



SMEC INTERNAL REF. 30049249

IMAGE SOURCE: VICTORIAN PLANNING AUTHORITY

Final Concept Design with Final Cost Estimates

### **Melton East PSP – ICP Transport Concept Designs & Costs**

Prepared for: Victorian Planning Authority (VPA)

20 February 2025

Client Reference: PSP 0760

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### 1. Project Understanding

### 1.1 Project Background

Melton East Precinct Structure Plan (PSP) is located 35km north-west of Melbourne's CBD, to the east of the existing Melton township. The PSP will complement existing surrounding development through the provision of residential and commercial opportunities. The precinct is included in the Melbourne Strategic Assessment area and includes Biodiversity Conservation Strategy conservation areas along Kororoit Creek.

#### **1.1.1** Scope

SMEC's scope for concept design and cost estimating comprises the following projects:

- 11\* x Road Projects
- 17 x Intersections
- 3 x Road Bridges
- 6 x Culverts

### 1.2 Reference Documents and Supporting Information

#### 1.2.1 Infrastructure Standards

The following design standards and documents will be adopted:

- Engineering Design and Construction Manual for Subdivision in Growth Areas (VPA, December 2019)
- Guidance for Planning Road Networks in Growth Areas (VicRoads, 2015)
- Benchmark Infrastructure Report (VPA, April 2019)
- Austroads Guide to Road Design and VicRoads Supplements
- VicRoads Road Design Note RDN 04-01, Heavy Vehicle Network Access Considerations (July 2019)
- DTP Bridge Technical Notes
- Austroads Design Vehicles and Turning Path Templates

<sup>\*</sup>The original number of road projects was 21, however some of the road projects were omitted due to proximity of neighbouring intersections, with the two intersections extending to meet, or designed by others.

### 2. Proposed Precinct Structure Plan

### 2.1 Road Connections

5 roads are planned to be upgraded within the Melton East PSP. The road projects are summarised below in Table 1.

Table 1 – Melton East Road Projects

Item No.	Project No.	ltem	Project Description	Design Requirements	Description
1	RD-01-01	Mount Cottrell Road (IN-02 to IN-03)	Secondary Arterial Interim – first carriageway	4 lanes – 60 km/h	<del>Item 2</del>
2	RD-01-02	Mount Cottrell Road (IN-03 to IN-06)	Secondary Arterial Interim – first carriageway	4 lanes – 60 km/h	<del>Item 2</del>
3	RD-01-03	Mount Cottrell Road (IN-06 to IN-08)	Primary Arterial Interim – first carriageway	6 lanes – 80 km/h	<del>ltem 1</del>
4	RD-01-04	Mount Cottrell Road (IN-08 to IN-09)	Primary Arterial Interim – first carriageway	6 lanes – 80 km/h	<del>ltem 1</del>
<del>5</del>	<del>RD-01-05</del>	Mount Cottrell Road (IN-09 to Western Freeway boundary)	Primary Arterial Interim — dual carriageway (4 lane)	6 lanes – 80 km/h	Modified Item 1
6	RD-02-01	Tarletons Road (IN-04 to IN-05)	Primary Arterial Interim – first carriageway	6 lanes – 80 km/h	Item 1
7	RD-02-02	Tarletons Road (IN-05 to IN-06)	Primary Arterial Interim – Same as ultimate due to proximity	6 lanes – 80 km/h	Item 1
8	RD-02-03	Tarletons Road (IN-06 to IN-07)	Secondary Arterial Interim – Same as ultimate due to proximity	4 lanes – 60 km/h	Item 2
9	RD-02-04	Tarletons Road (IN-07 to BR-01)	Secondary Arterial Interim – first carriageway	4 lanes – 60 km/h	Modified Item 2
10	RD-03-01	Taylors Road (IN-09 to IN-10)	Primary Arterial Interim – first carriageway	4 lanes – 80 km/h	Modified Item 2
11	RD-03-02	Taylors Road (IN-10 to IN-11)	Primary Arterial Interim – first carriageway	4 lanes – 80 km/h	Item 2
12	RD-03-03	Taylors Road (IN-11 to IN-13)	Primary Arterial Interim – Same as ultimate due to proximity	4 lanes – 80 km/h	Item 2

Item No.	Project No.	ltem	Project Description	Design Requirements	Description
13	RD-03-04	Taylors Road (IN-13 to IN-16)	Primary Arterial Interim – first carriageway	4 lanes – 80 km/h	Item 2
<del>14</del>	RD-03-05	Taylors Road (IN-16 to IN-17)	Primary Arterial Ultimate – dual carriageway	4 lanes – 80 km/h	Modified Item 2
15	RD-04-01	Paynes Road (BR-02 to IN12)	Connector Boulevard Ultimate – dual carriageway	2 lanes – 60 km/h 28m carriageway	Modified Item 3
<del>16</del>	RD-04-02	Paynes Road (IN12 to IN13)	Connector Road  Ultimate – dual carriageway	2 lanes — 60 km/h 28m carriageway	Modified  Item 3
<del>17</del>	RD 04 03	Paynes Road (IN13 to IN15)	Secondary Arterial Interim – dual carriageway	4 lanes — 60 km/h	Modified Item 2
<del>18</del>	RD-04-04	Paynes Road (IN15 to Western Freeway)	Secondary Arterial Interim – dual carriageway	4 lanes – 60 km/h 200m straight of road over the Western Freeway and then 200m radii turning circle	Modified Item 2
19	RD-05-01	Leakes Road (BR-03 to IN-14)	Secondary Arterial Interim – first carriageway	4 lanes – 60 km/h Native vegetation on the eastern side of Leakes Rd. Duplication must be designed within the Melton East PSP Boundary.	Item 2
20	RD-05-02	Leakes Road (IN-14 to IN-17)	Secondary Arterial Interim – first carriageway	4 lanes – 60 km/h	Item 2
<del>21</del>	<del>RD-05-03</del>	Leakes Road (IN-17 to Western Freeway)	Primary Arterial Interim – Retain existing (not annotated on drawings)	6 lanes — 60 km/h	<del>Item 1</del>

#### Notes

- 1. Strikethroughs indicate road projects that are proposed to be omitted in favour of extending the legs of adjoining intersection boundaries.
- 2. RD-01-05 has been removed post prelim schematics as it has been designed by others.
- 3. RD-04-04 has been removed post prelim schematics as it has been designed by others.
- 4. RD-05-03 has been removed as there is no works proposed for the interim design

For secondary arterial roads with 9.0m carriageway widths, the interim cross-section proposed is 2 x 4.5m lanes as per the ultimate carriageway width. This means that bicycle lanes at the intersection are provided but are not provided in the mid-block, therefore connections to off-road shared use paths are provided.

The design philosophy throughout the PSP has been to align carriageways as close to existing pavements wherever possible and practical. The assumption for cost estimating will be that these pavements would need to be upgraded and pavement rehabilitation works are expected, unless otherwise advised by VPA.

Curve widening has not been shown on the design drawings; however, this will be required as part of the detailed design. Additional space will be provided within the ROW boundaries and the cost estimates will include provision for this widening.

### 2.2 Intersections

A summary of the intersection projects in provided below in Table 2. Design and Check Vehicles have been determined based on the VicRoads Road Design Note RDN 04-01.

Table 2 – Melton East PSP Intersection Projects

Item No.	Project No.	ltem	Project Description	Design Requirements	Description	Design Vehicle	Check Vehicle
22	IN-01	Melton Highway and North- South Connector Road	Primary/ Connector Road T-Signalised Ultimate	Melton Highway – 6 Lane Connector Road	Item 13	19m prime mover and semi- trailer	26m B- Double
23	IN-02	Melton Highway and Mount Cottrell Road	Primary/Connector Road/Primary Arterial Cross signalised Ultimate	Melton Highway – 6 lanes Connector Road Mount Cottrell Road – 4 lanes	Modified Item 6	26m B- Double	35.4m B- Triple
24	IN-03	Mount Cottrell Road and East-West Connector Road	Primary/Connector Road Cross Signalised Ultimate	Mount Cottrell Road – 4 lanes Connector Road – 2 lanes	Item 7	19m prime mover and semi- trailer	26m B- Double
25	IN-04	Tarletons Road and Melton Highway	Primary/Primary Cross-signalised Ultimate Existing Roundabout with POS on east approach Interim	Melton Highway – 6 lanes Tarletons – 6 lanes	Item 5	26m B- Double	35.4m B- Triple
26	IN-05	Tarletons Road and North- South Connector	Primary/Connector Road Cross Signalised Ultimate	Tarletons – 6 lanes Connector Road – 2 lanes	Item 7	19m prime mover and semi- trailer	26m B- Double
27	IN-06	Mount Cottrell Road and Tarletons Road	Primary/Primary/ Primary/Secondary Cross Signalise Ultimate	Mount Cottrell Road South – 6 lanes Mount Cottrell Road North – 4 lanes Tarletons East – 4 lanes Tarletons West – 6 lanes	Modified Item 5	26m B- Double	35.4m B- Triple

Item No.	Project No.	ltem	Project Description	Design Requirements	Description	Design Vehicle	Check Vehicle
28	IN-07	Tarletons Road and North- South Connector	Secondary/Connector Road Cross Signalised - Ultimate	Tarletons – 4 lanes Connector Road	Item 9	19m prime mover and semi- trailer	26m B- Double
29	IN-08	Mount Cottrell Road and East-West Connector	Primary/Connector Road Cross Signalised - Ultimate	Mount Cottrell Road – 6 lanes Connector Road	Item 7	19m prime mover and semi- trailer	26m B- Double
30 <sup>1</sup>	IN-09	Taylors Road / Mount Cottrell Road / Connector	Primary/Primary/Conn ector Road Cross Signalised - Ultimate	Mount Cottrell Road – 6 lanes Taylors Road – 4 lanes Connector Road – 2 lanes	Modified Item 6	26m B- Double	35.4m B- Triple
31 <sup>1</sup>	IN-10	Taylors Road and East-West Connector	Primary/Connector Road Cross Signalised - Ultimate	Taylors Road – 4 lanes Connector Road – 2 lanes	Item 9	19m prime mover and semi- trailer	26m B- Double
32 <sup>1</sup>	IN-11	Taylors Road and North- South Connector	Primary/Connector Road Cross Signalised – Ultimate	Taylors Road – 4 lanes Connector Road – 2 lanes	ltem 9	19m prime mover and semi- trailer	26m B- Double
33 <sup>1</sup>	IN-12	Paynes Road and East-West Connector	Connector Boulevard /Connector Road Cross Signalised - Ultimate	Paynes Road Boulevard – 2 lanes Connector Road – 2 lanes Intersection into BR-02	Modified Item 9 using only connector legs	12.5m Single Unit Truck/Bu S	19m prime mover and semi- trailer
34 <sup>1</sup>	IN-13	Paynes Road and Taylors Road	Primary/Primary/Seco ndary/Secondary Arterial	Taylors Road – 4 lanes Paynes Road – 4 lanes	Item 8 with northern leg transitioning to Connector Boulevard	19m prime mover and semi- trailer	26m B- Double
35 <sup>1</sup>	IN-14	Leakes Road and Beattys Road	Secondary/Connector Road Cross Signalised Ultimate	Leakes Rd – 4 lanes Beattys Road – 2 lanes	Item 9	19m prime mover and semi- trailer	26m B- Double

Item No.	Project No.	ltem	Project Description	Design Requirements	Description	Design Vehicle	Check Vehicle
36	IN-15	Paynes Road and East Connector	Secondary/Connector Road T-Signalised Ultimate	Paynes Road – 4 lanes Connector Road – 2 lanes	Item 15	19m prime mover and semi- trailer	26m B- Double
37 <sup>1</sup>	IN-16	Taylors Road and South Connector	Primary/Connector Road T-Signalised Ultimate	Taylors Road – 4 lanes Connector Road – 2 lanes	Item 15	19m prime mover and semi- trailer	26m B- Double
38 <sup>1</sup>	IN-17	Taylors Road and Leakes Road	Secondary Arterial/ Primary Arterial/Existing Road Cross Signalised Ultimate	Taylors Road West – 4 lanes Taylors Road East – 6 lanes Leakes Road North – 4 lanes Leakes Road South – 6 lanes	Modified Item 6	26m B- Double	35.4m B- Triple

Typical turn lane lengths provided in the design drawings are as per the VPA intersection benchmark drawings. The turn lane lengths in the VPA benchmarks typically allow for deceleration to the stop line as a minimum. Turn lane lengths at detailed design will need to be reconfirmed based on traffic modelling undertaken at such time in the future.

### 2.3 Bridges

A summary of the proposed bridge projects in provided below in Table 3.

Table 3 - Melton East PSP Bridge Projects

Item No.	Project No.	Item	Project Description	Design Requirements	Description
39	BR-01	Tarletons Road crossing Kororoit Creek	Bridge Crossing Interim	Review of provided feasibility assessment	Modified Item 20
40	BR-02	Paynes Road crossing Kororoit Creek	Bridge Crossing Interim	Review of provided feasibility assessment	Modified Item 20
41	BR-03	Leakes Road Bridge Crossing		GHD proposed design to be adopted	Modified Item 20

Bridge 01 and 02 have adopted the grade lines and the 1 in 100-year flood levels provided in the GHD report to ensure compliance with Melbourne Water requirements. For Leakes Road Bridge 03, a 1 in 100-year flood level has not been provided by VPA therefore the grade line has been lifted by approximately 1.0m at the creek crossing to provide additional flood immunity as it is understood that the bridge floods in its current condition. The levels of BR-03 will need to be verified at the detailed design phase of the bridge design to ensure flood immunity.

For BR-03, the road alignment in the interim has adopted the downstream side of the carriageway as requested by VPA.

### 2.3.1 Bridge Costing Review and Commentary

On review of the BR-01 and BR-02 designs and costings provided by VPA within the GHD report, it is noted that these are ultimate designs and costings. The bridge costings have therefore been updated to reflect the interim two-lane bridge proposed.

On review of the bridge costing unit rates provided by VPA, the bridge costing rates appear appropriate for the purposes of preliminary bridge costing. The proposed design adopting 1800m deep concrete Super Ts with a maximum span of 40m appears appropriate. Delivery cost items are currently calculated as percentages and shall be further reviewed as the design is progressed to the next phase including additional allowance for contractor fees/margins and engagement with water catchment authorities as required. VPA shall make appropriate consideration to escalation and the risk of fluctuating material costs in their review of the preliminary costings.

It is noted that benchmark Item 20 appears to be based on driven pile foundations. It is noted that driven piles may not be suitable for the proposed bridge locations based on the anticipated ground conditions where shallow bedrock is normally encountered. Bored piles for the abutment and pier locations would provide a more suitable foundation type. As the bridge slab, foundations, piers, and beams are based on a consolidated rate per area of bridge deck, a change in piling methodology is not expected to have an impact on the initial unit rate adopted for the preliminary costing.

Additional miscellaneous components such as protection screens, on-structure drainage and expansion joints shall be further considered as part of Detailed Design and are currently incorporated as part of the established unit rates in the preliminary bridge costing.

### 2.4 Shared Use Paths, Cyclist Paths, and Footpaths

A series of shared-use paths and cyclist only paths will be included as part of the road's projects. The paths are to be 3.0m wide shared use path as per Engineering Design and Construction Manual for Subdivision in Growth Areas and Austroads guidelines. Where paths cross over roads, SMEC intend to design these crossings as part of intersections, without the need for independent mid-block pedestrian operated signals. There is one pedestrian operated signal proposed within IN-04 in the interim design only, when the eastern leg is an added leg to the roundabout. This pedestrian operated signal provides an opportunity for a safe crossing in the interim solution before the ultimate is built. The costing of this pedestrian operated signal has been included in the IN-04 costing.

Typical footpath widths of 1.5m have been allowed for in accordance with the VPA typical cross-sections as directed. It is noted that AS1428 does require footpath widths to be a minimum 1.8m wide to allow for two wheelchairs to pass. VPA have acknowledged that there would be opportunities for passing at driveway crossovers other incidental paved areas.

### 2.5 Vertical Geometry

Longitudinal sections have been included with the design drawings. Additional detailed cross-sections at 100m centres have been provided for each of the main roads. Refer to Appendix B. The grade lines are concept in nature and show that the amount of cut and fill within this PSP area to be minimal. The design intent was to keep the grade line within 1.0 m of the existing surface which has generally been achieved. The grade lines could be further reviewed during detailed design to ensure cut/fill is in balance.

### 2.6 Sodic and Dispersive Soil Methodology

Based on Jacobs Sodic Soils Assessment Report (2022), it is understood that field inspection and collection of 90 soil samples from 39 test locations across the site were undertaken at the site to assess the characteristic of the soil sodicity and understand correlations with soil dispersion and potential for erosion.

The site inspections did not observe any significant areas of erosion apart from minor surface cracking in the bare surface area and localised erosion around exiting point of drainage pipe where flow release from pipe.

Figure 1 shows the sodic soil test locations and the classified dispersive soil noted in red circle.

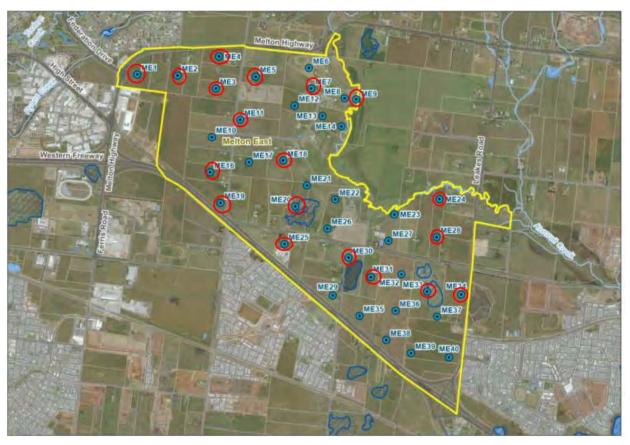


Figure 1 – Emerson dispersion subsoil mapping (remoulded 20 hours) (ref: 07\_Melton\_East\_Sodic\_Soils\_Assessment\_200423\_Rev05 issued on 26 April 2023)

The findings of the sodic soil assessment indicate that erosion risks resulting from exposure of sodic and dispersive soil are high and increase proportional to the extent or depth of exposure. Jacobs reported that the testing conducted for the onsite soil is effective for inferring dispersive soil risks to erosion across the precinct but also noted that the tested non-sodic soils should also be viewed as risk for erosion.

The report provided a concluding remark that "Although the exposure risk by mapping indicates that exposure to sodic soil conditions varies from low to high, dispersion results confirm that all soils should be treated as dispersive or potentially dispersive following disturbance, with a moderate to high erosion risk should they be exposed to rainfall and runoff."

While topsoils were noted by Jacobs typically have better structural stability, the subsoils layers have moderate to high susceptibility to erosion, particularly if topsoil is removed or the site is subjected to drainage. Figure 2 shows the mapped subsoil emersion dispersion findings extracted from Jacobs' report.

As highlighted in the report, four areas have been identified as areas of high erosion risk, which are in the vicinity of existing seasonal wetlands, constructed waterway, Kororoit Creek and steeper slopes along the riverbank.

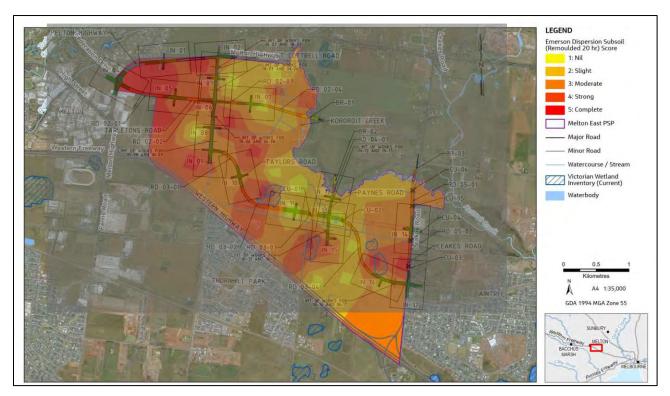


Figure 2 – Emerson dispersion subsoil mapping (remoulded 20 hours) (ref: 07\_Melton\_East\_Sodic\_Soils\_Assessment\_200423\_Rev05 issued on 26 April 2023)

As highlighted in the report, four areas have been identified as areas of high erosion risk (Score rating 3, 4 and 5), which are in the vicinity of existing seasonal wetlands, constructed waterway, Kororoit Creek and steeper slopes along the riverbank.

Based on our review of the sodic soil assessment report and the proposed concept design, soil stabilisation measures and engineering controls as summarised in Table 4 should be considered for the design and construction of the proposed development of this project.

Table 4 – High level recommendation on control measures for managing dispersive soils

Purposed Development	Relevant Geotechnical Work	Identified Geotechnical Risks	Comments and Discussions	Recommended Control Measures	
Site formation/ earthworks	Temporary excavation and fill placement	Proposed road alignment close to the existing wetlands	<ul> <li>Construction and earthwork are likely to cause disturbance to the ground where topsoil will likely be ineffective to protect the underlying subsoil and limit surface runoff or overland flow to the direction or around the wetland which will trigger surface erosion and may affect wetland slope if not managed properly.</li> <li>Earthwork for cutting of subgrade level in the vicinity of wetlands may induce ground instability to the wetlands.</li> </ul>	<ul> <li>Undertake detailed site investigation to assess the stability of the subsurface conditions around wetland to ensure no embankment instability occurs during road excavation and to manage water flow and mitigate the effects of flooding on road base and wetland embankment slope.</li> <li>Minimise disturbance to the existing wetlands during earthworks by mean of barricade of site and no-go-zone boundary.</li> <li>If disturbance occurs, restoration should be carried out through revegetation or use of appropriate geosynthetic materials to temporary protect the exposed surface from further deterioration and erosion.</li> <li>Design and adopt high level compaction to the subgrade and road base layers in combination with appropriate drainage system to minimise subsurface drainage flow that could trigger tunnel erosion.</li> </ul>	
	Subgrade preparation and foundation	Soil erosion due to the dispersive nature of the subsurface soil	<ul> <li>Dispersive soils are highly prone to erosion when exposed to water, causing instability of road base and foundation of the bridge crossing.</li> </ul>	<ul> <li>Undertake detailed site investigation to assess the subsurface conditions and stability of the road subgrade and bridge founding materials to inform suitable foundation design and appropriate protection to any exposed soil such as batter around bridge abutment.</li> </ul>	
				<ul> <li>Avoid constructing subgrade or foundation directly on dispersive and reactive soil.</li> </ul>	
				<ul> <li>Improve the subgrade layer by replacing the existing dispersive soil and reactive clay (immediate below the proposed subgrade or founding level) with imported granular fill materials for a nominal 200-300 thick layer.</li> </ul>	
					<ul> <li>Adopt lime treatment on the soil layers below the replaced fill if required by design.</li> </ul>
				<ul> <li>Incorporate drainage collection and diversion system in the foundation design to ensure no waterlogging or ponding in and around the subgrade or foundation particularly if parts of the backfill around foundation are to be exposed.</li> </ul>	
				Adopt high level compaction to the subgrade and foundation layers.	
				<ul> <li>All finishes of soil layer should be vegetated to control surface runoff and minimise erosion risk.</li> </ul>	

Purposed Development	Relevant Geotechnical Work	Identified Geotechnical Risks	Comments and Discussions	Recommended Control Measures
	Re-use of site won materials	Soil erosion due to the dispersive nature of subsoil material if not managed properly	Dispersive soils are highly susceptible to erosion when expose to water from rainfall or surface runoff	<ul> <li>Recommend stripping off the topsoil for reuse for vegetation within site</li> <li>Apply capping layer to cover and protect the recycled subsoil when re-use on site during construction</li> <li>Alternatively, apply gypsum treatment to the subsoil</li> <li>Gypsum-modified subsoil can only be used outside of the road corridors</li> </ul>
Road Pavement	IN01 to IN17 RD-02-01 to RD-02-04 RD-03-01 to RD-03-04 RD-04-01 RD-05-01 to RD-05-02	Instability of the road base due to the reuse of site won materials and subgrade is subjected to high groundwater table	<ul> <li>Basaltic clay is generally high plasticity and prone to significant shrinkage and swelling</li> <li>Majority of the site is found to be underlain by dispersive soil</li> </ul>	<ul> <li>Conduct a ground investigation and laboratory testing to determine the characteristics of the subsurface soils and the depths to groundwater across the site</li> <li>Apply lime treatment on site won materials before reusing them for subgrade or capping layer</li> <li>Lime-modified materials should be compacted and tested to comply with DTP/VicRoads standards</li> <li>Limit batter slope to 1:4 batters. Any slope steeper than 1:4 to be installed with erosion control mats</li> </ul>
Culverts	CU-01 to CU-06	Instability of the foundations due to the presence of dispersive soils	Dispersive soils are prone to erosion; further settlement may be induced if the soil beneath the foundation of the culvert may be washed away	<ul> <li>Conduct a ground investigation and laboratory testing to determine the characteristics of the subsurface soils and the depths to groundwater across the site</li> <li>Apply clay capping or founding layer and lime treatment to stabilise dispersive soils</li> <li>Backfill materials shall be compacted as per AS3725-2007 or DTP/VicRoads standard whichever applicable</li> <li>Install geotextile to mitigate fine migration and allow filtration</li> </ul>
Bridge crossing at Kororoit Creek	BR-01 to BR-03	Instability of bridge abutment foundation and revetment batter due to dispersive soil	Cutting and/or backfill around bridge abutment that expose dispersive soils to surface runoff or water are prone to erosion and slope instability	<ul> <li>Conduct a ground investigation and laboratory testing to determine the characteristics of the subsurface soils, the depths to groundwater, thickness of the dispersive soils and depth to basalt rock</li> <li>Site walkover at the proposed bridge locations to inspect any signs of tunnel erosion on the riverbank, and possibly any existing slope protective works in the waterway</li> <li>Erosion control measures such as rock beaching, riprap or erosion control mats to protect the soil from further degradation</li> </ul>

Purposed Development	Relevant Geotechnical Work	Identified Geotechnical Risks	Comments and Discussions	Recommended Control Measures
Steep slopes	IN04, IN01, IN02, IN05, IN03, RD-02-03, IN06, IN08, IN09, IN07, RD-02- 04, BR-01, IN10 (The western part of site and near the Kororoit Creek in the central part of the site)	Dispersive soil result in soil erosion especially during heavy rainfall	Soil wash-off or flooding in downslope can be expected due to the decrease in elevation from west to south-east during heavy rainfall.	<ul> <li>Recommend carrying out a surface runoff analysis to estimate the amount of water to be drained during heavy rainfall, and assess the need of reprofiling the site to reduce slope gradient</li> <li>Apply lime treatment to stabilise dispersive soils in the steeper or more critical part of the slope</li> <li>Recommend improving surface cover protection such as rock/concrete barriers, geotextiles or vegetation to prevent soil from being washed away by rainwater</li> </ul>

Based on the above summary of potential treatments, the below treatments have been adopted and applied to the intersection, road, bridge, and culvert projects based on the dispersive soil conditions expected.

Table 5 – Sodic soil contingency application

Treatment Option	Percentage applied to projects	Intersections	Roads	Culverts	Bridges
Provision of soil stabilisation using gypsum to topsoil and 150mm of earth beneath topsoil	10%	IN-01, IN-02, IN-03, IN-04, IN-05, IN-06, IN-07, IN-08, IN-09, IN-10	RD-02-04		BR-01
Batter protection matting	100%	IN01 to IN17	RD-02-01 to RD-02-04 RD-03-01 to RD-03-04 RD-04-01 RD-05-01 to RD-05-02	CU-01 to CU-06	
Lime stabilisation for soil up to 0.5m Back of kerb	100%	IN-01, IN-02, IN-03, IN-04, IN-05, IN-06, IN-08, IN-09, IN-10, IN-14, IN-15	RD-02-01, RD-02-02, RD-02-03, RD-03-01, RD-03-02, RD-03-03, RD-05-01, RD-05-02		
	50%	IN-07, IN-11, IN-12, IN-13, IN-16, IN-17	RD-02-04, RD-03-04, RD-04-01		
200mm capping layer	100%	IN01 to IN17	RD-02-01 to RD-02-04 RD-03-01 to RD-03-04 RD-04-01 RD-05-01 to RD-05-02	CU-01 to CU-06	

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### 2.7 Culvert Projects

Culvert Projects have been provided in accordance with the Melton East OSO Culverts Map. This includes DSS, ICP, and State funded projects.

For the DSS and State funded culverts, a hatch of the nominated location has been provided only. It is understood that further design will be undertaken by others to develop these projects. The nominated road projects have been designed to consider these locations so that they are not precluded in the future when designed.

The ICP culverts have been developed to a high-level concept design. A total of 6 culverts have been included as part of the ICP designs. The culvert sizes have been developed based on flow rates provided by the VPA and Melbourne Water. See below table for a summary of the flow rates adopted and the subsequent culvert sizes. It should be noted that the widths adopted do not necessarily align with the channel corridor shapes provided by VPA, they are based on the discharge rates provided.

The precise discharge rates and exact sizing of culverts should be confirmed at detailed design as some of the provided flows will be heavily dependent on the future road design levels.

Table 6 - Culvert Projects

Project No.	Location	Specified Discharge	Culvert Length	Culvert width	Culvert Size (mm)	Culvert Quantity	Benchmark Infrastructure Report Item No.
CU-01	RD-03	9.5 m3/s	46.36 m	4.2 m	1200 x 2100	38 No. Box Culverts	Item 25
CU-02	RD-03	4.0 m3/s	46.36 m	2.1 m	1200 x 2100	19 No. Box Culverts	Item 25
CU-03	RD-05	3.0 m3/s	41.48 m	2.1 m	1200 x 2100	17 No. Box Culverts	Item 25
CU-04	RD-05	40 m3/s	41.48 m	12.6 m	1200 x 2100	102 No. Box Culverts	Item 25
CU-05	RD-05	5.0 m3/s	41.48 m	2.1 m	1200 x 2100	17 No. Box Culverts	Item 25
CU-06	RD-05	5.0 m3/s	41.48 m	2.1 m	1200 x 2100	17 No. Box Culverts	Item 25

### 2.7.1 Growling Grass Frog Crossings

In the bridge cost estimates, three 10m wide box culverts have been allowed for to facilitate Growling Grass Frog crossings as per DEECA guidelines. A summary of these bridge culverts can be found below in table 7. Their costs have been included as a line item in each of the Bridge Cost Estimates.

Table 7 – Growling Grass Frog crossing Bridge Culvert Projects

Project No.	Location	Culvert Length	Culvert width	Culvert Size (mm)	Culvert Quantity	Benchmark Infrastructure Report Item No.
CU-BR-01	RD-02	36 m	10.5 m	1200 x 2100	85 No. Box Culverts	Item 25
CU-BR-02	RD-04	36 m	10.5 m	1200 x 2100	85 No. Box Culverts	Item 25
CU-BR-03	RD-05	36 m	10.5 m	1200 x 2100	85 No. Box Culverts	Item 25

### 2.8 Existing Overhead Power

The proposed alignments have avoided existing overhead utility poles where possible. The following details the treatment for each existing location.

Melton Highway north side of carriageway: The existing utility poles are expected to be retained. An
appropriate barrier treatment such as guard fence will be required. The proposed Shared Use Path will need
to be aligned in detailed design so that is does not clash with the existing poles.

- Mount Cottrell Road: The existing poles alternate from the east side to the west side of the alignment and vary
  in offset from the existing property boundaries and clash with the works by others at the southern limit of
  works. Therefore, based on the existing alignment of the overhead power, these poles are expected to be
  relocated.
- Taylors Road (Former Beattys Road): The existing power poles on the north side from RD-03-02 to RD-03-03 are expected to be retained. The overhead power then deviates to the south side of the existing road. The poles on the south side will be impacted by the proposed alignment and will need to be relocated to the north side of the carriageway for IN-13.
- Leakes Road: No existing overhead power was identified.

#### 2.9 Constraints

The below list of constraints have been used by SMEC in the production of the final concept plans:

- Cadastral / property boundaries.
- Reuse of existing carriageways / pavements where possible.
- Existing vegetation and roadside infrastructure such as culverts, active transport routes etc.
- Design / check vehicles.
- Melbourne Water Flood Level.

#### 2.10 Cost Estimates

Cost estimates have been prepared based on rates from the benchmark rates from the VPA Benchmark Infrastructure Costings Report (2019) using P90 rates. The interim design is used as the basis for the costing. Costs were indexed in accordance with the VPA Benchmark Infrastructure Cost Guide. Refer to Appendix C.

Please note that the cost estimates for IN-01, IN-02 and IN-14 are inclusive of both the ICP and the amount expected to be funded by the delivery agent. The amount expected to be funded by the delivery agent is provided in Appendix C as IN-01A, IN-02A and IN-14A and is summarized below:

IN-01A: \$1,183,562.06
 IN-02A: \$1,453,453.69
 IN-14A: \$2,060,775.77

Cost estimates are provided to the Victorian Planning Authority for budgeting purposes only for the Infrastructure Contributions Plan. SMEC Australia assumed no liability for losses incurred through changes to the quantities required to construct the projects or increases in construction costs. These values are not intended for use in construction and do not constitute a bill of quantities.

### 2.10.1 Exclusions from the cost estimates

No allowance has been included for:

- Utility relocation works (an allowance for protection of existing utilities for intersections projects is provided)
- Water Sensitive Urban Design (WSUD)

### Appendix A Final Concept Drawings



# MELTON EAST PSP

## DESIGN DRAWINGS

Controlled Copy Issue Number



Computer File: 30049249--2000.dgn

Catalogue: General Project: 30049249

Drawing No. 30049249--2000

SHEET NUMBER	DRAWING NUMBER	TITLE BLOCK	
1	300492492000	COVER SHEET	
2	300492492100	DRAWING INDEX	
3	300492492200	PSP KEY PLAN	
4	300492492201	NOTES AND LEGEND	
5	300492492301	TYPICAL SECTIONS	
6	300492492302	TYPICAL SECTIONS	
7	300492492302	TYPICAL SECTIONS	
	ALIGNMENT PLANS		
8		IN-01 - MELTON HIGHWAY AND NORTH-SOUTH CONNECTOR BOULEVARD	
9	300492493002	IN-02 - MELTON HIGHWAY AND MOUNT COTTRELL ROAD	
10	300492493003	IN-03 - MOUNT COTTRELL ROAD AND EAST-WEST CONNECTOR	
11	300492493004	IN-04 - TARLETONS ROAD AND MELTON HIGHWAY	
12	300492493005	IN-05 - TARLETONS ROAD AND NORTH-SOUTH CONNECTOR	
13	300492493006		
14	300492493007	IN-06 - MOUNT COTTRELL ROAD AND TARLETONS ROAD IN-07 - TARLETONS ROAD AND NORTH-SOUTH CONNECTOR	
15	300492493007	IN-07 - TARLETONS ROAD AND NORTH-SOUTH CONNECTOR	
16		IN-08 - MOUNT CUTTRELL ROAD AND EAST-WEST CONNECTOR	
17	300492493009 300492493010	IN-10 - TAYLORS ROAD AND EAST-WEST CONNECTOR	
18	300492493010	IN-10 - TAYLORS ROAD AND ROSTH-SOUTH CONNECTOR	
19			
	300492493012	IN-12- PAYNES ROAD AND EAST-WEST CONNECTOR	
20	300492493013	IN-13 - TAYLORS ROAD AND PAYNES ROAD	
21	300492493014	IN-14 - LEAKES ROAD AND BEATTYS ROAD	
22	300492493015	IN-15 - PAYNES ROAD AND EAST CONNECTOR	
23	300492493016	IN-16 - TAYLORS ROAD AND A SOUTH CONNECTOR	
24	300492493017	IN-17 - TAYLORS ROAD AND LEAKES ROAD	
25	ALIGNMENT PLAN-		
25	300492495001	RD-02-01- TARLETONS ROAD IN-04 TO IN-05	
26	300492495002	RD-02-02- TARLETONS ROAD IN-05 TO IN-06	
27	300492495003	RD-02-03- TARLETONS ROAD IN-06 TO IN-07	
28	300492495004	RD-02-04- TARLETONS ROAD IN-07 TO BR-01	
29	300492495005	RD-03-01- TAYLORS ROAD IN-09 TO IN-10	
30	300492495006	RD-03-02- TAYLORS ROAD IN-10 TO IN-11	
31	300492495007	RD-03-03- TAYLORS ROAD IN-11 TO IN-12	
32	300492495008	RD-04-01-PAYNES ROAD IN-12 TO BR-02	
33	300492495009	RD-03-04-TAYLORS ROAD IN-13 TO IN-16 SHEET 1	
34	300492495010	RD-03-04-TAYLORS ROAD IN-13 TO IN-16 SHEET 2	
35	300492495011	RD-05-02-LEAKES ROAD IN-14 TO IN-17	
36	300492495012		
27	ALIGNMENT PLANS		
37	300492496001	BR-01-TARLETON ROAD CROSSING KOROROIT CREEK	
38	300492496002	BR-02- PAYNES ROAD CROSSING KOROROIT CREEK	
39	300492496003	BR-03- LEAKES ROAD CROSSING KOROROIT CREEK	
L	LONG SECTION	MELTAN HIGH AV MON OUTET A	
40	300492497001	MELTON HIGHWAY-MC01 SHEET 1	
41	300492497002	MELTON HIGHWAY-MC01 SHEET 2	
42	300492497003	MELTON HIGHWAY-MC01 SHEET 3	
43	300492497004	MELTON HIGHWAY-MC01 SHEET 4	
44	300492497005	MELTON HIGHWAY-MC01 SHEET 5	
45	300492497006	MELTON HIGHWAY-MC01 SHEET 6	

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47	300492497008	MELTON HIGHWAY-MC01 SHEET 8
48	300492497009	MELTON HIGHWAY-MC01 SHEET 9
49	300492497010	TARLETONS ROAD-MC02 SHEET 1
50	300492497011	TARLETONS ROAD-MC02 SHEET 1
51	300492497012	TARLETONS ROAD-MC02 SHEET 2
52	300492497013	TARLETONS ROAD-MC02 SHEET 3
53	300492497014	TARLETONS ROAD-MC02 SHEET 4
54	300492497015	TARLETONS ROAD-MC02 SHEET 5
55	300492497016	TARLETONS ROAD-MC02 SHEET 6
56	300492497017	TARLETONS ROAD-MC02 SHEET 7
57	300492497018	TARLETONS ROAD-MC02 SHEET 8
58	300492497019	TARLETONS ROAD-MC02 SHEET 9
59	300492497020	TARLETONS ROAD-MC02 SHEET 10
60	300492497021	MOUNT COTTRELL-MC03 SHEET 1
61	300492497022	MOUNT COTTRELL-MC03 SHEET 2
62	300492497023	MOUNT COTTRELL-MC03 SHEET 3
63	300492497024	MOUNT COTTRELL-MC03 SHEET 4
64	300492497025	MOUNT COTTRELL-MC03 SHEET 5
65	300492497026	MOUNT COTTRELL-MC03 SHEET 6
66	300492497027	TAYLORS ROAD-MC04 SHEET 1
67	300492497028	TAYLORS ROAD-MC04 SHEET 2
68		
69	300492497029	TAYLORS ROAD-MCO4 SHEET 3
	300492497030	TAYLORS ROAD MCOV SHEET 4
70	300492497031	TAYLORS ROAD-MC04 SHEET 5
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72	300492497033	TAYLORS ROAD-MC04 SHEET 7
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77	300492497038	TAYLORS ROAD-MC04 SHEET 12
78	300492497039	TAYLORS ROAD-MC04 SHEET 13
79	300492497040	TAYLORS ROAD-MC04 SHEET 14
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83	300492497044	PAYNES ROAD-MC05 SHEET 4
84	300492497045	LEAKES ROAD-MC06 SHEET 1
85	300492497046	LEAKES ROAD-MC06 SHEET 2
86	300492497047	LEAKES ROAD-MC06 SHEET 3
87	300492497048	LEAKES ROAD-MC06 SHEET 4
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89	300492497050	LEAKES ROAD-MC06 SHEET 6
90	300492497051	LEAKES ROAD-MC06 SHEET 7
	CULVERT TYPICAL	
91	300492498001	CULVERT & WATERWAY CROSSING TYPICAL DETA
	STRUCTURAL TYPI	
92		BRIDGE ELEVATIONS

#### **WARNING**

BEWARE OF UNDERGROUND SERVICES THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.



### DESIGNED H DADWAL APPROVED A DONATO Victorian Planning Authority

SCALE OF METRES

### MELTON EAST PSP

**FINAL DESIGN** 

VICTORIAN PLANNING AUTHORITY GENERAL ALIGNMENT PLAN DRAWING INDEX

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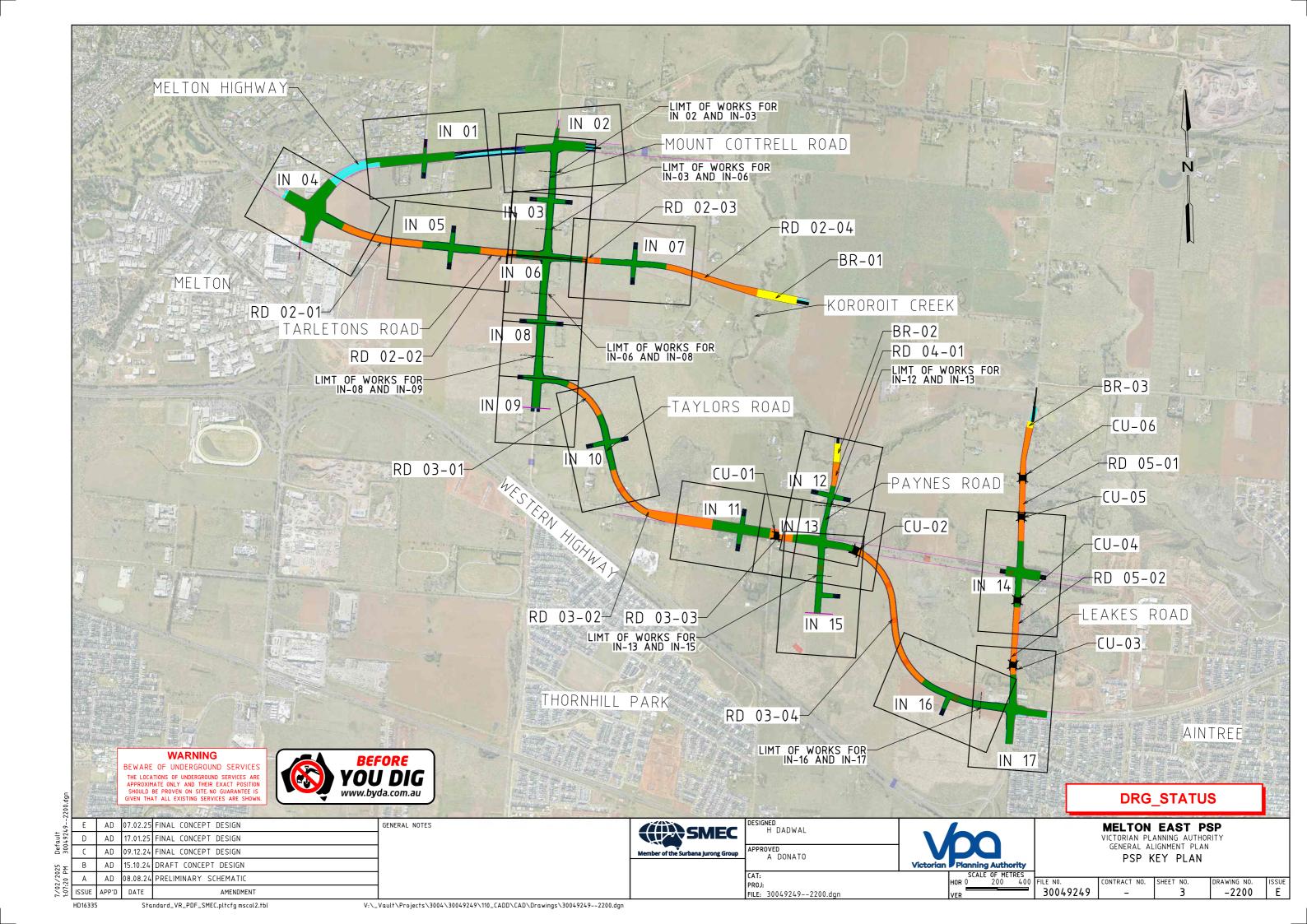
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SMEC
Member of the Surbana Jurong Group

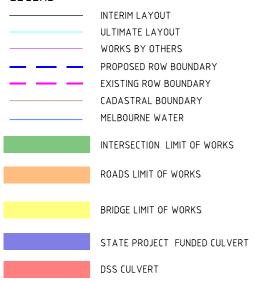
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#### GENERAL NOTES:

- 1. PROPOSED ROW BOUNDARY BASED ON TYPICAL CROSS SECTION AND TYPICAL INTERSECTION WIDTHS.
- ROAD CROSS SECTIONS HAVE BEEN ADOPTED FROM THE VPA TYPICAL CROSS SECTIONS. 2.
- THE CO-ORDINATE SYSTEM USED IN ALL DRAWINGS IS MGA2020 (ZONE 55).
- NO ASSESSMENT OF EXISTING OR PLANNED UTILITY SERVICES HAS BEEN UNDERTAKEN IN THE DEVELOPMENT OF THE INTERSECTIONS.
- LINEMARKING IS INDICATIVE AND REPRESENTATIVE OF THE FUNCTIONALITY OF THE INTERSECTION ONLY.
- TYPICAL TRAFFIC LANE WIDTHS ARE 3.5m
- 7. ALL SLIP LANES ARE 5m WIDE MIN AS PER DTP REQUIREMENTS
- SQUARE METRE AREAS SHOWN ON PLANS IS EQUAL TO THE TOTAL PROJECT AREA UP TO THE PROPOSED RIGHT OF WAY (ROW). THESE AREAS ARE SUBJECT TO CHANGE PROVIDED THE ACCETPANCE OF THE PROPOSED ROW BOUNDARIES.
- BR-01, BR-02 AND BR-03 TO PROVIDE 3 GROWLING GRASS FROG ACCESS CULVERT CROSSINGS AS PER DELWP GUIDELINES. EXACT LOCATIONS TO BE CONFIRMED IN DETAILED DESIGN.

#### LEGEND:



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Planning Authority SCALE OF METRES FILE: 30049249--2201.dgn

**MELTON EAST PSP** VICTORIAN PLANNING AUTHORITY GENERAL ALIGNMENT PLAN NOTES AND LEGEND

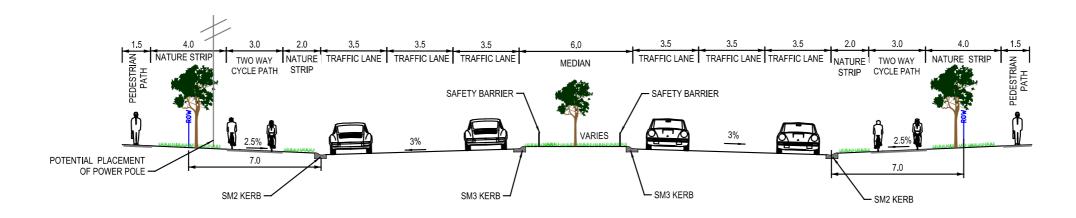
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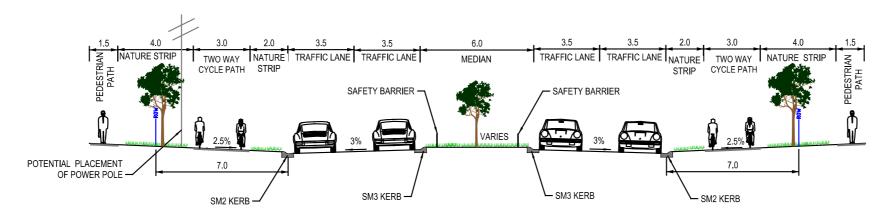
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GENERAL NOTES



### PRIMARY ARTERIAL 6 LANES



### PRIMARY ARTERIAL 4 LANES

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### **FINAL DESIGN**

**MELTON EAST PSP** 

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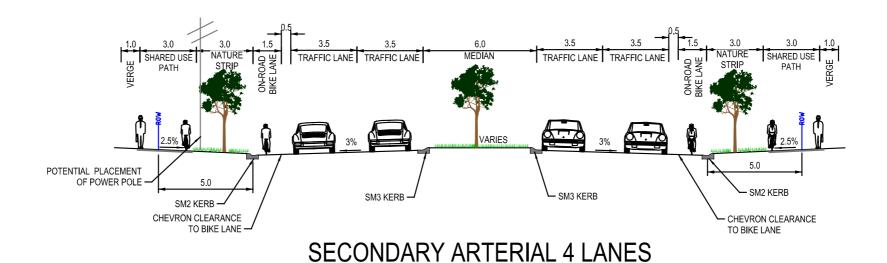
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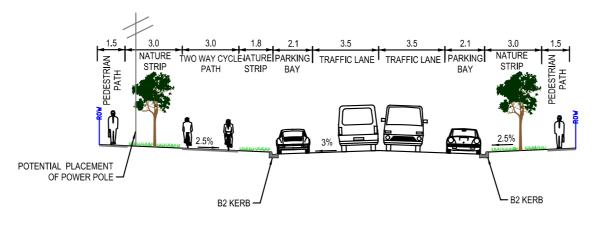
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**CONNECTOR STREET** 

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### **FINAL DESIGN**

| GENERAL NOTES | GENERAL NOTE

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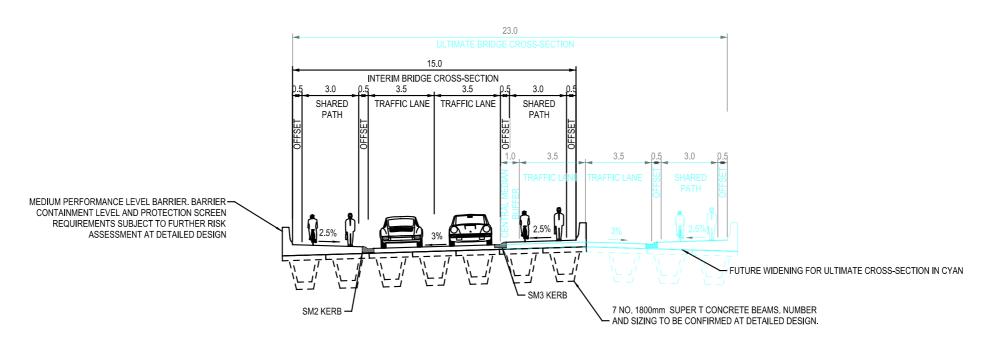
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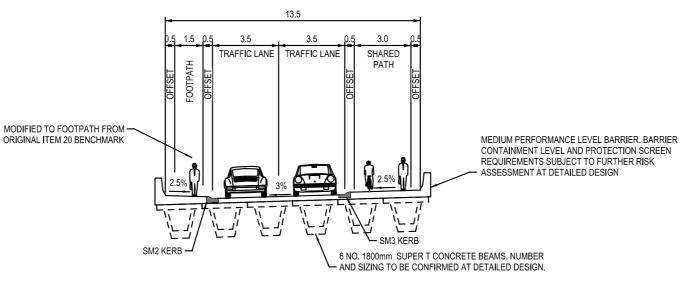
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### TARLETONS ROAD (BR-01) / LEAKES ROAD (BR-03) BRIDGE SECTION (ITEM 20)



### PAYNES ROAD (BR-02) BRIDGE SECTION (MODIFIED ITEM 20)

### WARNING

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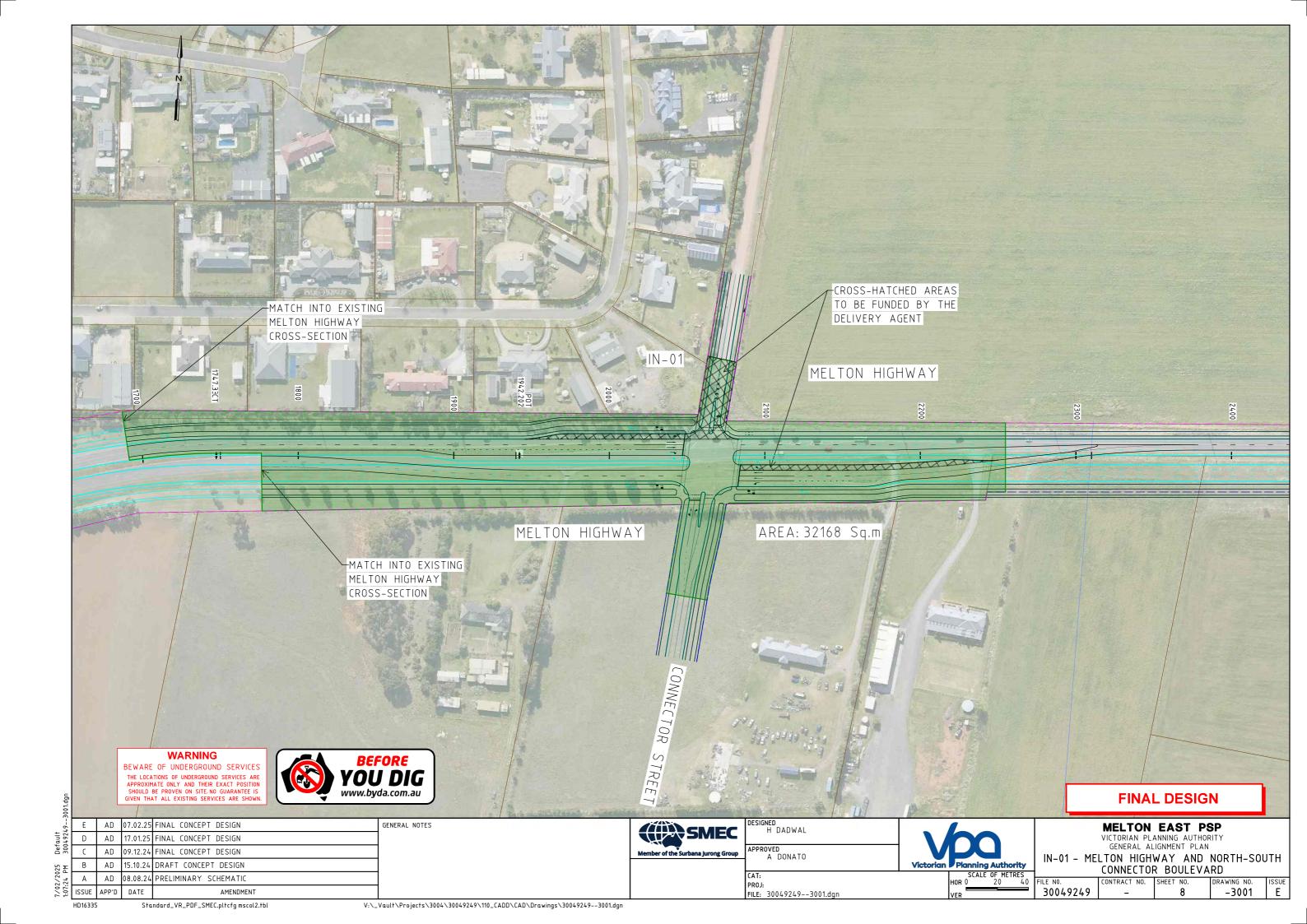
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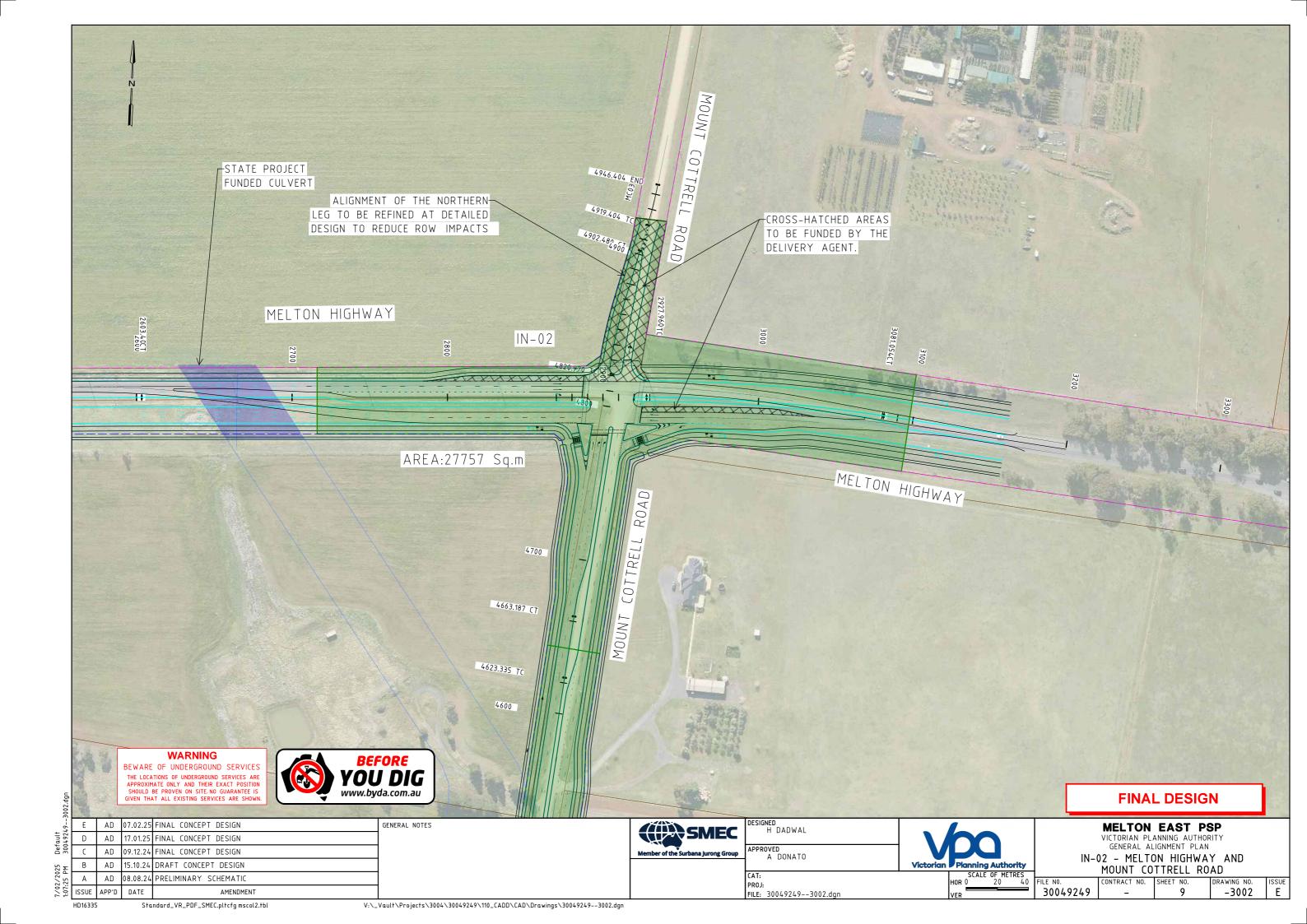
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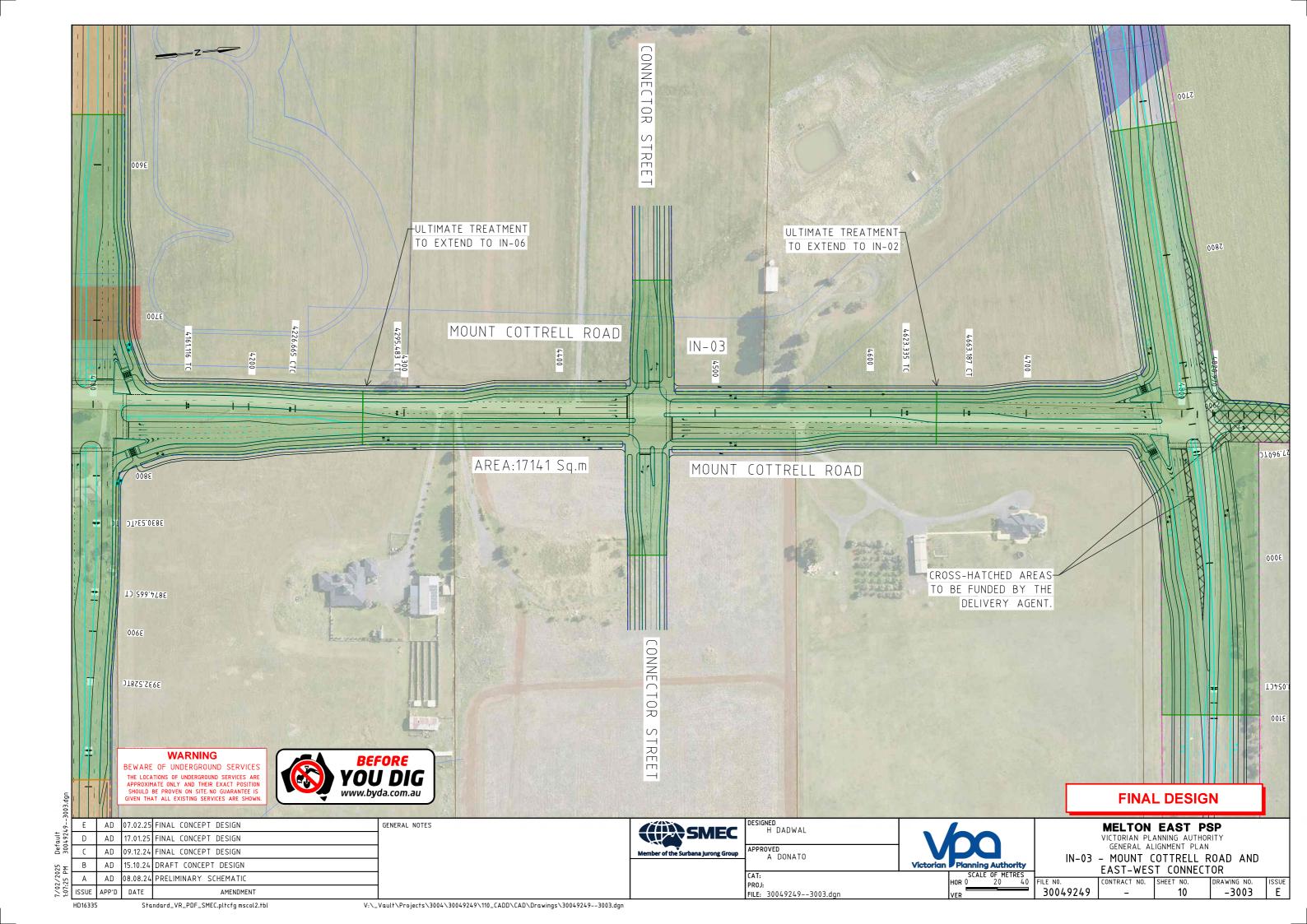
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TYPICAL SECTIONS

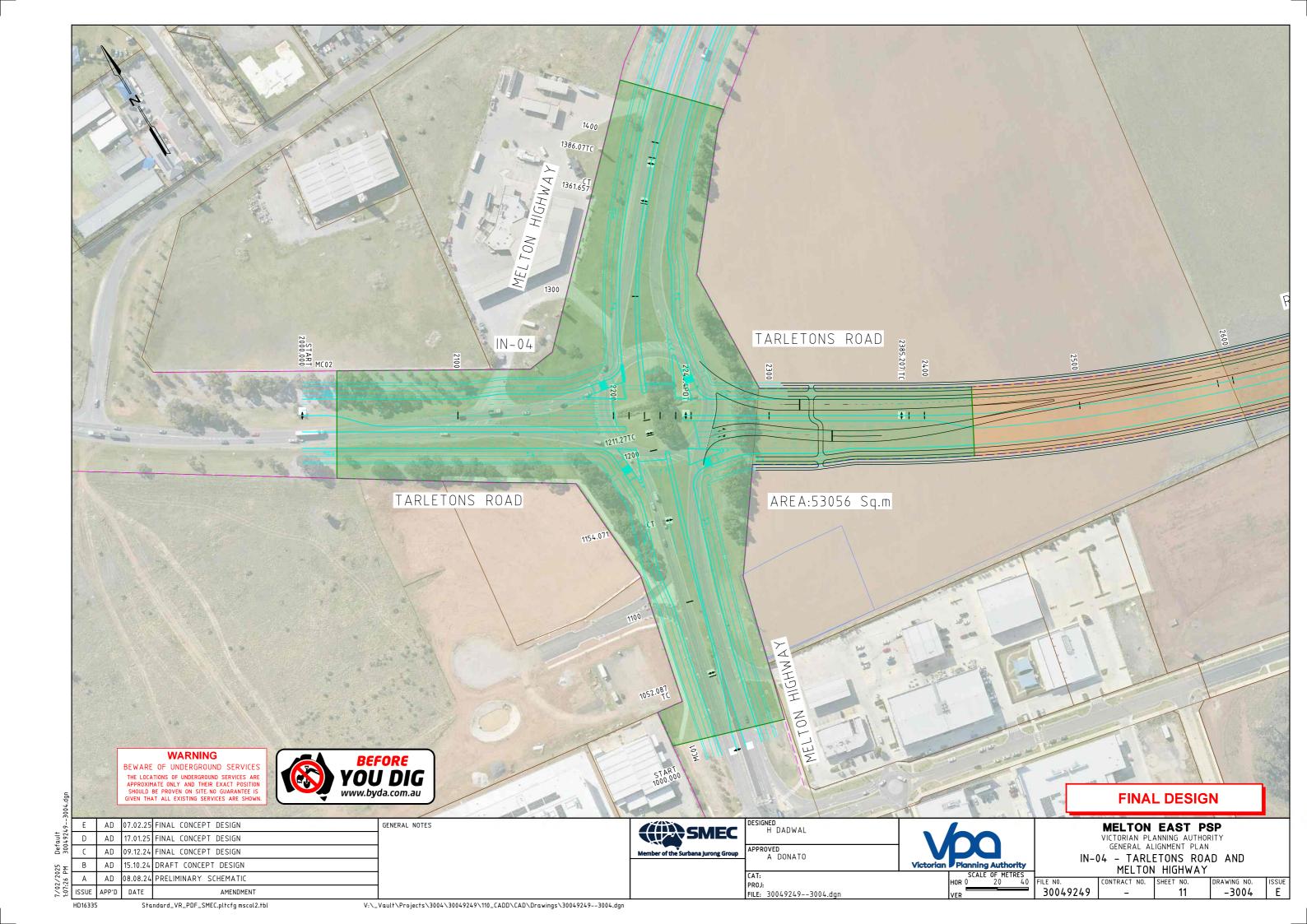
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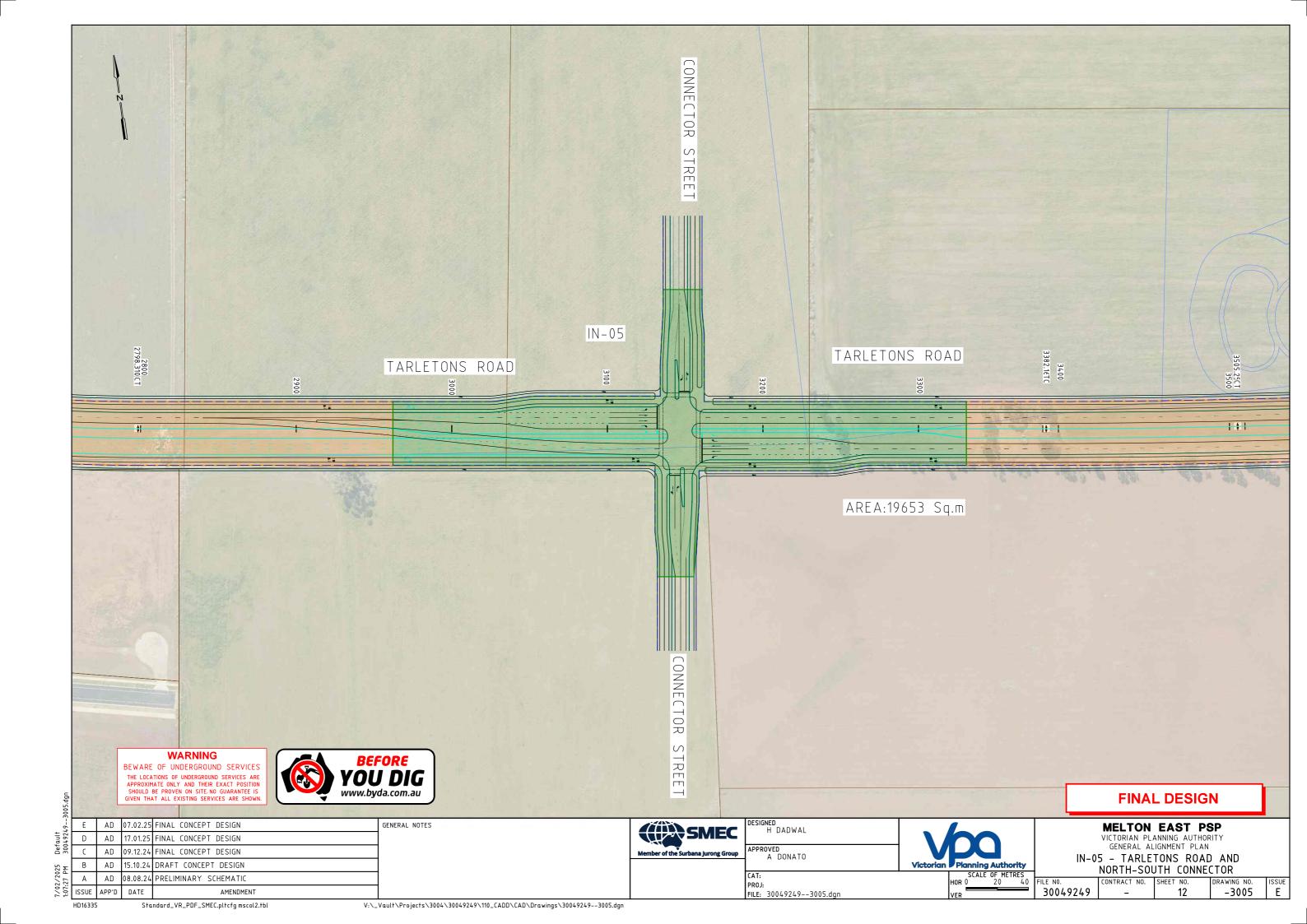
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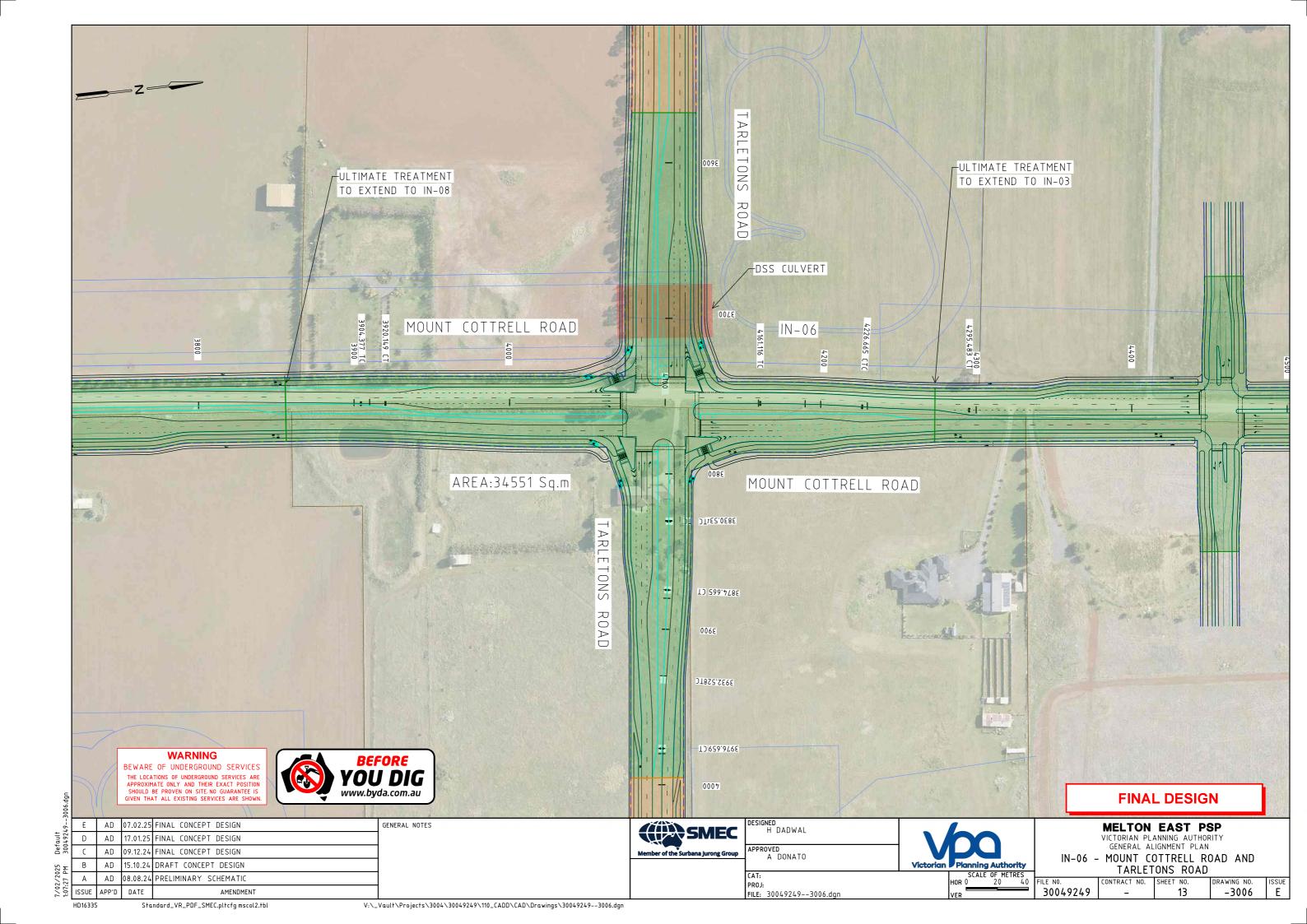


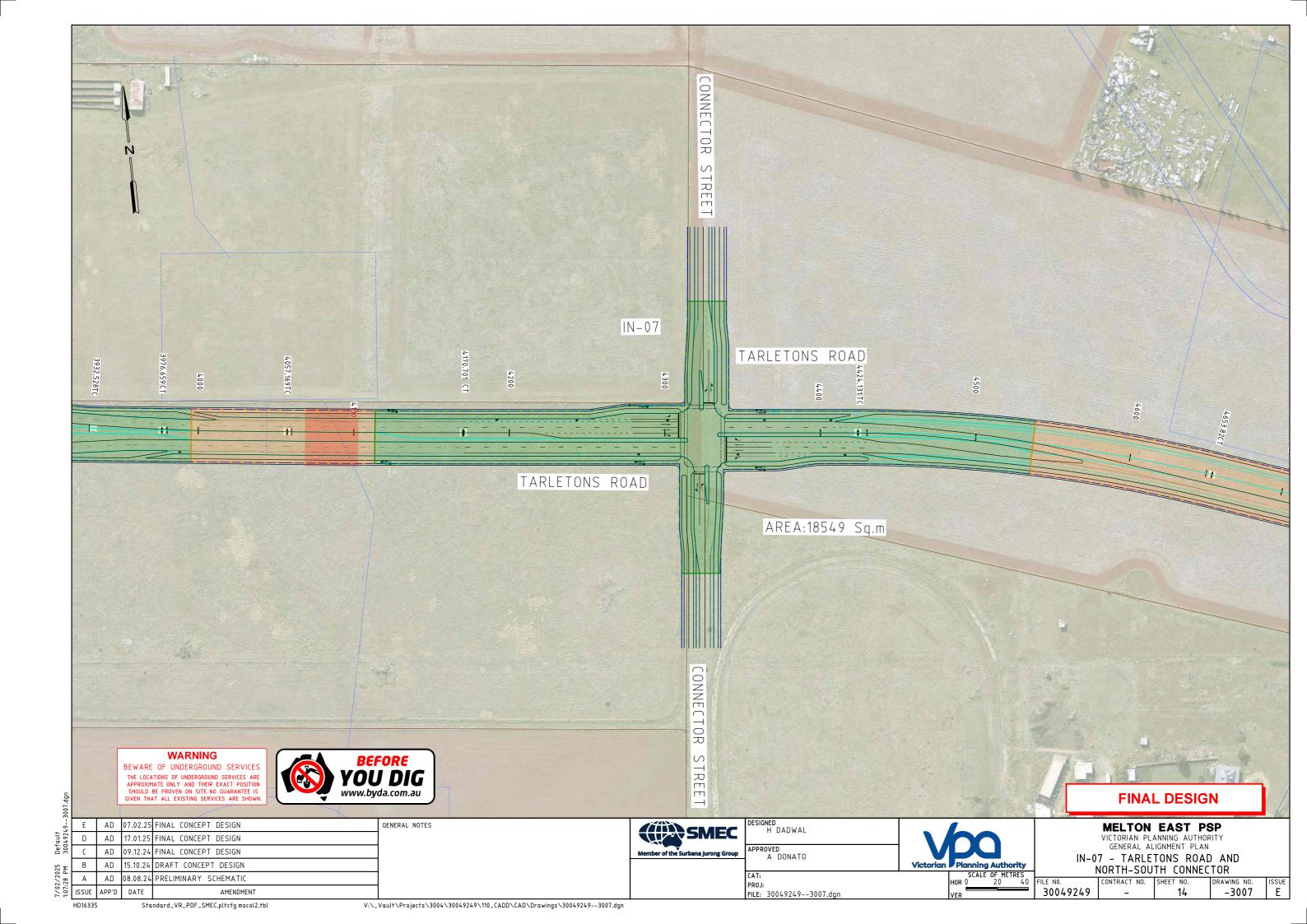


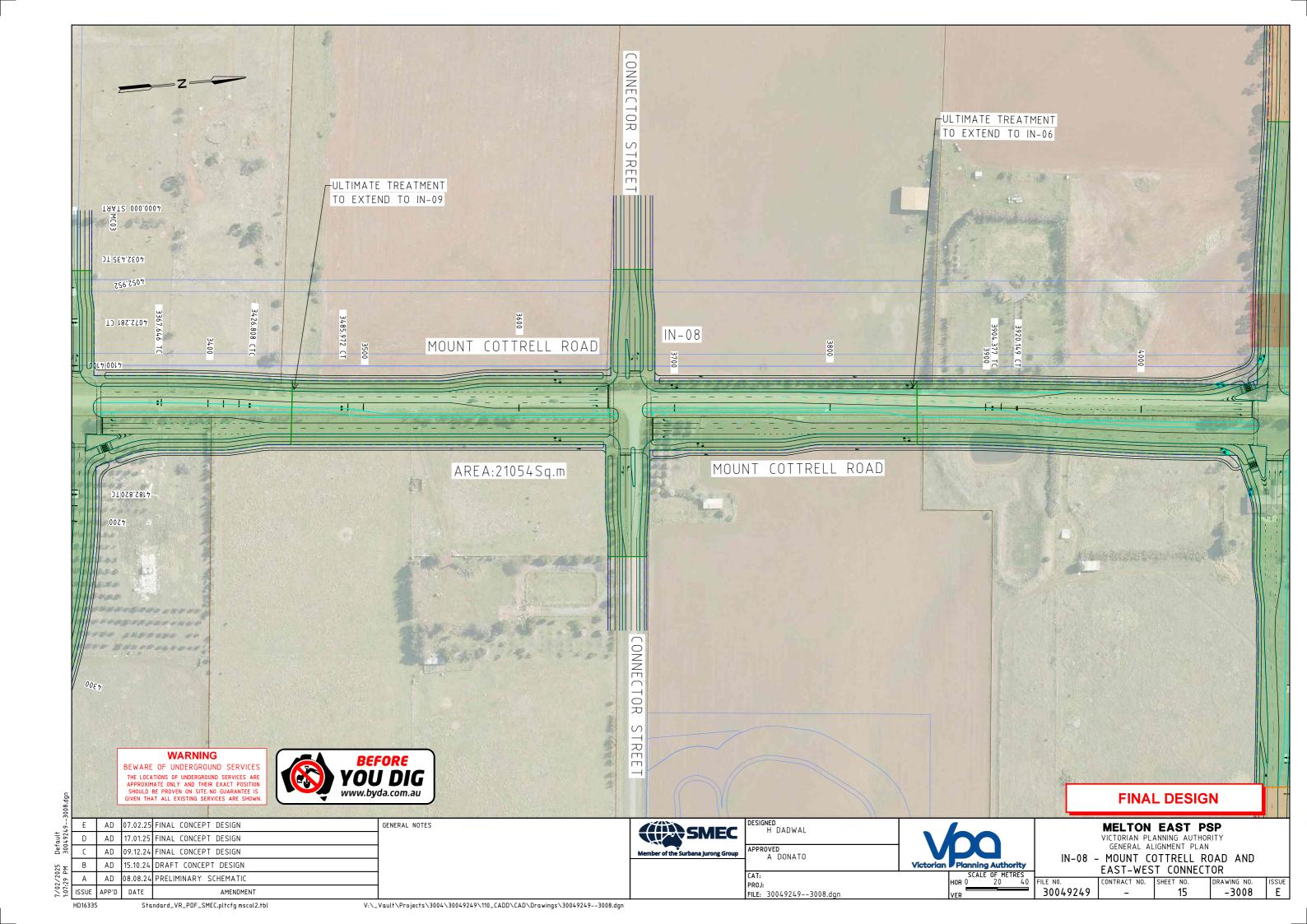


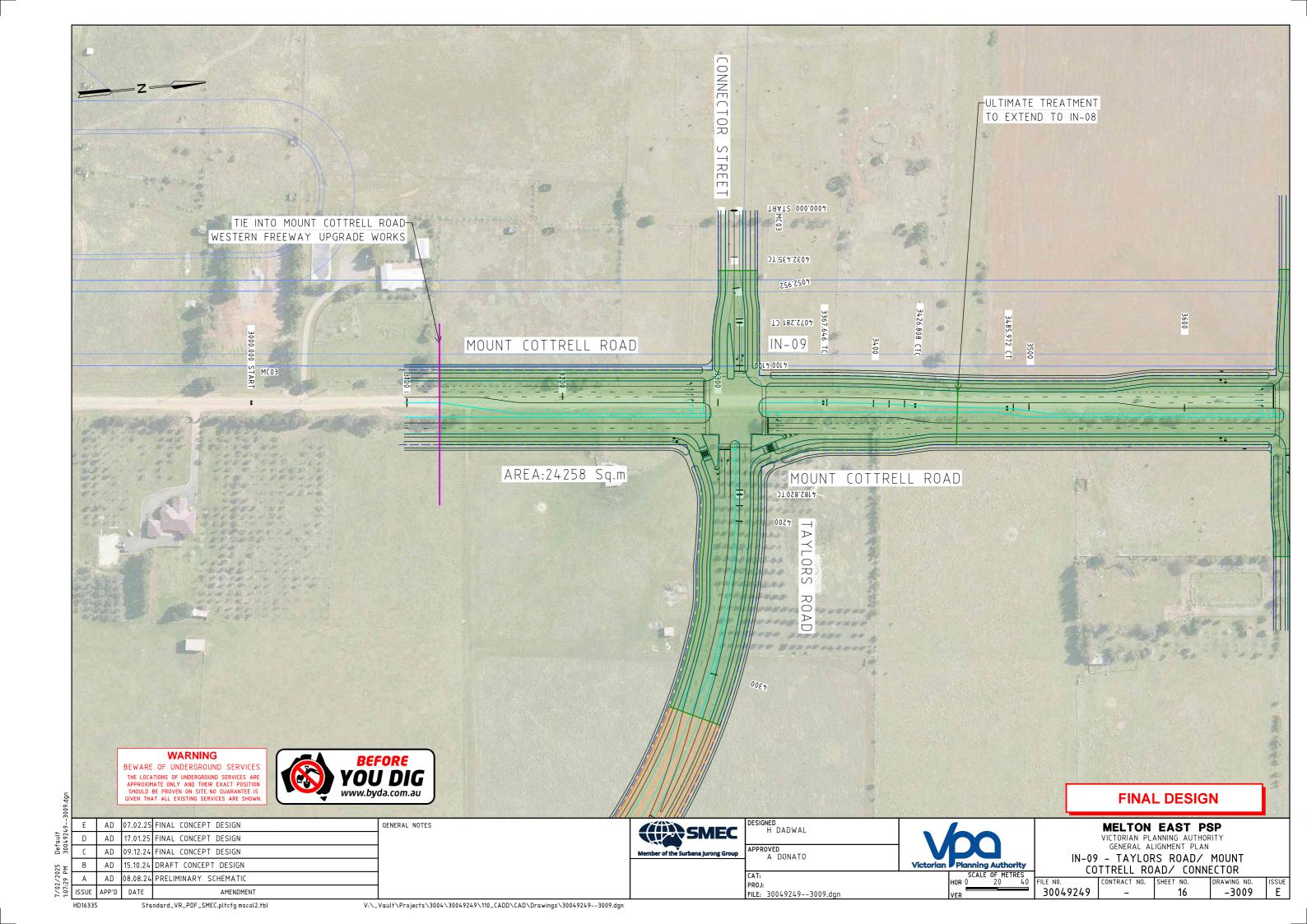


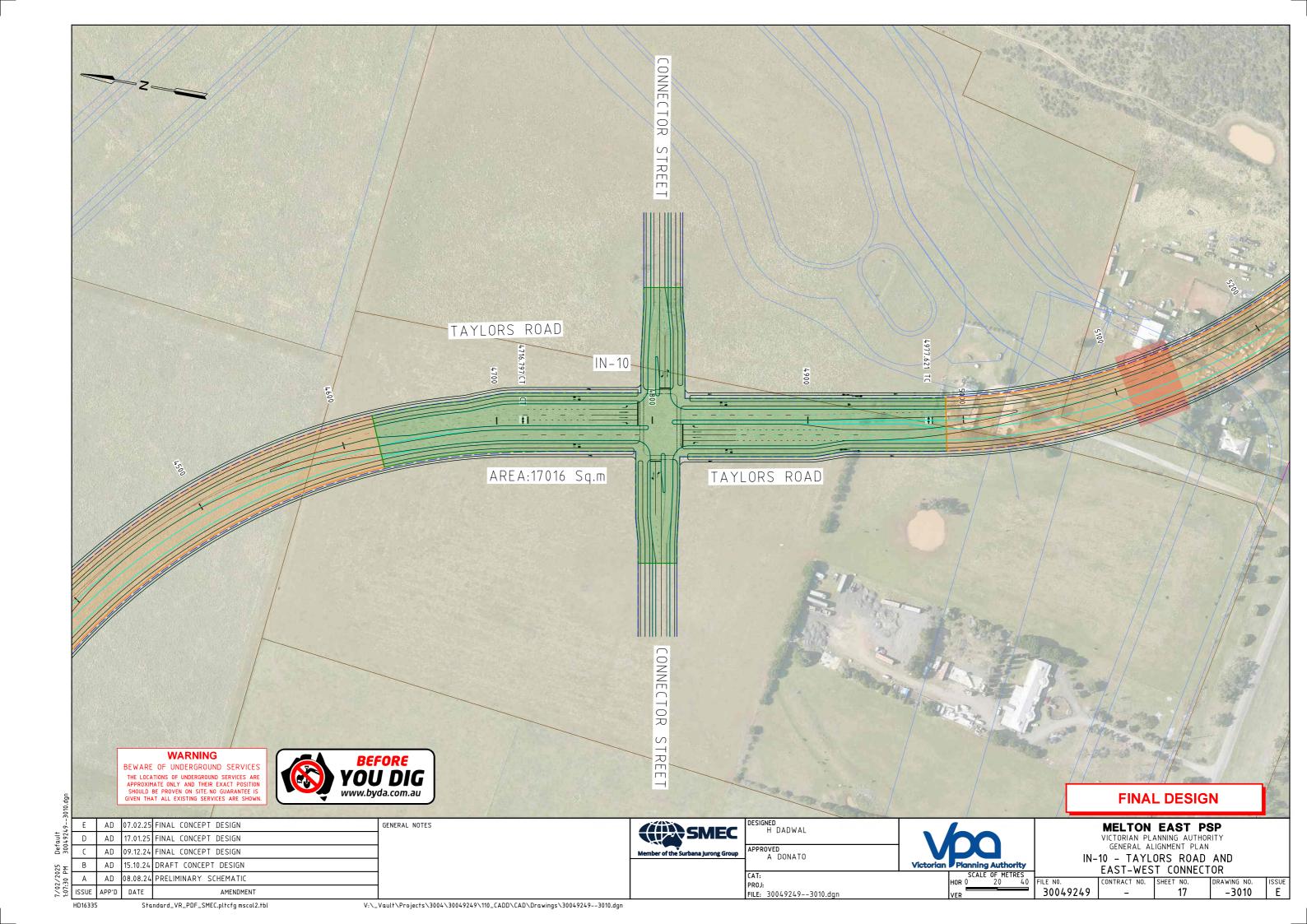


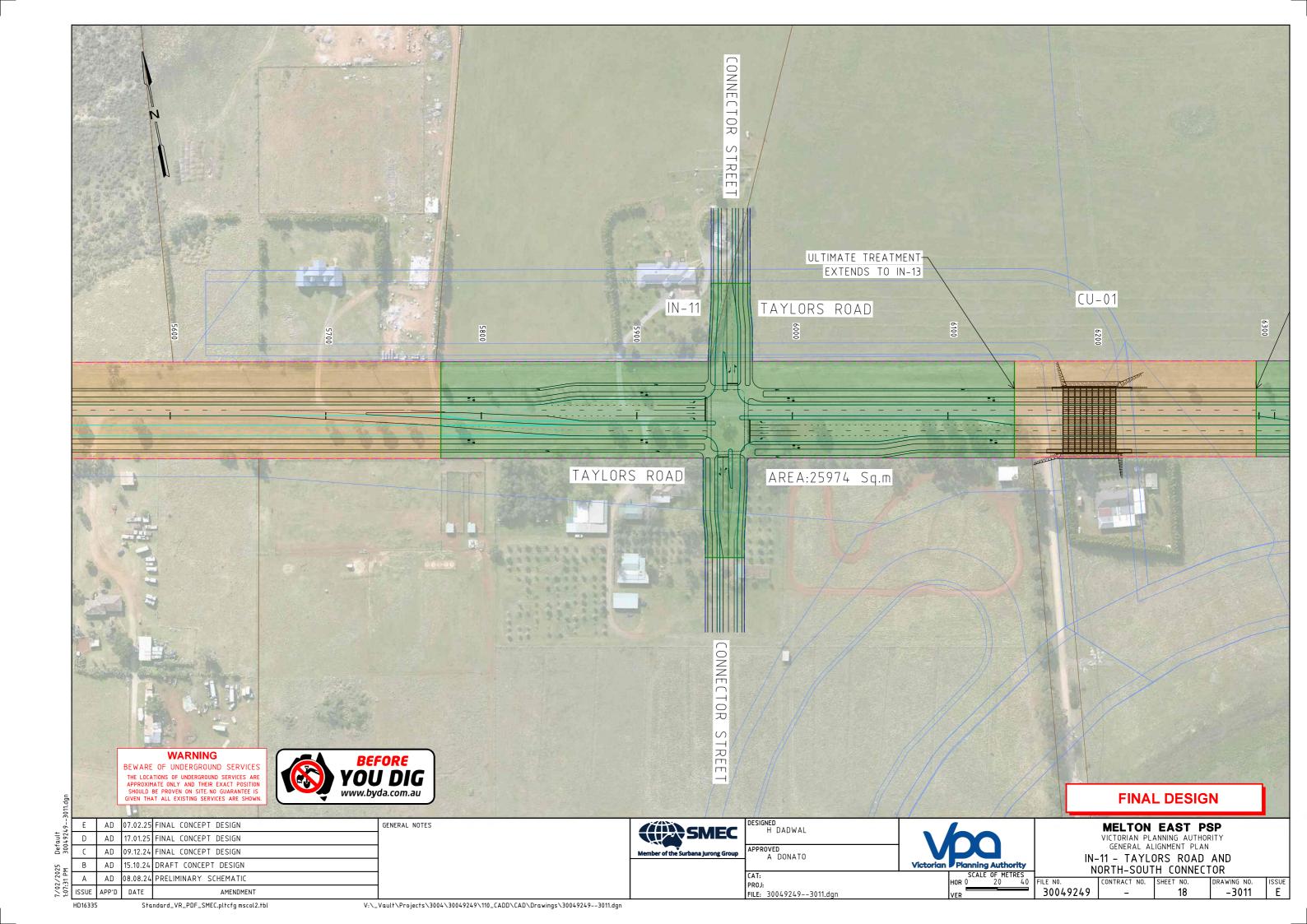


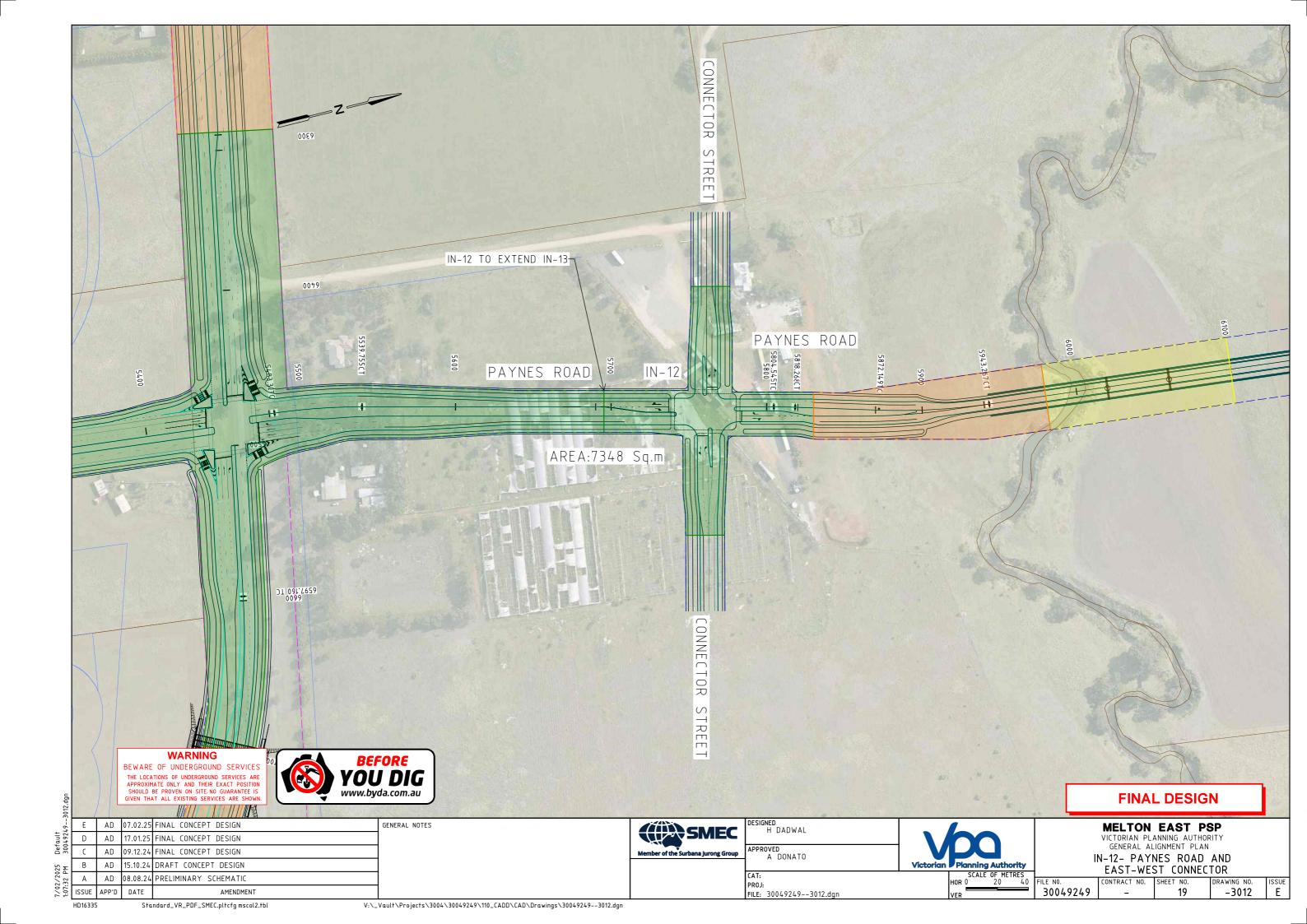


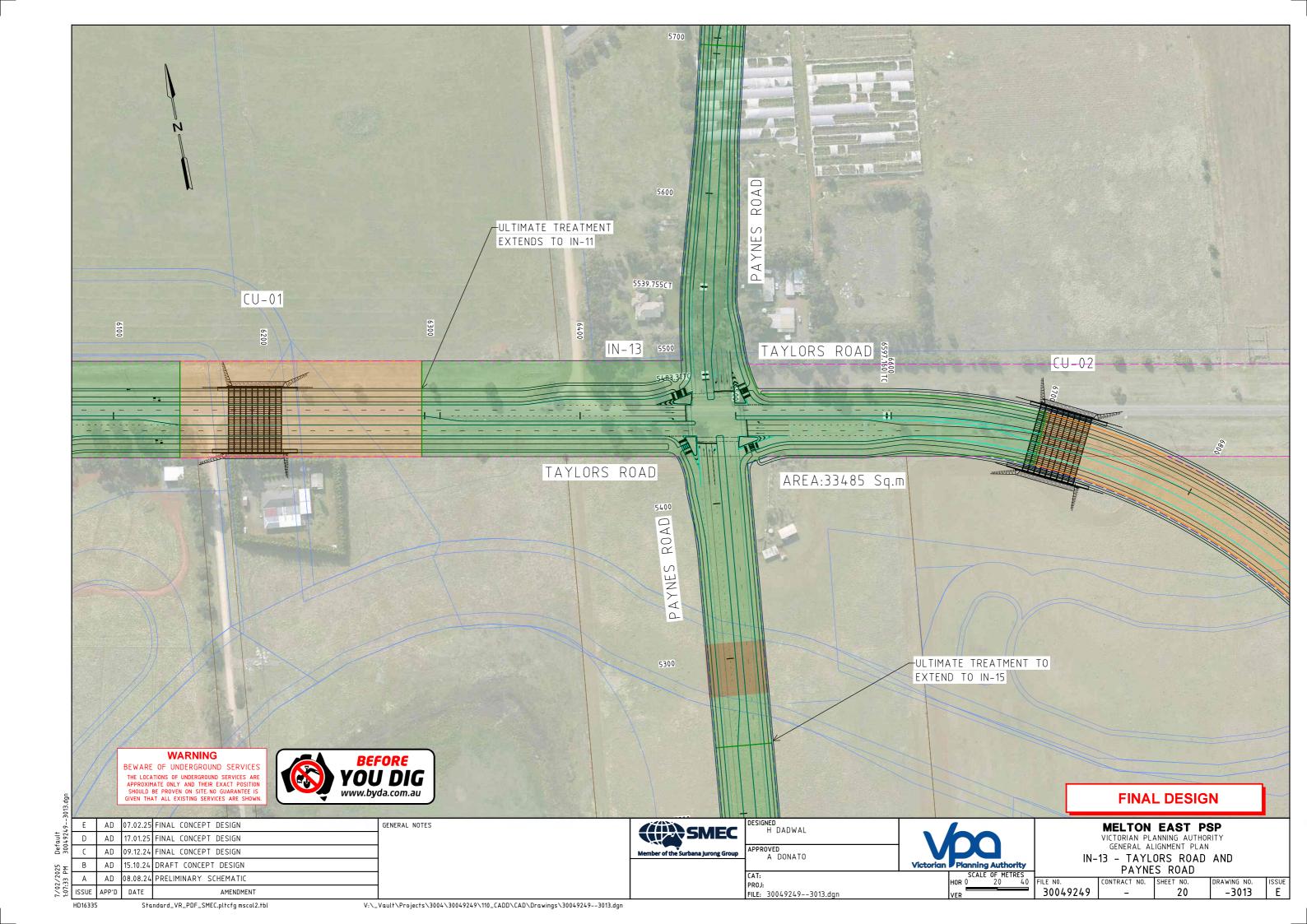


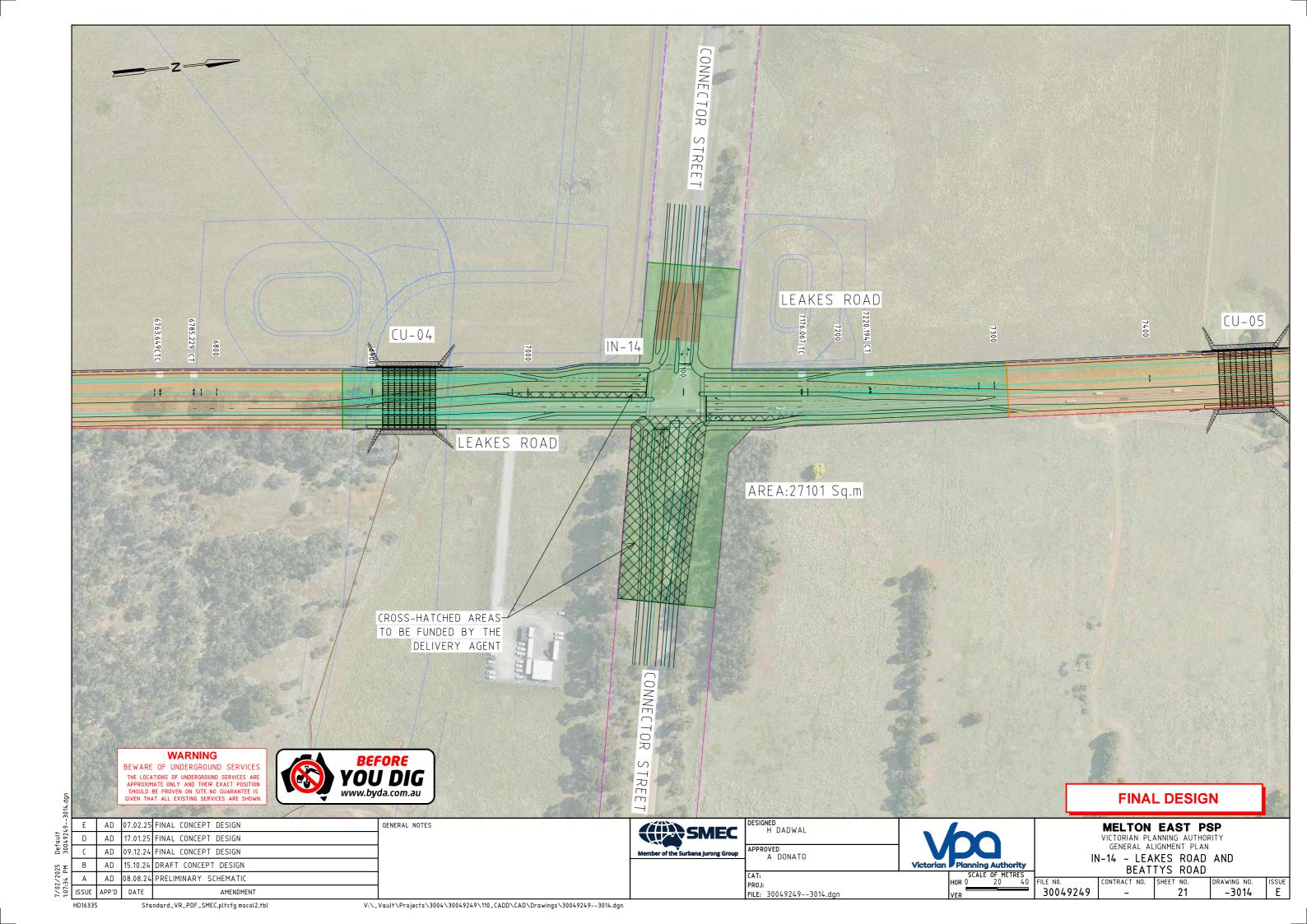


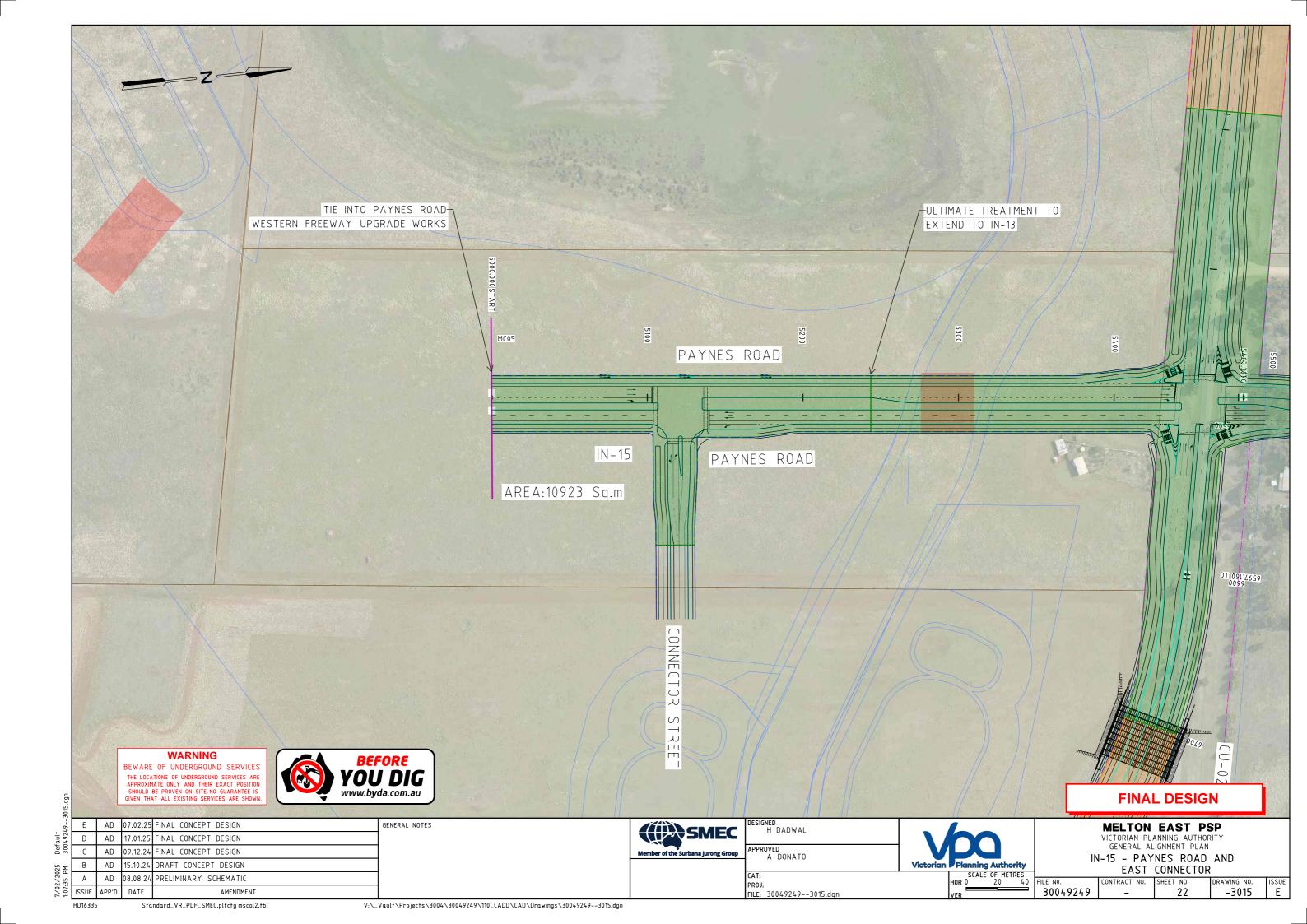


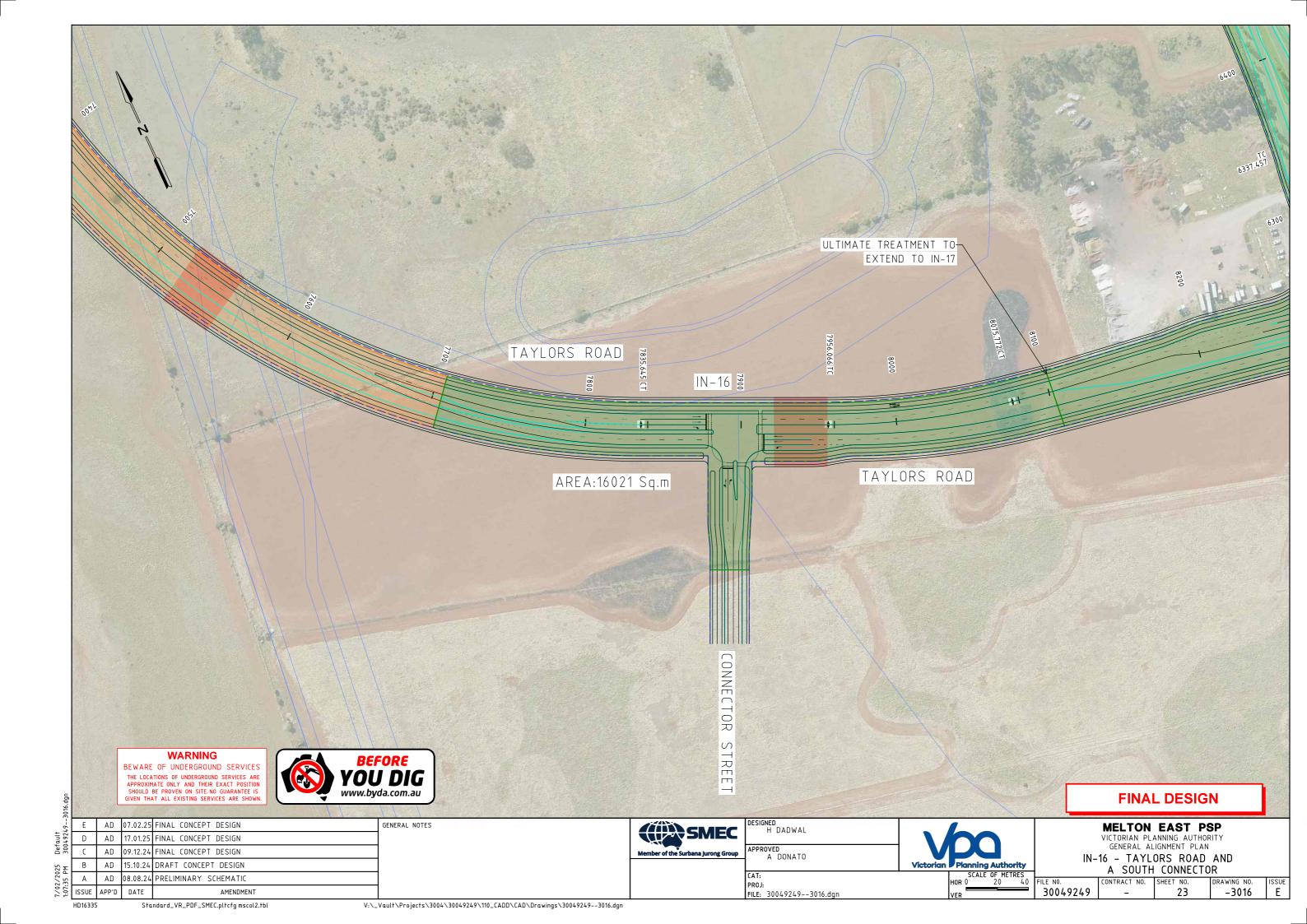




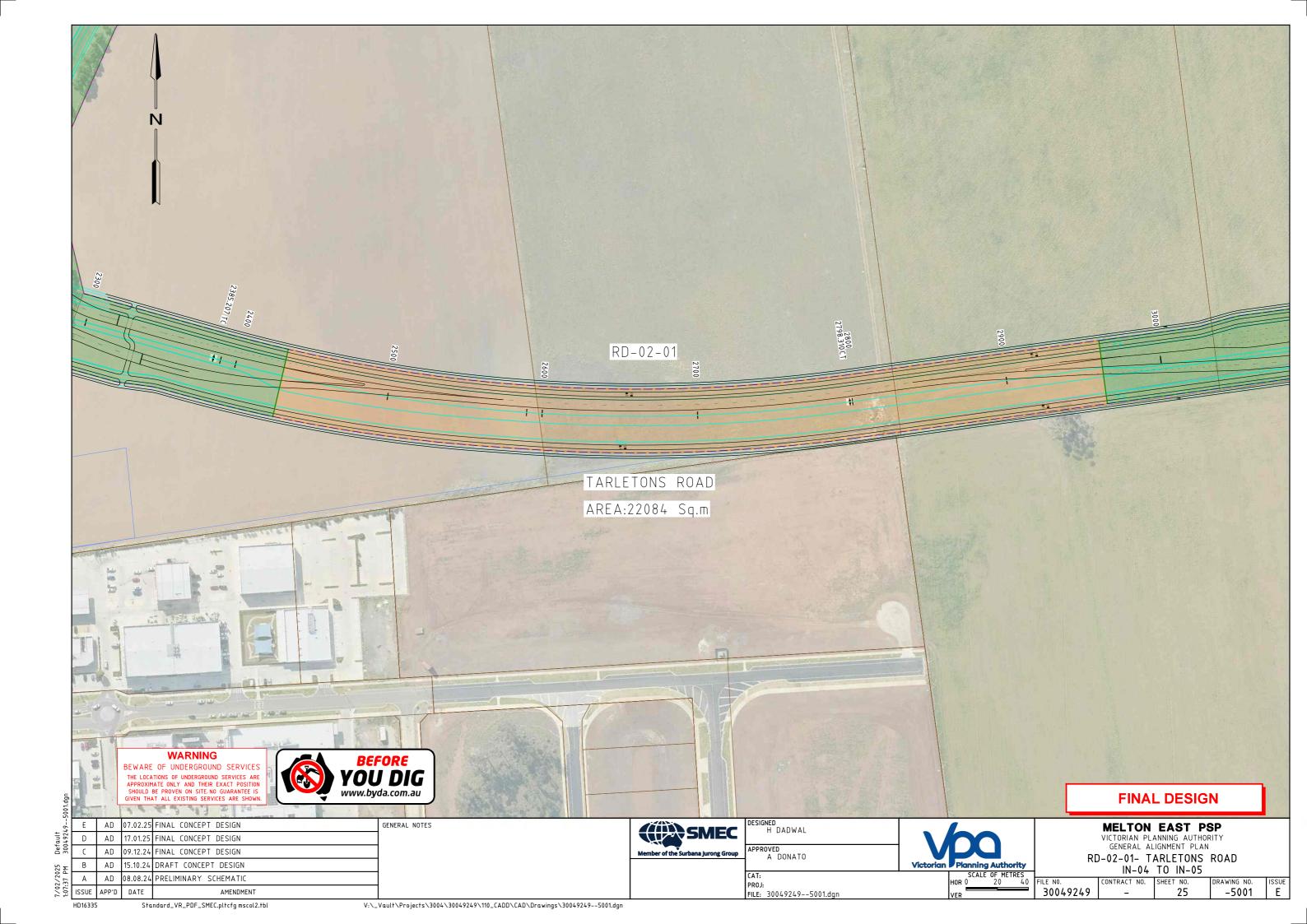


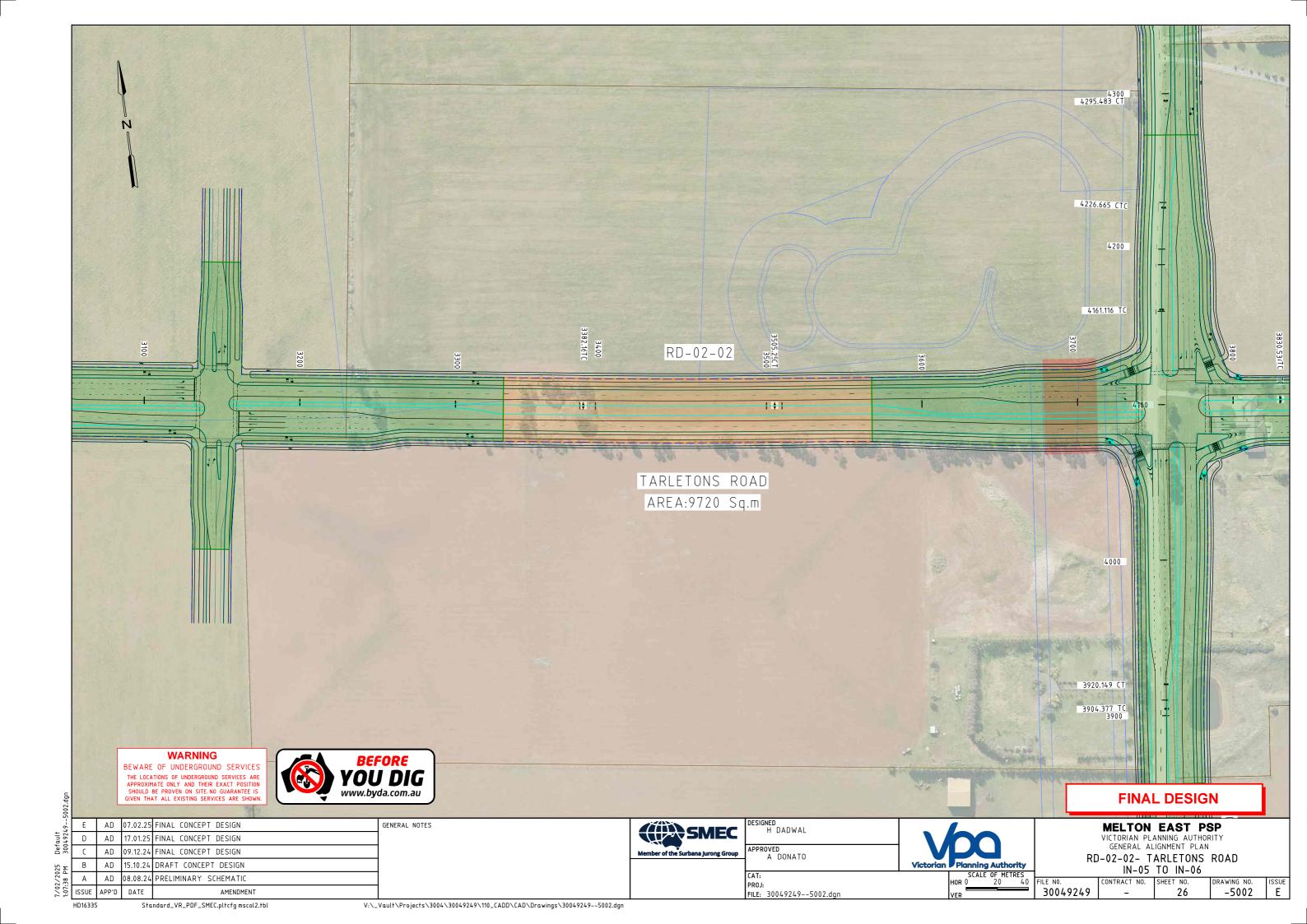


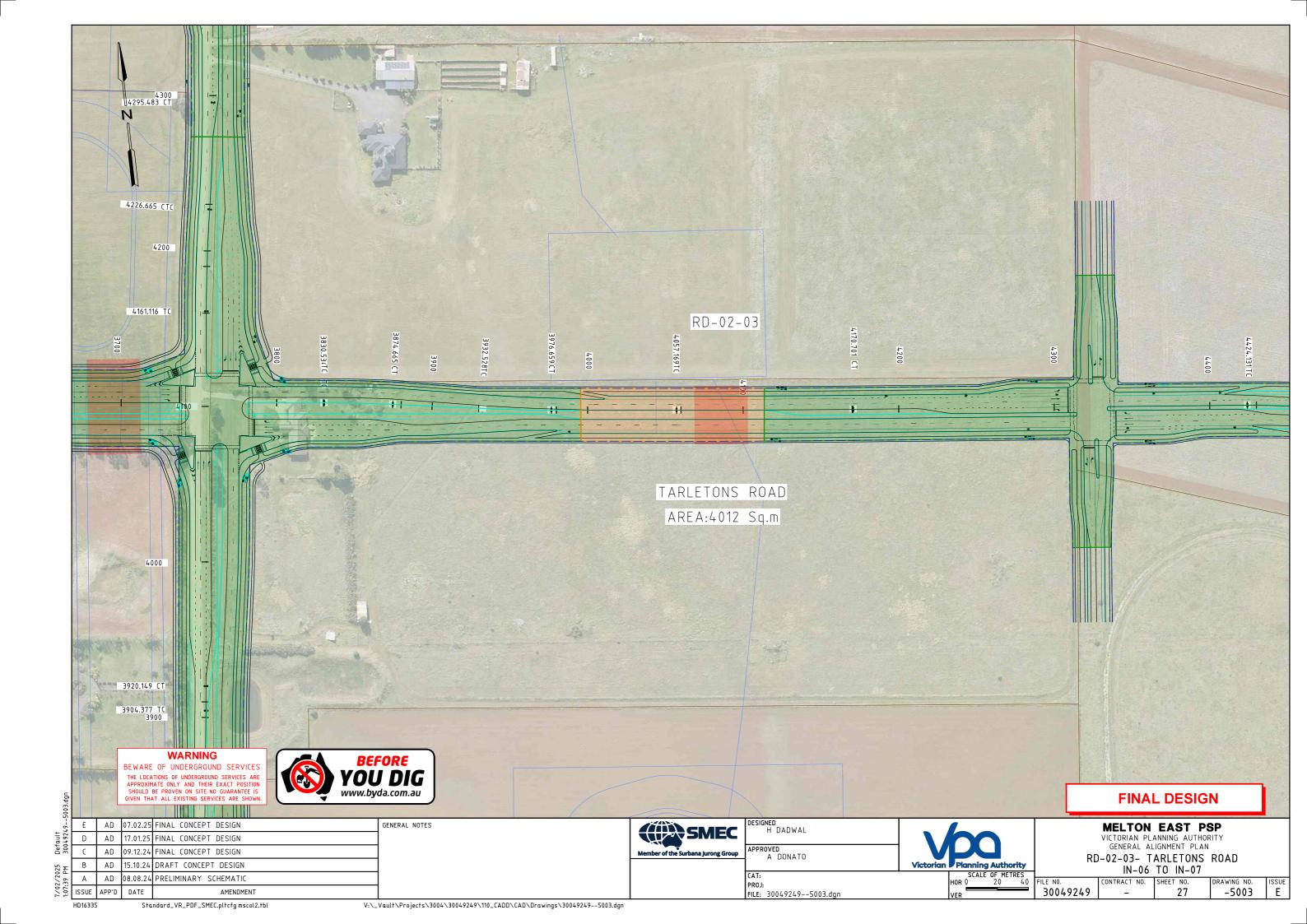


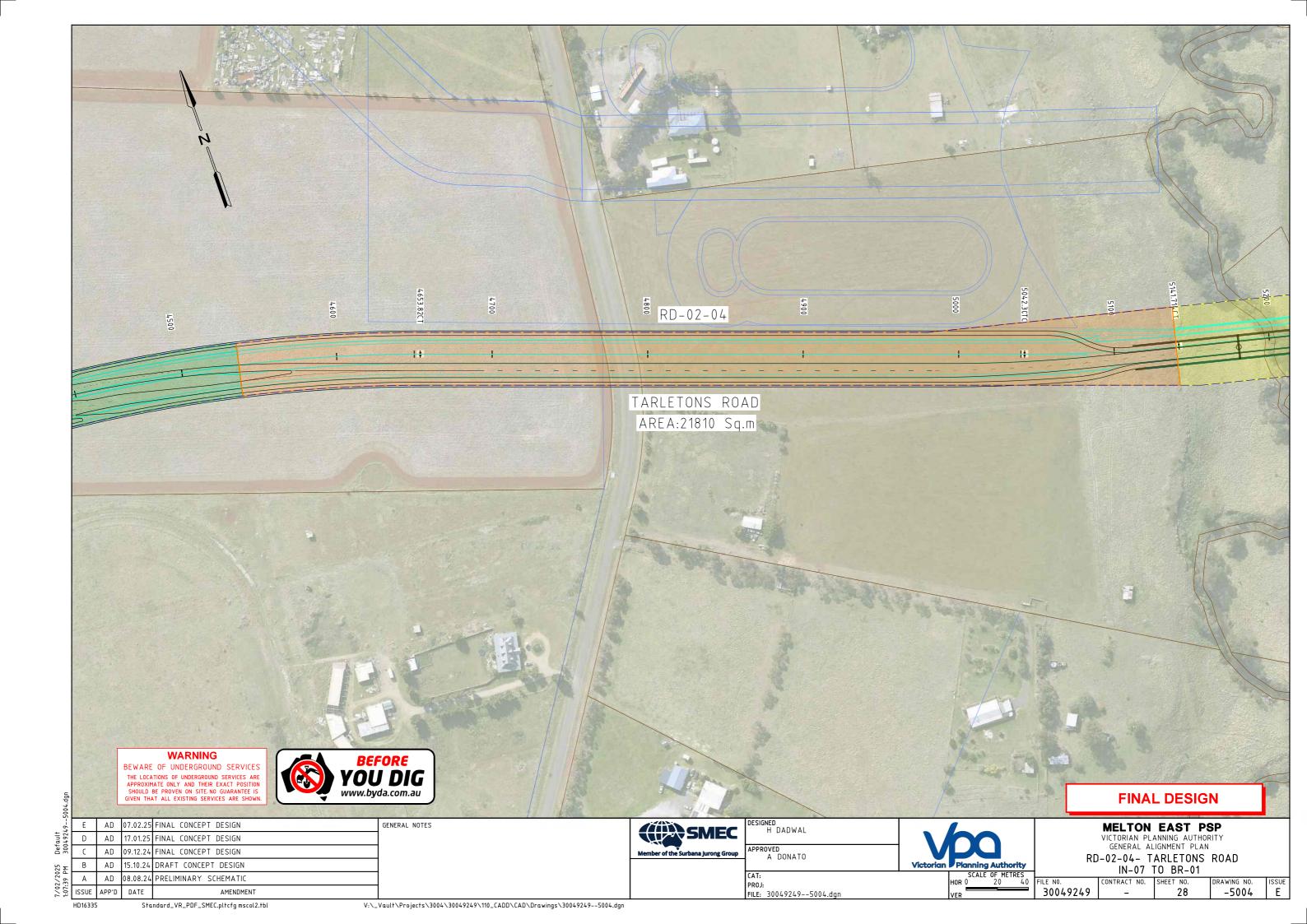


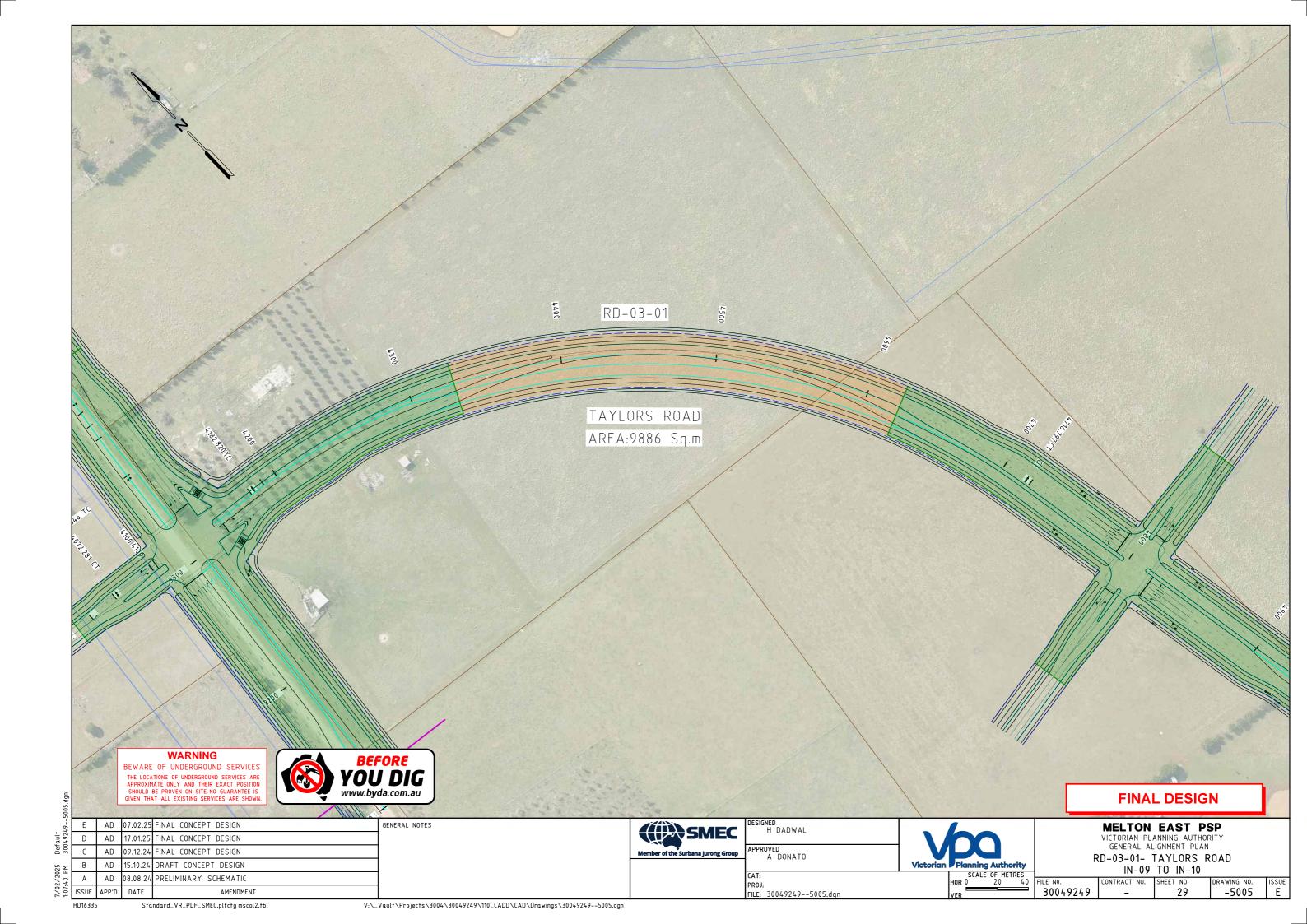


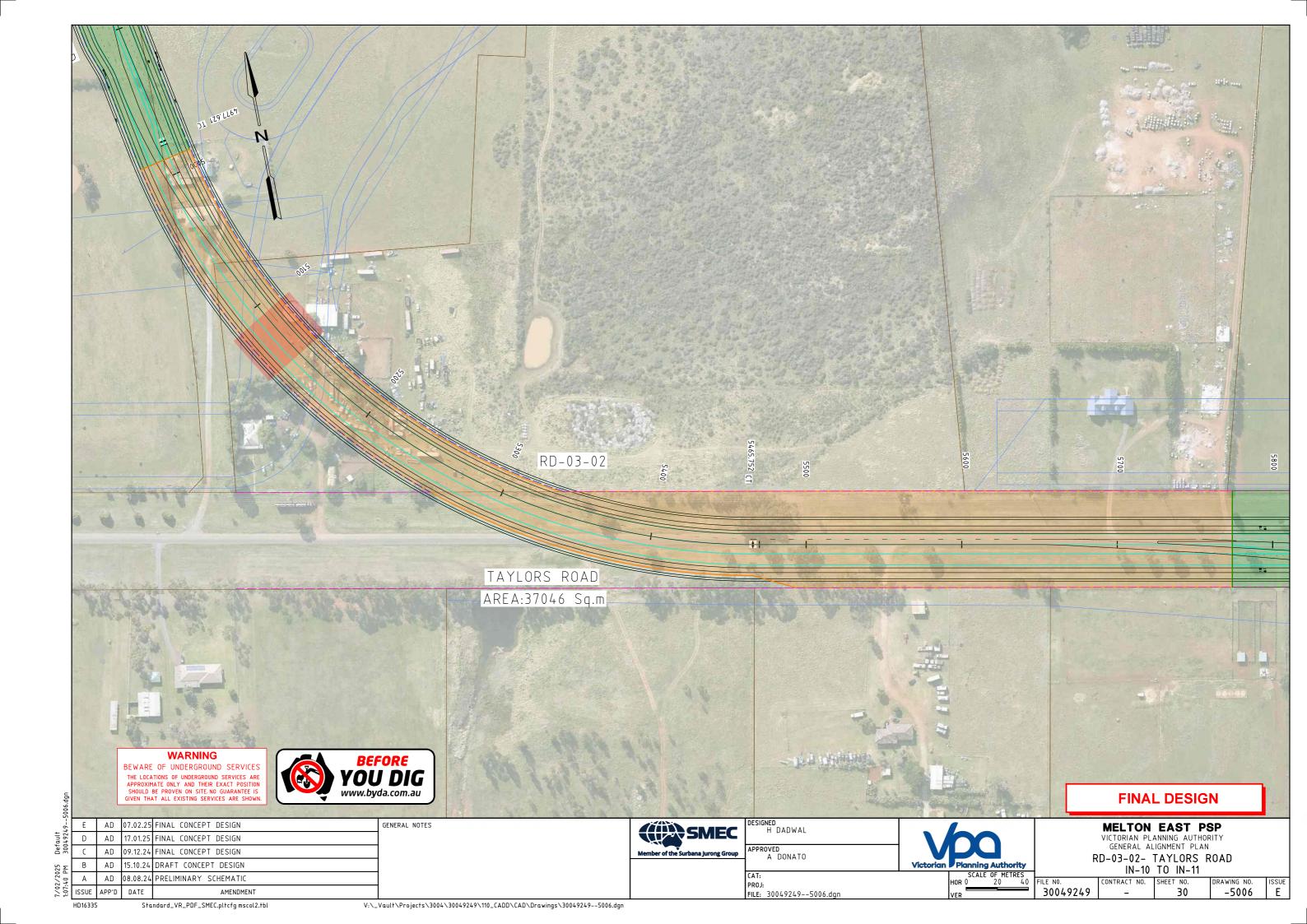


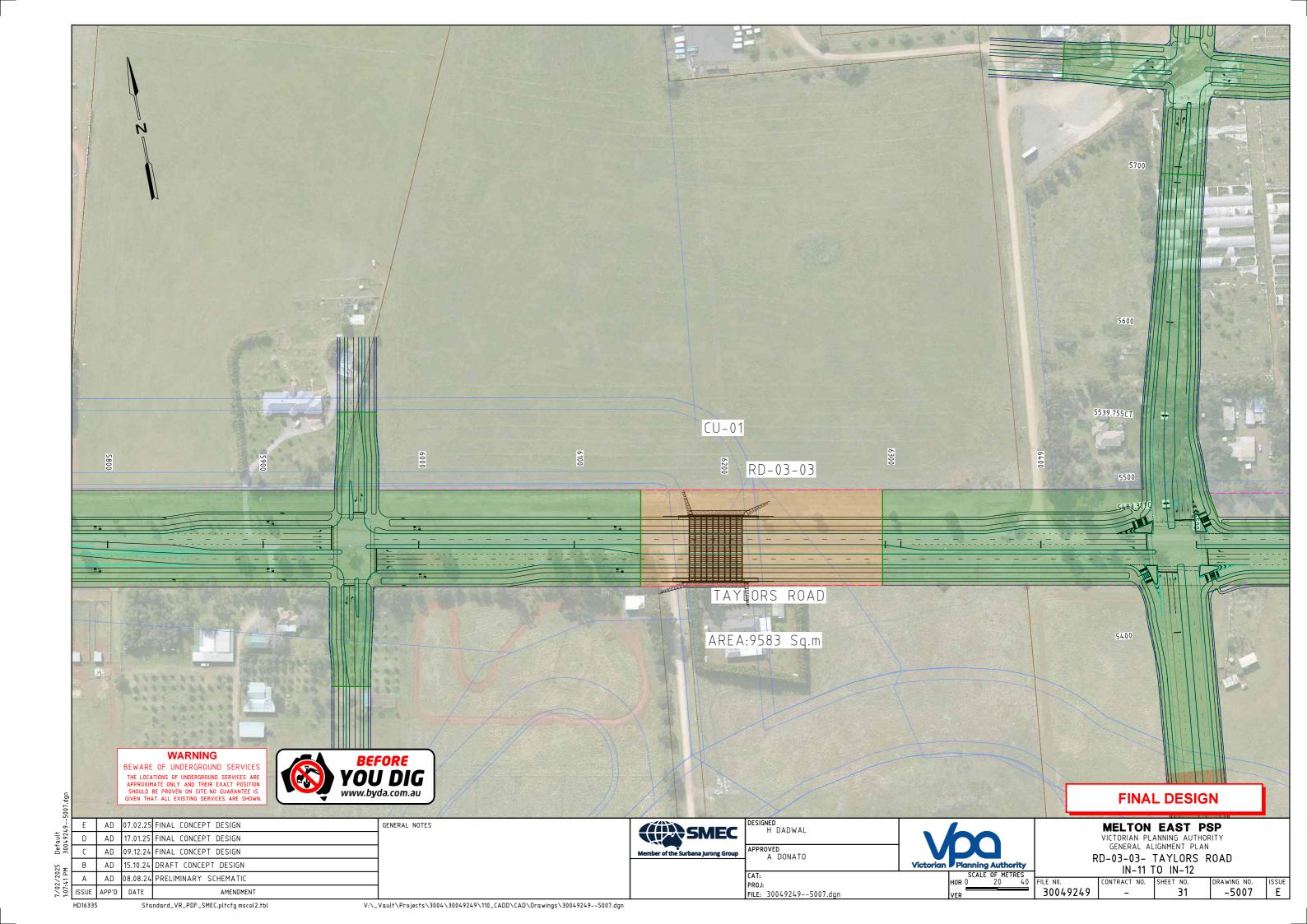


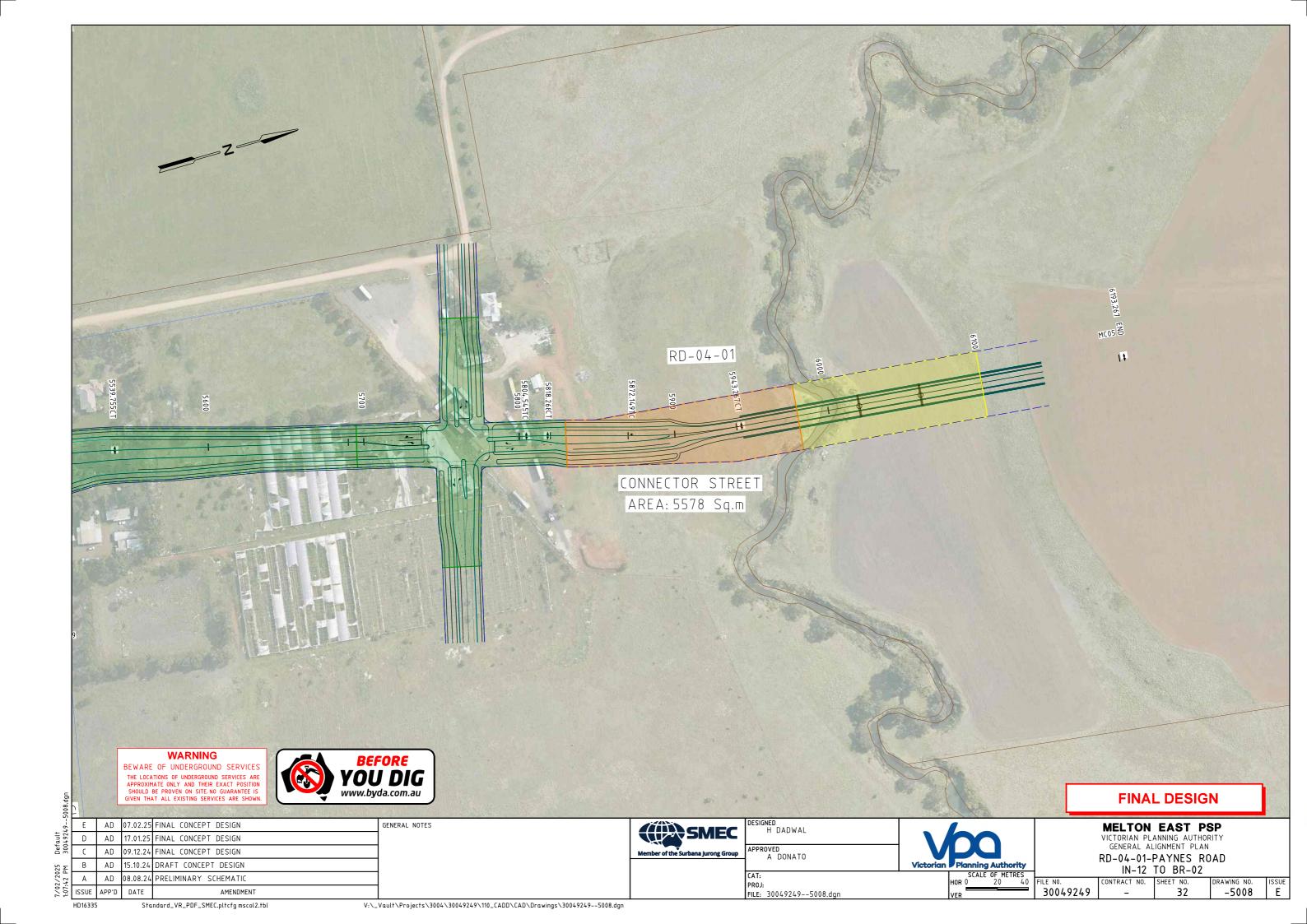


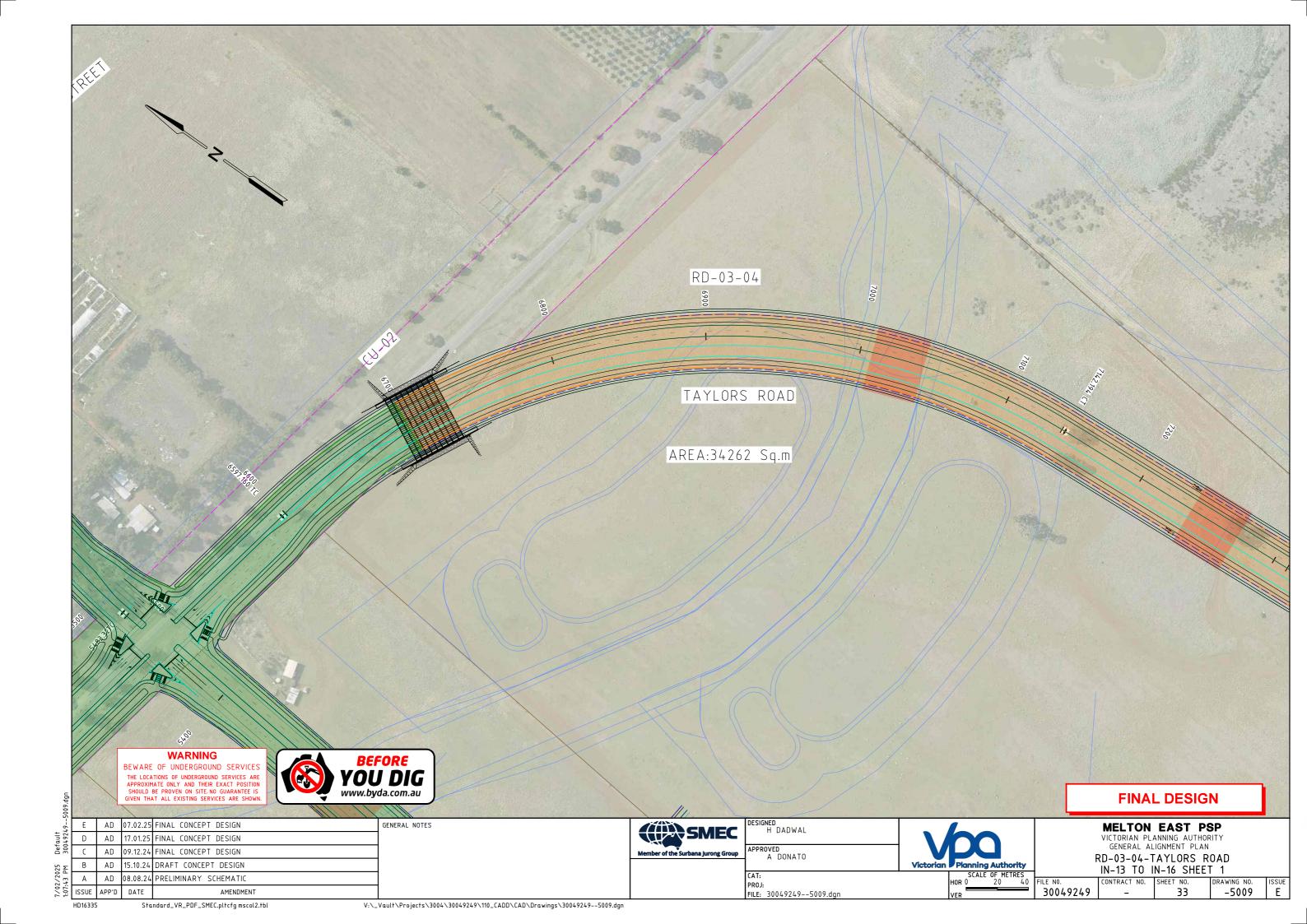


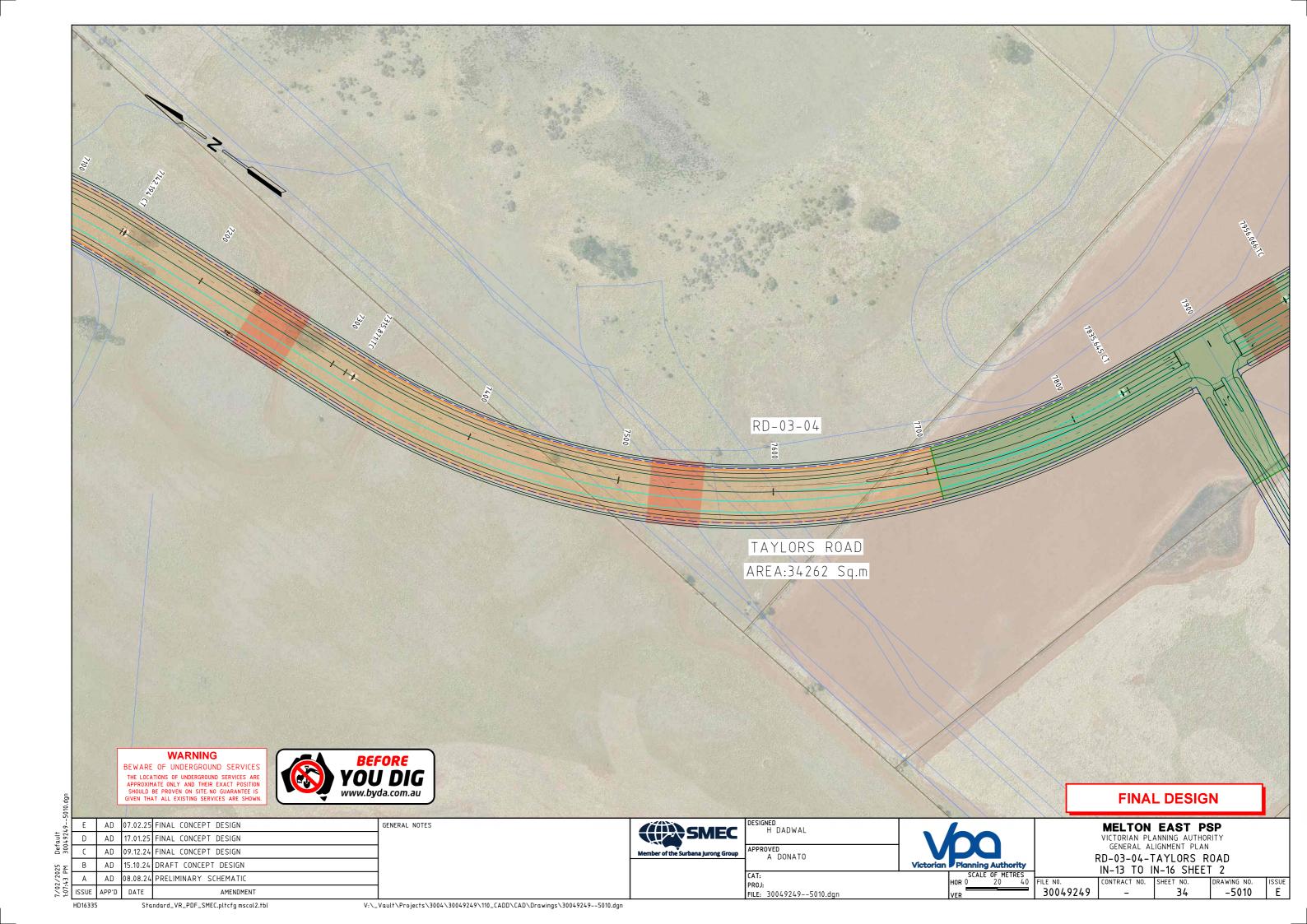


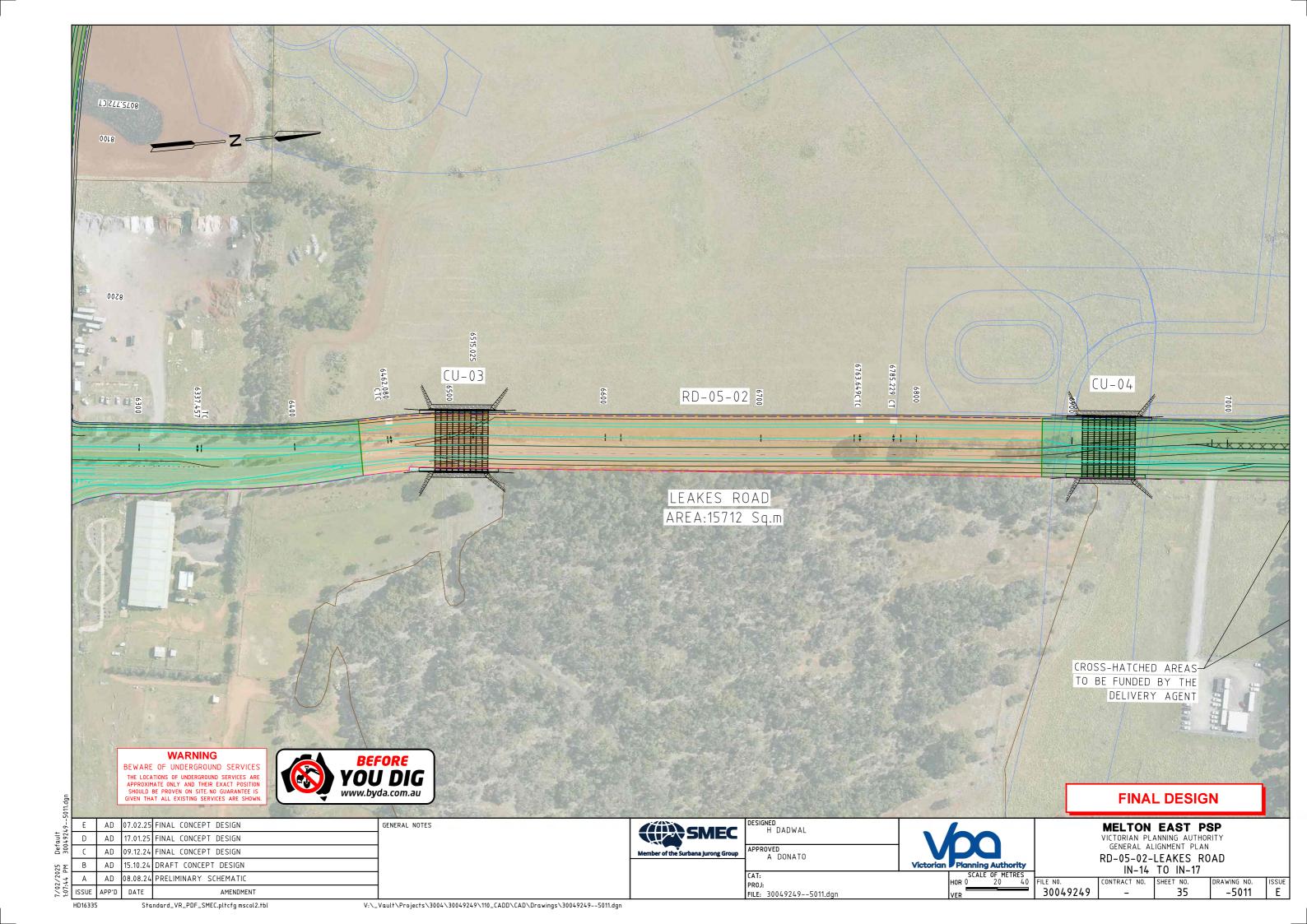


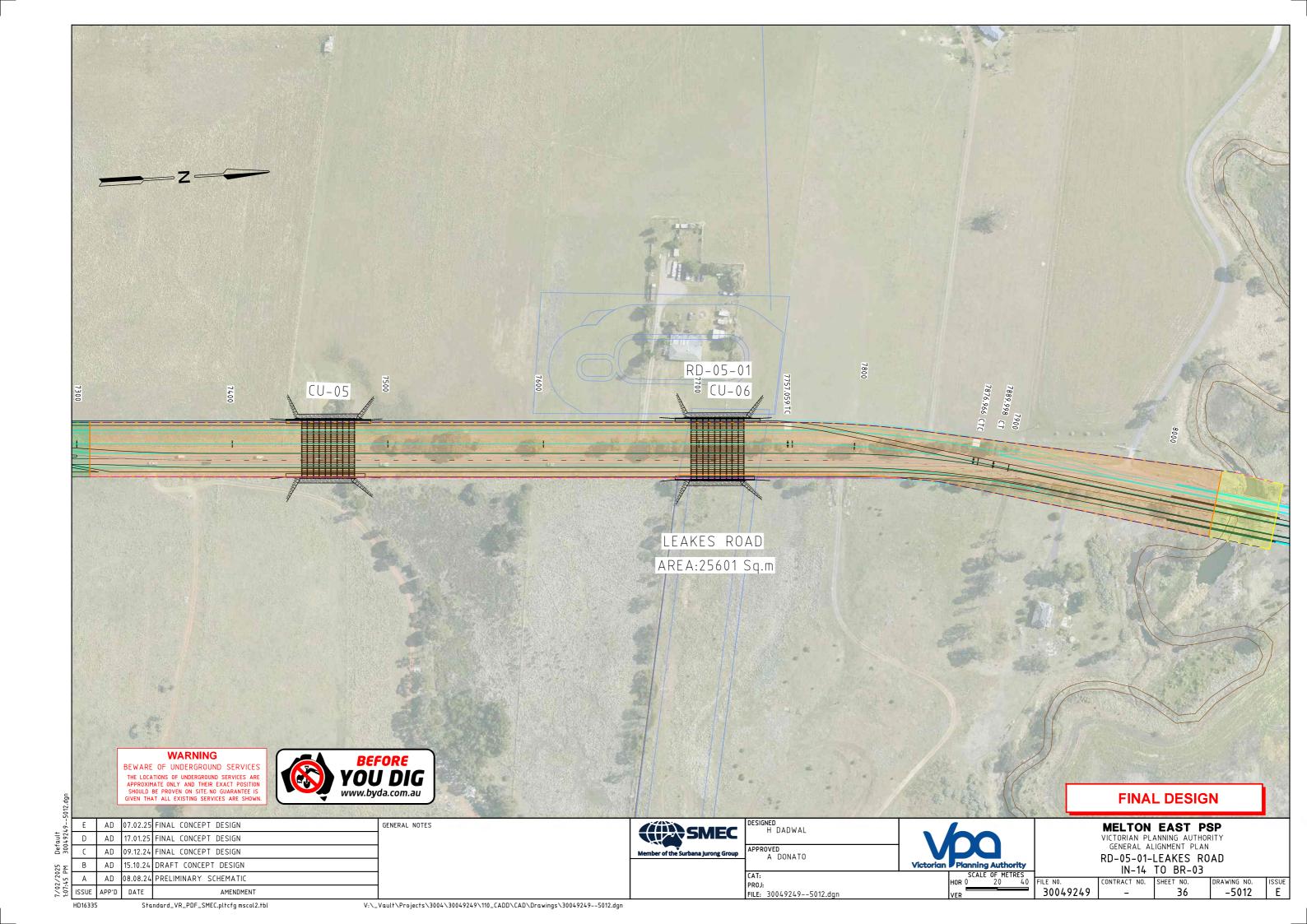


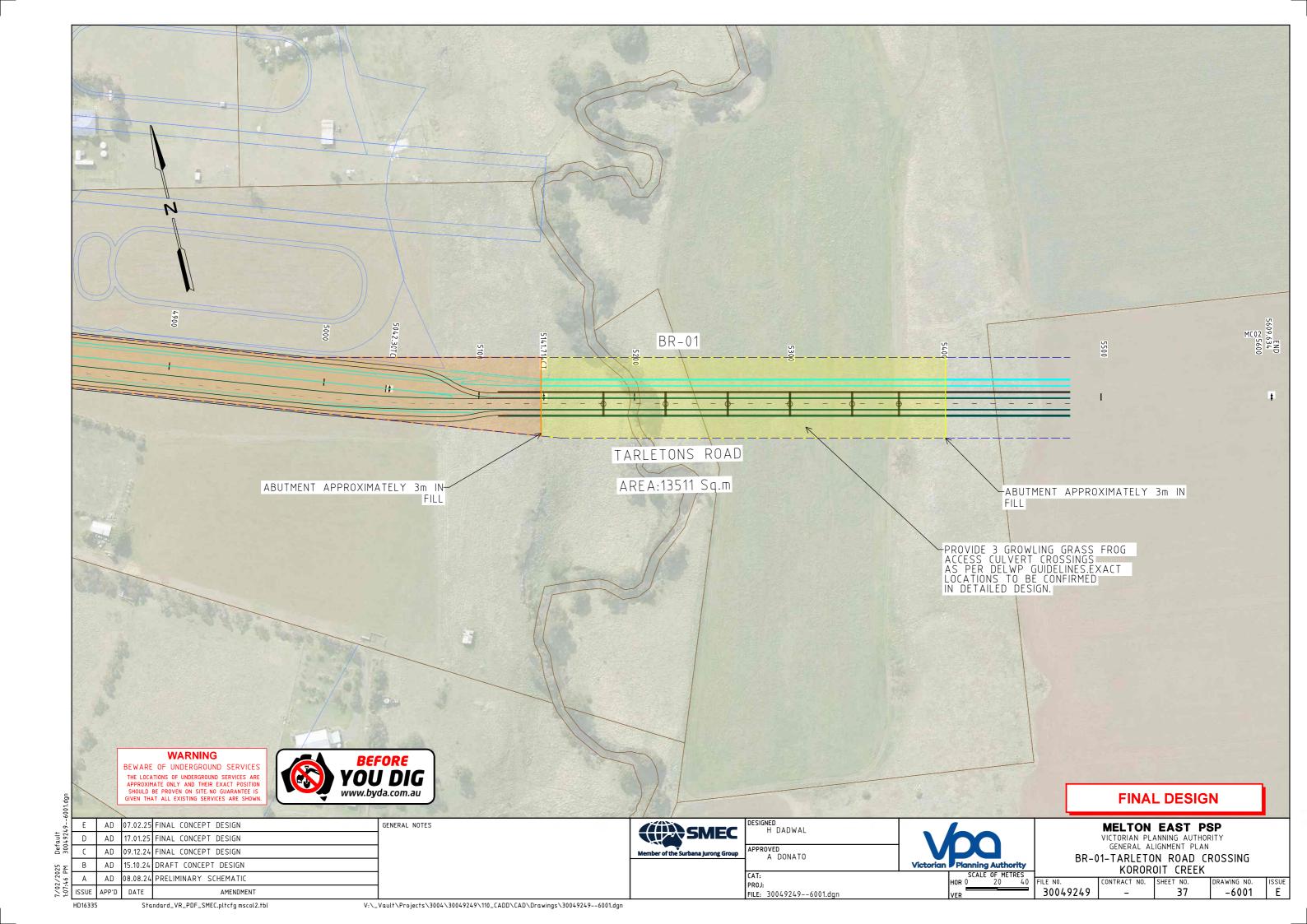


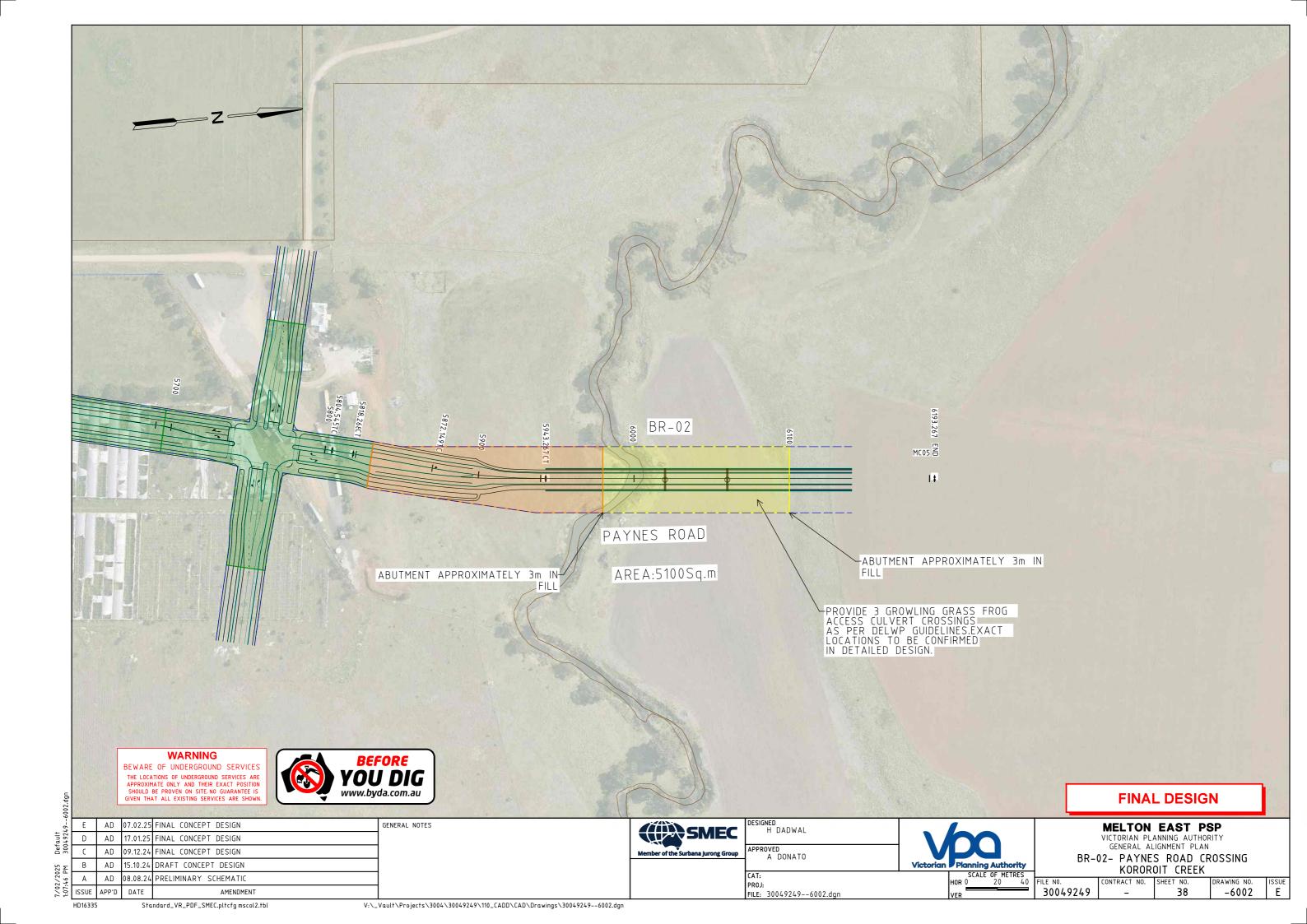


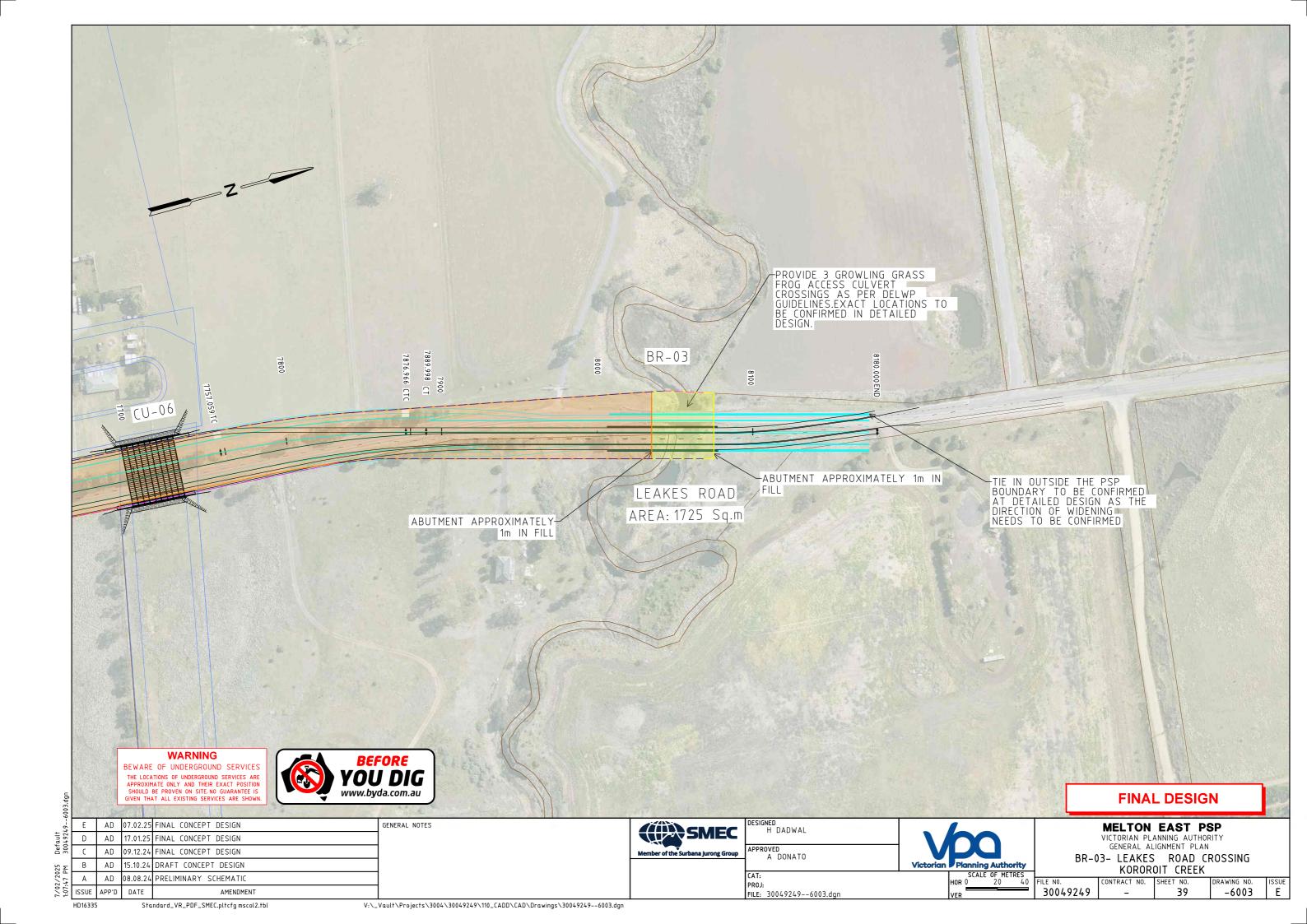


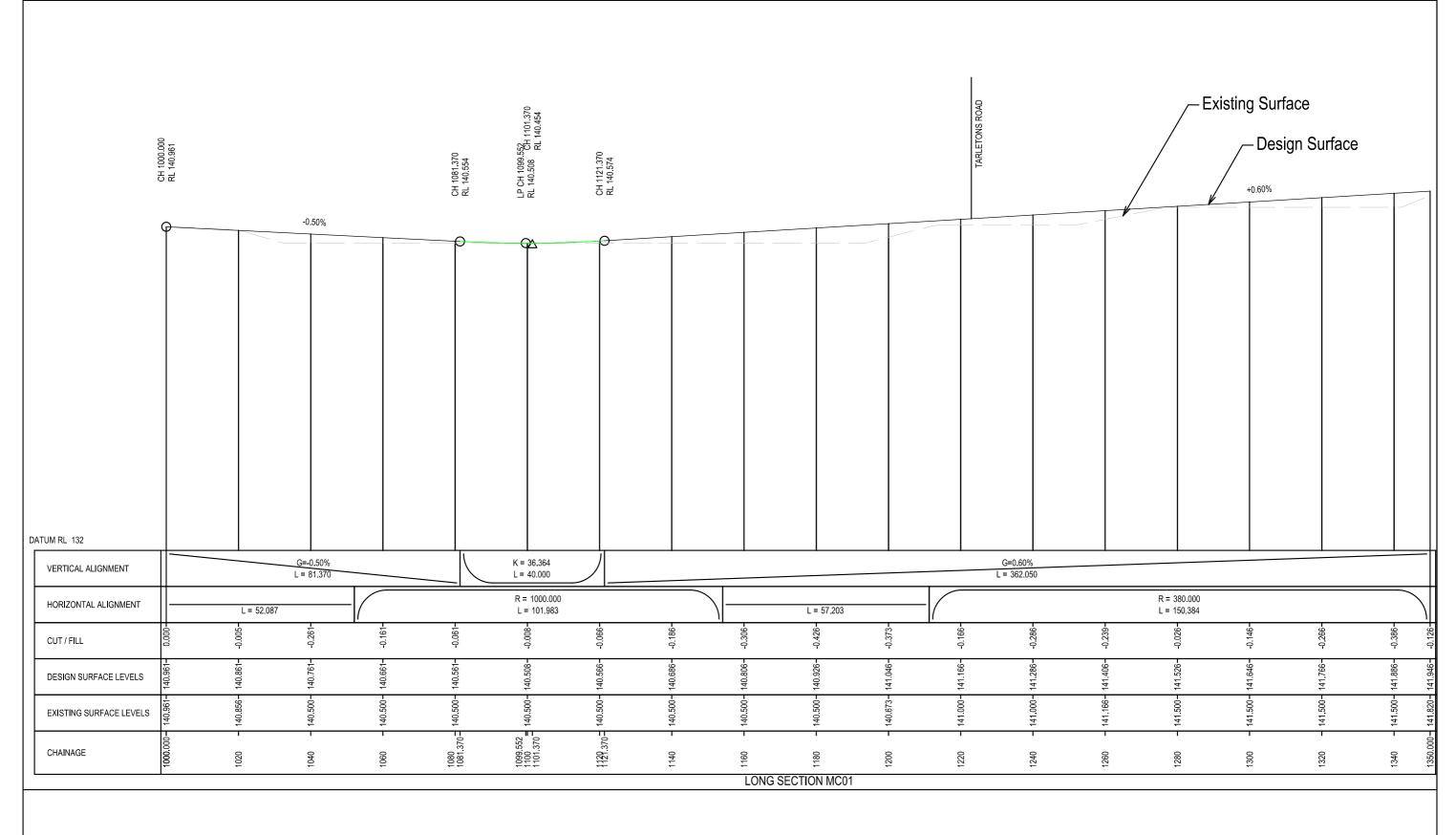












## WARNING

BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE
APPROXIMATE ONLY AND THEIR EXACT POSITION
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.



## **FINAL DESIGN**

64					GENERAL NOTES
492					
300	С	AD	17.01.25	FINAL CONCEPT DESIGN	
ЬМ	В	AD	09.12.24	FINAL CONCEPT DESIGN	
1.7	Α	AD	15.10.24	DRAFT CONCEPT DESIGN	
1:07:	ISSUE	APP'D	DATE	AMENDMENT	

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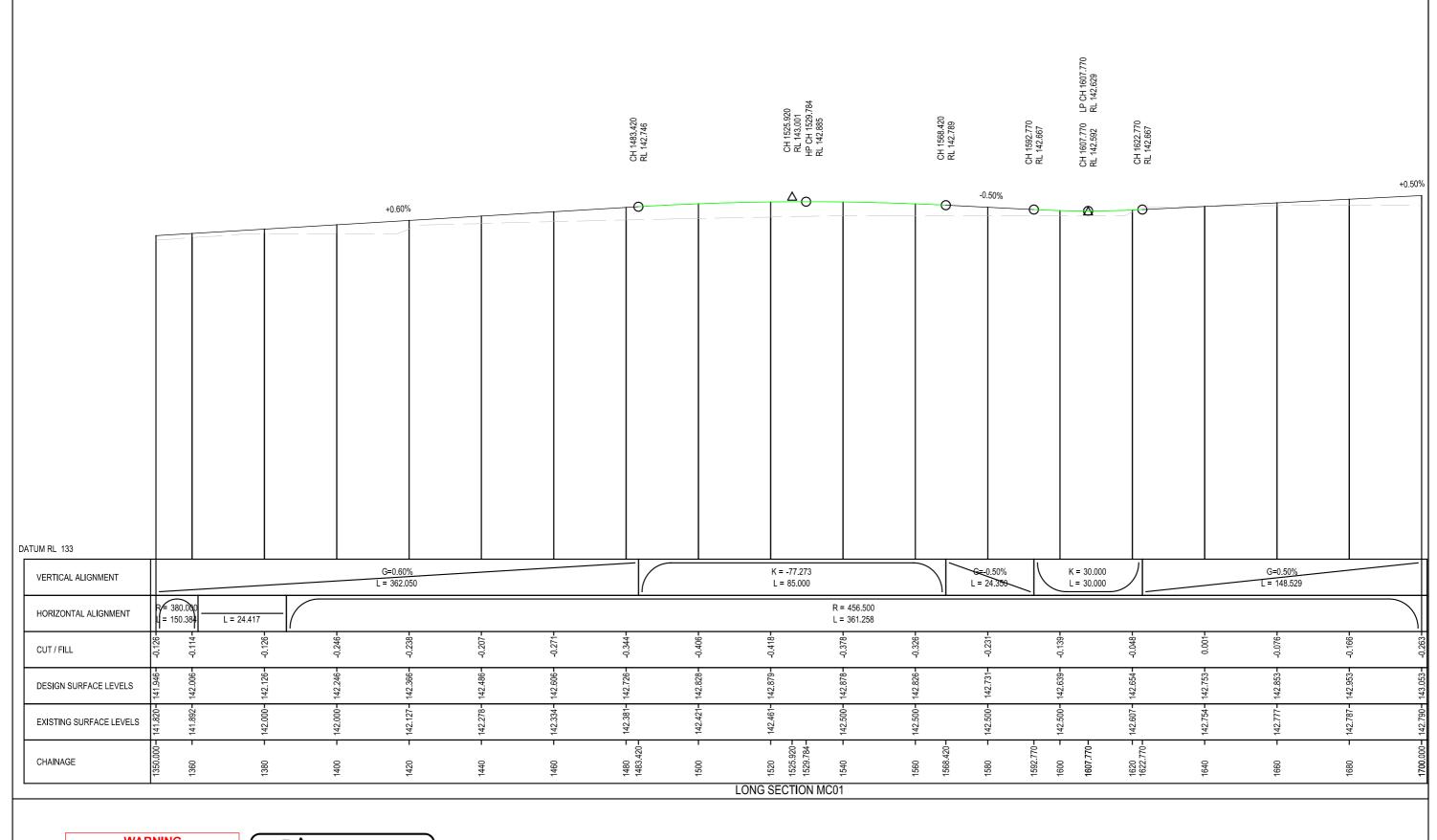
LONG SECTION

MELTON HIGHWAY-MC01 SHEET 1

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## **FINAL DESIGN**

| GENERAL NOTES | GENERAL NOTE

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Member of the Surbana Jurong Group	APPROVED A [
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GENERAL ALIGNMENT PLAN
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MELTON HIGHWAY-MC01 SHEET 2

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