

Traffic Assessment Report
Amendment 1
Lot 1 DP 109606
Princes Highway, Frogs Hollow

26 April 2018

Prepared for:

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APPENDICIES

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1.0 General

The purpose of the updated Traffic Assessment and Concept Design is to address RMS concerns summarized in RMS correspondence to Bega Valley Shire Council dated 20 Feb 2018 RMS reference STH08/02093/03.

Specifically RMS has requested clarification and additional information in order to adequately assess the impacts the development would have on the Princes Highway. RMS is concerned that the proposed access treatments addressed in the Traffic Assessment Report for the site dated 21-Dec-2017 and their timing may not be appropriate.

TEC has prepared a revised traffic flow analysis and determined that potential traffic volumes generated by the Sapphire Coast Kart Club (SCKC) under the approved development consent would preclude the use of a BAR BAL type intersection. The revised traffic flow analysis is addressed in detail below.

RMS has indicated that there are concerns with the suitability of the proposed CHR/AUL to cater for the ultimate traffic demands. TEC has prepared a revised CHR/AUL intersection Concept Plan and made the following revisions.

1. The headwalls on the existing drainage culvert within the intersection have been moved to a position outside the clear zone.
2. A 19 m articulated vehicle template has been used to evaluate the storage component of the CHR turn lane.
3. The revised plan has shown through lane widths, widened shoulder widths and offsets to property boundaries in a number of locations on the revised Concept Plan.
4. RMS has highlighted what appears to be a reverse curve in the proposed alignment for the Princes Highway immediately south of the proposed intersection. The revised Concept Plan shows a local widening of the formation opposite the intersection to accommodate a 19 m vehicle.
5. The formation widening required to develop the CHR has been up dated to include a safety barrier.
6. Trees which may require removal because they are either within the clear zone or have a potential impact on safe intersection site distance have been noted on the revised Concept Plan.
7. The safe intersection site distance has been shown in the revised Concept Plan.

A revised Concept Plan is included in **Appendix A**

2.0 Traffic Flow Analysis

Current traffic which utilizes the existing access to the Frogs Hollow airfield consists of traffic to and from the airstrip by the airfield owner, the Bega District Model Club (BDMC) and the SCKC.

2.1 Sapphire Coast Kart Club

According to the SCKC Secretary Stage 2 of the approved consent – the Go-Kart Hire proposal- has not been achieved to date. It is unlikely to eventuate due to the facility upgrade that would be required, which the committee are not in a financial position to undertake. Further, there has not been sufficient demand or interest to justify moving forward with this proposal.

SCKC stages club race events on Sundays which are expected to generate traffic flow up to approximately 30 vehicles. SCKC may also stage kart practice days on Saturday which would also be expected to generate approximately 30 vehicles.

The SCKC Secretary has indicated that were the facility to operate as a hire cart facility approximately 10 vehicles per day may be expected to access the SCKC during peak season. While Condition 2 of the development consent 1998.1165 as amended on 8 May 2012 indicates hours of operation for the proposed hire cart facility as Mon to Sun 8 am - 8 pm it is presumed that were the SCKC facilities to operate as a hire cart facility the customer traffic would arrive after 9 am.

2.2 Bega District Model Club

Members of the BDMC have also been interviewed regarding their utilization of the access. The BDMC uses the airfield on Wednesdays and Sundays between approximately 8 am and 12 noon. Up to 12 vehicles may access the site.

The BDMC facilities at the Frogs Hollow Airfield currently do not have development consent, according to Council records. It is the intention of SAFC to purchase the property. Therefore existing and future tenants would be required to enter into a formal lease agreement. Additionally evidence of development consent for operation would be necessary. Therefore it has been assumed that if the SAFC was in operation the BDMC would not be operating from the site without a development application being first submitted to Council for consideration.

2.3 Revised Traffic Flow Analysis

The attached spread sheet (**Appendix B**) indicates traffic numbers by stage and allows for traffic using the access for the Kart Club. Traffic flows for the BDMC are not included in the analysis. Traffic flows for the SCKC are not included in the peak hour analysis.

RMS has indicated that a justification is required for the estimated staff numbers in each stage of the proposed development. The proposed staff numbers have been developed based on the flight instructor's experience of the numbers necessary to support the number of students in each stage. The staff numbers are consistent with staff student ratios at other flight schools such as Port Macquarie and as proposed at Kempsey. The attached spread sheet (**Appendix B**) shows that the arrival and departure of the proposed non-resident staff is staggered throughout the day. It is noted that the capacity of the intersection during the peak hour is at the upper limit of flows allowed by the warrant for a BAL/BAR. The spread sheet also shows that the contribution to traffic flows during and after Stage 2 clearly show the necessity for upgrade to a CHR/AUL intersection therefore it is proposed that the CHR/AUL intersection treatment be implemented at Stage 1.

Weekend traffic which may include a SCKC race as well as bus traffic to and from the SAFC Airfield during Stage 1 is estimated to be up to approximately 35 vehicles per day during the weekend morning peak hour. Weekend

morning peak hour right hand turn into the facility for 35 vehicles would exceed the warrant for the BAR/BAL as well as the CHR(s)/AUL(s) which supports the justification for implementing a CHR/AUL intersection treatment at Stage 1.

RMS has indicated that the practical absorption capacity calculations be up dated as part of the revised traffic flow analysis. Practical absorption capacity has been calculated based on a CHR/AUL intersection treatment. **Table 1** summarises the practical absorption capacity for the intersection for the morning peak hour traffic entering the facility and the afternoon peak hour traffic leaving the facility.

Table 1 – Intersection Absorption Capacity					
Stage 1	Qm (v/hr)	Qt (v/hr)	ta (sec)	tf (sec)	Cp(v/hr)
RH in	381	8	4	2	1046
RH out	489	4	14	3	174
LH out	187	5	14	3	501
Stage 9					
RH in	561	17	4	4	899
RH out	715	18	14	3	79
LH out	272	17	14	3	373

Qm = major stream flow. Qt = minor stream (turn) flow. ta= critical acceptance gap, tf= follow up headway, RTA Road Design Guide, Section 4 Intersections At Grade, Table A4.1. Cp= Practical Absorption Capacity, RTA Road Design Guide, Section 4 Intersections At Grade, Figure A4.1.

The morning right hand turn into the facility is opposed by the northbound traffic, the south bound major flow has not been included in the calculation because the CHR intersection treatment allows the RHT traffic flow to be isolated of the major stream flow.

3.0 Headwalls and Drainage Infrastructure

Batter slopes adjacent to the intersection in the area of the existing drainage infrastructure were determined to be in the range of 6:1 (H:V) to flat. AGRD Part 6 Table 4.1 lists clear zone off sets from the edge of the travel way. In this case for a 100 kph speed zone and an ADT of 3676 vehicles, the edge distance would be 10 m. The revised Concept Plan shows the proposed location of headwalls and drainage infrastructure in the intersection which have been relocated beyond the 10 m clear zone.

4.0 Intersection Concept Design Revisions Based on 19 m Vehicle

The RMS 19 m vehicle template has been applied to the proposed CHR/AUL intersection and the geometry of the intersection has been revised.

Storage has been re-evaluated for the CHR turn treatment based on the method outlined in AGTM Part 3 resulting in one storage space for a 19 m vehicle.

The length of the deceleration lane has been re-evaluated using AGRD Part 4A, based on a 100 kph speed zone. The resulting deceleration length is 155 m including the taper. The taper length of 32 m was calculated based on a 3.5 m lane with and a design speed of 100 kph using AGRD Part 4 Figure A30. The total length of the CHR deceleration lane including storage is 174 m and has not been reduced for slope. Consideration of slope would shorten the deceleration distance by 10 % and would be incorporated in the final design

Similarly the deceleration and taper lengths for the AUL treatment have been re-evaluated resulting in a deceleration length of 186 m which has been factored up by 20% to account for the down-hill approach grade of 3-4%. The taper length of 32 m was calculated based on a 3.5 m lane with and a design speed of 100 kph using AGRD Part 4A requirements for a rural AUL turn treatment.

The revised concept design has modified outside edge of the south bound lane to accommodate a 19m vehicle executing a right hand turn on to the Prince's Highway. The edge line modification will also involve changes to the edge of pavement, the drain as well as the cut bank.

5.0 Stage 1 Concept Design

The Concept Design Plan for the CHR/AUL for Stage 1 of the proposed development has been revised to show:

- Shoulder width at a number of locations;
- Edge of pavement;
- Through Lane width at a number of locations;
- Width of widened shoulders at a number of locations; and
- Offset of proposed works to property boundary in area of proposed works.

6.0 Southbound Through Lane (Reverse Curve)

RMS has requested clarification regarding the eastern edge line of the south bound through lane which appears to show a reverse curve. The intent of the previous design was not to show a reverse curve but to preserve the 3.5 m through lane width around the widest point of the proposed median. The concept plan has been revised to show edge line and shoulder extended to the east in order to accommodate the 19m vehicle turning template as well as the 3.5 m through lane width.

7.0 Formation Widening Batter Protection

RMS has indicated that the formation widening on the northern approach to the intersection may require batter protection. The concept plan has been revised to show a barrier along the proposed fill batter.

8.0 Trees Within the Clear Zone

RMS has indicated that a number of trees within the clear zone were not shown on the previous plan and may require protection or removal. The Concept Plan has been revised to show the approximate location of trees which would require protection or removal.

9.0 Safe Intersection Site Distance

The revised concept plan shows the required safe intersection site distance in both directions from the intersection.

10.0 Flight Path Circuits and Low Flying Aircraft Crossing the Highway Alignment.

RMS has raised the matter of potential driver distraction by aircraft using circuits 09 and 27 which cross the highway at an elevation of 0 – 500.

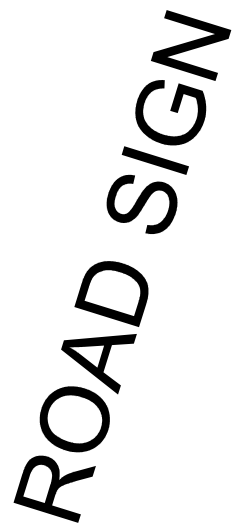
A height of 500 ft above ground level is reached in the departure manoeuvre prior to commencement of the turn” crosswind” and is maintained in the approach manoeuvre at the end of the turn to “base” leg. It is also noted that many major and regional airports are located adjacent to or in the vicinity of highways, where the potential for driver distraction might also exist. Such airports are used by larger aircraft than that proposed at Frog Hollow and the highways experience greater traffic volumes than the Princes Highway at Frogs Hollow.

In response to these concerns it is considered that standard warning signage for potential low flying aircraft could be erected at an appropriate location on the Princes Highway. Details would be provided to RMS satisfaction as part of the final intersection design.

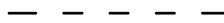
Tasman Engineering Consultants

Austin F. Legler, CP. Eng.

Appendix A- Figures



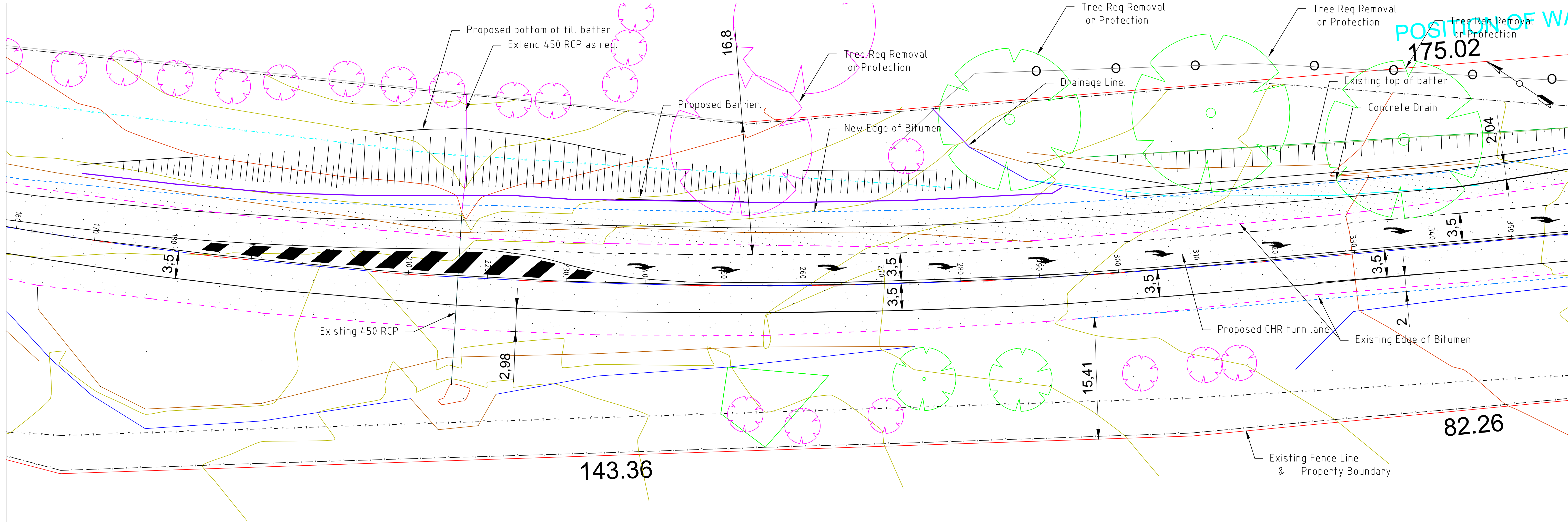
LEGEND

-  Proposed Safety Barrier
-  Existing Edge of Bitumen
-  Proposed Edge of Bitumen
-  Proposed Edge Line
-  Drain
-  Existing Fence
-  Proposed Fence Relocation
-  Telstra
-  Water
-  Optus
-  Property Boundary
-  Lane Line
-  Barrier Line

No.	Revision —	Drawn	Approved	Date

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Scale 1:500		Title Frogs Hollow CHR/AUL Concept Plan CH 0.00 - CH 172.4	
Drawn al	Date 24-4-18		
Approved		Client Sport Aviation Australia	
A.F.Legler B.S., M.A.S.C.E., M.I.E.(Aust.), C.P.Eng.		Size A1	Drg. No. S518 Sheet 1 of 6



LEGEND

- Proposed Safety Barrier
- Existing Edge of Bitumen
- Proposed Edge of Bitumen
- Proposed Edge Line
- Drain
- Existing Fence
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- Telstra
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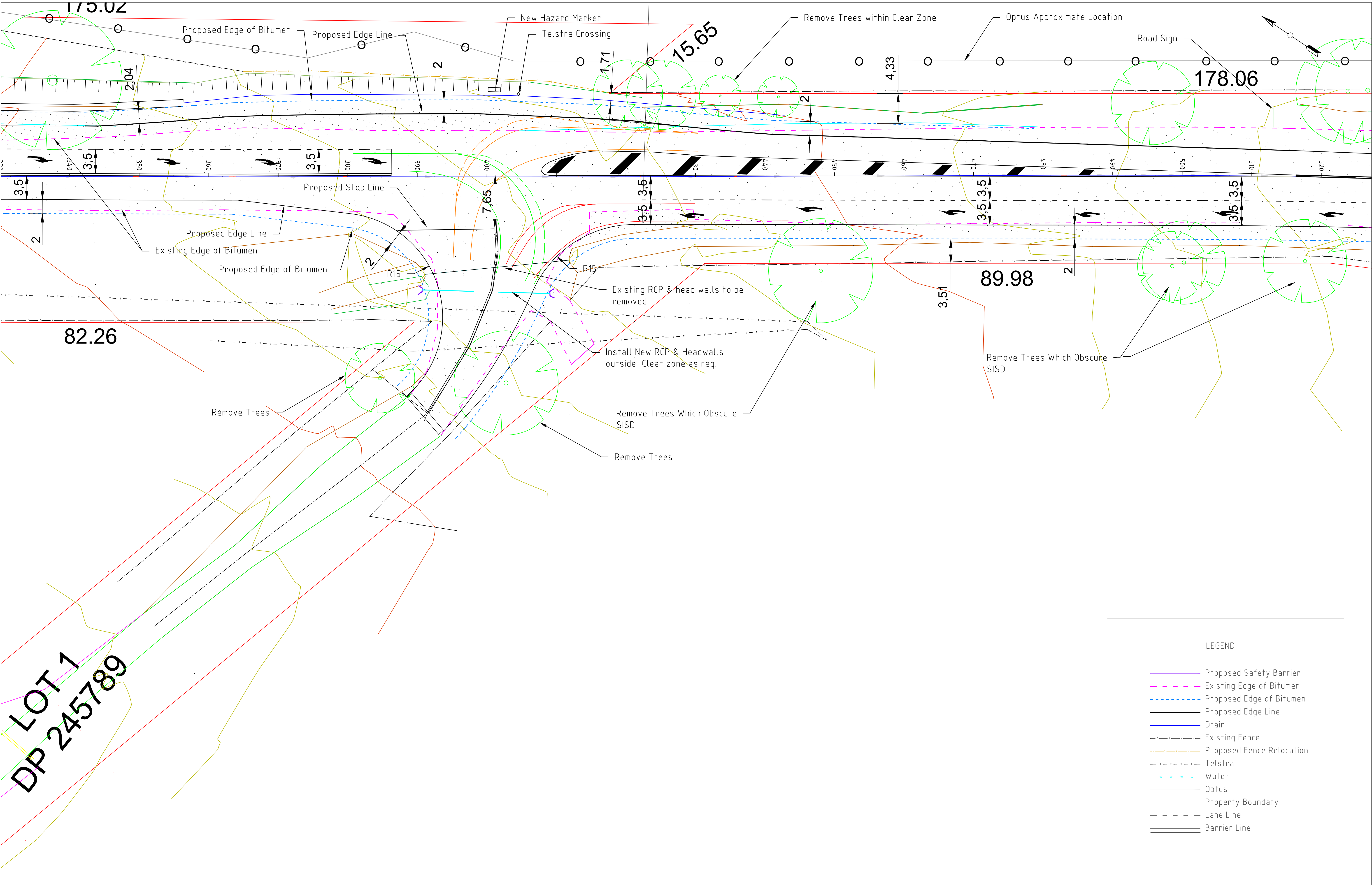
LOT 11
DP 787822

LOT 1
DP 245789

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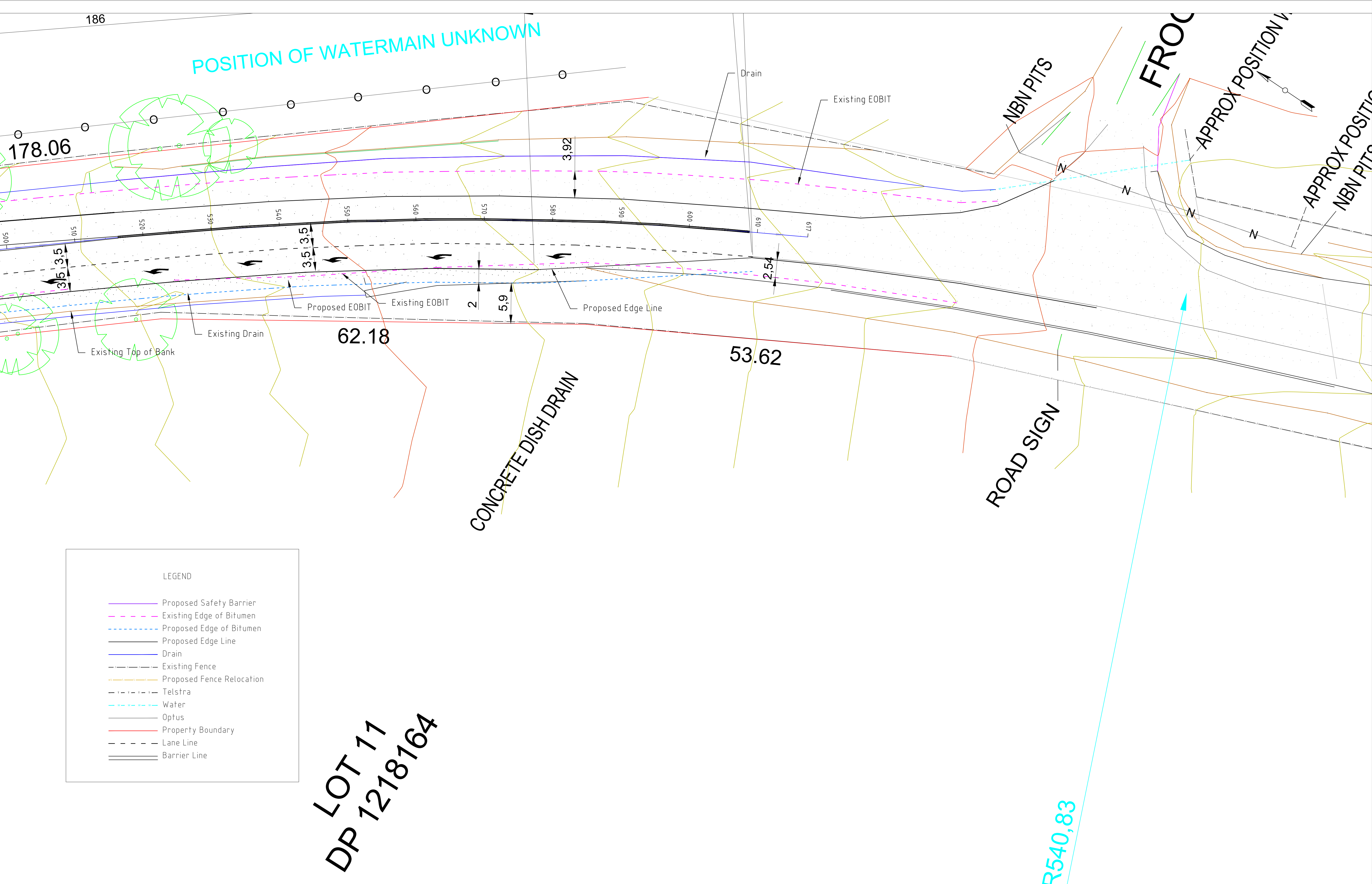
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Drawn al	Date 24-4-18					
Approved		Client Sport Aviation Australia				
A.F.Legler B.S., M.A.S.C.E., M.I.E.(Aust.), C.P.Eng.		Size A1	Drg. No. S518		Sheet 2 of 6	Rev



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Scale 1:500		Title Frogs Hollow CHR/AUL Concept Plan CH 344.7 - CH 517.2	
Drawn al	Date 24-4-18	Client Sport Aviation Australia	
Approved		Size A1	Rev S518
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LEGEND

Proposed Safety Barrier

Existing Edge of Bitumen

Proposed Edge of Bitumen

Proposed Edge Line

Drain

Existing Fence

Proposed Fence Relocation

Telstra

Water

Optus

Property Boundary

Lane Line

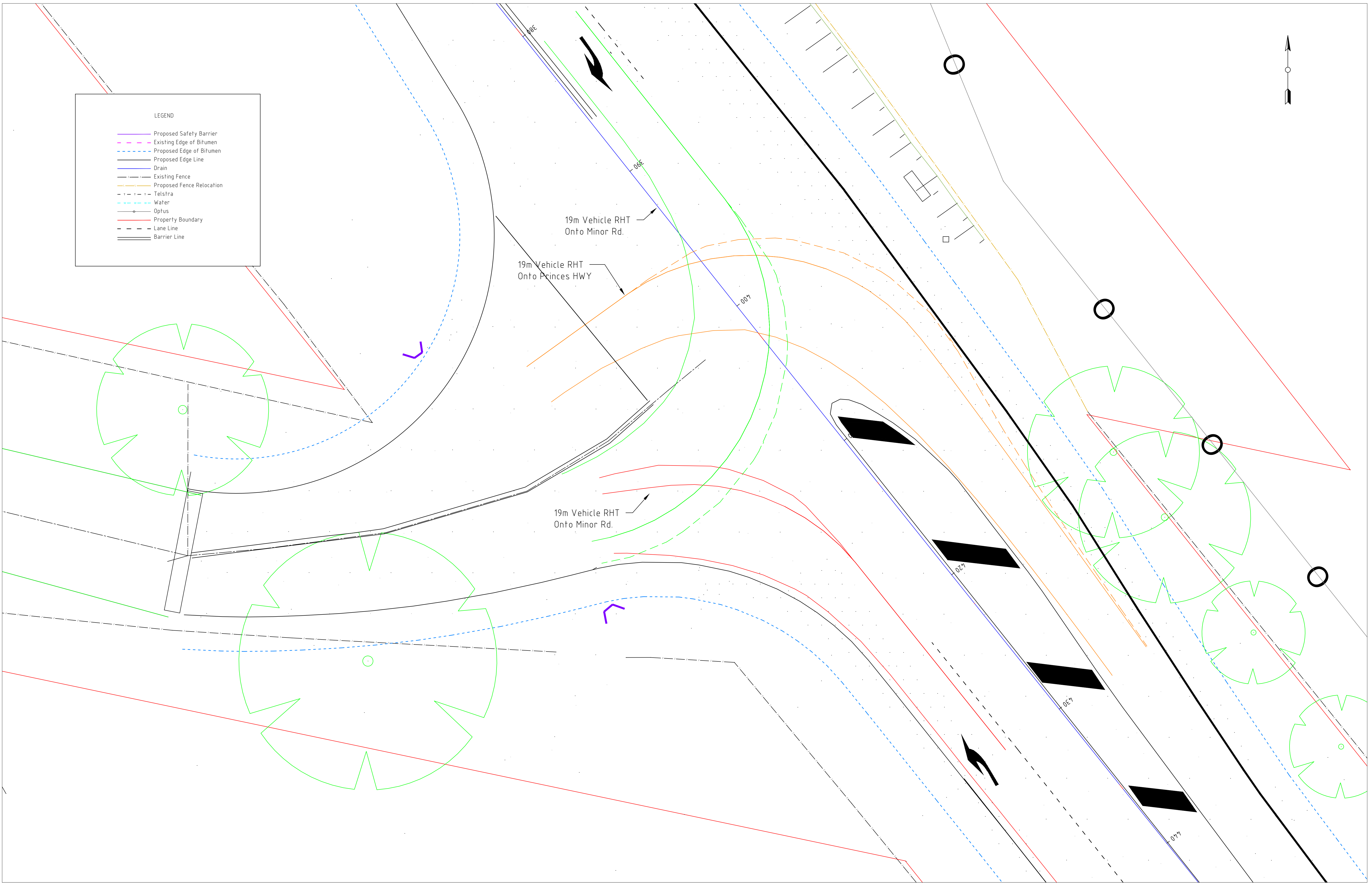
Barrier Line

LOT 11
DP 1218164

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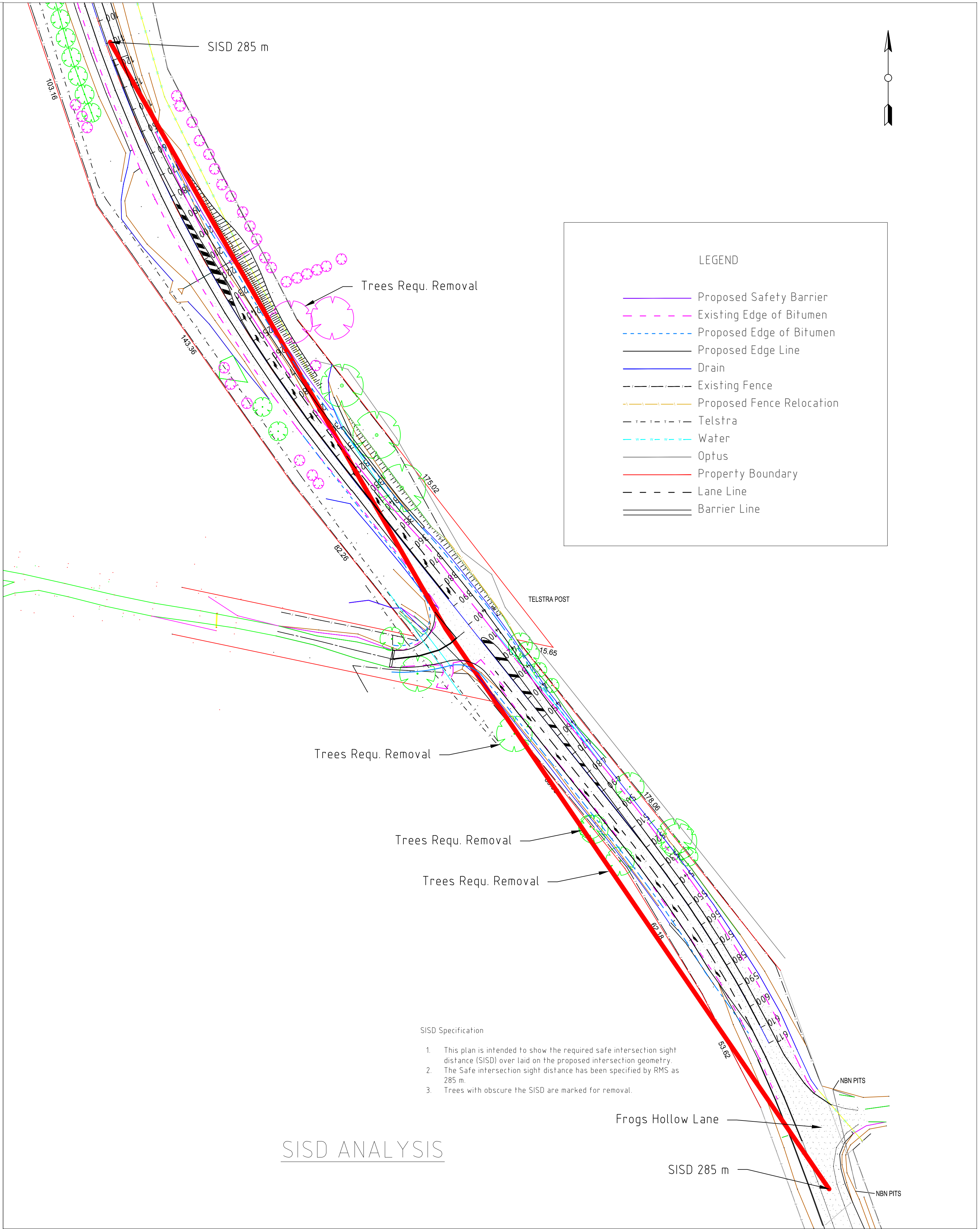
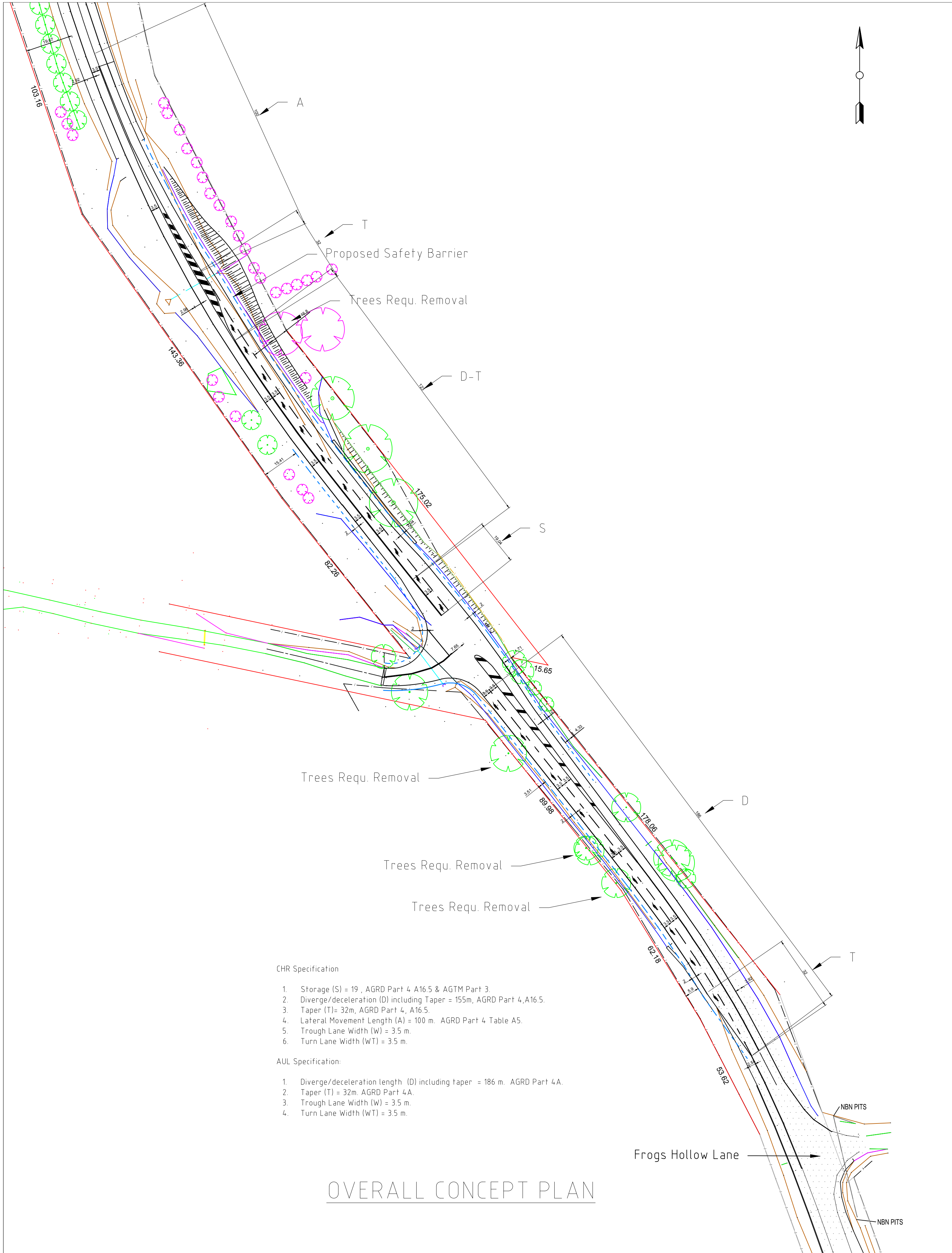
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Approved		Size A1 Drg. No. S518	
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Scale 1:100		Title Frogs Hollow CHR/AUL Concept Plan Swept Path Analysis		
Drawn al	Date 24-4-18	Client Sport Aviation Australia		
Approved		Size A1	Drg. No. S518	Sheet 5 of 6
A.F.Legler B.S., M.A.S.C.E., M.I.E.(Aust.), C.P.Eng.				Rev



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Scale 1:1000		Title Frogs Hollow CHR/AUL Concept Plan Overall Concept & Site Distance Analysis	
Drawn al	Date 24-4-18	Client Sport Aviation Australia	
Approved		Size A1	Rev S518
A.F.Legier B.S., M.A.S.C.E., M.I.E.(Aust.), C.P.Eng.		Sheet 6	of 6

Appendix B- Traffic Flow Analysis

Froggs Hollow Revised Week Day Traffic Schedule 26-4-18													
Time	Traffic category	Type (in/out)	hours	Total vehicles at each stage									
				1	2	3	4	5	6	7	8	9	
6 am - 7am													
	Squadron Leaders Morning	In	7:00 am-5:00 pm	6	9	12	15	18	21	24	27	30	
	Squadron Assistants Morning	In	7:00 am-5:00 pm	6	9	12	15	18	21	24	27	30	
	Kitchen/café/giftshop staff	In	6:00 am- 8:00 pm two shifts breckfast & lunch then dinner	4	4	4	4	4	4	4	4	4	
7 am - 8 am	Chief flight instructor	In	7:30 am-4:30 pm	2	3	4	5	6	7	8	9	10	
	Flight instructors	In	7:30 am-4:30 pm	8	12	16	20	24	28	32	36	40	
	Ground staff	In	8:00 am - 4:00 pm	8	8	12	12	12	12	12	12	12	
	Food service	In	Daily deliveries	2	2	2	2	2	2	2	2	2	
	Water Service	In	Weekly deliveries	1	1	1	1	1	1	1	1	1	
8 am-9 am	Management	In	9:00am-5 :00 pm	4	4	4	4	4	4	4	4	4	
	Aviation english instructors	In	8:30 am-4:00 pm	4	6	8	10	12	14	16	18	20	
	Admin & support	In	9:00 am- 5:00 pm	3	3	5	5	5	5	5	5	5	
	Food service	Out	Daily deliveries from Bega	2	2	2	2	2	2	2	2	2	
	Water Service	Out	Weekly deliveries from Bega	1	1	1	1	1	1	1	1	1	
	Fuel Service	In	Weekly deliveries from Bega	1	1	1	1	1	1	1	1	1	
	Maintenance Service	in	Variable	1	1	1	1	1	1	1	1	1	
			Total turn traffic	16	18	22	24	26	28	30	32	34	
			Qtr From Bega	8	9	11	12	13	14	15	16	17	
			Qtl From Merimbula	8	9	11	12	13	14	15	16	17	
			Qr North bound	373	386	406	426	447	470	493	518	544 TEC 15 Oct assessment report	
			Ql south bound	165	172	180	189	199	209	219	230	242 TEC 15 Oct assessment report	
			Qm (RHT)= Qtl+Qr	381	395	417	438	460	484	508	534	561 Major stream flow	
			Qm (LHT)= Ql	165	172	180	189	199	209	219	230	242 Major stream flow	
			Warrant AGRD Part 4 p 98	CHR(s)/AUL(s)	CHR(s)/AUL(s)	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	
	9 am -10 am	Fuel Service	Out	Weekly deliveries return to Bega	1	1	1	1	1	1	1	1	1
Maintenance Service		Out	Variable return to Bega	1	1	1	1	1	1	1	1	1	
Go cart hire track		In	8:00 am-8:00 pm	10	10	10	10	10	10	10	10	10	
Driver education		In	9:00 am- 5:00 pm	12	12	12	12	12	12	12	12	12	
Flight theory instructors		In	8:30 am-4:00 pm	2	3	4	5	6	7	8	9	10	
10 am-11 am													
11 am-12 pm													
12pm-1pm													
	Squadron leaders Morning	Out	7:00 am-5:00 pm	6	9	12	15	18	21	24	27	30	
	Squadron leaders afternoon	in	7:00 am-5:00 pm	6	9	12	15	18	21	24	27	30	
	Squadron Assistants Morning	Out	7:00 am-5:00 pm	3	5	6	8	9	10	12	14	15	
	Squadron Assistants Afternoon	In	7:00 am-5:00 pm	3	4	6	7	9	11	12	13	15	
1pm-2 pm													
2 pm-3 pm													
3 pm-4 pm	Kitchen/café/giftshop staff	In	6:00 am- 8:00 pm two shifts breckfast & lunch then dinner	4	4	4	4	4	4	4	4	4	
4 pm- 5 pm													
	1/2 Ground staff	Out	8:00 am - 4:00 pm	4	4	6	6	6	6	6	6	6	
	Flight theory instructors	Out	8:30 am-4:00 pm	1	2	3	4	5	6	7	8	9	
	Aviation english instructors	Out	8:30 am-4:00 pm	4	6	8	10	12	14	16	18	20	
			Total turn traffic	9	12	17	20	23	26	29	32	35	
			Qtl	5	6	8	10	11	13	14	16	17	
			Qtr	4	6	9	10	12	13	15	16	18	
			Qr Merimbula	187	193	203	213	224	235	247	259	272	
			Ql Bega	302	315	331	347	365	383	402	422	443	
			Qtl+Ql	307	321	339	357	376	396	416	438	460	
			Qtr+Qr	191	199	212	223	236	248	262	275	290	
			Qm (RHT)= Ql+Qr	489	508	534	560	589	618	649	681	715	
			Qm (LHT)= Qtl	187	193	203	213	224	235	247	259	272	
			Warrant AGRD Part 4 p 98	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	CHR/AUL	
	5 pm-8 pm	Squadron leaders	Out		12	18	24	30	36	42	48	54	60
		Squadron Assistants	Out		6	9	12	15	18	21	24	27	30
		Management	Out		4	4	4	4	4	4	4	4	4
Admin & support		Out		3	3	5	5	5	5	5	5	5	
Gocart hire track		Out		10	10	10	10	10	10	10	10	10	
Driver education		Out		12	12	12	12	12	12	12	12	12	
Chief flight instructor		Out		2	3	4	5	6	7	8	9	10	
Flight instructors		Out		8	12	16	20	24	28	32	36	40	
1/2 Ground staff		Out		4	4	6	6	6	6	6	6	6	
Recreational bus		Out	7:00 pm- 9:00 pm	2	2	2	2	2	2	2	2	2	
Recreational bus		In	7:00 pm- 9:00 pm	2	2	2	2	2	2	2	2	2	