

# Section 2.9 Services, Infrastructure and Energy Framework

## Overarching Principles:

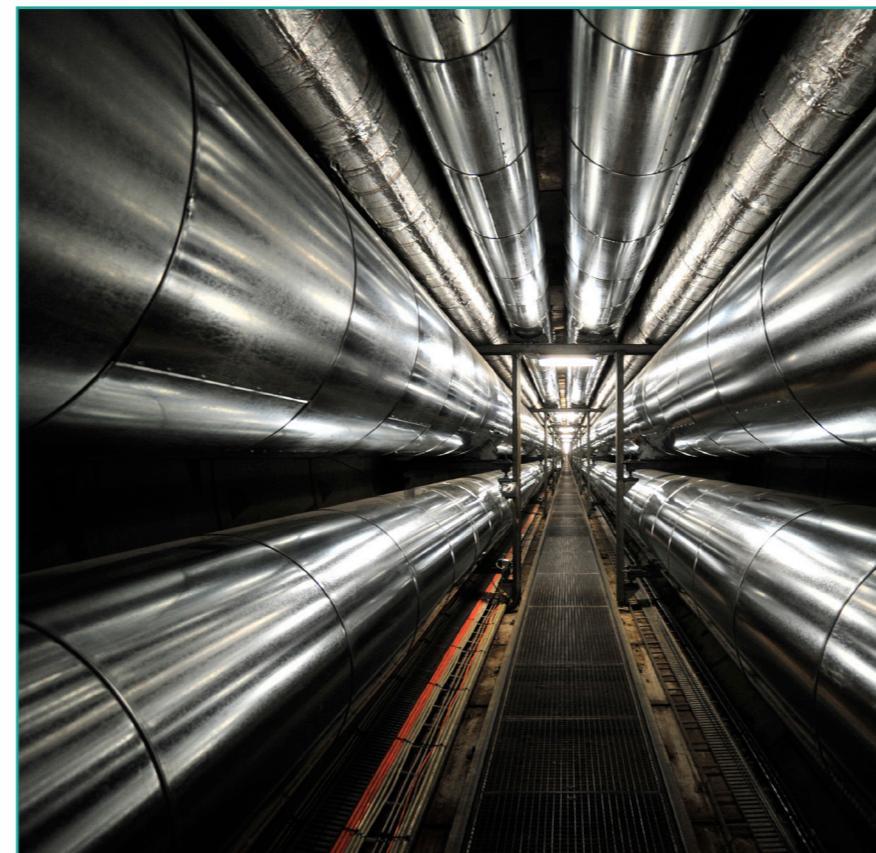
**To prioritise the delivery of high quality services, utilities infrastructure, and sustainable urban surface water drainage.**

**To pioneer the development of energy networks at the Clonburris and Kishoge urban centres, and explore potential for other low carbon energy opportunities at Clonburris.**



### 2.9.1 Introduction

This framework sets out the key provisions for services, infrastructure and low carbon energy opportunities at Clonburris. A range of on-site and off-site requirements and interventions are identified, to support the delivery and phased implementation of the Planning Scheme. The design and distribution of the proposed services, infrastructure and energy technologies reflect the land use mix and density, built form, street hierarchy and public space layout. Given the significance of the services and infrastructure to the development of Clonburris, early provision of strategic elements will be sought, which will cross cut different Development Areas, streets and spaces. As the SDZ advances into the future, the proposed services and infrastructure will connect into this strategic system on a neighbourhood, street and block basis. The energy opportunities at Clonburris are broad ranging and reflect a strategic approach to addressing climate change mitigation at the local level, with the ultimate aim of reducing energy costs and lowering greenhouse gas emissions.



## Key Principles

The infrastructure, services and energy framework is based on a number of key principles:

- » To set out a comprehensive evidence based approach to services, infrastructure and energy requirements and opportunities at Clonburris;
- » To ensure that infrastructure and services optimise connection to existing on site water main, foul and surface water pipe networks and resources;
- » To co-ordinate the delivery of infrastructure into key routes and corridors and the sharing of trenches to common infrastructure, to optimise road space, and to minimise potential impacts on the public realm arising from ongoing maintenance works;
- » To mitigate the risk of flooding by integrating a comprehensive and high quality Sustainable Urban Drainage System (SUD) into the design of new developments and maximising opportunities to incorporate rainwater attenuation measures into public realm, parks and open spaces;
- » To promote demand management and sustainable supply systems for all services;
- » To progress a range of low carbon and renewable energy opportunities at Clonburris and demonstrate leadership in their development and realisation, from strategic site options to individual block level technologies, in accordance with the recommendations of the Clonburris Energy Masterplan;
- » To enable connection and high quality use of telecommunications infrastructure by a range of parties, promoting Clonburris as a connected place;
- » To provide for gas infrastructure requirements in partnership with energy providers and other stakeholders;
- » To maximise best practice for waste minimisation, reuse and recycling during demolition, excavation, construction and occupation of development; and
- » To explore the use of pneumatic waste collection system for new developments, in particular higher density development areas at Clonburris and Kishoge.

### 2.9.2 Water Supply

The Water Services Strategic Plan (WSSP) by Irish Water sets out the strategic objectives for the delivery of water services in Ireland up to 2040. SDCC is charged with managing and maintaining aspects of water supply and foul drainage networks at the local level, through a Service Level Agreement with Irish Water.

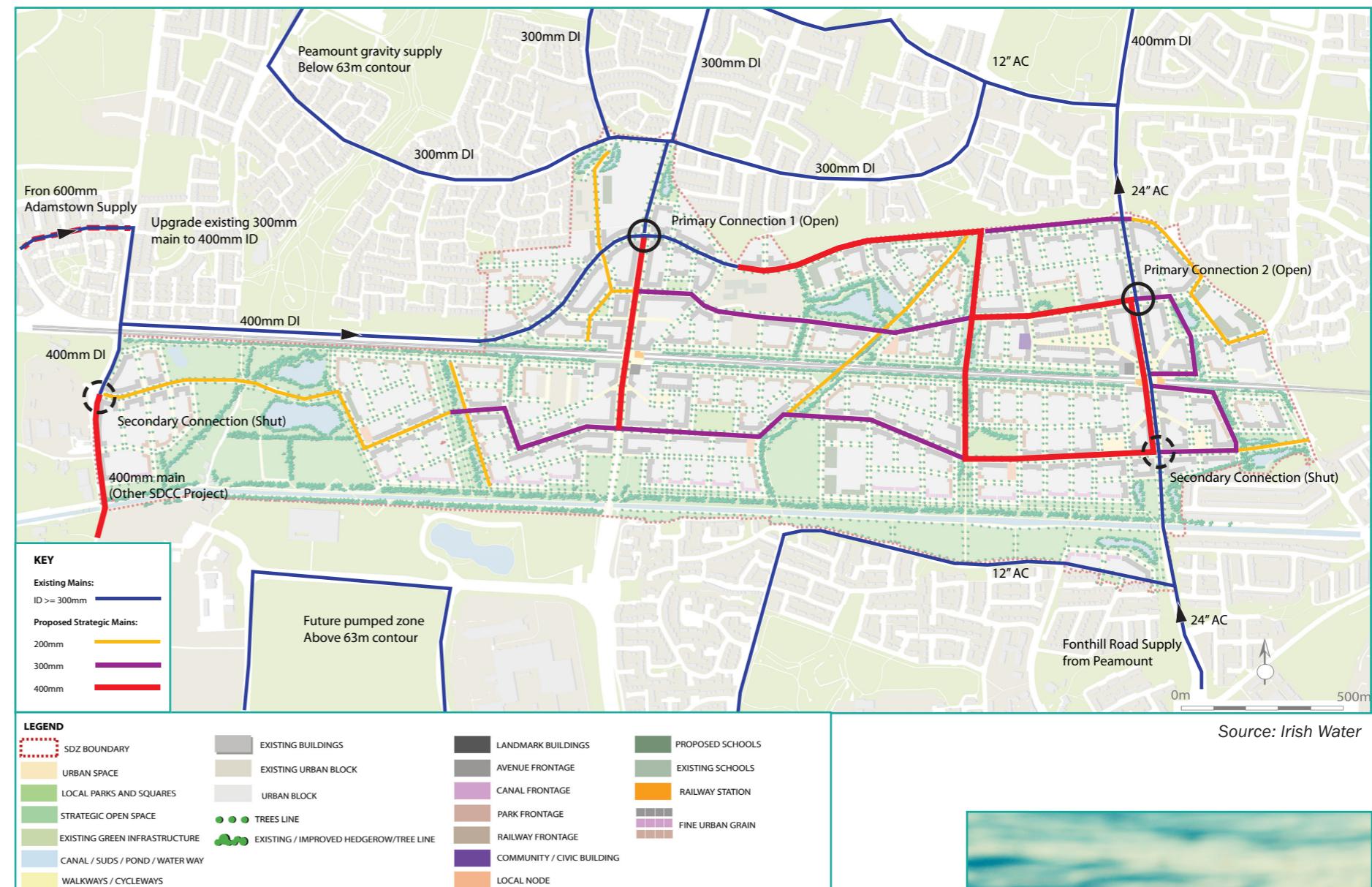
With regard to existing watermain infrastructure on the SDZ lands, there is a 400mm watermain that runs along Adamstown Avenue which turns north and runs along the Grange Castle Road. A 600mm watermain runs the length of the Fonthill Road through the entire SDZ lands. A 100mm watermain traverses the central portion of the SDZ lands from north-east to south-west servicing Kishoge Community College, Traveller accommodation and other private residences on the SDZ lands. A 100mm watermain serves Lucan East Educate Together National School to the north of the site and a 160mm watermain serves the northern section of Hayden's Lane, located adjacent to the western boundary of the SDZ lands.

Irish Water confirms that there is generally sufficient capacity in the public water services networks in the vicinity of the SDZ site to connect developer provided water services infrastructure serving the SDZ lands to the Irish Water networks (subject to the signing of a connection agreement with Irish Water). The projected population of Clonburris SDZ has been taken into account in Irish Water's long term planning for water services capacity in the Greater Dublin Area. A number of major infrastructure projects are being progressed to provide long term capacity to service projected demand into the future through Irish Water's multi annual Investment Programmes.

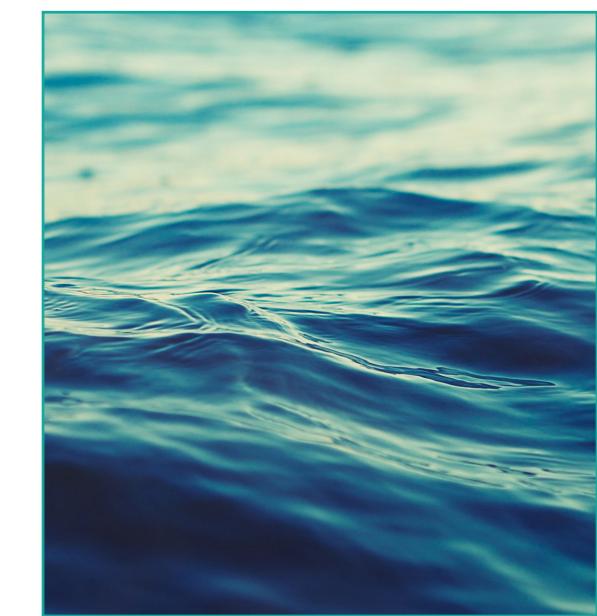
Water infrastructure development within the SDZ must align with Irish Water's Strategic Network Development Plans for the SDZ (refer to Figure 2.9.1 Indicative Strategic Water Development Plans). Note that these are subject to change based on finalisation of proposed finished ground levels etc). Prior to the commencement of any development within the SDZ, landowners/developers shall prepare detailed water services plans for the SDZ and agree these plans with Irish Water and SDCC. Such plans must align with Irish Water's Strategic Network Development Plans. Such plans must also comply with Irish Water standard details and codes of practice. Connection of infrastructure to a public water services network is subject to a connection agreement with Irish Water.

Connection of infrastructure to a public water services network is subject to a connection agreement with Irish Water.

**Figure 2.9.1** | Clonburris SDZ Indicative Strategic Network Development Plan – Water Network



In demand management terms, district water monitoring will be promoted per 750 residential units. Furthermore, the specification of water efficient appliances is promoted and shall be identified as part of Demand Management Plans submitted as part of planning applications at Clonburris. The use of greywater as a non-potable water supply in domestic situations, although not a mandatory requirement, is promoted as best practice in non-residential uses. This shall also be a requirement for all non-potable water consumption, particularly in commercial units. All non-residential proposals shall provide a method statement for the on-site storage, use and management of grey water. With regard to hydraulic pressure, buildings of three storeys and higher will be required to provide balancing tanks and booster pumps as part of planning applications.



### 2.9.3 Foul Water Drainage

Wastewater generated from the Planning Scheme will drain to the Ringsend Waste Water Treatment Plant. The Greater Dublin Strategic Drainage Study (GDSDS) sets out the need for upgrading of both the Ringsend Wastewater Treatment Plant and the Grand Canal Trunk Sewer and all associated works to increase drainage capacity throughout the Dublin Region.

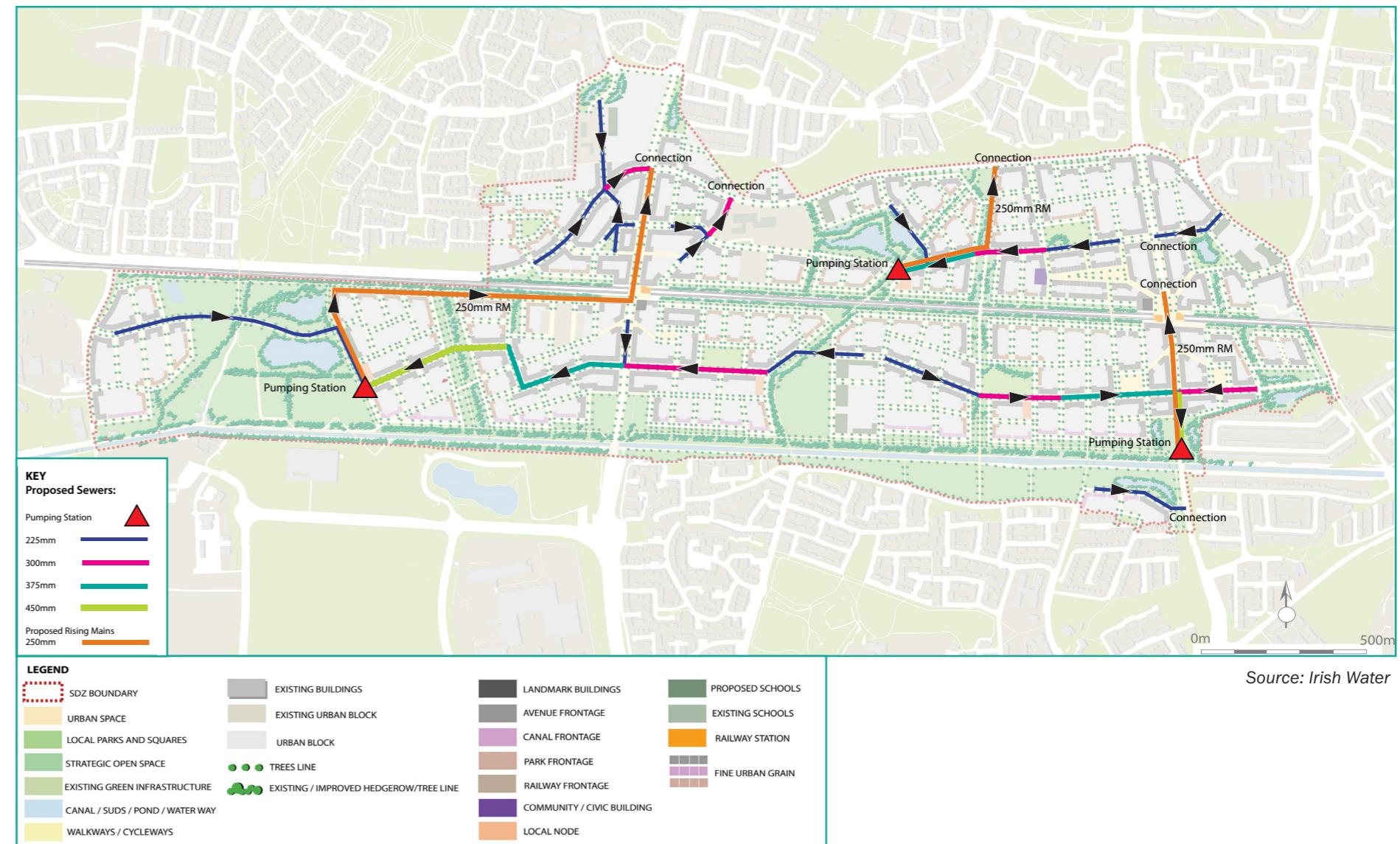
With regard to existing wastewater infrastructure on the SDZ lands, there are twin pumped rising mains (350mm and 500mm) flowing from west to east along Adamstown Avenue. The rising mains outfall into a 900mm gravity sewer to the north of the Plan area. A foul sewer ranging from 7500mm to 900mm runs in a west – east direction along the length of Thomas Omer Way to the Fonthill Road. There is also a 1050mm sewer (9B sewer) running southwards along the Fonthill Road and drains eastwards under the Lucan – Newlands Road.

There is an existing network of three 600mm foul sewers located to the south of the Grand Canal, running along the south east boundary of the SDZ site. Two of the three sewers ultimately drain into the third 600mm sewer, which flows southward into a 750 mm sewer adjacent to the Fonthill Road. One of the existing 600mm sewers flows from a set of twin rising mains that originate from a pumping station at Grange Castle Business Park.

Wastewater infrastructure development within the SDZ must align with Irish Water's Strategic Network Development Plans for the SDZ (refer to Figure 2.9.2 Indicative Strategic Wastewater Development Plans. Note that these are subject to change based on finalisation of proposed finished ground levels etc). Prior to the commencement of any development within the SDZ, landowners/developers shall prepare detailed wastewater services plans for the SDZ and agree these plans with Irish Water and SDCC. Such plans must align with Irish Water's Strategic Network Development Plans. Such plans must also comply with Irish Water standard details and codes of practice. Connection of infrastructure to a public wastewater services network is subject to a connection agreement with Irish Water.

**A Strategic Flood Risk Assessment has been prepared for the Planning Scheme in accordance with the Planning System and Flood Risk Management Guidelines.**

**Figure 2.9.2 |** Clonburris SDZ Indicative Strategic Network Development Plan – Wastewater Network



### 2.9.4 Strategic Flood Risk Assessment

A Strategic Flood Risk Assessment (SFRA) has been prepared for the Planning Scheme in accordance with the Planning System and Flood Risk Management Guidelines (OPW/DoEHLG, 2009). A strategic approach to the management of flood risk is important in Clonburris as it is primarily a greenfield development site, without any existing development in Flood Zone A/B. The SDZ represents a clear opportunity to integrate the Guidelines at an early stage in the statutory process. The SFRA concludes that there is no overlap between vulnerable land uses within the Planning Scheme and Flood Zone A or B. The SFRA also concludes that there is also no existing development that is at potential risk of flooding.

### 2.9.5 Surface Water Drainage and Sustainable Urban Drainage System (SUDS)

SDCC is committed to surface water management, aquifer protection and flood risk management at Clonburris. To inform a robust and evidence based approach to surface water drainage and flood risk management, a Surface Water Strategy (SWS) has been carried out and forms part of the accompanying documents to the Planning Scheme. The Office of Public Works (OPW) has overall responsibility for flood risk management in Ireland and have undertaken the Eastern Catchment Flood Risk Assessment and Management (CFRAM) study, which has informed the SWS. The Strategy also requires adequate levels of treatment of the surface water prior to discharge into local watercourses.

The SWS for the Clonburris SDZ prioritises the sustainable management of surface water, to ensure that there is no unacceptable residual risk of flooding to each development site, mitigating against increased flood risk up or downstream from each development site, and to manage the amount of surface water entering the local piped sewer system and watercourses, including the Griffeen and Camac Rivers.

The key principles of surface water management as outlined in SWS are set out as follows:

- » Manage surface water runoff at source in order to prevent or reduce surface water flows;
- » Manage water on the surface to intercept flows and direct them to areas designed to treat, store and discharge flows away from residential dwellings, businesses and transportation networks, where disruption and flooding could occur;
- » Develop a high quality Sustainable Urban Drainage System (SUDS) integrated within public realm and public open space where feasible, to provide high quality and attractive 'green and blue' corridors, features and focal points with the SDZ landscape, which can also enhance local amenity, ecology and biodiversity;
- » Effective operation and maintenance of SUDS measures, to ensure that such systems are operating to their designed capacity; and
- » Account for climate change and any changes to the amount of impermeable areas over the design life of the development, in accordance with the (GDSDS) (and any future updates to this Study).

#### **Character of the SUDS System**

It is an objective of this Planning Scheme to ensure that SUDS measures should be fully implemented on all sites to achieve two litre per second per hectare runoff rates, unless otherwise agreed with SDCC. The SDZ provides a range of opportunities for high quality designed SUDS measures, in areas of public realm and open space, and measures within individual development sites.

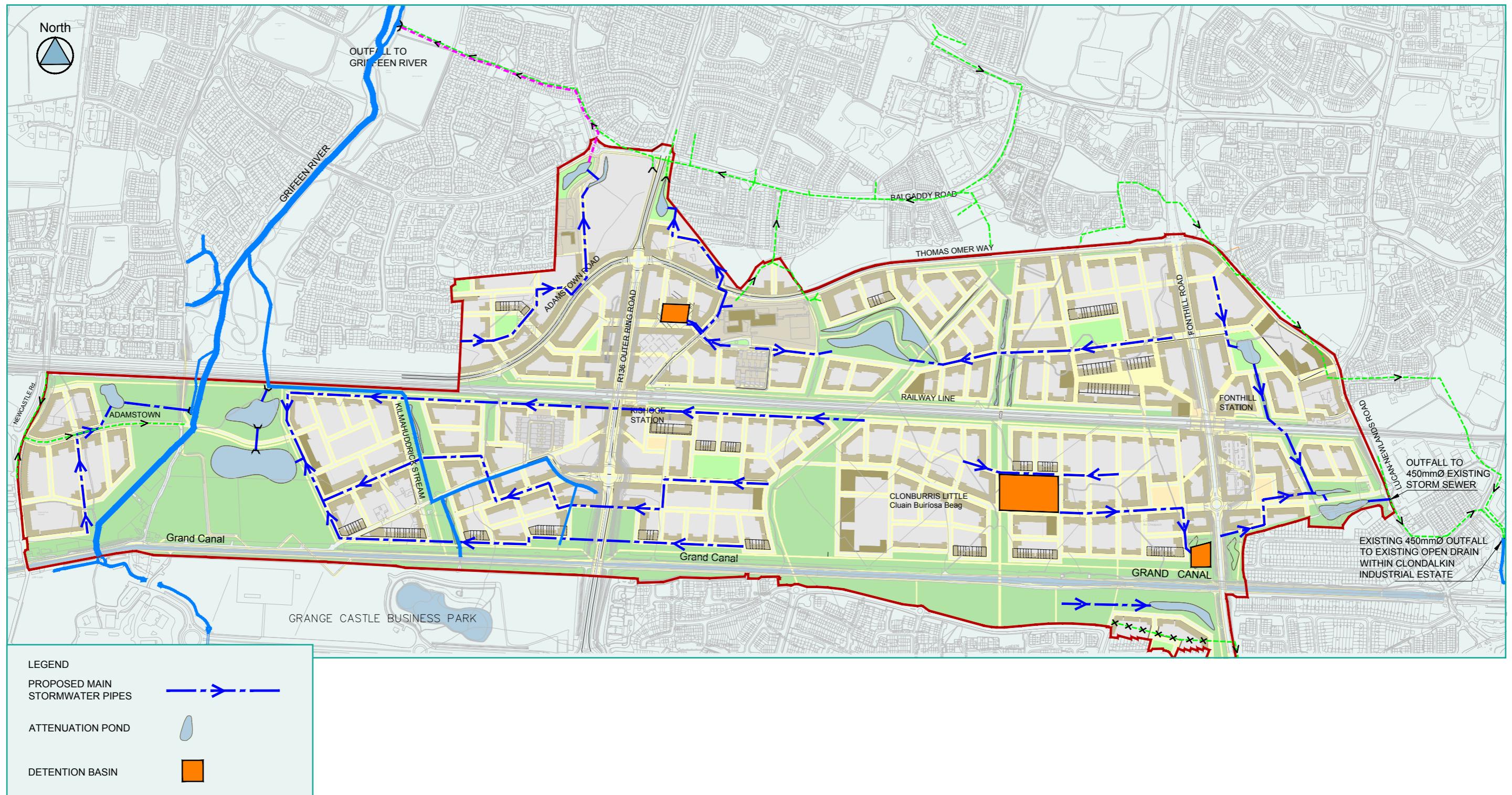
Measures in public realm and open space areas could include, for example, ponds/wetlands, detention basins, infiltration basins and filter strips. Ponds could be integrated as amenity and ecology features within parks and open spaces and be utilised as a local amenity within the overall SDZ scheme, as well as providing the additional volumetric storage required during extreme rainfall occurrences (i.e. 1 in 100 year storm events). The type, design and exact location for the pond attenuation areas is required to be agreed at detailed design stage.

In general terms, the attenuation areas should be designed to be integral elements of any related open space and landscape structure. The perimeter of the attenuation areas should be profiled to enable walkways, high quality planting, amenity edges, and habitat establishment, in addition to the necessary surface water management.

Having regard to individual development sites, surface water runoff should pass through at least one level of treatment using a SUDS component prior to treatment and attenuation in public realm and open space areas. Roof water runoff should be captured and treated within the curtilage of each site, for example through use of Blue and/or Green Roofs. Such measures should be prioritised for larger/mixed use developments within the Kishoge and Clonburris urban centres. Other measures within individual development sites could include, for example, pervious paving, swales and on-site rainwater harvesting measures.



Figure 2.9.3 | Surface Water Drainage and Sustainable Urban Drainage System



The use of underground tanking systems are generally not permitted within the SDZ.

A detailed Surface Water Management Plan (SWMP) is required to be prepared by the landowners/developers and agreed with SDCC in advance of any development on the SDZ lands. This is required to be prepared in accordance with the Surface Water Strategy, in order to achieve strategic surface water management objectives and ensure a high quality and viable Sustainable Urban Drainage System for the entire SDZ lands.

All SUDS proposals within the SDZ should comply with the SUDS Manual C753. A Surface Water Audit should also be submitted with each application for development within the SDZ, detailing measures to be carried out at both construction and operation stages of all development proposals.

### 2.9.6 Gas

The SDZ lands can be serviced by existing high pressure transmission gas pipes that run in a north – south direction adjacent to the Fonthill Road and the Grange Castle Road. Future provision for infrastructure requirements for gas supply will be made in consultation with relevant energy providers and other stakeholders.



### 2.9.7 Telecommunications Infrastructure

The provision of IT, broadband internet and high speed telecommunications infrastructure to the SDZ area as a whole will enable activities such as education uses, community facilities, home office working and commercial business to prosper.

To enable these opportunities, it is proposed to develop a data infrastructure spine comprising a network of fibre optic and broadband capacity cables routed in accordance with the primary and secondary street hierarchy structure. All buildings in the district shall be connected to the data spine. Each dwelling shall be provided with at least two telecom ducts and shall be serviced by carrier neutral multi-duct infrastructure having regard to relevant guidance from the Department of Communications, Climate Action and Environment.

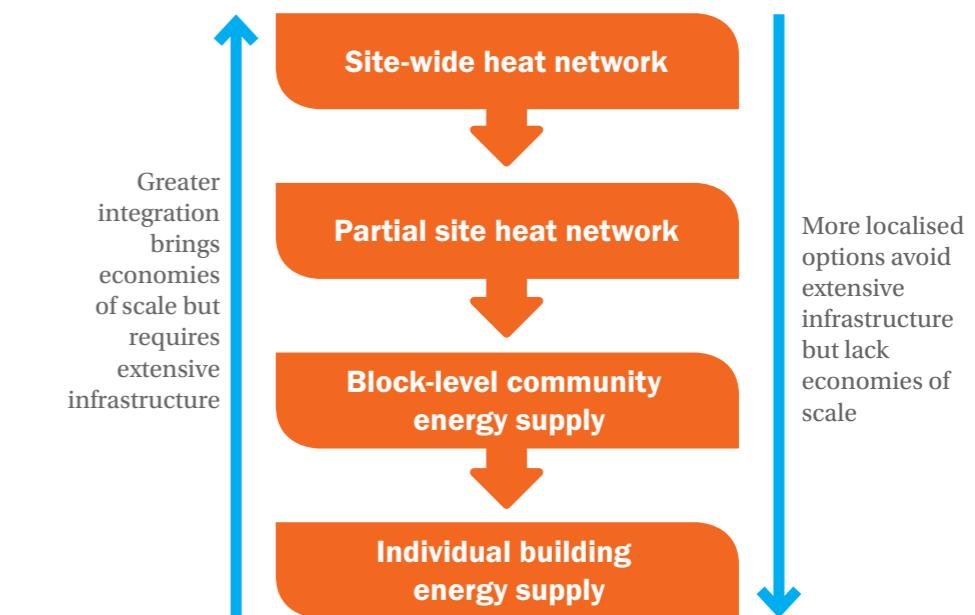
It is proposed to locate the services infrastructure with the proposed street hierarchy structure. The ducting of all services should be located to the appropriate depth standards, and not preclude the opportunity of street tree planting and location of street furniture.

Every opportunity should be taken to identify occasions when sharing of road space may be appropriate. This will include initiatives such as trench sharing. Trench sharing can be effective in reducing disruption from ongoing maintenance and street works, and optimise available space for services. Care should be taken to ensure that the balance is achieved between reducing the number of occasions that small works take place and increasing the scale of combined works.

### 2.9.8 Energy and Climate Change Mitigation

The Clonburris SDZ offers potential for the development of a sustainable energy community into the future, and the Clonburris Energy Masterplan represents a strategic first step in the development of a co-ordinated energy response for the area in the medium to long term. The key focus of the Clonburris Energy Masterplan, which has been prepared to support the Planning Scheme, is to appraise a range of options – including energy efficiency, heating, cooling and electricity. The energy options available at Clonburris vary from 'kick start' local networks or district energy schemes, to more localised, block and individual building level opportunities (see Figure 2.9.4). Viability and economic analysis of a range of options are included in the Energy Masterplan, which can be read in conjunction with this Planning Scheme.

**Figure 2.9.4 |** Energy Options at Clonburris SDZ

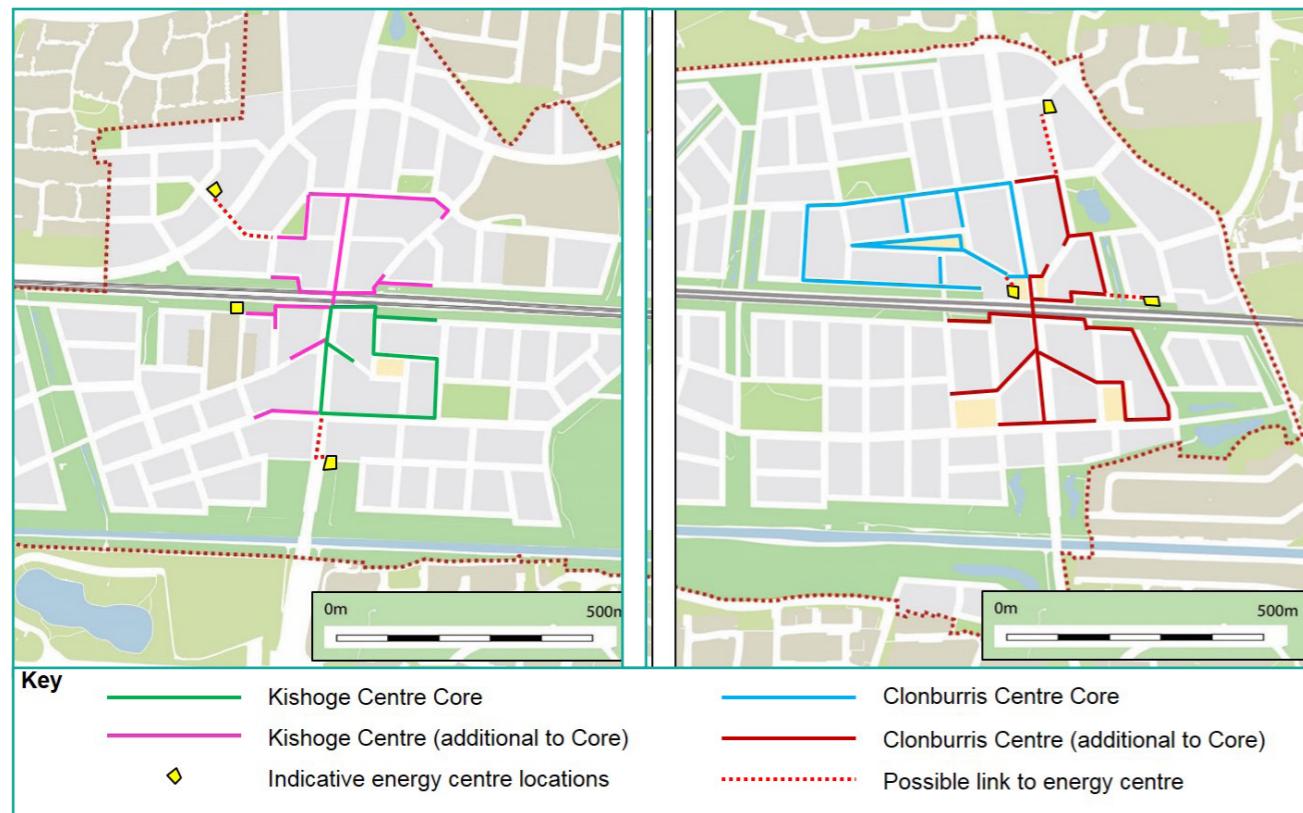


### Energy Efficiency in New Buildings

The design, construction and operation of new buildings has a significant contribution to make in reducing energy demand and increasing energy efficiency of all new buildings in the future. The energy efficiency and renewable energy requirements for the construction of new homes and non-residential buildings are primarily addressed in the current Building Regulations Part L (2008 and 2011). With regard to new homes, the Building Regulations prescribe requirements with regard to thermal performance, overall energy use and CO<sub>2</sub> emissions. The regulations also require that a reasonable proportion of the energy consumption to meet the energy performance of a dwelling is provided by renewable energy sources.

It is anticipated that by 2020 all new buildings in Clonburris will be required to be constructed to the Nearly Zero Energy Buildings (NZEB) standard, in accordance with the EU Energy Performance in Buildings Directive (EPBD). This standard will ensure that new buildings are constructed to a high level of thermal efficiency, with a significant contribution of renewable energy on site. Development proposals at Clonburris should have regard to the *Towards nearly Zero Energy Buildings in Ireland – Planning for 2020 and Beyond*, (DECLG), which promotes the increase of near Zero Energy Buildings in Ireland.

**Figure 2.9.5** | Potential heat energy hubs at Clonburris



The Clonburris Energy Masterplan explores different options with regard to meeting the NZEB standard at Clonburris into the future. Within the core areas of the Clonburris and Kishoge urban centres, local energy networks based on Gas Combined Heat and Power (CHP) are potentially viable to both the investor and home owner, when compared to an individual gas boiler scenario. Other options such as Water Source Heat Pumps (WSHP) and Biomass could be viable in the future, with the introduction of a sustained national Renewable Heat Incentive (RHI). Away from the urban centres and for lower density residential areas, the introduction of a Renewable Heat Incentive (RHI) in the future, could make air source heat pumps and ground source heat pumps more attractive in comparison to individual gas boiler options.

#### Heat Networks

A key factor determining the viability of a heat network at Clonburris, is the heat demand density across the area covered by the network. Heat demand density, measured in gigawatt hours per square kilometre (GWh/km<sup>2</sup>), is the amount of thermal energy used within a defined area and is an accepted European indicator for the economic viability of district heating schemes. The density and development mix at the Clonburris and Kishoge urban centres, allows potential for local heat networks to emerge at these centres. The indicative location of the energy hubs is shown in Figure 2.9.5.

The modelling carried out as part of the Clonburris Energy Masterplan demonstrates that the core areas of the Clonburris and Kishoge urban centres would have an expected heat density of 55 GWh/km<sup>2</sup> and 46 GWh/km<sup>2</sup> respectively.

Given the residential density, variety and mix of land uses at these urban centre core locations, the economic viability of a heat network could be favourable, initially based on Gas CHP. In this case, the high future lifetime costs associated with an individual gas boiler alternative for higher density residential development at the hubs, is due in part to the high thermal efficiency expected in new buildings built to the NZEB standard.

An Energy Centre is required at the Clonburris and Kishoge urban centres to accommodate infrastructure associated with the local heat network, such as a Gas or Biomass based CHP plant. Overall, the dimensions of the Energy Centre are driven by the need to provide additional boiler peaking plant, thermal storage, pumps and other equipment, and access. In broad terms, a typical footprint for the plant room for a scheme with a 2 MW peak demand would be approximately 300 sq.m, and for a scheme with a 13 MW peak demand the required size would be approximately 500 sq.m. There is a level of flexibility with regard to the location of the Energy Centres at the Clonburris and Kishoge urban centres, for example provision as individual stand-alone buildings, as part of larger blocks or at basement level.

All major developments within the Clonburris and Kishoge urban centres should be designed to be able to connect to a local heat network in the future. This means that such developments have the ability to be connected to a network if/when such a network becomes available in the future, rather than necessarily determining connection at the time of construction. SDCC will support the development of decentralised energy networks at Clonburris in principle, subject to meeting wider policy requirements, including design.

There are a range of delivery models and financing structures that could be used to unlock the investment required for the local heat networks at Clonburris. The development level expected at the Clonburris and Kishoge urban centres suggests that the heat network scheme could be attractive to a private sector investor, for example an energy service company (ESCO) or utility (or consortium) may undertake to design, build, finance and operate the heat network. In this case, the Development Agency could co-ordinate the partnership of all relevant stakeholders involved. Alternatively, SDCC as the Development Agency, could act to source project finance or even participate in a joint venture with an ESCO or consortium to deliver the project. It may be possible to obtain funding from wider sources; such as the European Regional Development Fund (ERDF).





**No new development shall occur within the existing overhead powerline easement area until such time as the undergrounding of the powerlines has occurred.**



### **Electricity Infrastructure**

At present, a 70 metre corridor of land within the SDZ area is sterilised from development by the presence of 220Kv overhead powerlines, spanning between pylons at approximately 200 metre intervals, along a stretch of the north and north western portions of the site. Planning permission has been granted for the removal of a section of the existing 220Kv overhead powerlines from the Grange Castle Road extending westwards beyond the site boundary (a length of approximately three kilometres). The permission provides for the undergrounding of replacement electricity infrastructure along local roads serving the area and adjoining lands, including Grange Castle Business Park. The removal of the powerlines enhances development opportunities along the north-western boundary of the SDZ lands. No development shall be carried out within the 70 metre corridor until such time as the undergrounding of the overhead powerlines has been carried out.

Having regard to the portion of the SDZ lands to the east of the Grange Castle Road, where planning permission has not currently been granted for the undergrounding of the existing 220Kv overhead powerlines, the Planning Scheme has been designed to assume the future undergrounding of these overhead powerlines.

Until such time as the undergrounding of the overhead powerlines to the east of the Grange Castle Road has been permitted and has taken place, all buildings, other than temporary buildings (such as site compounds) shall not be constructed within 30 metres either side of the 220Kv powerlines that traverse the SDZ lands. No new development shall occur within the existing overhead powerline easement area until such time as the undergrounding of the powerlines has occurred. Provision for electricity infrastructure will be made in consultation with ESB Networks, SDCC and other stakeholders.

### **2.9.9 Waste Management and Recycling Facilities**

The development and occupation of the new community at Clonburris will result in significant quantities of waste. Accordingly, waste reduction and recycling needs to be fully considered and implemented in the design construction, and operational phases of the Planning Scheme. The design phase is a critical stage where waste can be designed out of proposed new developments, as well as on site processes. The recycling of waste shall be encouraged in accordance with the *Eastern Midlands Region Waste Management Plan 2015-2021 (EMRWMP)*. With regard to new development at Clonburris, layouts should be designed to incorporate refuse collection points, bring centres and make provision for recycling and composting when required, at suitable locations.

The following criteria will be considered in the assessment of the design and siting of waste facilities and bring facilities:

- » The location and design of any refuse storage or recycling facility should ensure that it is easily accessible both for residents and/or public and for bin collection, be insect and vermin proofed, will not present an odour problem, and will not significantly detract from the residential amenities of adjacent property or future occupants,
- » Provision for the storage and collection of waste materials shall be in accordance with the guidelines for waste storage facilities in the relevant RWMP and the design considerations contained in Section 4.8 and 4.9 of the DECLG Design Standards for New Apartments (2015). Refuse storage for houses should be externally located, concealed/covered and adequate to cater for the size and number of bins normally allocated to a household. For terraced houses the most appropriate area for bins to be stored is to the front of the house, which should be located in well-designed enclosures that do not to detract from visual amenity, and

- » Access to private waste storage in residential schemes should be restricted to residents only.

To facilitate a high level of recycling within the Clonburris lands, a network of facilities are required for recycling. Bring bank facilities will generally be required at appropriate locations in the following developments:

- » In conjunction with large scale residential and mixed use developments, proposals should provide recycling facilities to serve residents and in some appropriate locations, the wider community.
- » In conjunction with significant new commercial developments.

Given the development at higher densities in certain parts of the site, in particular at the Clonburris and Kishoge urban centres, there is potential for innovative solutions to waste disposal and collection systems, such as pneumatic waste collection systems. These waste systems use vacuum technology to take waste and recyclable materials to a centralised storage point. Pneumatic waste systems also minimise the need for waste bins and maximise the potential for recycling by residents, businesses and other premises, whilst also increasing the general attractiveness of the street environment. The provision of pneumatic waste collection systems are encouraged at the Clonburris and Kishoge urban centres.

## 2.9.10 Topography

Development on the SDZ lands will need to respond to level differences at certain locations due to local topography and the current road infrastructure. As per Section 2.8.3, gradients on all Link Streets and Local Streets should be as gradual as possible with a gradient of between 1 in 33 (or 3%) and 1 in 20 (or 5%) targeted. The raising of floor levels to correspond with finished street levels, utilising car parking, plant services or storage etc and the engineering requirements to raise the level of strategic services to implement the Surface Water Strategy (and subsequent Surface Water Management Plan), need to be clearly demonstrated by relevant planning applications. At locations where level differences need to be addressed, planning applications are required to submit detailed topographical information, drawings and cross sections and detail street, floor and service levels.

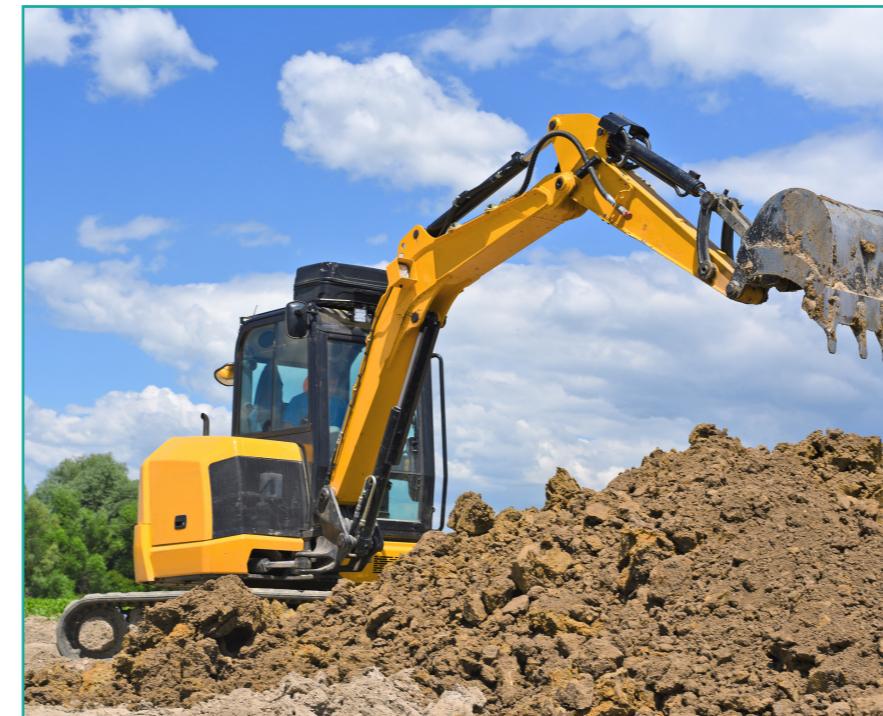
## 2.9.11 Aerodromes

The majority of the SDZ lands are located within the Inner Horizontal Surface of Casement Aerodrome and an eastern portion of the lands are located within the Outer Approach Area to the Aerodrome. Casement Aerodrome, being a military aerodrome, does not fall under the control of the Irish Aviation Authority, but the International Civil Aviation Organization Standards and Recommended Practices are applied as policy by the Department of Defence at Casement Aerodrome.

A large portion of the lands are located within the Dublin Airport Outer Safeguarding Boundary. All relevant applications for development within the Outer Safeguarding Boundary will be referred to the Dublin Airport licensee.

## 2.9.12 Noise

Development proposals at Clonburris shall have regard to the *Dublin Agglomeration Environmental Noise Action Plan 2013-2018*, with particular regard to development adjacent to major road and rail transport corridors, with a view to reducing noise from new sources and to identify and protect areas of low sound levels. Development proposals with the potential to give rise to significant noise impacts may require a Noise Impact Assessment and mitigation plan to minimise noise disturbances and protect the amenities of the area.



## 2.9.13 Construction Environmental Management Plans

A Construction Environmental Management Plan (CEMP) shall be prepared in advance of the physical elements proposed as part of the Planning Scheme and will be implemented throughout. Such plans shall incorporate relevant mitigation measures indicated below.

SDCC will be informed in advance of construction activities in sensitive environmental areas.

SDCC will be informed of all construction or maintenance works located within the vicinity of pNHAs (Grand Canal) or in the vicinity of watercourses linked to these designated conservation areas. Monitoring of works in these locations will be undertaken and the results of monitoring will be provided to SDCC.

Where works are undertaken in/adjacent to sensitive environmental receptors all construction/maintenance staff will be inducted by means of a “Tool-box Talk” which will inform them of environmental sensitivities and the best practice to be implemented to avoid disturbance to these receptors.

All construction and maintenance works will be undertaken in accordance with the following guidance documents:

- » Inland Fisheries Ireland’s Requirements for the Protection of Fisheries Habitat during Construction and Development Works.
- » CIRIA (Construction Industry Research and Information Association) Guidance Documents.

- » Control of water pollution from construction sites (C532).
- » Control of water pollution from linear construction projects: Technical Guidance (C648).
- » Control of water pollution from linear construction projects: Site Guide (C649).
- » Environmental Good Practice on Site (C692).
- » NRA Guidance Documents.
- » Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.
- » Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads.
- » Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, during and Post Construction of National Road Schemes.

Any excavations and/or vegetation removal shall be minimised during construction and/or maintenance works.

Excavated material will not be stored immediately adjacent to watercourses.

Disturbance to natural drainage features should be avoided during the construction and/or maintenance of routes.

Construction machinery should be restricted to public and or site roads. As a general rule machinery should not be allowed to access, park or travel over areas outside the footprint of proposed walking/cycling routes.

During route maintenance no construction activities should be undertaken at watercourse crossing in wet weather conditions.

Suitable prevention measures should be put in place at all times to prevent the release of sediment to drainage waters associated with construction areas and migration to adjacent watercourses, to reduce erosion and silt-laden runoff, create, where possible, natural vegetation buffers and divert runoff from exposed areas, control the volume and velocity of runoff, and convey that runoff away from.

Where necessary drainage waters from construction areas should be managed through a series of treatment stages that may include swales, check dams and detention ponds along with other pollution control measures such as silt fences and silt mats.

Where vegetation removal associated with treelines, hedgerows, individual mature trees, scrub or woodland is required, this shall only be undertaken outside the breeding bird season, between March and August inclusive.

Where extensive areas of ground are to be exposed during route construction or maintenance dust suppression should be undertaken during periods of dry weather.

All chemical substances required during construction and/or maintenance works will be stored in sealed containers.

Any refuelling or lubrication of machinery will not be undertaken within 50m of a watercourse

Spill kits will be required on site during construction and/or maintenance works.

Ensure non-native, invasive species do not occur at construction/maintenance areas, or if occurring, are not spread as a result of works. The NRA Guidance on invasive species, outlined above will be adhered to as well as the Invasive Species Management and Control Plan (See Section 2.11 of the Planning Scheme).

Disseminate information on sensitive ecological receptors, such as sensitive habitats, breeding birds etc. occurring adjacent to or in the wider area. This information will aim to educate recreational users on the conservation status and sensitivities of such receptors to encourage responsible usage of routes.

CEMPs typically provide details of intended construction practice for the proposed development, including:

- » location of the sites and materials compound(s) including area(s) identified for the storage of construction refuse.
- » location of areas for construction site offices and staff facilities.
- » details of site security fencing and hoardings.
- » details of on-site car parking facilities for site workers during the course of construction.
- » details of the timing and routing of construction traffic to and from the construction site and associated directional signage.
- » measures to obviate queuing of construction traffic on the adjoining road network.
- » measures to prevent the spillage or deposit of clay, rubble or other debris.
- » alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public right of way during the course of site development works.
- » details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels.
- » containment of all construction-related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained; such bunds shall be roofed to exclude rainwater.
- » disposal of construction/demolition waste and details of how it is proposed to manage excavated soil.
- » a water and sediment management plan, providing for means to ensure that surface water runoff is controlled such that no silt or other pollutants enter local water courses or drains.
- » details of a water quality monitoring and sampling plan.
- » if peat is encountered - a peat storage, handling and reinstatement management plan.
- » measures adopted during construction to prevent the spread of invasive species (such as Japanese Knotweed).
- » appointment of an ecological clerk of works at site investigation, preparation and construction phases.