2 THE PROJECT

2.1 Description of the Scheme

2.1.1 General

The Scheme would be a 9.7km long bypass, taking traffic away from the A487 at Bontnewydd at the southern end of the Scheme and Caernarfon at the northern end and would comprise of a Wide Single 2+1 Road. (WS2+1) This would provide two lanes in one direction and one lane in the opposite direction throughout the Scheme. The Scheme would provide a total of 4.60km of overtaking length in the northbound direction and 4.57km of overtaking length in the southbound direction. This route would be made up of three sections of WS2+1 standard carriageway separated by new at-grade roundabouts at Meifod and Cibyn. All the proposed alignment would be offline from the existing A499/A487(T) Goat roundabout to the existing A487(T) Plas Menai roundabout. The extents of the Scheme are shown in Volume 2, Figure 1.2, 2.1 and 3.2.

For the proposed alignment there would be two significant river crossings over the Afon Gwyrfai and the Afon Seiont.

New or diverted Public Rights of Way and Private Means of Access would be provided to replace those affected by the scheme.

Road drainage would be provided through 'over the edge' drainage which would discharge into attenuation ponds along the Scheme. The attenuation ponds would be provided for each of the carriageway drainage sub-catchments to mitigate for the increased rates and volume of run-off that would arise post-scheme construction. These ponds would attenuate and treat the collected surface water prior to discharging it into existing watercourses.

The drainage of both the Afon Seiont and Afon Gwyrfai viaducts would be via combined kerb and drainage bridge-deck compatible units.

The majority of the Scheme would be fenced with stock proof fencing. Otter fencing would also be provided at appropriate locations on the Scheme.

The general arrangement plans when prepared are shown in Volume 2, Figure 2.1, long sections in Volume 2, Figure 2.2 and indicative cross sections in Volume 2 Figure 2.7. Detailed description

2.1.2 Ch0 – 1650 Goat Roundabout to Dinas Accommodation Underpass (S105)

The Scheme would commence at its southern connection from a new arm on the A499/A487(T) Goat Roundabout and would provide two lanes in the southbound direction and one lane in the northbound direction. The Scheme would be on an embankment of up to 7m high for a short length, passing over Pont Parc Underpass (S101A) before entering a cutting of up to 9m deep, where a minor road would cross on the Ty'n Llan Overbridge (S103).

A treatment/attenuation pond (Pond 1A) would be located to the west of the bypass near to the Goat Outfall and another pond (Pond 1) would be located to the east of the bypass at the Pont Parc Underpass. The existing Lon Eifion cycleway that currently crosses the A449 would be diverted around Goat Roundabout, crossing the proposed de trunked A487. The existing footpaths FP 19 and FP10 would be diverted

along the proposed structures, Pont Parc Underpass (S101A) and Ty'n Llan Overbridge (S103) respectively. A dedicated bat/mammal underpass would be provided at Ch1180.(SNRW1)

An additional culvert to increase permeability of the Scheme following discussions with NRW during KS3 of the Scheme development has been included at Ch1180.

Geufron Culvert (S104) would be located at Ch1400 with two treatment/attenuation ponds (Pond 2 and Pond 3) located to the west of the Scheme.

Dinas Accommodation Underpass (S105) is located at Ch1550.

2.1.3 Ch1650 – 3460 Dinas Accommodation Underpass (S105) to Meifod Roundabout

The Scheme would provide a non-conflicting changeover after Dinas Accommodation Underpass (S105) to provide two lanes in the northbound direction and one lane in the southbound direction. It would cross the Afon Gwyrfai floodplain on a long viaduct that would be known as the Gwyrfai Viaduct (S106), which would be around 6m above the adjacent landscape. An attenuation pond (Pond 4a) would be located to the east of the Scheme north of the northern abutment of the Gwyrfai Viaduct (S106).

Between Ch2050 and 3000, the Scheme would be on embankment approximately 5m high. The Scheme would cross over the Pont Llydiart Gwyn (S107) box underbridge.at Ch2250 and a layby would be located in the northbound direction at Ch2450. Pont Cefnwerthyd (S108) underbridge would accommodate the crossing over the Welsh Highland Railway. The existing side road would be stopped up to vehicles and equestrians and the Pont Ceriw Non-Motorised User overbridge (S109) would provide access over the Scheme. The bridge would not be suitable for equestrian use. Access for equestrians and vehicles would be maintained through a diversion along existing alternative side roads. A dedicated bat/mammal underpass (SNRW2) would be provided at Ch3420.

A treatment/attenuation pond (Pond 4) would be located to the east of the Scheme adjacent to the section of the Scheme that would connect to the existing A487 via the new Meifod Roundabout.

An additional culvert to increase permeability of the Scheme following discussions with NRW during KS3 of the Scheme development has been included at Ch.3120.

2.1.4 Ch3460 – 4950 Meifod Roundabout to Caernarfon Quarry

On leaving the Meifod Roundabout the road would be on embankment approximately 7m high, providing two lanes in the southbound direction and one lane in the northbound direction. At Ch3900 the proposed Penybryn Road crossing would be made by way of an underbridge, Pont Bryn Mafon box underbridge (S111) and at Ch4000 the existing Penybryn Road would be replaced by a box culvert for bats (S111A). A layby would be provided at Ch4200 in the southbound direction. As the Scheme skirts the eastern side of Caernarfon Quarry, it would be on a small embankment of around 1.5m high. At Ch4800 the road then would enter a cutting approximately 5m deep.

There would be two treatment/attenuation ponds (Pond 5 and Pond 6) located to the north-east of the proposed Meifod Roundabout and east of the existing Penybryn Road.

2.1.5 Ch4950 – 6490 Caernarfon Quarry to Cibyn Roundabout

A non-conflicting crossover would be provided at Ch4950 to provide two lanes in the northbound direction and one lane in the southbound direction. An additional culvert to increase permeability of the Scheme following discussions with NRW during KS3 of the Scheme development has been included at Ch.5100.

The Scheme would approach the Afon Seiont floodplain on embankment up to 8m high and cross by means of a large viaduct, the Seiont Viaduct (S112), approximately 20m above the valley floor. A dedicated bat/mammal underpass (SNRW3) would be provided at Ch5100. The road would lie to the north of the Glan Gwna Holiday Park and would be in cutting of up to 2.5m deep until the A4086. This section would then terminate at the proposed Cibyn Roundabout, which connects with the existing A4086.

There would be three attenuation ponds (Pond 7, Pond 8 and Pond 8a) located to the west of the southern embankment of the Seiont Viaduct (S112), north-east of the northern abutment of the Seiont Viaduct (S112) and south of Cibyn Industrial Estate respectively.

2.1.6 Ch6490 – 7910 Cibyn Roundabout to Bethel Road

There would be two treatment/attenuation ponds (Pond 9 and Pond 10) located at Cibyn Roundabout. The road would be at grade for a short distance before entering another embankment, which would cross an existing minor road (Bethel Road), which would be diverted to the east of the proposed bypass including a new Bethel Road Roundabout.

Another treatment/attenuation pond (Pond 11) would be located to the south west of Bethel Roundabout and Pond 12 would be located between the proposed Scheme and the proposed diverted Bethel Road Roundabout.

2.1.7 Ch7910 – 9710 Bethel Road to Plas Menai Roundabout

A conflicting crossover would be provided at Ch7910 to provide two lanes in the southbound direction and one lane in the northbound direction.

The route then would lower slightly into cutting and the B4366 is accommodated with an overbridge at Ch8420. The existing Bethel Road Roundabout would be relocated to the eastern side of the Scheme. On the approach to the existing A487 there would be a gradient of 6% which would be a cutting. The Afon Cadnant would be diverted around this junction using oversized culverts to encourage use by mammals.

The connection at Crug Lane with Plas Menai Roundabout would maintain a two-way access. The access would be provided by constructing a new section of carriageway between the existing land and would tie in at Crug Farm Nurseries.

Between Ch8900-9600 the Scheme would enter a deep cutting with exposed rock slopes of up to 22.5m on the approach to Plas Menai Roundabout. The existing Outdoor Centre access would be relocated from a direct link to Plas Menai Roundabout to join Caernarfon Road. The existing bus layby on the Caernarfon Road approach would also be relocated approximately 100m away from the new Yacht Club access junction.

2.1.8 Lighting, signage, earthworks and structures

The lighting strategy has been developed in liaison with WG, NMWTRA, NRW and Gwynedd Council. The lighting would be restricted to the following:

- Meifod Roundabout would be provided with full standard lighting for the roundabout itself and the existing A487 spurs.
- At Cibyn a 'ring of light' would be provided for the roundabout with the existing A4086 towards Caernarfon only being fully lit in order to link with the existing lighting at Cibyn Industrial Estate junction
- The Bypass mainline spurs would not be lit on Meifod and Cibyn roundabouts.
- The lighting provision to the existing Bethel Roundabout is not in accordance with current standards. To minimise the ecological impacts, the proposed Bethel Roundabout would require lighting to the same standards as the existing Bethel Roundabout.
- The lighting at both the Goat and Plas Menai roundabouts would remain in their current configuration.

2.1.9 Signage and Road Markings

The Signage and Road Markings strategy has been developed in liaison with WG, NMWTRA and Gwynedd Council. The location of signs along the Scheme is shown in Volume 2, Figure 16.1.

2.1.10 Earthworks

The earthworks for the scheme would reuse material excavated from site and use material excavated from Caernarfon quarry in embankments, false cuttings and re-graded landscaping areas. A plan showing areas of cut and fill along the Scheme is shown in Volume 2, Figure 2.3.

2.1.11 Structures

The main structures associated with the Scheme are:

- A crossing over the Welsh Highland Railway
- A 300m viaduct over Afon Seiont
- A 280m viaduct over Afon Gwyrfai and its flood plains
- Bridges carrying exisiting roads under or over the new road
- Culverts and wildlife mitigation crossings

Additional information on the design and dimensions of main structures are provided in Volume 3, Appendix A.6 – Structures Design Options Report.

Structures on the Scheme would be defined by BD2/12 Technical Approval of Highway Structures Clause 3.3. They have been grouped by form/function as listed in Table 2.1.1 below. The location of the structures are shown in Volume 2, Figure 2.5.

Table 2.1.1 Structures associated with the Scheme

Structure Group	Structure	WG Structure Name	WG Asset No.	Comment
	S100	Goat Outfall		
Watercourse crossings - minor	S101	Ty Hên Culvert	A487 550 C68	Crossings of ordinary watercourses, small main river crossings, and provision for minor field ditches. All culverts are specified to allow crossings for mammals and bats.
	S104	Geufron Culvert	A487 571 C80	
	S109A	Pen Y Bryn Culvert 3	A487 601 C01	
	S109B	Pen y Bryn Culvert 4		
	S110A	Pen Y Bryn Culvert 2	A487601 C58	
	S110	Pen y Bryn Culvert 1	A487 601 C73	
	S111B	Bryn Mafon Culvert 2	A487 611 C09	
	S112A	Bodrual Culvert 2	A487 621 C61	
	S112B	Bodrual Culvert 1	A487 621 C59	
	S112C	Cibyn Culvert 1		
	S112D	Cibyn Culvert 2		
	S116	Parciau Culvert		
	S116A	Parciau Mammal Culvert		
	S118A	Crug Lane Mammal Culvert		
Wildlife crossings	S102A	Afon Rhyd Mammal Culvert 1		Pipe culverts to provide continuity of flightlines for bats, and to allow crossings for mammals
	S102B	Afon Rhyd Mammal Culvert 2		
	NRW1	Wildlife Crossing 1	TBC	
	NRW2	Wildlife Crossing 2		
	S111A	Bryn Mafon Wildlife Underpass	A487 611 C08	
	NRW3	Wildlife Crossing 3	TBC	
	S116A	Parciau Mammal Culvert		

Structure Group	Structure	WG Structure Name	WG Asset No.	Comment
	S118A	Crug Lane Mammal Culvert		
Watercourse crossings – Afon Rhyd and Afon Cadnant	S102	Afon Rhyd Culvert	A487 565	River Rhyd.
	S114	Afon Cadnant Cattle Creep / Culvert	A487 631	River Cadnant – but combined with cattle creep. See Underbridges.
	S114A	Lon Glai Culvert	A487 631 C08	River Cadnant
	S115A	Bethel Road Culvert 1	A487 635 C01	River Cadnant tributary.
	S115B	Crug Lane Culvert 1	A487 635 C03	River Cadnant tributary.
	S115C	Bethel Road Culvert 2	TBC	River Cadnant tributary
Large Box Underbridges	S101A	Pont Parc Underpass	A487 561	Side road.
	S105	Dinas Accommodation Underpass	A487 575	Accommodation track.
	S107	Pont Llydiart Gwyn	A487 585	Side road.
	S111	Pont Bryn Mafon	A487 611	Side road.
	S113A	FP 36	A487 625	Footpath and watercourse.
	S114	Afon Cadnant Cattle Creep / Culvert	A487 631	Cattle creep and water course.
Overbridges	S103	Ty'n Llan Overbridge	A487 571	Side Road.
	S109	Pont Ceriw NMU Overbridge	A487 601	NMU bridge.
	S115	Bethel Road Overbridge	A487 635	Side Road.
Underbridge	S108	Pont Cefnwerthyd	A487 591	Crosses WHR.
	S112E	Waunfawr Road Underbridge	A487 617	Side Road
Afon Gwyrfai Viaduct	S106	Afon Gwyrfai Viaduct	A487 581	Crosses Afon Gwyrfai flood plain.
Afon Seiont Viaduct	S112	Pont Afon Seiont Newydd	A487 621	Crosses Afon Seiont flood plain.

The containment barriers along the length of bridges (bridge parapets) would be to normal containment level. The requirements for lengths of vehicle barriers on the approaches to bridge would be determined from the Road Restraint Risk Assessment Process (RRRP). Typically, vehicle barrier on the approach to the bridge would be connected to the ends of bridge parapets to form a continuous safety barrier.

All parapets would meet the minimum required heights for road restraint system and proposed parapets would be typically 1000mm high. Pedestrian restraint systems (i.e. handrails) would be provided to the tops of all pedestrian facing walls.

Street furniture, such as signs and street lighting, would be typically located away from structures.

2.2 Construction Strategy

2.2.1 Methodology and overview

The start date for the construction phase would depend on a number of factors including the successful completion of the statutory processes in making the Orders to construct the scheme, availability of Welsh Government funding and the formal signing of the contract to construct the works. It is currently anticipated that the construction activities for the scheme would commence in early 2018. It is anticipated to be a 30-month contract, with an anticipated completion date in summer 2020. The works would be planned to ensure that the construction activities and traffic management would have minimal disruption to road users.

At the start of construction, the site would be fenced and site clearance would commence. All works would be undertaken as detailed in the Construction Environmental Management Plan (CEMP) and in accordance with ecological constraints. Protected species licences would be obtained for bats as necessary and as outlined in Chapter 8 Nature Conservation. Temporary and permanent drainage consents and other environmental consents including Listed Building consent would be obtained where required.

2.2.2 Site compound and delivery routes

It is anticipated the main site office and compound would be located midway along the scheme and would be constructed early in 2018. A 2m high chainlink fence or hoarding would be provided as necessary to form a compound area to provide security and noise mitigation. It is anticipated the compound would have one main access from Seiont Mill Lane off the existing roundabout on the A487, with access directly on to the site from the east side of the compound at approximate chainage 4700, thus reducing unnecessary traffic movements on the existing roads.

A number of satellite compounds would be required along the length of the scheme and these would predominately be located at the location of major structures, with provisions for small offices, welfare, storage, preparation areas and access to the local road network. Haul roads would be formed around the structures to maintain a route through the site.

Construction of the scheme would be carried out over an anticipated 30 months. The first three months would be predominately site setup and site clearance works and the last three months would be predominately preparation of landscape plots, planting and finalising the site works. Therefore, the main construction vehicular movements and earth moving works would be undertaken over a period of 12 months with

drainage and road construction and structures construction taking a further -12 months, as noted in the Air Quality Chapter (Chapter 5).

A plan showing the compound areas, access points and delivery routes is shown in Volume 2, Figure 2.6.

2.2.3 Goat Roundabout tie in to Afon Gwyrfai Viaduct (Ch0 – 1800)

The scheme starts from the existing Goat roundabout of Bontnewydd. The tie in off the roundabout would be constructed to minimise disruption to road users. From the roundabout the road heads north towards Afon Gwyrfai.

Three new culverts would be constructed to deal with existing watercourses. These would be reinforced concrete pipes and box sections delivered via the site access at the Goat Roundabout. New underpass bridges would be constructed at Pont Parc and Dinas. These structures would be reinforced cast in situ concrete structures, with materials being delivered from the Goat Roundabout site access. An over bridge would be constructed at Ty'n Llan. This structure would be a three span bridge with the deck sections supported on precast concrete beams on in situ reinforced concrete abutments and piers. The beam deliveries would be anticipated around spring 2019 from the site access at Goat Roundabout. Localised road closures would be implemented to facilitate the construction of these structures. The diversion route would be planned and agreed with GC to ensure road users are informed and diverted with the minimum of disruption.

A traffic controlled plant crossing would be provided where the site haul route crosses over Ty'n Llan. There would be a further plant crossing on the access to Dinas Farm which will be manually controlled. These crossings would be used to bring excavated material through the site for deposition in this area. It is anticipated that the majority of the fill material required for this section would be obtained from within the section with a small balance to finish the earthwork hauled from the cutting at Ch9300 along the site haul routes. There would be an earthworks area at Ty'n Llan that would be removed in the second earthworks season. Three attenuation ponds would be constructed within this section. These would be constructed early to deal with site run off and provide water for dust suppression. Landscaping and planting works would be carried out over two planting seasons providing early establishment of significant sections of the scheme.

Anticipated phasing of the works in this area is shown in Table 2.2.1 below. Phase 1 commences at the start of construction and all durations follow on.

Table 2.2.1 Phasing of the works from Ch0 – Ch1800

Phase	Approximate Duration	Key Activities
1	8 months	Secure site, fencing, ecological mitigation as required and site clearance (including vegetation), Statutory Undertakers diversions. Construct temporary haul routes. Construct pre earthworks drainage, Commence earthworks, Construct attenuation ponds 1A,1,2 and 3, Construct stream culvert (S104).

2	6 months	Construct stream culvert (S101), Construct Pont Parc Underpass (S101A), Construct Afon Rhyd Culvert (S102), Culvert NRW1, Construct Dinas Accommodation Underpass (S105), Continue Statutory Undertakers Diversions, Commence Road Drainage, Commence Landscaping and planting.
3	8 months	Complete Statutory Undertakers Diversions, Construct Ty'n Llan Overbridge (S103), Complete earthworks/drainage/road construction, Lighting and signage, Complete landscaping and environmental mitigation.

2.2.4 Afon Gwyrfai Viaduct (S106) (Ch1800 – 2100)

The Afon Gwyrfai Viaduct would be an eight span viaduct with the deck formed on steel beams supported on in situ reinforced concrete leaf piers and abutments. The leaf piers are located within the flood plain of the Afon Gwyrfai. Construction of the viaduct would start in late summer of 2018, once the earthworks have significantly progressed. Steel beams would be delivered in early 2019. A satellite office and stores area would be erected near the South abutment above the flood plain with access off the Goat Roundabout for light vehicles. Plant and materials would not be stored on the flood plain.

The steel beams would be delivered to site from the access at the Goat Roundabout and craned into position. The delivery route would be planned with GC to ensure road users are informed and have the minimum disruption. A temporary bailey bridge would be constructed to provide access over the Afon Gwyrfai to maintain the haul route through the site. A crane platform will be constructed around the footprint of the bridge deck in order to accommodate bridge pier access.

Phase 1 works would start in summer 2018 and all other durations follow on. Given the status of the Afon Gwyrfai as a SAC ecological monitoring would be carried out as required. Mitigation measures would be included in the CEMP to prevent potential pollution of the Afon Gwyrfai during construction of the viaduct.

Table 2.2.2 Phasing of the works from Ch1800 – Ch2100

Phase	Approximate Duration	Key Activities
1	4 months	Topsoil strip. Construct haul roads and install bailey bridge over the river Gwyrfai. Construct crane platform, then commence. Engineered fill for abutments and piers. , Construct abutments and piers
2	10 months	Deliver and install Beams, Construct bridge deck, Construct ballast and wing walls, Structure drainage

		and earthworks/ backfill, Vehicle Parapet, Finishes to deck

2.2.5 Afon Gwyrfai Viaduct to Meifod Roundabout (Ch2100 – 3500)

This section would continue on embankment from the Afon Gwyrfai Viaduct to the existing A487(T) Pwllheli Road. The fill material for the predominantly embankment construction within this section would be hauled through on the site haul roads from the cutting at Ch9300. Two attenuation ponds would be constructed within this section. These would be constructed early to deal with site run off and provide water for dust suppression.

An in situ reinforced concrete box section Underbridge would be constructed at Pont Llydiart Glyn. This road would be closed for construction of the structure. Where the new road crosses over the Welsh Highland Railway (WHR) the Pont Cefnwerthyd Underbridge will be constructed for the railway to pass through. The structure would be a single span reinforced earth construction with precast concrete facing panels with columns extending through the reinforced earth abutment, supporting precast reinforced concrete beams with an in situ concrete deck. The abutments would be positioned either side of the track at a distance to allow construction to be carried out in the safe zone. A detailed method statement and liaison with WHR would ensure safety to the rail infrastructure during construction.

A controlled plant crossing would be provided to facilitate site vehicles crossing the WHR and this would be agreed with WHR and constructed to meet current railway standards. It is anticipated that a number of night and weekend closures would be required to construct the bridge deck and these would be confirmed with WHR during the detailed design stage. This structure also includes provision for an access track and a recreation route.

The Pont Ceriw NMU Overbridge would be a single span reinforced earth construction with precast concrete facing panels with piles extending through the reinforced earth abutment supporting precast reinforced concrete beams with an in situ concrete deck. Deliveries for these structures would be from the A487(T). The precast beam deliveries would be anticipated in early 2019. Localised road closures would be implemented to facilitate the construction of these structures. The diversion routes would be planned and agreed with GC to ensure road users are informed and diverted with the minimum of disruption.

Two new culverts would be constructed to deal with existing watercourses. These would be constructed using concrete pipes. These would provide a bat flight path and animal crossing points. Landscaping and planting works would be carried out over two planting seasons providing early establishment of significant sections of the scheme.

Phase 1 works start in the summer of 2018 and all durations follow on.

Table 2.2.3 Phasing of the works from Ch2100 – Ch3500

Phase	Approximate Duration	Key Activities
1	8 months	Secure site, fencing, ecological mitigation and site clearance (including vegetation), Statutory Undertakers diversions, Construct pre earthworks drainage, Commence earthworks, Construct attenuation ponds 4 and 4A
2	7 months	Construct Pont Llydiart Gwyn Underbridge (S107), Construct Pont Cefnwerthyd Underbridge (S108), Construct Pont Ceriw NMU Overbridge (S109), Construct Stream Culverts (S109A and S109B), Culvert NRW2, Complete Statutory Undertakers diversions, Commence Road drainage, Commence landscaping and planting, Commence road construction
3	7 months	Complete earthworks/drainage/road construction, Lighting and signage, Complete landscaping and environmental mitigation

2.2.6 Meifod Roundabout to A4085 Waunfawr Road (Ch3500- 5310)

The Meifod roundabout would be constructed mostly off line ensuring minimal disruption to road users on the existing road. A bailey bridge would also be constructed at this location over the A487 to provide a plant crossing. This section is predominantly constructed on embankment with a section of cut at Ch4900 which would provide the material for a significant section of the embankments with the balance coming from an external quarry source and also from the cut at Ch9300 along the site haul routes. Two attenuation ponds would be constructed within this section. These would be constructed early to deal with site run off and provide water for dust suppression. The main site compound would also be located within this section and access would be provided directly to the works at Ch4700. It is expected the compound would be erected early in 2018. Two plant crossings would be provided to cross over minor roads and one plant crossing over the busier A4085 Waunfawr Road in this section. These plant crossings would be signal controlled crossings with the highway surface replaced with a durable concrete surface layer at the crossing location.

Pont Bryn Mafon Underbridge would be an in situ reinforced concrete box section structure, with materials deliveries accessing site from the Meifod Roundabout site access. Three new culverts would be constructed to deal with existing watercourses. These would be constructed using concrete pipes delivered to site from the site access at the Meifod Roundabout. A further culvert would be constructed using concrete pipes to provide a bat flight path.

Table 2.2.4 Phasing of the works from Ch3500 – Ch5310

Phase	Approximate Duration	Key Activities
1	5 months	Secure site, fencing, ecological mitigation and site clearance, Statutory Undertakers diversions Construct temporary site access and bailey bridge, Pre earthworks drainage, Commence earthworks, Construct attenuation ponds 5, 6
2	6 months	Construct Pont Bryn Mafon Underbridge (S111), Construct stream culverts (S110, S110A, S111B) Construct Bat Culvert (S111A), Culvert NRW3, Complete Statutory Undertakers diversions, Commence road drainage, Commence landscaping and planting
3	11 months	Complete earthworks/drainage/road construction, Lighting and signage, Complete landscaping and environmental mitigation

Pont Afon Seiont Viaduct (S112) to Cibyn Roundabout (Ch5310 – 6400)

The road through this section is in cutting. The excavated material would be transported on a short length of the site haul roads for deposition in the fill areas at Ch5300. A temporary bailey bridge would be constructed to provide access over the River Seiont to maintain the haul route through the site. One stream culvert and two attenuation ponds would be constructed between Ch5600 and Ch6000 to manage existing watercourses.

The Pont Afon Seiont Viaduct would be a four span viaduct with the deck formed on steel beams supported on in situ reinforced concrete columns and abutments. The columns are located on the valley floor near to the Afon Seiont. Construction of the viaduct would start in late summer/autumn of 2018, once the earthworks activities have significantly progressed. A satellite office and stores area would be erected near the southern abutment with access off A4085 Waunfawr Road.

The larger construction vehicles would access the bridge site from within the scheme boundary gaining access to the southern and northern abutments from the south off A4085 Waunfawr Road. The steel beams would be delivered early 2019 via the A487 and would access site compound and lay down area from the A4085 Waunfawr Road from where they would be craned into position. The delivery route would be planned with GC to ensure road users are informed and have the minimum disruption.

Where the structure crosses over the A4085 Waunfawr Road the construction will be in situ reinforced concrete deck supported on precast concrete beams supported on in situ reinforced concrete abutments on piled bases. Lane closures using traffic signal control would be required for the construction of the abutments. The signals would be controlled manually at peak times to reduce disruption to road users. Some night time or weekend road closures would be required for the beam installation. Arrangements for lane/road closures would be agreed with GC to minimise the impact on road users. Mitigation measures would be included in the CEMP to prevent potential pollution of the Afon Seiont during construction of the viaduct.

Table 2.2.5 Phasing of the works from Ch5310 – Ch6400

Phase	Approximate Duration	Key Activities
1	6months	Secure site, fencing, ecological mitigation and site clearance (including vegetation), Statutory Undertakers diversions, Pre earthworks drainage, Commence earthworks
2	6 months	Topsoil strip, Piling to abutments and piers, Construct abutments and piers, Construct Stream Culvert (S112C), Construct A4085 span of the Viaduct (S112E)
3	10 months	(S112) Deliver and install Beams, Construct bridge deck, Construct ballast and wing walls, Structure drainage and backfill, Construct attenuation ponds 7 and 8, Vehicle parapet, Finishes to deck, Complete earthworks/drainage/road construction, Complete statutory Undertakers diversions, Lighting and signage, Complete landscaping and environmental mitigation

2.2.7 Cibyn Roundabout to Bethel Road South (Ch6400 – 7900)

Cibyn Roundabout would be constructed mostly off line with disruption to road users limited to the tie in works. Two stream culverts and an attenuation pond would be constructed at the roundabout to manage existing watercourses. The phasing of the tie in works would be agreed with GC to minimise the impact on road users. From the roundabout the road proceeds north through a mostly shallow cut with some low embankments towards Bethel Road. A small amount of excavated material from this cutting would be transported along the site haul road to the fill area at Ch5300 with the larger balance from the following cuttings being transported and placed in the fill areas at Ch8000 – Ch8500. A traffic controlled plant crossing would be provided where the haul route crosses over the A4086 Llanberis Road. One further attenuation pond would be constructed within this section. This would be constructed early to deal with site run off and provide water for dust suppression.

A precast concrete box culvert would be constructed to divert Footpath 36 and an existing watercourse at Ch7160. In situ reinforced concrete wingwalls would be constructed at each end of the structure. The units for the structure would be delivered to site through the site access at Cibyn Roundabout and offloaded by crane.

Table 2.2.6 Phasing of the works from Ch6400 – Ch7900

Phase	Approximate Duration	Key Activities
1	6 months	Fencing, ecological mitigation and site clearance, Statutory Undertakers diversions, Pre earthworks drainage, Commence earthworks, Construct FP36 Underbridge (S113A), Construct Stream Culverts (S112A, S112B,), Construct attenuation ponds 9, 10 and 14
2	3 months	Complete Statutory Undertakers diversions, Commence road drainage,
3	6 months	Complete earthworks/drainage/road construction, Lighting and signage, Complete landscaping and environmental mitigation

2.2.8 Bethel Road South to Plas Menai Roundabout (Ch7900 – 9700)

The road continues north through this section into a deeper cutting where it crosses over Bethell Road, then into the rock cutting as it approaches the end of the scheme at Plas Menai Roundabout. The majority of the excavated fill material in this section is transported to the fill areas Ch1250 - 5250, along the site haul routes, also a significant quantity will be transported along the haul routes and placed in the side road fill areas at Ch8400. A large quantity of the materials generated in this cutting will be used for production of premium aggregates which will include some cement bound products. A high proportion of the material to be excavated in this area would be rock and therefore it is envisaged that there would be need for controlled blasting in order to remove the rock and achieve the designed profile. The rock excavated from within the cutting would be processed to the side of the cutting area for use on site as capping, sub base, drainage stone and other crushed stone products

A controlled plant crossing would be provided at Bethel Road with a temporary concrete crossing in order to ensure safe crossing of plant. The balance of the fill material would be retained within the section to provide a small proportion of the fill for the diverted side road. Three attenuation ponds would be constructed within this section. These would be constructed early to deal with site run off and provide water for dust suppression. Five culverts would be constructed to deal with existing watercourses. These would be constructed from concrete pipes which would also provide flight paths for bats.

A precast concrete box culvert would be constructed to divert the Afon Cadnant watercourse and provide a cattle creep. In situ reinforced concrete wing walls would be constructed at each end of the structure. The units for the structure would be delivered to site through the site access at Plas Menai Roundabout and offloaded by crane. Bethel Road Overbridge would be constructed offline from the existing Bethel Road. The structure would be precast concrete reinforced abutments and wing walls. The in situ reinforced concrete bridge deck would be cast on piled precast concrete

beams supported on in situ reinforced concrete piles passing through the reinforced earth abutment. Deliveries for this structure would be received through the site access at Plas Menai Roundabout. The precast concrete beams would be delivered through this access in spring 2019.

Table 2.2.7 Phasing of the works from Ch7900 – Ch9700

Phase	Approximate Duration	Key Activities
1	7 months	Fencing, ecological mitigation and site clearance (including vegetation), Pre earthworks drainage, Commence earthworks, Commence rock cutting and processing, Construct Afon Cadnant Cattle Creep Underbridge (S114), Construct Stream Culverts (S114A, S115A, S115B, S116), Construct attenuation ponds 11, 12 and 13
2	9 months	Construct Bethel Road Overbridge (S115), Commence road drainage, Commence landscaping and planting, Complete earthworks/drainage/road construction to side road
3	5 months	Complete earthworks/drainage/road construction, Lighting and signage, Complete landscaping and environmental mitigation

2.2.9 Land take

Land necessary to construct the scheme and mitigation would be acquired through the Compulsory Purchase Order process.

2.3 Detailed description

2.3.1 Summary of culverts and associated mitigation

The scheme and associated side roads would cross eight watercourses and minor streams. A list of streams and ditches will be shown in the Flood Consequence Assessment in Volume 3, Appendix K.1. A list of the culverts that would be required for highway and those required as part of the flood mitigation strategy is given in Table 2.3.1 below.

All new or retained land drainage culverts would convey a 1% (1 in 100 year) chance flow including 20% allowance for climate change. Checks would also be made to ensure that a 0.1% (1 in 1000 year) chance event does not increase flood risk in the locality.

Culverts associated with the flood mitigation strategy would be designed to ensure that the flood risk in the locality is not adversely affected by flood events up to the 0.1% (1 in 1000 year) chance event.

For a detailed appraisal of all the culverts associated with the flood risk management strategy for the scheme refer to Section 14 and to the Flood Consequences Assessment which is included in Volume 3, Appendix K.1. For details of the highway drainage culverts refer to Section 14 and to the Drainage Strategy in Volume 3,

Appendix K.3. Table 2.3.1 below shows the existing and proposed culverts along the scheme.

Table 2.3.1 Summary of Scheme Culverts and associated wildlife mitigation

Ref	Structure	Length	Headroom when in spate (1 in 100yr)	Associated mammal mitigation	Function
	Size /Type	(m)	(m)		
S100	0.6m pipe	33		Non-LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S101	1.8m pipe	57.2	1.11	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S101A	7.2 x 5.8m box underbridge	23.7	N/A	LHB foraging and potential commuting route, wildlife crossing	Road crossing
S102	3.2m x 2.4m box culvert	54.9	0.71	LHB foraging and potential commuting route, wildlife crossing, dry pipes also provided	Stream diversion
S103	Overbridge	N/A	50.9	Non-LHB foraging and potential commuting route	Road crossing
NRW1	1.8m pipe	25.5	N/A	LHB foraging and potential commuting route, wildlife crossing	Ecological mitigation only

S104	1.8m pipe	35.2	1.10	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S105	4.5 x 4.5 box underbridge	23.6	N/A	LHB foraging and potential commuting route, wildlife crossing	Farm access
S106	Afon Gwyrfai Viaduct	260	N/A	LHB foraging and potential commuting route, wildlife crossing	Watercourse crossing
S107	7.2 x 6.1m box underbridge	24.6	N/A	LHB foraging and potential commuting route, wildlife crossing	Road crossing
S108	19.5 underbridge	17	N/A	LHB foraging and potential commuting route, wildlife crossing	Rail crossing
S109	Overbridge	24.7	N/A	Non-LHB foraging and potential commuting route, wildlife crossing	Road crossing
S109A	1.8m pipe	36.4	0.89	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S109B	0.6m pipe	23.6	0.36	Non-LHB foraging and potential commuting route, mammal ledge	Watercourse crossing

NRW2	0.9m pipe	28.0	N/A	Non-LHB foraging and potential commuting route, wildlife crossing	Ecological mitigation only
S110	1.8m pipe	30.2	1.16	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S110A	1.8m pipe	23.2	1.09	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S111A	1.8m box culvert	29.6	N/A	LHB foraging and potential commuting route, wildlife crossing	Ecological mitigation only
S111B	1.5m pipe	14.2	0.66	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
NRW3	1.8m pipe	28.5	N/A	LHB foraging and potential commuting route, wildlife crossing	Ecological mitigation only
S112	Afon Seoint Viaduct	148	N/A	LHB foraging and potential commuting route, wildlife crossing	Watercourse crossing
S112A	1.5m pipe	15	0.85	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S112B	1.5m pipe	32.2	0.81	LHB foraging and potential commuting	Watercourse crossing

				route, mammal ledge	
S112C	0.6m pipe	32.7	0.34	Non-LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S112D	0.6m pipe	118		Non-LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S112E	18.7m box underbridge	9.7	N/A	LHB foraging and potential commuting route, wildlife crossing	Road crossing
S113A	2.3m x 3.0m box culvert	23.0	2.3	LHB foraging and potential commuting route, wildlife crossing	Watercourse crossing
S114	3.4m x 3.4m box culvert	22	1.77	LHB foraging and potential commuting route, wildlife crossing	Watercourse crossing and cattle creep
S114A	1.8m pipe	29.4	0.60	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S115	Overbridge	23.5m	N/A	Non-LHB foraging and potential commuting route, wildlife crossing	Road crossing
S115A	2.1m pipe	55.5	0.79	LHB foraging and potential commuting	Watercourse crossing

				route, mammal ledge	
S115B	2.1m pipe	53.5	0.78	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S115C	2.1m pipe	21	0.72	LHB foraging and potential commuting route, mammal ledge	Watercourse crossing
S116	0.6m pipe	35	0 (surcharged ~ 2m)	Not suitable for wildlife passage, dry pipes provided (S116A and S118A)	Watercourse crossing
S116A	0.6m pipe	46	0	Dry pipe provided for mammal passage (NB: Otter pipe surcharged by about 1.3m for 100CC event.)	Ecological mitigation only
S118A	0.6m pipe	24	0	Dry pipe provided for mammal passage (NB: Otter pipe surcharged by about 1.3m for 100CC event.)	Ecological mitigation only

2.3.2 Long-term management

On completion of the construction phase the JV Team would monitor and maintain the environmental mitigation, especially the landscape and ecological works, for five years. The environmental requirements for this period are set out in an Environmental Landscape and Ecology Aftercare Management Plan (ELEAMP), which would be produced and managed by the JV Team environmental specialists. During the post construction period, the JV Team would review the effectiveness of the environmental mitigation against their intended function as identified within the ES and would provide any remedial actions if required.

At the completion of this five-year period, the management of the soft estate and environmental mitigation measures would be transferred to the North and Mid Wales Trunk Road Agent (NMWTRA). The JV Team would prepare a ten-year Maintenance

Environmental Management Plan (MEMP), which would set out on-going management and monitoring actions. For further details, refer to Chapter 16 – Environmental Management.

KEY

- 2+1 CARRIAGEWAY
- EARTHWORKS
- CUT-OFF DITCH
- ATTENUATION POND
- FENCE
- MAIN RIVER
- RIVER DIVERSION

REV	DATE	DESCRIPTION	BY	CHKD	APPD

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A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
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Sheet 1 of 9

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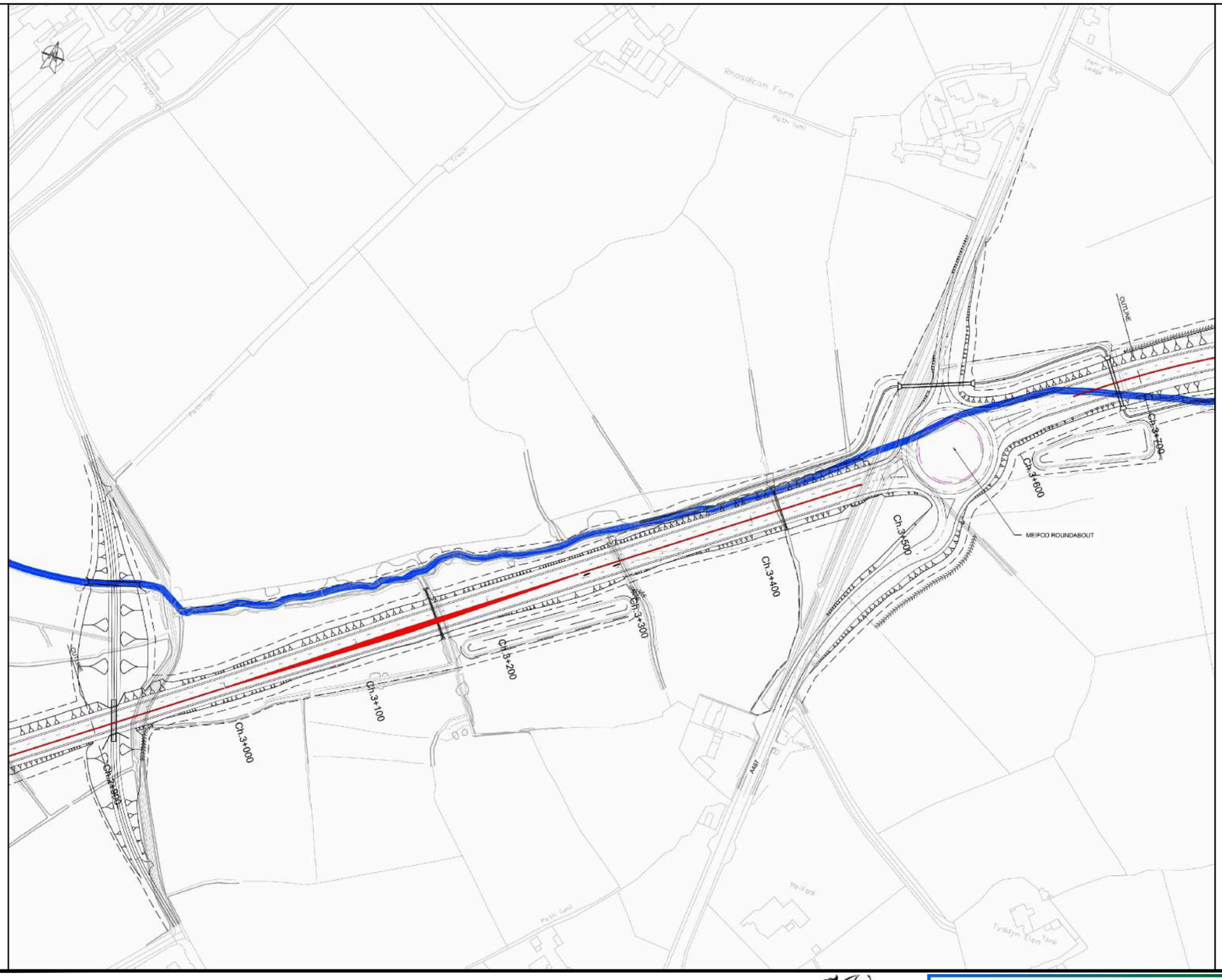

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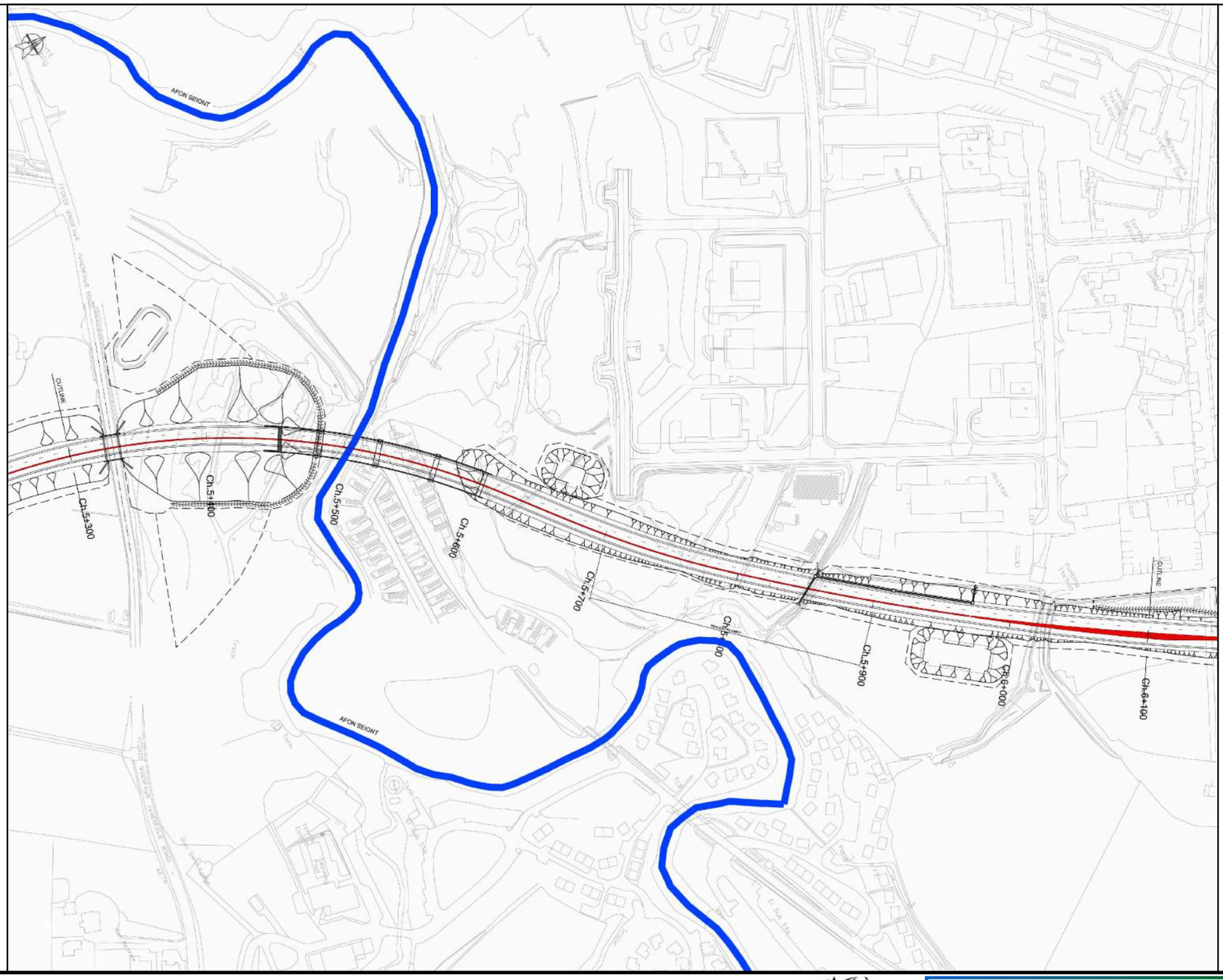

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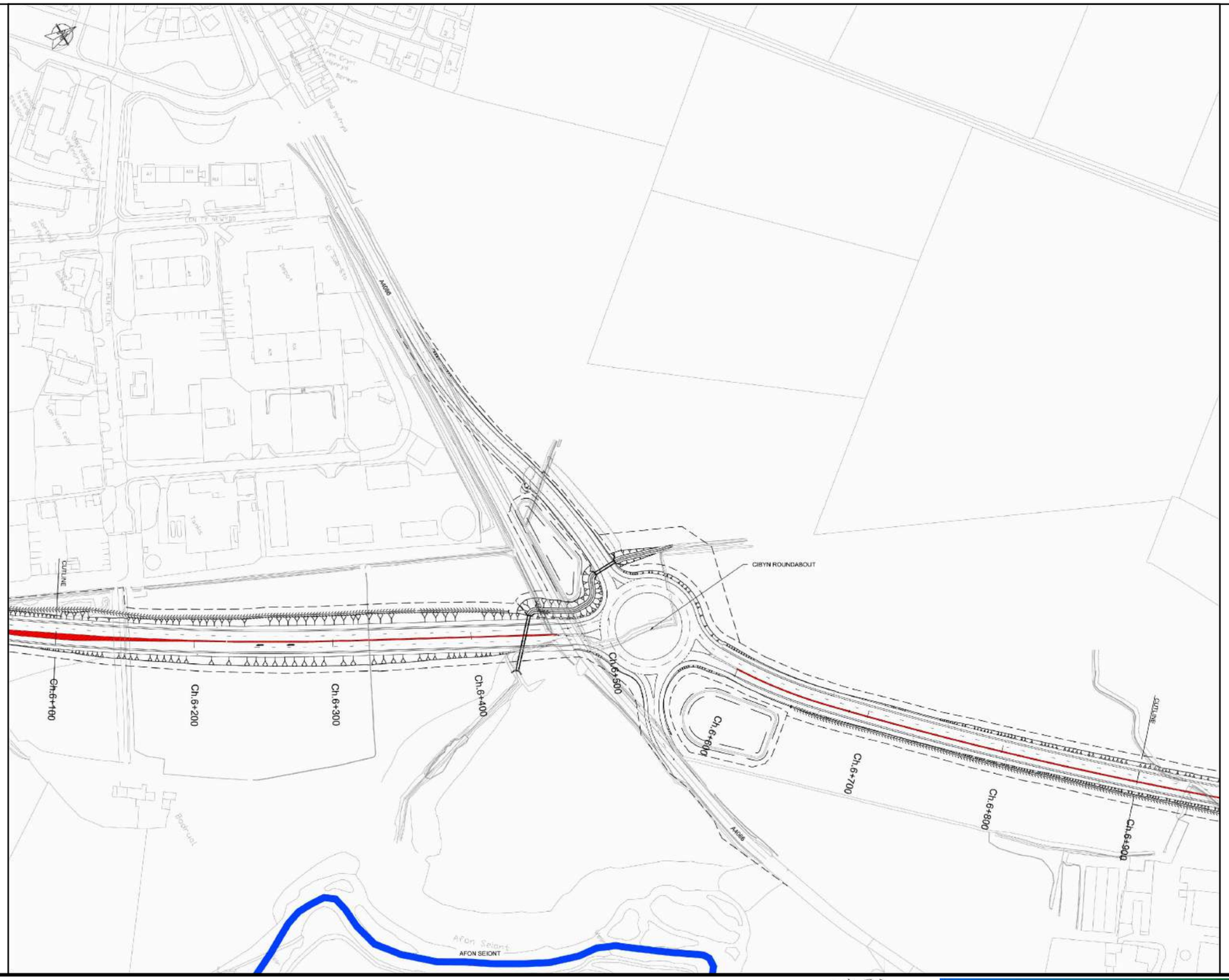

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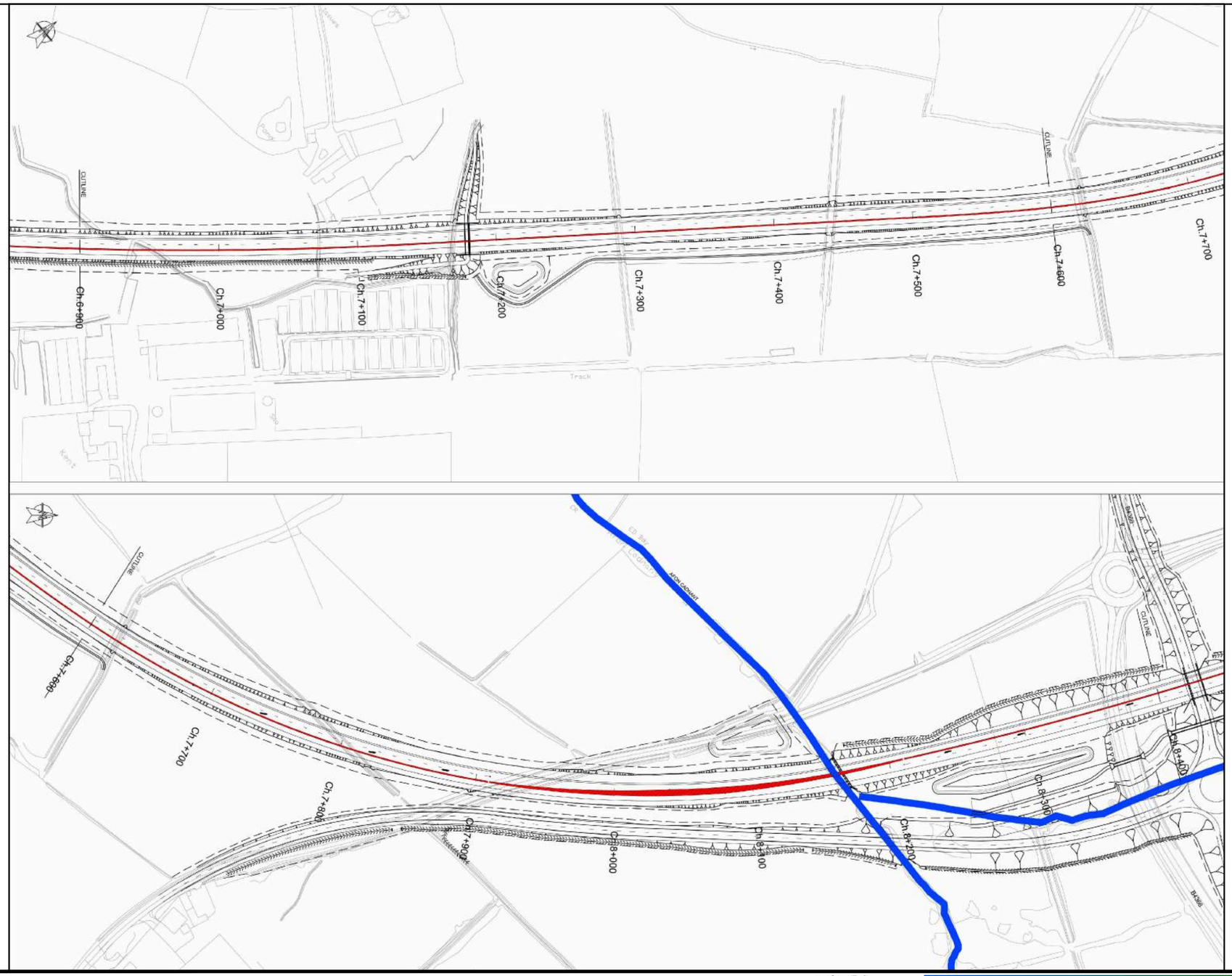

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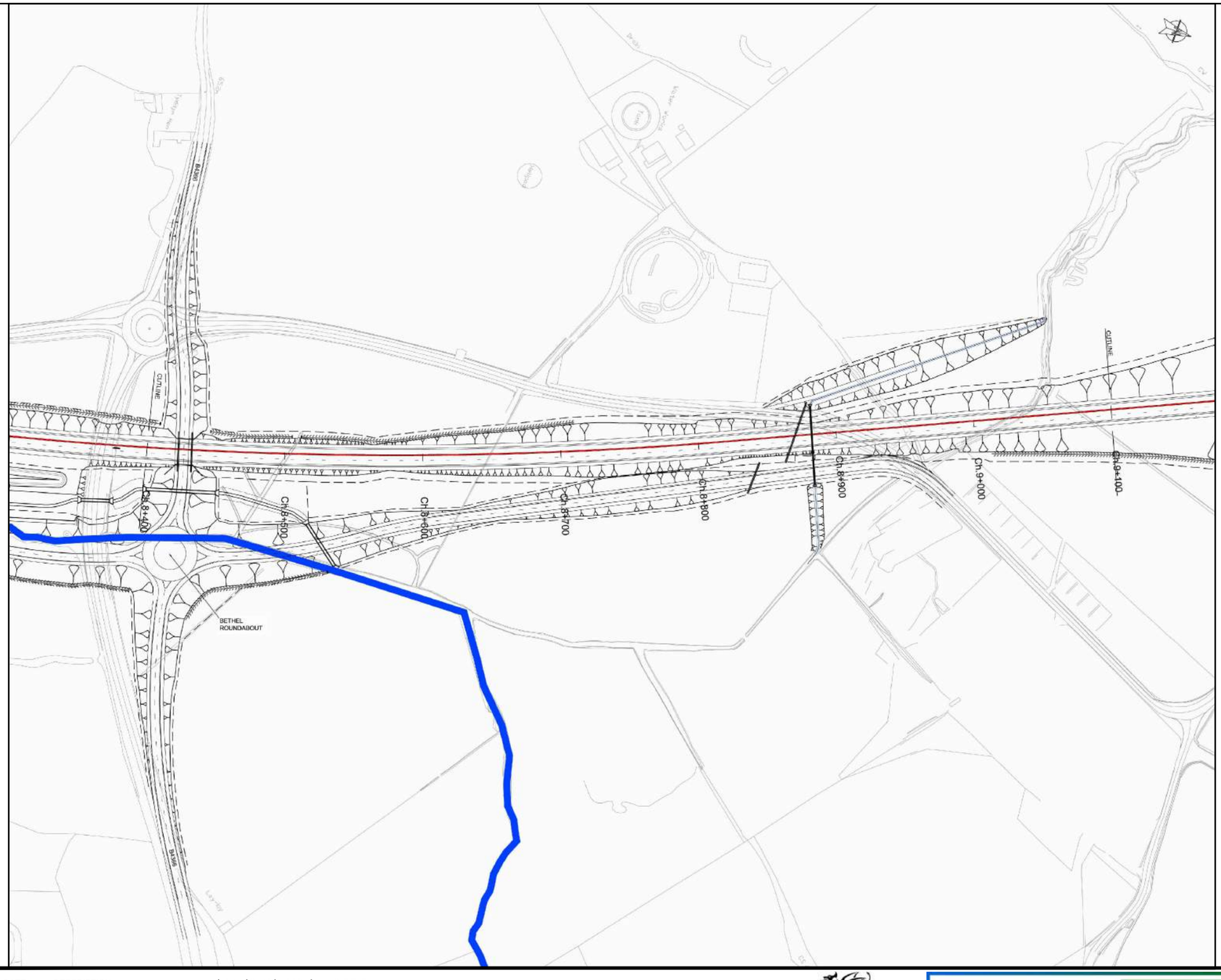

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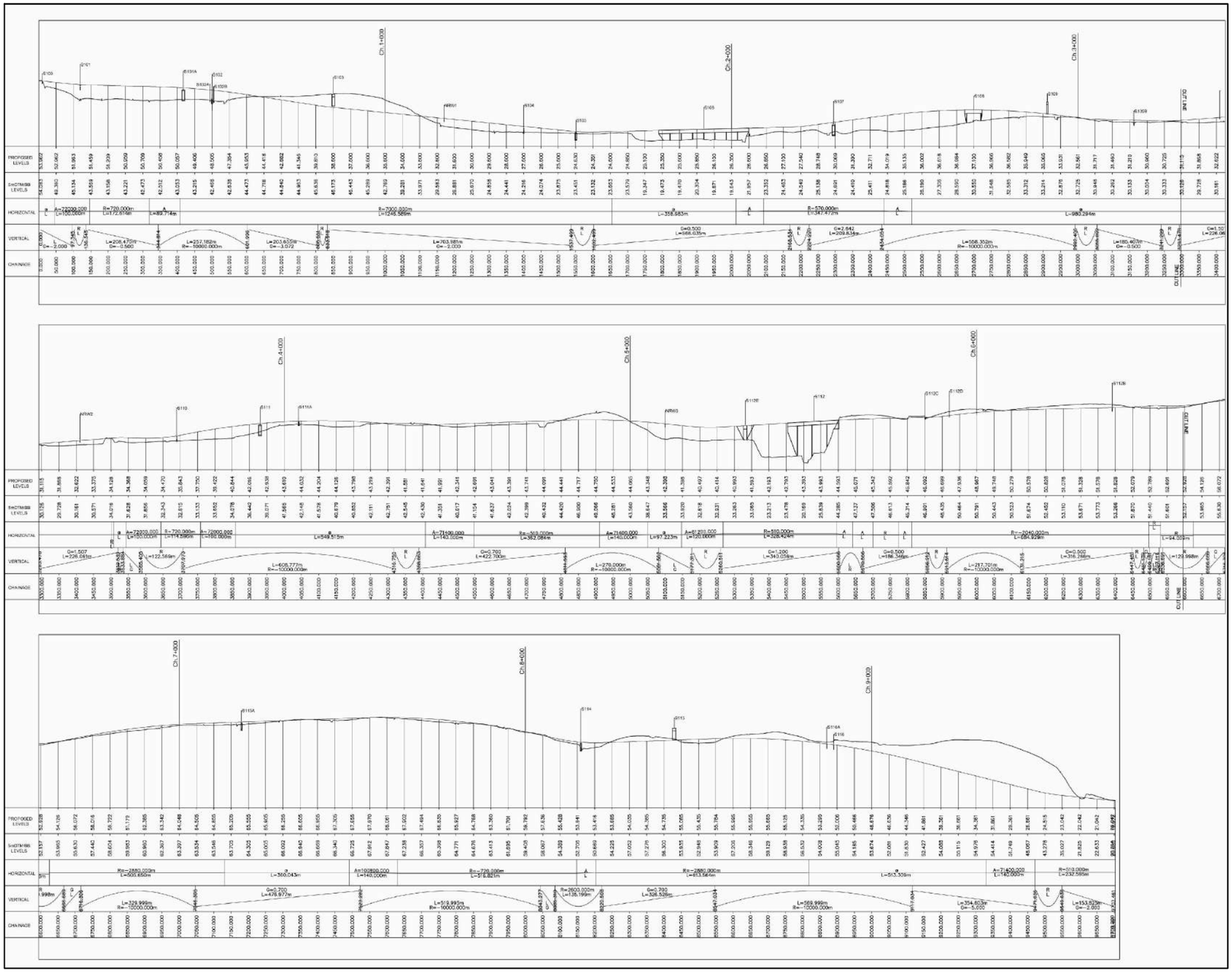

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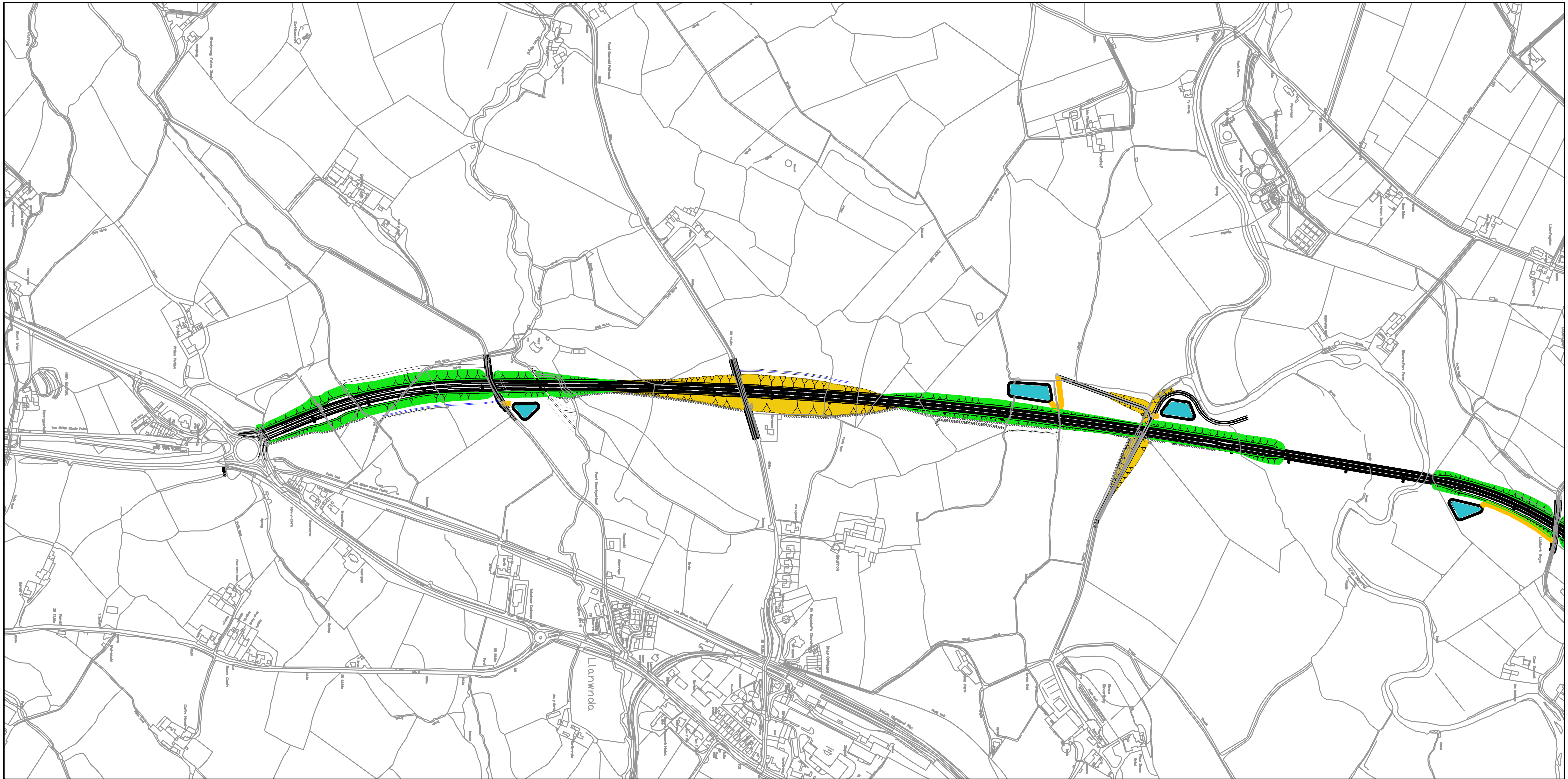

KEY:

- Highway Boundary
- On Embankment
- In Cutting
- False Cutting
- Areas of cut
- Areas of fill
- Attenuation Pond

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The Project
Proposed Areas of Cut and Fill (a-d)
Sheet 1 of 4

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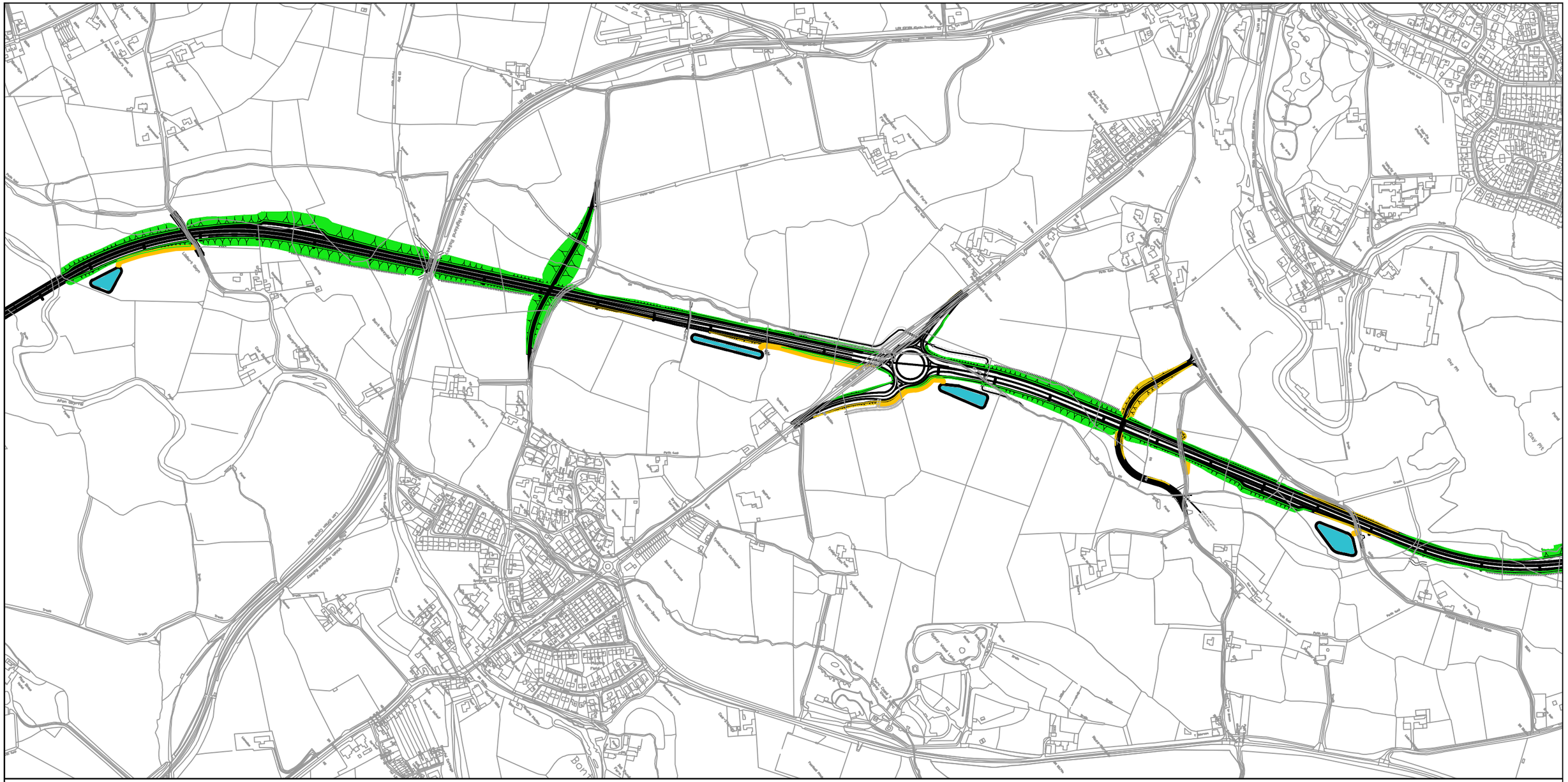

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The Project
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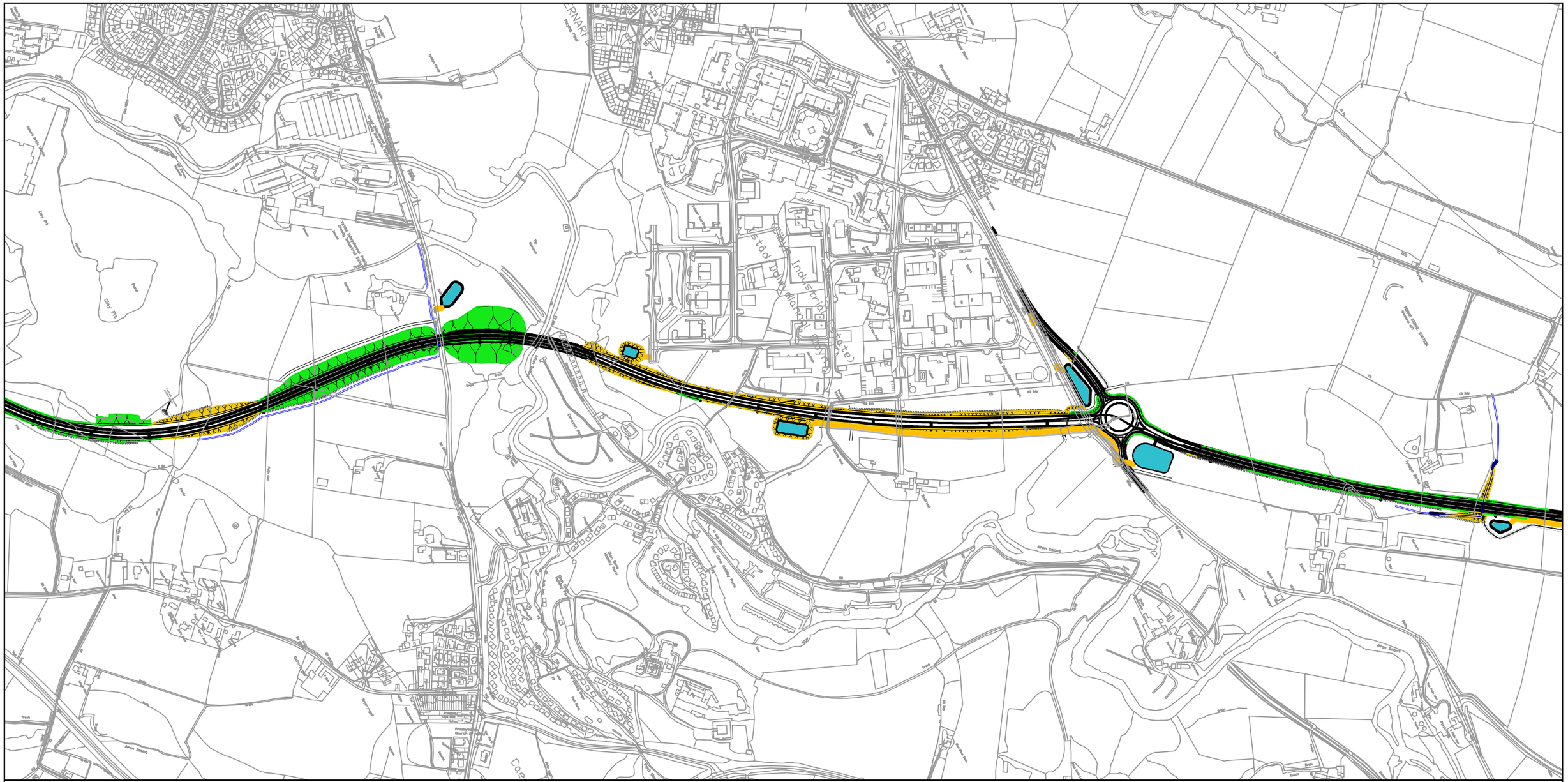

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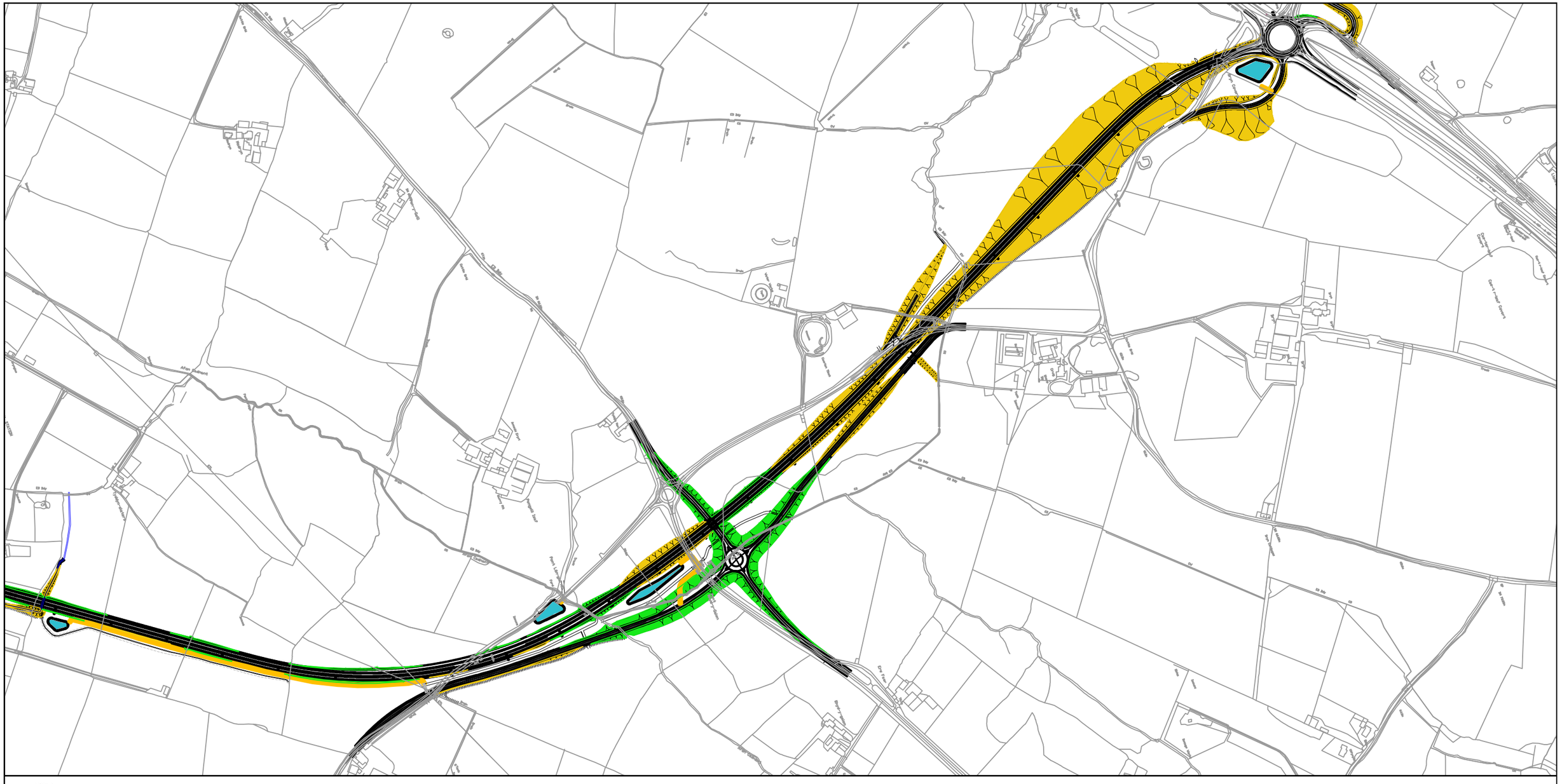

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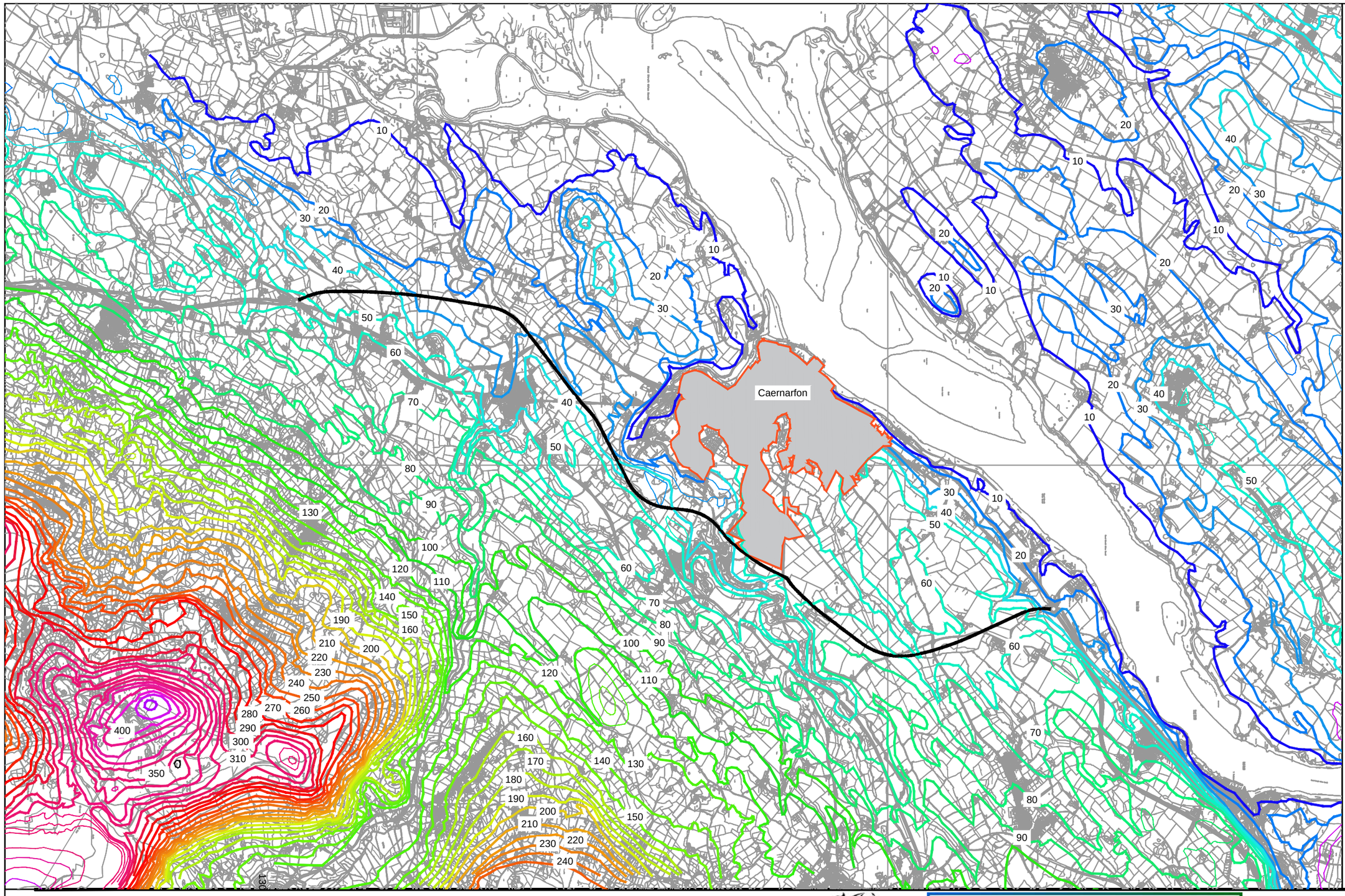

Legend:

Caernarfon to Bontnewydd Bypass

Built up areas

Contours from high to low

Meters Above Ordnance Datum

420 410 400 390 380 370 360 350 340 330 320 310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10

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• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Scheme on Contours

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Llywodraeth Cymru
Welsh Government

Balfour Beatty JONES BROS CIVIL ENGINEERING UK

ARCADIS | RAMBOLL | WSP | PARSONS BRINCKERHOFF | TACP

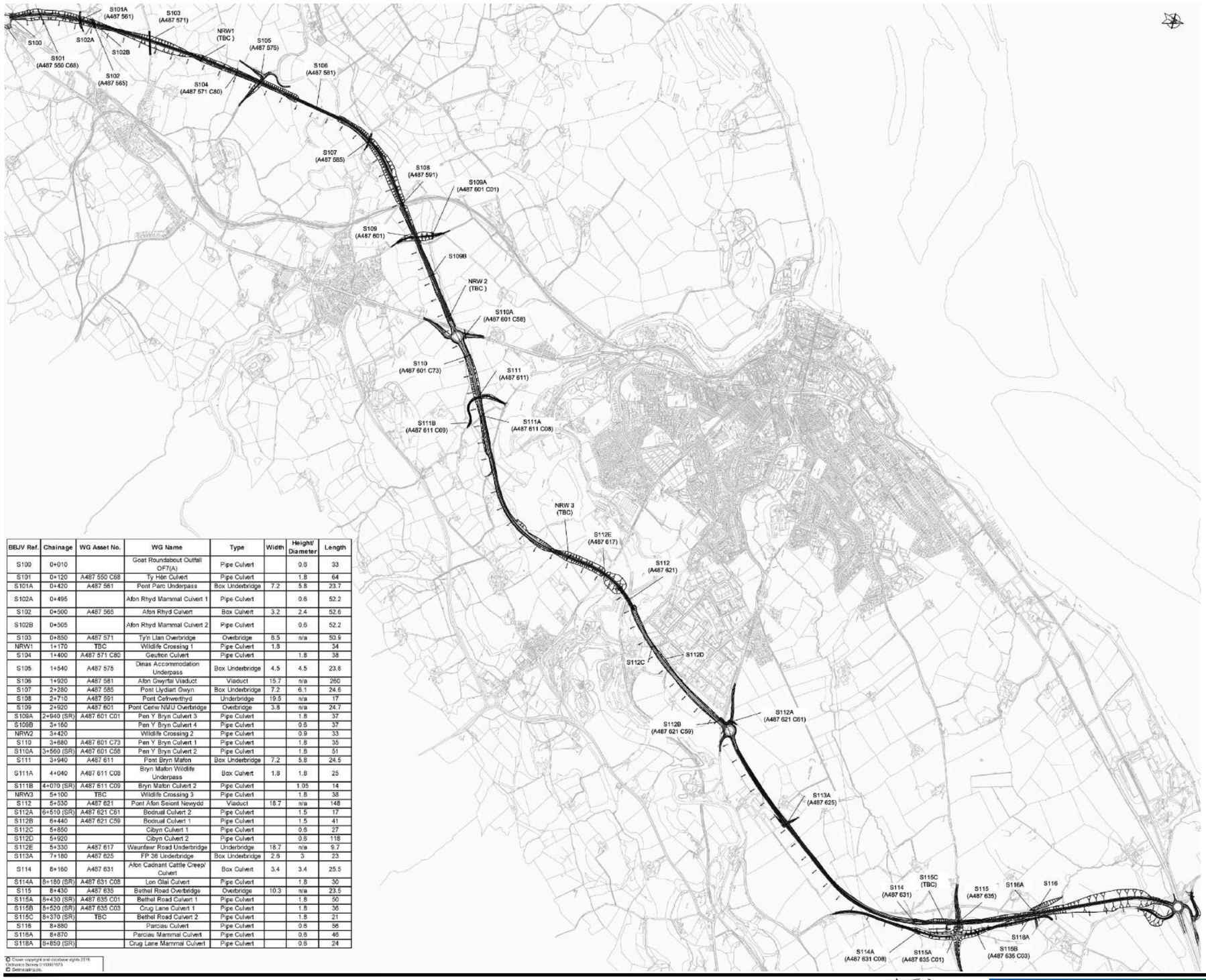
Ty Glyn, Canol Y Dre, Ruthin
Denbighshire Tel: 01824 703661

FINAL

• DATE 29/06/16
• SCALE Not To Scale

DRAWN BY RW
DESIGNED
CHECKED LJ
APPROVED PM

• FIGURE NUMBER
2.4



BBJV Ref.	Chainage	WG Asset No.	WG Name	Type	Width	Height/ Diameter	Length
S100	0+010		Goat Roundabout Outfall OF7(A)	Pipe Culvert		0.6	33
S101	0+120	A487 550 C68	Ty Hén Culvert	Pipe Culvert		1.8	64
S101A	0+420	A487 561	Pont Parc Underpass	Box Underbridge	7.2	5.8	23.7
S102A	0+495		Afon Rhyd Mammal Culvert 1	Pipe Culvert		0.6	52.2
S102	0+500	A487 565	Afon Rhyd Culvert	Box Culvert	3.2	2.4	52.6
S102B	0+505		Afon Rhyd Mammal Culvert 2	Pipe Culvert		0.6	52.2
S103	0+850	A487 571	Ty'n Llan Overbridge	Overbridge	8.5	n/a	50.9
NRW1	1+170	TBC	Wildlife Crossing 1	Pipe Culvert	1.8		34
S104	1+400	A487 571 C80	Geufron Culvert	Pipe Culvert		1.8	38
S105	1+540	A487 575	Dinas Accommodation Underpass	Box Underbridge	4.5	4.5	23.8
S106	1+920	A487 581	Afon Gwyrfai Viaduct	Viaduct	15.7	n/a	260
S107	2+280	A487 585	Pont Llydiart Gwyn	Box Underbridge	7.2	6.1	24.6
S108	2+710	A487 591	Pont Cefnwerthyd	Underbridge	19.5	n/a	17
S109	2+920	A487 601	Pont Cerw NMU Overbridge	Overbridge	3.8	n/a	24.7
S109A	2+940 (SR)	A487 601 C01	Pen Y Bryn Culvert 3	Pipe Culvert		1.8	37
S109B	3+160		Pen Y Bryn Culvert 4	Pipe Culvert		0.6	37
NRW2	3+420		Wildlife Crossing 2	Pipe Culvert		0.9	33
S110	3+680	A487 601 C73	Pen Y Bryn Culvert 1	Pipe Culvert		1.8	35
S110A	3+560 (SR)	A487 601 C58	Pen Y Bryn Culvert 2	Pipe Culvert		1.8	51
S111	3+940	A487 611	Pont Bryn Mafon	Box Underbridge	7.2	5.8	24.5
S111A	4+040	A487 611 C08	Bryn Mafon Wildlife Underpass	Box Culvert	1.8	1.8	25
S111B	4+070 (SR)	A487 611 C09	Bryn Mafon Culvert 2	Pipe Culvert		1.05	14
NRW3	5+100	TBC	Wildlife Crossing 3	Pipe Culvert		1.8	38
S112	5+530	A487 621	Pont Afon Seiont Newydd	Viaduct	18.7	n/a	148
S112A	6+510 (SR)	A487 621 C61	Bodrual Culvert 2	Pipe Culvert		1.5	17
S112B	6+440	A487 621 C59	Bodrual Culvert 1	Pipe Culvert		1.5	41
S112C	5+850		Cibyn Culvert 1	Pipe Culvert		0.6	27
S112D	5+920		Cibyn Culvert 2	Pipe Culvert		0.6	118
S112E	5+330	A487 617	Waunfawr Road Underbridge	Underbridge	18.7	n/a	9.7
S113A	7+180	A487 625	FP 36 Underbridge	Box Underbridge	2.6	3	23
S114	8+160	A487 631	Afon Cadnant Cattle Creep/ Culvert	Box Culvert	3.4	3.4	25.5
S114A	8+180 (SR)	A487 631 C08	Lon Glai Culvert	Pipe Culvert		1.8	30
S115	8+430	A487 635	Bethel Road Overbridge	Overbridge	10.3	n/a	23.5
S115A	8+430 (SR)	A487 635 C01	Bethel Road Culvert 1	Pipe Culvert		1.8	50
S115B	8+520 (SR)	A487 635 C03	Crug Lane Culvert 1	Pipe Culvert		1.8	36
S115C	8+370 (SR)	TBC	Bethel Road Culvert 2	Pipe Culvert		1.8	21
S116	8+880		Parciau Culvert	Pipe Culvert		0.6	56
S116A	8+870		Parciau Mammal Culvert	Pipe Culvert		0.6	46
S118A	8+850 (SR)		Crug Lane Mammal Culvert	Pipe Culvert		0.6	24

REV	DATE	DESCRIPTION	BY	CHKD	APPD

• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Structures Location Plan

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Llywodraeth Cymru
Welsh Government

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Ty Glyn, Canol Y Dre, Ruthin
Denbighshire Tel: 01824 703661

FINAL

• DATE 01/07/16
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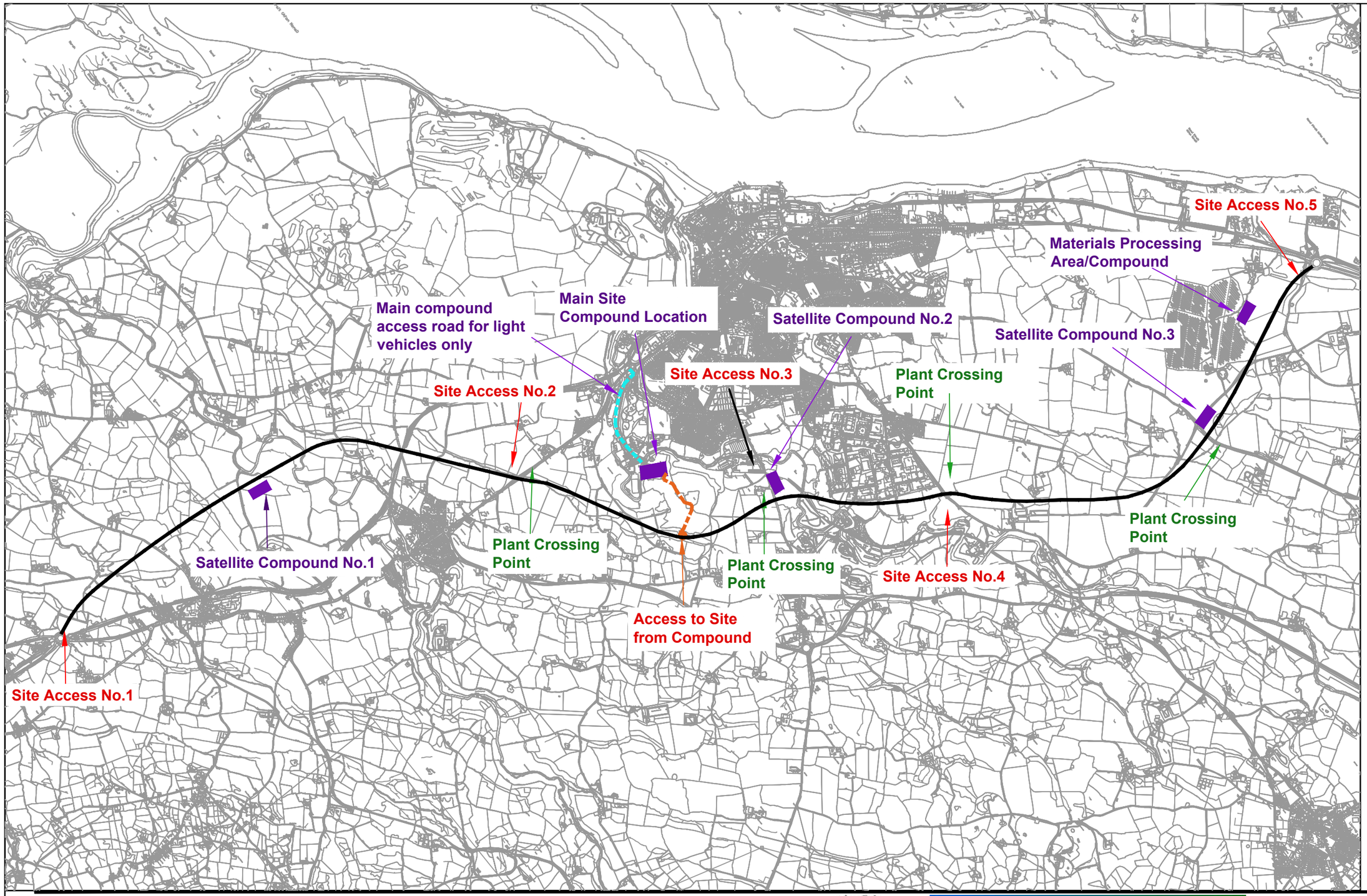
APPROVED PM

• FIGURE NUMBER
2.5



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• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project Construction Plan

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• FIGURE NUMBER
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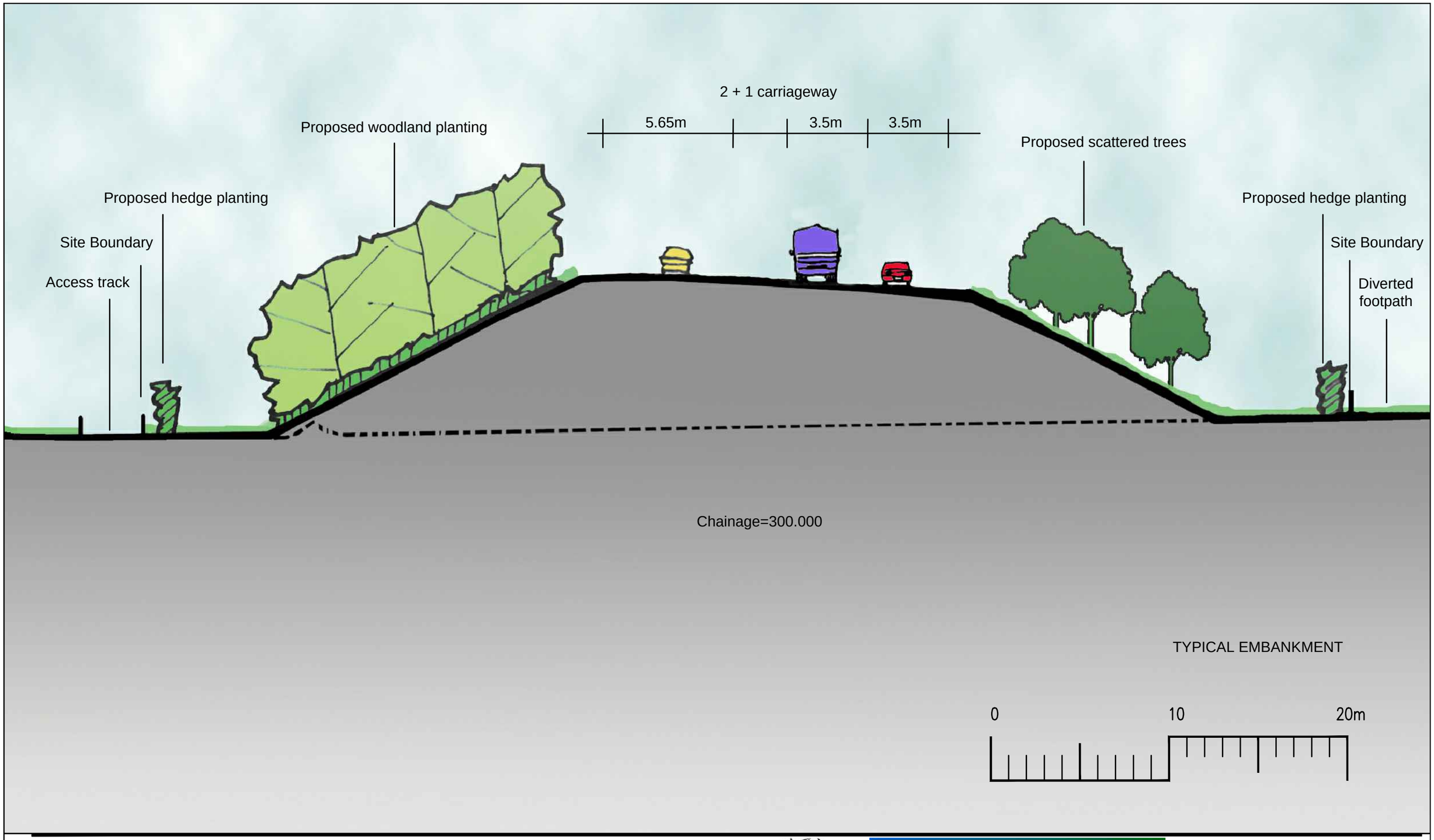

TYPICAL EMBANKMENT

0 10 20m

REV	DATE	DESCRIPTION	BY	CHKD	APPD

TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Indicative Cross Sections (a-c)
Sheet 1 of 3

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DATE 29/06/16
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FIGURE NUMBER
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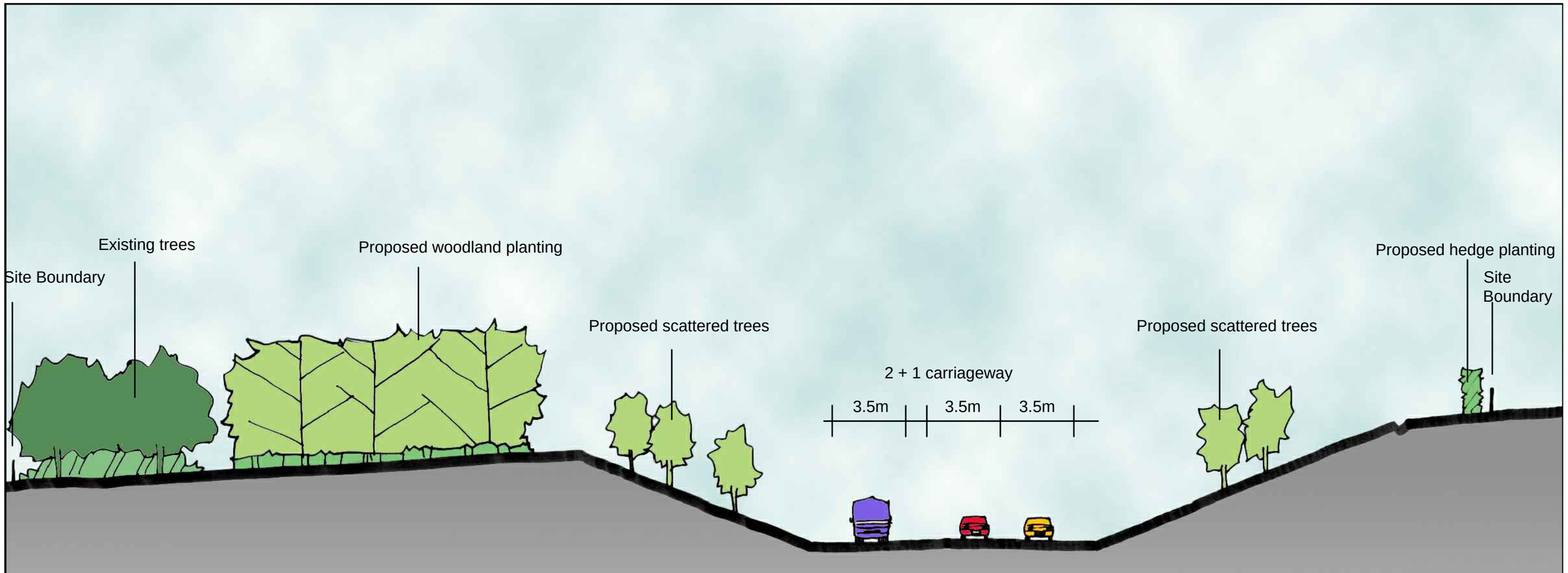

TYPICAL CUTTING

South of Morogoro Farm

0 10 20m

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• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Indicative Cross Sections (a-c)
Sheet 2 of 3

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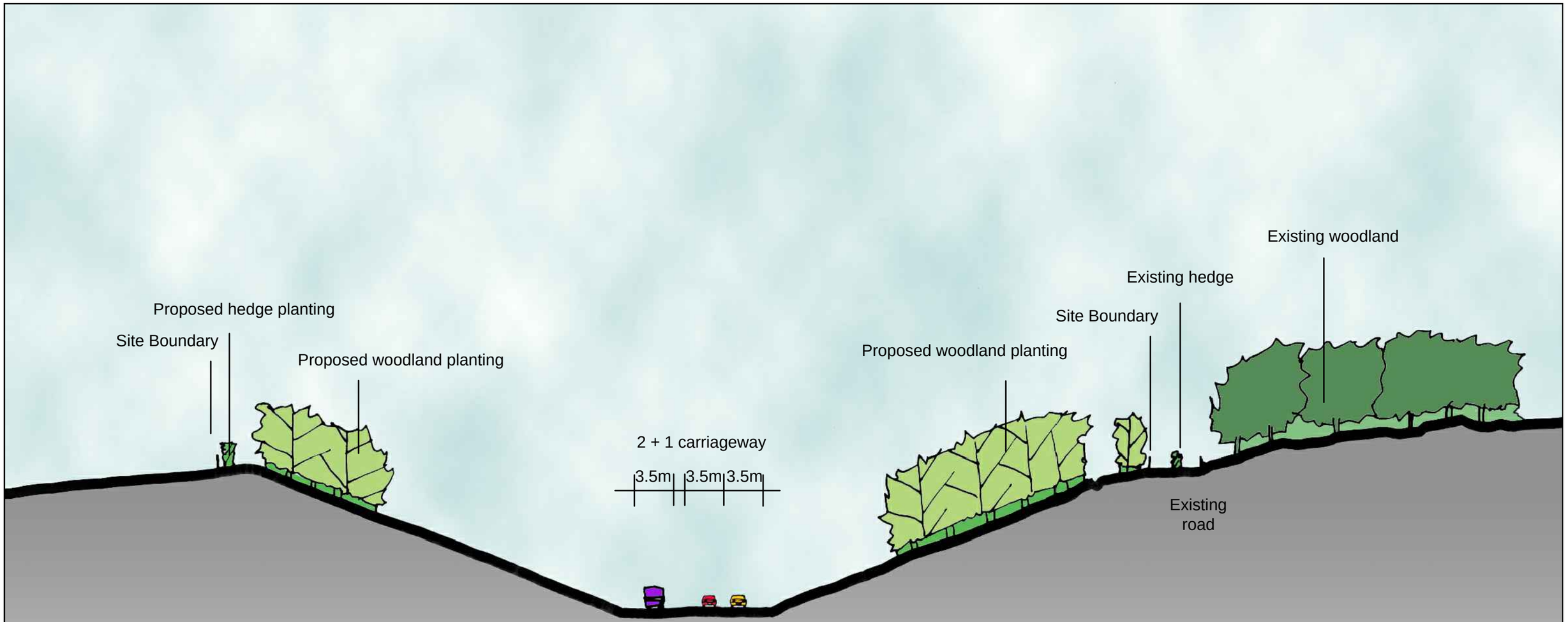
APPROVED PM

• FIGURE NUMBER
2.7b



Chainage=9400.000

PLAS MENAI CUTTING

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A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Indicative Cross Sections (a-c)
Sheet 3 of 3

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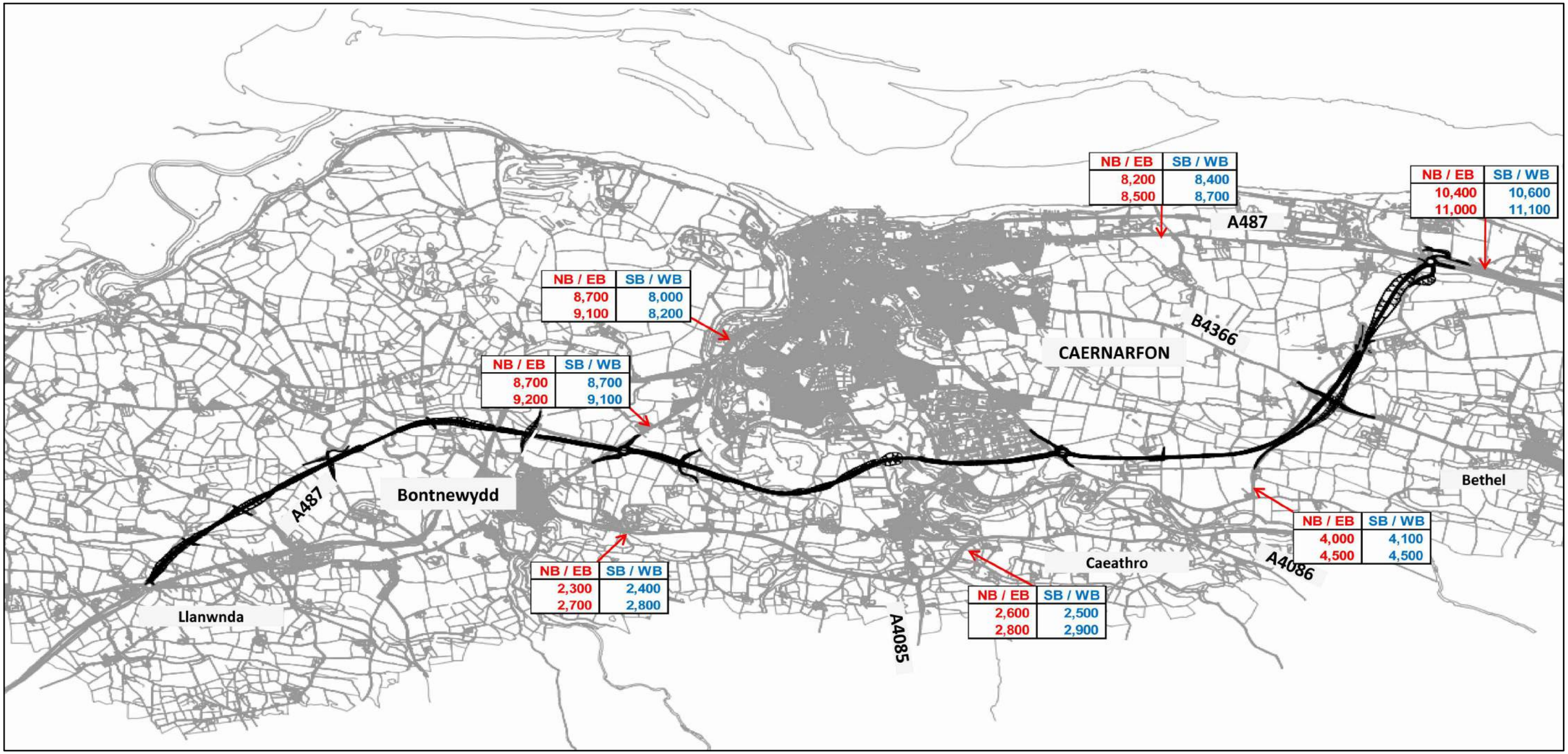
• FIGURE NUMBER
2.7c



KEY

NB	NORTH BOUND
SB	SOUTH BOUND
EB	EAST BOUND
WB	WEST BOUND

REV	DATE	DESCRIPTION	BY	CHKD	APPD

• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Opening & Design Year
Do Something AADT Flows (a-b)
Sheet 1 of 2

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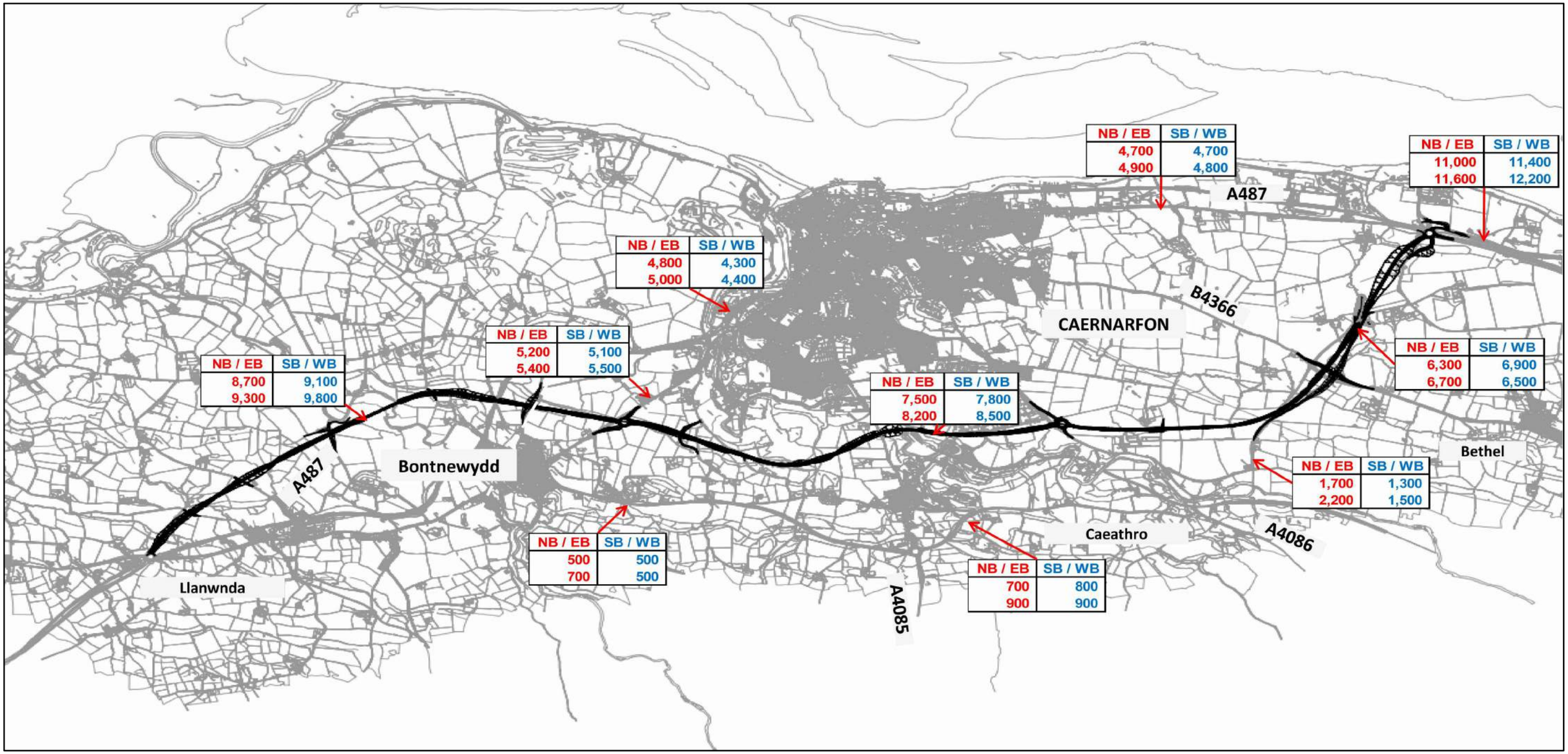
• FIGURE NUMBER
2.8a



KEY
NB NORTH BOUND
SB SOUTH BOUND
EB EAST BOUND
WB WEST BOUND

REV	DATE	DESCRIPTION	BY	CHKD	APPD

• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS

The Project
Opening & Design Year
Do Something AADT Flows (a-b)
Sheet 2 of 2

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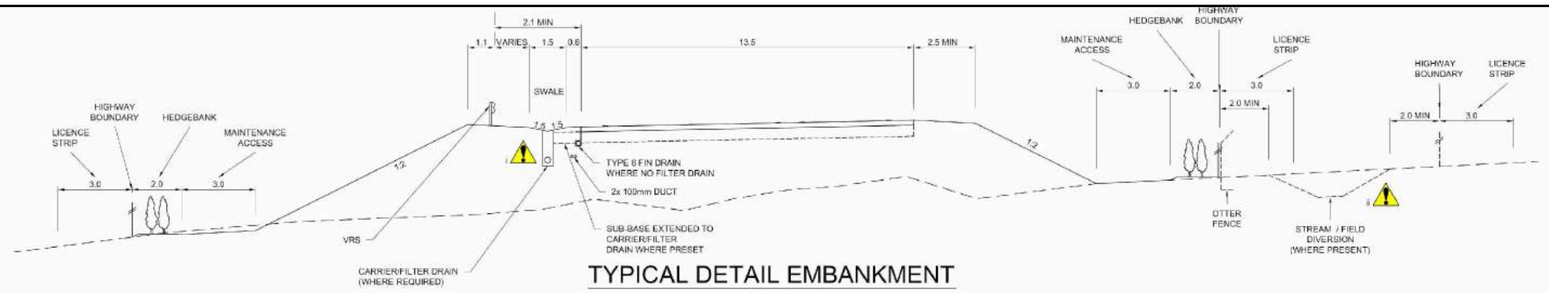
• FIGURE NUMBER
2.8b



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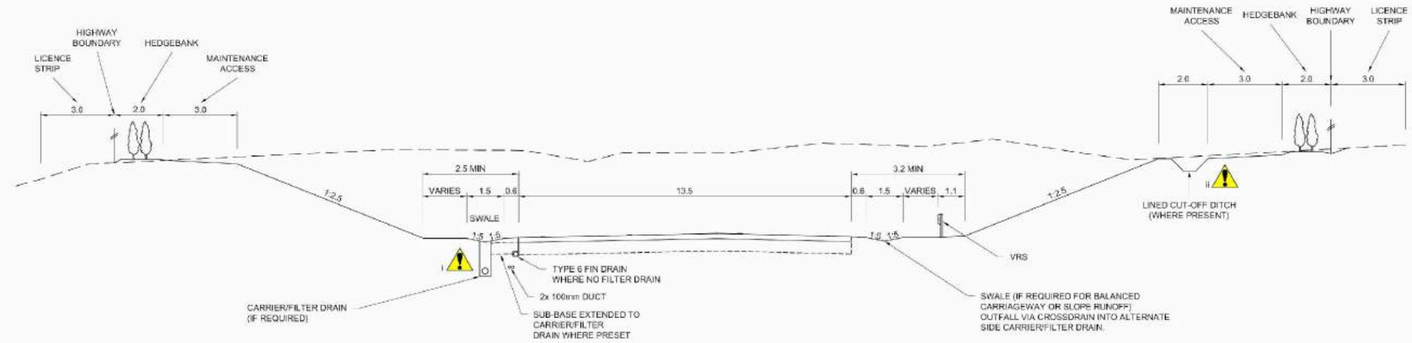
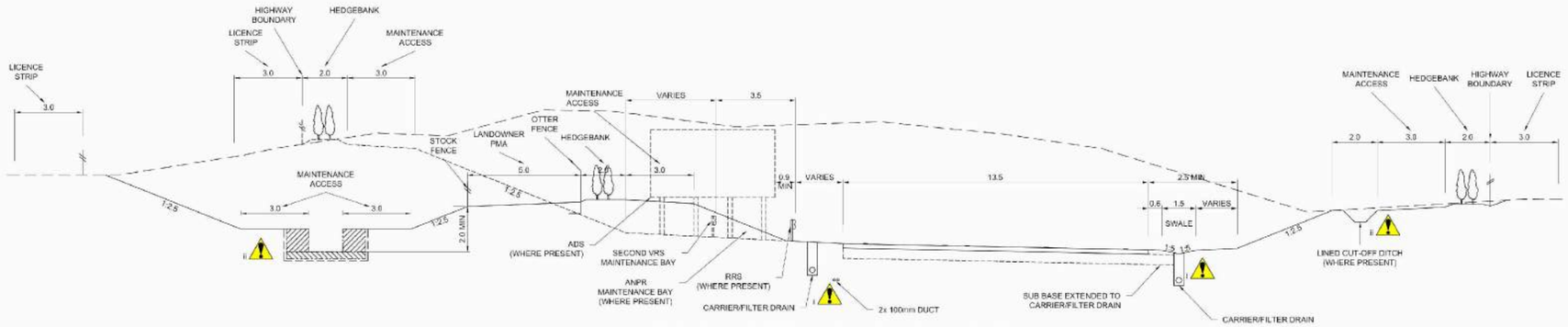
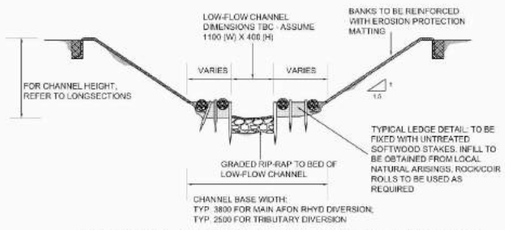


TYPICAL DETAIL CUTTING



TYPICAL DETAIL PLAS MENAI CUT



TYPICAL CROSS-SECTION S102 ON STREAM DIVERSION

NTS

NOTES

A1

1. THIS IS A C.A.D. DRAWING AND SHOULD NOT BE AMENDED BY HAND.
2. ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

CONSTRUCTION PHASE

1. PLEASE REFER TO THE HAZARD RISK REGISTER AND THE WORKS INFORMATION FOR DETAILS OF THE RISKS ASSOCIATED WITH THIS WORK.
2. IN PREPARATION OF CONSTRUCTION METHOD STATEMENTS CONSIDERATION SHOULD BE GIVEN TO THE CLOSE PROXIMITY OF ANY STRUCTURES THAT MAY BE AFFECTED BY CONSTRUCTION.
3. RESIDUAL HAZARDS ARE LISTED HERE AND REFERENCED ON THE DRAWING.
   i. NO CONSTRUCTION HAZARD ASSESSMENT.
4. THE CONTRACTOR SHALL REFER TO STATUTORY UNDERTAKERS LAYOUT DRAWINGS AND IDENTIFY LOCATIONS OF EXISTING UNDERGROUND SERVICES PRIOR TO CARRYING OUT EXCAVATION WORKS.

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION PHASES

1. PLEASE REFER TO THE HAZARD RISK REGISTER AND THE MAINTENANCE AND REPAIR STRATEGY FOR DETAILS OF THE RISKS ASSOCIATED WITH THE MAINTENANCE, OPERATION, DECOMMISSIONING AND DEMOLITION PHASES.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE HEALTH AND SAFETY FILE(S) PRODUCED AND HANDED OVER ON COMPLETION OF THIS PROJECT.
3. RESIDUAL HAZARDS ARE LISTED HERE AND REFERENCED ON THE AS-BUILT DRAWING.
   i. CATCHPIT MAINTENANCE HAZARD.
   ii. DITCH HAZARD.

REV	DATE	DESCRIPTION	BY	CHKD	APPD

• TITLE

A487 CAERNARFON AND BONTNEWYDD BYPASS Environmental Statement

The Project
Typical Cross Section Details

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Welsh Government

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EC HARRIS BUILT ASSET CONSULTANCY · RAMBOLL · WSP | PARSONS BRINCKERHOFF · TACP

DRAFT

• DATE 04/07/2016
• SCALE Not To Scale

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CHECKED BS
APPROVED BS

• FIGURE NUMBER
2.9