



Tidal Lagoon Swansea Bay

Construction Phasing Scheme

DCO Requirement 3

April 2020

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1 Introduction

1.1 The TLSB project

- 1.1.1 Tidal Lagoon Swansea Bay (TLSB) will be the world's first purpose built tidal energy lagoon. The generating station will have an installed capacity of 320 megawatt (MW) and will enclose part of Swansea Bay, from the eastern side of the River Tawe to the eastern edge of the new Swansea University Bay Campus. In total the seawall will form an approximately 9.5km-long, U-shape which will encompass approximately 11.5km² of the seabed, foreshore and intertidal area of Swansea Bay.
- 1.1.2 TLSB made an application to the Planning Inspectorate on 7 February 2014 for a Development Consent Order (DCO) for a tidal lagoon (the TLSB Project) in Swansea Bay, South Wales. Examination of the application closed on 10 December 2014 and development consent was granted by the Secretary of State for Business, Energy and Industrial Strategy (SoS) on 9 June 2015.

1.2 DCO Requirement

- 1.2.1 The Construction Phasing Scheme is a Requirement of the DCO, under Requirement 3 and as such has been prepared by TLSB for approval by the relevant planning authorities in accordance with the DCO.

- 1.2.2 DCO Requirement 3 [Construction Phasing Scheme]

3.—(1) The authorised development must not commence until a construction phasing scheme for the authorised development has been submitted to and approved in writing by the relevant planning authorities. The phasing scheme must set out the sequence of construction of the authorised development and under which Requirements approvals are to be sought in whole or in part depending on the contents of the construction phasing scheme.

(2) Where a construction phasing scheme has been submitted to and approved by the relevant planning authorities, the details to be submitted to the relevant planning authorities to discharge any Requirement may relate to a particular construction phase only, in order that the construction or operation of that phase may commence in accordance with the approved details for that phase alone. Where details have not been submitted in relation to any particular construction phase, then construction of that phase must not commence until the relevant part of any Requirement has been discharged in relation to that phase. Construction must then be carried out in accordance with any relevant approval.

- 1.2.3 DCO Requirement 3 includes elements that are relevant to the City and County of Swansea Council (CCSC) and Neath Port Talbot County Borough Council (NPTCBC), therefore, this Construction Phasing Scheme is provided to both planning authorities for approval.

2 Scope

2.1 Introduction

- 2.1.1 The Construction Phasing Scheme is prepared in accordance with the indicative sequence of construction and phases set out in the Environmental Statement (6.2.4 ES Project Description). The Environmental Statement sets out the main stages of construction work, with the first phase involving mobilisation and set up of the construction support site.
- 2.1.2 This Construction Phasing Scheme only relates to the DCO. Any conditions imposed for development consented under separate Town and Country Planning Act (TCPA 1990) applications are not included within this Construction Phasing Scheme.
- 2.1.3 The Construction Phasing Scheme defines five phases of construction work, with commencement of the authorised development in Phase 1 being terrestrial only. The Construction Phases are:
- Phase 1 – Mobilisation
 - Phase 2 - Further mobilisation, western seawall, start of eastern seawall
 - Phase 3 - Turbine and sluice gate structure, continue eastern wall
 - Phase 4 - Turbine and sluice gate structure, continue eastern wall
 - Phase 5 - Finishing and other works

2.2 Construction Phasing

- 2.2.1 The **Construction Phasing** (Appendix 1) sets out the Works (including connected 'further development' and 'further ancillary works') relevant to each of these **Construction Phases** (see Table 1.1).
- 2.2.2 Under Schedule 1 Part 1A and Part 1B of the DCO, the authorised development is broken down into numbered Works, ancillary and necessary **Works, and, connected 'further development' and 'further ancillary works'**. A Construction Phase may contain one or more Work from the DCO, or part of a Work or Works, and may also include 'further development' (as defined under Part 1A from a) to i)) and/or 'further ancillary works' (as defined under Part 1B) - see Appendix 2 of the Construction Phasing Scheme.
- 2.2.3 The DCO **Works Location Plan** (Appendix 3) provides an illustrative reference of the general arrangement of DCO Works across the TLSB Project site for information. All Works (with reference to Part 1A and 1B of Schedule 1 of the DCO) are shown on this drawing. Sub-categories of a Work are not shown. It should be noted that all locations are subject to the limits of deviation defined by the DCO and shown on certified Works Plans.

2.3 Phased Approvals

- 2.3.1 The Construction Phasing Scheme identifies the Requirements and/or parts of Requirements that must be approved prior to commencement of the authorised development. Full details of the DCO Requirements are at Schedule 1, Part 3 of the TLSB DCO (June 2015). A phased approach to approval of Requirements allows for the relevant pre-commencement Requirements to be addressed in a timely manner. The **Phased Approvals Matrix** (Annex 1) indicates the pre-commencement approvals required prior to commencement of the authorised development.
- 2.3.2 A number of documents form part of the Phased Approvals Matrix:
- **DCO Works Construction Sequence** (Construction Phasing Scheme Matrix_2.0_April2020_TLSB_DCO3);
 - **Requirements Construction Phasing Scheme Pre-commencement Approvals Matrix** (Construction Phasing Scheme Matrix_2.0_April2020_TLSB_DCO3);
 - **CEMP Construction Phasing Scheme Pre-commencement Approvals Matrix** (Construction Phasing Scheme Matrix_2.0_April2020_TLSB_DCO3)
 - **AEMP Construction Phasing Scheme Pre-commencement Approvals Matrix** (Construction Phasing Scheme Matrix_2.0_April2020_TLSB_DCO3);
- 2.3.3 The **DCO Works Construction Sequence** sets out the earliest construction commencement date for a specified Work (as listed within Part 1A and 1B of Schedule 1 of the DCO, and Appendix 1 of this Construction Phasing Scheme).
- 2.3.4 The DCO Works Construction Sequence is presented in two ways for ease of reference, first in number order of DCO Work and secondly in chronological order.
- 2.3.5 The **Requirements Construction Phasing Scheme Pre-commencement Approvals Matrix** sets out the Requirements that are relevant to Work(s) and identifies the approvals required before commencement of a specified Work or part of a Work. The Matrix indicates which DCO Requirements are to be approved in whole or in part (in writing by the relevant planning authority) before commencement of the authorised development in line with the Construction Phases.
- 2.3.6 The **CEMP Construction Phasing Scheme Pre-commencement Approvals Matrix** supports a phased approach to approval of Requirement 5. The matrix indicates the CEMP details that are to be approved prior to commencement of a phase of the authorised development (comprising a Work, Works, or partial Work). The CEMP Construction Phasing Scheme Pre-commencement Approvals Matrix should be used alongside the Requirements Construction Phasing Scheme Pre-commencement Approvals Matrix to inform a phased approach to approval of documents prior to commencement of the authorised development in line with the Construction Phases. The authorised development will not commence until the relevant CEMP approvals, as indicated by the Matrix have been obtained in writing by the relevant planning authority.

- 2.3.7 It should be noted that there are other details relevant to the CEMP, though are not part of the CEMP pre-commencement approvals because the details are to be submitted to satisfy other Requirements. For example, a Site Waste Management Plan (SWMP) is relevant yet included as a CEMP approval it is a phased pre-commencement Requirement in accordance with Requirement 20, therefore to be submitted for approval separately.
- 2.3.8 The **AEMP Construction Phasing Scheme Pre-commencement Approvals Matrix** supports a phased approach to approval of Requirement 6. The matrix indicates the AEMP details that are to be approved prior to commencement of a phase of the authorised development (comprising a Work, Works, or partial Work). The AEMP Construction Phasing Scheme Pre-commencement Approvals Matrix should be used alongside the Requirements Construction Phasing Scheme Pre-commencement Approvals Matrix to inform a phased approach to approval of documents prior to commencement of the authorised development. The authorised development will not commence until all relevant AEMP approvals, comprising pre-commencement approval of surveys and of survey methodologies as indicated by the Matrix have been obtained in writing.
- 2.3.9 It should be noted that the AEMP is a comprehensive and adaptive approach to monitoring. As such, the Construction Phasing Scheme only identifies the construction stage pre-commencement approvals to allow a phased approach to meeting the Requirement. It should be noted that most of AEMP requirements relate to the main components of the authorised development, Work 1a, Work 1b and Work 2a (Phase 1 and 2).

Appendix 1 Construction Phasing

A Construction Phase will comprise a full or partial Work or Works (Part 1A and 1B) and any development in connection with Part 1A Works that fall within the categories a) to i) listed in Part 1A of the Schedule (see Appendix 2).

Table 1.1 Construction Phases

Construction Phase	Description
Phase 1 – Mobilisation	Partial Work 7a (a new internal access road comprising 2 carriageways together with a fence in between running in a north-easterly direction from 267048E; 191928N to 269035E; 192887N); and in connection with Work 7a (with reference to Part 1A) a), temporary construction works, including workshops and stores, working areas, laydown areas, construction sites, and vehicle parking facilities; f) to the extent shown on the demolition plan, the alteration, removal, clearance, refurbishment, reconstruction, decommissioning and demolition of any buildings and structures within the Order limits; h) lighting columns and lighting; i) safety / emergency points.
Phase 2 – Further mobilisation, western seawall, start of eastern seawall	Work 1a (A western seawall crested by a road and footway commencing at 266417E; 189134N as shown on works plans 1, 4, 7 and 9 approximately 2700m in length); Work 1a (a) (a low voltage substation); Partial Work 1b (An eastern seawall crested by a road and footway commencing at 266420E; 189131N approximately 6800m in length and incorporating provision of and for lighting); Work 2b (A temporary offshore work consisting of a sediment berm cofferdam for the purposes of constructing Work No. 2a as shown on works plan 2.2.8B and having wall heights not exceeding 16.5m above Chart Datum); Work 2c (An offshore work comprising up to 15 dolphin piles with lights, cable booms or floating buoys in between located up to 500m seaward from the outer edge of Work No. 2a (266113E; 189484N) for the purposes of demarcating a safety zone as shown on works plan 2.2.8B and works section 2.2.16A); Work 2d (An offshore work comprising buoys (with or without lights) with or without floating booms located up to 500m landward from the outer edge of Work No. 2a (266123E; 189494N) for the purposes of demarcating a safety zone as shown on works plan 2.2.8B and works section 2.2.16A); Work 3 (an offshore work consisting of a buried pipeline the uppermost surface of which shall be below the level of the surrounding sea bed for the extension of the existing long sea sewage outfall from 268408E; 189407N to 268030E; 187224N and replacement of diffuser apparatus); Work 4 (An offshore work consisting of a new eastern channel training wall in the River Neath providing for the relocation of Monkstone lights from 270138E; 190336N to 271033E; 191419N which work must not exceed the heights shown on works section 2.2.15A); Work 6a (A work consisting of the construction of a jetty or mole and floating pontoons and piles or dolphins, located from 267494E; 191898N to 266998E; 191498N); Work 7g (A work for a new access track at the eastern seawall landfall running in an easterly direction from 269016E; 192826N to 270275E; 192496N). In connection with these Works (with reference to Part 1A) a) temporary construction works, including workshops and stores, storage areas for rock armour, working areas, laydown areas, construction sites, internal site roads and vehicle parking facilities; b) works to existing wave protection walls; c) habitat creation; d) navigational aids; e) bunds, embankments, swales, landscaping and boundary treatments and fencing; f) to the extent shown on the demolition plan, the alteration, removal, clearance,

	refurbishment, reconstruction, decommissioning and demolition of any buildings and structures within the Order limits; g) the provision of footpaths; h) lighting columns and lighting; i) safety / emergency points. Also in connection with these Works (with reference to Part 1B) f) buoys, beacons, fenders and other navigational aids, warning or ship impact protection works; g) temporary land places, moorings and other means of accommodating vessels in the construction of the Works; h) works to alter the position of apparatus on, over or under tidal waters or tidal lands within the Order limits. In relation to Works 1a and 1b, localised widening of the seawall to provide a) viewing areas; and b) siting locations for works of public art.
Phase 3 – Turbine and sluice gate structure, continue eastern wall	Partial Work 1b (An eastern seawall crested by a road and footway commencing at 266420E; 189131N approximately 6800m in length and incorporating provision of and for lighting); Work 2a (a turbine and sluice gate housing structure located between 266417E; 189134N and 266410E; 189131N as shown on works plans 2, 6, 8 and 9, measuring approximately 410m in length and 67.5m in width containing up to 16 variable speed hydro-turbines with a gross combined installed generating capacity of up to or equal to 320MW, and up to 10 sluice gates and incorporating); Work 2a (d) (dividing structures and wingwalls); Work 5a (a 275kV grid connection laid underground consisting of 3 single phase cables and other electric cables connecting Work No. 2a (266120E; 189499N) to 266970E; 191821N); Work 10c (extension of the existing surface drainage outfalls serving Fabian Way). In connection with these Works (with reference to Part 1A) e) bunds, embankments, swales, landscaping and boundary treatments and fencing. In relation to Works 1b and 2a, localised widening of the seawall to provide a) viewing areas; and b) siting locations for works of public art.
Phase 4 – Lagoon closure and Commissioning	Work 2a (a) (a switch room); Work 2a (b) (scour protection); Work 9 (Reclamation of land to establish a saltmarsh habitat area of up to 5ha and coastal grassland habitat area of up to 3ha including pedestrian and cycle routes and structures as shown on works plans 2.2.2B and 2.2.3B); Work 10 (Reclamation of land to establish a new coastal grassland and dune area of up to 11 ha. close to the landfall of Work No. 1b as shown on works plan 2.2.3B incorporating); Work 10a (a beach area); Work 2a c) (associated electrical equipment and transformers); Work 2a e) (a maximum of 4 external gantry cranes and such infrastructure works or plant as may be necessary for the purposes of operating and maintaining the sluices and turbines); Work 6b a)(i-vi) (A work consisting of construction of onshore operation and maintenance facilities comprising (a) an onshore building centred on 267129E; 191741N comprising (i) a hatcheries and laboratories; (ii) maintenance workshops and spares stores; (iii) garaging for operation and maintenance vehicles; (iv) storage for boats associated with the operation and maintenance of the generating station; (v) a control room; (vi) staff office accommodation; Work 6b b) (i-ii) outdoor parking spaces for operation and maintenance vehicles and essential visitors to the generating station and outdoor emergency access facilities to enable rapid access to the authorised works.
Phase 5 – Finishing and other works	Work 1a e) (operation and maintenance facilities within the seawall together with sufficient foundation areas and pilings to enable construction of an offshore building centred on grid reference 266218E; 189338N containing an administration and engineering suite); Work 10b (a visitor/information point to serve Crymlyn Burrows SSSI as shown on planning drawing 2.4.58); Partial Work 7a (a new internal access road comprising 2 carriageways together with a fence in between running in a north-easterly direction from 267048E; 191928N to 269035E; 192887N); Work 1a b) (provision of and for lighting); Work 1a c) one or more slipways, jetties, access points and associated hardstanding for

	boats used in connection with the operation and maintenance of the generating station; Work 1a d) (a landscaped area where the seawall makes landfall). In connection with these Works (with reference to Part 1A) b) the landscaping elements of the Broad Seaward Park, Narrow Seaward Park, and Landward Ecological Park as described in the design and access statement, including works to existing wave protection walls; c) habitat creation (including mariculture); e) bunds, embankments, swales, landscaping and boundary treatments and fencing; g) the provision of footpaths; h) lighting columns and lighting; i) safety / emergency points. In connection with these Works (with reference to Part 1B) d) oyster spatting ponds.
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Appendix 2 DCO Works

Schedule 1 of the DCO defines the authorised development, ancillary and necessary works and associated Requirement.

The TLSB DCO defines the authorised development as comprising of Works at set out at Part 1A of Schedule 1 (Table 2.1 below), and development in connection with these Works (Table 2.2 below).

Table 2.1 Schedule 1 Part 1A authorised development

<i>Part 1A DCO Work</i>	<i>Work Description</i>
1a	A western seawall crested by a road and footway commencing at 266417E; 189134N as shown on works plans 1, 4, 7 and 9 approximately 2700m in length and incorporating:
1a(a)	a low voltage substation;
1a(b)	provision of and for lighting
1a(c)	one or more slipways, jetties, access points and associated hardstanding for boats used in connection with the operation and maintenance of the generating station
1a(d)	a landscaped area where the seawall makes landfall
1a(e)	operation and maintenance facilities within the seawall together with sufficient foundation areas and pilings to enable construction of an offshore building centred on grid reference 266218E; 189338N containing an administration and engineering suite
1b	An eastern seawall crested by a road and footway commencing at 266420E; 189131N approximately 6800m in length and incorporating provision of and for lighting
2a	A turbine and sluice gate housing structure located between 266417E; 189134N and 266410E; 189131N as shown on works plans 2, 6, 8 and 9, measuring approximately 410m in length and 67.5m in width containing up to 16 variable speed hydro-turbines with a gross combined installed generating capacity of up to or equal to 320MW, and up to 10 sluice gates and incorporating
2a(a)	a switch room
2a(b)	scour protection
2a(c)	associated electrical equipment and transformers
2a(d)	dividing structures and wingwalls
2a(e)	a maximum of 4 external gantry cranes and such infrastructure works or plant as may be necessary for the purposes of operating and maintaining the sluices and turbines
5a	A 275kV grid connection laid underground consisting of 3 single phase cables and other electric cables connecting Work No. 2a (266120E; 189499N) to 266970E; 191821N.
6a	A work consisting of the construction of a jetty or mole and floating pontoons and piles or dolphins, located from 267494E; 191898N to 266998E; 191498N

<i>Part 1A DCO Work</i>	<i>Work Description</i>
<i>6b(a)</i>	A work consisting of construction of onshore operation and maintenance facilities comprising— (a) an onshore building centred on 267129E; 191741N comprising— (i) a hatcheries and laboratories; (ii) maintenance workshops and spares stores; (iii) garaging for operation and maintenance vehicles; (iv) storage for boats associated with the operation and maintenance of the generating station; (v) a control room; (vi) staff office accommodation; and (vii) staff welfare facilities
<i>6b(b)</i>	provision to allow construction within the area of Work No. 6b of— (i) outdoor parking spaces for operation and maintenance vehicles and essential visitors to the generating station; (ii) outdoor emergency access facilities to enable rapid access to the authorised works
<i>7a</i>	A new internal access road comprising 2 carriageways together with a fence in between running in a north-easterly direction from 267048E; 191928N to 269035E; 192887N.
<i>7g</i>	A work for a new access track at the eastern seawall landfall running in an easterly direction from 269016E; 192826N to 270275E; 192496N.

Table 2.2 Development in connection with Part 1A Works

<i>Part 1A reference</i> <i>(page 30 of DCO)</i>	<i>Description</i>
<i>(a)</i>	temporary construction works, including workshops and stores, storage areas for rock armour, working areas, laydown areas, construction sites, internal site roads and vehicle parking facilities
<i>(b)</i>	to the extent required for mitigation, the landscaping elements of the Broad Seaward Park, Narrow Seaward Park, and Landward Ecological Park as described in the design and access statement, including works to existing wave protection walls
<i>(c)</i>	habitat creation (including mariculture)
<i>(d)</i>	navigational aids
<i>(e)</i>	bunds, embankments, swales, landscaping and boundary treatments and fencing
<i>(f)</i>	to the extent shown on the demolition plan, the alteration, removal, clearance, refurbishment, reconstruction, decommissioning and demolition of any buildings and structures within the Order limits
<i>(g)</i>	the provision of footpaths
<i>(h)</i>	lighting columns and lighting

(i)	safety/emergency points
<i>In relation to Works 1a, 1b and 2a</i> (page 29 of the DCO)	Localised widening of the seawall to provide – a) viewing areas; and b) siting locations for works of public art.

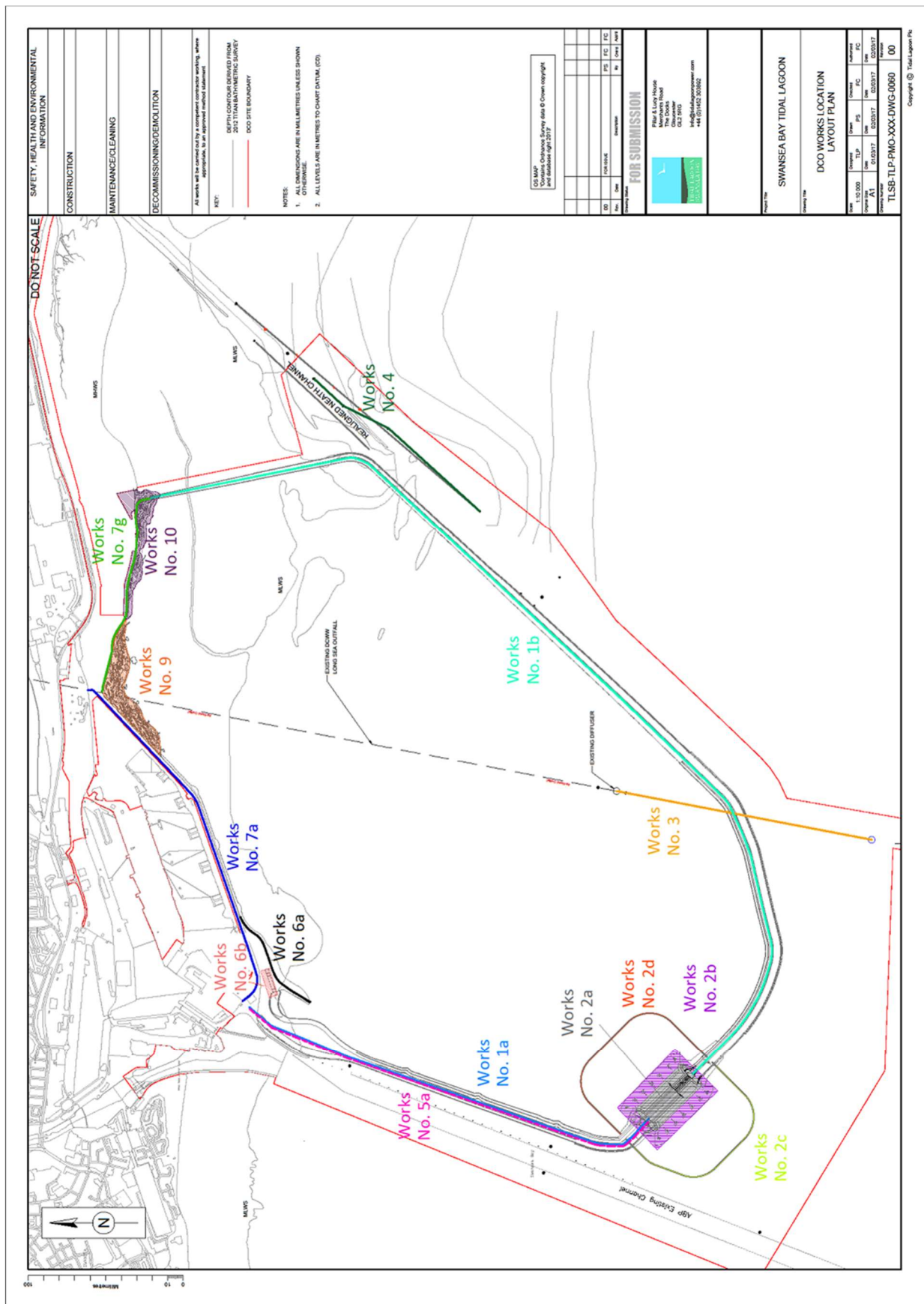
Table 2.3 Part 1B Ancillary and necessary works

<i>Part 1B DCO Work</i>	<i>Work Description</i>
<i>2b</i>	A temporary offshore work consisting of a sediment berm cofferdam for the purposes of constructing Work No. 2a as shown on works plan 2.2.8B and having wall heights not exceeding 16.5m above Chart Datum
<i>2c</i>	An offshore work comprising up to 15 dolphin piles with lights, cable booms or floating buoys in between located up to 500m seaward from the outer edge of Work No. 2a (266113E; 189484N) for the purposes of demarcating a safety zone as shown on works plan 2.2.8B and works section 2.2.16A.
<i>2d</i>	An offshore work comprising buoys (with or without lights) with or without floating booms located up to 500m landward from the outer edge of Work No. 2a (266123E; 189494N) for the purposes of demarcating a safety zone as shown on works plan 2.2.8B and works section 2.2.16A.
<i>3</i>	An offshore work consisting of a buried pipeline the uppermost surface of which shall be below the level of the surrounding sea bed for the extension of the existing long sea sewage outfall from 268408E; 189407N to 268030E; 187224N and replacement of diffuser apparatus.
<i>4</i>	An offshore work consisting of a new eastern channel training wall in the River Neath providing for the relocation of Monkstone lights from 270138E; 190336N to 271033E; 191419N which work must not exceed the heights shown on works section 2.2.15A.
<i>9</i>	Reclamation of land to establish a saltmarsh habitat area of up to 5ha and coastal grassland habitat area of up to 3ha including pedestrian and cycle routes and structures as shown on works plans 2.2.2B and 2.2.3B.
<i>10</i>	Reclamation of land to establish a new coastal grassland and dune area of up to 11 ha. close to the landfall of Work No. 1b as shown on works plan 2.2.3B incorporating
<i>10(a)</i>	a beach area;
<i>10(b)</i>	a visitor/information point to serve Crymlyn Burrows SSSI as shown on planning drawing 2.4.58;
<i>10(c)</i>	extension of the existing surface drainage outfalls serving Fabian Way,

Table 2.4 Development in connection with Part 1B Works

<i>Part 1B reference</i> <i>(page 31 of DCO)</i>	Description
<i>(d)</i>	oyster spatting ponds;
<i>(e)</i>	installation of services along eastern and western seawalls, including electricity and telecommunications;
<i>(f)</i>	buoys, beacons, fenders and other navigational aids, warning or ship impact protection works;
<i>(g)</i>	temporary land places, moorings and other means of accommodating vessels in the construction of the works set out in Part 1A and this Part;
<i>(h)</i>	works to alter the position of apparatus on, over or under tidal waters or tidal lands within the Order limits.

Appendix 3 DCO Works Location Plan



Annex 1 Phased Approvals Matrix
