



Gravity

Smart Campus

On Site Utilities Summary

Fast-track to the future, naturally

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Document Control Sheet

Project Name: Gravity Local Development Order

Project Ref: 332310102

Report Title: On Site Utilities Summary

Doc Ref: -

Date: August 2021

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Revision	Date	Description	Prepared	Reviewed	Approved
-		Draft			

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Contents

1	Introduction.....	5
1.1	General	5
2	Fibre.....	7
3	Energy.....	9
4	Gas.....	12
5	Water & Wastewater	13
6	Conclusions.....	15

Appendices

Appendix A Utilities Plan

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1 Introduction

1.1 General

- 1.1.1 This is Gravity Ltd, known as 'Gravity', is the UK's first commercial smart campus, creating a blueprint for a smarter, cleaner future - faster. It will deliver a new era of possibility by supporting companies making a difference socially, economically, and environmentally, driving the UK's transition to a cleaner economy.
- 1.1.2 With its unique scale and immediate availability as a 616-acre enterprise zone, excellent connectivity to national and local infrastructure including Bristol port and airport, and the site is located at the heart of a South West innovation cluster comprising Bristol University's Smart Lab, the Bristol Robotics Lab, the National Composites Centre, the Institution of Advanced Automotive Propulsion (IAPPS), creating a centre of excellence in the UK for transport decarbonisation and innovation.
- 1.1.3 Gravity have developed a digital masterplan which is fundamental to raising ambition as well as promoting inclusion, including underpinning new advanced manufacturing facilities, managing logistics and recording environmental information, as well as facilitating opportunities to travel and work at the site through travel app.
- 1.1.4 With dark fibre in place, and working with Cellnex, Gravity can offer digital connectivity as well as an accessible talent pool including four top-tier universities and a high performing college close by to meet workforce needs. With on-site water provision, national scale energy including renewable and low carbon energy infrastructure and energy management solutions, Gravity provides occupiers with the ability to invest, transform and create a new era of green jobs driven by advanced manufacturing, as part of a 4th Industrial Revolution.
- 1.1.5 Gravity establishes the foundations for accelerating and transforming the economy whilst simultaneously cutting greenhouse gas emissions, creating good jobs, integrating low carbon homes and realising positive social outcomes for local communities. Gravity will be a low carbon campus generating approximately 7500 green collar jobs, providing both a strategic economic stimulus to drive economic renewal, shaping and connecting to a green supply chain across the UK. Home to international business, start-ups and SMEs, Gravity will be a home for Clean Growth and green industries, creating the space to innovate and create sustainable solutions from energy solutions to smart homes and new smart mobility choices. Gravity is a UK destination for international occupiers and will drive the delivery of the Sedgemoor, Somerset, and Heart of the South West Local Enterprise economic, climate change, and Local Industrial Strategy: delivering transformational investment opportunities, unlocking connectivity through infrastructure, and bringing new higher value employment and skills opportunities to the South West as a whole.
- 1.1.6 Gravity is being taken forward through a Local Development Order (LDO) which is a route to planning permission. LDOs are a positive planning tool and a marketing tool for the locality and site. They create a more certain planning environment for investors and potential occupiers, and thereby make inward investment more attractive. They embody a fundamental shift on the part of local authorities from waiting for the market to come to them with a proposal, to initiating development by granting permission for the kind of development that they want to come forward on a site. The Gravity LDO is therefore informed by the market to be highly responsive in a national and international context and will help Sedgemoor, Somerset, and the South West region, compete for scarce investment against other national and international competitors.

- 1.1.7 The function of a LDO is to accelerate delivery. They are about adopting a local solution to simplifying planning and provide local authorities with a flexible tool to address particular circumstances. Over 100 LDOs now exist across 80 authorities who wish to be proactive in attracting investment. The Gravity LDO will further demonstrate Sedgemoor District Council's proactive approach to economic development and being 'open for business'. As such, in adopting the Gravity LDO Sedgemoor will add a robust management tool for the EZ, to complement the Development Plan, to achieve corporate, economic, and planning policy objectives to the benefit of the local, regional and national economy providing maximum benefit to the Sedgemoor community.
- 1.1.8 This document gives an overview of the proposed utilities and energy systems on the development.

2 Fibre

- 2.1.1 The Gravity site will benefit from an accessible and available dark fibre network, allowing full flexibility for each plot to connect independently to the fibre system.
- 2.1.2 There is sufficient capacity overall on the site as the site has direct connection into the main fibre network serving the South West of England and benefits from three data centres within the development. WPD Telecoms have recently installed a new Fibre Optic cable route between Bridgwater Bulk Supply Point (BSP) substation and Portishead BSP. This route consists of 96 G652-D Fibres, hence providing sufficient capacity. Two separate interconnect joint locations have also been established at the Gravity site to be able to provide totally diverse connectivity to the site customers. A high performing, high bandwidth, low latency fibre connection is to be provided to site. This will be an integral part of the overall connectivity solution for the site. The points of connection are at the site entrance and the northwest corner of the site.
- 2.1.3 There will be an initial temporary (approximately two years) 5G network on the site, facilitated by three proposed masts, each post being 10m tall lattice tube alloy construction, anchored in concrete footings. This is part of a trial as supported by The West of England Combined Authority (WECA). WECA's 5G Logistics project programme will develop 5G products and services to support operations at Bristol Port and Gravity Smart Campus and demonstrate a smart and dynamic port environment to manage and administer trade. It will demonstrate how 5G private network capabilities can offer efficiency and productivity improvements and offers the potential for such advances in technology to be implemented industry-wide, including at ports, Enterprise Zones or other similar developments.
- 2.1.4 There may be the opportunity to continue the 5G network for longer than the initial period to form a legacy network and this is being actively explored as part of the sustainability plan for the project, though no commitment beyond the trial is currently in place.
- 2.1.5 WPD Telecoms can also provide managed services to the site with a current maximum capacity of 100 Gbit/s ethernet connectivity on a new Infinera Optical platform. In addition to this, Infinera are currently working on developments to provide even higher Ethernet speeds.
- 2.1.6 As a result, Gravity should benefit from 'phenomenal speed' connections. Speeds of 1Gbit/s to 10Gbit/s are hoped to be offered as a minimum standard on the smart campus, as outlined in the Digital Masterplan.
- 2.1.7 Tenants will provide their own switch and accessory to connect into the dark fibre system which can be installed by either Western Power Distribution (WPD), or another provider such as Cellnex.
- 2.1.8 Cellnex will be providing the wireless connectivity across the Gravity site – for both public and private networks, outdoors and indoors location. This will primarily be based around 5G cellular technology, however, will also include smart campus Internet of Things (IoT) applications as well as the ability to provide enterprise grade Wi-Fi and other wireless applications.
- 2.1.9 Cellnex's infrastructure will be designed and built to provide the required service, security, bandwidth, and user experience that will meet and exceed the expectations of a current smart location to ensure that digital connectivity and digital inclusion are at the heart of Gravity. All of this can be provided by the Cellnex infrastructure which will provide a fully managed end-to-end solution.

- 2.1.10 As such, the site will benefit from significant connectivity to the fibre and potentially the 5G network, where there is adequate capacity to support Gravity and allow flexible connections for future plots.

3 Energy

- 3.1.1 The energy strategy supports This Is Gravity's approach to delivering its Clean and Inclusive Growth Strategy. This strategy will contribute towards delivering on the UK's Industrial Strategy's Energy Grand Challenge which focusses on reviewing existing policies, the energy hierarchy and assessing potential predicted energy demand. The challenge also aims to at least halve the energy use of new buildings by 2030. Clean energy delivery should include an energy strategy to provide national scale power infrastructure to enable high energy intensive industries including cyber infrastructure, advanced manufacturing, biosciences, giga factories, digital, Agri-tech and zero emission transport.
- 3.1.2 Somerset County Council (SCC) has referred to the Gravity scheme's energy strategy several times as being a great example of how a new development needs to be delivered and constructed in order to reach SCC's climate change goals which are as follows:
- To decarbonise local authorities, wider public sector and reduce our carbon footprint;
 - To work towards making Somerset carbon neutral by 2030; and
 - Making Somerset prepared for and resilient to the impacts of climate change.
- 3.1.3 As this is a large development that will progress over several years, the Energy Strategy needs to be flexible and able to respond to regulatory changes, market forces and technological advances.
- 3.1.4 The suitability of the various technologies should continue to be reviewed as the detailed design progresses. This is to ensure compatibility with detailed building designs and the mechanical and electricity strategy.
- 3.1.5 This is Gravity's priorities in clean energy include a shift away from fossil fuelled combustion technologies and use of the Enterprise Zone status of the site to provide incubation facilities for innovative energy technologies. These are as outlined in the Digital Masterplan.
- 3.1.6 A broad range of renewable and low carbon energy generation technologies are available that cover potential site wide energy delivery and building integrated opportunities. Integrating these technologies requires consideration of the nature of energy demand (instantaneous demand, daily and monthly variations) in the first instance, prior to selecting a technology. To support these objectives an adequate provision has been made available on the site specifically for energy infrastructure. This is in the form of both 'multi-plot' level and 'building-specific' level energy generation infrastructure, and the E.ON Energy Centre.
- 3.1.7 This is Gravity wishes to provide the option to connect to and deliver large scale energy supply to Gravity to attract international business through the National Grid infrastructure.
- 3.1.8 Gravity will create a low carbon campus, delivering high standards of energy efficiency and generating between 4,000 and 7,500 green collar jobs, providing both a strategic economic stimulus to drive economic renewal, and shaping and connecting to a green supply chain across the UK. Home to international businesses, start-ups and SMEs, Gravity will be a home for clean growth and green industries, creating the space to innovate and create green solutions from energy solutions to smart homes and new smart mobility choices.

- 3.1.9 In order to facilitate the opportunity for developing smart energy infrastructure and utilise the opportunity to capture locally generated offsite renewable energy, space has been made available for energy infrastructure. This is in the form of energy generation infrastructure, and the E.ON energy centre.
- 3.1.10 Solar PV systems could be installed on suitable south facing roofs within Gravity. Frame-mounted systems can be used on flat roofs to optimise performance. Key buildings such as the large-scale advanced manufacturing space, energy centre, offices, car parks and homes could potentially accommodate roof-mounted PV arrays. This would deliver over 100MW of generation providing in excess of 100GWh of energy.
- 3.1.11 The permeability of green spaces throughout Gravity, as well as the selection of layout and building location, will help to facilitate air movement and enhance natural ventilation.
- 3.1.12 Charging hubs will be provided for Gravity service Electric Vehicles, commercial vehicles, residential homes, employees, and visitors.
- 3.1.13 A further opportunity to incorporate low carbon and renewable energy and move towards achieving zero carbon status exists in the establishment of a smart grid associated with the Bridgwater Substation (BSP).
- 3.1.14 The Future Homes Standard is anticipated to come forward by 2025 and aims to “future-proof” new build homes with low carbon heating and high energy efficiency. However, it should be noted a Future Homes Fabric Standard has not yet been set by Government. Targets will be refined in accordance with the emerging National requirements at each stage of the LDO.
- 3.1.15 A series of design principles to increase energy efficiency has been considered through careful design. In accordance with the Energy Hierarchy, Gravity will seek to adopt a “fabric-first” approach to building design (enhancing the performance of the components and materials that make up the building fabric itself, such as improving insulation and reducing cold bridging), before considering the use of mechanical or electrical services systems and renewable/low carbon technologies.
- 3.1.16 This Energy Strategy has identified a number of opportunities for incorporating renewable and low carbon energy generation technologies.
- 3.1.17 A review of the suitability of various renewable and low carbon technologies for the Site has been undertaken, at both a ‘multi-plot’ level and ‘building-specific’ level, to identify a ‘suite’ of technologies that could potentially be deployed at Gravity.
- 3.1.18 A further opportunity to incorporate low carbon and renewable energy exists in the establishment of a smart grid associated with the surrounding renewable energy landscape. This would provide the opportunity to capture and distribute power generated externally from the LDO boundary within the development. A review of near site renewable energy generation has indicated that solar development could potentially be feasible near to the Site and directly connect into the Bridgwater Substation, subject to further investigation and viability appraisal.
- 3.1.19 There is a ‘suite’ of ‘building-specific’ technologies that could potentially be deployed at Gravity. At this stage, the most suitable technologies are anticipated to be photovoltaic solar panels (PV), heat recovery technology, solar water heating systems (or solar thermal) and air source heat pumps.

- 3.1.20 Subject to further investigation, there may be potential for small-scale ground source heating solutions serving individual or small collections of buildings and small/medium scale wind turbines (e.g., in less sensitive areas such as employment zones).
- 3.1.21 The use of on plot generation will be integrated into the wider projects ability to deliver a smart grid. This will be based on using active network management and connecting the energy solutions deployed at Gravity with existing and potential future local renewable energy solar arrays, where appropriate and viable.
- 3.1.22 Compliance with the energy and CO2 targets will be demonstrated through full Standard Assessment Procedure calculations for Building Control at the next detailed LDO compliance stage for each occupier.
- 3.1.23 It is also possible to accommodate battery storage on site to provide greater energy resilience.
- 3.1.24 Additionally, external electrical connections will be provided to the site via a 43 MVA WPD connection within the Gravity Link Road at Bridgwater. A formal offer has been issued by WPD and accepted by 'This is Gravity Ltd'.
- 3.1.25 The existing 132kV overhead electricity cables on the east of the site are proposed to be removed and replaced with 400kV overhead cables on T-pylons.
- 3.1.26 As such, the site has agreed access to adequate energy provision, either on-site or through off-site connections, to support its growth and a broad range of potential occupiers and energy users with significant opportunity to support the objectives to work toward net-zero by 2030. The site will embrace a wide range of emerging technologies through a carefully considered energy masterplan in order to align with the Clean and Inclusive Growth Strategy. The campus will respond to the UK Industrial Strategy's Energy Grand Challenge both within its design, but also through providing a home for industry.
- 3.1.27 The Energy Strategy will be updated at each application for compliance against the LDO. This will be to ensure that the flexibility that this strategy defines is refined towards detailed building design, infrastructure delivery, and onward site management.
- 3.1.28 At each reserved matters stage an energy strategy will be presented which will provide an update to the progression of investments into energy efficiency, smart grid and energy demand of the defined occupants.

4 Gas

- 4.1.1 If required to support any initial users in early phases, ahead of greener forms / on site energy provision being available, gas will be supplied to the site via two existing medium pressure connections with dual service provision. This will provide up to 3000m³ per hour from each service to satisfy the 17 million m³ per year required during the initial construction phases. This will satisfy early phases comfortably, with the possibility of sustaining later phases with small reinforcement works.
- 4.1.2 From late 2024 onwards, a supply of 30 million m³ of gas per year will be required. Should nominally upgrade works be needed, this would involve an additional medium pressure gas main to be installed between the site and a connection point approximately 1450m to the west. These works would be designed and delivered by Wales and West Utilities (WWU).
- 4.1.3 If an additional supply is required, then WWU have confirmed that a connection could be made to an existing intermediate pressure gas main in Bridgwater via Crancombe Lane and Bath Road, a public highway route.
- 4.1.4 In accordance with the Clean and Inclusive Growth Strategy and the vision for Gravity, gas is unlikely to be utilised on the site in the long term. However, should gas be required on the site in the short term, it can be supplied via two existing connections or via small reinforcement works.

5 Water & Wastewater

- 5.1.1 The site water strategy is being managed by Albion Water as a consultant to This is Gravity Ltd. The main focus is to create a sustainable water and wastewater network which is innovative, efficient and cost effective whilst being aesthetically pleasing and environmentally friendly. An objective for the site is for 50% of the water used to be from recycled sources including a combination of treated effluent and SuDS features. Increased abstraction consents requests and additional capacity from Wessex Water will provide the remaining water on site. The site will also utilise SuDS lakes.
- 5.1.2 The site topography is fairly flat, and the existing surface water drains northwards via a rhyme system towards the southern end of the reed beds. The flow then follows a channel northward on the eastern side of these beds before discharging to a small stream (the Acid Ditch) that parallels the southern bank of the Huntspill River. This stream flows westwards before discharging to the River Parrett just to the south of the weir at the end of the Huntspill River.
- 5.1.3 Some consideration has been made with regard to on-plot Sustainable Drainage Systems (SuDS) features. The inclusion of on-plot SuDS will ultimately be determined by future development design for each plot as they come forward. These would provide attenuation to reduce the discharge rate in to the Huntspill River as well as adding climate change resilience and contributing to the wider ecological and placemaking aims.
- 5.1.4 As previously agreed with the Environmental Agency (EA) and Sedgemoor District Council (SDC), the site will discharge freely into the Huntspill River via an alteration to its current outfall. Surface water flows will be directed into the existing reed beds, which are no longer required to treat effluent, before an amended outfall will direct surface water to the existing North Water Outfall into the Huntspill River.
- 5.1.5 Albion Water have proposed a foul water strategy which utilises Vacuum Sewerage Systems. These are a low cost, environmentally friendly solution in which sewage flows from the site via gravity to a collection point in the street. From there, the Flovac vacuum collection system transporting all sewage quickly and efficiently to the treatment plant with no leaks.
- 5.1.6 Foul water sewers are often sized for domestic level flows, and it is therefore important that all flows above a standard are monitored and controlled, and above standard levels these are described as 'Trade Effluent' discharges. These limits may be varied depending on local circumstances, considering the volume and rate of discharge and the size and flow of the receiving sewer network and treatment works.
- 5.1.7 Wastewater would be treated on site rather than discharged to Wessex Water. This is to enable treated effluent to be recycled locally due to the local practicalities and cost of a Wessex Water connection.
- 5.1.8 Site drainage and treated effluent that is not recycled would be channelled through the reed beds. These beds would be refurbished to provide additional water polishing and SuDS/Tide Lock storage. The reed beds would then discharge directly to the Huntspill River rather than to the Acid Ditch as is the current arrangement, but not the preference of the EA going forward.
- 5.1.9 The site currently has two licences which authorise large abstractions from the Huntspill River and King Sedgemoor drain. Current flow calculations indicate an abstraction of up to 423m³/d from the SuDS system. These would likely be consolidated on the Huntspill River with a new abstraction point close to the top of the reed bed system. The water would be used for industrial purposes before being returned to the Huntspill River via the reed beds and following appropriate treatment.

- 5.1.10 The suggested potable water point of connection (POC) is to an existing 250mm diameter Wessex Water trunk main at the site boundary. The on-site distribution network volume available is 1,200m³/d – 2,500m³/d.
- 5.1.11 As such, adequate capacity and provision for water and wastewater will be provided on the site through several methods. The site will benefit from the recycling of grey water and many on-site provisions for water treatment, which both contribute to the clean growth and sustainability credentials of the development.

6 Conclusions

- 6.1.1 This report has confirmed that adequate capacity and connectivity on various utilities networks is available to accommodate the proposed Gravity development.
- 6.1.2 These proposals are all in line with the Clean and Inclusive Growth Strategy and the development will employ many emerging technologies in achieving these objectives. The strategy will contribute towards delivering on the UK's Industrial Strategy's Energy Grand Challenge.
- 6.1.3 The energy strategy on the site aims to reduce the energy requirements by sustainable design and energy efficient buildings. Renewable technologies will be employed on the site to provide users with the required energy provision. A connection to existing electrical WPD infrastructure is proposed to provide any additional electricity needs.
- 6.1.4 A dark fibre and trial 5G networks within the site will allow for flexible connections to future plots and allow users to benefit from fast connection speeds.
- 6.1.5 Gas is not proposed to be utilised in the long term, although may be required during the initial construction phases. Gas connections can be provided via an existing medium pressure gas main which is present to the west of the site. Minimal reinforcement works may also be required but these are deliverable.
- 6.1.6 The water and wastewater strategy aims to minimise the volume of potable water that will be required to be brought to the site by maximising grey water recycling and establishing an on-site water treatment works.

Appendix A Utilities Plan

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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services,
plant or apparatus shown on this drawing is believed to be correct, but no warranty to this
is expressed or implied. Other such plant or apparatus may also be present but not
shown. The Contractor is therefore advised to undertake their own investigation where the
presence of any existing sewers, services, plant or apparatus may affect their operations.

KEY

- EX SWS EXISTING SURFACE WATER SEWER
- EX FWS EXISTING FOUL WATER SEWER
- EX FRS EXISTING FOUL RISING MAIN
- EX FPS EXISTING FOUL PUMPING STATION
- EX PW EXISTING POTABLE WATER MAIN
- EX 400KV EXISTING 400KV OVERHEAD ELECTRICITY CABLE
- EX 132KV EXISTING 132KV OVERHEAD ELECTRICITY CABLE
- EX 33KV EXISTING 33KV OVERHEAD ELECTRICITY CABLE
- EX 11KV EXISTING 11KV OVERHEAD ELECTRICITY CABLE
- EX LV EXISTING LOW VOLTAGE ELECTRICITY CABLE
- EX 11KV EXISTING 11KV UNDERGROUND ELECTRICITY CABLE
- EX 400KV EXISTING 400KV UNDERGROUND ELECTRICITY CABLE
- EX MP EXISTING MEDIUM PRESSURE GAS MAINS
- EX IP EXISTING INTERMEDIATE PRESSURE GAS MAINS
- EX LP EXISTING LOW PRESSURE GAS MAINS
- EX MP EXISTING MEDIUM PRESSURE GAS MAINS
- EX IP EXISTING INTERMEDIATE PRESSURE GAS MAINS
- EX LP EXISTING LOW PRESSURE GAS MAINS
- EX OP EXISTING UNDERGROUND OPENREACH CABLE
- EX OP EXISTING OVERHEAD OPENREACH CABLE
- FIB EXISTING UNDERGROUND FIBRE CABLE
- ABANDONED SERVICE
- SITE BOUNDARY

EW	-	AD	2022.02.08
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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Gravity

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THIS IS GRAVITY

Title

GRAVITY ON SITE

PROPOSED UTILITY PLAN

Project No. 332310102	Scale NTS
Revision -	Drawing No. GVT-STN-GA-XX-DR-U-SK001



