

## Executive Summary

1. The Outline Business Case (OBC) progresses the development of a potential Green Energy Park on the former landfill site at Harewood Whin. The objective of the OBC is to assess the project following HM Treasury Green Book guidance<sup>1</sup>; using the 5-case model to define the scope and preferred way forward for the project.
2. The OBC follows the work undertaken in the Strategic Outline Case (SOC), taking the preferred way forward for a solar first phased approach to delivery and builds the strategic, financial, economic, management and commercial case for this preferred option.
3. A GEP is an appropriate use for a closed landfill, with few viable alternatives; turning a maintenance liability into a source of income for the council. The project has the potential to become a local exemplar for other organisations to replicate. This would accelerate the region and UK's net zero transition, creating opportunities to provide employment in local areas and revenue for local authorities.
4. The first phase of the project would be a small-scale solar installation of up to 1MW to supply on site electricity consumption from the site operator's activity. This phase could be financed and installed by Yorwaste directly and satisfy the requirements of the planning approval to progress the scheme within 3 years.
5. A second phase of up to 5MW could be delivered by the council at a capital cost of £5m to £9m. Over a 25-year period, a rate of return (28%) and cashflow (£4m) are achieved, with a lifetime carbon saving of over 5,000tCO<sub>2e</sub>. This phase would also replace the need for the council to purchase a green energy tariff with Renewable Energy Guarantees of Origin (REGO) for half of its supply, an additional saving of up to £100k/yr.
6. The viability of phase 2 requires a Smart Export Guarantee (SEG) for sale of the generated electricity. Commercial modelling indicates a break-even tariff price of 8p/kWh with a target price of 10.8p/kWh, in line with the historical average.

---

<sup>1</sup> <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-centralgovernment/the-green-book-2020>

7. Further expansion is dependent on findings from the Full Business Case (FBC). Planning approval currently permits a 16.5MW installation. While future phases could achieve significant environmental and social benefits for the city, the financial modelling would not support scaling to this size under current market conditions and without external grant funding. The FBC should explore this possibility and refresh sensitivity analysis to confirm these findings.
8. External funding should be identified to support the development of the FBC. EGAP has been identified as a potential source, with the project being a good strategic fit with the aims of the fund. Securing capital grant funding of £500k or above significantly improves the financial case for the project. Capital grant funding should be explored as part of the FBC.
9. While the OBC provides sufficient indication to recommend development of FBC, risk and uncertainty remain. The FBC should focus on minimising risks and removing uncertainties. All analysis should be refreshed as market conditions are volatile and assumptions used in the OBC can change.

## Section 1: Project Background

10. Harewood Whin is situated to the north of the B1224. The site comprises approximately 82.47ha of land and associated buildings, including a materials recovery facility (MRF), waste transfer station and former landfill that now comprises a series of capped mounds. The site is primarily bordered by agricultural land with the village of Rufforth located approximately 1km to the west, Knapton 2km to the east and the city of York less than 4km to the east. The Foss, a stream, flows through the centre of the site.



11. An initial feasibility study was completed in 2021 to identify opportunities for generating renewable energy at the site. The study, commissioned by Yorwaste and the York & North Yorkshire Local Enterprise Partnership, identified the potential for 28MW of ground mounted solar and complementing energy storage technologies.
12. In February 2024, City of York Council (the Council) approved the initiation of a project to develop a business case for a Green Energy Park (GEP) at the former landfill site at Harewood Whin. Revenue funding of £243,500 had been obtained via the Net Zero Fund, administered by York & North Yorkshire Combined Authority (YNYCA), with the intention of supporting the completion of a Strategic Outline Business Case and an Outline Business Case, no later than July 2025.
13. Planning permission for 16MW received planning permission from City of York Council in March 2025, a reduction on the technical potential of the site to accommodate concerns about glint and glare to the neighbouring airfield.



14. The business case followed the Government's Green Book approach, consisting of three stages:

Stage 1 – Scoping the scheme and preparing the Strategic Outline Case  
Stage 2 – Planning the scheme and preparing the Outline Business Case  
Stage 3 – Procuring the solution and preparing the Full Business Case

This document provides the key deliverable for Stage 2. It summarises progress on the scope of the project and the plan ahead. It also satisfies the Council's commitment for the Net Zero Funding from York and North Yorkshire Combined Authority.

15. This OBC covers the 5-case model to demonstrate value for money:
- Strategic Case – Setting out the case for change, including the rationale for the project, expected outcomes and wider strategic objectives.
  - Financial Case – Cost and revenue potential for the project
  - Economic Case – The total social value of the project compared to business as usual.
  - Commercial Case – Procurement and contractual implications.
  - Management Case – How the project will be managed and delivered

### **Strategic Outline Case and Options Appraisal**

16. Option refinement was carried out throughout the development of the SOC. This process can be summarised as:
- Stage 1 – Ambition options appraisal
  - Stage 2 – Technological options appraisal
  - Stage 3 – Off-taker options appraisal
  - Stage 4 – Delivery structure options appraisal
17. As part of the review process, the option of direct off-taking at Harewood Whin through the relocation of council operations was removed. This was due to the funding and time constraints of the Net Zero Fund requirements.
18. Based on stakeholder feedback and options analysis, a 'solar first' approach with phased delivery was deemed most appropriate. This would present the simplest route to delivery, while maximising the potential benefits. The OBC takes this option as the preferred way forward.

## **Section 2: Strategic Case**

19. The Harewood Whin GEP project aligns (and could potentially enable) key policies and plans that aim to decarbonise York and North Yorkshire.

### **UK Government Clean Power 2030 Plan**

20. GEP's are likely to play a crucial role in the UK's Clean Power 2030 Plan by integrating multiple renewable energy sources and advanced technologies. These parks can centralise the production of clean energy, potentially combining solar farms, onshore wind turbines, battery storage systems, and green hydrogen generation facilities. This integrated approach aims to ensure a continuous and reliable supply of renewable energy, even when individual sources are less productive. Solar farms within these parks could generate substantial amounts of electricity, while onshore wind turbines could harness wind energy to provide a steady power supply. The inclusion of advanced battery storage systems could also allow excess energy generated from solar and wind to be stored and used during periods of low generation, thereby stabilising the grid and reducing the need for fossil fuel backup.
21. Economically, the development and operation of GEP's could create jobs in construction, maintenance, and research, boosting the local economy and attracting investment. Environmentally, these parks will significantly reduce carbon emissions, helping the UK meet its net zero targets by 2030. The government is supporting these initiatives through policies and incentives, including subsidies, tax breaks, and grants, encouraging public-private partnerships to drive innovation and investment.
22. £40 billion is expected to be invested in the grid (generation and transmission assets) each year from 2025 to 2030, with the aim of nearly doubling the grids capacity and enabling projects like Harewood Whin to connect to the grid. Overall, GEP's could be instrumental in transforming the UK's energy landscape, ensuring a sustainable, secure, and economically beneficial transition to clean power by 2030.

### **City of York Council Plan 2023-2027**

23. The Council Plan adopted in September 2023 identifies 'Cutting carbon, enhancing the environment for future generations' as one of the council's key priorities. Increasing sources of renewable energy is central to achieving this priority. The Council Plan identifies "A fair, thriving, green economy for all" as another of the council's key priorities. The design, development, planning, and construction services required to deliver a GEP will provide an opportunity to return benefits to the local economy and develop the local supply chain capabilities.

### **York Climate Change Strategy 2022-2032**

24. The Council declared a climate emergency in March 2019 and set the ambition for York to be net zero carbon by 2030. To achieve this ambition, the council's

net zero pathway requires a significant reduction in emissions across heating, transport, and energy systems. In order to decarbonise the local electricity system in York, additional renewable generation capacity will be required.

25. In 2018, the City's greenhouse gas emissions totalled 936 ktCO<sub>2</sub>e, with the majority of emissions sourced from buildings (61.9%) and transport (27.9%). Energy is therefore a key part of the decarbonisation journey, sourcing energy that fuels buildings from renewable sources and switching to electric vehicles (EV's) for fleet and public transport. In order to meet the net zero carbon pathway, emissions in York will have reduced by 88% from 2005 levels, to 196 ktCO<sub>2</sub>e by 2030.
26. Increasing local renewable generation capacity across York is a key priority within the council's Climate Change Strategy (in support of objective 7.1). Battery energy storage could also potentially be delivered on site as part of the project supporting the council to improve energy flexibility and storage (in support of objective 7.2). Finally, there are a range of potential community benefits that this project could support including the provision of a community benefit fund and/or part community ownership of the asset (in support of objective 7.3).
27. To enhance any carbon savings, opportunities to generate additional carbon sequestration will be considered in the project development stage (in support of objectives 6.1 and 6.2). Carbon sequestration could, for example, be achieved through the planting of trees and hedgerows on the site.

### **North Yorkshire & City of York – LAEP & Zoning Technical Consultancy**

28. The City of York Local Area Energy Plan (LAEP) estimates that 1GW of local renewable generation will be required to decarbonise the city's energy system. Currently, the City of York has a local renewable energy generation capacity of 23.5MW. To meet York's growing electricity demand and transition towards net zero, a drive towards increasing local renewable energy generation capacity is urgently required.
29. The former landfill site at Harewood Whin was identified within the LAEP as a suitable site for large-scale renewable energy generation. The proposed GEP could provide additional renewable capacity in York, and support York's transition to a low-carbon energy system.
30. The LAEP identifies Acomb to Rufforth as a "focus zone", an area where delivery of the plan should be prioritised. This area would include the landfill site at Harewood Whin which is between Acomb and Rufforth. The area has been identified as a focus zone because of high levels of fuel poverty, increasing the potential value of building fabric and heating improvements. For this reason, a District Heat Network (DHN) is suggested for the zone, even in the low ambition scenario. If this zone was built to connect both Acomb and Rufforth it would pass by the landfill site, providing an opportunity for it to be repurposed as an energy centre, generating low-carbon heat using heat

pumps and the solar PV. However, it's unlikely that Acomb and Rufforth would be grouped together in a network like this, as the distance between them without any heat demand would significantly reduce the Linear Heat Density of a potentially network which is a key high-level indicator of commercial viability. After the completion of the LAEP the Department for Energy Security and Net Zero (DESNZ) and City of York Council created heat network zoning studies on York as a part of the Zoning Technical Consultant (ZTC) UK wide studies. This study again identified parts of Rufforth as being a part of a zone where district heating could be viable, but didn't extend the zone to include Rufforth, likely because the impact it would have on linear heat density. With the zone remaining in Acomb only, heat generated at Harewood Whin would need to be transported at least 3km under the B1224 to connect.

31. In the hydrogen section of the report, Hazel Court is identified as a candidate for hydrogen heating in the 2030 - 2040s, as it is in an area of industrial uses that may require hydrogen as a heat source for high temperature processes in the coming decades. It may make financial sense for buildings in these industrial areas to be heated by hydrogen, as it would avoid the need for air source heat pump installation at the constrained space at Hazel Court.

### **Minerals and Waste Joint Plan**

32. The plan contains planning policies to support North Yorkshire County Council, City of York Council, and the North York Moors National Park Authority to take decisions about matters such as where, when, and how minerals and waste developments should be planned and controlled up to 31 December 2030. The Harewood Whin site is listed as an allocated site for ongoing waste management over the plan period within the Joint Plan. The GEP proposal will not change the current functionality of the Harewood Whin site; it will continue to operate as a capped landfill and the proposed technology options discussed in the report are considered a complementary use.

### **Site & Grid Context**

33. The Harewood Whin site is located to the west of York City on a rural grid network which is constrained for new generation. The network heatmap for electricity generation for the region has been reviewed against the existing sub-stations and shows as 'red' for the entire area, which means the grid is currently constrained for new connections.
34. Securing a viable grid connection agreement will be an important requirement for the project to enable export and potential import of electricity to and from the Harewood Whin.
35. Connection applications have been made by Yorwaste as part of their analysis for installing renewables energy. The results show a high price for connection to Poppleton. The timescales provided are shorter than those provide by NPG in recent consultation in November 2024. Yorwaste has had accepted G99 connection offers to connect to two meter points on their site for smaller arrays.

36. As of January 2025, The National Energy System Operator (Neso) has paused connections to the grid, with the aim of using the time to overhaul application rules that have allowed a surge of unfunded project proposals to join the queue, blocking the progress of legitimate green investments. Following the pause in grid connections, energy projects will be able to apply for a grid connection only during designated windows through the year and will be required to meet key progress milestones to keep their place, including proof of funding and prioritisation of green technologies. This may serve to progress viable projects such as the one at Harewood Whin and reduce timescales for connection.
37. Solar2 limited applied for planning permission for a 50MW solar farm in March 2023 directly adjacent to Harewood Whin. The application was approved in September 2024, despite negative responses from local Parish councils and residents due to visual impact and use of farmland. The development has received planning application approval and a grid connection offer (approximately 40MW). The developers have also been successful in Feed in Tariff Contract for Difference (CfD) auction and received support for 32 MW at a strike price of £50.07/MW which was outlined as around £74/MW in today's prices (as the strike price is based on 2012 prices). Due to constraints, the site is potentially able to deliver less output than the grid capacity that has been awarded. The developers have outlined that they plan to have the solar farm connected to the grid by August 2026.
38. A potential risk is that Solar2 has taken the substation generation capacity which would otherwise be used by Harewood Whin, so network reinforcement will be required to connect both solar farms to the grid. As it is being developed by commercial developers they are able to move the project on quickly from stage to stage
39. As the grid connection offer is higher than Solar2 is able to generate with current plans, a potential opportunity exists to utilise this capacity for Harewood Whin. There are three potential options where this can be undertaken:
- Solar2 develops additional solar capacity on Harewood Whin land and pays rental agreement for use of the space. Solar2 outlined that they would have no theoretical objection developing on a landfill site as opposed to a less complex greenfield site, if there was a commercial return.
  - The council develops a solar array on Harewood Whin land and uses the additional connection available to Solar2 and supplies Solar2 with additional power to export to the grid
  - An IDNO is used by both parties and supports the development of the grid connection

## **Ground Investigation**

40. A Preliminary Ground Investigation (GI) Report has been undertaken to inform the solar array foundation options. The recommendations are based on findings from the works completed to date as the geotechnical laboratory results are still to be finalised. The GI investigation observed the composition and thickness of



the landfill cap and cover materials, and a process for geotechnical and geo-environmental sample recovery for laboratory testing. Light-Weight Deflectometer (LWD) in-situ testing has been undertaken to measure bearing capacity across the site, the results of which will be interpreted alongside the geotechnical laboratory testing data when available.

41. A full assessment of foundation solutions will be undertaken once geotechnical data results are made available; however, it is considered unlikely that the Environment Agency will allow any piling (or other construction activity) that disturbs the engineered landfill cap (piles typically driven to depths of approximately 1.8 m BGL). Given that the depth to the clay cap was observed to be between 0.2 and 0.8 m BGL, surface mounted solutions may be required to avoid breaching the cap.
42. Given the nature of the site development (solar photovoltaics) and surface mounted foundation solution, the geo-environmental risks are considered to be low as viable source-pathway receptor linkages will not exist at the site post construction.

### **Council Context**

43. At the outset of the project, the council identified the following objectives:
  - Redevelop the former landfill site at Harewood Whin into a Green Energy Park (GEP) consisting of large-scale renewable energy generation and low-carbon services.
  - Consider opportunities to develop a new council depot on site as a potential offtake of electricity generated by the Green Energy Park (GEP).
  - Ensure that the Green Energy Park (GEP) development is commercially viable, affordable, and generates a return on investment over the lifetime of the project.
  - Strengthen engagement with residents, communities, and other key stakeholders throughout the project's development.
  - Deliver biodiversity enhancements on site as part of the development, with a minimum of at least 10% BNG achieved by project completion.
44. During development of the Business Case, a decision was taken to remove any further review for a direct 'off-taking' opportunity through relocation of council depot operations to the Harewood Whin site, as described in paragraph 17.
45. With the nature of this project potentially leading to the generation and sale of energy, the project is classed as a discretionary function for the council, above and beyond mandatory council services. There are, however, significant additional potential benefits to the council and York. These include:
  - Increased revenue through the sale of electricity
  - Demonstrating civic leadership towards achieving our climate change ambitions
  - Reduced energy costs
  - Reduce carbon emissions
  - Repurpose unutilised land

- Provide a demonstrator for similar transformative projects
- Establish a Community Energy Fund to support community initiatives
- Contribute to a pipeline of investible net zero projects

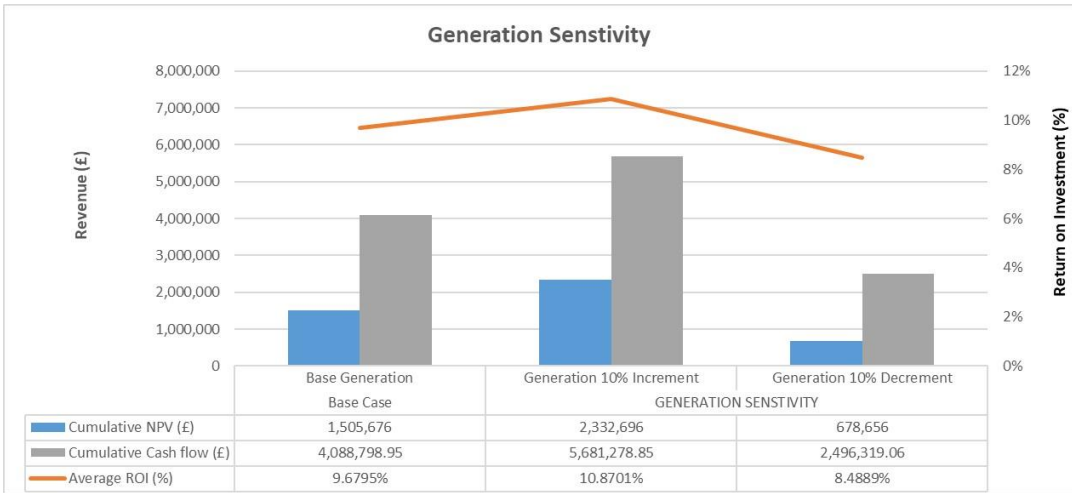
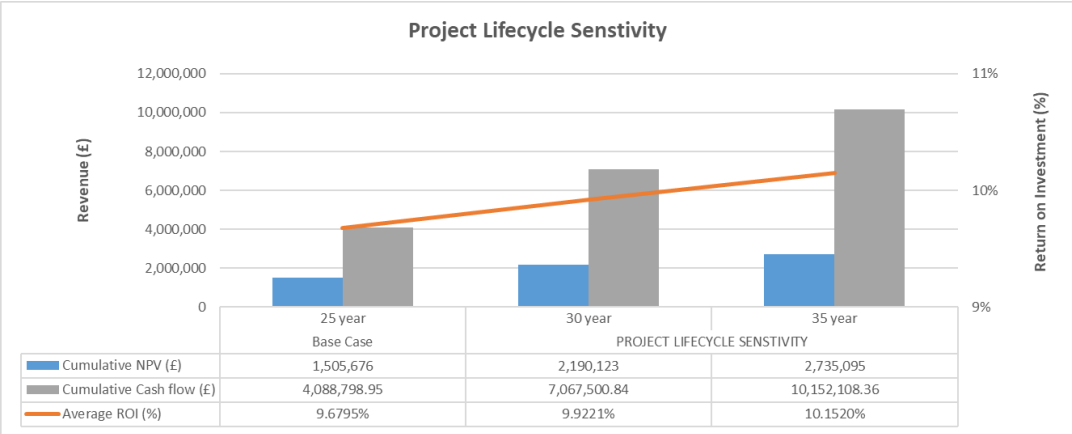
### Section 3: Financial Case

46. The Table below provides a summary of the scenarios that have been assessed as part of the financial modelling in the OBC, based on the National Wealth Fund borrowing cost at 5.4%.

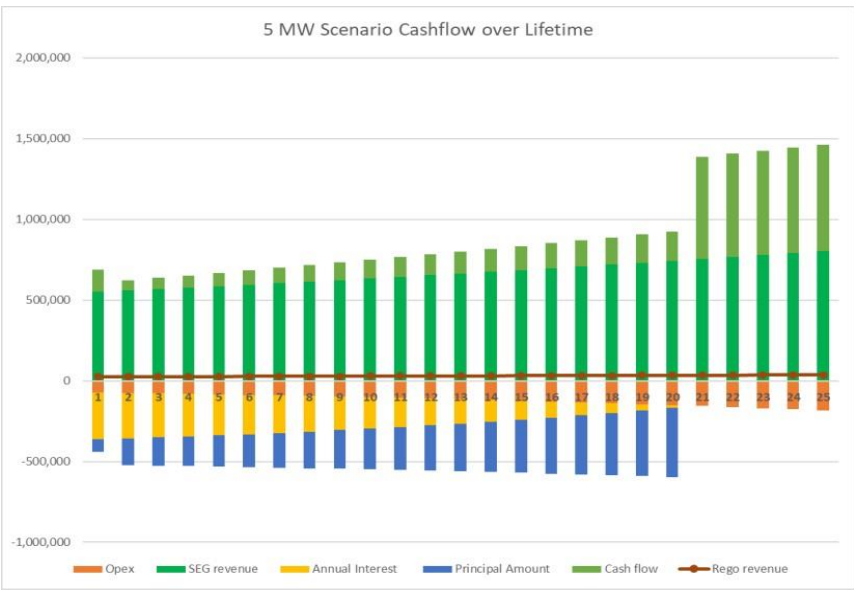
Criteria	0.5 MW	5 MW	10 MW	28 MW
Size (kWp)	500	5,000	10,000	28,000
Cost of Capital + interest (including grid connection)	706,943	8,870,579	16,580,522	45,762,241
Grid connection cost	1,370	1,100,000	2,000,000	8,000,000
Opex (total over 25 years)	297,845	2,978,455	5,956,910	16,679,348
Annual generation (kWh/yr)	492,886	4,629,605	9,222,480	25,679,832
Income	1,945,494	15,924,799	22,621,403	62,988,890
Cash Flow (25 years)	940,706	4,075,765	842,666	547,301
Rol (25 years)	110%	28%	-8%	-10%
NPV	469,538	1,493,231	-823,455	-2,869,992
Lifetime Carbon Savings (tCO <sub>2e</sub> )	583	5,295	10,546	29,378

47. The best return is seen from the Phase 1 (using or selling power directly on site). This is because it replaces the full cost of grid supplied electricity at Harewood Whin. This option would satisfy the planning obligation to start work within 3 years.
48. Income from all other options rely on the market benefits of selling electricity either to the grid or other electricity consumers. Under these scenarios, prices are typically lower and less certain over the long term.
49. The analysis shows the next best option is to build a <5MW array and sell electricity to the grid. The sale price is likely to be a higher rate than other market options. Scaling the next phase to a 5MW array provides the flexibility to choose this market route or alternative options should they become more attractive.
50. There is a potential to increase the internal rate of return (IRR) if the project is live for 35 years. This is due to the increased income over this period and will offset any additional replacement costs, such as inverters, that would need replacing during this time
51. Solar2 has the potential to enable power to be sold to Poppleton substation without the need of a further grid connection to Harewood Whin. Avoiding these grid connection costs could significantly improve the financial case for an array of 10MW.
52. Economies of scale are seen in the cost of developing solar arrays. A balance should be found between developing small arrays quickly and allowing for advancement in technology over larger arrays in the long term that would be more cost effective to build.

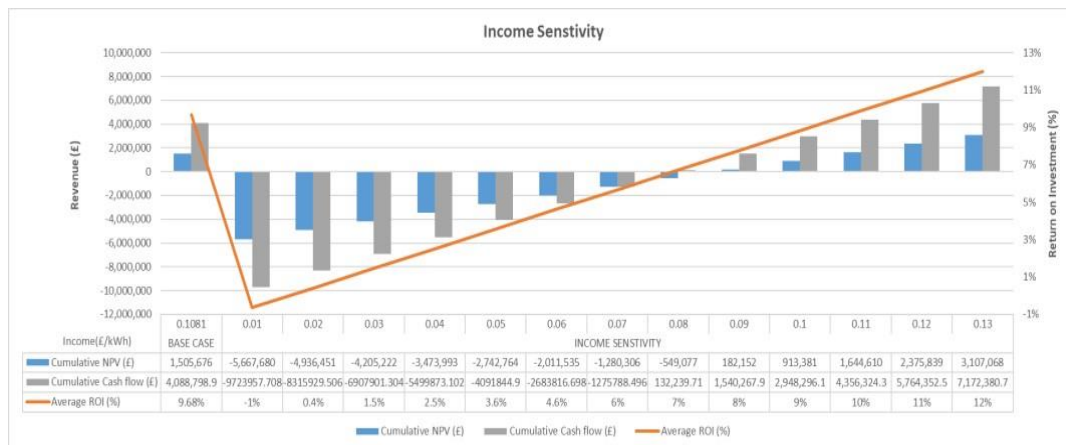
53. Additional financial modelling was carried out to test the scenarios against different sensitivities. The table below models different lifetime scenarios and has indicated that the preferred scheme would provide a positive net present value (NPV), cash flow and return on investment (ROI) under 23, 30 and 35year scenarios; and with a 10% tolerance on expected generation.



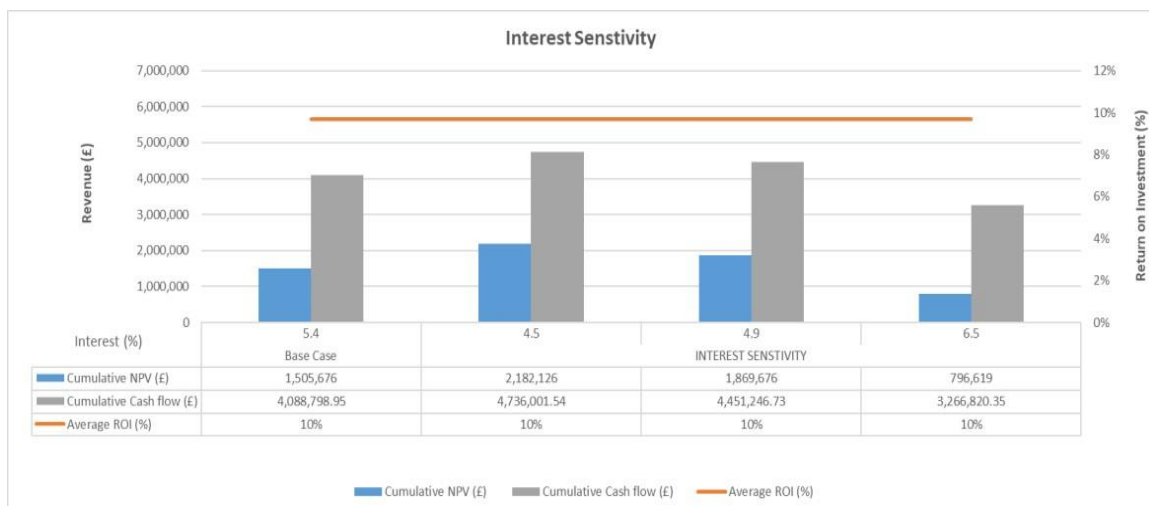
54. Cashflow was also modelled over a 25-year lifetime and with a 10% tolerance on expected generation.



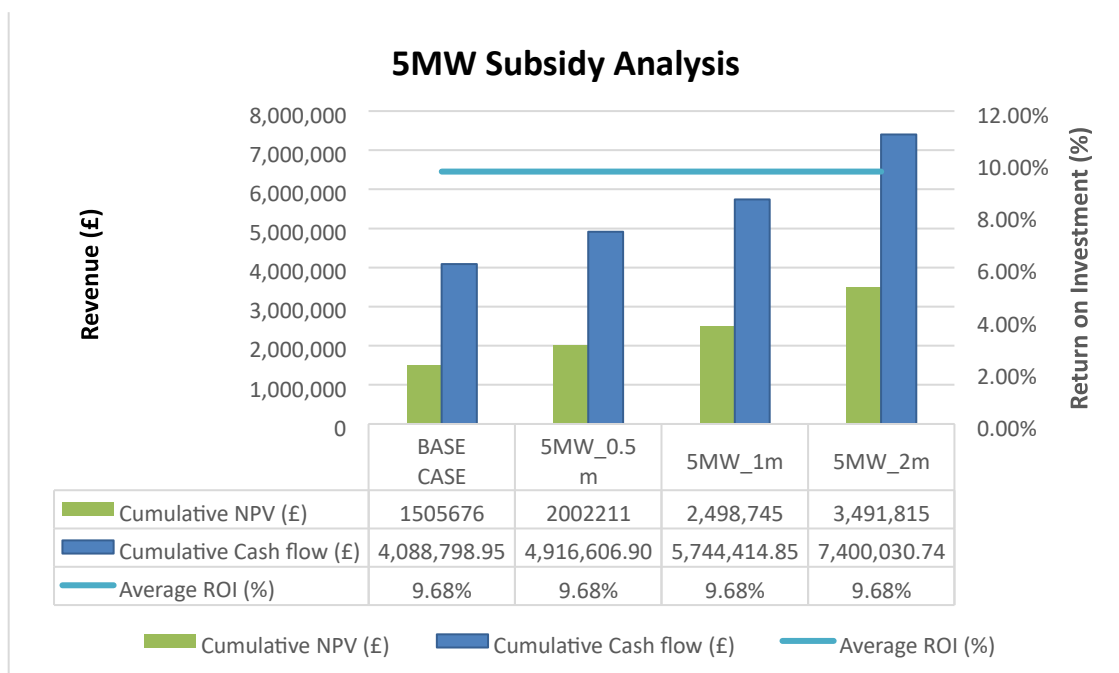
55. Income sensitivity analysis has been undertaken on income assumptions, evaluating a range of tariff values from £0.01/kWh to £0.13/kWh.



56. This analysis shows that the break-even point for the project is a sale price of 8p/kWh. The target price for the project is 10.8p/kWh.
57. Delivery of a Phase 1 scheme up to 5MW of solar could achieve cashflow of in excess of £7m over a 30-year timescale, with a net present value (NPV) in excess of £2m. Further phases up to 10MW could add an additional £10m of cashflow to the council.
58. The financial analysis provides confidence that the phased approach can be self-financing with 100% debt, with scenarios modelled using example borrowing costs supplied by the National Wealth Fund (Formerly UK Investment Bank). They operate at gilt rate plus margin of 0.4%. With the recent tariff related economic turbulence, this rate is currently high, at 5.4%. If this rate reduces, significant financial benefits can be achieved.
59. To understand the impact of interest rate fluctuations on key financial model parameters, we conducted a sensitivity analysis using interest rates of 4.5%, 4.9%, and 6.5%. These scenarios were compared against the base case assumption of 5.4%



60. Timing and fixing any capital costs of borrowing will be a significant success factor for the project. Alternative borrowing approaches are also under review. Public Works Loans are currently more expensive than the National Wealth Fund and Abundance Climate Change Bonds have also been explored.
61. The financial model is sensitive to the Capex, especially when 100% of cost is to be borrowed from a loan provider, as this option will require the council to repay the principal capital alongside the interest rates. Therefore, any amount of interest free grant funding would impact on the overall business case viability and derisk the project given the uncertainty of the income stream.
62. The graph below presents the outputs of the three modelled scenarios with different intervention rates for the 5MWp solar farm. The Base Case does not include for any external funding, and it models the cashflow based on the 100% capital outlay being financed from a loan. A £0.5m grant intervention would increase cumulative cashflow from £4m to almost £5m over the lifespan of the project (almost double the initial investment). Similarly, a higher intervention rate of £1m will increase the cumulative cashflow to £5.7m. Finally, a 47% grant intervention rate, equivalent to £2m, would impact positively on the 25-year cashflow, increasing to £7.4m, which is £3.5m higher than the baseline case.



63. A relatively small cash injection of £500k could almost double in value. This is due to the lower amount of principle loan repayment and its associated interest rate. As part of the Full Business Case, opportunities to access grant funding or provide initial equity into the development should be maximised to help derisk the project and lead to improved levels of returns.

## Section 4: Economic Case

64. Income to the project can initially be generated through the Smart Export Guarantee Scheme (SEG)<sup>2</sup> or via Power Purchase Agreements (PPA). The SEG scheme provides a beneficial income return for small energy generators up to 5MW. As an example, current income rates are in excess of 10p per kWh via the SEG route, versus rates of 7.5p per kWh achieved through normal, such as via the council's existing electricity provider, or through separate contracting arrangements.
65. 5MW of electricity generation is approximately 50% of the Council's annual generation, while 10MW of generation would see the council achieve a position of generating all of our onsite electricity consumption. While we are unable to directly connect the generation to consumption through private wire, a PPA would allow the council to provide electricity to itself through a sleeving arrangement. This, however, is likely to reduce income as a fee will be paid to the wholesale provider.
66. The OBC, therefore, recommends initial use of the SEG. As the operation of the solar installation matures, exploration of PPA may provide a lower income but with greater long-term security. As the generation of the site increases, and eventually exceeds the council's annual electricity consumption, a 'sleeved' PPA option may offer additional strategic benefits.
67. The electricity income market is complex and other council operators have confirmed that they have initially started out with simplified tariff arrangements, which have subsequently evolved over time. Greater certainty of the income mechanism and expected value should be prioritised as part of the Full Business Case.
68. Beyond 10MW, generation will exceed the current levels of council electricity consumption. This additional generation can be used to offset emissions associated with heating and fleet, providing a viable pathway to net zero for all council operations.
69. There are wider indirect benefits achieved through civic leadership to deliver renewable energy. The council can use the project as a demonstrator for scale-up and replication in other areas of the region and country, supporting the wider drive towards net zero.
70. York becomes an exemplar, with the council taking an active leadership role in making the transition to net zero.
71. A summary of the wider social value is presented in the table below:

---

<sup>2</sup> [https://www.ofgem.gov.uk/environmental-and-social-schemes/smart-export-guaranteeseg#:~:text=About%20the%20Smart%20Export%20Guarantee%20\(SEG\)&text=The%20SEG%20requirements%20some%20electricity,providing%20certain%20criteria%20are%20met.](https://www.ofgem.gov.uk/environmental-and-social-schemes/smart-export-guaranteeseg#:~:text=About%20the%20Smart%20Export%20Guarantee%20(SEG)&text=The%20SEG%20requirements%20some%20electricity,providing%20certain%20criteria%20are%20met.)

CATEGORY	BENEFIT	BENEFIT DESCRIPTION	PROJECT ACTION	NARRATIVE
Equity & Social	Energy Transition	Create fairer society and implement localised green transition	Install renewable technology	Renewable generation provides climate change adaptation
Resilience (energy)	Enhance energy resilience and security of supply	Energy projects provide local electricity generation	Grid connected solar farm	Energy generation within the local authority boundary will supply green electricity
Resilience (ecology)	Enhance ecological resilience and biodiversity	Solar farms can provide opportunity for local environmental enhancements through planning management and operation	Wildflower meadow creation	Landfill sites can be seeded with wildflowers to protect and improve plant pollinator diversity
Economic opportunity and job creation	Create local jobs and training	Creating opportunities to provide employment in a local area	Job opportunities arising from the construction and management	Main contractors can employ local labour and skilled workers for the design, construction and management
Net Zero	Reduce carbon emissions	Reducing carbon emissions through active changes to energy generation, supply and demand management	Design, build, operation & management of a solar farm	Total installed capacity of ground mounted solar farm



## Section 5: Management Case

72. Revenue funding was secured from the Net Zero Fund to complete the OBC at no cost to the council. This funding provided a project manager and specialised technical support to the project. At the time of writing, no additional funding is as yet confirmed to progress the project to FBC.
73. The York and North Yorkshire Combined Authority's Energy Generation Accelerator Programme (EGAP) is part of the Carbon Negative Challenge Fund. This programme has been pulled together to enhance York and North Yorkshire's transition to renewable energy. This is a key part of national governments objective to reach a net zero grid and is also one of the region's growth priorities. The intention is to prepare the region for additional funding opportunities that may arise from central government, a strategic energy partnership or other funding opportunities. A strand of EGAP intends to deliver feasibility and business cases in the region for new renewable generation. The Harewood Whin GEP would appear an ideal fit for this programme and should be considered for funding to develop the FBC.
74. Potential sources of capital funding have yet to be explored. This is not required to progress the project to FBC, but should be considered as part of the next phase. A Capital grant contribution would significantly improve the financial returns for the project, reducing the level of interest paid versus 100% borrowing.
75. If the project is successful, revenue generated could be reused to support similar projects in the future, creating a revolving fund to achieve net zero.
76. Several delivery options have been considered as part of the OBC, with varying risk and reward profiles. This section demonstrates the different routes to delivery, with further refinement required as part of the FBC.
- o **Own/Develop/Maintain and Operate** – Take the project through entire lifecycle from feasibility to operation and maintenance. It can include financing and subcontract arrangements. In this option the council retain all project benefits but also accept all risks
  - o **Sell after construction** – Take the project through planning and development and then sell the asset. This would generate short-term revenue, with reduced long-term risks but also reduced long-term benefits.
  - o **Sell before construction** – With the necessary planning and permits to an investor to then develop, agreeing commercial arrangements for Council returns. This presents a lower risk option with short-term revenue but also significantly reduced benefits.
  - o **Lease the land** – to a private sector operator. This presents a very low risk option with long-term revenue but also significantly reduced benefits.

77. The chosen delivery route be influenced by a number of factors:

- **Financing:** Ability of the council to finance the project. Consideration should be given to council or Government funding with an option to gain third-party financial investment or split the capital investment through a Joint Venture (JV).
- **Experience and/or Capacity:** The level of experience the council has in delivering, tendering and partnering with other entities. LAs typically subcontract to an engineering, procurement and construction (EPC) provider or subcontract elements of the project. It is typical for this type of project to appoint a Client Engineer consultant to guide the Authority through the process.
- **Risk:** Determine the level of risk that the council is comfortable with for the project. Risks are associated with financials, development, market and regulatory aspects, with risk generally being largest at the beginning of the project and reduce in latter stages. This adds project or contractual complexity.
- **Benefits:** The relative significance and desired ownership over certain project benefits may influence the preferred delivery route.

78. Project management and delivery can be simplified through the phased approach:

#### 1. Phase One - Yorwaste solar project

Installing up to 1MW of solar to support Yorwaste's operations on site. The council will work collaboratively with Yorwaste to agree revised conditions of the lease to enable these works to take place. It should be noted that at this point, it would be prudent to cover the possibility of the wider solar scheme and the potential implications for the lease in the future.

#### 2. Phase Two – Council installs a solar installation up to 5MW

Limited installed capacity to below 5MW as the SEG scheme provides a beneficial income return for small energy generators up to this threshold. Grid connection cost and timing is also more beneficial on schemes up to 5MW. Schemes under 5MW do not require National Grid approval, significantly reducing the wait time for a grid connection to less than two years. Larger schemes typically require a lead time in excess of 5 years.

Connections up to 10MW can be made at Gale Lane substation, rather than the larger substation at Poppleton, which we know has a long waiting list for connections for other large solar installations.

A 5MW array reduces the risk exposure by limiting borrowing levels to approximately £5-£6m. Limiting the initial size and scope of the installation provides the opportunity for the council to operate as a small energy generator, with the benefit of increasing learning and experience in the market before expanding operations.

### 3. Phase Three – Additional installation up to 10MW

This phase would see the installation of an additional 5MW to 10MW, with revenue generated through SEG, Solar2 and/or PPA. Economies of scale with grid connection and installation costs might possible at phase.

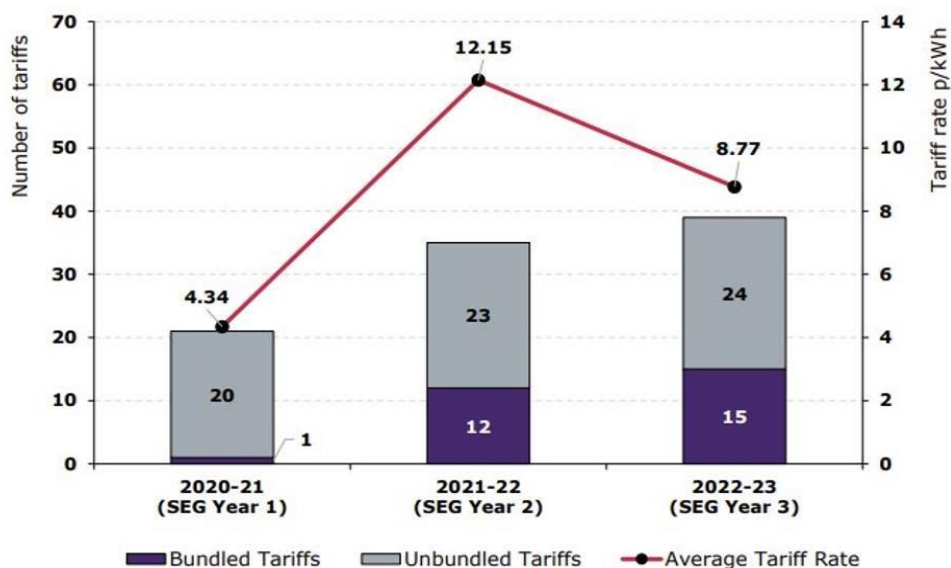
### 4. Phase Four – Potential to exceed existing planning permission approval for an additional 12MW solar (28MW total)

Maximising the full technical solar capacity potential of the site, exploring other renewable technology and off-taking opportunities and complementing storage technologies.



## Section 6: Commercial Case

79. The council currently pays an additional amount of £195K per year for a Green Energy Tariff on top of standard electricity prices. The Green Tariff allows the council to offset electricity use for emissions reporting. Approximately half of this cost would be saved with a 5MW scheme, and all of this cost could be avoided with a 10MW scheme (as we demonstrate that at this point, we are producing enough renewable energy to offset the council's annual electricity consumption). This is based on the current contracted price for Renewable Energy Guarantees of Origin (REGO), which could reduce when the next electricity contract is negotiated in March 2027. At the point of generation, the council will have the option to sell REGO certificates, or 'retire' them towards its own emissions reporting. At present, the potential cost saving would be higher if the REGO is retired.
80. SEG and PPA rates are normally secured at the point that generation is ready. This means that all investment has already been made on solar installation and grid connection. The cashflow sensitivity analysis had set a target rate of 10.8p/kWh as realistically achievable for the scheme, with a breakeven point modelled at 8p/kWh. Historically, the average SEG tariff rate has fluctuated from 4.34p/kWh in Year 1 to 12.15p/kWh in Year 2 and then returning to 8.77p/kWh in Year 3<sup>3</sup>. Based on this information, the assumed average rate used in the OBC modelling for the year 2024-25 has been set at 10.81p. Securing a SEG contract price is a crucial stage in the development of the FBC.



81. SEG contracts are typically 12 months in duration, so risk remains over a 30year term. There are possible ways to mitigate this and fix the rate at the outset e.g. through energy auctions to agree an up-front 'strike price'. These can be complex and often achieve a lower price than non-fixed SEG contracts.
82. The council currently pay 9p/kWh as a commodity price through the existing energy contract with NPower. This means the SEG income target is higher

<sup>3</sup> [Smart Export Guarantee \(SEG\) Annual Report](#)

than currently paid for the basic energy commodity price. However, the actual cost paid to NPower is 26p/kWh, which includes additional charges for metering costs, broker costs, climate change levy and an additional 1.25p/kWh for the green energy tariff.

83. Carbon pricing should benefit renewable installations as generators are forced to pay higher environmental levies for energy generation from fossil fuels. This is driven from policies such as the UK's Carbon Price Support (CPS) mechanism, which is a carbon tax on fossil fuels used for electricity generation, designed to encourage a shift towards lower-carbon energy sources.
84. The UK is currently undergoing significant electricity market reform. This is a multi-stranded process to modernise the electricity system to ensure a secure, low-carbon, and affordable energy supply. It includes mechanisms such as the Capacity Market and Contracts for Difference. This is a complex set of policies, but could provide further benefit to reduce volatility of market pricing amongst other things. These revenue opportunities should be developed as part of the FBC.
85. The cashflow modelling and commercial assumptions provided in this document evidence the position based on current information/energy markets. These should be refreshed as part of the FBC.
86. It is difficult to approach and involve potential suppliers directly at this stage of the scheme. However, technical advice at the OBC phase has provided industry supported information, which provides confidence in the approach and costs. Within the initial financial modelling a conservative approach has been taken to minimise optimism bias.
87. Procurement will be a main tool used to source the most appropriate supplier to provide technical support to deliver the FBC and subsequent supplier or delivery partner for the capital scheme. All services must be procured via a compliant, open, transparent, and fair process in accordance with the council's internal Contract Procedure Rules (CPR) and where applicable, the Procurement Act 2023. Creative and innovative ways of procuring will be explored whilst ensuring all relevant legislations are adhered to. The targeted market will be given plenty of time to allow sufficient planning within their business to allow a competitive, quality bid to be put forward for consideration. Within the procurement, there will be a quality and price split with associated weightings to drive quality and efficiencies. All relevant notices, such as UK2 and UK4, will be completed and published on the relevant platforms.
88. Whilst the procurement route has not yet been identified, the Commercial Procurement Team, along with the project team, will discuss requirements and outcomes internally for a procurement strategy to then be created and implemented. The strategy will outline market trends, available procurement routes, advantages, and disadvantages and a recommend route to market.

## Section 7: Project Risks and Uncertainties

89. Electricity Income Generation Rate – Securing the actual tariff is both complex and difficult to achieve before investing in the solar infrastructure. There is no guarantee that the rate achieved will be sufficient and no guarantee how long or for how many years over the 30-year period that the target rate is achieved. This is not a passive strategy and active ongoing electricity contract management is required to mitigate this risk.
90. Grid Connection – Costs remain estimates. A grid connection request needs to be submitted before full costs and timings can be provided. The application should be submitted as part of the FBC at an approximate cost of £5K and also requiring a deposit of £25k to secure the quote within 90 days of receipt.
91. Borrowing Approach –The OBC has been modelled with all borrowing independent to the council's treasury approach. The exact source and cost of borrowing should be finalised as part of the FBC.
92. Capital costs – Exact costs will only be known following a competitive tender process. This should be achieved during the FBC with early market engagement recommended.
93. Estimated benefits – The performance of solar installations can reduce over time and towards the end of life, therefore financial sensitivity analysis should be re-run based on the technologies available at the time. Ongoing and effective operation and maintenance of the installation throughout its operating life will mitigate this risk.

## Section 8: Next Steps

94. The following next steps are recommended:

- Approval for the preferred way forward of a phased solar-first project and progress to FBC. The FBC will progress the project viability by testing assumptions, removing uncertainty and derisking the project.
- Secure funding to deliver the FBC and associated works.
- Allocate Project Management resource and assess technical support requirements.
- Consider project implications in in upcoming contract energy supply contract negotiations with Yorkshire Purchasing Organisation (YPO).
- Undertake a full assessment of foundation solutions once geotechnical data results are made available.
- Co-ordinate any onsite phase 1 activity with Yorwaste. Supporting this phase and ensuring it aligns to the wider ambition for the site will avoid potential issues in later phases. The lease with Yorwaste will need to be revisited and concluded.
- Discharge pre-start planning conditions as required. Yorwaste have presented a preliminary set of costs in the region of £10K to discharge pre-start conditions.
- Enter into negotiations with Solar2 for potential future shared network connections and/or off-taking opportunities.
- A communications and engagement strategy should be prepared for the project.
- Identify sources of capital funding as part of the FBC.
- Review ongoing legal issues on the site, including access requirements to the 'Gun Club' and potentially for onward access to the nearby Solar2 site.
- Agree on the operational and commercial approach to delivery and make arrangements for the project delivery phase as part of the FBC.

Roadmap	Q2 2025	Q3 2025	Q4 2025	H1 2026	H2 2026	H1 2027	H2 2027	H1 2028	H2 2028	H1 2029	H2 2029	2030	Onwards
Planning 3 Yr Period	Starts 28/4/25	Discharge Pre Start Conditions			Discharge All Conditions			Ends 28/4/28		Further Planning needed to utilise the full solar site and technologies beyond solar			
Ground Investigation	Mobilise	Test/Results											
Yorwaste Lease	Lease lapsed/needs revisions before any works on site												
Yorwaste Phase One 1MW	Agree Approach		Procure & Mobilise		On Site Installation Phase One								
CYC Phase Two	OBC Completed	OBC Approved	Full Business Case /Approval										
Revenue Funding for FBC	Secured with YNYCA												
Grid Connection	Budget Quote			Full Quote/Secure Start				Grid Connection Phase Two		Grid Connection Phase Three			
Borrowing			Deal Secured										
CYC Installations								Procure & Mobilise	Phase Two Installation	Procure & Mobilise	Phase Three Installation		
Current CYC Electricity Purchase Contract				Negotiation (PPA needed ?)		Contract Signed							
CYC Electricity Income Contract			Negotiation		Contract Signed								
CYC Fleet Electrification / Possible Direct Offtaker								Next Decision point					
CYC Future Installations / Possible Offtakers on site or locally or Solar 2												Phase Four	
Mound 3/Other technologies - Utilise the full site													Phase Five

## Section 9: Conclusion

95. The OBC progresses the development of a potential GEP at the former landfill site of Harewood Whin. It builds on the techno-economic feasibility study and SOC, taking the preferred way forward for a solar first phased approach to delivery and builds the strategic, financial, economic, management and commercial case for this preferred option.
96. The project aligns with local, regional and national strategic priorities to increase local renewable energy generation, support the transition to net zero and tackle the challenges of climate change. It also has the potential to positively impact energy security and fuel poverty, without negatively affecting food production.
97. The phased approach provides a positive financial outcome up to 5MW under scenario analysis using a 5.4% rate of borrowing and tariff price of 10.8p/kWh. This would make it possible to self-finance the project up to the second phase of delivery with a positive cash-flow. Further expansion is dependent on future tariff prices, grid connection costs and third-party agreements. Securing a SEG tariff price should be a critical element of the FBC.
98. A GEP is an appropriate use for a closed landfill, with few viable alternatives; turning a maintenance liability into a source of income for the council. The project could become a local exemplar for other organisations to replicate. This would accelerate the region and UK's net zero transition, creating opportunities to provide employment in local areas and revenue for local authorities.
99. A phased delivery approach has been recommended to maximise financial benefit while also simplifying the delivery process. While the phased scheme may not fully benefit from potential economies of scale, it will allow the project to capitalise on future technology developments and efficiency improvements in the solar panel sector.
100. Several ownership and delivery options have been considered. These should be further explored as part of the FBC, with a confirmed route agreed early in the process.
101. The potential to offset council energy usage and reduce costs associated with REGO purchase presents a potential cost saving for the council. CPR should be followed at every stage and specialist procurement support will be required.
102. External funding should be identified to support the development of the FBC. EGAP has been identified as a potential source, with the project being a good strategic fit with the aims of the fund. Securing capital grant funding of £500k or above significantly improves the financial case for the project. Capital grant funding should be explored as part of the FBC.



103. Risk and uncertainty remains. The FBC should focus on minimising risks and removing uncertainties. All analysis should be refreshed as market conditions are volatile and assumptions used in the OBC can change.

## **Appendix**

Annex A: Baseline Report

Annex B: Project Baseline & Options Overview

Annex C: Financial Model and Cashflow

Annex D: Financial Models and Sensitivity Analysis

Annex E: Strategic Outline Case

Annex F: Risk Summary

Annex G: Preliminary Report on Title/Legal Review Relating to Various Parcels of  
Land at and Adjoining Harewood Whin. [CONFIDENTIAL]

Annex H: Supplementary Technical Details

Annex I: Ground Investigation Summary Report