MOTT MACDONALD

Colwyn Bay Waterfront Project Phase 2b Environmental Statement

Volume 2: Technical Appendices
Technical Appendix 10 - Climate

September 2021

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Colwyn Bay Waterfront Project Phase 2b Environmental Statement

Volume 2: Technical Appendix 10.1 Design for Resource Efficiency

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1 Design for Resource Efficiency

To encourage reduced embodied carbon and material use, a Design for Resource Efficiency Workshop (D4RE) was completed on 31st March 2021. Several members of the design team meet to discuss possible actions to reduce materials usage and associated carbon. The workshop involved the following people:

- Project Manager;
- Client Representatives;
- Coastal Team Lead;
- Landscape Architect Team Lead;
- Consultant Civil Engineer;
- Client Civil Engineers;
- Environmental Co-ordinator;
- Carbon Specialist; and,
- CEEQUAL Assessor and workshop facilitator.

Throughout the workshop, ideas were grouped by ease of implementation and potential impact to allow prioritisation of the biggest impacts. These ideas were recorded within the opportunities matrix (Table 1-1) which has been treated as a live document and updated throughout the design process. A number of the ideas recorded are currently being implemented within the Scheme design.

Please note the D4RE process is ongoing and this document remains live until construction. This document represents the position of the D4RE tracker at the time of writing.

Table 1-1: D4RE Workshop Opportunities Matrix

Ref	Element	Detail of opportunity	Score	Status	Notes / comments	Who	Estimated savings
1	Marine	Optimisation of the beach profile to ensure only the exact amount required is imported.	A - high impact, easy to implement	*To be implemented*		Coastal team	30,000 m^3 of material and 143 tCO_2e
2	Marine	Consider alternative more sustainable sources of dredged sand.	B - high impact, difficult to implement	*Requires further investigation*	Unlikely to be implemented but the suitability, properties and grading requirements of alternatives could be assessed	Coastal team / Client	
3	Terrestrial	Minimise excavation and replacement by leaving the road surface in place if everything is structurally sound.	A - high impact, easy to implement	*To be implemented*	Proposed design shows existing surface to be removed and relayed. Full depth construction restricted to areas of footway converted to carriageway only. Therefore removing the need for full depth construction across the scheme (subject to suitable ground conditions and existing carriageway conditions). The amount that can remain needs to be determined.	Highways Team	300 tCO_2e
4	Terrestrial	Reuse any excavated material on site or on local schemes.	C - low impact, easy to implement	*To be implemented*	Rock armour to be used for the upgraded groyne design and protection to the outfall extensions. No rock to leave site, any unused to be placed at the toe of the sea wall and buried. Coal tar to be used at Old Colwyn (if identified) to lock away hazardous materials. Additional options to be explored, amount of material cannot be determined.	Highways Team / Coastal team / Client	
5	Marine	Biodiversity enhancements to be included by modifying existing materials/structures rather than acquiring bespoke structures.	B - high impact, difficult to implement	*Requires further investigation*	E.g. drill holes, cores etc rather than importing new structures. Determined to be ineffective and may cause issues with rock structural ingerity.	Ecology Team / Coastal team	
6	Terrestrial	Minimise the depth of highways drainage	A - high impact, easy to implement	*To be implemented*	Reduce excavation and increases ease of maintenance. Reused much of the existing drainage.	Drainage Team	Using generic drainage design it is estimated there will be a saving of 98 tCO_2e
7	Terrestrial	Avoid the use of interceptors if possible.	B - high impact, difficult to implement	*To be implemented*	No interceptors required.	Drainage Team	1 tCO_2e
8	Marine	Reuse existing outfalls where possible.	A - high impact, easy to implement	*To be implemented*	Reduces material and excavation requirement and increases ease of maintenance. Design has reduced the number of outfall extensions from 5 to 3, as agreed with DCWW, reducing concrete and works required.	Drainage Team	330 tCO_2e
9	Terrestrial	Specify the use of plastic pipes rather than clay/metal pipes. In addition, specify recycled content.	B - high impact, difficult to implement	*Requires further investigation*	May not be possible due to constraints from DMRB for instance clay pipes required for gullies. Few new pipes within the design.	Drainage Team	
10	Terrestrial	Leave structures in place such as timber groynes and concrete access steps in place to avoid waste generation.	A - high impact, easy to implement	*To be implemented*	Will be left in place to reduce waste.	Coastal team / Client	
11	Marine/Terrestrial	Reuse the timber groynes as a landscape feature e.g. sculpture.	D - low impact, difficult to implement	*Determined to be unsuitable*	Not possible to progress so will be left in place.	BCA / Client	
12	Marine	Reuse rock within existing revetment where required and design appropriately to accommodate this rock.	A - high impact, easy to implement	*To be implemented*	Reuse of existing rock material in the terminal groyne and as scour protection.	Costal team	10,000m^3 of rock and 2,574 tCO_2e

Ref	Element	Detail of opportunity	Score	Status	Notes / comments	Who	Estimated savings
13	Terrestrial	Use pre-cast concrete or modular units where necessary to reduce waste and improve quality.	D - low impact, difficult to implement	*To be implemented*	Limited opportunity within the design but to be explored for shelters. However precast concrete paving and kerbs used.	Highways Team / Structures Team / BCA	92 tCO_2e from paving and kerbs
14	Terrestrial	Use of recycled cement and other site won materials as subbase in pavement.	A - high impact, easy to implement	*To be implemented*	Existing subbase material where feasible is to be reused and recompacted. Difficult to determine prior to on site testing/investigations.	Highways Team	
15	Terrestrial	Provision of electric vehicle and bike charging points. Potentially run by solar panels.	A - high impact, easy to implement	*To be implemented*	EV charging points included but bike charging points excluded. Using grid electricity.	Client / BCA	
16	Terrestrial	Retain existing lighting columns and street furniture or return to depot for reuse in other CCBC projects.	C - low impact, easy to implement	*Requires further investigation*	All existing lighting columns will be removed to tip, as removing lighting columns does not leave them in a useable state. Street furniture in decent condition will be removed to tip/store, or reused within the new scheme (such as signage).	Client	
17	Terrestrial	Use recycled rebar in areas of concrete.	A - high impact, easy to implement	*To be implemented*	To be implemented where possible	Structures Team	
18	Terrestrial	Minimise the requirement for concrete slabs on the promenade.	B - high impact, difficult to implement	*To be implemented*	Concrete slabs minimised to just a 2m strip behind sea wall.	Coastal team / BCA	329 tCO_2e
19	Terrestrial	Rewild the embankment whilst also considering the low maintenance and climate resilient species for the landscaping.	C - low impact, easy to implement	*To be implemented*	To be implemented	Ecology Team / BCA / Client	
20	Terrestrial	Ensure appropriate waste bins are included within the Scheme.	B - high impact, difficult to implement	*Requires further investigation*	Additional ideas include bins to collect plastic which can be then used to create items such as kayaks or street furniture. Also, provide additional bins on the beach itself during busy periods or for events. Provision for litter picking. Ongoing discussion with CCBC around provision of bins.	BCA	
21	Terrestrial	Design to minimise the requirement for signage.	C - low impact, easy to implement	*To be implemented*	To be implemented, difficult to quantify.	BCA	
22	Terrestrial	Explore the use of grey water for the operation of the site (kiosks).	D - low impact, difficult to implement	*Requires further investigation*		Client	
23	Terrestrial	Optimise the thickness of the pavement design so not to be overly conservative and only use the necessary amount of materials.	A - high impact, easy to implement	*To be implemented*	Completed in line with standards, not over and above the required. Not provided vehicle loading for entire area where only ad-hoc requirement.	Highways Team / BCA	20 tCO_2e
24	Whole Project	Consider climate resilience and ability of the design to be adapted in the future.	A - high impact, easy to implement	*To be implemented*	Considered in overtopping so coastal design considers this. Potentially look at removable/pop-up kiosks to allow removal if flood issues. Promenade planters raised to protect against potential overtopping/flooding.	Coastal team / BCA / Drainage Team / Structures Team	
25	Marine	Explore alternative modes to transport materials to site. E.g. barge/train	A - high impact, easy to implement	*To be implemented*	Sand is to be dredged and piped to the beach. Further investigation into other materials, likely to be delivered by conventional methods (e.g. HGVS).	Client / Contractor	
26	Whole Project	Shuttle buses for transport workers travelling by train to site.	C - low impact, easy to implement	*Requires further investigation*	Dependent on number of staff who would travel by train.	Client / Contractor	

Ref	Element	Detail of opportunity	Score	Status	Notes / comments	Who	Estimated savings
27	Whole Project	Use local sources of materials where possible. Particular focus on the rock and quarries from Wales.	A - high impact, easy to implement	*Requires further investigation*	Needs a strategic approach with other CRMP projects. All rock required will be site won, from existing rock structures no longer required.	Client / Contractor	
28	Whole Project	Encourage the use of local contractors	D - low impact, difficult to implement	*Requires further investigation*	Contract to be split between the onshore and offshore aspects which could allow the use of local contractors for the onshore work as less specialist.	Client	
29	Terrestrial	Design features that facilitate quick set up and demobilisation for temporary events.	A - high impact, easy to implement	*To be implemented*	Power hook-up points provided within the design which allow event vehicles to connect for power. Pedestrian guardrail within event spaces has been designed to be removable to allow greater use of the space.	Client / BCA	
30	Terrestrial	Incorporate power units into design so they can be utilised for events instead of generators.	A - high impact, easy to implement	*Requires further investigation*	Power hook-up points provided within the design which allow event vehicles to connect for power.	Client / BCA	

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Appendix 10.2 – Carbon Management Plan

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1 Introduction

1.1 Purpose of the Carbon Management Plan

1.1.1 This Carbon Management Plan (CMP) sets out the framework for managing and reducing project-related greenhouse gas (GHG) emissions for the Colwyn Bay Waterfront Project Phase 2b (hereafter referred to as the "Scheme").

1.1.2 It also documents the key carbon reduction measures implemented within the project.

1.2 Scope of the Carbon Management Plan

1.2.1 The CMP covers the strategy that has been followed through design and will continue to be used as the design progresses. The CMP defines:

- The relevant carbon objective and targets to which the Scheme is working towards;
- Roles and responsibilities;
- Approach to integrating low-carbon thinking during design;
- Assessment approach;
- Reductions to date; and
- Further required reductions.

1.2.2 The CMP is focused upon the design stage of the Scheme, however the approach should be followed through later stages including construction. In addition, a number of ideas for implementation have been outlined within the CMP that need to be implemented or further investigated for construction.

2 Key Parts of the Carbon Management Plan

2.1 Key components of the carbon management approach

2.1.1 The carbon management approach has several key components which will support the delivery of low carbon solutions. These are as follows in Table 2.1.

Table 2.1: Key CMP components

Component	Theme	Section of the CMP
Strategy	Setting a strong direction for the project in pursuit of low-carbon solutions.	Section 3
People	The CMP identifies key members of the project team that can support the delivery of low-carbon solutions. This includes design, construction, procurement and management teams as well as topic specialists and supply chain where relevant.	Section 4
Processes	The process of design and delivery will include carbon in multi-criteria analysis as well as targeted workshops and support throughout.	Section 5
Assessment	The carbon emissions associated with the Scheme at different stages of design will be estimated.	Section 6
Reduction	The measures identified at this stage that have been implemented and further measures are noted.	Section 7

Source: Mott MacDonald Ltd, 2021

2.1.2 Each of the sections of this report will be updated as design progresses, and as other activities become increasingly important. Any sections no longer relevant will be moved to the Appendices.

3 Strategy

3.1 Mott MacDonald Policy

3.1.1 Mott MacDonald is committed to reducing carbon on projects by certifying its carbon management processes used on projects globally with PAS 2080: Carbon Management in Infrastructure.

3.2 Conwy County Borough Council (CCBC) policy

3.2.1 The Conwy Local Development Plan was adopted in 2013[1]. Within the plan Policy DP/1 – Sustainable Development Principles references making efficient and effective use of resources, take account and address the potential impact of climate change, reduce waste production. The Natural Environment Strategic Statement states that developments must seek to limit the impact on the environment "*by minimising resource use, increasing energy efficiency and reducing carbon emissions*".

3.2.2 Alongside the Welsh Government declaration of a climate emergency[2], CCBC declared a climate emergency on 9th May 2019[3]. This further indicates the importance CCBC place on action against climate change.

3.3 Targets

3.3.1 The Scheme has set out to reduce carbon throughout the design process. To focus the reduction of carbon a target has been set to show a reduction from the conceptual design to the end of Detailed design.

3.3.2 The target has been set at 30% reduction from the baseline of conceptual design. This is in line with the target achieved for a similar previous scheme within the Colwyn Bay Waterfront project, the Phase 3 Old Colwyn Coastal Defence and Active Travel Scheme.

[1] Conwy County Borough Council (2013). Conwy Local Development Plan 2007-2022 [online] available at: https://www.conwy.gov.uk/en/Resident/Planning-Building-Control-and-Conservation/Strategic-Planning-Policy/Adopted-Local-Development-Plan-LDP/Assets-written-proposals-maps/Conwy-Local-Development-Plan-2007-2022.pdf (last accessed June 2020)

[2] Welsh Government makes climate emergency declaration | GOV.WALES

[3] Climate Emergency Declaration (conwy.gov.uk)

4 Roles and Responsibilities

4.1 Key roles

4.1.1 All members of the project teams have the potential to influence low-carbon outcomes. However, some roles have key responsibilities in leading the efforts to implement low-carbon solutions during design and delivery.

4.1.2 These are:

- Project leads – ultimate responsibility for compliance with legislation and client project commitments;
- Design managers – overall responsibility for guiding design to minimise carbon emissions as far as possible. Providing a level of challenge to make sure that focus is given to low carbon options;
- Design team – practical role in developing designs that minimise emissions and capturing and recording low-carbon options;
- Environment managers – supporting the design team to identify low-carbon solutions and providing links to other environmental disciplines to highlight co-benefits or risks;
- Quantity Surveying (QS) team – supporting the production of information relevant to the carbon assessment, challenging cost and productivity within their models and identifying associated low carbon opportunities;
- Procurement team – challenging suppliers to provide innovative, low carbon products and solutions;
- Pre-Construction team – minimising carbon through challenging design buildability, planning and integration of activities, optimising / challenging logistics and procurement;
- Carbon Specialists – setting the framework for considering carbon and undertaking the required quantifications. Training and informing the design managers and teams; and
- Client – setting the direction and commitments for the reduction of carbon.

4.2 Communication and training

4.2.1 The successful implementation of this CMP depends upon there being adequate co-ordination, communication and liaison between the various parties. Any specific construction requirements for carbon reduction would be recorded by the contractor within the Construction Environmental Management Plan (CEMP). In addition, the CMP would be provided as an Appendix to the CEMP.

4.2.2 The appropriate project team members of the list outlined in the Section 4.1 would be provided with the following training or guidance where necessary:

- Carbon baseline and opportunities for reduction through the carbon and Design for Resource Efficiency (D4RE) workshops;
- Mott MacDonald Carbon Portal e-learning module; and
- Reference document: PAS 2080 – Carbon management in infrastructure.

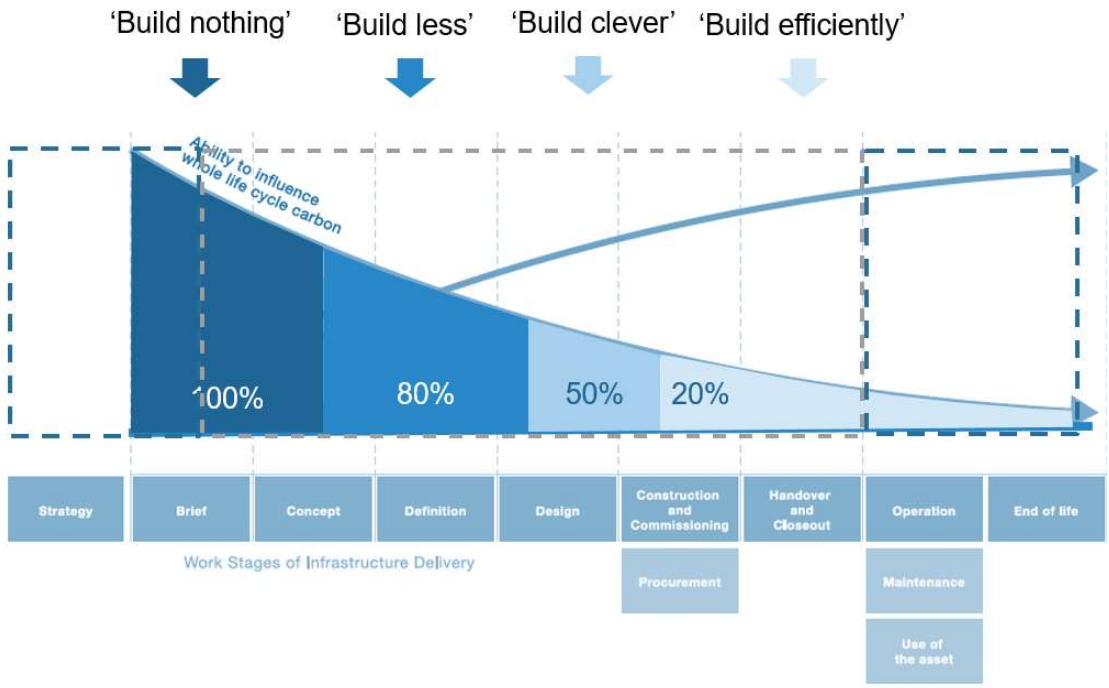
5 Approach to Integrating Low-Carbon Thinking During Design

5.1 Overall approach

5.1.1 During the design stage, carbon has been evaluated and carbon reduction has occurred with contributing design managers being supported by the core carbon team in this process. The different design aspects have been assessed for the impact on low carbon either qualitatively or where possible quantitatively.

5.1.2 Evaluation followed the carbon hierarchy approach of identifying assets which can be designed out (build nothing), opportunities to build less, build clever and build smart, shown in Figure 5.1.

Figure 5.1: Carbon Hierarchy Approach



Source: Adapted from Infrastructure Carbon Review[4]

5.1.3 The reduction challenge has been focused on both reducing the amounts of primary materials required and then selecting the best materials available. In simple terms this means first trying to reduce, for example, the amount of concrete and (where compatible with other specifications) selecting the best (low-carbon) concrete available on the market.

[4] HM Treasury, Department for Busines Innovation and Skills and the Green Construction Boards. (2013). *Infrastructure Carbon Review*

5.2 Challenge points

5.2.1 Key questions that prompted the discussion include the following (depending on the assets to be considered). Answers to some of these questions may not have be known at any given point during the design or delivery stage:

Design focus:

- Have you considered all build nothing options? This could include ancillary items such as avoiding the need for diversions (utility / road)?
- Have you optimised material use in scheme and detailed design?
- Have you considered lowest carbon materials? In particular, any impacts from low-carbon concrete?
- Can any existing assets/infrastructure be utilised?
- Has topography and need for excavation works been considered?
- Have low-carbon soil stabilisation materials and methods been considered?
- Has optimal longevity of assets been achieved to minimise replacement vs initial capital carbon?
- Has standardisation / modularisation been considered in design to minimise cut offs and waste?
- Have you considered potential effects for re-use and/or recycling of on-site aggregates and spoil?
- Have maintenance requirements been minimised?
- Has design considered deconstruction where required to optimise recycling and reuse of components?

Construction focus:

- Have you used methods to optimise resource productivity and resource allocation to reduce construction duration and cost?
- Have you considered new construction techniques that minimise construction time, result in less temporary works, use of temporary works as permanent or reduce fuel consumption?
- Has near site assembly/manufacture been considered to minimise transport requirements?
- Have you considered alternative low carbon fuels for construction plant?
- Have you considered energy efficient site cabins and equipment?
- Have you considered optimal material logistics to reduce unnecessary transport during construction?
- Has offsite manufacture been considered to minimise waste?

5.3 Topic specific workshops

5.3.1 A carbon reduction or Design for Resource Efficiency (D4RE) workshop was held with the design team on 31st March 2021. This workshop was run by the carbon management team within Mott MacDonald Ltd and included representatives from CCBC and Mott MacDonald Ltd engineers, management team, the environmental co-ordinator and carbon specialist. This workshop served to check and challenge the design as it progressed. Members from the specific disciplines as well as other key design and delivery staff were included as part of the workshop.

5.3.2 The focus for the workshop was as follows:

- Reminder of the key drivers for carbon reduction and resource efficiency;
- Focus on the key hotspots per asset/ material type and structural solution;
- Review of any baseline reports available;
- Step through the carbon hierarchy (build nothing, build less, build clever); and
- Note specific actions and ideas to develop further.

5.3.3 An additional workshop was completed on 28th July to further discuss the opportunities originally identified and gain updates on the progress of these actions.

5.3.4 Outputs from this workshop are captured within the Colwyn Bay Waterfront Phase 2b ES Volume 2 Technical Appendices: Appendix 10.1. These have been shared with the relevant teams throughout the scheme development to monitor the opportunity implementation and impact on carbon.

5.4 CEEQUAL

5.4.1 The Scheme is being assessed under the Civil Engineering Environmental Quality Assessment and Award Scheme (CEEQUAL). A number of the questions being assessed revolve around carbon reduction including producing a carbon management approach, identifying and measuring reduction targets. This further encourages the low carbon thinking throughout design. The aim is to achieve a CEEQUAL rating of Excellent or higher.

6 Assessment approach

6.1 Activity scope

Life cycle stages

6.1.1 The carbon assessments has been broken down by life cycle stages (modules) in Table 6.1 consistent with the principles set out in PAS 2080. The scope of assessment included lifecycle stages A1-3, A4, and A5.

Table 6.1: Life Cycle Stage Activities

Life cycle stage	Activities incorporated
Product stage (modules A1-A3)	The extraction, processing and manufacturing of all materials required for the permanent assets. This includes all energy and carbon emissions from manufacturing plants, primary and secondary manufacturing stages as well as any transport emission between these stages.
Construction process stage - transport to site (module A4)	The transportation of all materials required for the permanent assets and construction equipment to site from the point of production (or point of storage in the case of plant and machinery).
Construction process stage - construction and installation (module A5)	Construction site works activities including: ● Temporary work, ground works and landscaping; ● Materials storage and any energy or otherwise need to maintain necessary environmental conditions; ● Transport of materials and equipment on site; ● Installation of materials and products into the infrastructure asset; ● Emissions associated with site water demand; ● Waste management activities (transport, processing, final disposal) associated with waste arising from the construction site; and ● Production, transportation, and waste management of materials/products lost during works.
Operation – Operational Energy use (module B6)	Energy required for lighting for the scheme.

Source: Mott MacDonald Ltd, based on lifecycle stages set out in PAS 2080

6.2 Temporal scope

6.2.1 The reference study period does not include decommissioning. The main focus is the design and construction stage as the greatest impacts can be made at these stages. Whilst the operational emissions are considered to be minimal, there are some mitigation measures identifed to reduce the emissions.

6.3 Activity data

6.3.1 Activity data has been sourced from QS data used to produce bills of materials. This will be used to make sure all activities have been captured in the same way for carbon as in cost.

6.3.2 In selecting activity data, the project used data which is the most complete, up-to-date and referenceable. During the design process, it has been necessary to use interim data in order to

support decision making. As far as possible this will follow the same criteria however there may be cases where assumptions are required.

6.4 Emission factor data

Data quality

6.4.1 Emission factor data will be selected based on its overall applicability to the project. A number of criteria will be applied:

- Age: the most recently published data will be preferred;
- Geography: data which applies to the location of actual suppliers and/or activities will be preferred;
- Technology: data which represent the actual product/activity in question will be preferred;
- Methodology: data which follow a published methodology or product category rules will be preferred; and
- Competency: data which are produced from proficient entities will be preferred.

6.5 Calculations

6.5.1 The Moata Carbon Portal, the Mott MacDonald in house carbon accounting tool, has been used to quantify the emissions associated with the Scheme by inputting the quantities of materials as provided. The Moata Carbon Portal contains a library of materials and activities with the associated emission factor. Items selected within the Moata Carbon Portal wherever possible contain the embodied carbon emissions and plant activities.

6.5.2 The Moata Carbon Portal does not contain information of transport of materials to site. To include this lifecycle stage, calculations have been completed in line with the Royal Institute of Chartered Surveyor (RICS) methodology assumptions on travel distances where scheme specific information is not available[5]. This can be refined as the project and associated procurement progresses.

6.6 Baseline

6.6.1 Due to the availability of detailed design information (quantities and specific materials) and in the interest of efficiency it has not been possible to produce a complete footprint from conceptual design to be used as the baseline.

6.6.2 It has been deemed appropriate for the assessment, and to measure the progress of carbon reduction, to back-calculate the approximate baseline. The D4RE workshop listed the largest reductions which occurred between conceptual design and the Detailed design, and a number of these were possible to quantify. The calculations involved adding the quantified carbon reductions on to the Detailed design footprint.

6.6.3 This methodology for calculating the baseline has limitations and a number of assumptions, listed below. However the estimates of reductions are considered to be conservative and the actual savings are likely to be greater than that reported, particularly as the majority of the actions have not been quantified. The assumptions considered are as follows:

- Potential omissions of increases between conceptual design and Detailed design that have not been recorded;

[5] Royal Institute of Chartered Surveyors (2017). Whole life carbon assessment for the built environment.

- A number of the reductions to-date have not been quantified in the latest footprint or in the baseline; this means the calculated baseline is potentially lower than the true value;
- Reuse of rock for the rock armour has been assumed to have been considered not possible at concept design due to the dependency of the size and type for the design;
- The quantities for the reductions are based upon the Detailed design footprint quantities; and
- There is potential for aspects in the Detailed design not to have been considered at conceptual design.

7 Carbon reduction

7.1.1 The design has followed the process defined within this CMP to ensure carbon reduction is considered through the process. The outputs of the D4RE workshop have been regularly reviewed and implemented where possible. The purpose of this section is to detail the measures currently incorporated and those that are to be implemented with the greatest impact. The full list of measures is shown within the Colwyn Bat Waterfront Phase 2b ES Volume 2: Technical Appendix 10.1.

7.2 Implemented measures

7.2.1 There are a number of measures that have been incorporated at this stage or have been determined that is possible to include and that they will be implemented. These measures are detailed in Table 7.1.

Table 7.1: Implemented and to be implemented carbon reduction measures

Aspect	Reduction measure	Quantified reduction
Beach recharge optimisation	Optimisation of the beach profile to ensure only the exact amount of material required is imported.	30,000 m^3 and 143 tCO_2e
Leave pavement surface in place	Full depth construction restricted to areas of footway converted to carriageway.	300 tCO_2e
Minimise highways drainage	Reused much of the existing drainage.	~900m pipe and 98 tCO_2e
Reuse rock from existing revetment	Rock used in terminal groyne and as scour protection	10,000 m^3 and 2,574 tCO_2e
Use precast concrete	Use precast concrete for paving slabs and kerbs.	92 tCO_2e
Minimise concrete slabs for promenade	Concrete slabs minimised to just a 2m strip behind the wall.	329 tCO_2e
Optimise pavement design thickness	Not designed for vehicle loading across entire area when there is only an ad-hoc requirement.	20 tCO_2e
Reuse existing outfalls where possible	Reduced excavation and material requirement	330 tCO_2e

Source: Mott MacDonald Ltd, 2021

7.3 Progression through design

7.3.1 The carbon footprint of the scheme was calculated using the methodology described in Section 6 and presented in the Environmental Statement. The Scheme was calculated to result in 4,206 tCO_2e through construction, full details of assumptions and breakdown of results is shown within the Environmental Statement Volume 1[6].

[6] Colwyn Bay Waterfront Phase 2b Environmental Statement Volume 1: Main Text, Mott MacDonald Ltd, 100374-MMD-00-XX-RP-N-0003, August 2021

7.3.2 The reductions that have been identified and are quantifiable result in a saving of 3,884 tCO_2e. This reduction represents a 46% saving from the back calculated estimate for the conceptual design.

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