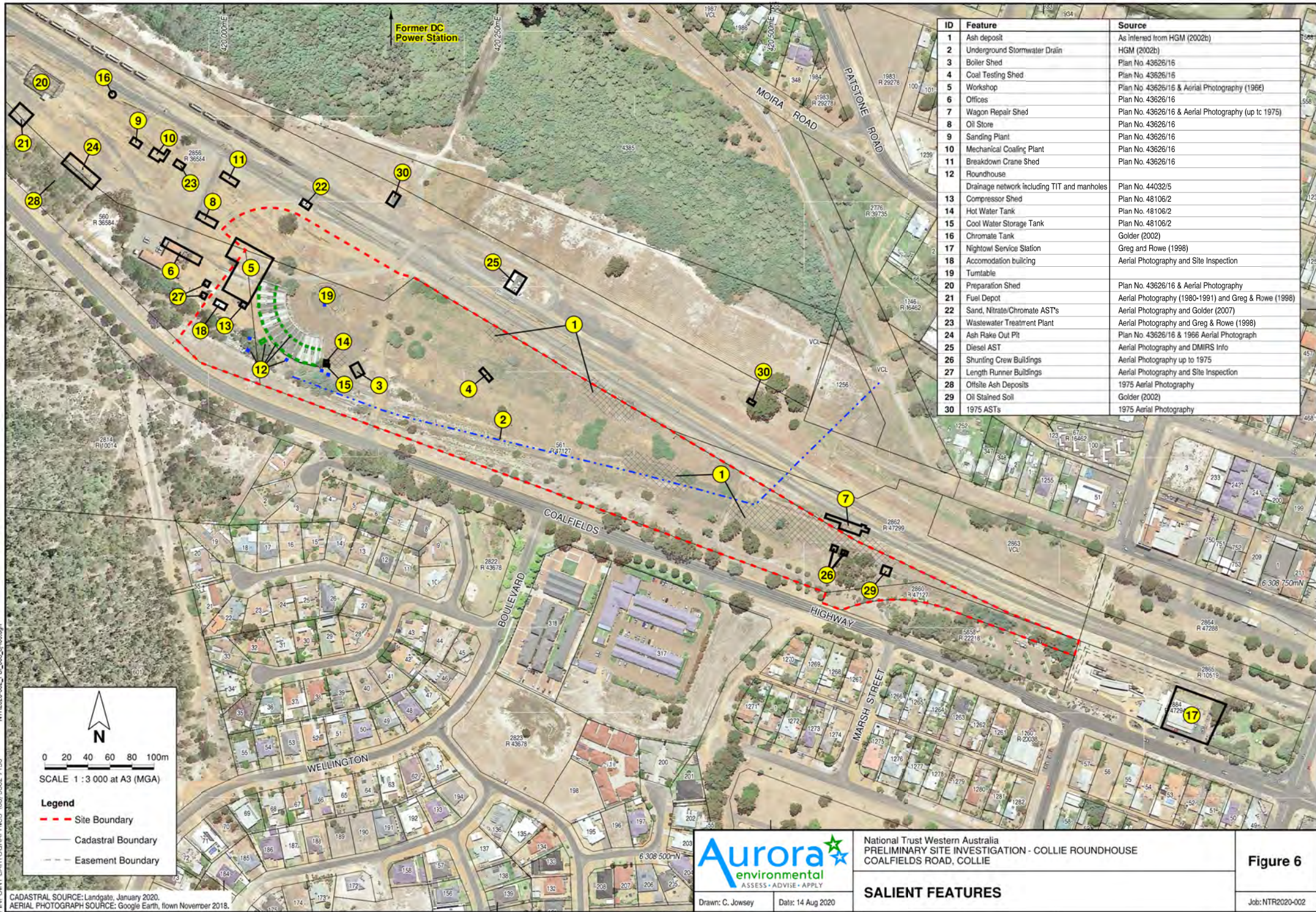


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# **Appendix C**

SALIENT FEATURES – FIGURE 6 (AURORA ENVIRONMENTAL)



ID	Feature	Source
1	Ash deposit	As inferred from HGM (2002b)
2	Underground Stormwater Drain	HGM (2002b)
3	Boiler Shed	Plan No. 43626/16
4	Coal Testing Shed	Plan No. 43626/16
5	Workshop	Plan No. 43626/16 & Aerial Photography (1966)
6	Offices	Plan No. 43626/16
7	Wagon Repair Shed	Plan No. 43626/16 & Aerial Photography (up to 1975)
8	Oil Store	Plan No. 43626/16
9	Sanding Plant	Plan No. 43626/16
10	Mechanical Coaling Plant	Plan No. 43626/16
11	Breakdown Crane Shed	Plan No. 43626/16
12	Roundhouse	
13	Drainage network including TIT and manholes	Plan No. 44032/5
14	Compressor Shed	Plan No. 48106/2
15	Hot Water Tank	Plan No. 48106/2
16	Cool Water Storage Tank	Plan No. 48106/2
17	Chromate Tank	Golder (2002)
18	Nightowl Service Station	Greg and Rowe (1998)
19	Accommodation building	Aerial Photography and Site Inspection
20	Tumbletable	
21	Preparation Shed	Plan No. 43626/16 & Aerial Photography
22	Fuel Depot	Aerial Photography (1980-1991) and Greg & Rowe (1998)
23	Sand, Nitrate/Chromate AST's	Aerial Photography and Golder (2007)
24	Wastewater Treatment Plant	Aerial Photography and Greg & Rowe (1998)
25	Ash Rake Out Pit	Plan No. 43626/16 & 1966 Aerial Photograph
26	Diesel AST	Aerial Photography and DMIRS Info
27	Shunting Crew Buildings	Aerial Photography up to 1975
28	Length Runner Buildings	Aerial Photography and Site Inspection
29	Offsite Ash Deposits	1975 Aerial Photography
30	Oil Stained Soil	Golder (2002)
30	1975 ASTs	1975 Aerial Photography

N

0 20 40 60 80 100m

SCALE 1 : 3 000 at A3 (MGA)

**Legend**

- Site Boundary
- Cadastral Boundary
- Easement Boundary

CADASTRAL SOURCE: Landgate, January 2020.  
 AERIAL PHOTOGRAPH SOURCE: Google Earth, flown November 2018.

**Aurora**  
 environmental  
 ASSESS • ADVISE • APPLY

Drawn: C. Jowsey      Date: 14 Aug 2020

National Trust Western Australia  
 PRELIMINARY SITE INVESTIGATION - COLLIE ROUNDHOUSE  
 COALFIELDS ROAD, COLLIE

**SALIENT FEATURES**

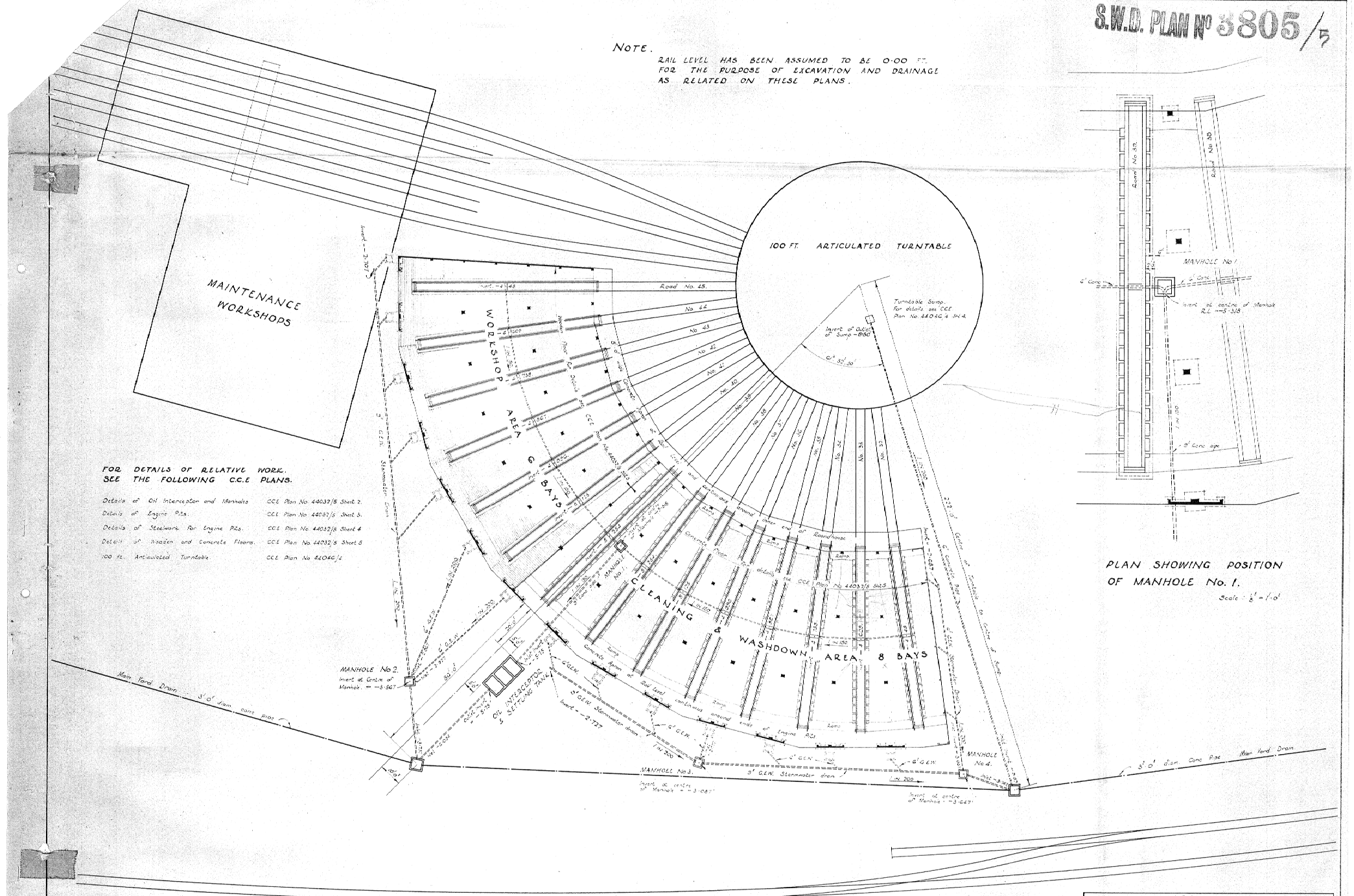
**Figure 6**

Job: NTR2020-002

# Appendix D

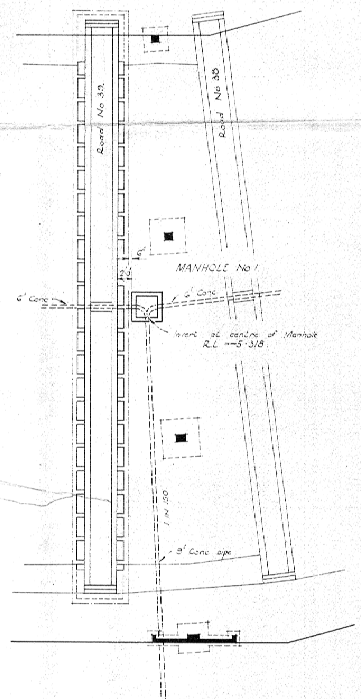
SWD PLAN NO 9806-5 PLAN NO 44032-5 SHEET NO 1: LAYOUT FOR DRAINAGE FOR  
ROUNDHOUSE AND TURNTABLE

NOTE.  
RAIL LEVEL HAS BEEN ASSUMED TO BE 0.00 FT.  
FOR THE PURPOSE OF EXCAVATION AND DRAINAGE  
AS RELATED ON THESE PLANS.



FOR DETAILS OF RELATIVE WORK.  
SEE THE FOLLOWING C.C.E. PLANS.

- Details of Oil Interceptor and Manhole C.C.E. Plan No 44032/5 Sheet 2.
- Details of Engine Pits C.C.E. Plan No 44032/5 Sheet 3.
- Details of Steelwork for Engine Pits C.C.E. Plan No 44032/5 Sheet 4.
- Details of Wooden and Concrete Floors C.C.E. Plan No 44032/5 Sheet 5.
- 100 ft. Articulated Turntable C.C.E. Plan No 42046/2.



PLAN SHOWING POSITION  
OF MANHOLE No. 1.

Scale: 1/2" = 1'-0"

WESTERN AUSTRALIAN GOVERNMENT RAILWAYS COMMISSION CIVIL ENGINEERING BRANCH			
<b>COLLIE LOCO DEPOT ENGINE ROUNDHOUSE</b>			
Layout of Drainage for Roundhouse and Turntable			
Scale = 1/2" = 1'-0"	File No. 13224/5	COPY OF PLAN No.	
Approved (Sigs) E. A. BESCHROEDD	Drawn 2.7.44 Jan 55	<b>44032/5</b>	
Checked 5.4.55 Jan 55	Checked 5.4.55 Jan 55	SHEET No. 1.	

GHD

10 Victoria Street


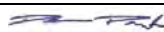
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12536985 – Collie Roundhouse Services Assessment Report

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft B	S.Mosaval	D. Preston		D. Preston		07/09/2020

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