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## **TRAFFIC ASSESMENT REPORT FOR SPORTS AVIATION AUSTRALIA AT THE INTERSECTION OF THE ACCESS OF THE PROPOSED DEVELOPMENT AND THE PRINCES HIGHWAY.**

### **Introduction**

The development proposal is to construct accommodation and training facilities for prospective pilots. The proposal is to be constructed in 9 stages at six monthly intervals. This report concerns the estimation of increased traffic flows due to the development over the nine stages and to propose a concept plan for the intersection upgrade at the intersection of the proposed development's access and the Princes Highway.

### **Existing property access**

At present the property is served by a sealed access terminating in a gravel road at a gate which is set back from the highway. The access is angled at approx 45 degrees to the highway. See appendix. The access type is a hybrid between a Basic Right Turn (BAR) and an Auxiliary lane right turn (AU) in that unlike a BAR, the widened shoulder is sealed, but the widened length, although adequate for a 90 access angle, is inadequate for a 45 degree angle. The left hand turn out of the access is sufficient for a HRV, having a 15m radius. The right hand turn to the property enables a HRV to turn in as shown in the HRV template.

### **Traffic estimation**

Through traffic data has been obtained from the RMS for the week ending 23<sup>rd</sup> October 2015 at hourly intervals over 24 hour periods. See Appendix. An estimation of the present traffic count has been calculated by obtaining traffic counts at the nearest permanent traffic counter north of Bega for the years 2015, 2016 and 2017 from the RMS traffic volume viewer. These AADT counts show that northbound traffic has increased by 1.15% from 2015 to 2016 and 6.95% from 2016 to 2017 and southbound traffic has increased by 1.49% and 8.36% for the same intervals. It is assumed that traffic will continue to increase at the same rate for the duration of the construction of the nine development stages. The developer has provided a spreadsheet with the proposed staff increases over the nine stages which includes an analysis of employee categories. This enables a worst case analysis of intersection use, depending on the assumed arrival and exit times for each employee category. The most morning intersection use will be between 7 – 8 am for flight instructors, squadron staff and ground staff and between 8 -9 am for management, flight theorists and english teachers.

TRAFFIC REPORT FOR SPORTS AVIATION AUSTRALIA

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The most evening use will be between 4-5pm for instructors, theorists, teachers and ground staff, and between 5 – 6pm for squadron staff and management.

It is assumed that entry and egress from the proposed development will be split 50/50 north and south as the access is in between two major towns, Bega and Merimbula.

#### Right turn intersection type

Combining the assumed highway traffic data and the increasing staff numbers over the nine development stages yields a turning volume/approaching volume for the hours 7-8, 8-9, 4-5, and 5-6. This ratio is used to decide the intersection type (BA, AU, CH) that is appropriate for the development at each stage from Fig 4.5.12 Warrants for Rural Turn Lanes from RMS Road Guide Section 4. The result is in the row labelled Warrants on the spreadsheet below.

#### Left turn intersection type

The governing design criteria for the left turning lane are

- turning radius adequacy for the design vehicle
- access road AADT
- necessity for storage for left turning vehicles from the highway depending on the estimated delay to through traffic caused by decelerating left turn traffic.

The first stage of the development has an estimated AADT of 53 (see appendix) which is just over the 50AADT requirement for an upgraded left turn from the access.

Thereafter, the left hand turn from the development requires an upgrade.

### **Practical Absorption Capacity**

It is desirable that turning traffic minimises the interference with true traffic. This is especially desirable for access to a high speed through road. A desirable outcome is a critical acceptance gap of 14 sec and follow up headway of 3 sec.

Calculating the worst case absorption capacity at stage 9 with 544 vph through traffic by using the formula from Fig A4.1 from RMS Road Guide Section 4, shows that the practical absorption capacity is 143 vehicles. This is more than the maximum hourly vehicle entry and exits from the development (71 vehicles) thus the entry and exits of vehicles from the development will have minimal impact on through traffic.

### **Intersection choice for each stage.**

#### Stage 1

It is recommended that no upgrade is necessary for stage 1. This is because

1. The turning traffic/ through traffic ratio implies a BAR treatment and there already is a hybrid BAR/AU treatment present.
2. The existing access has been designed for 15m radius turns to enable HRV access and egress.
3. The access has more than 10m sealed surface which minimises mud from the gravel road being dropped on the highway.
4. There is sufficient SISD and MGSD and ASD with the present access if the three marked trees are removed. See appendix EXISTING ACCESS PLAN

It is recommended that give way/stop lines be painted on the access 7.5 m from the highway centreline but this has already been painted as a fog line. Suitable give way/stop signs be placed at suitable locations.

#### Stage 2 to stage 4

These stages will require

1. An AU type intersection with a 155 m deceleration/taper lane for left turns for northbound traffic.
2. moving the access road so it is at 90 degrees to the highway.
3. Installing new concrete drainage pipes.
4. Widening pavement on southbound lane to allow 3.5m passing lane and 1m wide sealed shoulder.
5. Repainting fog lines and adding broken lines as appropriate.

#### Stage 5 to stage 9

These stages will require a CH type intersection. This will involve a deceleration lane and storage length for right turning vehicles on the southbound lane.

Storage requirements as calculated using Appendix 4.1 of RMS Road Guide Section 4 show that because the utilisation ratio is less than 0.1, only 1 vehicle length is required. This is chosen as 12.5m.

The deceleration length is calculated as 75 m which includes a 50 m taper.

The access will remain the same as the AU design intersection.

### Intersection design by traffic flow warrants fig 4.5.12

Morning 7 am 8 am Qr vph = northbound Ql vph = southbound

Stage	1	2	3	4	5	6	7	8	9
Qr	249	257	270	284	298	313	329	345	362
Ql	107	111	117	123	129	135	142	149	156
Qtr	18	25	34	39	45	52	58	65	71
Qtl	18	25	34	39	45	52	58	65	71
Qr+Qtr	267	282	304	323	343	365	387	410	433
Qr+Qtl	267	282	304	323	343	365	387	410	433
Ql+Qtr	125	136	151	162	174	187	200	214	227
Ql+Qtl	125	136	151	162	174	187	200	214	227
Warrant	BA	AU	AU	AU	CH	CH	CH	CH	CH

Morning 8 am 9 am Qr vph = northbound Ql vph = southbound

Stage	1	2	3	4	5	6	7	8	9
Qr	373	386	406	426	447	470	493	518	544
Ql	165	172	180	189	199	209	219	230	242
Qtr	7	8	11	12	14	15	17	18	20
Qtl	7	8	11	12	14	15	17	18	20
Qr+Qtr	380	394	417	438	461	485	510	536	564
Qr+Qtl	380	394	417	438	461	485	510	536	564
Ql+Qtr	172	180	191	201	213	224	236	248	262
Ql+Qtl	172	180	191	201	213	224	236	248	262
Warrant	BA	BA	BA	AU	AU	AU	AU	AU	AU

Evening 4 pm 5 pm Qr vph = northbound Ql vph = southbound

Stage	1	2	3	4	5	6	7	8	9
Qr	187	193	203	213	224	235	247	259	272
Ql	302	315	331	347	365	383	402	422	443
Qtr	12	16	22	26	30	34	38	42	46
Qtl	12	16	22	26	30	34	38	42	46
Qr+Qtr	199	209	225	239	254	269	285	301	318
Qr+Qtl	199	209	225	239	254	269	285	301	318
Ql+Qtr	314	331	353	373	395	417	440	464	489
Ql+Qtl	314	331	353	373	395	417	440	464	489
Warrant	BA	AU	AU	AU	AU	CH	CH	CH	CH

Evening 5 pm 6 pm Qr vph = northbound Ql vph = southbound

Stage	1	2	3	4	5	6	7	8	9
Qr	140	145	152	160	168	176	185	194	204
Ql	256	267	280	294	309	324	341	358	376
Qtr	13	17	23	27	32	36	41	45	50
Qtl	13	17	23	27	32	36	41	45	50
Qr+Qtr	153	162	175	187	200	212	226	239	254
Qr+Qtl	153	162	175	187	200	212	226	239	254
Ql+Qtr	269	284	303	321	341	360	382	403	426
Ql+Qtl	269	284	303	321	341	360	382	403	426
Warrant	BA	AU	AU	AU	AU	CH	CH	CH	CH

## Appendix

Photos of worst case SISD views

Traffic count from RMS

Existing access plan with SISD sections from both directions scale 1:1000 A2

AU upgraded concept plan with SISD sections from both directions scale 1:1000 A2

Existing and AU concept designs showing increased pavement area scale 1:500

CH concept design showing increased pavement area scale 1:500





Looking north from south of access, 1.15m post just behind trees to be removed



Looking north from access showing clear view in excess of 350 m

## TCS Instruments Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-6263 -- English (ENA)

### Datasets:

**Site:** [08.033N] HW1 S MR275  
**Direction:** 1 - North bound, A hit first. **Lane:** 0  
**Survey Duration:** 13:00 Thursday, 15 October 2015 => 9:09 Friday, 23 October 2015  
**Zone:** Australia (VIC ACT NSW)  
**File:** 08.033N23Oct2015.EC0 (Plus)  
**Identifier:** M658NCK3 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** **Modified** - Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

### Profile:

**Filter time:** 0:00 Friday, 16 October 2015 => 0:00 Friday, 23 October 2015  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 0 - 200 km/h.  
**Direction:** North, South (bound)  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 14448 / 16067 (89.92%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-6263

Site: !08.033N.0.0N

Description: HW1 S MR275

Filter time: 0:00 Friday, 16 October 2015 => 0:00 Friday, 23 October 2015

Scheme: Vehicle classification (AustRoads94)

Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NS) Sp(0,200) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
Hour									
0000-0100	2.0	1.0	3.0	1.0	2.0	1.0	9.0	1.8	2.7
0100-0200	2.0	1.0	2.0	1.0	2.0	2.0	4.0	1.6	2.0
0200-0300	4.0	5.0	3.0	1.0	3.0	2.0	7.0	3.2	3.6
0300-0400	10.0	10.0	7.0	5.0	10.0	5.0	5.0	8.4	7.4
0400-0500	9.0	9.0	8.0	7.0	11.0	2.0	4.0	8.8	7.1
0500-0600	56.0	69.0	52.0	46.0	48.0	18.0	12.0	54.2	43.0
0600-0700	116.0	126.0	130.0	112.0	115.0	46.0	18.0	119.8	94.7
0700-0800	199.0	230.0	193.0	201.0	192.0	69.0	40.0	203.0	160.6
0800-0900	283.0<	318.0<	344.0<	327.0<	275.0<	114.0	56.0	309.4<	245.3<
0900-1000	179.0	228.0	201.0	200.0	193.0	144.0	117.0<	200.2	180.3
1000-1100	168.0	162.0	205.0	220.0	209.0	151.0<	105.0	192.8	174.3
1100-1200	160.0	150.0	165.0	172.0	146.0	138.0	113.0	158.6	149.1
1200-1300	142.0	152.0	156.0	163.0	155.0	120.0<	116.0	153.6	143.4
1300-1400	144.0	183.0<	172.0<	173.0<	158.0	118.0	131.0	166.0<	154.1<
1400-1500	157.0	157.0	153.0	142.0	177.0<	90.0	143.0<	157.2	145.6
1500-1600	176.0<	182.0	151.0	157.0	162.0	91.0	103.0	165.6	146.0
1600-1700	151.0	172.0	162.0	123.0	156.0	77.0	90.0	152.8	133.0
1700-1800	111.0	129.0	113.0	99.0	119.0	48.0	71.0	114.2	98.6
1800-1900	58.0	52.0	47.0	47.0	62.0	44.0	40.0	53.2	50.0
1900-2000	27.0	42.0	40.0	28.0	43.0	30.0	29.0	36.0	34.1
2000-2100	35.0	22.0	31.0	27.0	33.0	26.0	25.0	29.6	28.4
2100-2200	43.0	36.0	32.0	38.0	42.0	37.0	29.0	38.2	36.7
2200-2300	18.0	14.0	14.0	23.0	18.0	20.0	10.0	17.4	16.7
2300-2400	5.0	5.0	7.0	3.0	11.0	15.0	4.0	6.2	7.1
Totals									
0700-1900	1928.0	2115.0	2062.0	2024.0	2004.0	1204.0	1125.0	2026.6	1780.3
0600-2200	2149.0	2341.0	2295.0	2229.0	2237.0	1343.0	1226.0	2250.2	1974.3
0600-0000	2172.0	2360.0	2316.0	2255.0	2266.0	1378.0	1240.0	2273.8	1998.1
0000-0000	2255.0	2455.0	2391.0	2316.0	2342.0	1408.0	1281.0	2351.8	2064.0
AM Peak	0800	0800	0800	0800	0800	1000	0900		
	283.0	318.0	344.0	327.0	275.0	151.0	117.0		
PM Peak	1500	1300	1300	1300	1400	1200	1400		
	176.0	183.0	172.0	173.0	177.0	120.0	143.0		

\* - No data.



## TCS Instruments Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-6262 -- English (ENA)

**Datasets:**

**Site:** [08.033S] HW1 S MR275  
**Direction:** 3 - South bound, A hit first. **Lane:** 0  
**Survey Duration:** 13:00 Thursday, 15 October 2015 => 9:10 Friday, 23 October 2015  
**Zone:** Australia (VIC ACT NSW)  
**File:** 08.033S23Oct2015.EC0 (Plus)  
**Identifier:** M630QF2J MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** **Modified** - Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

**Profile:**

**Filter time:** 0:00 Friday, 16 October 2015 => 0:00 Friday, 23 October 2015  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 0 - 200 km/h.  
**Direction:** North, South (bound)  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 14720 / 16491 (89.26%)

## Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-6262

Site: !08.033S.0.0S

Description: HW1 S MR275

Filter time: 0:00 Friday, 16 October 2015 => 0:00 Friday, 23 October 2015

Scheme: Vehicle classification (AustRoads94)

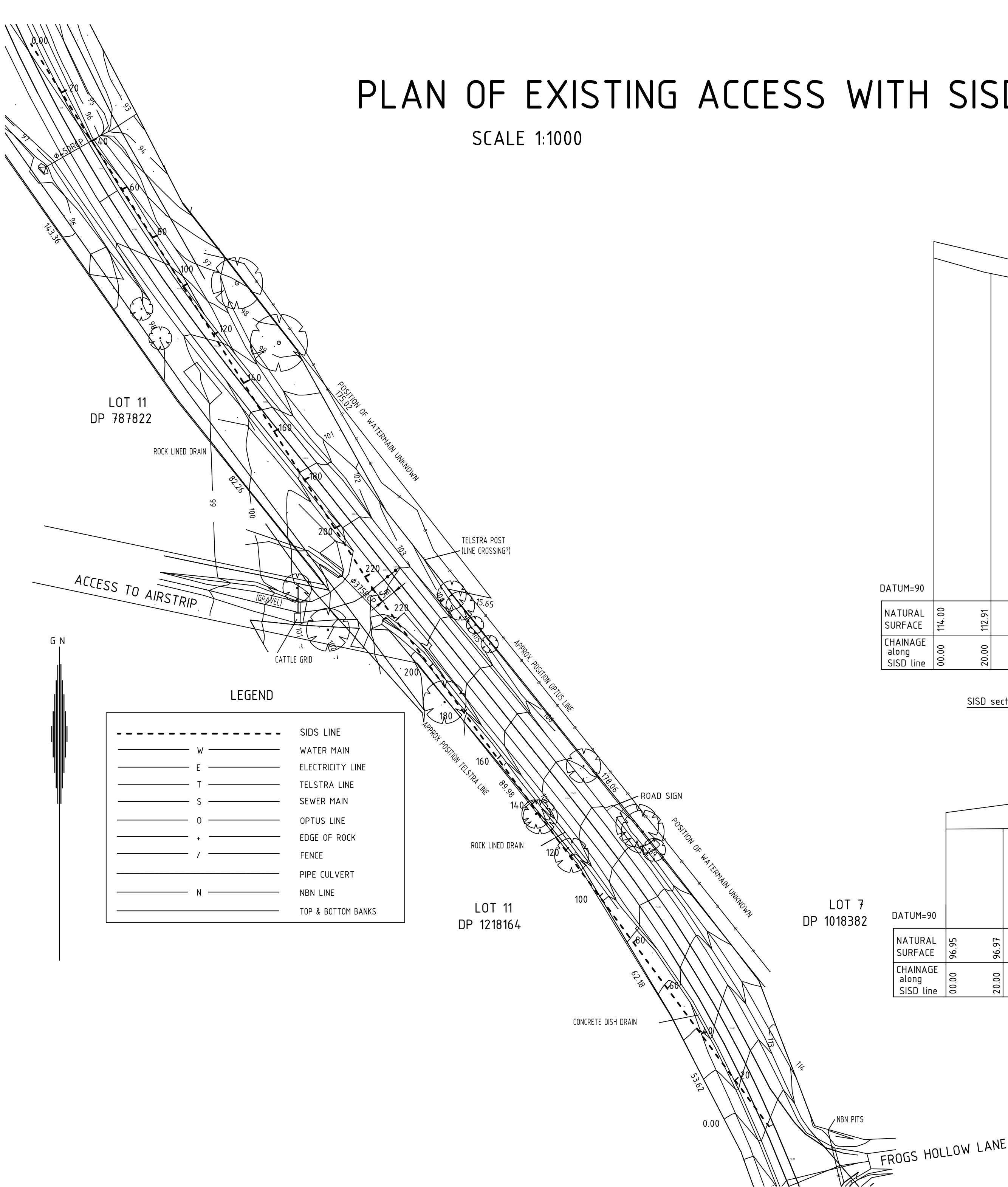
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NS) Sp(0,200) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
Hour									
0000-0100	6.0	6.0	4.0	5.0	8.0	13.0	9.0	5.8	7.3
0100-0200	6.0	3.0	5.0	3.0	8.0	1.0	2.0	5.0	4.0
0200-0300	3.0	0.0	2.0	3.0	3.0	8.0	2.0	2.2	3.0
0300-0400	0.0	2.0	2.0	5.0	1.0	4.0	4.0	2.0	2.6
0400-0500	4.0	3.0	6.0	2.0	8.0	3.0	4.0	4.6	4.3
0500-0600	16.0	19.0	18.0	22.0	22.0	6.0	6.0	19.4	15.6
0600-0700	53.0	87.0	70.0	64.0	64.0	28.0	31.0	67.6	56.7
0700-0800	91.0	84.0	97.0	74.0	91.0	41.0	28.0	87.4	72.3
0800-0900	102.0	146.0	150.0	145.0	140.0	61.0	35.0	136.6	111.3
0900-1000	144.0	158.0	142.0	139.0	142.0	102.0	79.0	145.0	129.4
1000-1100	122.0	137.0	155.0	199.0<	177.0	148.0	104.0	158.0	148.9
1100-1200	159.0<	207.0<	192.0<	176.0	195.0<	159.0<	133.0<	185.8<	174.4<
1200-1300	174.0	163.0	156.0	149.0	164.0	158.0<	130.0	161.2	156.3
1300-1400	164.0	167.0	175.0	194.0	213.0	145.0	130.0<	182.6	169.7
1400-1500	192.0	201.0	227.0	216.0	217.0	134.0	106.0	210.6	184.7
1500-1600	237.0	233.0	276.0<	226.0	248.0	96.0	92.0	244.0	201.1
1600-1700	253.0<	258.0<	245.0	257.0<	275.0<	92.0	99.0	257.6<	211.3<
1700-1800	233.0	228.0	230.0	223.0	198.0	98.0	71.0	222.4	183.0
1800-1900	134.0	129.0	135.0	107.0	117.0	86.0	66.0	124.4	110.6
1900-2000	57.0	65.0	49.0	66.0	59.0	40.0	41.0	59.2	53.9
2000-2100	36.0	49.0	42.0	46.0	32.0	38.0	24.0	41.0	38.1
2100-2200	26.0	35.0	25.0	38.0	29.0	19.0	18.0	30.6	27.1
2200-2300	24.0	40.0	37.0	32.0	41.0	18.0	7.0	34.8	28.4
2300-2400	13.0	10.0	8.0	8.0	12.0	5.0	6.0	10.2	8.9
Totals									
0700-1900	2005.0	2111.0	2180.0	2105.0	2177.0	1320.0	1073.0	2115.6	1853.0
0600-2200	2177.0	2347.0	2366.0	2319.0	2361.0	1445.0	1187.0	2314.0	2028.9
0600-0000	2214.0	2397.0	2411.0	2359.0	2414.0	1468.0	1200.0	2359.0	2066.1
0000-0000	2249.0	2430.0	2448.0	2399.0	2464.0	1503.0	1227.0	2398.0	2102.9
AM Peak	1100	1100	1100	1000	1100	1100	1100		
	159.0	207.0	192.0	199.0	195.0	159.0	133.0		
PM Peak	1600	1600	1500	1600	1600	1200	1300		
	253.0	258.0	276.0	257.0	275.0	158.0	130.0		

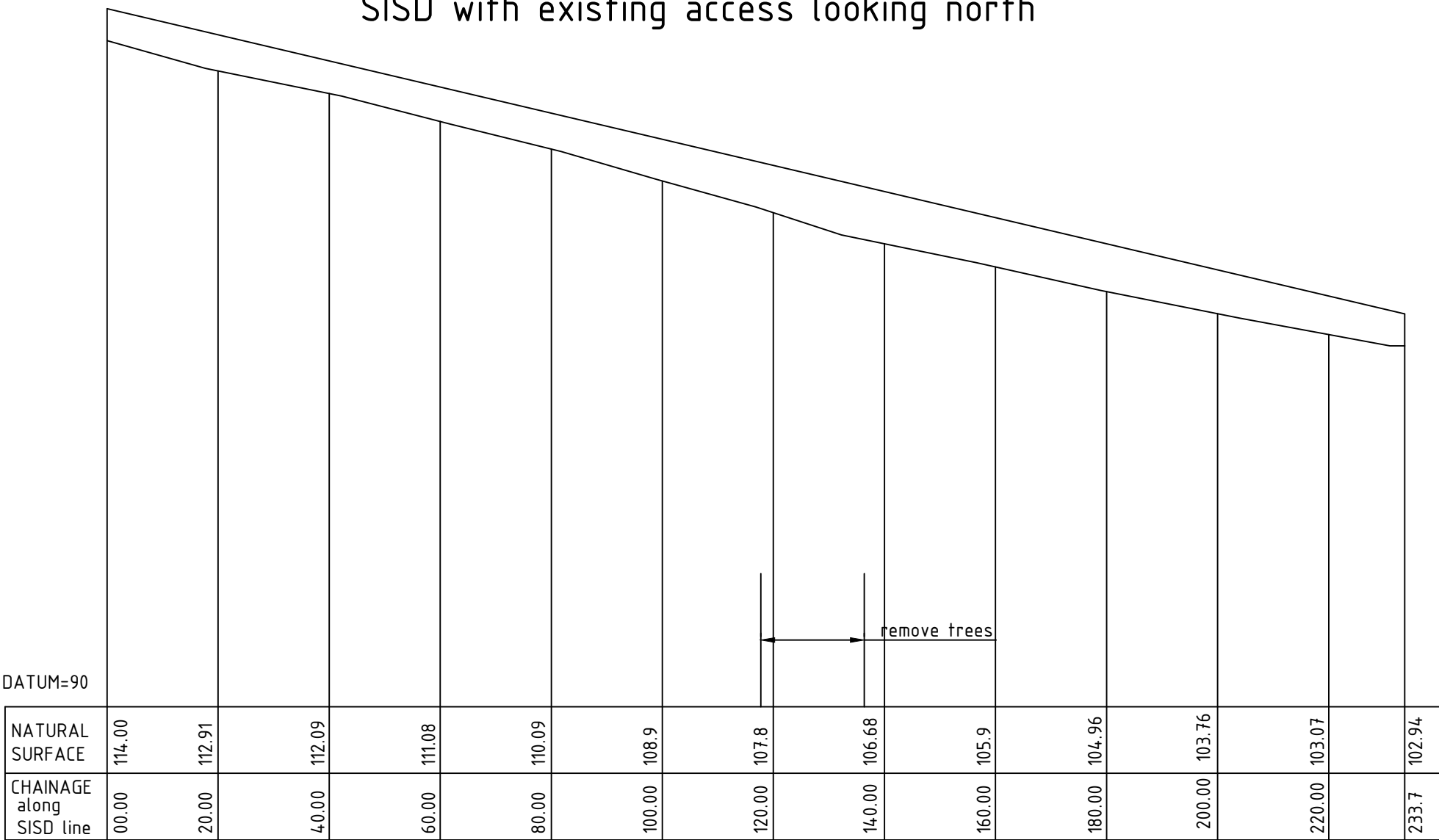
\* - No data.

# PLAN OF EXISTING ACCESS WITH SISD SECTIONS

SCALE 1:1000

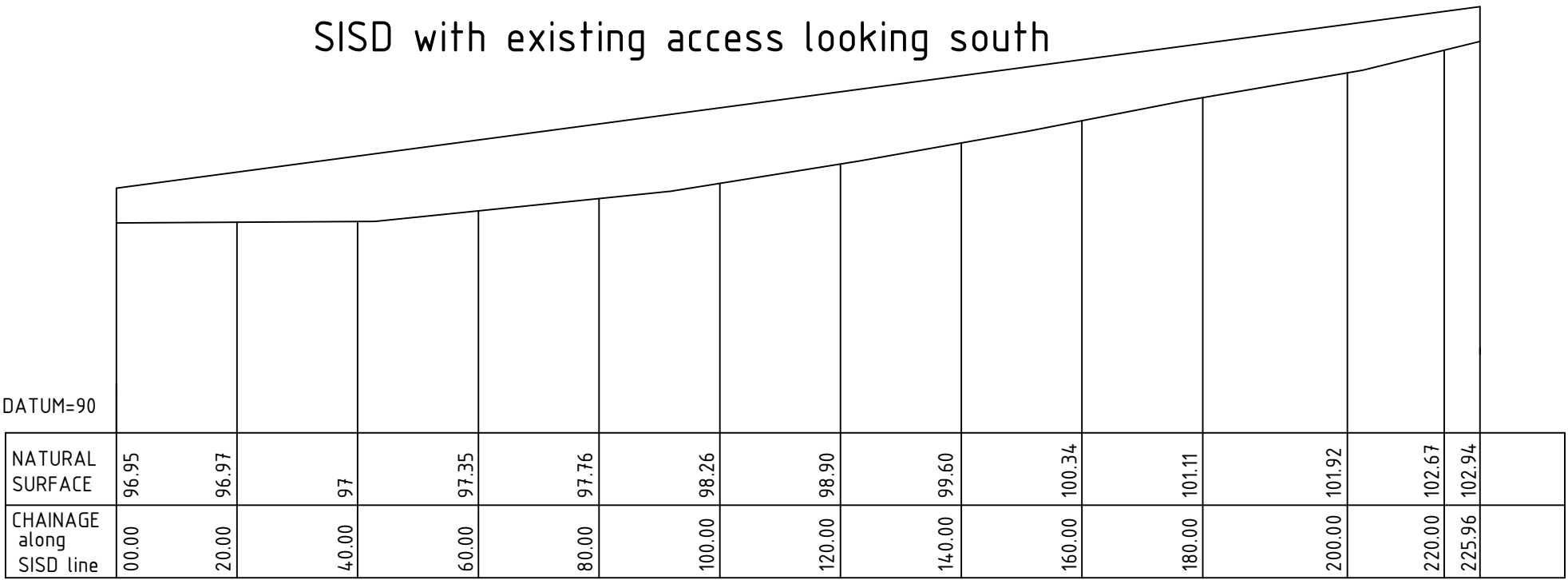


SISD with existing access looking north



SISD section along sight distance with 1.15 sight height at both ends LOOKING NORTH  
Horizontal scale 1:1000, vertical scale 1:200

SISD with existing access looking south

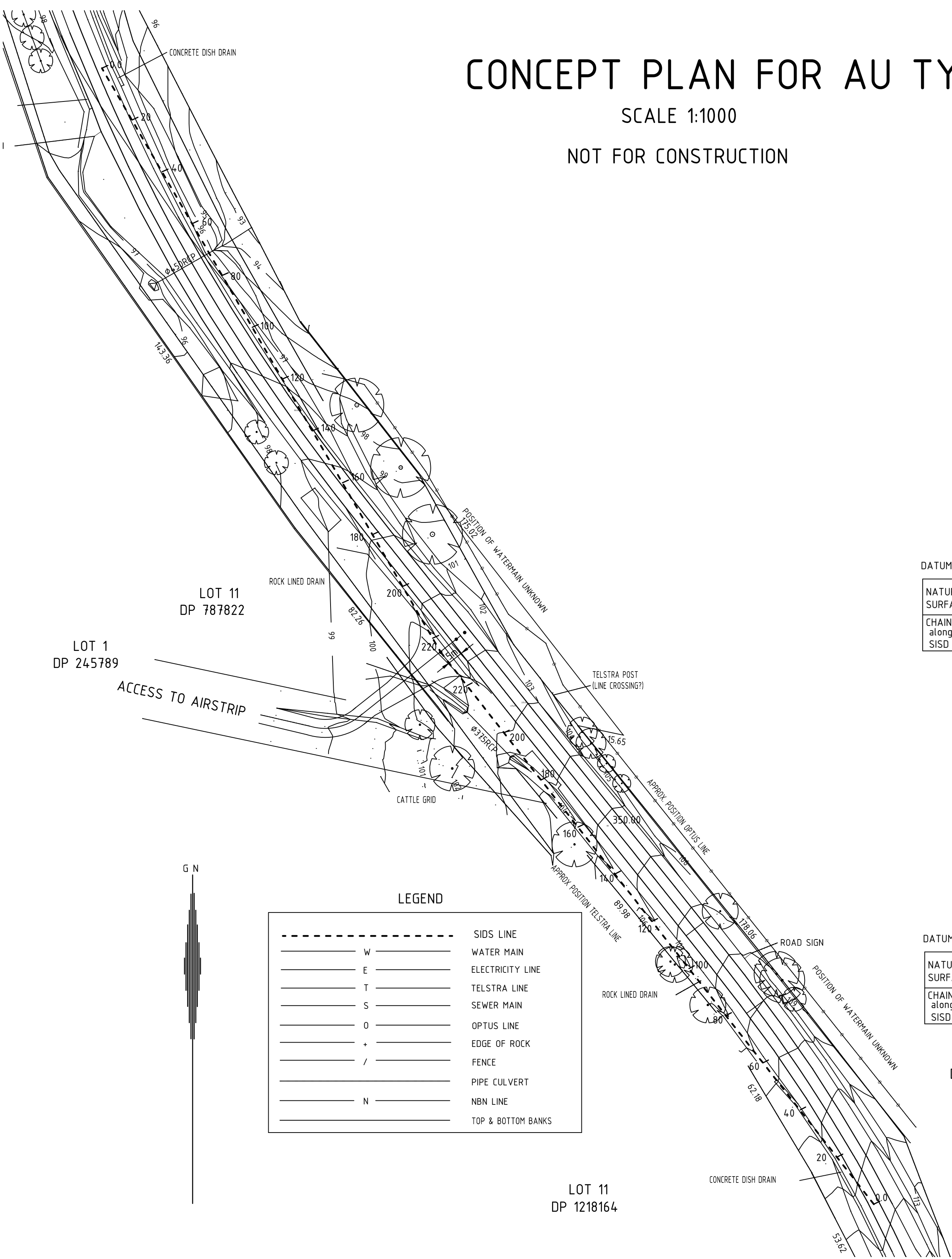


SISD section along sight distance with 1.15 sight height at both ends LOOKING SOUTH  
Horizontal scale 1:1000, vertical scale 1:200

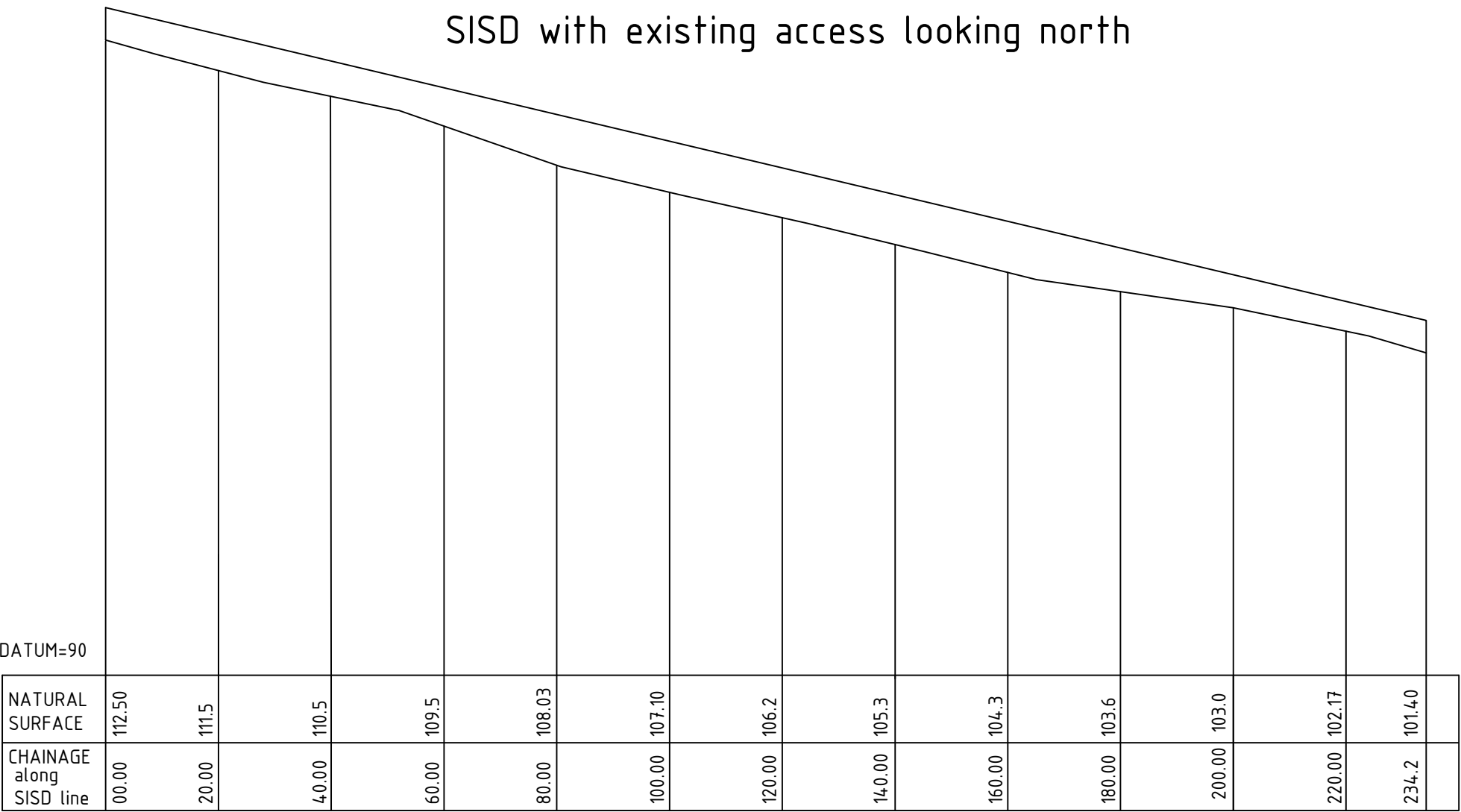
# CONCEPT PLAN FOR AU TYPE UPGRADE WITH MOVED ACCESS

SCALE 1:1000

NOT FOR CONSTRUCTION

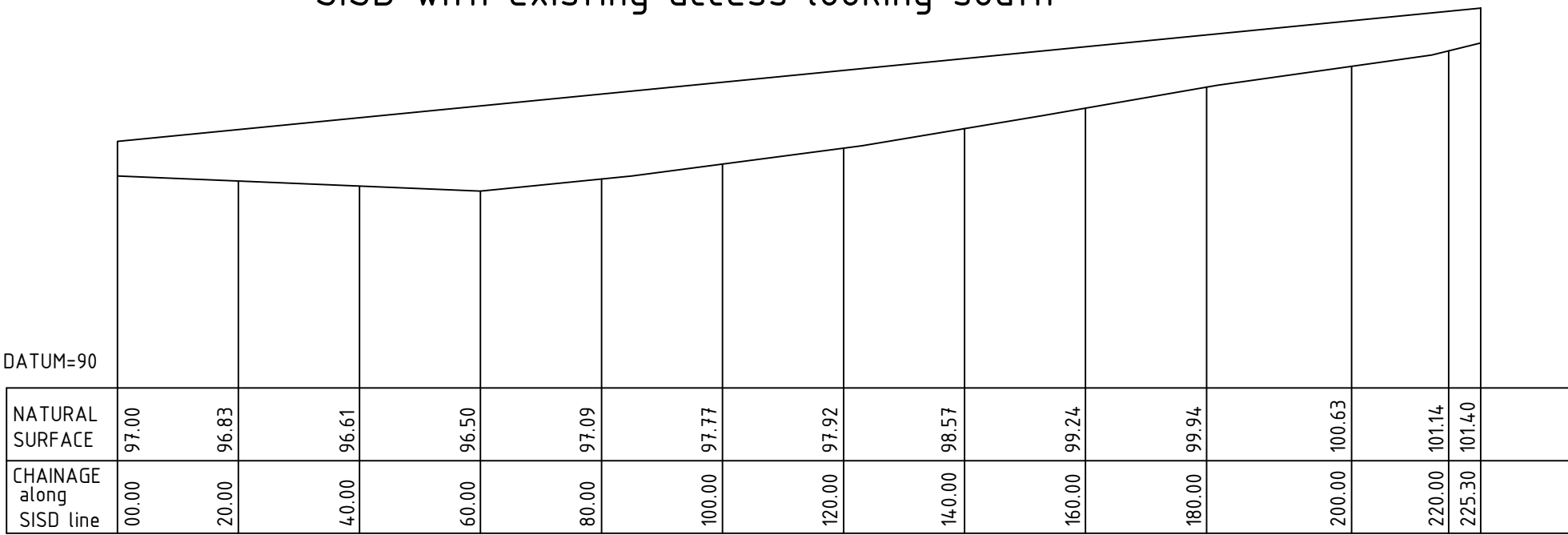


SISD with existing access looking north



SISD section along sight distance with 1.15 sight height at both ends LOOKING NORTH  
Horizontal scale 1:1000, vertical scale 1:200

SISD with existing access looking south



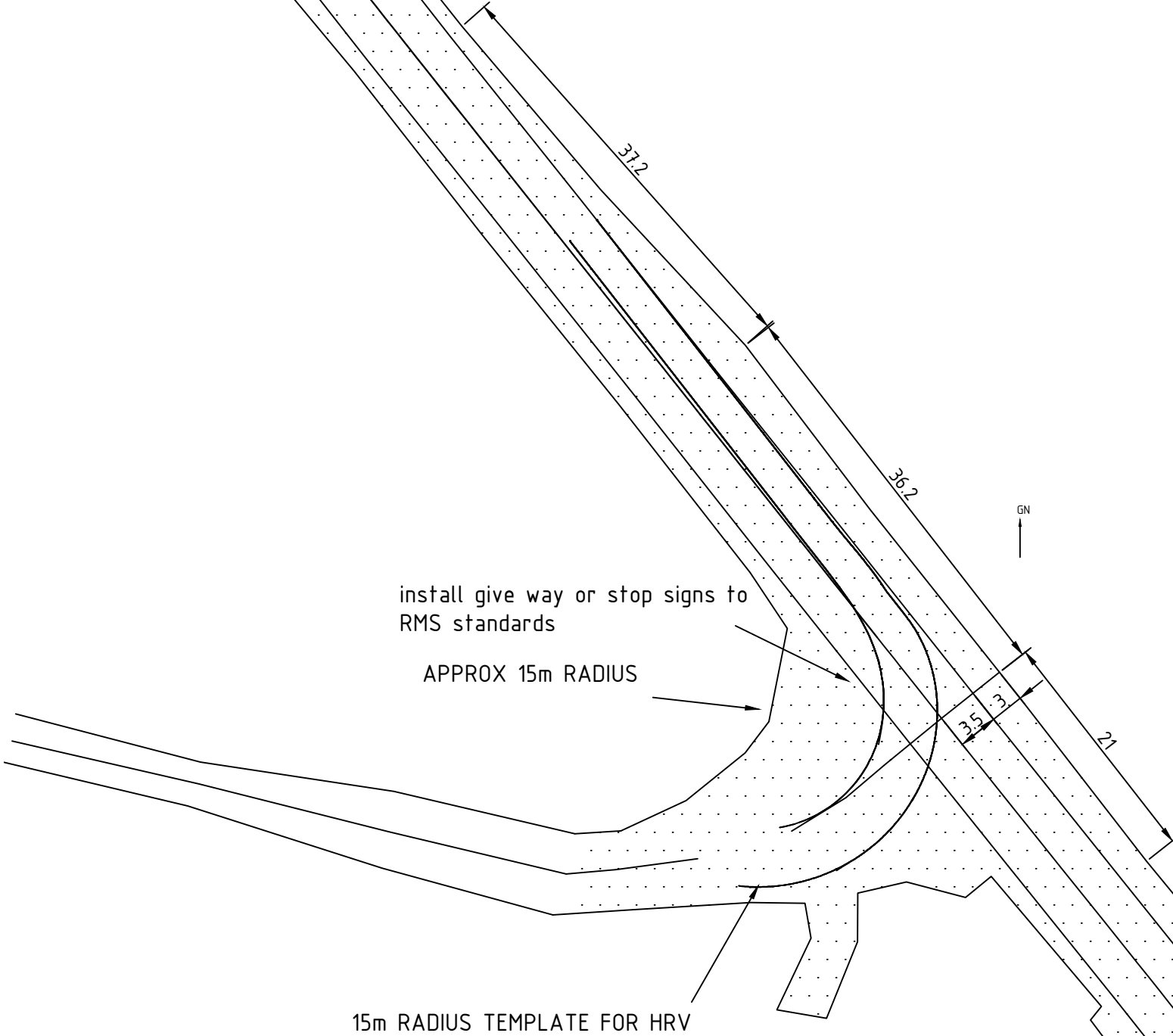
LOT 7  
DP 1018382

SISD section along sight distance with 1.15 sight height at both ends LOOKING SOUTH  
Horizontal scale 1:1000, vertical scale 1:200

# EXISTING ACCESS

SCALE 1:500

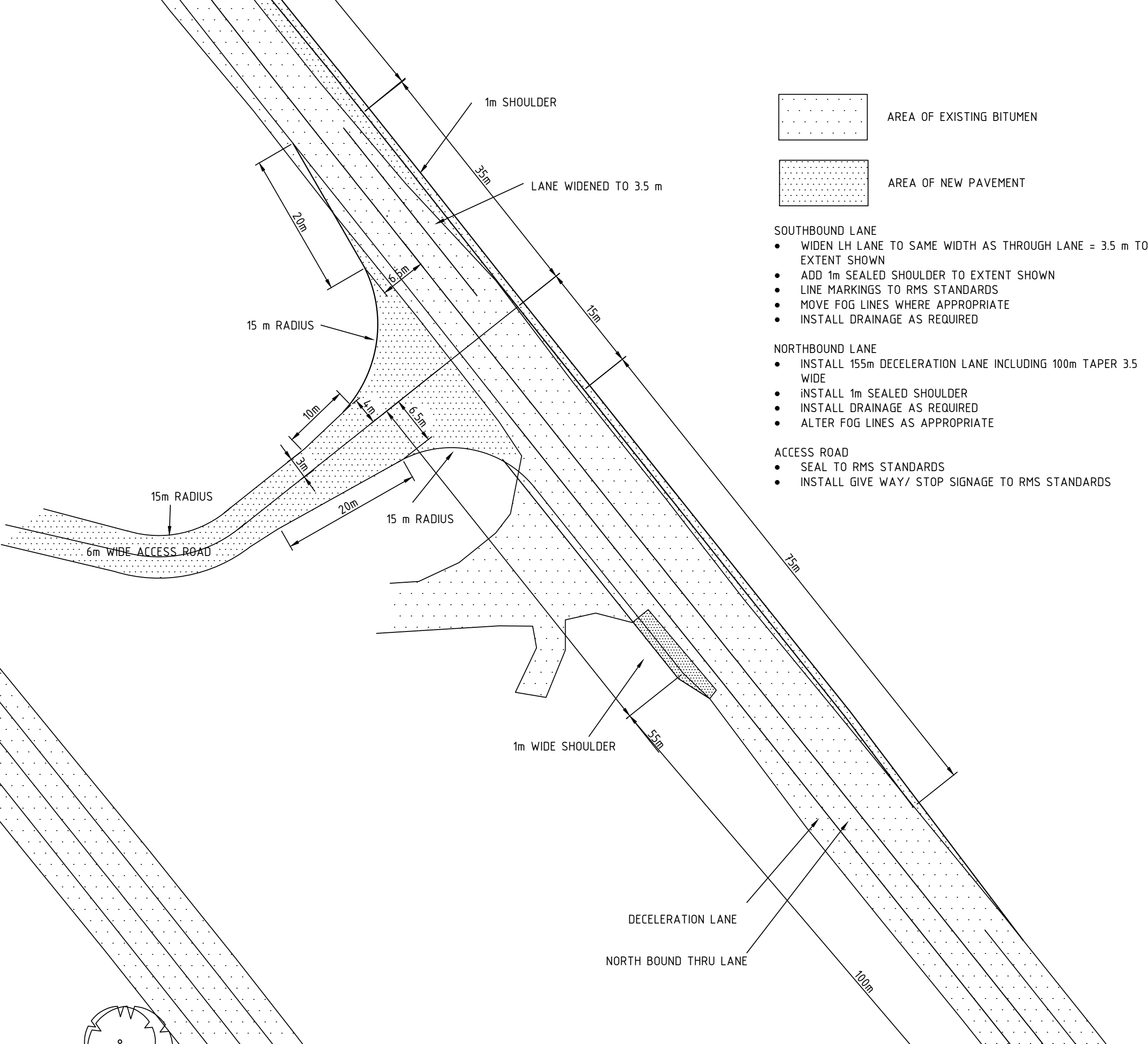
Access at present may be used for development stage 1 subject to RMS approval



# CONCEPT PLAN FOR AU TYPE UPGRADE

SCALE 1:500

This type of intersection may be used from stage 2 to 4 subject to RMS approval



# CONCEPT PLAN FOR CH INTERSECTION DESIGN

SCALE 1:500

This intersection design may be required from development stage 5, subject to RMS approval

