4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the development and its component parts (the 'Proposed Development') including a description of the site, proposed construction activities & methodologies as well as general construction and operational phase characteristics of the project.

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development (henceforth referred to as the Proposed Development).

A total of three planning applications will be submitted to Meath County Council (MCC) as the relevant competent authority. Of these three applications, one planning application seeks to provide for the first phase of a Strategic Employment Zone (referred to as Site A) one planning application is for Healthcare Facilities which includes a Nursing Home and Primary Care Centre (referred to as Site B), and one planning application is for the delivery of the proposed Maynooth Outer Orbital Road (MOOR).

A planning application for the Moygaddy Castle SHD henceforth referred to as Site C - Strategic Housing Development (SHD) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

There will also be two separate planning applications submitted to Kildare County Council (KCC) for shared infrastructure, proposed services and utilities connections to Maynooth town in County Kildare. One planning application to KCC includes a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development. The second planning application to be submitted to KCC is located to the southwest of Site C (SHD) for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments.

As outlined in Chapter 1: Introduction, this EIAR assesses all six planning applications under the one 'Proposed Development' due to the proximity, timeline and links between the applications. Three planning applications will be submitted to MCC (**Site A, Site B** and **MOOR**). One planning application will be submitted to An Bord Pleanála (**Site C: SHD**) as the competent authority, while two planning applications will be submitted to KCC for infrastructure works required to connect the Proposed Development to the road network and services and utility infrastructure within Co. Kildare.

The Strategic Employment Zone (**Site A**) will consist of:

1) *The proposed development comprises 3 no. office blocks and all associated site development works (GFA: 20,633.26 sq.m) as follows:*
2) *Block A: 5 storey office building providing offices, stair and lift cores and plant rooms (GFA: 10,260.42 sq.m)*
3) *Block B: 3 storey office building providing offices, stair and lift cores and plant rooms (GFA: 5,186.54 sq.m)*
4) *Block C: 3 storey office building providing offices, stair and lift cores and plant rooms (GFA: 5,186.30 sq.m)*

5) *The development includes a surface car park which includes 323 no. car parking spaces and 320 no. bicycle car parking spaces (including 16 no. accessible car parking spaces and 12 no. EV charging spaces)*
6) *Undertaking of road upgrade works including the provision of a signalised junction on the R157 Dunboyne Road and the construction of a section of the Maynooth Outer Orbital Route and provision of associated pedestrian and cycle infrastructure, as well as a realignment of a section of the R157. The works to the R157 adjoin the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).*
7) *Vehicular access to the site will be provided via the R157 Dunboyne Road and provision is made for a secondary vehicular access via the proposed section of the Maynooth Outer Orbital Route.*
8) *Provision of water, foul and surface water drainage infrastructure including pumping station.*
9) *Provision of a new pedestrian & cycle bridge structure at the River Rye Water adjacent to the existing Kildare Bridge.*
10) *Provision of roof mounted solar PV panels on Office Blocks A, B & C.*
11) *Provision of 3 no. ESB Kiosks.*
12) *Provision of bin stores, bike stands, landscaping, boundary treatments and public lighting and all other site development works and services ancillary to the proposed development.*

The Healthcare Facilities (**Site B**) will consist of:

1) *Construction of a new two-storey Nursing Home of 156 no. bedrooms with a Gross Floor Area (GFA) of 8,576m^2, including vehicular pick up/drop-off area and service road;*
2) *Construction of a new three-storey Primary Care Centre (PCC) with a Gross Floor Area (GFA) of 3,049m^2;*
3) *The development includes a shared surface car park providing 161 no. car parking spaces (comprising of 151 no. standard car parking spaces and 10 no. accessible car parking spaces) and 160 no. bicycle parking spaces.*
4) *Provision of foul and surface water drainage including wastewater pumping station.*
5) *Connection to potable water supply at Kildare Bridge.*
6) *Provision of communal (semi-private) and public open space*
7) *Provision of hard and soft landscaping including amenity equipment, fencing and gates.*
8) *Provision of substation and public lighting.*
9) *Proposed road improvement and realignment works including:*
    i. *Construction of a new 2-way, 6m-wide access road from the R157 Dunboune Road to include a priority T-junction on the R157,*
    ii. *Upgrade works to a section of the R157 from the new site entrance south to Kildare Bridge on the R157 (representing delivery of a 15m-wide portion of the Maynooth Outer Relief Road (MOOR)), including creation of a new 2m-wide footpath, 3m-wide cycle lane and pedestrian and cycle link adacent to the Kildare Bridge,*
    iii. *Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556)*
10) *All other site development works and services ancillary to the proposed development.*
11) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) will be submitted to the planning authority with the planning application.*

The Strategic Housing Development (**SHD: Site C**) will consist of:

1) *Construction of 360 no. residential homes comprising:*
   196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2) *Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle Towerhouse and pedestrian and cyclist links along the Rye Water River. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.*
3) *Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.*
4) *Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.*
5) *Provision of a single storey Scout Den facility, including a hall, kitchen, meeting room and ancillary facilities (220sqm) and associated parking of 6 no. spaces.*
6) *Provision of 4 no. bridge structures comprising:*
   i. *an integral single span bridge at Moyglare Hall over the Rye Water River to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   ii. *a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.*
   iii. *a new pedestrian and cycle bridge across the Blackhall Little Stream on the L6219 adjacent to the existing unnamed bridge.*
   iv. *a new pedestrian and cycle bridge over the Blackhall Little Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.*
7) *Provision of 500m of distributor road comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.*
8) *Proposed road improvement and realignment works including:*
   realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   Provision of pedestrian and cycle improvement measures along the L6219 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9) *Provision of 3 no. vehicular and pedestrian accesses from the L6219 local road and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.*
10) *The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.*
11) *A total of 667 no. car parking spaces are provided on site located at surface level. The car parking provision includes 10 no. Electric Vehicle charging and Universally Accessible spaces allocated for the Apartment & Duplex units. All Houses will be constructed with provision for EV Charging.*
12) *Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.*
13) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning application for the Maynooth Outer Orbital Road (**MOOR**) will consist of:

1) *Provision of approximately 1,700m of new distributor road (MOOR Arc) comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All*

associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.

2) *Proposed road improvement and realignment works including:*

   i. *realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.*
   ii. *Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).*
   iii. *Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).*
   iv. *Realignment of a section of the existing L22143 local road and R157, which will entail the demolition of an existing section of the road which extends to circa 3,200 sqm.*
   v. *Provision of a new signalised junction at the realigned junction between the L22143 and R157.*
   vi. *Provision of a new signalised junction between the L2214 local road and the MOOR with right-turn lanes on approaches.*
   vii. *Reconfiguration of the L2214 section within the MOOR arc to a one-way from north to south with right-turn lanes, where applicable.*
   viii. *Reconfiguration of the northbound lane of the L2214 within the arc to a shared facility for use by pedestrians and cyclists.*
   ix. *Addition of chicanes on the L6219 and L22143 local road to reduce traffic flow and encourage utilisation of the MOOR.*

3) *Provision of 4 no. bridge structures comprising:*

   i. *an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   ii. *a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.*
   iii. *a new pedestrian and cycle bridge across Moyglare Stream on the L22143 adjacent to the existing unnamed bridge.*
   iv. *an integral single span bridge on the north-eastern section of the MOOR arc, over the Blackhall Little Stream, and associated floodplain works and embankments.*

4) *Provision of site landscaping, public lighting, site services and all associated site development works.*
5) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning application for the **Kildare Bridge** will consist of:

The proposed development will consist of the following:

1. *Provision of a new bridge structure comprising the following:*

   i. *a pedestrian and cycle bridge structure to be erected adjacent to the upstream/western side of the existing Kildare Bridge, with a 2m clearance, with the infrastructure tying into new infrastructure in Co. Meath.*
   ii. *This bridge will be a standalone, independent structure that will also support new water main assets*

2. *New wastewater rising mains to be installed underground adjacent the bridge structure, to the west.*

3. *New walkways and cycle track will tie-in with new infrastructure to be constructed by Cairn Homes and their Agents.*
4. *Provision of site landscaping, public lighting, site services and all associated site development works.*
5. *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning application for the **Moyglare Bridge** will consist of:

The proposed development will consist of the following:

1) *Provision of approximately 200m of new portion of distributor road comprising of 7.0m carriageway with footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation. This new road section with pedestrian and cycle infrastructure will tie in with existing infrastructure just east of the roundabout which provides access to the Maynooth Community College and Moyglare Hall Estate.*
2) *Provision of a new bridge structure comprising the following:*

    i. *an integral 50m single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
    ii. *The bridge will include pedestrian and cycle facilities*
    iii. *Extension of the water main assets to serve new developments in Maynooth Environs*

3) *Provision of site landscaping, public lighting, site services and all associated site development works.*
4) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The 6 no. planning applications that form the Proposed Development are accompanied by a Natura Impact Statement (NIS) and an Environmental Impact Assessment Report (EIAR). All elements of the Proposed Development have been assessed as part of this EIAR.

4.2 Existing Site Description

4.2.1 Site Layout

4.2.1.1 Strategic Employment Zone (Site A)

The site measures approximately 6.8 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists of a green field currently in agricultural use.

The site is directly adjacent and to the northeast of Carton House woodlands and grounds, which is separated by the R157 Regional Road. Approximately 400m to the southwest of the development site is an existing housing development in Maynooth. The site is surrounded by agricultural lands to the north, west and south. There are no existing buildings or structures on the development site. A figure on the existing land use at the site is shown on Figure 2-2 in Chapter 2 of this EIAR.

4.2.1.2 Healthcare Facilities (Site B)

Site B measures approximately 6.6 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists of a green field currently in agricultural use.

The site is directly adjacent and to the east of Carton House woodlands and grounds, which is separated by the R157 Regional Road. Approximately 350m to the south of the development site is an existing housing development in Maynooth. The site is surrounded by agricultural lands to the north and west. There are no existing buildings or structures on the development site. A figure on the existing land use at the site is shown on Figure 2-3 in Chapter 2 of this EIAR.

4.2.1.3 Strategic Housing Development (Site C)

Site C measures approximately 19.5 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists of a green field currently in agricultural use.

The site is directly adjacent and to the north of the River Rye Water, which is the county boundary between Meath and Kildare. The site is also bounded by the L22143 Local Road which rounds to the north of the site boundary in an east-west direction. Approximately 120m to the south of Site C is Moyglare Close, an existing housing development in Mariavilla on the outskirts of Maynooth town in County Kildare. The site is surrounded by agricultural lands to the north, west and east. The existing Moygaddy Castle (ME053-001—) is a Recorded Monument (RMP), which is located within the eastern part of the Site C boundary, consisting of a 17th century three-storey tower house. Moygaddy House is located to the north of Moygaddy Castle, directly adjacent to the Site C boundary, which is a protected structure consisting of a two storey over basement 19th century Georgian house and associated stable block. A figure on the existing land use at the site is shown on Figure 2-4 in Chapter 2 of this EIAR.

4.2.1.4 Maynooth Outer Orbital Road (MOOR)

The Maynooth Outer Orbital Road (MOOR) consists of approximately 1.7km of proposed new distributor road linking the R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the Site C (SHD). The distributor road will comprise of 7.0m carriageway with turning lanes where required, public lighting, footpaths, cycle tracks and grass verges.

The total area of the MOOR site boundary measures approximately 6.6 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists predominately of green fields currently in agricultural use. Some road upgrade works along the existing R157 Regional Road, L6219, L2214 and L22143 Local Roads are required and these works are included as part of the overall site boundary in order to facilitate the delivery of the MOOR.

There are two new watercourse crossings required as part of the MOOR, which will be delivered in the form of clearspan bridges. One bridge crossing is located on the Blackhall Little Stream, approximately 250m northeast of Moygaddy House. The other bridge crossing is located on the Rye Water River, at the southwest corner of Site C (SHD) in order to connect the MOOR to the existing Moyglare Hall Road in County Kildare. The existing Moyglare Close housing estate in County Kildare is located less than 40m from the MOOR site boundary at its closest point. The MOOR site is surrounded by agricultural lands. There are no existing buildings or structures within the MOOR site boundary, with the exception of existing access roads which will require upgrade works as part of the Proposed Development. A figure on the existing land use at the site is shown on Figure 2-5 in Chapter 2 of this EIAR.

4.2.1.5 Kildare Bridge

The Kildare Bridge planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a

proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station which is located to the southeast of the Proposed Development. The Kildare Bridge planning application site boundary measures approximately 1.2 hectares and is located in County Kildare on the northern edge of Maynooth town. The site consists of made ground in the form of the R157 Regional Road (Dunboyne Road), the Dunboyne Road Roundabout and the L1013 Local Access Road.

There are no existing buildings or structures within the Kildare Bridge site boundary, with the exception of existing access roads which will require upgrade works as part of the Proposed Development. A figure on the existing land use at the site is shown on Figure 2-6 in Chapter 2 of this EIAR.

4.2.1.6 Moyglare Bridge

The Moyglare Bridge planning application includes for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments, as well as construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the Rye Water River.

with associated services and utilities. The Moyglare Bridge planning application site boundary measures approximately 0.5 hectares and is located in Mariavilla, County Kildare on the outskirts of Maynooth town. The site consists of a green field site currently in agricultural use.

The site is directly adjacent and to the south of the River Rye Water, while the existing Moyglare Close housing estate is located approximately 5m from the site boundary at its closest point. There are no existing buildings or structures within the site boundary A figure on the existing land use at the site is shown on Figure 2-7 in Chapter 2 of this EIAR.

4.2.2 Site Access

4.2.2.1 Strategic Employment Zone (Site A)

The road network within Site A can be broken-up into three distinct elements, mainly:

1. *Approximately 750m section of proposed road upgrade works along the existing R157 Regional Road, to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road linking the overall Moygaddy Masterplan area to Maynooth town.*
2. *Approximately 110m section of proposed road upgrade works along the existing L22143 Local Road, to facilitate the proposed new junction/crossroads as part of the Maynooth Outer Orbital Route (MOOR) distributor road.*
3. *Delivery of approximately 365m of the Proposed MOOR. The complete delivery of the MOOR will be subject to permission of a separate planning application.*

The aforementioned MOOR distributor road is outlined is a key Policy Objective outlined in the Meath County Development Plan 2021 – 2027. The Meath CDP policy objectives relating to the MOOR are outlined in the draft Maynooth Local Area Plan and listed below:

- **MAY OBJ 4 –** To support and facilitate in conjunction with Kildare County Council and private developers and landowners, the construction of the Maynooth Outer Orbital Route.
- **MAY OBJ 5 –** To require that the Maynooth Outer Orbital Route connects with the MOOR being delivered in the administrative area of Kildare County Council. Said route shall incorporate the construction of a sewer and ring main linking the sewer and trunk main in the Dublin Road to the residential development in the Mariavilla area.

The planning application for the Strategic Employment Zone includes approximately 750m of proposed road upgrade works along the existing R157 Regional Road, and approximately 110m of proposed road upgrade works along the existing L22143 Local Road, to the south of the Strategic Employment Buildings. These road upgrade works will be necessary to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road. The complete delivery of the MOOR will be subject to a separate planning application.

Also included as part of the Strategic Employment Zone planning application is a new proposed junction/crossroads between the existing L22143 Local Road and the existing R157 Regional Road, at the southeast corner of the Strategic Employment Zone. This new junction/crossroads will facilitate the delivery of the c.365m section of the proposed MOOR, which runs in a north-northeast direction from the existing junction, between the R157 Regional Road and the existing L22143 Local Access Road, and the Blackhall Little Stream to the northeast.

A high-level study of a much wider area has been carried out to ensure the technical viability to the full extension of the MOOR. The findings of this study were discussed in detail with the Roads Department of MCC on two separate meetings as referred in Chapter 2 of this report and separate meetings with the Roads Department in Kildare County Council. The full delivery of the MOOR is subject to the success of its own separate planning application, as described in Section 4.2.2.4 below.

The main access to the proposed Site A will be via a new entrance from the existing R157 Regional Road, on the eastern boundary of the site, creating a new T-junction. The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

Site A provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with a main arterial pedestrian and cycle route running through the scheme from north to south, linking Site A to Maynooth town. The location of existing pedestrian and cycle routes, and other transport infrastructure in the vicinity of Site A and Maynooth town are shown in the Mobility Management Plan included as Volume 3a Appendix 4-1 of this EIAR. Site A will provide new pedestrian and cycle infrastructure adjacent to the Kildare Bridge, the Dunboyne Road (R157), and throughout Site A.

4.2.2.2 Healthcare Facilities (Site B)

The road network within Site B can be broken-up in two distinct elements, mainly:

1) *The proposed internal road network servicing the proposed nursing home and primary care centre.*
2) *290m section of proposed road upgrade works along the existing R157 Regional Road, to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road linking*

the overall Moygaddy Masterplan area to Maynooth town. The delivery of the entire MOOR will be subject to permission of a separate planning application.

The aforementioned MOOR distributor road is outlined is a key Policy Objective as described in Section 4.2.2.1 above.

The planning application for Site B includes a 290m section of proposed road upgrade works along the existing R157 Regional Road that runs along the eastern boundary of the planning application site. These road upgrade works will be necessary to facilitate the planned Maynooth Outer Orbital Route (MOOR) distributor road. The complete delivery of the MOOR will be subject to permission of a separate planning application as described in Section 4.2.2.4 below.

The main access to Site B will be via a new entrance to the west of the existing R157 Regional Road, opposite Carton House Woods creating a new T-junction. The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

Site B provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with a main arterial pedestrian and cycle route running through the scheme from north to south, linking Site B to Maynooth town. The location of existing pedestrian and cycle routes, and other transport infrastructure in the vicinity of the Proposed Development and Maynooth town are shown in the Mobility Management Plan included as Volume 3b Appendix 4-1 of this EIAR. Site B will provide new pedestrian and cycle infrastructure adjacent to the Kildare Bridge and the Dunboyne Road (R157).

4.2.2.3 Strategic Housing Development (Site C: SHD)

The road network within Site C can be broken-up in three distinct elements, mainly:

1) *The proposed internal road network servicing the proposed Strategic Housing Development (SHD).*
2) *Approximately 850m of road, pedestrian and cycle improvements measures along the L6219 and L22143 Local Roads, including two dedicated pedestrian and cycle bridges over the Blackhall Little Stream; and*
3) *Delivery of Approximately 500m of the Proposed MOOR which will facilitate access to the proposed Strategic Housing Development. The complete delivery of the MOOR will be subject to a separate planning permission for the overall route.*

The aforementioned MOOR distributor road is outlined is a key Policy Objective as described in Section 4.2.2.1 above.

The planning application for Site C includes a c.650m section of proposed road upgrade works along the existing L6219 and L22143 Local Roads that runs along the north-eastern boundary of the planning application site and c.200m of upgrade works along the L22143 Local Road which runs along the northern section of the planning application site. These road upgrade works also include for pedestrian and cycle infrastructure and 2 no. dedicated pedestrian and cycle bridges over the Blackhall Little stream and one pedestrian and cycle bridge adjacent to the existing Kildare Bridge. The planning application for Site C also includes for the delivery of approximately 500m of the Proposed MOOR which will facilitate access to the proposed Strategic Housing Development. The complete delivery of the MOOR will be subject to permission of a separate planning application as described in Section 4.2.2.4 below.

The main access to the proposed SHD (Site C) will be via a new entrance to the north of the site from the existing L6219 Local Road, creating a new T-junction. The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

Site C provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with a main arterial pedestrian and cycle route running through the scheme from east to west, along the L6219 & L22143 Local Road on the northern boundary of Site C. The location of existing pedestrian and cycle routes, and other transport infrastructure in the vicinity of the Proposed Development and Maynooth town are shown in the Mobility Management Plan included in Volume 3c(i) Appendix 4-1 of this EIAR.

4.2.2.4 Maynooth Outer Orbital Road (MOOR)

The road network associated with the MOOR can be broken-up in three distinct elements, mainly:

1) *Construction of c.1.7km of distributor road linking the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges; and*
2) *Approximately 750m section of proposed road upgrade works along the existing R157 Regional Road from the existing Kildare Bridge up to the new proposed signalised junction with the MOOR.*
3) *Installation of new 2 no standalone pedestrian and cycle links adjacent to the Kildare Bridge and along the L22143 crossing the Blackhall Little Stream.*

The aforementioned MOOR distributor road is outlined is a key Policy Objective outlined in the Meath County Development Plan 2021 – 2027. The Meath CDP policy objectives relating to the MOOR are outlined in the draft Maynooth Local Area Plan and listed below:

- **MAY OBJ 4** – To support and facilitate in conjunction with Kildare County Council and private developers and landowners, the construction of the Maynooth Outer Orbital Route.
- **MAY OBJ 5** – To require that the Maynooth Outer Orbital Route connects with the MOOR being delivered in the administrative area of Kildare County Council. Said route shall incorporate the construction of a sewer and ring main linking the sewer and trunk main in the Dublin Road to the residential development in the Mariavilla area.

The planning application for the MOOR includes for the construction of c1.7km of new distributor road linking the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges. Road upgrade works will also be required to facilitate the delivery of the MOOR, including approximately 750m section of proposed road upgrade works along the existing R157 Regional Road from the existing Kildare Bridge up to the new proposed signalised junction with the MOOR.

Access to the proposed MOOR will be via the R157 Regional Road to the south and east, with access also being provided from the L2214 and L6219 Local Roads to the north and west of the site. Access will also be provided to the MOOR via the proposed Moyglare Bridge to the south.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

The MOOR provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with arterial pedestrian and cycle routes running through the entire scheme.

4.2.2.5 Kildare Bridge

The road network associated with the Kildare Bridge planning application can be broken-up in two distinct elements, mainly:

1. *Approximately 115m section of proposed road upgrade works along the existing R157 Regional Road between the existing Kildare Bridge and the Dunboyne Roundabout in County Kildare; and*
2. *Installation of new standalone pedestrian and cycle link adjacent to the Kildare Bridge.*

The main access to the Kildare Bridge site will be via the R157 Regional Road (Dunboyne Road).

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

The Kildare Bridge works provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided with a main arterial pedestrian and cycle route running through the scheme in a north-south direction, along the R157 Regional Road.

4.2.2.6 Moyglare Bridge

The road network associated with the Moyglare Bridge planning application can be broken-up in two distinct elements, mainly:

1) *Installation of 2 no. new single span bridge over the River Rye and Blackhall Little Stream to facilitate the delivery of the MOOR; and*
2) *Construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the River Rye.*

The main access to the Moyglare Bridge Planning Application site will be via the existing Moyglare Hall Road to the south of the site.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

The Moyglare Bridge provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided with a main arterial pedestrian and cycle route running through the scheme in a north-south direction.

4.3 Proposed Development Construction Operations

The detailed layout drawings for the Proposed Development are included in the planning drawings pack of this EIAR. A Construction and Environmental Management Plan (CEMP) for each component of the Proposed Development is included in Volume 3 of this EIAR. The CEMP's are located in the following:

- Site A – Volume 3a Appendix 4-3
- Site B – Volume 3b Appendix 4-3
- Site C – Volume 3c(i) Appendix 4-3
- MOOR – Volume 3d Appendix 4-2
- Kildare Bridge – Volume 3e Appendix 4-2
- Moyglare Bridge – Volume 3f Appendix 4-2

4.3.1 Phasing

4.3.1.1 Strategic Employment Zone Application (Site A)

It is anticipated that the proposed Strategic Employment Zone (Site A) will be completed over 2 separate phases (See Figure 4-1), and the access and egress routes will change for the various phases. Two of the three office buildings will be constructed as part of Phase 1, while the most north-eastern of the three buildings will be constructed as part of Phase 2 along with a c.365m section of the proposed MOOR. The construction phase of the proposed Site A is expected to commence in March 2023 and last approximately 22 months in total, with a 2 month overlap between the construction of the two phases

- Phase 1: Office Block A & B = Month 0 – Month 12;
- Phase 2: Office Block C = Month 10 – Month 12).

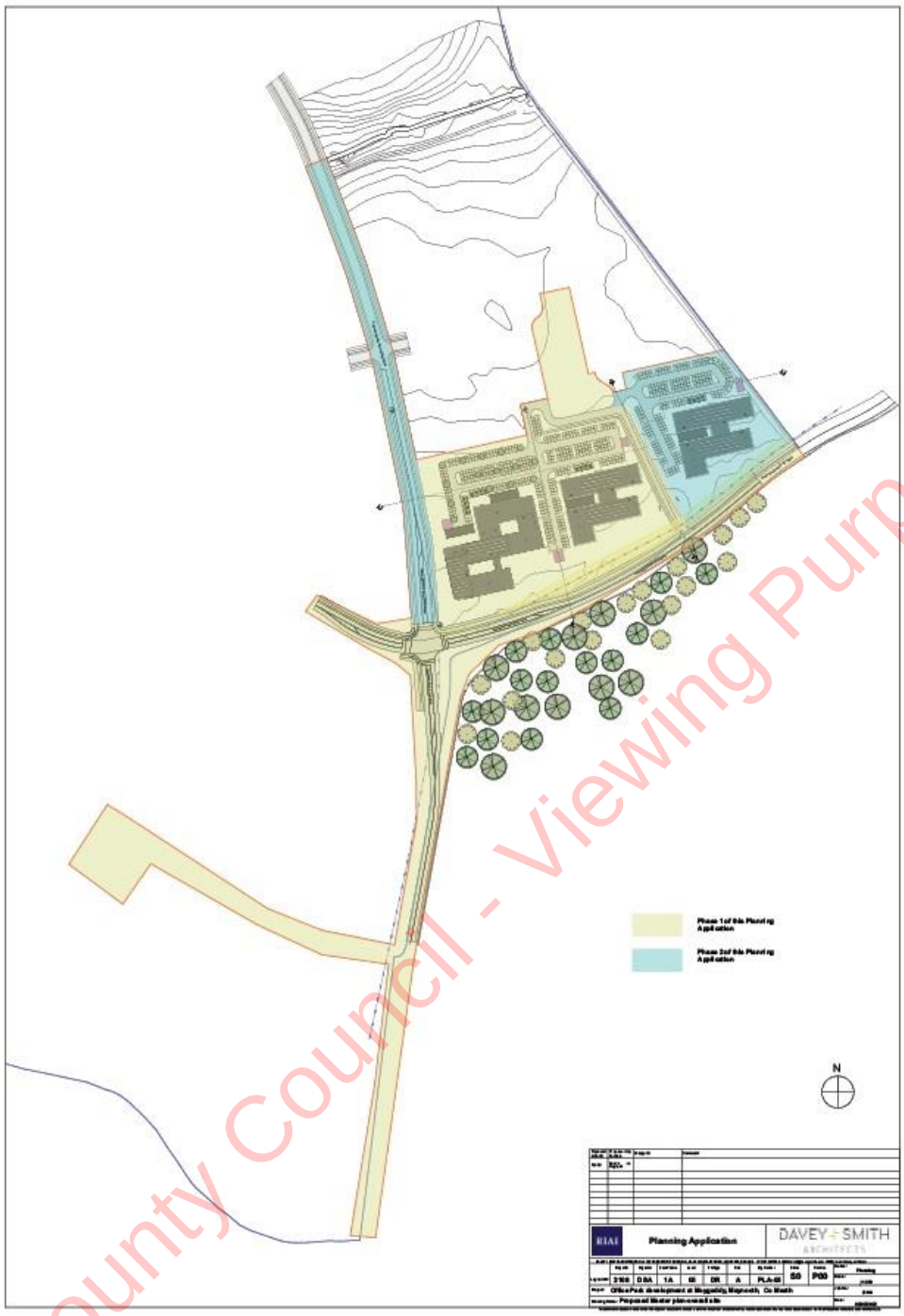

Figure 4-1 Site A Construction Phasing (Source Davey-Smith Architects)

4.3.1.2 Healthcare Facilities (Site B)

It is anticipated that the development will be completed over two individual, but sequential phases. Phase 1 will consist of the Primary Care Centre, while Phase 2 will consist of the Nursing Home and proposed onsite pumping station (See Figure 4-2). The construction phase of the proposed Site B is expected to commence in September 2023 and last approximately 27 months in total, with a 2 month overlap between the construction of the two phases.

- Phase 1: Primary Care Centre = Month 0 – Month 14;
- Phase 2: Nursing Home = Month 12 – Month 27.

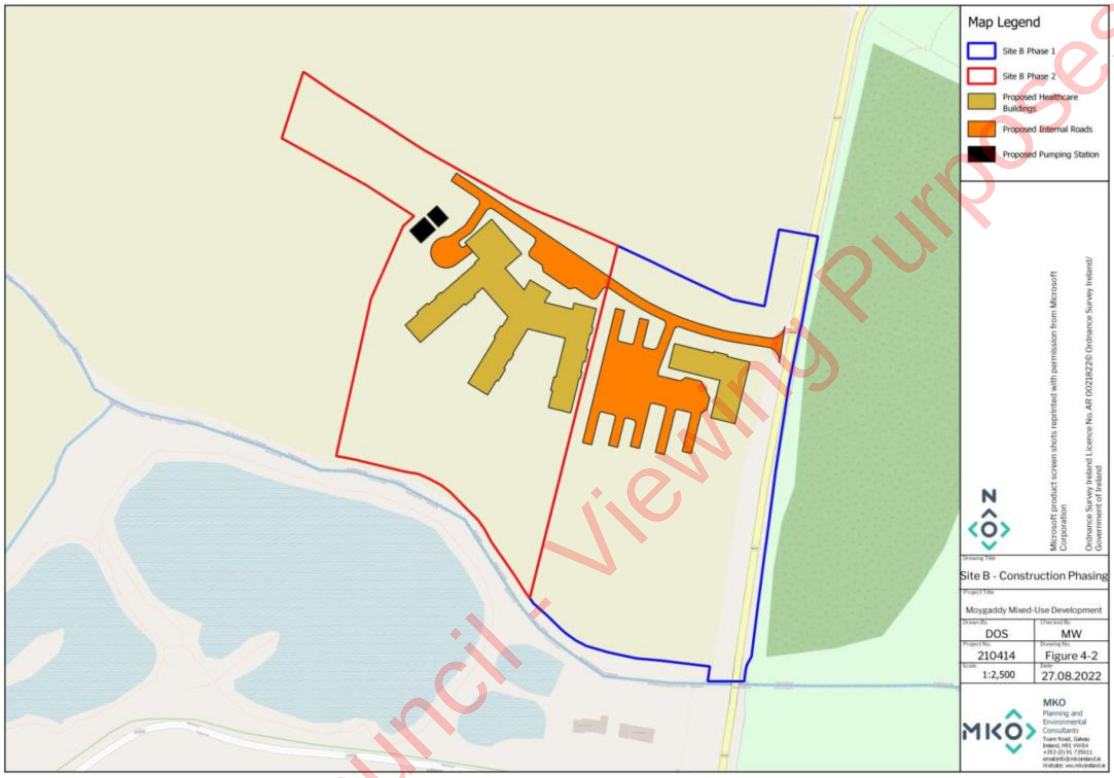

Figure 4-2 Site B Construction Phasing

4.3.1.3 Strategic Housing Development (SHD: Site C)

It is anticipated that the development will be completed over four individual phases. (See Figure 4-3). The construction phase of the proposed Site C is expected to commence in September 2023 and last approximately 27 months in total. The development will be constructed in four phases, however it is anticipated that all of the phases will overlap within the construction period mentioned above.

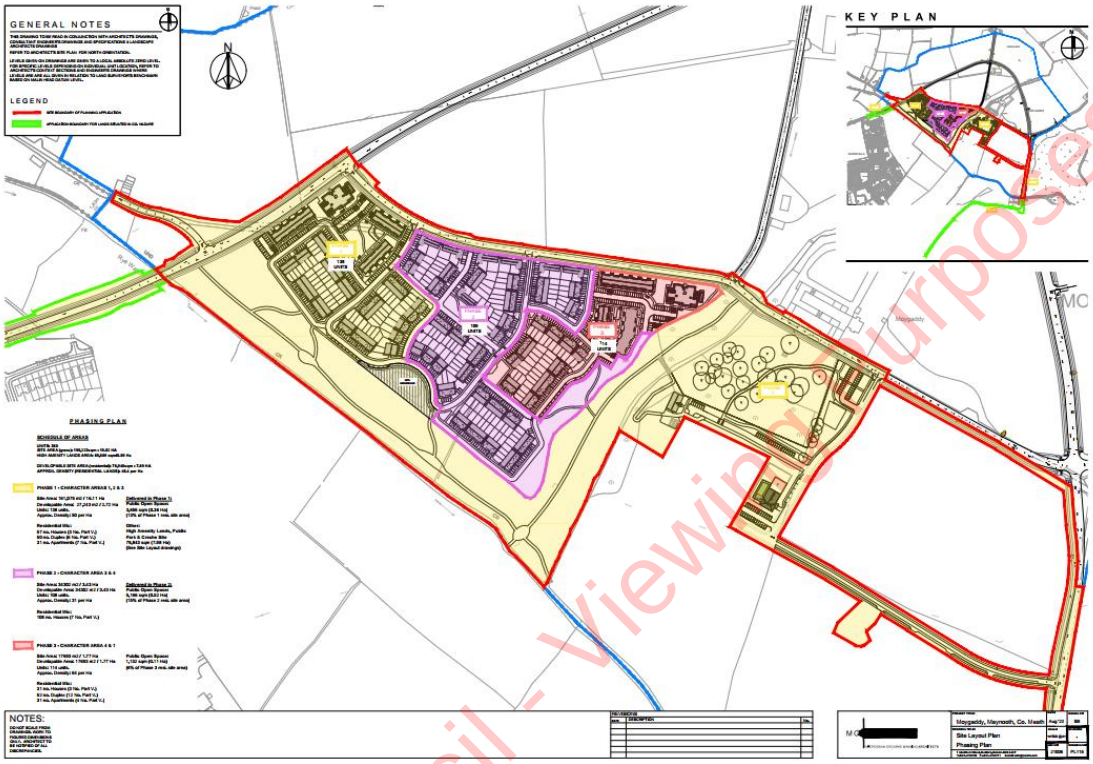

Figure 4-3 - Site C Construction Phasing

4.3.1.4 Maynooth Outer Orbital Road (MOOR)

It is anticipated that the MOOR will be completed in one phase (See Figure 4-4). Detailed design is expected to be completed by Q2 2023 with construction commencing by Q3 2023. Construction is expected to be completed by Q3 2025 and it's anticipated that the construction duration will be approximately 21 months.

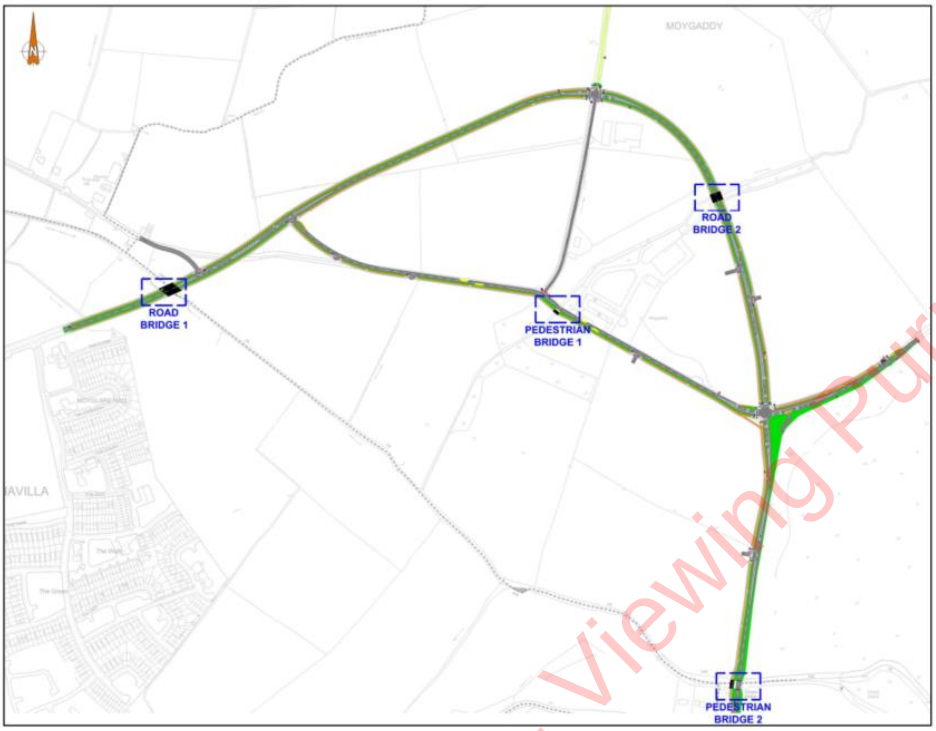

Figure 4-4 - MOOR Construction Phasing (Source OCSC)

4.3.1.5 Kildare Bridge

It is anticipated that the Kildare Bridge application will be completed in one phase (See Figure 4-5). Detailed design is expected to be completed by Q2 2023 with construction commencing by Q3 2023. Construction is expected to be completed by Q3 2024 and it's anticipated that the construction duration will be approximately 12 months.

Figure 4-5 - Kildare Bridge Construction Phasing

4.3.1.6 Moyglare Bridge

It is anticipated that the Moyglare Bridge will be completed in one phase (See Figure 4-6). Detailed design is expected to be completed by Q2 2023 with construction commencing by Q3 2023. Construction is expected to be completed by Q3 2024 and it's anticipated that the construction duration will be approximately 21 months.

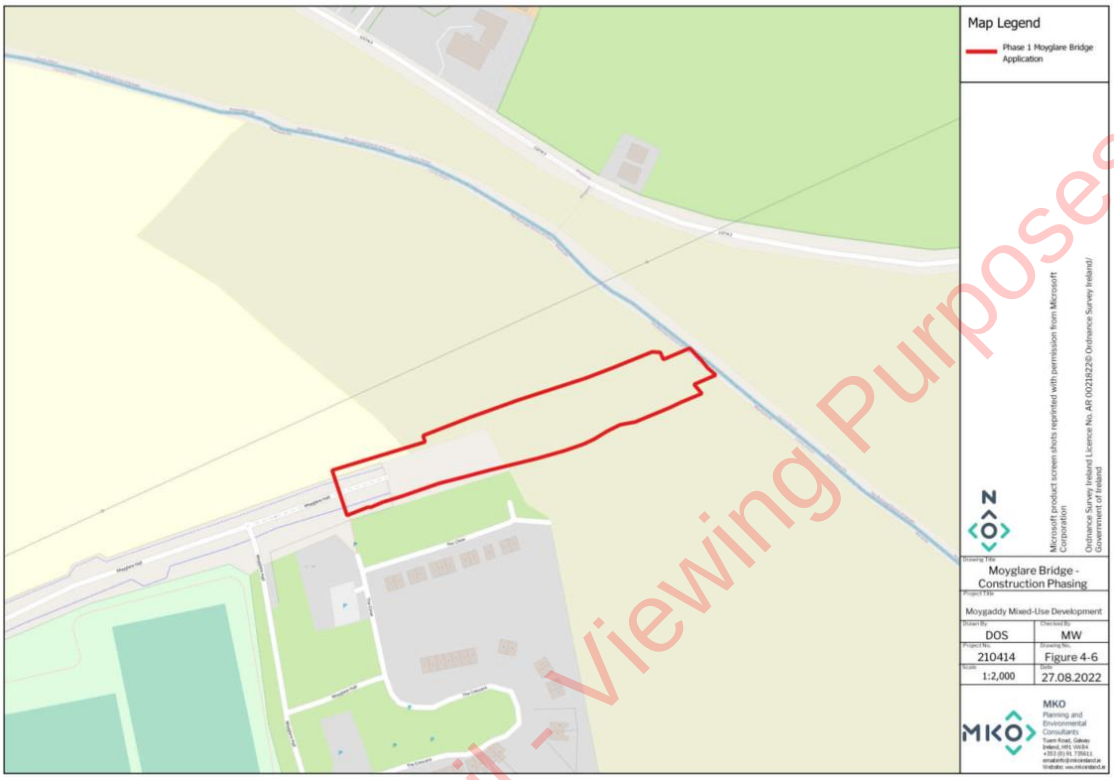

Figure 4-6 Moyglare Bridge Construction Phasing

4.3.2 Hoarding

The site areas **(Site A** (Phase 1 & Phase 2), **Site B** (Phase 1 & Phase 2) **Site C** (Phases 1-4), **MOOR** (Phase 1) & **Kildare Planning Applications** (Phase 1)) will be enclosed with perimeter site hoarding as required, the exact details of which will be agreed with Meath and Kildare County Councils prior to commencement of construction. Controlled access/egress points will also be provided. Hoarding will be maintained to a high standard and painted or covered as appropriate. Temporary hoarding will be provided as necessary within the site as safety restrictions to prevent public access. The locations and arrangement of this temporary hoarding will vary as work progresses across the site.

4.3.3 Site Security

The Contractor will be responsible for the security of each site. The Contractor will be required to undertake the following:

- Operate a Site Induction Process for all site staff,
- Ensure all site staff will have current 'Safe Pass' cards,
- Install adequate site hoarding to the site boundary,
- Maintain Site Security at all times,
- Install access security in the form of turn-styles and gates for staff,
- Separate public pedestrian access from construction vehicular access,
- Ensure restricted access is maintained to the works.

4.3.4 Access Arrangements for Vehicles

The access arrangements will be as specified in the statutory publications with reference to the publications "Traffic Management Guidelines" manual and the "Traffic Signs Manual" and as agreed with Meath and Kildare County Councils.

Traffic Management procedures will be implemented to ensure the safety of the users of the access routes, for each component of the Proposed Development and the construction access.

All deliveries and vehicles into site will access the site from the new site entrances that will be constructed as part of each planning application as described in Section 4.2.2 above.

Access details for pedestrians and cyclists are discussed in Section 4.3.7 below.

Further information on traffic management is outlined in the Construction & Environmental Management Plans in Volume 3 of the EIAR within the following appendices.

- Site A – Volume 3a Appendix 4-3
- Site B – Volume 3b Appendix 4-3
- Site C – Volume 3c(i) Appendix 4-3
- MOOR – Volume 3d Appendix 4-2
- Kildare Bridge – Volume 3e Appendix 4-2
- Moyglare Bridge – Volume 3f Appendix 4-2

4.3.5 Type of Vehicles

It is anticipated that there will be numerous types of delivery vehicles used to bring material to and from the site. These include:

- Tipper lorries required for removal/movement of spoil following excavation.
- Ready mix concrete lorries.
- Flatbed delivery vehicles for the delivery of various material.
- Skip lorries. These will include roll on/roll off skips for major demolition works and standard yard skips for waste.

4.3.6 Parking and Loading Arrangements

A "Just in Time" approach will be implemented for the delivery of particular building materials such as concrete formwork and large structural steels in order to ensure no long-term stockpiling of material within the site. The location of these materials' storage facilities will be within the site boundaries and as highlighted within the Construction and Environmental Management Plan for each individual site which forms part of the Proposed Development.

Materials will be stored within the site boundaries. It is proposed to provide on-site car parking spaces for workers and a limited number of visitors during the construction phase.

4.3.7 Site Compound and Facilities

Temporary construction compounds are proposed for the construction phase of the proposed development, which will be located within the site boundary of each phase of the proposed developments. The proposed temporary compound area incorporates temporary site offices, staff facilities and car-parking areas.

A dedicated waste management area will be located within each compound, with waste to be sorted and collected from site by permitted collectors. In the absence of a temporary water supply, potable drinking water will be supplied via water coolers located within the staff facilities, which will be restocked on a regular basis as required during the construction phase. A supply contract will be set up with a water cooler supply company with water supplies delivered to site as required for the duration of the construction period.

Temporary port-a-loo toilets located within portacabins will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. Power will be supplied by either a temporary electricity connection and/or through the use of a diesel generator, located within the compound. The construction compound will be used for temporary storage of some construction materials, prior to their delivery to the required area of the site.

4.3.8 Site Landscaping

Before completion of the construction phase for each phase of the Proposed Development, landscaping works will be carried out to improve the visual amenity of the site. These landscaping works will follow the layout of the landscape plan provided in the Landscape Masterplan which is included as in Volume 3 of this EIAR in the following appendices:

- Site A – Volume 3a Appendix 4-7
- Site B – Volume 3b Appendix 4-7
- Site C – Volume 3c(i) Appendix 4-7
- MOOR – Appendix 3d Appendix 4-5

4.4 Construction Methodologies

This section describes the construction methodologies that will be used for the Proposed Development. Further details are also provided in the Construction and Environmental Management Plan (CEMP) for each component of each application of the Proposed Development.

4.4.1 General Construction Measures

Communication with the public, local residents and businesses adjacent the development will be an important responsibility of the Project Manager and delegated persons. All parties will be kept up to date and informed about each phase of development both prior to and throughout the construction period. Two to three weeks before any work commencing, reasonable efforts will be made to inform all parties of the upcoming works.

- All personnel will be inducted and made familiar with Risk Assessments / Method Statements (RAMS) and Traffic Management Plans.
- All site-specific safety rules will be adhered to.
- All plant operators will have appropriate CSCS training.
- All personnel will have SOLAS Safe Pass training
- Fire extinguishers and first aid supplies will be available in the work area.
- All adjacent roadways will be maintained in clean condition at all times.
- Helmets, high visibility clothing and safety footwear will be worn at all times.
- Competent foremen will be on site at all times

A Traffic Management Plan (TMP) will be issued to both Meath and Kildare County Councils for approval prior to works commencing on each site. The approved TMP and any revisions thereto will be set up and implemented on each site. All necessary signage will be erected in the weeks prior to any

works commencing along and on adjacent roads to the Proposed Development giving advance warning to traffic, pedestrians / members of the public. Every effort will be made to minimise the impact of the above works on local residences and traffic. A copy of the Design Stage Traffic Management Plan is included in Volume 3 of this EIAR in the following appendices

- Volume 3a Appendix 4-8
- Volume 3b Appendix 4-8
- Volume 3c(i) Appendix 4-8

4.4.2 Soil Excavation/Stripping, Redistribution & Temporary Stockpiling

The excavation and stripping of soils and subsoils will be required across much of the site, and this soil will need to be redistributed and temporarily stockpiled around the sites as the Proposed Development progresses. Prior to the construction of each phase of the proposal, site levelling will be undertaken. During these works, topsoil will be stripped and stored in temporary storage areas for reuse. As the Proposed Development sites currently support seminatural grassland, the seedbank within the topsoil will be used within the green spaces during final landscaping work. This will ensure that the green spaces comprise of plant species of a local origin and reduce a requirement for reseeding. Full details of the soil/subsoil and the cut and fill is provided in the Construction and Environmental Management Plans provided for each site, and in the Engineering Services Report as Appendix 4-9 in Volumes 3a, 3b & 3c(i) of the EIAR. Where these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to excavate the material, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material which is not required for future landscaping works or for backfill of excavations will be removed to an authorised waste recovery facility. This will also apply to material which is not suitable for reuse on site.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.
- A silt filtration system will be used as appropriate to prevent contamination of any watercourse.

4.4.3 Site Roads

The construction methodology for the proposed roads is outlined as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 450mm of granular fill.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final hard surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.

- Prior to completion of the construction works on site, the finished road surface will be applied.
- Roads will be designed in line with Section 4.4.9 of DMURS. All footpaths within the development will be a minimum of 1.80m wide and will run parallel to the proposed road infrastructure.
- The design of the MOOR and the realignment of the R157 Regional Road and L6219 local road will consist of a carriageway width of 7.0m, 1.5m verge, footpath and also 1.75m off road cycle tracks along the R157 designed in accordance with the National Cycle Manual.
- All works on public roads will be carried out subject to, and under a Road Opening Licence from the Local Authority. All works will be carried out as per the Local Authority and HAS guidelines for working on public roads, with appropriate traffic management guidelines

4.4.4 Excavation and Services Installation

Services will be required to each building in the Proposed Development. Where these are located, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Meath and Kildare County Councils etc. will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excess excavated material will be removed to an authorised waste recovery facility or, if suitable, stockpiled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.
- The built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the development designer/Local Authority as appropriate.

4.4.4.1 Existing Underground Services

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

4.4.5 Building Construction

The buildings will be constructed by the following methodology:

- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping (if not already done so). Any excess material will be sent to an authorised recovery facility.
- A tracked 360-degree excavator or similar will be used to excavate the area down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it;
- The block work walls will be built up from the foundation (including a DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work and/or timber frame will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for this operation;
- Any concrete slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by an engineer at the appropriate stages of construction.

4.4.6 Bridge Construction

All of the bridges to be constructed as part of the proposed development share a number of key characterises. The bridges include:

- Piled foundations;
- Cast in situ abutments;
- Precast deck elements
- On deck cast in situ slabs or screeds;
- Post-fix parapets.

In advance of any construction of bridges, a bridge specific Risk Assessment and Method Statement (RAMS) will be produced by the contractor. The RAMS will also be reviewed by the designer to ensure that the construction methodology is compatible with the individual bridge design.

The construction sequence below is envisaged at this juncture to likely be adopted for construction:

- Clear the works area and install silt traps and drainage controls under archaeological and ecological supervision as required;
- Prepare the area with geotextile and piling mat of approximately 300 to 600mm of 6F material;
- Install bored piles for the foundations by way of a mobile CFA piling rig;
- Mobilise the in situ reinforced concrete team of steel fixers and carpenters under engineering supervision to build the abutments and central piers (where required);
- Place the main deck structure in accordance with a bespoke lifting plan prepared by a competent person;
- Fix and pour the bridge deck;
- Erect parapets and complete the bridge construction.

The bridges are designed to be constructed without carrying out works in the wetted areas of the watercourses. All structures in proximity to water and over water will be planned and built in line with a detailed Risk Assessment and Method Statement that takes into account the requirements of Inland Fisheries Ireland and the mitigation measures outlined in this EIAR. Full details are provided in the Construction and Environmental Management Plans and Bridge Options Reports which are prepared for each application within the proposed development.

4.4.7 Headwalls

The sustainable drainage network requires the construction of outfalls along the Rye Water River and the Blackhall Little Stream, which consist of the construction of new concrete headwalls along the watercourses.

All headwalls required for the construction of the proposed development will be small in nature and will be precast. As such, the site work will be minimised. The contractor will set out the position of the headwall and prepare the base with lean mix concrete or CI 808 crushed stone. Once the base is prepared the headwall will be placed on the base in the pipeline and will be constructed from the back of the headwall.

4.4.8 Directional Drilling

Drilling will be required for the installation of the wastewater line beneath the Rye Water River. The horizontal directional drilling method of installation is carried out using bespoke plant such as a Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant. The launch and reception pits will be approximately 2.5m wide, 2.5m long and 2.0m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod and the operator will commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore will continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring, as listed below, will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exits.

- The area around the Clear Bore™ batching, pumping and recycling plants shall be bunded using terram and sandbags in order to contain any spillages;

- One or more lines of silt fences shall be placed between the works area and adjacent rivers and streams on both banks;
- The area around the Clear Bore™ batching, pumping and recycling plants shall be bunded using terram and sandbags in order to contain any spillages;
- One or more lines of silt fences shall be placed between the works area and adjacent rivers and streams on both banks;
- Accidental spillage of fluids shall be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.

4.4.9 Construction Site Management Measures Incorporated into Project Design

The following measures pertaining to water quality have been incorporated into the design phase of the project to mitigate the potential for significant effects on sensitive environmental receptors.

4.4.9.1 Pollution Prevention Control Measures

The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides guidance. This will ensure that surface water arising during the course of construction activities will not contain excess sediment. The following methods and best practice measures will ensure that potential sediment release and the potential for pollution during the construction phase is minimised.

4.4.9.1.1 *Drainage*

For the initial phase of construction, i.e., during the ground works phase when the constructed drainage systems are not yet in place, control measures will be implemented as follows,

- Hoarding will be constructed around the construction site footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and the River Rye Water and Blackhall Little stream and associated riparian habitats. No works will be undertaken outside the confines of this hoarding fence, with the exception of;
  - The construction of the new single span bridge over the River Rye to facilitate the delivery of the MOOR at Moyglare Close,
  - The construction of the two no. new pedestrian and cycle bridges over the Blackhall Little Stream, which will serve Site C and will be located to the south of Moygaddy Castle,
  - The construction of a new single span bridge over the Blackhall Little Stream to facilitate the delivery of the MOOR and will be located to the northwest of Site A and to the northeast of Moygaddy House,
  - The construction of a new single span pedestrian/cycle bridge located adjacent to the existing Kildare Bridge to improve accessibility across the Kildare Bridge for pedestrians and cyclists.
  - Installation of the surface water outfall locations at the River Rye and Blackhall Little, and;
  - Minor landscaping works including plantings and the installation of a silt fence, which will be undertaken as a separate element of the development that is described below.

- A silt fence will also be attached to this boundary fence. This will protect each watercourse from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan for each component of the Proposed Development, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Once the drainage systems and the majority of the buildings are constructed, it is proposed to separate the surface water and wastewater drainage networks, which will serve the Proposed Development, and provide independent connections for attenuated surface water discharge to the adjacent watercourse (River Rye Water and Blackhall Little) and the separate wastewater connection to the local wastewater sewer network respectively.

The proposed development will be split into a number of surface water catchments that will contribute to the surface water drainage network. Full detail including maps on the individual catchment areas are provided in the Engineering Services Report, attached as Appendix 4-9 in Volumes 3a, 3b & 3c(i) of this EIAR. All remaining areas within the Proposed Development are considered green space and allowed to drain naturally, and therefore do not contribute to the surface water drainage networks. All catchments are to discharge treated and attenuated surface water flows at a rate that is less than greenfield run off rates to surface water outfall locations along the Rye Water River and the Blackhall Little Stream.

The Proposed Development is to contain a series of measures for Sustainable Urban Drainage Systems, the details of which are described in Section 4.6.1 below and in further detail in the following appendices:

- Volume 3a – Appendix 4-9
- Volume 3b – Appendix 4-9

- Volume 3c(i) – Appendix 4-9

Watercourse Crossings

Five new watercourse crossings are required as part of the Proposed Development. 2 no. of these crossings are to facilitate the delivery of the MOOR in the form of an integral single span bridge over the River Rye, located at ITM X693697, Y739265, and a new single span bridge over the Blackhall Little Stream, located at ITM X694635, Y739417.

There are two crossings of the Blackhall Little Stream included as part of the planning application for Site C to provide a new dedicated pedestrian and cycle bridge, the first of which is located at ITM X694259, Y739139, linking the residential areas to the west and the public park to the west and a second pedestrian and cycle bridge which is located at ITM X694257 Y739163 linking the residential areas to the scout den and creche/childcare facilities to the east.

The other crossing at the Rye water River is associated with the Kildare Bridge application, located at ITM X694632, Y739421, to facilitate a standalone pedestrian and cycle bridge adjacent to the existing Kildare Bridge.

The location of these crossings are shown in further detail in the following appendices of this EIAR.

- Volume 3a – Appendix 4-6
- Volume 3b – Appendix 4-6
- Volume 3c(i) – Appendix 4-6
- Volume 3d – Appendix 4-4
- Volume 3e – Appendix 4-4
- Volume 3e – Appendix 4-4

Both watercourse crossings associated with the MOOR will require a 7-metre single span road bridge as shown in the standard design drawings which accompanies this application.

The pedestrian/cycle bridges over the Blackhall Little Stream and the Rye Water River adjacent to Kildare Bridge, will require a 2-metre clear span pedestrian and cycle footbridge as shown in the standard design drawings which accompanies this application.

The clear-span watercourse crossing methodologies are presented below:

The standard construction methodology for the installation of a clear-span bridge is as follows:

- Clear the works area and install silt traps and drainage controls under archaeological and ecological supervision as required;
- Prepare the area with a geotextile and piling mat of approximately 300 to 600mm of 6F material;
- Install bored piles for the foundations by way of a mobile CFA piling rig;
- Mobilise the in situ reinforced concrete team of steel fixers and carpenters under engineering supervision to build the abutments and central piers (where required);
- Place the main deck structure in accordance with a bespoke lifting plan prepared by a competent person;
- Install falsework and permanent shutters;
- Fix and pour the bridge deck;
- Erect parapets and complete the bridge construction.

The clear span bridge's will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland.

If Planning permission is granted for the Proposed Development a separate Section 50 application will be submitted to the OPW for each individual bridge structure and associated infrastructure.

4.4.9.2 Invasive Species

The introduction and/or spread of invasive species such as Japanese Knotweed and Himalayan Knotweed for example, could result in the establishment of the species and this may have knock on effects on the surrounding environs. No invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the dedicated invasive species survey.

Appropriate control measures will be incorporated into the design and construction phase of the development to ensure that the relevant measures (outlined in the following section below) will be implemented.

4.4.9.2.1 *Control Measures for the Management of Invasive Species*

Invasive species, such as Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam, Gunnera, and Giant Hogweed pose a serious threat to biodiversity and the health of native vegetation types. Construction machinery can act as a vector for the spread of these plants. Machinery that has worked at an infected site is likely to cause the spread of such species by transferring their tiny seeds or plant fragments, in soil trapped in their tyre tread for instance. Equally, they can cause the spread of species within a site. The duration of the impact could be short-term or permanent depending on whether or not an eradication effort is made but once established, eradication is time-consuming and expensive. Himalayan Knotweed, for example, propagates vegetatively, forming a new plant from even very small plant fragments. Thus, there is a high risk of causing the spread of this species to other parts of the site. The UK Environment Agency's 'Japanese Knotweed Code of Practice' provides guidance on managing Japanese Knotweed and Himalayan Knotweed on development sites. A number of control measures have been drawn up and included in the design and construction phase of the proposed works to avoid the introduction and spread of invasive plant species. The following project design elements have been devised to avoid such effects. The following measures address potential effects associated with the construction phase of the development:

- Invasive species surveys have confirmed that there are no existing stands of invasive species on site. However, should any be found, prior to the commencement of the construction of the development, they will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral rhizomes.
- All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere.
- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- All contractors and staff will be briefed about the presence, identification and significance of Japanese Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly washed prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese Knotweed and Rhododendron. All washing must be undertaken in areas with no potential to result in the spread of invasive species.

- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal. Cognizance will be had of any watercourses in the area.
- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the 'Third Schedule' of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- If any excavations must be carried out in areas of Japanese Knotweed, the excavated material will not be moved from the location. The machinery must be thoroughly pressure-washed in a designated area at least 25 metres from any watercourse before moving on to an area that is not yet infected.
- Any soils or subsoils contaminated with invasive species will sent for disposal to an authorized waste facility.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA 2010) and the Environment Agency (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013).

4.4.10 Landscaping Works

Prior to completion of works on the development site, the landscaping works will be carried out. The proposed landscaping plan is shown as Appendix 4-7 in Volumes 3a, 3b & 3c(i) and Appendix 4-5 in Volume 3d of this EIAR. The finishes include green areas for public amenity and swale planting, footpaths and cycling infrastructure and tree planting. This work will be carried out before the completion of each phase in order to ensure that the Proposed Development will be aesthetically pleasing place for those using and working at the Proposed Development. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. Solid barriers will be erected around the site boundary for the duration of the landscaping and construction works.

4.5 Other Site Details

4.5.1 Waste Management

Appendix 4-4 of Volumes 3a, 3b & 3c(i) and Appendix 4-3 of Volumes 3d, 3e, & 3f of this EIAR, provides a construction and demolition waste management plan (CDWMP) which describes the best practice procedures during the construction phase of the project. The CDWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the proposed development. Disposal of waste will be seen as a last resort.

The treatment of waste is to be employed by the contractor or a specialist waste management contractor as a trade package. This contractor is responsible for:

- Ensuring the site is kept clean and safe
- The collection of waste from a central point
- Segregation of waste on site

The waste management contractor will ensure that all access routes, fire escapes and staircases are swept and kept clear of debris on a regular basis to maintain high standards of health and safety on the project. No fires will be permitted on site.

The Contractor will prepare a Construction Waste Management Plan in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately permitted or licensed waste recovery facility.

In order to ensure appropriate segregation of waste on site, a material storage zone will be provided in the compound area. This storage zone will include material recycling areas and facilities. Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.

The CDWMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The CDWMP can then be adapted with changes that are seen through record keeping.

4.5.2 Dust

Dust prevention measures will be included for control of any site airborne particulate pollution. The Contractor will put in place and monitor dust levels in the vicinity using a Bergerhoff gauge instrument or similar. The minimum criteria to be maintained will be the limit for Environmental Protection Agency (EPA) specification for licensed facilities in Ireland, which is 350mg/m2/day. The Contractor will continuously monitor dust over the variation of weather and material disposal to ensure the limits are not breached throughout the project. Dust suppression systems should be implemented if required based on the continuously monitored dust levels.

Dust control should be achieved by:

- Site roads shall be regularly cleaned and maintained as appropriate;
- Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development works;
- Any un-surfaced roads shall be restricted to essential site traffic only;
- Any road that has the potential to give rise to fugitive dust may be regularly watered, as appropriate, during extended dry and/or windy conditions;
- On-site speed limits will be stipulated to prevent the unnecessary generation of fugitive dust emissions;
- Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to the wind;
- A complaints register will be maintained on-site and any complaints relating to dust emissions will be immediately dealt with;
- In periods of dry weather when dust emissions would be greatest, a road sweeper, which would also dampen the road, will be employed to prevent the generation of dust;
- Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; and
- If appropriate, dust monitoring will be carried out during the construction phase of the scheme. If the level of dust is found to exceed 350mg/m2day in the vicinity of the site, further mitigation measures will be incorporated into the construction of the proposed scheme.

4.5.3 Noise

Construction contractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations. Noise levels will be kept below those levels specified in the National Roads Authority – "Guidelines for the Treatment of Noise and Vibration in National Roads Schemes" or such further limits as imposed by Meath County Council. The proposed development will comply with BS 5228 "Noise Control on Construction and open sites Part 1: Code of practice for basic information and procedures for noise control."

Construction equipment for use outdoors will comply with the European Communities Regulations– Noise Emission by Equipment for Use Outdoors – SI 241 - 2006.

All plant items used during the construction phase will comply with standards outlined in the 'Safety, Health and Welfare at Work (Control of Noise at Work) Regulations' and the 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations'. The Proposed Development will include the following noise mitigation measures:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 08:00-16:00 h.
- Screening and enclosures will be utilised in areas where construction works are continuing in one area for a long period or around items such as generators or high duty compressors. For maximum effectiveness, a screen will be positioned as close as possible to either the noise source or the receiver. The screen will be constructed of material with a mass of >7kg/m2 and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise-sensitive receptors;
- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and mobile equipment will be throttled down or switched off when not in use; and
- All mobile plant onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. Accordingly, where possible all construction traffic to be used on-site will have effective well- maintained silencers. Defective silencers will be immediately replaced;

4.5.4 Road Cleaning and Wheel Washing

The Contractor will make provision for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works as required. It is intended that cleaning will be undertaken on a daily basis during the excavation works and as required thereafter. A wheel wash facility will be provided on site to clean site traffic leaving the site. Wastewater generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to permitted or licensed waste recovery facility. All road sweeping vehicles will be emptied off site at a suitably permitted or licensed facility as per our construction stage environmental waste management document.

4.5.5 Water Supply

Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).

4.5.6 Wastewater Management

Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the

portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Any sewage or greywater generated during the operational phase of the Proposed Development will be directed to the local municipal wastewater treatment plants for treatment via the proposed onsite pumping station.

4.5.7 Aggregates

The aggregates required for the construction of the Proposed Development will be where possible reused from the various sites within the proposed development, as many have overlapping construction timelines. This will reduce the potential for any negative impacts associated with the haulage of the materials to and from the site of the Proposed Development. Existing soils and subsoils located on the site will be used where possible to reduce the amount of such materials required for import onto the site.

4.5.8 Construction Traffic/Plant

The following mitigation measures will be implemented in relation to construction traffic and plant/machinery in order to minimise and reduce emissions where possible:

- All vehicles to switch off engines when not in use – no idling vehicles
- Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes.
- On-road vehicles to comply to set emission standards.
- All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced.
- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site

4.6 Operational Phase

The Proposed Development will require periodic maintenance throughout the operational phase. The operation of Site A (Office Buildings), Site B (Healthcare Facilities), Site C (Residential Development) are not recognised sources of significant environmental emissions or nuisance and so there will be no adverse effects associated with its operation, provided drainage measures, wastewater systems are regularly maintained.

4.6.1 Proposed Surface Water Drainage

Once the drainage systems and the majority of the buildings are constructed, it is proposed to separate the surface water and wastewater drainage networks, which will serve the Proposed Development, and provide independent connections for surface water to the adjacent River Rye Water and Blackhall Little stream and a separate wastewater connection to the local wastewater sewer network respectively. Sites A, B & C will direct surface water from surfaced areas roads, and roofs, via gravity, infiltration area/attenuation storage, hydrocarbon interceptors and filtration drain to outfalls at the River Rye Water, just west of the Kildare Bridge and the Blackhall Little stream. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

Site A

It is proposed that surface water within Site A (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage areas, to an existing ditch along the southern boundary, which is to be replaced by a new filter trench as part of the upgraded and re-aligned R157. This drain conveys surface water runoff in a southerly direction, ultimately towards the River Rye at the proposed outfall location described below. Underground attenuation will comprise underground poly-tunnel systems, to be provided within proposed green spaces at Site A.

The discharge rates at the proposed surface outfall, which serves Site A, is to be restricted to a low rate less than than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on the River Rye and other downstream properties

Site B

It is proposed that surface water within Site B (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage (located in the shared carpark at Site B), to a high-level outfall at the River Rye, just west of the Kildare Bridge. The Proposed Development will direct surface water from surfaced areas roads, and roofs, via gravity, infiltration area/attenuation storage, hydrocarbon interceptors and filtration drain at less than greenfield run off rates to a high-level outfall at the River Rye, just west of the Kildare Bridge. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

The discharge rates at the proposed surface water outfall, which serves Site B, is to be restricted to a flow rate less than less than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on the River Rye and other downstream properties.

Site C (SHD)

It is proposed that surface water within Site C (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage (located in the open spaces to the south and east of the site), at less than greenfield run off rates to a high-level outfall at the Blackhall Little Stream. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

The discharge rates at the proposed surface water outfall, which serves Site C, is to be restricted to a flow rate less than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on the Blackhall Little Stream and other downstream properties.

Maynooth Outer Orbital Road (MOOR)

It is proposed that surface water run off on the MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning

footpath and cycle track shall be intercepted by the dividing tree-lined grass verge, with excess runoff only being collected by the road's gully network. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent.

The proposed surface water network is to be split into 4 no. catchments, in order to optimise the network based on the natural topography of the site.

It is proposed that surface water from the MOOR is to discharge the treated and attenuated runoff from each catchment to the existing watercourses at the proposed outfall locations, namely the Rye Water River and Blackhall Little Stream.

Kildare Bridge Application

It is proposed that surface water run off on the Kildare Bridge is to be captured by the proposed drainage features proposed as part of the MOOR. Adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle track and bridge shall be intercepted by the dividing tree-lined grass verge, rainfall will be allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent.

Moyglare Bridge Application

It is proposed that surface water run off on the Moyglare Bridge is to be captured by the proposed drainage features proposed as part of the MOOR. Adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle track shall be intercepted by the dividing tree-lined grass verge, with excess runoff only being collected by the road's gully network. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent.

It is proposed that surface water from the MOOR and Moyglare Bridge is to discharge the treated and attenuated runoff from each catchment to the existing watercourses at the proposed outfall locations, namely the Rye Water River.

4.6.1.2 Operational Phase Sustainable Drainage Systems

The Proposed Development will contain a series of measures for Sustainable Urban Drainage Systems as outlined below:

4.6.1.2.1 *Rainwater Harvesting*

Site A

Rainwater Harvesting will be considered at each of the proposed office facilities, which can re-use the collected rainwater for welfare facilities, or landscaping purposes. Rainwater Harvesting helps to reduce the overall volume of rainfall runoff entering the surface water network.

Figure 4-7 Example of Rainwater Harvesting System

Site C

Rainwater harvesting is to be considered at individual residential units in the form of 'Water Butts', which can re-use the collected rainwater for gardening and other domestic watering purposes. Rainwater Butts help to reduce the overall volume of rainfall runoff entering the surface water network.

Figure 4-8 Example of Domestic Rainwater Harvesting Butt for Site C

4.6.1.2.2 Attenuation Storage

Attenuation Storage will be provided at strategic locations, in order to temporarily store excessive surface water, due to the restricted flow rates during rainfall events up to, and including, the design 1% AEP with a 20% additional allowance for climate change. This will allow for the limiting discharge rates to less than greenfield run off rates at the Proposed Development outfall, as outlined above.

Attenuation will be provided in the form of unlined proprietary poly-tunnel storage units (or similar approved). These poly-tunnel storage units will be underground, in proposed green-spaces for both Site A and Site C and in the car parking area for Site B, for the attenuation of rainfall runoff prior to discharge. The attenuation for the proposed MOOR are to comprise of largely enclosed vegetated ponds, and be preceded by a Class 1 bypass fuel separator.

Typical poly-tunnel storage systems comprise plastic arch-units with open-graded crushed rock bedding and surround. These units are arranged in rows, with an isolator row for efficient operation and maintenance. These systems also allow for interception of initial rainfall to be provided at the base of the system, by elevating the outlet relative to the systems base. The attenuation systems are to be installed in the greenfield areas of sites A and C and in the parking areas of Site B and was calculated to support a discharge rate that is less than the natural greenfield runoff rate.

Figure 4-9 Typical Poly Tunnel Installation Arrangement

4.6.1.2.3 Limiting Discharge

The discharge rate from the catchments are to be restricted to a maximum discharge rate which is less than the equivalent greenfield runoff. The Proposed Development discharge rates are to be restricted by using a flow control device, in a chamber upstream of the outfalls, such as Hydro-Brake Optimum Vortex Flow control unit, or similar approved by Meath and Kildare County Councils, downstream of the proposed attenuation systems as outlined above.

4.6.1.2.4 Permeable Paving

Permeable Paving is to be provided for all in-curtilage car parking space within the Residential Development (Site C), which will have a layer of drainage stone underneath. This will provide at-source treatment, interception, and attenuate rainfall runoff throughout the site, prior to entering the main

surface water drainage network. A **Type B** porous asphalt, with a 300mm depth of open graded crushed rock as base course, is to be provided in all car parking spaces that serve the Apartments and Duplex homes in Site C and the Primary Care and Nursing Home in Site B.

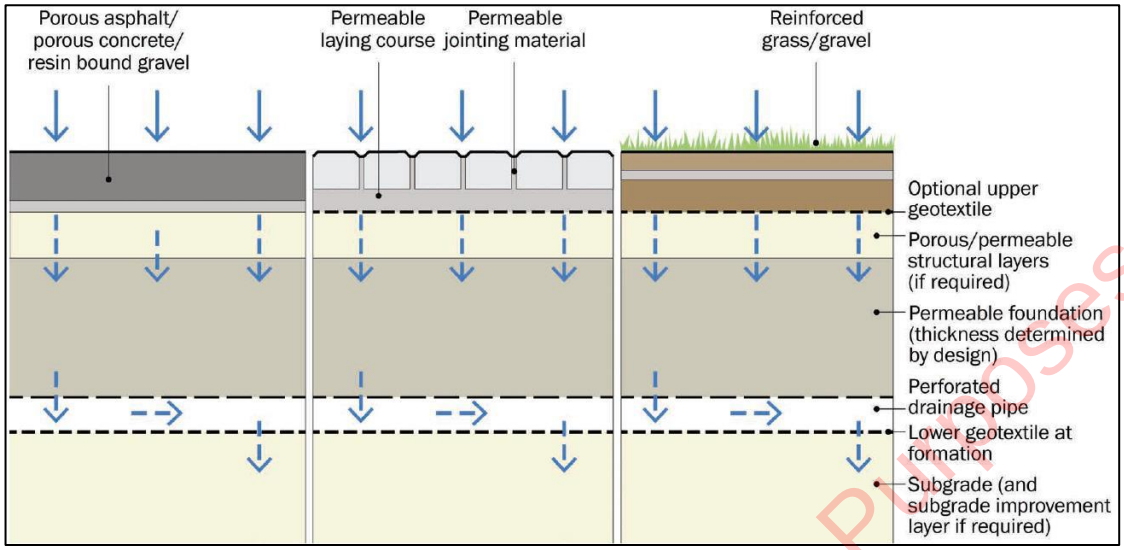

Figure 4-10 Detail of Type B Pervious Paving (CIRIA C753)

4.6.1.2.5 Trapped Road Gullies

Trapped Road Gullies will be provided for all road gullies serving the Proposed Development, to help prevent sediment and gross pollutants from entering the surface water network, and thus improving the water quality discharging from site. The road gullies will have grated covers with a minimum load classification of D400, for frequent vehicular traffic, and shall be lockable, as required by MCC.

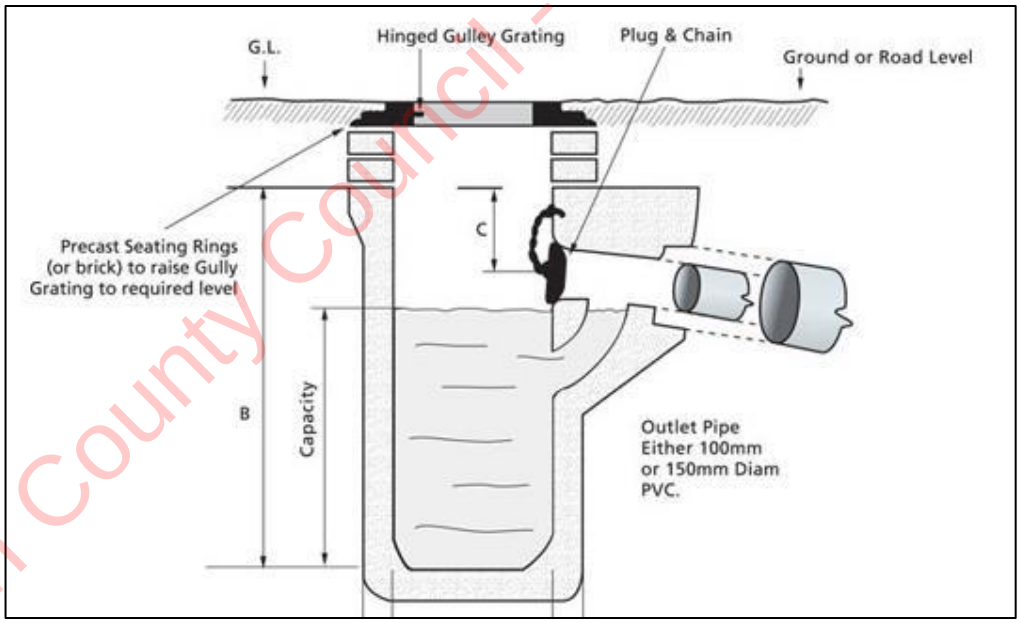

Figure 4-11 Trapped Road Gully (Typical Detail)

4.6.1.2.6 Summary of Measures

Water quality of the surface water, discharging from site, is to be improved with the following provisions:

- Permeable Paving in all private driveways, as described above;

- Intensive landscaping, where practical;
- Trapped road gullies on all road carriageways, to trap silt and gross pollutants;
- Traditional gravity pipe and manhole network will be provided, to convey the collected rainfall runoff as far as the development's outfall. Manholes are provided for maintenance access at branched connections, change in pipe size and gradient, and at intervals no greater than 90m distance.
- Silt traps to be provided on manholes immediately upstream of attenuation systems, as a further preventative measure to trap silt and other gross pollutants;
- Surface water attenuation storage in the form of poly-tunnel installation at both Site A and Site C (green spaces) and Site B (car parking area);
- A Class 1 Bypass Fuel/Oil Separator is to be provided as an additional and final mitigation measure, prior to surface water discharge from the Proposed Development sites.

4.6.2 Proposed Wastewater Infrastructure

4.6.2.1 Site A, Site B & Site C

It is proposed to provide an onsite underground wastewater pumping station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. Both Site A to the north and Site B to the east and Site C to the west of the proposed pumping station, will drain by gravity to the Pumping Station where it will then be pumped along the R157 and L1013 Local Road towards the existing Irish Water network at Maynooth Municipal Wastewater Pumping Station in County Kildare, approximately 1km south of the proposed pumping station. All wastewater is to discharge to the public infrastructure, this is subject to agreement with Irish Water through the PCE process. In order to achieve this, a new gravity wastewater network is to be installed across the Rye Water River, as part of the proposed bridge structure. The wastewater from the proposed crèche facility is to discharge to the main wastewater network that is to be provided within the residential development, via independent packaged pump system.

Individual buildings will connect to the 225mm diameter foul drains via individual 100mm diameter connections, as per Irish Water Code of Practice for Wastewater Infrastructure. The wastewater discharge from each dwelling is to connect, via a private outfall chamber, to the new development's gravity wastewater network, which is to be designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. A Pre-Connection Enquiry Form has been submitted to Irish Water for review, for both the Proposed Development, as well as the masterplan development for the LAP lands. Irish Water (IW) issued a Confirmation of Feasibility Letter (Refer to Appendix 4-9 in Volumes 3a, 3b & 3c(i) of this EIAR) for the Proposed Development, subject to upgrade works being carried out.

The foul sewers will be sealed and there will be no discharge of wastewater to ground within the Proposed Development. Wastewater will be pumped from the Proposed Development to the Maynooth pumping station, and onwards from Maynooth pumping station to the Leixlip Wastewater Treatment Plant.

4.6.3 Proposed Water Supply

4.6.3.1 Site A and Site B

A proposed new connection to one of the existing watermains local to Site A and Site B will be made for the Proposed Development. There is an existing 200mm watermain to the south of the Site B, in County Kildare, just south of the Kildare bridge. An extension from the existing 200mm watermain will be provided along/within the existing R157 Regional Road, to the connection point at the Proposed Development. It is anticipated that a metered 150mm high density polyethylene connection will be

required. Internal distribution network of 150mm HDPE watermain will be provided to serve the proposed Nursing Home and Primary Care Centre and Biotechnology & Life Sciences Campus.

The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements.

There is no proposed extraction of groundwater at the site for drinking water purposes.

4.6.3.2 Site C

A proposed new connection to one of the existing watermains local to Site C (SHD) will be made for the Proposed Development. It is proposed to provide an extension to the existing 200mm ductile iron watermain at Moyglare Close, with a metered 200mm high density polyethylene connection provided to serve the Proposed Development. Internal distribution networks of 100mm and 150mm HDPE watermain will be provided to serve the proposed residential units. An extension from the Proposed Development's watermain will be provided to serve the proposed crèche facility, adjacent.

The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements.

There is no proposed extraction of groundwater at the site for drinking water purposes.

4.6.4 Access Arrangements

As described in Section 4.2.2 above the Proposed Development once operational will be accessible from new site entrances that will be constructed as part of each planning application. The Proposed Development includes for road upgrade works along the existing Dunboyne Road, L6219 and L22143 Local Roads, as well as providing pedestrian and cycle infrastructure, linking the Proposed Development to Maynooth town via the new Moyglare bridge and via a new pedestrian and cycle bridge adjacent to the Kildare Bridge.

A Mobility Manager/Travel Coordinator will be appointed at the Proposed Development by the management company relevant to each component of the Proposed Development. It is envisaged that the management company will oversee the implementation of the Mobility Management Pan including the Mobility Manager and can update the plan regularly following feedback from staff and residents, once occupied. Further details on the Mobility Management Plan can be found in Appendix 4-1 of Volumes 3a, 3b & 3c(i) of this EIAR. The duties of the Mobility Manager will include inter alia:

- Conducting travel surveys at regular intervals once the development is completed and operational. These surveys will provide detailed and up-to-date information on travel habits which can be used to develop new strategies that encourage travel by alternate modes;
- Implementation of various schemes/plans aimed at encouraging the uptake of more sustainable means of travel;
- Acting as an information point;
- Negotiating with public transport companies and other service providers;
- Setting up and administering registers for particular measures such as taxis if the need arises;
- Branding of the plan;
- Ongoing promotion and marketing of the plan through various mediums;
- Evaluation and adaptation of the plan in the light of experience.

4.6.5 Resource, Waste Management & Energy Use

4.6.5.1 Site A

Site A is designed to comply with Irish Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Reports, which forms Appendix 9-1 of Volume 3a of this EIAR. A new Unit Substation will be required to supply electricity to each building. It is proposed to use Unit Subs rather than a standard substation in order to maintain landscape views in keeping with the open plan design.

The ESB supply to the development will be a Three Phase and Neutral (TPN) supply. Each individual floor will have a TPN Distribution Board which will be supplied from the main distribution board off loader from the Unit Sub. There will be a TPN supply for a vertical transportation system and Landlord Supplies for the common areas.

Each office block within Strategic Employment Zone will have solar PV panels fitted to the roof of each building, with the inverter, meter and distribution board housed within the buildings, to facilitate the supply of renewable electricity for energy demands of the buildings.

Waste generated throughout the operational phase of the site will be dealt in accordance with waste legislation. A detailed Operational Waste Management Plan can be found in Appendix 4-5 of Volume 3a of this EIAR.

4.6.5.2 Site B

Site B is designed to comply with Irish Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Report, which forms Appendix 9-1 of Volume 3b of this EIAR. A new Unit Substation will be required to supply electricity to both the Primary Care Centre and Nursing Home buildings.

The ESB supply to the developments will be a Three Phase and Neutral (TPN) supply. Each individual floor will have a TPN Distribution Board which will be supplied from the main distribution board off loader from the Unit Sub. There will be a TPN supply for a vertical transportation system and Landlord Supplies for the common areas. A substation will be required to supply electricity to the healthcare facilities.

Each of the Primary Care Centre and Nursing Homes will have solar PV panels fitted to the roof of each building, with the inverter, meter and distribution board housed within the buildings, to facilitate the supply of renewable electricity for energy demands of the buildings.

Waste generated throughout the operational phase of the site will be dealt in accordance with waste legislation. A detailed Operational Waste Management Plan can be found in Appendix 4-5 of Volume 3b of this EIAR.

4.6.5.3 Site C

The Proposed Development is designed to comply with Irish Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Planning Report, which forms Appendix 9-1 of Volume 3c(i) of this EIAR. 3. No substations will be required to supply electricity to the residential development.

Waste generated throughout the operational phase of the site will be dealt in accordance with waste legislation. A detailed Operational Waste Management Plan can be found in Appendix 4-5 Volume 3c(i) of this EIAR.

4.6.6 Operational Phase Noise

Low noise levels are important for good living, in the case of residential development (Site C) and nursing home residents (Site B) and working conditions (in the case of Site A and Site B). Mechanical and electrical systems will be designed for lowest possible noise emission conducive with efficient operation. At Sites A and B, noise emissions may arise from dispersed sources such as extraction fans, vents and air conditioning cassettes. Noise emissions from these sources are unlikely to be audible beyond 10m and are thus highly unlikely to affect offsite receptors. Noise generated by occupants will be minimised by the use of acoustic panels, where necessary, which will be strategically located throughout the building. Increases in traffic noise levels on the surrounding road network including the MOOR will be minor, and no specific mitigation measures are required.

Operational phase noise mitigation required onsite relates to road-facing facades of Site A, where moderately enhanced glazing will be required to reduce internal LAFmax levels (with windows closed) below 45 dB.

At Site C, operational phase mitigation required onsite relates solely to inward impacts associated with L6219 and MOOR traffic noise. Internal LAeq T criteria will be met at most residential units using standard thermal glazing. However, certain facades will require enhanced glazing to meet ProPG and BS 8233:2014 criteria. At these façades, it is proposed to install glazing with a minimum RW value of 33 dB in living rooms and dining rooms, and 38 dB on bedrooms. Standard glazing will suffice in kitchens, bathrooms, hallways and stairwells.

The RW 33 dB specification is readily achievable, and a number of suppliers offer suitable products. See Section 10.5.2 of this EIAR for further details in relation noise during the operational phase of the Proposed Development.

4.7 Decommissioning Phase

It is not intended that the proposed buildings or roads will be removed, as permanent planning permission is being sought for the entirety of the Proposed Development (each planning application). The Proposed Development will form an integral part of the local area plan for Moygaddy as outlined in the Meath County Development Plan. Therefore, it is intended that the Proposed Development will be retained as permanent and will not be decommissioned.