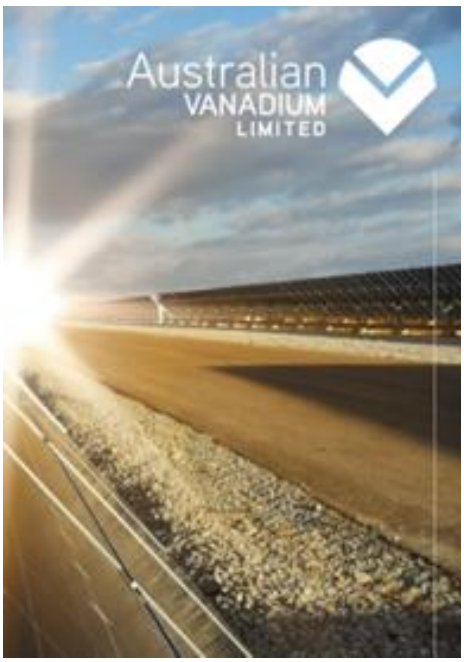
appendix c

Traffic Impact Statement

AUSTRALIAN VANADIUM PROJECT
TRANSPORT IMPACT STATEMENT

Construction of Tenindewa Processing Plant
Production of Vanadium

Issued for Information



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1. Introduction

The Australian Vanadium Project is located in the Murchison Province at the Gabanintha minesite which is approximately 45 kilometres (km) south-east of the town of Meekatharra. The project includes an open cut mine and two locations for processing magnetite iron ore with a concentrator at the minesite and a downstream processing plant at Tenindewa, which is approximately 27 km west of Mullewa and approximately 80 km east of the Port of Geraldton.

The iron ore concentrate is processed at Tenindewa to extract the Vanadium product (flake). The calcined iron ore (washed co-product) is then transported to Geraldton Port for export. The extracted Vanadium flake is transported to Fremantle Port for export. Figure 1 shows the location of the mine site and concentrator and the processing plant. Figure 2 shows where the processing plant is in relation to the Town of Mullewa.

This Traffic Impact Statement provides information on vehicle movements associated with the construction of the Tenindewa processing plant and when the plant and mine are in operation.

Figure 1: Mine - Processing Plant - Port Proximity

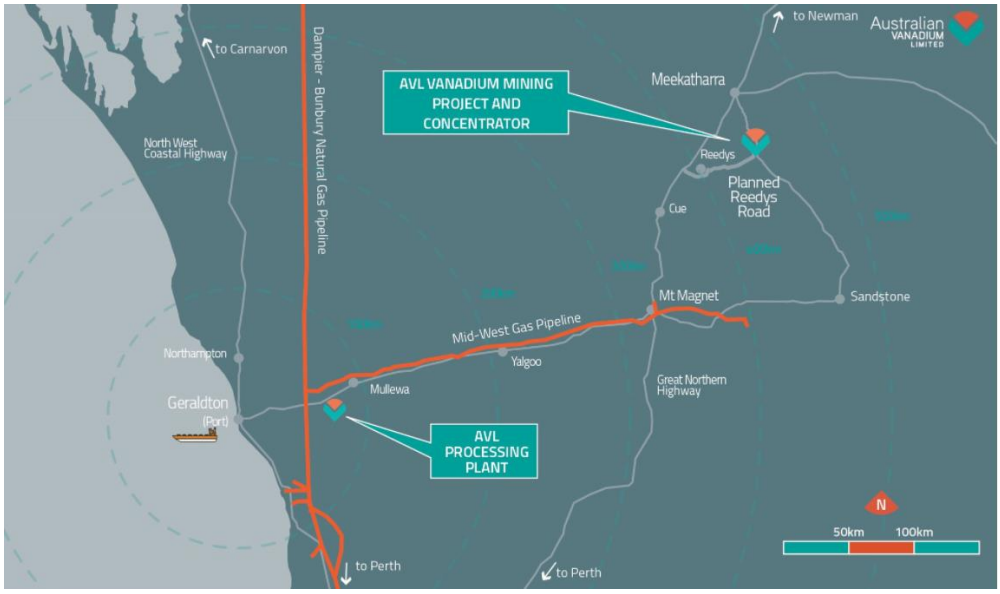
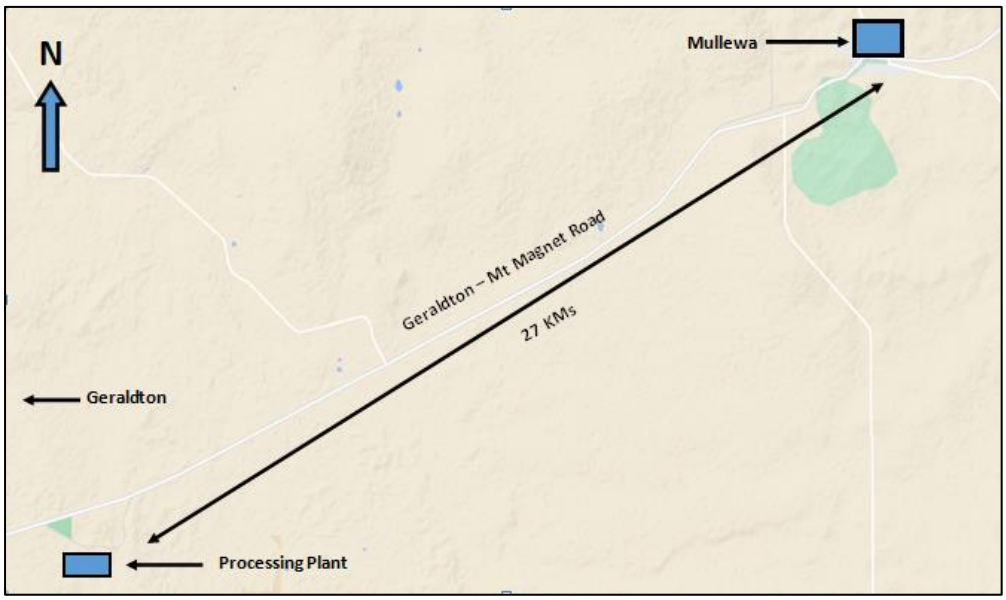


Figure 2: Site location of Tendewa Processing Plant to Mullewa



2. Road Network and RAV compliance for Haulage Task

The road network used for the transport task associated with the Tenindewa processing plant and Gabanintha minesite is:

- The Geraldton - Mt Magnet Road between Tenindewa and Geraldton during construction.
- The Brand Highway during construction.
- The Great Northern Highway and Geraldton - Mt Magnet Road for concentrate product transported between the Gabanintha minesite and Tenindewa and then to Geraldton Port for washed co-product transportation during operations.
- The Geraldton - Mt Magnet Road and then Brand Highway for the transport of the refined Vanadium flake between Tenindewa and Fremantle Port during operations.

The prescribed routes for all transport tasks relative to Heavy Vehicle (HV) type are compliant with the Restricted Access Vehicles (RAV) network requirements.

These are:

- RAV 10 or approved concession for either 53.5 metre (m) triples or 60 m PBS Tri Drive Quad Axle Ultra Quad Road Trains from Gabanintha mine to Tenindewa processing plant to Geraldton Port and return via Geraldton-Mt Magnet Road and Great Northern Highway.
- RAV 7 route for bulk and bulker bags - Tenindewa to Fremantle Port and return via the Brand Highway and the Geraldton - Mt Magnet Road.
- RAV 7 route for services and supply of spares and processing reagents and chemicals on the Geraldton-Mt Magnet Road.
- The network can also manage the Over Size Over Mass (OSOM) movements intended for the construction of the Tenindewa processing plant.

Note: Greater detail of the haulage task for production when the mine and processing plant are operational can be found in section 3.2 on page eight.

3. Transport Task

There are two components to the transport task.

1. Construction phase of the Tenindewa processing plant.
2. Production phase when the Gabanintha minesite, concentrator and Tenindewa are operational.

3.1 Construction Phase

The construction phase of the Tenindewa processing plant has two parts.

The first part is the development of the construction camp. It is intended that the camp will be located at the processing plant site however, there is a possibility that the construction camp could be sited at Mullewa. The second part is the construction of the Tenindewa processing plant. At the completion, there is will be a decommissioning and demobilisation of the construction camp including any required rehabilitation.

Some of the development of the construction and demobilising of the construction camp overlaps the construction of the processing plant. The construction and commissioning of the processing plant is expected to take approximately 26 months with the following milestones:

- Construction of the processing plant including early enabling works - e.g. camp construction to practical completion (22 months).
- Commissioning to handover to operations (4 months).
- A maximum 600 person size construction camp to be established as part of early works to minimise Drive In – Drive Out worker's traffic. As previously stated, the camp will most likely be situated at the Tenindewa site so there will no main roads required for traffic from camp to site.
- Prior to establishment of the onsite construction camp, some early works construction workers will be accommodated at fly camps near Mullewa and transported to the Tenindewa site via shuttle bus service.

- The construction worker roster is based on 3 weeks on - 1 week off roster but with allowance for a minimum one bus run every week for offsetting crew rotation. The estimated bus capacity is 63 passengers.
- Typical class of trucks used for materials transported onto the processing plant construction site will be B-triples, which have an average payload of 53 tonnes (t).

The transport task for the development of the construction camp and the Tenindewa processing plant construction is reflected in Figure 4 on page five. The profile provides an oversight into the general transport movements during the construction period with a combination of HVs, Light Vehicles (LV) and OSOM movements.[1] The graph shows the aggregate movements escalate in the first year with peak movements in Month 13 at 551. It then declines over the next year to Month 26.

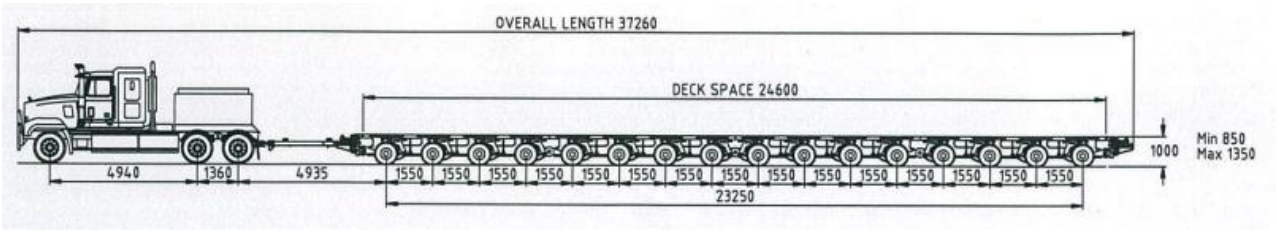
Phases of Construction and Associated Movements

There are 16 phases of the construction of the processing plant. The movements of some truck types are not known at this stage such as fuel deliveries and waste collection. However, it is assumed fuel will be delivered by at least a B-triples and waste collection by rigid trucks. Table 3: Phases of Construction Table 2 on page six provides the sum of these phases in terms of movements through the months of construction. Table 3 on page seven provides vehicle type and task during phases of construction.

OSOM

There will be a total of 18 OSOM loads (constituting 36 OSOM movements) to the Tenindewa construction site from Month 8 to Month 17. [2] Table 1 on page five provides a breakdown on OSOM movements by month. The loads will be undertaken by the trailers shown below in Figure 3.[3] It is yet to be finalised the total quantity of the OSOM loads travelling from Geraldton Port and/or from Perth. However, it is most likely that all will be entering the Tenindewa construction site from the west and exiting to the west.

Figure 3: OSOM Truck Configurations to be used



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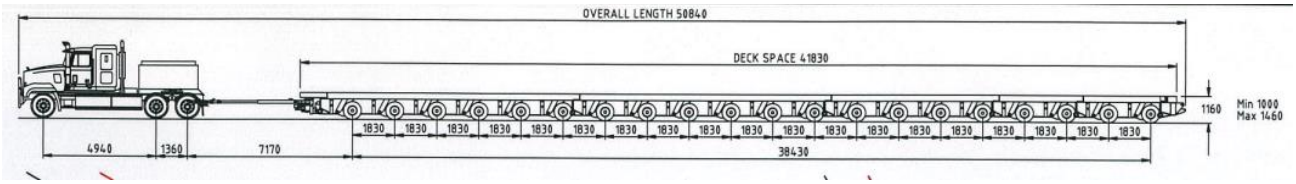

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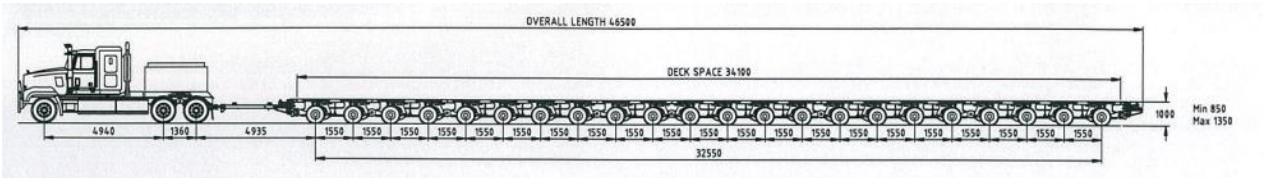

Drake 20

[1] A 'Movement' constitutes a one way trip. All calculations are based on Movements.

[2] Half of these OSOM movements will be empty platforms either exiting after delivering an OSOM load or arriving to collect a load from the site.

[3] Nicolas 16 row 'Side by Side Four File' at 1.55m axle spacing and 6.22 m spread, and overall length of 37.26 m
Nicolas 22 row 'Two File' at 1.55 m axle spacing and 2.99 m spread, and overall length of 46.50 m
Drake 20 row 'Two File' at 1.80 m axle spacing and 3.70 m spread, and overall length of 50.84 m

Figure 4: Tenindewa Construction Traffic Profile – Total Movements by Month

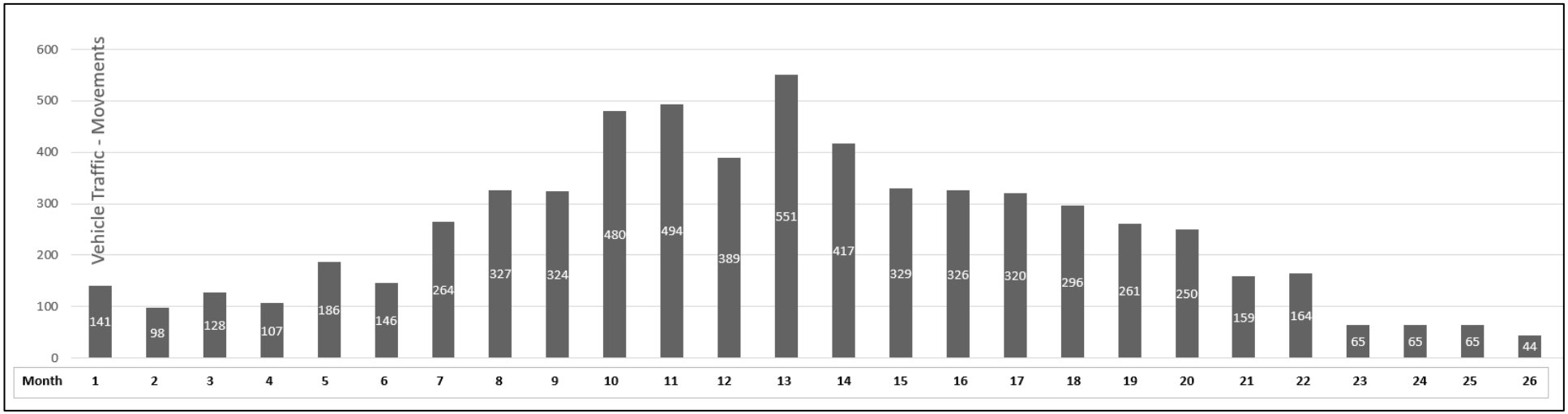

Table 1: Breakdown of OSOM loads to Tenindewa by month

Description	Approx. Dimensions and Weight per load	Month							
		8	9	10	12	13	14	16	17
300 t Crawler Crane	12 m long x 3 m wide - 60 t	2	2				2		
700 t Crawler Crane	30 m long x 3.5 m wide - 60 t					2			
Iron Sinks Transfer Feeder	12 m long x 3 m wide - 60 t	2							
Iron Sinks Feeder 2	20 m long x 3 m wide - 60 t	2							
Iron Sinks Feeder 1	20 m long x 3 m wide - 60 t	2							
Temp Stockpile Reclaim Feeder	20 m long x 3 m wide - 60 t	2							
Travelling Grate	20 m long x 3 m wide - 60 t							2	2
Rotary Kiln	35 m long x 6.5 m wide - 120 t							2	2
Quench Mill	5 m long x 4 m diameter - > 60 t					2			
Leach Drum	12 m long x 5.5 m diameter > 60 t					2			
Calcine Filter	30 m long x 3 m wide - 60 t			2					
AMV Filter Vendor Package	12 m long x 3 m wide - 60 t			2					
Refinery Weighbridge 2	30 m long x 3.5 m wide - 60 t				2				
Refinery Weighbridge 1	30 m long x 3.5 m wide - 60 t				2				
	Total	10	2	4	4	6	2	4	4

Table 2: Key Phases of construction at Tenindewa – Movements per month

	PHASE *Month*	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**
1	General Services and Visitation	33	38	42	47	64	82	105	120	123	123	119	119	115	112	94	87	81	81	81	70	70	75	65	65	65	44
2	Early Works - Haul Roads and Intersections	56	16	16	16	56																					
3	Bulk Works - Contractor Construction	52	44	12	12	12	12	12	12	12	32	48	12	12													
4	Pyro Civil Contractor Construction			34	26	26	26	26	22	22	26	26	26														
5	Balance of EPCM Civil Contractor Construction					16	14	14	14	14	14	14	16	16	16												
6	Camp and NPI - Construction Camp Procurement			24	6	12		20			100	100															
7	Camp Contractor Construction								62	64	34	30	30	50													
8	Concrete Foundation Construction							75	75	75	75	75	75	75													
9	Main Equipment Delivery						12	12	12	12	12	12	12	12	12												
10	Steel Construction												25	25	25	25	25	25	25								
11	Piping Construction													19	19	19	19	19	19	19	19						
12	EI&C Construction													79	79	79	79	79	79	79	79	79	79				
13	NPI Buildings Construction													62	62	62	62	62	62	62	62						
14	Power Station Construction											10	10	20	30	30	30	30	30	20	20	10	10				
15	Natural Gas Pipeline Construction										60	60	60	60	60	20	20	20									
16	OSOM Movements								10	2	4		4	6	2		4	4									
	Totals	141	98	128	107	186	146	264	327	324	480	494	389	551	417	329	326	320	296	261	250	159	164	65	65	65	44

Table 3: Phases of Construction at Tendewa – Vehicle Type and Task.

Phase		Vehicle Type	Task
1	General Services and Visitation	Buses	Based on 3wk on: 1wk off roster & 63 person bus
		LV	Private LV trips
		HV	Fuel Deliveries
		HV	Waste Collection
2	Early Works - Haul Roads and Intersections	LV	
		MR	Mob/ Pick-up equipment/ parts/ tools
		Prime M + Float	Mob and Demob of Mobile Equipment
		Prime M + Flat bed	Delivery of Buildings/ Offices/ Materials
		Prime M + side tippers	Delivery of Construction Materials
3	Bulk Works - Contractor Construction	LV	
		MR	Mob/ Pick-up equipment/ parts/ tools
		Prime M + Float	Mob and Demob of Mobile Equipment
		Prime M + Flat bed	Delivery of Buildings/ Offices/ Materials
		Prime M + side tippers	Delivery of Construction Materials
4	Pyro Civil Contractor Construction	LV	
		MR	Mob/ Pick-up equipment/ parts/ tools
		Prime M + Float	Mob and Demob of Mobile Equipment
		Prime M + Flat bed	Delivery of Buildings/ Offices/ Materials
		Prime M + side tippers	Delivery of Construction Materials
5	Balance of EPCM Civil Contractor Construction	LV	
		MR	Mob/ Pick-up equipment/ parts/ tools
		Prime M + Float	Mob and Demob of Mobile Equipment
		Prime M + Flat bed	Delivery of Buildings/ Offices/ Materials
		Prime M + side tippers	Delivery of Construction Materials
6	Camp and NPI - Construction Camp Procurement	Prime M + Flatbed Doubles	Building Deliveries - from Perth and return
7	Camp Contractor Construction	LV	
		MR	Mob/ Pick-up equipment/ parts/ tools
		Prime M + Float	Mob and Demob of Mobile Equipment
		Prime M + Flat bed	Delivery of Buildings/ Offices/ Materials
		Prime M + side tippers	Delivery of Construction Materials
8	Concrete Foundation Construction	B-Triples 53t average Prime M + Flat bed Low Loader Combinations 40 t side tipper Quad road train 190t GCM	Earthworks Concrete delivery Steelworks Piping EI&C Buildings Equipment
9	Main Equipment Delivery		
10	Steel Construction		
11	Piping Construction		
12	EI&C Construction		
13	NPI Buildings Construction		
14	Power Station Construction		
15	Natural Gas Pipeline Construction		
16	OSOM Movements	Nicholas 16 / 22 types Drake 20 type	OSOM Delivery of various plant and equipment

3.2 Production Phase

When in production the transport haulage task is divided into four parts: [4]

- Gabanintha Mine to Tenindewa processing plant (bulk product).
- Tenindewa to Geraldton Port (bulk product).
- Tenindewa to Fremantle Port (bulker bag product).
- Supply of reagents and chemicals for Tenindewa processing plant production.

Haulage Task 1

This haulage task will transport concentrate from the concentrator at the minesite approximately 456 km to the Tenindewa processing plant for further processing.

The first portion of this route from the mine constitutes 61 kms of unsealed road built to specifications to accommodate up to RAV 10 equivalent HVs. It then intersects with Great Northern Highway with HVs moving south through Cue and Mt Magnet before turning right onto the Geraldton - Mt Magnet Road to the Tenindewa processing plant.

This will constitute 20 movements to the Tenindewa processing plant per day. HVs will access the site by turning left into the designated haulage road.

Haulage Task 2

On delivering concentrate product from the mine to Tenindewa, the trucks will be reloaded with the washed co-product (iron calcine) for delivery to the Geraldton Port for export.

Both haulage tasks 1 and 2 will use either 60 m quad or 53.5 m triple road trains.

This will constitute 20 movements out of the Tenindewa site per day.

This equates to 20 movements west from mine to port (via Tenindewa) and then 20 movements travelling east empty from the port direct to the Gabanintha mine on the Geraldton - Mt Magnet Road, past Tenindewa.

These eastward movements do not directly impact on this Transport Impact Statement. However, these movements will ultimately be counted in future Annual Average Daily Traffic counts (AADT).[5]

Haulage Task 3

This haulage task entails the transport of 11,250 tonnes (t) of vanadium flake (per annum) from Tenindewa to Fremantle Inner Harbour (North Quay). These are in 1.3 t bulker bags and expected to be carried on an ‘A - Double’ size truck. This will generate 1.7 movements per day [6].

When returning from Fremantle along the Geraldton - Mt Magnet Road in an easterly direction, these HVs will turn right into Erangy Spring Road and access the processing plant via the designated main entrance road.

Figure 5 on page nine describes the two bulk haulage tasks from mine to processing plant to Geraldton Port and the third task of vanadium flake bulker bag transport from processing plant to Fremantle Port.

Note that the route for the bulker bags from Tenindewa to Fremantle Port is not finalised but it is assumed that they will travel west along the Geraldton - Mt Magnet Road to Geraldton before turning south along the Brand Highway to Fremantle and return on the same route.

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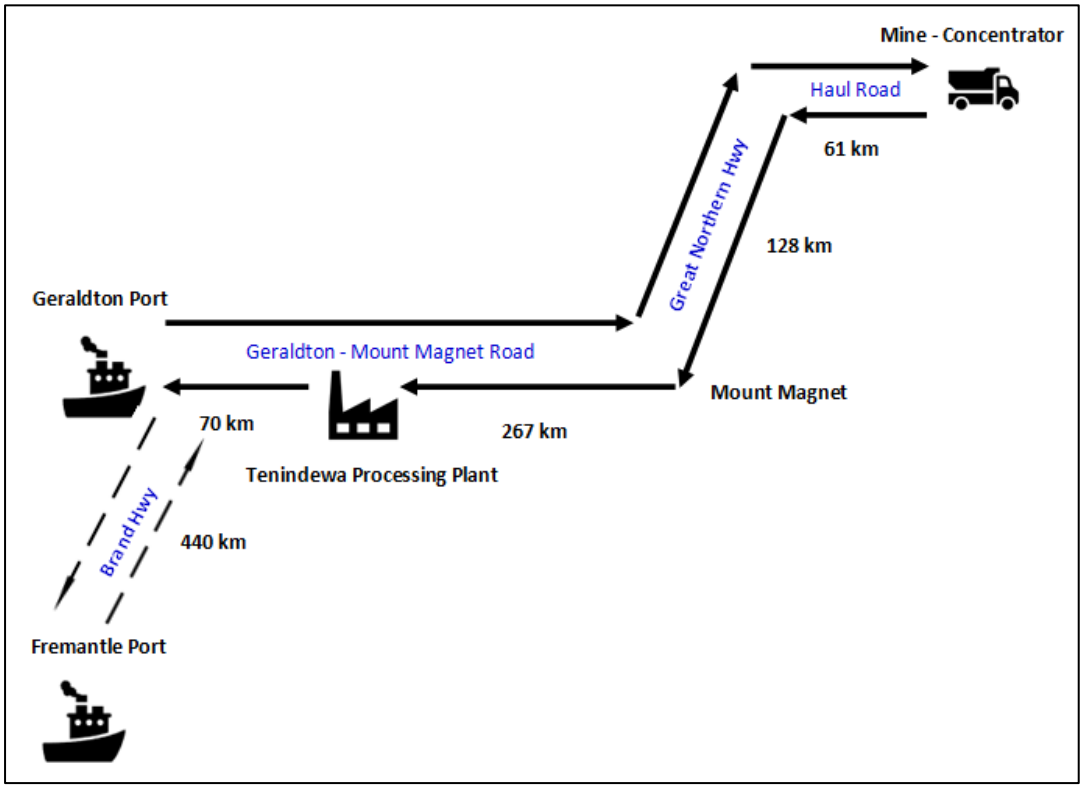
[4] HV movements prescribed constitutes mine and processing plant at full production. This occurs at month 27 after commencement of production.

[5] AVL movements will be counted in AADT traffic when production commences.

[6] This is an average over 365 days. Movements might be campaigned together due to production cycles and Fremantle port ship loading movements.

Figure 5: The Transport Supply Chain



Haulage Task 4

This task constitutes the supply of reagents and chemicals for production purposes at the Tenindewa processing plant.

Table 4 describes the range of reagents and chemicals delivered and frequency. Whilst frequency of delivery ranges from multiple trips per day to one per month, the daily average of trips is 6.2 per day which equates to 12.4 movements per day.

Table 4: Reagents and chemicals supply

Reagent/Chemical	Annual Tonnage	Storage	Transport Method	Delivery Frequency
Sodium Carbonate	37 700 t	650 t silo	Road Train : 68 t loads	2 per day
Sulphuric Acid (98%)	8 400 t	471 m³ tank	Bulk Tanker: 50 t loads	4 per week
Ammonium Sulphate	24 000 t	600 t shed	Road Train: 26 t loads	3 per day
Sodium Hydroxide (50%)	2 130 t	136 m³ tank	Bulk Tanker: 50 t loads	2 per week
Aluminium Sulphate (44%)	4 000 t	209 m³ tank	Bulk Tanker: 50 t loads	1 per week
Binder	1,650 t	8 t silo Reagent shed	800 kg bags in 20 ft Container: 16 t/delivery (Cargo Transport)	1 per week
Sodium Metabisulfite	77 t	1250 kg bag Reagent shed	Cargo Transport	1 per month
Flocculant*	1 t	15 kg bag (TBC) Reagent shed	Cargo Transport	< 1 per month

Most of these movements enter and exit via Erangy Spring Road intersection except for the Sodium Carbonate which will use the bulk transport intersection further to the east.

Summary of HV movements

Total movements for HVs per day are estimated to be 54 movements per day. Table 5 describes the transportation tasks.

Table 5: Description of Transport Task Daily movements in and out of Tenindewa

	Haulage Task 1	Haulage Task 2	Haulage Task 3	Haulage Task 4
Bulk Haulage	Concentrate	Iron Calcine	Bulker Bag Movements	Regents and Chemicals supply
Movements per day	20	20	1.7	12.3

HV numbers by direction [7]

A breakdown of the 54 movements expected on the Geraldton - Mt Magnet Road entering and exiting the Tenindewa site shows:

- 49 movements are in a westerly direction
- 5 are in an easterly direction.

Of the 49 westerly movements:

- 42 will be entering and exiting the plant site from the bulk transport HVs haulage road.
- 5 exiting the plant site via the main entrance road and the Erangy Spring Road access point.

Five movements will be in an easterly direction entering the processing plant site via the main entrance road or the Erangy Spring Road intersection.

There will also be the additional 20 movements of empty HVs returning to the Gabanintha mine from Geraldton.

Additional vehicles

There will be two small buses carrying 24 persons each arriving from Geraldton for day workers and then departing at the end of each day. It is expected that an additional 27 persons will be based in Mullewa and use in their own transport. Total number of day workers is 75 and five days per week.

There will be 12-13 workers for plant operations per shift on a three shift panel. This will require a Toyota Hi-Ace type mini bus arriving three times per day and departing three times per day seven days per week from Geraldton and return. Table 6 summarise the day and shift worker vehicle movements.

Table 6: Day and shift worker vehicle movements

	Geraldton - Tenindewa - return movements	Mullewa - Tenindewa - return movements
Day Workers	4 (small bus)	26 (LV)
Shift Workers	6 (mini bus)	N/A

It is not yet determined how many LVs [8] there will be entering and exiting the Tenindewa processing plant via the Erangy Spring Road intersection (except for the Mullewa based employees). These will be a combination of service contractors and other deliveries like small spares and parts, refreshments, furniture and stationery.

Notwithstanding, all of these vehicles will use the Erangy Springs Road access.

Vehicle access to the Tenindewa site is further discussed in Section 6 - Vehicle Access.

[7] Refer to Section 5 Vehicle Access.

[8] Except for the known 27 employees. It is assumed that there will be 2 employees per LV.

4. Traffic Volumes on Geraldton – Mt Magnet Road

4.1 Traffic Counter sites

Traffic counter numbers were reviewed at two permanent 24 hour counting sites [9]. These were:

- East of Glengarry road site
- East of Mullewa - Wubin road site.

These sites are situated west and east of the Tenindewa processing plant respectively.

Figure 6: Traffic Counter Sites

4.2 Traffic Data

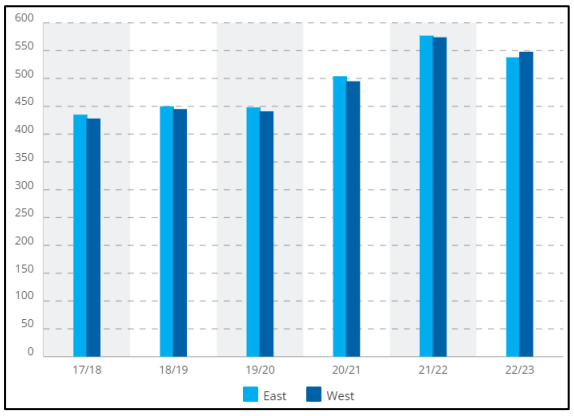
Table 7 shows Annual Average Daily Traffic (AADT) for the two sites. The percentages between HV and LV traffic is proportional but is higher for HV traffic at the East of Mullewa - Wubin Road. This reflects the higher LV traffic in the immediate adjacent areas east of Geraldton and LV traffic to Mullewa.

Table 7: AADT data analysis

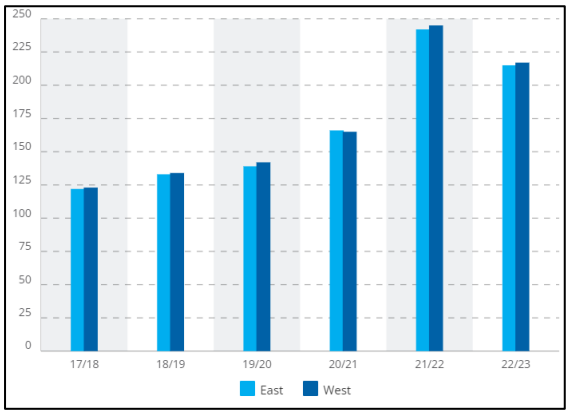
Permanent Counter Location	Total Traffic	HVs	HV %	LVs	LVs%
East of Glengarry Rd	1,086	402	37	684	63
East of Mullewa Wubin Rd	432	223	52	209	48

Thie data shows traffic volumes have reduced slightly from the peak in 2021-22.

Figure 7: Main Roads historical AADT data



East of Glengarry Road site



East of Mullewa – Wubin Road site

[9] AADT data current as of June 2023 (Monday to Sunday) Total Traffic - both directions.

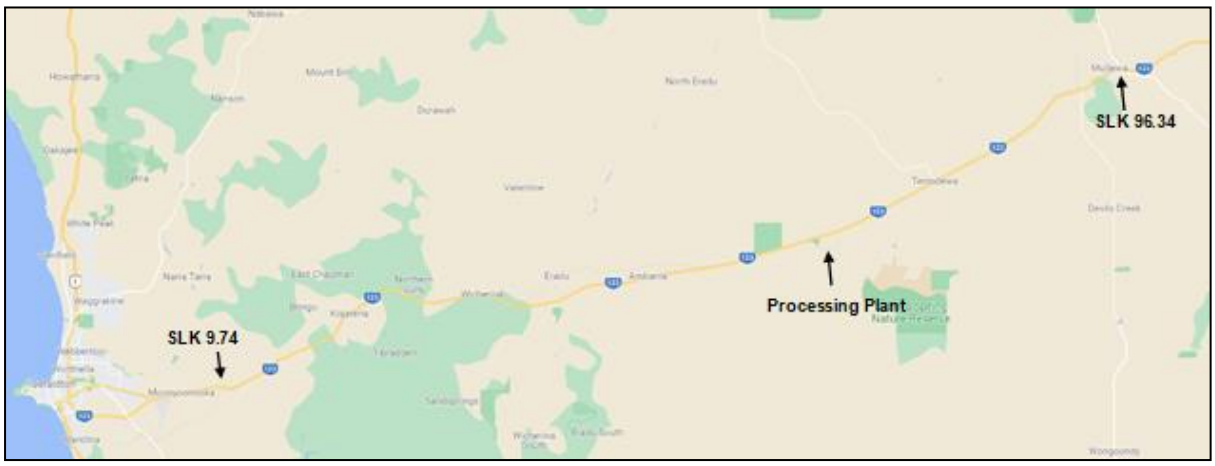
There could be a number of reasons for this reduction including:

- Additional LV tourism traffic due to a big wildflower season in 2020-21.
- A large grain harvest in 2020-21.

5. Crash History

Crash data supplied by Main Roads WA for the period February 2019 and August 2023, shows there were ten accidents between Moonyoonooka-Narngulu Road SLK 9.74 and Mullewa (SLK 96.34 on the Geraldton Mt Magnet Road. Figure 8 shows the study area and the proximity of the Tenindewa processing plant.

Figure 8: Road Section SLK 9.74 - 96.34 SLK



Particular points of reference to this project on the Geraldton - Mt Magnet Road are:

- Erangy Springs Road (SLK 67.12)
- The haul road intersection (SLK 69.56)
- Level crossing in close proximity to Erangy Springs Road (SLK 66.07)
- Level Crossing in proximity to Haul Road (SLK 69.08).

There has been no crashes covering these locations in the last five years.

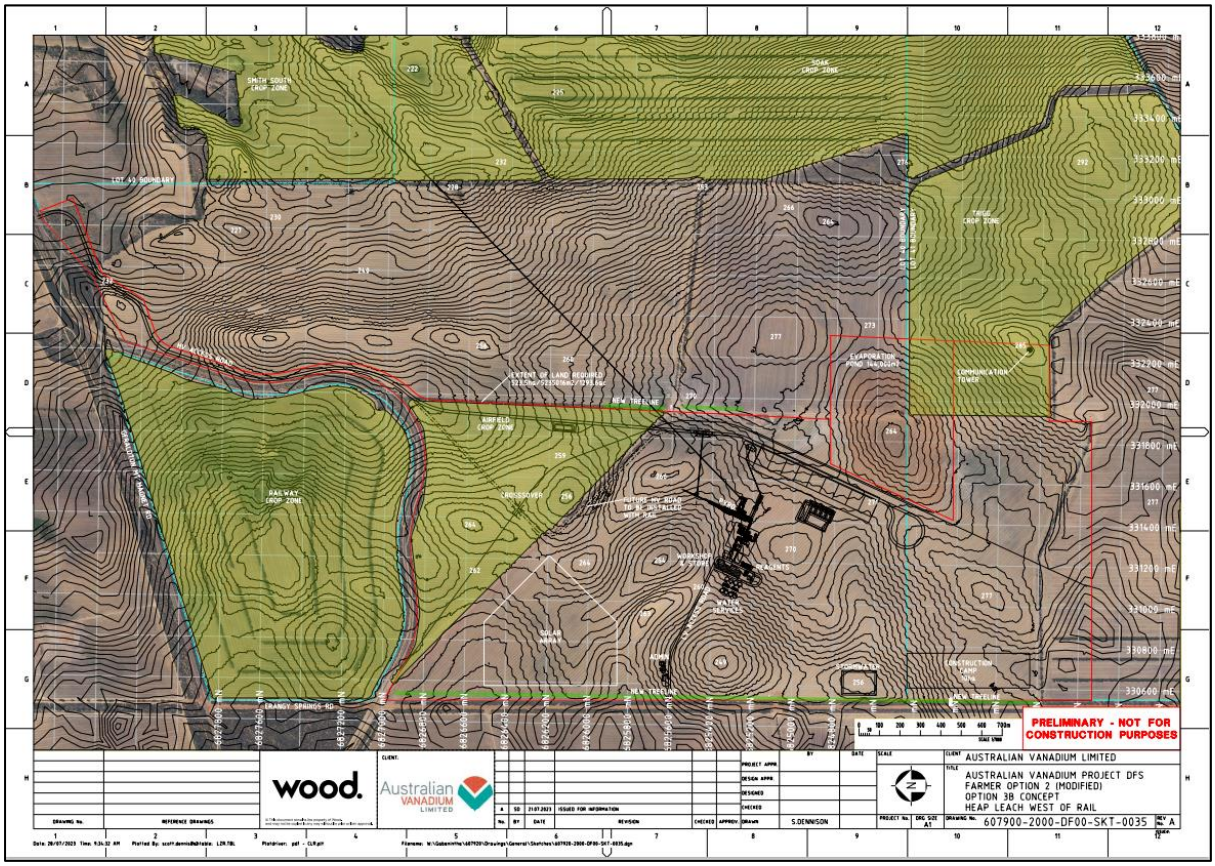
6. Vehicle Access

All vehicles entering and exiting the site will be at two points. One for haulage HVs and one for services HVs and LVs. There are two intersections for the following reasons.

- Service HVs and haulage HVs deliver product to two distinct locations at the processing plant.
- Separation of LVs and 60 m haulage HVs for safety

Figure 9 on page 13 shows the haulage vehicle intersection in relation to the processing plant site.

Figure 9: New entry-exit intersection in relation to site



6.1 Haulage task intersection

This intersection (SLK 69.56) will be designed to accommodate 53.5 m road trains or approved concession for 60 m PBS Tri Drive Quad Axle Ultra Quad Road Trains bringing concentrate from the mine and delivering washed co-product (iron calcine) to the Geraldton Port. The vast majority of these movements through this intersection will be westerly, exiting the Geraldton - Mt Magnet Road onto the haulage road to the processing plant and entering the Geraldton - Mt Magnet Road from the processing plant travelling to Geraldton port.

However, the intersection will be designed to accommodate easterly movements through a right hand turning lane from the haulage road onto the Geraldton - Mt Magnet Road. The haulage road will also be designed to accommodate a right hand turning lane off the Geraldton - Mt Magnet Road when accessing the haulage road from the west side of the intersection.

This accounts for the two per day sodium carbonate deliveries and on occasion where an empty 53.5 / 60 m HV may be relocating back to the mine from Tenindewa or arriving from Geraldton to Tenindewa to accommodate unforeseen circumstances such as a replacement for a broken down HV.

6.2 Secondary access intersection

This intersection (SLK 67.12) will be an upgrade of the existing Erangy Springs Road connection to the Geraldton - Mt Magnet Road. It will be designed to accommodate up to A-Double equivalent HVs. This access point will provide for service HVs delivering processing spares, supplies and reagents/ chemicals for the processing plant and Vanadium flake Bulker Bag HVs.

The layout of the processing plant is designed to separate the movement of HV vehicles involved with Haulage Tasks 1 and 2 from as many other HV movements as possible and all LV movements. Hence the different access points are required.

Figure 10: Detailed description of haulage intersection with Geraldton-Mount Magnet Road

This intersection will also accommodate right hand turning into and out of Erangy Springs Road, mostly to accommodate returning Mullewa resident workers and staff but also any HV vehicles that might need to head east after delivering processing spares, supplies and reagents. Figure 11 describes the proposed design of the intersection.

Figure 11: Detailed description of service intersection for HVs and LVs[10]

[10] Note the design has a silhouette of a quad truck. This will not be the case as the maximum will be A-Doubles.