

Regional Landfill Strategy Detailed Assessment

NEWROC



Unless specifically agreed otherwise in the contract of engagement, ASK Waste Management Pty Ltd retains Intellectual Property Rights over the contents of this report. The client is granted a licence to use the report for the purposes for which it was commissioned.

Acknowledgements

ASK Waste Management acknowledges the Traditional Owners of the land in which we work and live, and pays respects to Elders past, present, and emerging.

ASK also gratefully acknowledge the cooperation of the NEWROC Group staff that provided information and assistance in the development of this report.

Disclaimer

Information in this document is current as of August 2021. While all professional care has been undertaken in preparing the document, ASK Waste Management accepts no liability for loss or damages incurred as a result of reliance placed on its content.

Any plans, designs or otherwise contained in this report are schematic and are provided for general guidance only. No reliance should be made by any user on this material for construction purposes. Advice must be sought from a suitably qualified engineer, prior to any construction, excavation or otherwise.

The mention of any company, product or process in this report does not constitute or imply endorsement by ASK Waste Management.

Document Control			
Version	Date	Description	Initials
0C	11/08/2021	Draft for internal review	SBG
1A	12/08/2021	Draft for NEWROC review	SBG

Report produced by:

Samuel Green BSc
Fred Forward

ASK Waste Management

PO BOX 401
Brunswick Heads
NSW. 2483
AUSTRALIA

0447 393363
admin@askwm.com
www.askwm.com



CONTENTS

1	INTRODUCTION	7
1.1	Regional Landfill Strategy Feasibility Study	7
1.2	Shire of Dowerin	8
1.3	Project Objectives	8
1.4	Methodology	9
2	SHIRE OF DOWERIN	11
2.1	Dowerin Landfill	11
2.2	Suitability as Regional Landfill	13
3	WASTE QUANTITY MODELLING	14
3.1	Waste Generation Rates	14
3.2	Waste Per Facility	16
4	TRANSPORT MODELLING	19
4.1	Site Locations	19
4.2	Transfer Station Servicing	20
4.3	Household Waste Collection Service	23
5	FACILITY DESIGNS	24
5.1	Transfer Stations	24
5.1.1	Earthworks	25
5.1.2	Perimeter Fencing	25
5.1.3	Remote Access and Security System	26
5.1.4	Skip Bins	26
5.1.5	Concrete Apron for Skip Bins	27
5.1.6	Elevated Tipping Platform	27
5.1.7	Greenwaste Storage Area	28
5.1.8	Scrap Metal Storage Area	28
5.1.9	Hazardous Waste Storage Area	28
5.2	Regional Landfill	28
5.2.1	CAT 953K Tracked Loader	29
5.2.2	Automated Access and Security System for Landfill	29
5.2.3	20ft Sea Container for Storage	29

6	LICENCING REQUIREMENTS	30
6.1	Regional Landfill	30
6.2	Transfer Stations	30
7	FINANCIAL MODELLING	31
7.1	Capital Expenditure	32
7.1.1	Transfer Stations	32
7.1.2	Regional Landfill	35
7.2	Operational Expenditure	36
7.2.1	Transport.....	36
7.2.2	Transfer Stations	36
7.2.3	Regional Landfill	36
7.3	Revenue	37
8	RECOMMENDATIONS	38
8.1	Detailed Project Planning.....	38
8.1.1	Project Business Case.....	38
8.1.2	Site Specific Plans.....	38
8.1.3	Communication Strategy.....	38
8.2	Choose a Preferred Governance Model	38
8.3	Employ a Regional Waste Management Coordinator.....	39
8.4	Contract Management and Regional Procurement.....	39
8.4.1	Kerbside Waste Collection Contracts.....	39
8.4.2	Regional Procurement for Project Implementation	39
8.5	Funding opportunities	40
8.5.1	WasteSorted Grants	40
8.5.2	Building Better Regions Fund (BBRF)	40
8.5.3	Other options	41
	REFERENCES	42

LIST OF FIGURES

Figure 2.1 - Dowerin Landfill Aerial Image (Nearmap, 2004)	11
Figure 2.2 - Dowerin Landfill Access Gate.....	12
Figure 2.3 - Below ground trench with ringlock litter fence.....	12
Figure 4.1 - Map of Proposed Transfer Stations and Regional Landfill	19
Figure 4.2 - Mobilisation Run from Northam to Dowerin to Wyalkatchem	21
Figure 4.3 – Southern collection run	21
Figure 4.4 - Northern collection run.....	22
Figure 5.1 – Indicative Transfer Station design	25
Figure 5.2 - Remote Access and Security System.....	26
Figure 5.3 – 6m ³ front lift skip bins	26
Figure 5.4 - Custom Panel (2500mm x 4000mm x 150mm)	27
Figure 5.5 - L-block and Safety Bollard	28
Figure 5.6 - Cat 953K Tracked Loader	29

LIST OF TABLES

Table 2.1 – Dowerin Landfill attributes	12
Table 3.1 - Per capita landfill rates (kg/person) used in original report	14
Table 3.2 - Amended per capita waste generation rates	15
Table 3.3 – Estimated annual waste generation	15
Table 3.4 – Estimated waste quantities received annually at each Transfer Station	16
Table 3.5 – Estimated scrap metal, greenwaste, and waste requiring transfer.....	17
Table 3.6 – Comparisons of total waste to Regional Landfill and skip bins required weekly	18
Table 4.1 – Proposed locations of waste facilities	19
Table 4.2 - Comparison of Transfer Station Pickup Costs.....	20
Table 4.3 – Comparisons of individual vs. Regional Landfill on kerbside collection services	23
Table 7.1 – Summary of capital and operational expenditure	31
Table 7.2 – Common capital expenditure for Transfer Stations	32
Table 7.3 - Capital expenditure for Koorda Transfer Station	32
Table 7.4 - Capital expenditure for Bencubbin Transfer Station	33
Table 7.5 - Capital expenditure for Beacon Transfer Station	33

Table 7.6 - Capital expenditure for Mukinbudin Transfer Station.....	33
Table 7.7 - Capital expenditure for Nungarin Transfer Station	34
Table 7.8 - Capital expenditure for Trayning Transfer Station	34
Table 7.9 - Capital expenditure for Dowerin Transfer Station	34
Table 7.10 - Capital expenditure for Wyalkatchem Transfer Station.....	35
Table 7.11 - Capital expenditure for Wyalkatchem Regional Landfill	35
Table 7.12 - Operational expenditure for transportation of skip bins.....	36
Table 7.13 - Operational expenditure of remote access system at transfer stations.....	36
Table 7.14 - Operational expenditure for Regional Landfill	36

1 INTRODUCTION

The North Eastern Wheatbelt Regional Organisation of Councils (NEWROC) is a voluntary organisation that unites councils from the Shires of Koorda, Mount Marshall, Mukinbudin, Nungarin, Trayning and Wyalkatchem to work together for the economic prosperity of the region which covers close to 19,500 square kilometres and is home to around 2,500 people.

In 2019, NEWROC engaged ASK Waste Management (ASK) to assess their waste facilities and develop achievable concepts to improve waste management across the region. The findings were documented in a *Regional Landfill Strategy Feasibility Study* as is summarised in **Section 1.1**.

The NEWROC decided in 2021 to further investigate Option 4 of the *Regional Landfill Strategy* which involves:

- Development of the Wyalkatchem site as a Regional Landfill to receive waste from all the NEWROC communities.
- Converting the other landfills in the region to waste transfer stations that would be used to receive waste in front lift skip bins that would be collected on a weekly basis and transported to the Regional Landfill.
- Securing all waste sites against unauthorised access using remote access technologies and the provision of swipe card access to ratepayers.

ASK was engaged by NEWROC to undertake detailed financial modelling of Option 4 and to produce a series of recommendations that NEWROC can follow to progress implementation of the project.

1.1 REGIONAL LANDFILL STRATEGY FEASIBILITY STUDY

The *Regional Landfill Strategy Feasibility Study* (ASK, 2019) was produced to address the following issues:

- The nine waste facilities across the NEWROC region are registered, however, none are gated or staffed. Common challenges seen at these facilities include commercial waste being dumped (sometimes illegally), non-residents depositing waste at the sites, and maintaining site compliance.
- The uncontrolled disposal of waste at all the NEWROC sites also means that there are no gate fees being recovered. Currently residential rates are subsidising commercial waste disposal from businesses, organisations and State departments located in the region.
- Without any monitoring, there is also no way to collect data or be sure of exactly what kinds of waste are being deposited. Potential environmental risks of unmonitored landfills include air pollution, groundwater contamination and public health issues, for example contact with hazardous substances or disease spread through live-in rodents and other animal vectors.
- It is also possible that waste generated in Shires close to the NEWROC are transported to the NEWROC landfills to avoid paying gate fees elsewhere.
- As per DWER policy and in alignment with the NEWROC objective to solve problems as a collective, this report intends to recommend scenarios that aggregate landfills to create a regional solution that results in less but larger and more efficiently run landfills.

ASK employed the following methodology in developing the *Regional Landfill Strategy Feasibility Study*:

- Complete a desktop assessment of the existing landfills operated by the Shires in NEWROC to identify the facilities that would be suitable as regional sites, based on:
 - Proximity of watercourses and depth to groundwater (where available)
 - Proximity to sensitive receptors (residential and commercial properties)
 - All weather access (sealed roads)
 - Potential airspace (operational life) based on site size and depth of excavatable soil
 - Suitability of location within the NEWROC region.
- Assess five potential options for the future operation of the facilities, including:
 0. All landfill operations stay as they are.
 1. Keep all the current sites but install remote access systems for Shire residents and CCTV to control the use of the sites.
 2. As above, but also staff two key sites for a limited time each week for the receipt of commercial waste, for which a gate fee would be paid.
 3. Maintain two sites as landfills to service the NEWROC area, these would be staffed with limited opening hours each week. The other sites would be converted to transfer stations, with remote access system for Shire residents and CCTV to monitor the use of the sites.
 4. Maintain a single staffed landfill facility for the region, supported by remote access system and CCTV monitored transfer stations at all other locations.
- Assess each option on their environmental, compliance, social and technical merits.
- Produce an economic assessment based on the capital and operational costs for each option and include any additional revenue that the option may generate.
- Summarise the findings to provide NEWROC with the information needed to make an informed decision about their future strategic direction, including recommendations and the next steps required.

1.2 SHIRE OF DOWERIN

The Shire of Dowerin covers 1,863 square kilometres on the western boundary of the NEWROC region and has a population of 676 people. The Dowerin landfill was fenced and staffed in recent years to prevent it being exploited for free tipping by non-ratepayers. As the Shire understood the landfill was approaching the end of its operational life and recognised the value of seeking a regional solution to waste management challenges, it requested to participate in the project upon becoming aware of the solutions NEWROC were investigating. A key component of this project was therefore to account for Dowerin's participation in the project in terms of impacts on costs and transport logistics.

1.3 PROJECT OBJECTIVES

The key objectives of this project are to:

- Account for the participation of Dowerin in transport and financial modelling of Option 4.
- Re-evaluate waste generation estimates and quantities of waste that will need to be collected at transfer stations and delivered to the Regional Landfill under Option 4.
- Re-assess and model the transport logistics associated with collecting waste from the Transfer Stations under Option 4.
- Quantify the impacts of utilising a Regional Landfill on the domestic waste collection service.
- Provide detailed operational and capital expenditure estimates for the Transfer Stations and Regional Landfill based on the re-evaluated waste generation estimates and transport modelling for Option 4.
- Make recommendations on actions NEWROC shires should take towards implementing Option 4.

1.4 METHODOLOGY

Deliverable	Action
Kick-off Telecom and schedule	A meeting will be held with representative from NEWROC to: • Confirm project objectives and deliverables • Discuss the proposed methodology • Confirm dates for site tour and meetings • Request the information needed from NEWROC, such as Shire's considering where a transfer station could be located nearer to population centres, and with access to services such as power
Liaison with Dowerin	ASK will call the Shire of Dowerin to discuss their waste services and infrastructure to gain an insight into their situation. ASK will request any useful information such as site licences, reports, etc.
Mapping out infrastructure	Once the shires have provided feedback on a potential location for each transfer station, ASK will produce a 'mudmap' of the locations for infrastructure and logistics.
Site visits and meeting	ASK will visit the region to complete a tour that will include: • Visiting the transfer station at Bendering • Visiting the Avon Waste MRF and meeting to discuss potential site layouts and transport costs
Shire Council presentations	ASK will prepare a 20 – 30 min presentation to summarise: • The drivers for the changes to the waste facilities (i.e. State Waste Strategy, DWER policy, environmental impact, cost recovery, regulatory compliance, etc). • The potential changes to facilities and services. • How and why access to facilities will be managed and controlled. • Possible cost sharing models for NEWROC (i.e. Individual shires to fund facility capex and opex, while a uniform transport and disposal cost per tonne or per capita). • The remaining time will be for a Q&A session with the Councillors
Establish capital and operational costs	ASK contact industry providers of equipment to determine the current capex and opex (servicing, etc) for equipment. We will draw on the expertise of GreenTec Consulting Engineers to assist in the capex estimates for the transfer station infrastructure.

Deliverable	Action
Modelling of costs	ASK will construct a model (in MS Excel) to determine the estimated capital and operational cost to implement Option 4 (multiple transfer stations supporting a single Regional Landfill at Wyalkatchem). The model will include several KPI's (such as waste tonnage, etc) to allow sensitivity analysis to be completed on the results.
Compliance requirements and associated cost	ASK will provide details about the compliance actions and associated costs for the key phases of implementation: • Closure of landfills (Requirements under the Rural Landfill Regulations) • Establishing transfer stations (If less than 500tpa throughput, the compliance will be minimal, but planning may be required) • Upgrading existing landfill to the Regional Landfill (possibly a DWER works approval or Licence amendment application) • On-going compliance associated with new transfer stations and Regional Landfill
Production of the draft report	ASK would develop a draft report that would: • Outline the likely services to be provided at the transfer stations • The potential locations of each transfer station • The site infrastructure the costing is based upon • The costs associated with capital works • The operational costs (including waste transport) • Estimated revenue from commercial wastes at the landfill • Recommendations for the equitable division of transport costs throughout the NEWROC group • Regulatory compliance requirements and associated costs • Conclusions and any recommendations that can be drawn from the project Once the draft report has undergone an internal QA, an electronic copy will be sent to NEWROC to review
On-line meeting to discuss draft report	ASK will present a summary of the draft report at an on-line meeting with NEWROC, answer any questions and seek feedback. Following the meeting NEWROC will need to provide ASK with a consolidated set of feedback on the draft report.
Final report production	The feedback from NEWROC will be incorporated into the document and the report finalised; this includes an internal review as part of ASK's Quality Management System.

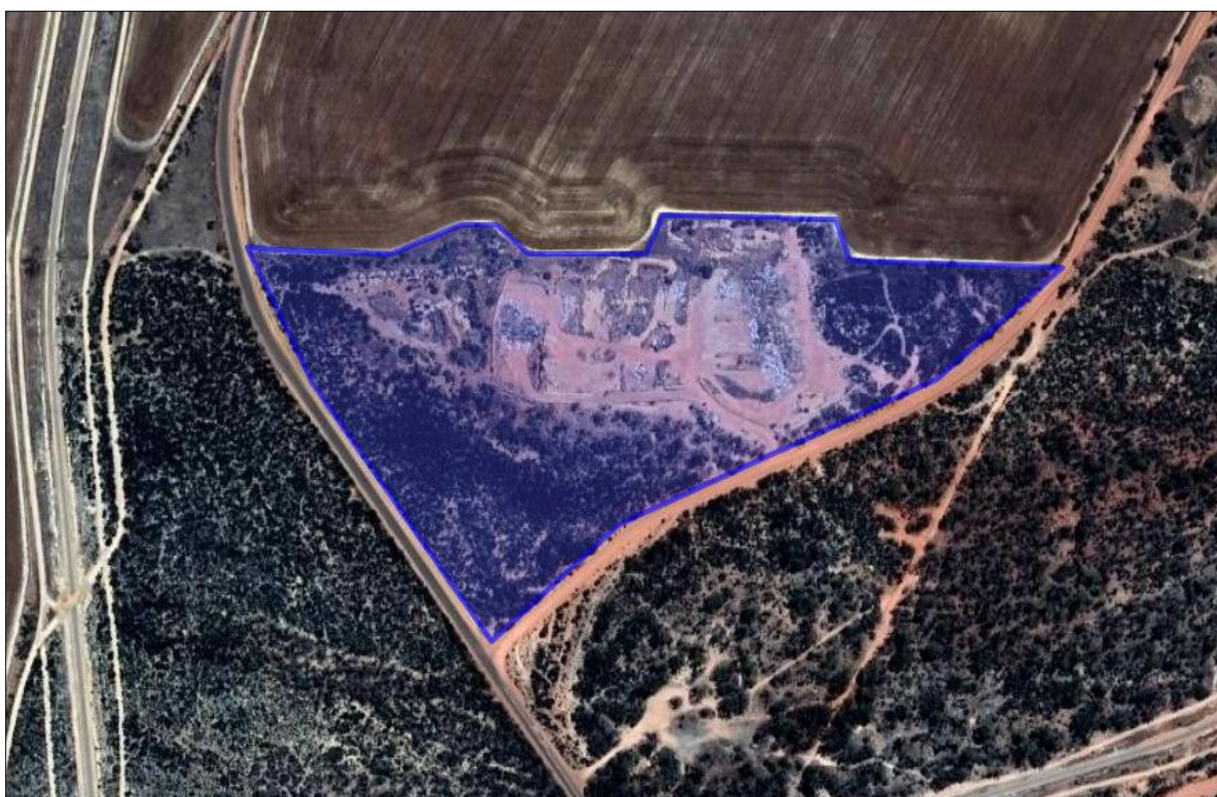
2 SHIRE OF DOWERIN

The Shire of Dowerin has a population of 676 people and covers 1,863 square kilometres on the western boundary of the NEWROC region. The town of Dowerin itself has a population of 467 making it the largest townsite in the region.

2.1 DOWERIN LANDFILL

The Shire operates a landfill located approximately 8.2km northeast of the Dowerin township that covers an area of 9.4 hectares (See **Figure 2.1**). The Shire recently secured access to the facility and staffed it during operating hours to prevent non-ratepayers from exploiting free waste disposal at the site. Anecdotal evidence indicates that this has resulted in waste quantities increasing at the neighbouring Wyalkatchem landfill.

Figure 2.1 - Dowerin Landfill Aerial Image (Nearmap, 2004)



ASK inspected the Dowerin Landfill on the 21 June 2021 to determine the site attributes as presented in **Table 2.1**.

Table 2.1 – Dowerin Landfill attributes

Site Area	9.4 Ha
Site security	Ringlock entrance gate and perimeter fence. Gate locked outside of opening hours Gatehouse staffed during opening hours
Opening hours	Wednesday 11am – 4pm Friday 11am – 4pm Sunday 11am – 4pm
Waste types accepted	Greenwaste, Commercial Bulk Waste/Builders Demolition Waste, Commercial Liquid Waste, Asbestos (By appointment only), Commercial/General Putrescible Waste
Cell construction	Below ground trenches.
Remaining capacity	Most of the site has already been used for below ground landfilling and it is estimated there is less than two years of below ground capacity remaining. There is potential for the construction of above ground cells, but this would likely require the importation of soil for cell construction, cover, and final capping.
Equipment	Caterpillar 938H wheeled loader
Utilities	No mains water supply or electricity connection

Figure 2.2 - Dowerin Landfill Access Gate



Figure 2.3 - Below ground trench with ringlock litter fence



2.2 SUITABILITY AS REGIONAL LANDFILL

Although it was not within ASK's scope to assess the Dowerin Landfill's suitability for use as a Regional Landfill, the site visit undertaken by ASK and subsequent transport modelling (**Section 4**) made it apparent that the Wyalkatchem landfill is still the best location for a Regional Landfill due to the following factors:

- Dowerin has limited remaining below ground landfilling capacity and soil reserves, especially when compared to Wyalkatchem.
- Expansion of the Dowerin landfill to provide suitable capacity for use as a Regional Landfill would require clearing of high value native vegetation, which the Department of Water and Environmental Regulation (DWER) would likely oppose.
- It poses fire, litter, and leachate contamination risk to the agricultural land located immediately north of the landfill.
- The location of the Dowerin site will increase transport distances and costs for Option 4 when compared to the Wyalkatchem site.

3 WASTE QUANTITY MODELLING

A core component of this project was to reassess the waste quantity estimates used in the original *Landfill Strategy Feasibility Study* (ASK, 2019) to ensure that transfer station designs are appropriate for the anticipated waste quantities received, and transport modelling is based on waste quantities likely to be received.

3.1 WASTE GENERATION RATES

As the NEWROC landfills are unstaffed and do not have weighbridges there is almost no data available on the quantities of waste received at them. To address this data gap in the original *Landfill Strategy Feasibility Study*, ASK utilised the 8-year average of non-metropolitan landfill per capita estimates in Western Australia from the Recycling Activity Review (ASK, 2010-2018).

Table 3.1 shows the kilograms of waste per person according to the 8-year average by waste type (MSW is Municipal Solid Waste (domestic waste), C&I is Commercial & Industrial, and C&D is Construction & Demolition). For simplicity, ASK rounded the results to the nearest hundred kilograms.

Table 3.1 - Per capita landfill rates (kg/person) used in original report

Waste type	WA Non-metropolitan Average 2010 -18	Rounded values used for original report
MSW	511	500
C&I	496	500
C&D	835	800
Total (kg)	1,842	1,800
Total (tonne)	1.84	1.8

In undertaking this Detailed Assessment, the above per capita averages were evaluated for their applicability to the NEWROC region. ASK Senior Consultant Samuel Green was heavily involved in the data collection and analysis process for WA's *Recycling Activity Review* (that was used as the source of the per capita estimates) between 2012 and 2020. In his opinion, the values used in the original report (**Table 3.1**) may not accurately reflect actual per capita landfill quantities for the NEWROC region due to the following factors:

- Data collected for non-metropolitan WA is heavily influenced by major regional centres (MRCs) that have landfills with weighbridges (E.g., Bunbury, Albany, Geraldton, Karratha, Broome). As almost no landfill data from the Wheatbelt region is reported through the WA Recycling Activity Review process, the region is not represented in the dataset.
- The MRCs from which most of the data for non-metropolitan per capita averages are sourced have significantly different demographic and economic profiles to the Wheatbelt region, that are likely to result in differences to per capita waste generation rates, specifically:
 - MRCs generally have positive population growth that results in associated housing construction activity and the generation of C&D waste.
 - The Shires of the NEWROC region have population decline associated with agricultural consolidation so have comparatively lower levels of domestic construction activity. Whilst there is demolition activity associated with the removal of abandoned homesteads, it is understood that these structures are usually buried onsite to minimise transportation costs.

- MRCs have elevated economic activity compared to the Wheatbelt region as they service the population of the surrounding region/s, rather than just their own residents. It is therefore considered that C&I waste generation in the Wheatbelt region will be considerably lower than what is indicated by the non-metropolitan per capita average.
- The original report used the average non-metropolitan per capita landfill rate of 500kg/person to estimate MSW waste quantities in the NEWROC region. This value does not represent the total MSW generation rate for non-metropolitan WA of 650kg/person as it did not include waste diverted from landfill through resource recovery.

Considering the factors detailed above, ASK has amended the per capita waste generation rates used to estimate waste quantities in the NEWROC region as shown in **Table 3.2**.

Table 3.2 - Amended per capita waste generation rates

Waste type	Values used for original report (kg/person)	Amended values (kg/person)	Rationale for change
MSW	500	650	Increased to 650kg/person as the original value did not account for resource recovery.
C&I	500	500	Although it is considered likely that C&I waste generation in the region will be lower than MRCs, the values was left at 500kg/person to ensure that Transfer Station designs, and transportation modelling are not based on underestimated waste quantities.
C&D	800	500	Reduced by 300kg/capita as the Wheatbelt region has significantly less construction and demolition activity compared to the MRCs that the per capita data is largely sourced from.
Total (kg)	1,800	1,650	

ASK used the per capita waste generation rates from **Table 3.2** and multiplied them by Shire population to estimate waste quantities generated in each Shire as shown in **Table 3.3**.

Table 3.3 – Estimated annual waste generation

Shire	Koorda	Wyalkatchem	Mukinbudin	Nungarin	Troynng	Dowerin	Mount Marshall	Regional Total
Shire Population	408	498	531	247	348	676	518	3,226
MSW generation (tonnes)	265	324	345	161	226	439	337	2,097
C&I generation (tonnes)	204	249	266	124	174	338	259	1,613
C&D generation (tonnes)	204	249	266	124	174	338	259	1,613
Total tonnes generated	673	822	876	408	574	1,115	855	5,323

3.2 WASTE PER FACILITY

To appropriately size the proposed transfer stations and undertake transport modelling, estimates of the waste quantities likely to be received at each site had to be calculated. ASK did so by subtracting quantities of waste not likely to be received at the transfer stations from the waste generation estimates as shown in **Table 3.4**, this included:

- Waste collected through the kerbside waste collection contracts as this will be transferred directly to the Regional Landfill (refer to **Section 4.3**).
- Waste recycled through kerbside recycling collection contracts as this is transferred directly to York.
- On-farm waste disposal of MSW (assumed to be 60% of non-town population MSW generation).
- On-farm disposal of construction and demolition waste (assumed to be 100% of non-town population C&D generation).

Table 3.4 – Estimated waste quantities received annually at each Transfer Station

	Koorda	Wyalkatchem ¹	Mukinbudin	Nungarin	Trayning	Dowerin	Bencubbin	Beacon
Shire / Facility Catchment Population	408	498	531	247	348	676	312	206
Town Population	268	397	355	145	344	467	242	160
Total waste generated (tonnes)	673	822	876	408	574	1,115	515	340
On-Farm MSW Disposal (tonnes)	54.6	39.4	68.6	39.8	1.6	81.5	27.3	17.9
On-Farm C&D Disposal (tonnes)	70.0	50.5	88.0	51.0	2.0	104.5	35.0	23.0
C&D waste direct to Regional Landfill (tonnes)	53.6	79.4	71.0	29.0	68.8	93.4	48.4	32.0
Kerbside landfill disposal (tonnes)	143	185.5	145	54	117	194	75	48
Kerbside recycling recovery (tonnes)	34	0	41.5	0	30	62	21	14
Total waste not to be received at Transfer Stations (tonnes)	355	355	414	174	219	535	207	135
Total waste to be received at Transfer Station (tonnes)	318	467	462	234	355	580	308	205

¹ Waste quantities for Wyalkatchem have been estimated using the same method as for the other Facilities as it is proposed that a Transfer Station will be used to receive Wyalkatchem's domestic waste to prevent access to the tipping face and allow the site to be staffed on a part time basis.

In the transfer station designs detailed in **Section 5**, bunded areas have been allocated for the storage of scrap metal and greenwaste. Both material types were observed in significant quantities when ASK undertook site visits, and they are both problematic to transport as they do not pack well into 6m³ skip bins or front lift collection trucks. It is proposed that scrap metal be stockpiled onsite until sufficient quantities make it viable for collection by a scrap metal merchant. For greenwaste it is recommended that it either be mulched for use in onsite rehabilitation works or burnt under controlled conditions. ASK estimated the quantities of greenwaste and scrap metal likely to be received based on the assumption that 10% of the waste dropped at Transfer Stations will be separated greenwaste and 10% separated scrap metal. This leaves the remaining 80% to be placed in the 6m³ skip bins for transfer to the Regional Landfill at Wyalkatchem.

Table 3.5 below presents the estimated quantities of scrap metal, greenwaste, and waste requiring transfer to the Regional Landfill at each of the Transfer Stations. It also provides estimates on the number of 6m³ skip bins that will require collecting on a weekly basis. These values have been rounded up to the nearest whole number.

Table 3.5 – Estimated scrap metal, greenwaste, and waste requiring transfer

	Koorda	Wyalkatchem	Mukinbudin	Nungarin	Trayning	Dowerin	Bencubbin	Beacon
Total tonnes to transfer station	318	467	462	234	355	580	308	205
Greenwaste disposed onsite (tonnes)	32	47	46	23	35	58	31	20
Scrap metal stored onsite (tonnes)	32	47	46	23	35	58	31	20
Total onsite disposal/storage (tonnes)	64	93	92	47	71	116	62	41
Waste for skip bin transfer (tonnes)	254	374	370	187	284	464	246	164
Waste for skip bin transfer (m3)	1,272	1,868	1,848	935	1,419	2,320	1,232	820
Waste for skip bin transfer /week (m3)	24	36	36	18	27	45	24	16
6m3 skip bins required weekly ² (Rounded up)	5	6	6	3	5	8	4	3

² For the transfer station designs ASK has accounted for 50% more skip bins to be purchased for each facility

The impact of ASK's revised waste quantity modelling in terms of total waste requiring transfer to the Regional Landfill and the number of skip bins required at each Transfer Station is demonstrated in **Table 3.6** below. The revised waste quantity estimates have resulted in the transfer stations being required to handle between 50% and 150% more skip bins on a weekly basis.

Table 3.6 – Comparisons of total waste to Regional Landfill and skip bins required weekly

Transfer Station/Regional Landfill	Initial Feasibility Study		Revised Estimates		Percentage Increase	
	Total waste to Regional Landfill (m3/year)	Skip bins required weekly (Rounded)	Total waste to Regional Landfill (m3/year)	Skip bins required weekly (Rounded)	Total waste to Regional Landfill (m3/year)	Skip bins required weekly (Rounded)
Wyalkatchem	841	3	1,868	6	122%	100%
Koorda	832	3	1,272	5	53%	67%
Mukinbudin	1,108	4	1,848	6	67%	50%
Bencubbin	498	2	1,232	4	147%	100%
Beacon	329	2	820	3	149%	50%
Nungarin	570	2	935	3	64%	50%
Trayning	389	2	1,419	5	265%	150%
Dowerin	N/A	N/A	2,320	8	N/A	NA
Total	4,556	18	11,714	40	157%	122%

4 TRANSPORT MODELLING

Due to the revised estimates of waste quantities to be received at transfer stations, ASK has reassessed the transportation modelling to ensure that it remains appropriate. ASK has also modelled impacts on the kerbside waste collection service in terms of additional time and distance required to transport waste to the Regional Landfill at Wyalkatchem.

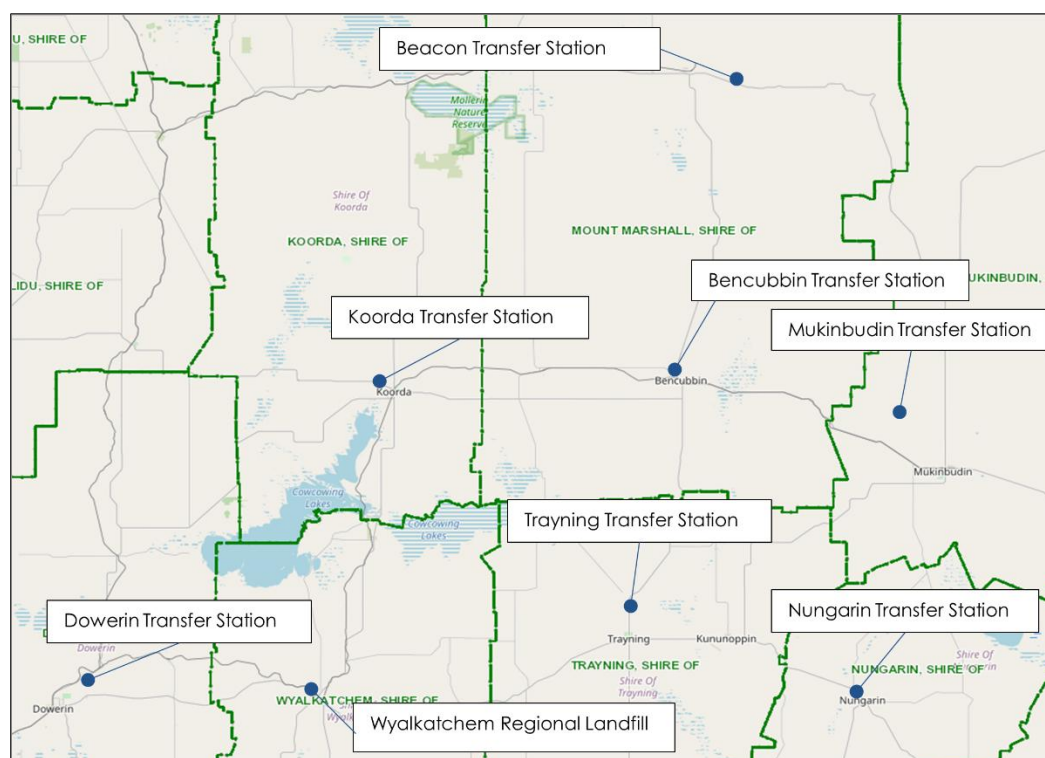
4.1 SITE LOCATIONS

Table 4.1 below shows the proposed future use of existing waste facilities in the NEWROC region and **Figure 4.1** maps the location of the proposed Transfer Stations and the Regional Landfill used to undertake the revised transport modelling.

Table 4.1 – Proposed locations of waste facilities

Shire	Existing Waste Facility	Proposed location / use
Dowerin	Amery Refuse Site	Dowerin Transfer Station
Wyalkatchem	Wyalkatchem Refuse Disposal Site	Wyalkatchem Regional Landfill
Koorda	Shire of Koorda Landfill	Koorda Transfer Station
Mt Marshall	Bencubbin Refuse Disposal Site	Bencubbin Transfer Station
	Beacon Refuse Disposal Site	Beacon Transfer Station
Mukinbudin	Mukinbudin Landfill Site	Mukinbudin Transfer Station
Nungarin	Nungarin Refuse Disposal Site	Nungarin Transfer Station
Trayning	Trayning Refuse Disposal Site	Trayning Transfer Station
	Yelbeni Refuse Disposal Site	Shut down/Rehabilitate
	Kununoppin Refuse Disposal Site	Shut down/Rehabilitate

Figure 4.1 - Map of Proposed Transfer Stations and Regional Landfill



4.2 TRANSFER STATION SERVICING

The original transportation modelling for the collection of skip bins from transfer stations was based on the following assumptions:

- Waste being collected into 6 cubic meter front lift bins
- A bulk density of 200kg/m³ for the front lift bins (therefore each bin holding 1.2 tonnes of waste)
- Waste collected by a compaction front lift truck with a capacity to collect 16 of the 6m³ bins
- Collection truck mobilising from and back to Northam

The original modelling resulted in one truck being able to collect waste from all sites and dispose of it at the Regional Landfill in a single load. The revised waste quantity estimates (**Table 3.6**) now make it unlikely that the truck will have enough capacity to pick up from all transfer stations in a single run.

The front lift trucks have capacity for 16 bins, or 96m³ of waste, whilst the new waste estimates predict a weekly average of 34 bins requiring collection from Transfer Stations (not including Wyalkatchem). To ensure sufficient truck capacity it is proposed the collection run be split into three runs as follows:

- Truck to collect the 8 bins from Dowerin and drop them at the Regional Landfill during the mobilisation run as detailed in **Figure 4.2**.
- Truck to collect bins from Mukinbudin (6 bins), Nungarin (3 bins), and Trayning (as many bins as can fit) on the 'Southern Run' as shown in **Figure 4.3**.
- Truck to collect bins from Koorda (5 bins), Bencubbin (4 bins), Beacon (3 bins) and Trayning (any remaining bins if necessary) on the 'Northern Run' as shown in **Figure 4.4**.
- Skip bins at the Wyalkatchem Transfer Station can be transferred to the landfill during any of the three times that the collection truck is at the site.

Compared to the original modelling, this model adds 125km to the total trip length, as the mobilisation portion of the trip will still only be conducted once, culminating in approximately a 20% increase in transportation costs, as detailed in **Table 4.2**.

Table 4.2 - Comparison of Transfer Station Pickup Costs

	Original Report	Revised Estimates	% Increase
Distance travelled (km)	610	735	20%
Skip bins collected	18	40	122%
Annual Costs	\$63,440 ³	\$84,084	20%

³ The original estimate has been adjusted to include a 10% increase due to inflation since the first report was published in 2019

Figure 4.2 - Mobilisation Run from Northam to Dowerin to Wyalkatchem

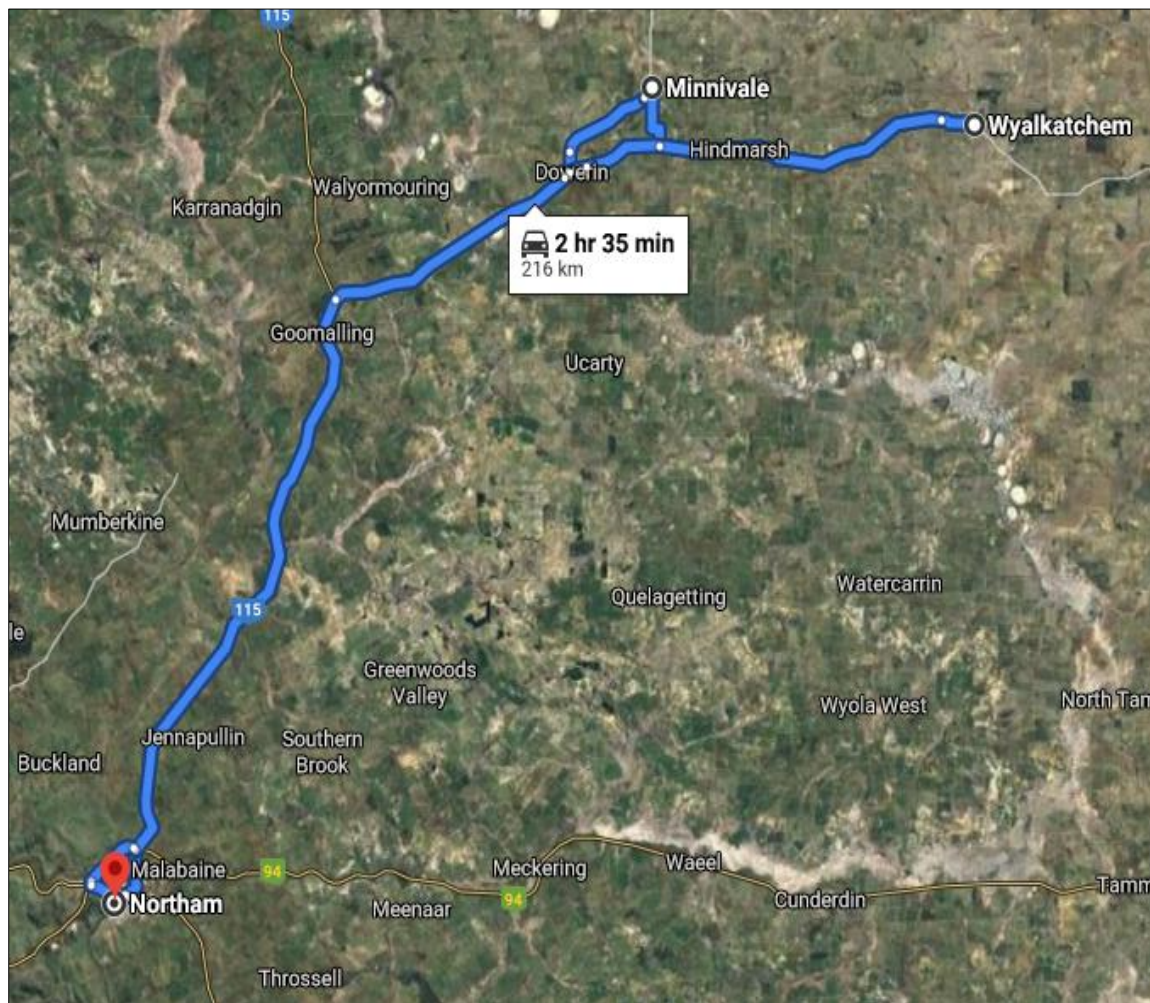
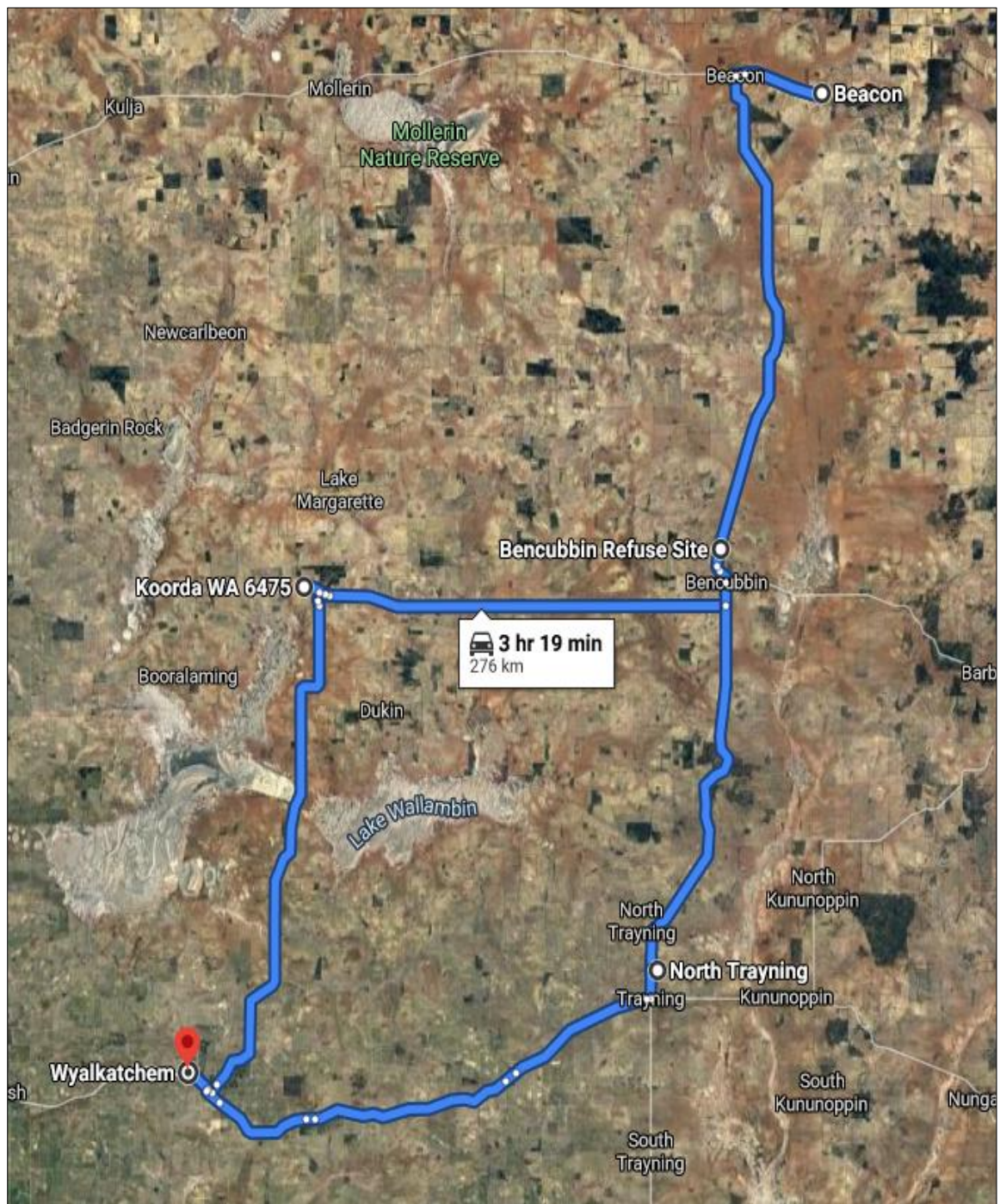


Figure 4.3 – Southern collection run



Figure 4.4 - Northern collection run



4.3 HOUSEHOLD WASTE COLLECTION SERVICE

The household waste collection service currently utilises the landfills in each town it passes through. Once a Regional Landfill is established it will alter the logistics of how this service will operate. The impact that this change would have on the logistics for the contractor providing this service was analysed, with comparisons being made between the two options.

Observations of a local council rubbish truck provided an average time taken to pick up bins in a suburban setting. This was extrapolated and applied to each of the towns and their kerbside catchment numbers to quantify the time taken to pick up in each locality. The bin numbers were estimated from the number of households obtained from Australian Bureau of Statistics' Quick Stats service.

The relevant differences are highlighted in **Table 4.3**, which is effectively comparing the pickup as either a single run, which is the current situation, or a split run which is the same as the route proposed for the transfer station pickups described above. As demonstrated in **Table 4.3**, this equates to a 24% increase in distance travelled and approximately a 7% increase in overall time taken.

Table 4.3 – Comparisons of individual vs. Regional Landfill on kerbside collection services

	Individual	Regional	% Difference
Distance (km)	560	735	23.8%
Time (hours)	14.3	15.3	6.6%

During the site visits conducted by ASK in June 2021, it was highlighted that waste contracts are due to expire soon for multiple members of NEWROC. These differences between the current pickup model and the proposed Regional Landfill should be allowed for in any renegotiations of said contracts, with a predetermined cost for future contract variations being highly desirable. The best outcome for the foreseeable future would be for each member of NEWROC to align their waste contracts to allow for mutual negotiations and bargaining power when the time comes.

5 FACILITY DESIGNS

The following subsections detail the proposed preliminary designs of the Transfer Stations and Regional Landfill for cost estimation purposes. Detailed engineering designs will be required for each site prior to their construction.

The proposed designs build on the original *Regional Landfill Strategy Feasibility Study* (ASK, 2019) but account for the greater waste quantities estimated to be received (refer to **Section 3**).

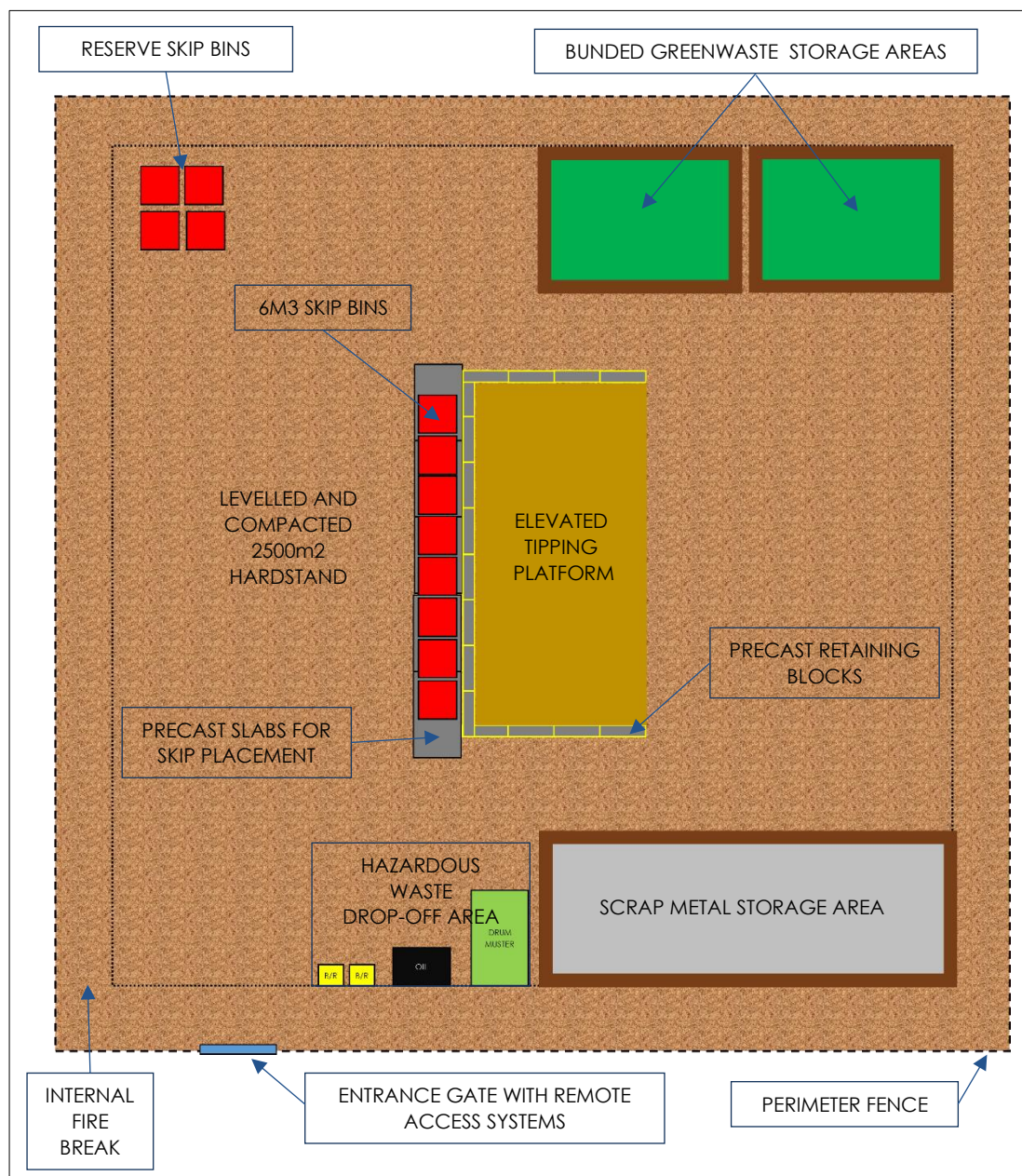
5.1 TRANSFER STATIONS

An indicative Transfer Station design (**Figure 5.1**) was developed that is comprised of the following elements:

- 2500m² (50m x 50m) site area constructed from levelled and compacted soil
- Perimeter fencing
- Internal fire break
- Electronic gate with swipe card access and CCTV
- Hazardous waste drop off area (batteries, waste oil and DrumMuster)
- Scrap metal storage area
- Bunded greenwaste storage areas
- Pre-cast concrete apron for placement of 6m³ skip bins
- 800mm elevated tipping platform constructed of precast retaining blocks and compacted earthen ramp.

The indicative design should not be used for construction purposes as its intent was solely to estimate capital expenditure of different design elements.

Figure 5.1 – Indicative Transfer Station design



5.1.1 Earthworks

The initial earthworks will require a 2500m² area (50m x 50m) to be levelled. An allocation in the capital expenditure estimates has also been made for stormwater controls and the creation of bundled areas for the storage of greenwaste and scrap metal.

5.1.2 Perimeter Fencing

The perimeter fencing will need to be secured to deny access to both non-residents and any local fauna. It is proposed that the side with the entrance gate will be ringlock fencing with the remaining sides constructed of stock fencing to minimise cost. Depending on prevalent wind directions it may be prudent for Shires to consider additional ringlock fencing to minimise wind-blown litter.

5.1.3 Remote Access and Security System

A remote access system is an automated, unmanned system that allows access to a site via an electronic key (e.g. swipe card, RFID or 'fob' tag, or electronic keypad). A CCTV camera provides extra security and monitoring of people entering and exiting. **Figure 5.2** shows an example of a remote access system used at a landfill in NSW. This system has a remote power source (solar panel) which powers the automatic gate, CCTV camera and remote access technology as mains power is unavailable at the sites.

No changes to the remote access and security system have been made from the original *Regional Landfill Strategy Feasibility Study* (ASK, 2019).

Figure 5.2 - Remote Access and Security System



5.1.4 Skip Bins

The Transfer Stations have been designed around the use of 6m³ front lift skip bins such as that shown in **Figure 5.3**. These skip bins are preferred as they are already used throughout the region and can be collected with a front lift compaction truck to maximise transport efficiencies.

Figure 5.3 – 6m³ front lift skip bins



In capital expenditure estimates (**Section 7.1.1**), ASK has accounted for each site to have 50% more bins than the estimated weekly required bins (see **Table 3.5**) to provide contingency in the event that more waste is received than estimated. To minimise capital expenditure, the concrete aprons (**Section 5.1.5**) and the elevated tipping platforms (**Section 5.1.6**) have only been sized to service the weekly required skip bins. As such, if additional bins are required the Shire/s will need to use a loader equipped with tines to move full bins away from the concrete apron and replace them with reserve bins.

5.1.5 Concrete Apron for Skip Bins

Following feedback from Avon Waste and observing winter weather conditions at the sites, ASK has included a concrete apron for the placement of skip bins in the updated design so that the area remains serviceable in winter.

Precast concrete slabs have been identified as a cost-effective solution compared to pouring of a concrete slab onsite. Precast concrete wall panels (2500mm x 4000mm x 150mm) (as shown in **Figure 5.4**) will be placed on suitably prepared subgrade. The number of panels required at each site has been calculated to ensure that there is sufficient space for the placement of the skip bins estimated to be required on a weekly basis.

Assuming the subgrade is suitably prepared upon delivery of the panels, they should be able to be placed directly into position with a HIAB to eliminate double handling and additional installation costs.

Figure 5.4 - Custom Panel (2500mm x 4000mm x 150mm)



5.1.6 Elevated Tipping Platform

As the skip bins are about 1,800mm high, ASK proposes that an elevated tipping platform approximately 800mm high be constructed along the back of the concrete apron to enable site users to tip into the skip bins from a comfortable and safe height. Whilst other transfer stations in the wheatbelt region often have user tipping platforms that are close to the height of the skip bins, ASK considers this an unacceptable health and safety risk to site users due to the fall hazards that these designs present.

Pre-cast engineered L-blocks (shown in **Figure 5.5**) will be used to form three sides of the tipping platform/ramp which will be backfilled with locally available soil and compacted.

There will be removable safety bollards placed every 1.5 metres along the edges of the tipping platform to reduce the risk of vehicles reversing into the skip bins or off the edges of the tipping platform.

Figure 5.5 - L-block and Safety Bollard



5.1.7 Greenwaste Storage Area

To reduce the amount of waste that will require further transport to the Regional Landfill it is proposed that banded greenwaste storage areas be constructed at each site. It is recommended that two greenwaste storage areas be constructed so that one stockpile can dry out until it is ready to undertake a safe controlled burn, whilst new material continues to be received in the second.

Note - Earthen bunds are usually required by DWER to contain any potentially contaminated stormwater and water from fire suppression.

5.1.8 Scrap Metal Storage Area

It is also recommended that there be a designated Scrap Metal disposal area of sufficient size to allow for stockpiling until a scrap metal recycler can justify collection. Again, this will reduce a bulky item from taking up space in the transfer bins and adding overall transport costs to get it to the Regional Landfill.

Recommended that this area be surrounded with earthen bunds to contain any potentially contaminated stormwater.

5.1.9 Hazardous Waste Storage Area

It is recommended that Shires consider providing facilities for the drop-off of hazardous wastes at the sites to minimise the quantities of hazardous waste being disposed of to landfill. This may include vehicle batteries, waste oil, gas bottles, and agricultural chemical drums (DrumMuster). ASK has not included the cost of hazardous waste storage facilities in capital expenditure estimates as some Shires already have these facilities at their waste sites.

5.2 REGIONAL LANDFILL

The proposed Wyalkatchem Regional Landfill is recommended to have a Transfer Station as detailed above, located at the front of the site for use by residents. The advantage of this is that it

will prevent people from having uncontrolled access to the tipping face whilst negating the need to staff the landfill facility full time to ensure appropriate supervision and safety.

Waste trucks and authorised commercial waste vehicles are proposed to be provided access to the landfill and active tipping face through a second remote access gate with a swipe card. This approach is anticipated to deliver similar outcomes to what is being achieved at the Bending Regional Waste Management Facility where the site is lightly staffed but control is retained by only granting access to authorised commercial vehicles.

5.2.1 CAT 953K Tracked Loader

The largest capital expense for the Regional Landfill is recommended to be a CAT 953K tracked loader, shown in **Figure 5.6** below. Such a machine will dramatically improve waste compaction rates, minimise cover utilisation, and extend the lifespan of the Regional Landfill. Use of such tracked machinery will also reduce breakdowns associated with punctures to wheeled loaders and reduce the time taken to compact and cover waste.

It is anticipated that this machine will only require operation for a few hours each day that waste from kerbside collections or transfer stations are received at the site.

Figure 5.6 - Cat 953K Tracked Loader



5.2.2 Automated Access and Security System for Landfill

The same type of remote access system being used for the transfer stations (**Section 5.1.3**), will be utilised to ensure only authorised vehicles can access the landfill with a swipe card. The system will capture images of vehicles accessing the landfill and record swipe card access data to assist with invoicing.

5.2.3 20ft Sea Container for Storage

It is recommended that a sea container be purchased for providing weatherproof and secure storage of plant and equipment required for operation of the landfill.

6 LICENCING REQUIREMENTS

6.1 REGIONAL LANDFILL

As contained in Schedule 4, Part 1 of the Environmental Protection Regulations 1987 (EPA 1987), any landfill that receives over 5,000 tonnes per annum of putrescible waste will need to be licenced as a Category 64 facility.

ASK estimates that the Regional Landfill is likely to receive between 3,500 and 5,000 tonnes of waste per annum. As this is close to the 5,000-tonne limit, it is recommended that a works approval application be made to licence the Wyalkatchem as a Category 64 putrescible landfill.

The works approval fee will be \$6,496 under the DWER fee structure, and the ongoing licencing fee will be \$6,496 for each year it is operating as a Category 64 facility. These costs have been included in the financial modelling detailed in **Section 7**.

6.2 TRANSFER STATIONS

As contained in Schedule 4, Part 1 of the Environmental Protection Regulations 1987 (EPA 1987), any solid waste depot (transfer station) that receives more than 500 tonnes of waste per annum is required to be licenced as Category 62 prescribed premises. The waste quantity modelling undertaken by ASK (**Table 3.4**) indicates that a transfer station at Dowerin will likely exceed 500 tonnes per annum, whilst Mukinbudin will be very close to the limit.

A works approval application fee for a Category 62 facility is \$324.80 with an ongoing annual premises fee of the same amount. Although Transfer Stations at the other locations will likely be well below the 500-tonne limit, ASK has included Works Approval application fees and ongoing licence fees for all sites in the financial modelling detailed in **Section 7**.

7 FINANCIAL MODELLING

ASK has updated the original financial modelling to account for the following changes:

- Inflation and increases to construction costs.
- Participation of Dowerin.
- Licencing and regulatory costs.
- Utilisation of one transfer station for the Shire of Trayning instead of two.
- Enlarged transfer station design to accommodate increased waste quantities and additional skip bins.
- Increases to transportation costs associated with additional skip bins.
- Transfer stations to have concrete aprons for skip bin placement.
- Regional Landfill to also have Transfer Station for residential use.
- Regional Landfill to be equipped with tracked loader for waste compaction and cover application.

The updated financial modelling is summarised in **Table 7.1** below with detailed breakdowns in the following subsections.

Table 7.1 – Summary of capital and operational expenditure

Facility	Facility Costs				Transport
	Capital	Annualised Capex	Operational	Annualised Capex & Opex	Operational Expenditure
Koorda Transfer Station	104,856	8,158	11,733	19,891	92,664
Bencubbin Transfer Station	99,916	7,528	11,733	19,261	
Beacon Transfer Station	92,216	6,760	11,733	18,493	
Mukinbudin Transfer Station	113,276	8,962	11,733	20,695	
Nungarin Transfer Station	92,216	6,760	11,733	18,493	
Trayning Transfer Station	105,396	8,185	11,733	19,918	
Dowerin Transfer Station	125,521	10,340	11,733	22,073	
Wyalkatchem Transfer Station	113,276	8,962	11,733	20,695	
Wyalkatchem Regional Landfill	413,996	20,383	48,875	69,258	-
NEWROC TOTAL	1,260,671	86,038	142,738	228,776	92,664
TOTAL ANNUAL COST					321,440

7.1 CAPITAL EXPENDITURE

Total capital expenditure for the project is estimated to be \$1,260,700 with annualised capital costs of \$86,040 per annum.

7.1.1 Transfer Stations

Detailed breakdowns of the capital costs associated with development of the Transfer Stations are detailed below. **Table 7.2** includes capital expenditure items that will be incurred at all Transfer Stations, whilst **Table 7.3** through to **Table 7.10** detail site specific capital costs.

Table 7.2 – Common capital expenditure for Transfer Stations

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Design & Approvals						
Facility design	20,000	ea	0.2	4,000	30	133
DWER approvals (licencing)	3,000	ea	1	3,000	20	150
Infrastructure & Equipment purchase						
Groundworks (level site)	3.30	m2	2500	8,250	20	413
Stormwater control allocation	5,000	m	1	5,000	20	250
Construction of bunds for greenwaste storage areas	10	m	150	1,500	20	75
Chainlink fencing (at entrance of drop off area)	74	m	50	3,675	20	184
1.8m stock fencing (remaining perimeter of drop off area)	10	m	150	1,500	20	75
Signage	3,000	ea	1	3,000	5	600
Automated access gates	24,200	m	1	24,200	15	1,613
Regional price index	25%	%	1	11,781	N/A	802
Total				65,906		4,295

Table 7.3 - Capital expenditure for Koorda Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	3	7,200	20	360
Surface preparation for precast concrete	80	m2	26	2,100	20	105
Precast retaining wall for access and tipping ramp	575	ea	11	6,325	20	316
Safety bollards	150	ea	18	2,700	20	135
Transfer containers (6m with lid)	2,750	ea	8	20,625	7	2,946
Total				38,950		3,863

Table 7.4 - Capital expenditure for Bencubbin Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	3	7,200	20	360
Surface preparation for precast concrete	80	m2	21	1,680	20	84
Precast retaining wall for access and tipping ramp	575	ea	10	5,750	20	288
Safety bollards	150	ea	16	2,880	20	144
Transfer containers (6m with lid)	2,750	ea	6	16,500	7	2,357
Total				34,010		3,233

Table 7.5 - Capital expenditure for Beacon Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	2	4,800	20	240
Surface preparation for precast concrete	80	m2	16	1,260	20	63
Precast retaining wall for access and tipping ramp	575	ea	9	5,175	20	259
Safety bollards	150	ea	15	2,700	20	135
Transfer containers (6m with lid)	2,750	ea	5	12,375	7	1,768
Total				26,310		2,465

Table 7.6 - Capital expenditure for Mukinbudin Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	4	9,600	20	480
Surface preparation for precast concrete	80	m2	32	2,520	20	126
Precast retaining wall for access and tipping ramp	575	ea	12	6,900	20	345
Safety bollards	150	ea	20	3,600	20	180
Transfer containers (6m with lid)	2,750	ea	9	24,750	7	3,536
Total				47,370		4,667

Table 7.7 - Capital expenditure for Nungarin Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	2	4,800	20	240
Surface preparation for precast concrete	80	m2	16	1,260	20	63
Precast retaining wall for access and tipping ramp	575	ea	9	5,175	20	259
Safety bollards	150	ea	15	2,700	20	135
Transfer containers (6m with lid)	2,750	ea	5	12,375	7	1,768
Total				26,310		2,465

Table 7.8 - Capital expenditure for Trayning Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	3	7,200	20	360
Surface preparation for precast concrete	80	m2	26	2,100	20	105
Precast retaining wall for access and tipping ramp	575	ea	11	6,325	20	316
Safety bollards	150	ea	18	3,240	20	162
Transfer containers (6m with lid)	2,750	ea	8	20,625	7	2,946
Total				39,490		3,890

Table 7.9 - Capital expenditure for Dowerin Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	5	12,000	20	600
Surface preparation for precast concrete	80	m2	42	3,360	20	168
Precast retaining wall for access and tipping ramp	575	ea	13	7,475	20	374
Safety bollards	150	ea	21	3,780	20	189
Transfer containers (6m with lid)	2,750	ea	12	33,000	7	4,714
Total				59,615		6,045

Table 7.10 - Capital expenditure for Wyalkatchem Transfer Station

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Precast concrete pad for placement of waste bins	2,400	ea	4	9,600	20	480
Surface preparation for precast concrete	80	m2	32	2,520	20	126
Precast retaining wall for access and tipping ramp	575	ea	12	6,900	20	345
Safety bollards	150	ea	20	3,600	20	180
Transfer containers (6m with lid)	2,750	ea	9	24,750	7	3,536
Total				47,370		4,667

7.1.2 Regional Landfill

Capital expenditure associated with development of the Regional Landfill at Wyalkatchem is detailed in **Table 7.11** below. Please note that this is in addition to the capital expenditure associated with establishment of the Wyalkatchem Transfer Station shown above in **Table 7.10**.

Table 7.11 - Capital expenditure for Wyalkatchem Regional Landfill

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)	Life (years)	Annualised cost (\$)
Design & Approvals						
Facility planning (Operational Management Plan, Cell Layout Plans etc)	30,000	ea	1	30,000	30	1,000
DWER Works Approval Application	6,496	ea	1	6,496	30	217
Infrastructure & Equipment purchase						
CAT 953K Tracked Loader	360,000	ea	1	360,000	20	18,000
Automated access gate for landfill access	12,500	ea	1	12,500	15	833
20ft Sea Container (for storage)	5,000	ea	1	5,000	15	333
Total				413,996		20,383

7.2 OPERATIONAL EXPENDITURE

Operational expenditure is to be incurred in three main areas: transportation of skip bin waste to the Regional Landfill, operation of the Transfer Stations, and operation of the Regional Landfill.

7.2.1 Transport

The operational costs associated with transporting the Transfer Station skip bins to the Regional Landfill are detailed in **Table 7.12** below.

Table 7.12 - Operational expenditure for transportation of skip bins

Description	Unit cost (\$)	Unit	No. of units (weekly)	Total annual cost (\$)
Mobilisation	2.20	km	220	25,168
Northern Run	2.20	km	280	32,032
Southern Run	2.20	km	235	26,884
Total				84,084

7.2.2 Transfer Stations

Once the Transfer Stations are established, there will be an annual expenditure for the operation and maintenance of the remote access systems associated with each location. These are detailed in **Table 7.13** below.

Table 7.13 - Operational expenditure of remote access system at transfer stations

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)
Data management and gate maintenance	5,908	ea	1	5,908
Shire site monitoring and maintenance (estimate)	5,500	ea	1	5,500
Category 62 licencing fees (if applicable)	325	ea	1	325
Total				40,430

7.2.3 Regional Landfill

The ongoing costs associated with the Regional Landfill for operations and maintenance are detailed in **Table 7.14**.

Table 7.14 - Operational expenditure for Regional Landfill

Description	Updated Unit cost (\$)	Unit	No. of units	Total cost (\$)
Annual DWER Licence Fee	6,496	ea	1	6,496
Site staff (plant operator)	72,800	FTE	.125	9,100
Electronic waste records system	7,000	ea	1	7,000
Plant fuel and maintenance	15,000	ea	1	15,000
Administration (30%)				11,279
Total				48,875

7.3 REVENUE

Revenue received from waste disposal fees and charges at Transfer Stations and the Regional Landfill has not been modelled as a component of this project as this will ultimately depend on Shire specific policies and approaches to cost recovery from residential and commercial site users.

ASK recommends the NEWROC members consider the following issues regarding cost recovery:

- Introduction of disposal charges, or pass systems, should ideally be done once data from the remote access systems has been collected for a period of at least 6 months, and analysed to determine site usage and access trends.
- Fees and charges for waste disposal should be structured in a way that seeks to minimise residential subsidisation of commercial waste disposal.
- Fees and charges for waste disposal should be structured in a way that promotes resource recovery.
- Transfer Stations have not been designed to receive large quantities of commercial waste, or construction and demolition waste. Policies should be implemented and enforced to limit commercial waste received to small local businesses and require larger waste generators to transfer waste directly to the Regional Landfill.
- Members should consider introducing charges for commercial waste generators using Transfer Stations.

8 RECOMMENDATIONS

ASK has made the following recommendations to guide NEWROC in its next steps towards implementation of the Regional Landfill Strategy.

8.1 DETAILED PROJECT PLANNING

8.1.1 *Project Business Case*

Produce a detailed business case, with costing and an implementation schedule. This will provide the information for the Shires and any funding applications. The project plan should be developed with consideration of the criteria and information required for any funding stream.

8.1.2 *Site Specific Plans*

A substantial amount of additional site-specific planning is required to further this project. ASK recommends the following be undertaken in sequential order:

- Topographic surveys of all existing waste facilities (to enable detailed site designs and Landfill Closure Management Plans).
- Production of Landfill Closure Management Plans (LCMPs) for each existing landfill that details how they will be closed and rehabilitated, and what this is likely to cost. These plans will be useful for:
 - Quantifying closure costs that have not been previously accounted for.
 - Determining suitable onsite locations for the establishment of Transfer Stations.
 - Accurately quantifying the potential capacity of the Regional Landfill.
 - Developing a staged filling and progressive rehabilitation plan of the Regional Landfill.
- Site specific engineering designs for Transfer Stations and Regional Landfill.
- Operational Management Plan for the Transfer Stations and Regional Landfill to ensure they are operated safely, efficiently, and in accordance with relevant environmental regulations (will likely be necessary for environmental approvals process).
- A whole of life cost analysis for the Regional Landfill that can be used to determine transparent fees and charges.

8.1.3 *Communication Strategy*

Development and implementation of communication and community engagement strategy will be critical for explaining the reasons, benefits and changes to services resulting from the project.

8.2 CHOOSE A PREFERRED GOVERNANCE MODEL

The key action towards implementation of a Regional Landfill solution is for NEWROC to determine a suitable governance model for the project. The preferred governance model should address issues regarding:

- Regional fairness and equitable outcomes for NEWROC members
- Financial accountability and transparency
- Employment arrangements

- Project funding arrangements
- Asset ownership
- Dispute resolution mechanisms

8.3 EMPLOY A REGIONAL WASTE MANAGEMENT COORDINATOR

ASK recommends that NEWROC consider employing a Regional Waste Management Coordinator to be responsible for the significant task of planning, implementation, and ongoing operational and administrative management of the project, such a role could include:

- Project planning
- Grant funding applications
- Communication with key stakeholders
- Regional procurement
- Contract management
- Data collection and analysis
- Facility oversight and maintenance.

Although employment of a Regional Waste Management Coordinator will increase direct project costs, in ASK's experience it is likely to significantly increase the chances of the project being implemented on a regional basis. It is also likely to deliver indirect savings through reductions in demands on NEWROC member council staff.

The position may not need be fulltime role and could potentially be undertaken remotely if there is difficulty employing a suitable candidate locally. There may also be opportunities to share the role with neighbouring ROCs to minimise costs.

8.4 CONTRACT MANAGEMENT AND REGIONAL PROCUREMENT

8.4.1 *Kerbside Waste Collection Contracts*

Implementation of this project will have implications on existing and future kerbside waste collection contracts as utilisation of a Regional Landfill will result in increased travel distances for the collection vehicle (refer to **Section 4**). ASK therefore recommends that all NEWROC members seek to align their waste collection contracts with the objective of participating in a regional procurement process for kerbside waste services that has flat rate contract pricing for waste collection (\$ per lift) across the NEWROC group.

If it is not possible for a regional kerbside collection contract to be implemented prior to this project, individual member councils will be required to request contract variations to utilise the Regional Landfill, likely resulting in higher per unit costs and unequal pricing across the group.

8.4.2 *Regional Procurement for Project Implementation*

Whilst it may be possible for individual member councils to procure goods and services required for this project individually, it is expected that there would be significant savings realised by pursuing a regional approach to procurement. As regional procurement will increase economies of scale and minimise mobilisation costs, ASK recommends that it be considered for the following goods and services:

- Site surveys

- Consultancy services for detailed engineering designs
- Consultancy services for operational planning and environmental approvals
- Purchase and delivery of skip bins
- Purchase and installation of remote access technologies
- Purchase and installation of concrete aprons and retaining blocks
- Production and delivery of signage and communications material
- Skip bin collection service for transfer stations.

8.5 FUNDING OPPORTUNITIES

A review of grant funding indicates that there are two potentially suitable programs currently available, namely the WasteSorted grant being offered by the Waste Authority and the Federal Government's Building Better Regions Fund (BBRF).

8.5.1 *WasteSorted Grants*

WasteSorted Grants support projects which target the State Government's focus materials. Preference in the 2021–22 funding round will be given to projects which recover higher value and resources from, and promote the diversion and recovery of, the following focus materials:

- Organics: food and garden organics
- Construction and demolition waste
- Glass: packaging and containers
- Metals: steel, non-ferrous metals, packaging and containers
- Paper and cardboard: office paper, newspaper and magazines
- Plastics: packaging and containers
- Textiles: clothing and other fabric-based materials
- Hazardous waste (non-household)

The WasteSorted grant is separated into two streams, namely Recycling Infrastructure and Community Education. The construction of the transfer stations may be suitable for funding under the Recycling Infrastructure stream. A maximum of \$250,000 is being awarded to each project that fulfils the program objectives.

8.5.2 *Building Better Regions Fund (BBRF)*

The BBRF invests in projects located in or benefiting eligible areas outside the major capital cities of Sydney, Melbourne, Brisbane, Perth, Adelaide, and Canberra.

Grant funding is available through two funding streams:

- The Infrastructure Projects Stream: Supports projects that involve construction of new infrastructure, or the upgrade or extension of existing infrastructure
- The Community Investments Stream: Funds community development activities including, but not limited to, new or expanded local events, strategic regional plans, leadership and capability building activities

The BBRF has been given another round of funding, with the Deputy Prime Minister announcing in May that there will be a further \$250 million dollar investment for the sixth round of the program. The applications are likely to open sometime during the 2021-22 financial year, but the NEWROC Shires should regularly check to see when the sixth round is open for applications at <https://www.regional.gov.au/regional/programs/>.

8.5.3 *Other options*

ASK recommends that NEWROC and its members lobby State and Federal politicians to assist with funding capital expenditure associated with the project, as it aligns with the State's strategic objectives of landfill consolidation and ensuring the state has adequate waste management infrastructure. ASK recently completed an audit of WA's waste infrastructure for the Department of Water and Environmental Regulation in support of the Waste Strategy 2030. Whilst existing grant programs appear limited, ASK anticipates that the findings of the waste infrastructure audit, and the yet to be completed Waste Infrastructure Strategy are likely to result in more suitable grant programs being made available in coming years.

Conversely, if suitable grant funding programs do not become available in the short to mid-term, ASK recommends that NEWROC consider fully funding the capital component of the project with Council reserves or loans. This is recommended as the cost of not implementing a regional solution will likely result in an even greater financial burden for NEWROC members through continued growth of liabilities associated with closure and rehabilitation of existing landfills, and the need to develop new landfills once the existing ones reach capacity.

REFERENCES

ASK Waste Management (2019). **Regional Landfill Strategy Feasibility Study**. Produced for NEWROC.

ASK Waste Management (2010-2018). **Recycling Activity Review**. Produced for Waste Authority WA.

Environmental Protection Authority (1987). **Environmental Protection Regulations 1987**. Available at https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_1400_homepage.html

