

Cambridge Waste Water Treatment Plant Relocation Project



Preliminary Environmental Information
February 2022

Landscape and visual Amenity

Version	Date	Author(s)	Check	Approve	Comment
Draft	17/12/22	J Morrison	C Patterson	C Squires	Working version for comment
P01	31/01/22	J Morrison	C Patterson	C Squires	Update to address WIP review comments
P02	04/02/22	J Morrison	C Patterson	C Squires	Final

Document reference: 100102041-MML-XX-00-RP-LA-0204011

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Environmental information paper: Landscape and visual amenity

Summary

The Proposed Development, including the proposed Waste Water Treatment Plant (WWTP), pipelines carrying waste and treated water and an outfall on the River Cam would be largely constructed and operated on farmland and in the River Cam corridor between Cambridge and Waterbeach. This is an open landscape with large fields, separated by low hedgerows and drainage ditches. Woodland and tree belts break up views across the landscape and powerlines are a common feature. The proposed WWTP would be situated on arable farmland adjacent to the A14, in the Green Belt and close to the north-eastern boundary of Cambridge. The nearby villages of Fen Ditton, Horningsea and Stow cum Quy and Cambridge are screened by existing vegetation and consequently there is little development visible from the site of the proposed WWTP.

There would be significant¹ landscape effects in construction on the Eastern Fen Edge Landscape Character Area (LCA) due to the introduction of large-scale construction works on the proposed WWTP into the predominantly rural area, changing the character of the farmland between Waterbeach and Horningsea. Landscape effects elsewhere would be limited to the pipeline corridors and would be screened from the wider landscape by existing screening vegetation. There would be significant visual effects in construction on residential receptors on or close to Horningsea Road, High Ditch Road, Low Fen Drove Way and at Northern Bridge Farm, Red House Close, Poplar Hall and Poplar Hall Farmhouse and a small number of isolated residential properties along the Waterbeach pipeline route. Recreational receptors on the public rights of way network and on the River Cam would also be significantly affected. Effects would be due to the prominence of the construction works for the Proposed Development in views over the open landscape.

The outline Landscape Masterplan provides the landscape context for the proposed WWTP and long-term screening or partial screening of the new structures from the surrounding area. The proposed WWTP would be surrounded by an earthwork bank, 5-7m high, woodland and grassland. The land disturbed by the installation of buried infrastructure would be restored, with vegetation removed during construction replaced.

Our preliminary assessment identifies that there would be significant landscape effects in year 1 of operation on the Eastern Fen Edge LCA due to the introduction of large-scale infrastructure into the predominantly rural area, changing the character of the landscape between Waterbeach and Horningsea. There would be no significant effects on the wider landscape of the study area. There would be significant visual effects in year 1 of operation on residential and recreational receptors on or close to the B1047 Horningsea Road, High

¹ In environmental impact assessment terms

Ditch Road, Low Fen Drove Way and on nearby PRow due to the prominence of the proposed WWTP in views over open farmland.

Adverse landscape effects would reduce by year 15 of operation, but they would potentially remain significant on the Eastern Fen Edge LCA due to the presence of large-scale infrastructure and the currently open landscape in the area of the WWTP become more wooded in character. Adverse visual effects would similarly reduce by year 15 of operation, but they would potentially remain significant on a small number of residential receptors on the B1047 Horningsea Road, High Ditch Road and Low Fen Drove Way and users of nearby PRow due to the prominence of the proposed WWTP in views and the shortening of long views over the open landscape by woodland planting.

Document purpose

This information paper considers impacts on landscape character and visual amenity during the construction and operational phases of the Cambridge Waste Water Treatment Plant (WWTP) and associated structures comprising the Proposed Development. It also considers the context and landscape setting of the Proposed Development and the effectiveness of mitigation and design in reducing impacts of the Proposed Development on landscape character and visual amenity.

This information paper comprises:

- Baseline information on landscape character and visual amenity
- Potential impacts during construction on landscape character and visual amenity
- Potential impacts during operation on landscape character and visual amenity
- Measures to avoid and minimise adverse impacts on landscape character and visual amenity
- Potential significant effects

This information paper refers to the following document, figures and design information:

- Scoping report
- Figures in the report showing:
 - local land form and the study area boundary
 - landscape character areas
 - landscape features and green belt
 - representative viewpoint locations
 - representative viewpoint locations with visual receptors grouped in areas and the zone of theoretical visibility in year 1
 - representative viewpoint locations with visual receptors grouped in areas and the zone of theoretical visibility in year 15
- Visualisations (photomontages) in the Appendix A.1
- Outline Landscape Masterplan

This information paper refers to the Environmental Information Papers for Biodiversity, Community, Historic Environment and Traffic and Transport.

Overview of local landscape character and views

The Proposed Development would be situated partly in the Green Belt and on arable farmland between Fen Ditton and Waterbeach. This is an open landscape of large fields, separated by low hedgerows and drainage ditches, and woodland belts along field boundaries and around settlement edges. There is little existing development visible from the land required for the proposed WWTP or the Waterbeach pipeline corridor, though cranes are apparent on the skyline in views south. The A14 detracts from the openness of the landscape where it rises to cross the River Cam but generally, it has a fairly discreet visual presence, being mainly at ground level or in slight cutting. It is lined with trees and scrub for much of its length but passing tall vehicles can be seen above the vegetation. Pylons and powerlines are prominent features of the landscape. The River Cam towpath, Fen Rivers Way, Harcamlow Way and the cycle path along Horningsea Road provide important recreational walking and cycling routes between Cambridge and the landscape to the north-east. The Environmental Information Paper: Recreation and Environmental Information Paper: Traffic and transport provide more detail in relation to opportunities for active travel and recreation.

The location of the Proposed Development and its landscape and visual context

The Proposed Development comprises:

- a proposed WWTP on land north of the A14 and west of Horningsea Road
- a waste water transfer tunnel connecting the proposed WWTP with the existing Cambridge WWTP
- a treated effluent transfer pipeline taking treated effluent from the proposed WWTP to the River Cam, via a concrete treated effluent discharge outfall at the river bank
- pipelines transferring flows from Waterbeach to the existing Cambridge WWTP, as a potential initial phase, and to the proposed WWTP.

Details of the proposals are further described in the PEI Introductory Paper and associated figures.

The proposed WWTP would be situated on farmland immediately north of the A14 and east of the B1047 Horningsea Road. The landscape here appears to be almost flat but there are gentle undulations in the landform and it generally slopes gently down towards the River Cam. Three overhead powerlines meet on the site of the Proposed WWTP. The land required for the proposed WWTP is visible from Horningsea Road and the landscape to the west, but woodland around Quy Fen, Lode and Stow cum Quy screens most views from the east and north. The existing pylons on the land required for the proposed WWTP are visible in views north from High Ditch Road and the edge of Fen Ditton, but the land itself is screened by the A14 and intervening vegetation.

The waste water transfer tunnel and treated effluent transfer pipeline would pass under arable fields and rough pasture close to the River Cam. Views from this area over the landscape are partially screened by existing vegetation along roads and the river but they are more open south of Biggin Abbey. The proposed treated effluent discharge outfall on the River Cam would be situated close to the A14 bridge. The landscape here is open to the east, with views across the river towards Horningsea Road and the land required for the proposed WWTP.

The Waterbeach pipeline would pass under open, arable farmland with large fields bordered by farmland tracks, tree belts and hedgerows with mature trees. There are long views south from the area towards the land required for the proposed WWTP.

The study area

The study area for the assessment was established by modelling the theoretical zone of visibility (ZTV)² for the Proposed Development in the first year of operation and verified through mapping and site survey. The ZTV, mapping and survey showed that tree and woodland belts, vegetation on settlement edges, undulations in the landform and road infrastructure would limit most views of the Proposed Development to an area within 2km of the Draft Scheme Order Limits. There are a small number of more distant locations where there could be landscape and visual effects. These have been included in the assessment. The local landform and study area are shown on Figure 1 below. The ZTV for year 1 of operation is shown on Figure 7 in a later section of this document.

² The area within which the Proposed Development would be theoretically visible to a person standing on the ground and with an eye height of 1.6m.

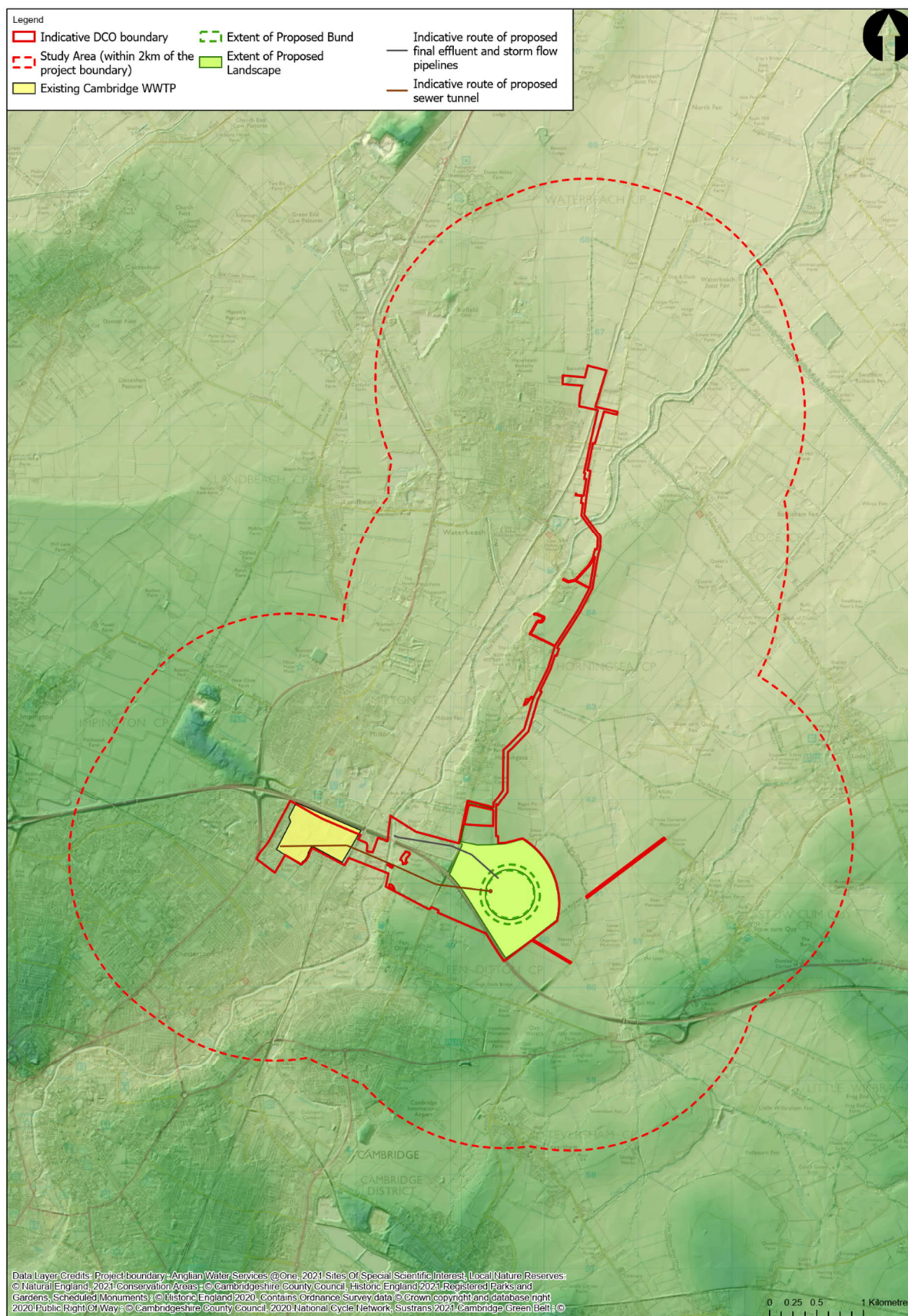


Figure 1: Local landform and study area

Local landscape character

The Cambridge Inner Green Belt Boundary Study³ published in 2015 and the Greater Cambridge Landscape Character Assessment (February 2021)⁴ both evaluate the landscape character of the majority of the study area. The 2015 and 2021 assessments come to broadly similar conclusions on landscape character and have been used to establish landscape character areas (LCA)⁵ for this environmental information paper. Other documents relevant to an understanding of the landscape character of the area are the Greater Cambridge Green Infrastructure Opportunity Mapping report⁶ and the Greater Cambridge Green Belt Assessment⁷. There is no up-to-date current published landscape character assessment for the part of the study area within East Cambridgeshire District, so the landscape character of this area has been evaluated for this assessment through site survey and use of mapping and aerial photography.

The landscape character areas potentially affected by the Proposed Development in construction and operation are:

- Eastern Fen Edge LCA
- Waterbeach-Lode Fen LCA
- River Cam Corridor LCA

Also in the study area, but unlikely to be affected by the Proposed Development, are the following LCA:

- Western Fen Edge LCA
- North-east Cambridge LCA

The WWTP would lie in the Eastern Fen Edge LCA. The Waterbeach pipeline would pass under the Eastern Fen Edge LCA and the Waterbeach-Lode Fen LCA. The transfer pipeline and waste water outfall to the River Cam pass under or through all three LCA. The LCA are illustrated on Figure 2 below.

³ Cambridge Inner Green Belt Study, LDA, 2015

⁴ Greater Cambridge Landscape Character Assessment, Chris Blandford Associates, 2021

⁵ An area of landscape with a broadly consistent character

⁶ The Greater Cambridge Green Infrastructure Opportunity Mapping, LUC, 2021

⁷ The Greater Cambridge Green Belt Assessment, LUC, 2021

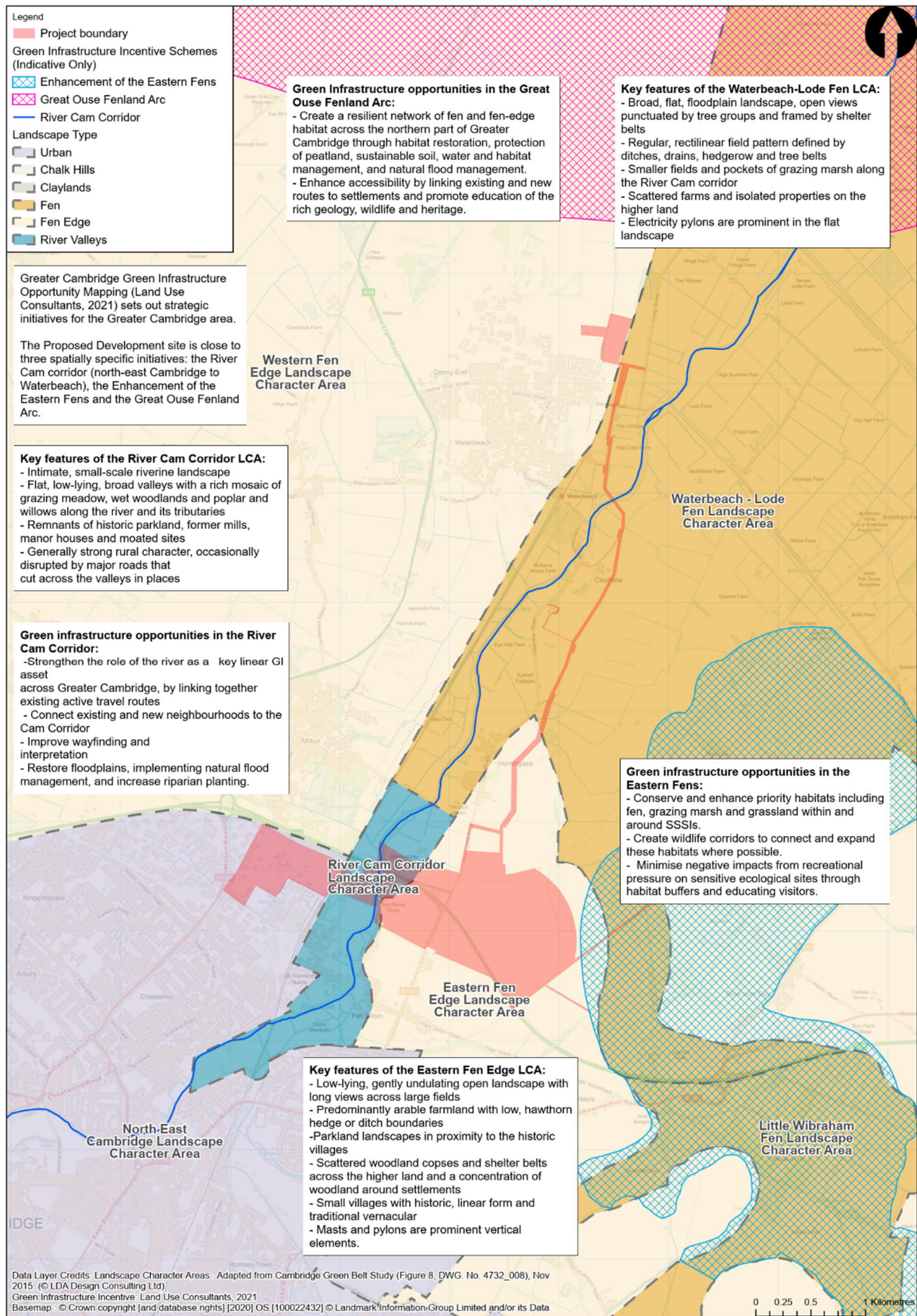


Figure 2: Landscape character types and areas and spatially specific strategic green infrastructure initiatives identified in the Greater Cambridge Green Infrastructure Opportunity Mapping (LUC, 2021).

The three LCA likely to be affected by the Proposed Development are:

- Eastern Fen Edge LCA – An open landscape of low-lying farmland separated by drainage ditches, hawthorn hedges, tree-lined farm tracks and woodland belts (Photo 1). There are distant views of the centre of Cambridge from higher ground to the east, but the city is not visible from the study area. Villages with defined, well-vegetated settlement edges are situated above the fen floodplain. They retain their rural setting, with the urban edge meeting farmland in most directions. Church spires are prominent in the landscape. The LCA includes a network of PRoW including the Harcamlow Way Trail, and there is registered park and garden at Anglesey Abbey (National Trust) which contributes to the value of the landscape and is described in the heritage environmental information paper. The A14 severs Cambridge from the landscape to the north and east and overhead power lines are prominent vertical features. The area is relatively tranquil away from the A14 and through roads. The villages are lit at night, but the minor roads in rural areas are not lit and overall, the landscape is relatively dark at night. Skyglow above Cambridge is apparent.



Photo 1: Eastern Fen Edge LCA – flat, open farmland, tree belts and power lines are typical features of the area.

- Waterbeach-Lode Fen LCA - A farmed landscape of fields bordered by drainage ditches, low hedgerows and woodland belts (Photo 2). The peaty soils are dark brown, supporting intensive arable agriculture. The landscape has an expansive, open character and the horizon and sky are an important component of panoramic, distant views. Around Quy Fen, there are areas of unploughed wildflower meadow, grazed by cattle. Willows and poplars mark the course of the River Cam and line

drainage ditches and ponds. The village of Waterbeach is situated on slightly higher land on the southern boundary of the LCA. It has expanded substantially and will continue to do so, with the Waterbeach New Town development, which received planning permission in 2019 ((S/0559/17/OL) and 2021 (S/2075/18/OL). Other settlement is dispersed, with isolated farms situated on slightly higher land and along straight roads or farm tracks. The area is tranquil, with little through traffic, and dark at night.



Photo 2: Waterbeach-Lode Fen LCA – flat, intensively farmed arable fields, open views and woodland belts are typical features of the area.

- River Cam Corridor LCA - The narrow LCA has a rural and pastoral character, even close to the city centre, and forms a distinctive approach to Cambridge from the north-east, through meadow and commons (Photo 3). The river, lined with willow, poplar and alder, has a secluded character for much of its length, but there are frequent views from the river and towpath out over farmland through gaps in the trees. The river has been heavily modified over the years and the sheet piled banks and lock structure at Bait's Bite Lock are characteristic features of the river management system. It is relatively dark at night and is tranquil for much of its length, except where it passes under the A14. The tow path is a well-used shared cycle and footpath, with the Fen Rivers Way, on the west bank, linking Cambridge with Ely and the Wash.



Photo 3: River Cam Corridor LCA – river management infrastructure, sheet piled river banks and the tree-lined towpath are typical features of the area.

Green Infrastructure

The study area lies within the zone of a number of green infrastructure projects such as the Wicken Fen Vision and the proposed Fens Biosphere. The new Greater Cambridge Green Infrastructure Opportunity Mapping report sets out broad opportunity zones for the theme of landscape, cultural heritage and sense of place, one of the seven themes of the mapping. The Proposed Development site is within or close to three opportunity zones which are shown on Figure 3 below: Wicken Fen Vision (1c), the North-east Fen Arc (1b) and the North-east Cambridge to Waterbeach Corridor (1k).

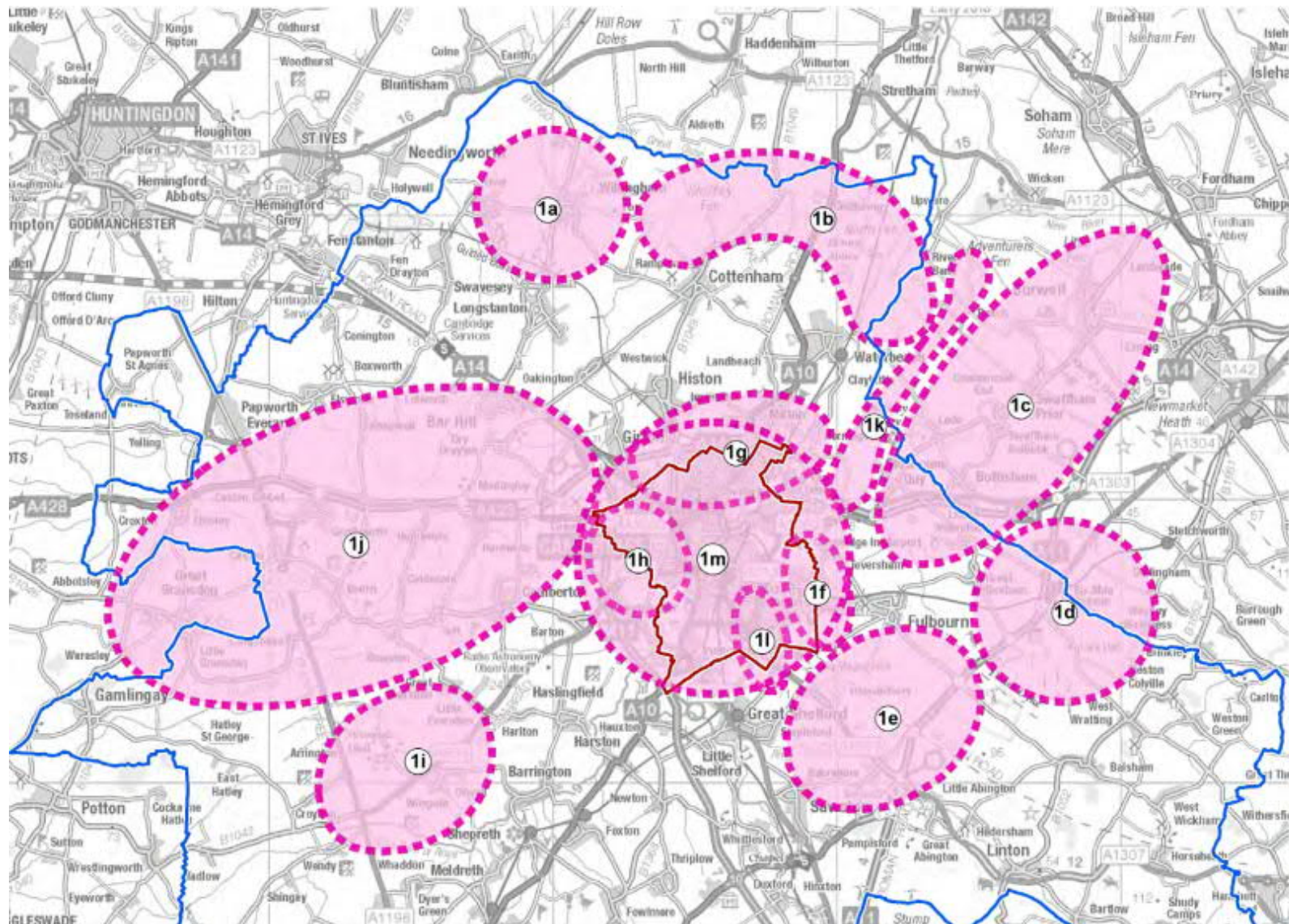


Figure 3: Showing broad opportunity zones - extract from Greater Cambridge Green Infrastructure Opportunity Mapping report, LUC 2021.

Green Belt

The Proposed Development, apart from a short section of the Waterbeach pipeline, would be situated in the Green Belt. The land proposed for the WWTP site was not included in the Cambridge Inner Green Belt Study, published in 2015, but the land the waste water transfer tunnel connecting the proposed WWTP with the existing Cambridge WWTP would pass under was included in the study. This pipeline would pass under Sector 19, described in the study as supportive landscape, which becomes distinctive along the river corridor and provides a soft green edge to Cambridge. Sector 19 is important to the setting of Fen Ditton and the City. A new assessment, the Greater Cambridge Green Belt Assessment, released in September 2021, assessed the landscape within the Green Belt in terms of its contribution to the three purposes of the Green Belt set out in the Cambridge Local Plan. The assessment found the land in the study area provides a low contribution to Purpose 1 (to preserve the setting of Cambridge) and a moderate contribution to Purposes 2 and 3 (to preserve the green separation between existing villages and urban expansion of Cambridge and to protect green corridors between open corridors and the urban areas). The Green Belt, along with designated landscape, heritage and ecological features and public rights of way (PRoW), is shown on Figure 4 below.

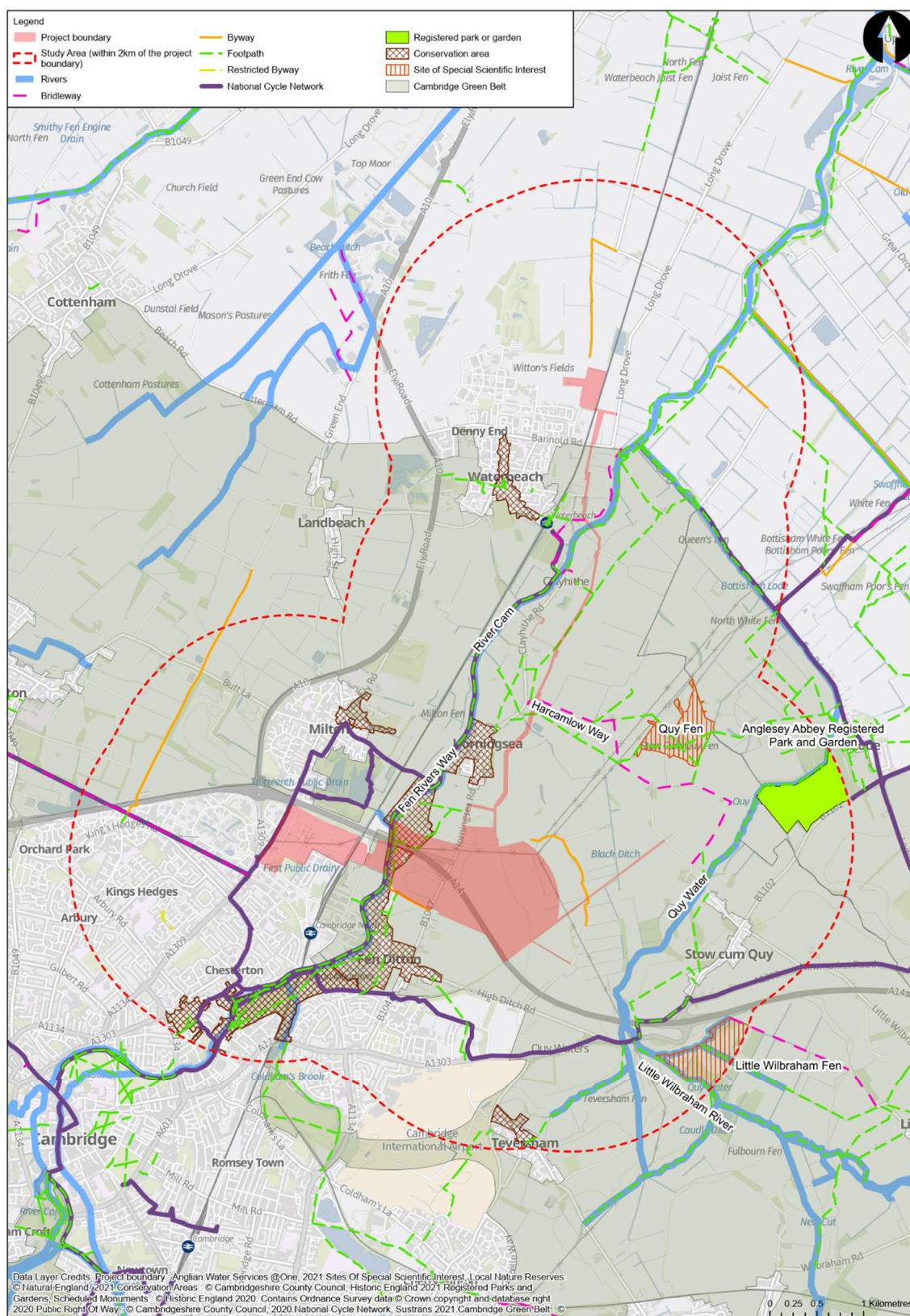


Figure 4: The Green Belt and designated landscape, heritage and ecological features and PRoW.

Local views and visual amenity

For the assessment, representative viewpoints have been identified to represent the views of people living, engaged in recreation or travelling in the area likely to be affected by the Proposed Development. This follows the approach to visual assessment set out in the in the Guidelines for Landscape and Visual Impact Assessment, Third Edition⁸. The representative viewpoints were selected in consultation with Greater Cambridge Shared Planning Service, Historic England, National Trust and Cambridge Past Present and Future⁹. They are listed in Table 1 below and shown on Figure 5 below.

Table 1: Representative viewpoints.

Representative viewpoint number	Visual receptors
1	Users of the Little Wilbraham Road looking north-west
2	Users of PRow network in and around Little Wilbraham Fen looking north-west
3	Residents of Church Road and Orchard Street, Stow cum Quy looking west
4	Users of Footpath Stow cum Quy 218/2 (Harcamlow Way) and guests at the Quy Mill Hotel looking west
5	Residents on Newmarket Road around Quy Waters looking north-west
6	Users of Low Fen Drove Way looking north-west
7	Residents of Orchard House, Black House and Hardwick House on High Ditch Road, Fen Ditton looking north
8	Future residents of the Marleigh Development (under construction) looking north
9	Users of High Ditch Road looking north
10	Residents of High Ditch Road, Fen Ditton looking north-east
11	Residents on the B1047 Horningsea Road and Musgrave Way, Fen Ditton looking north and north-east
12	Users of the A14 looking north
13	Residents in Gate House on Low Fen Drove Way looking west
14	Residents of Station Road, Quy and Quy Hall looking south-west
15	Users of Bridleway Stow cum Quy 218/5 looking west
16	Visitors to Anglesey Abbey Registered Park and Garden looking south-west
17	Users of Byway Fen Ditton 85/14 (Low Fen Drove Way) looking west
18	Users of Horningsea Road looking east
19	Residents of Green End and Byway Horningsea 130/3 (Field Lane) looking north

⁸ Guidelines for Landscape and Visual Impact Assessment, Landscape Institute and Institute for Environmental Management and Assessment, Third Edition, 2013.

⁹ At a Technical Working Group meeting and a follow-up meeting with Greater Cambridge Shared Planning Service on 7 12 2021 and 13 12 2021 respectively

Representative viewpoint number	Visual receptors
20	Residents of Fen Road looking north
21	Residents at Northern Bridge Farm looking south
22	Residents of Poplar Hall and Poplar Hall Farmhouse looking south, residents of Red House Close looking north and users of Footpath Fen Ditton 85/6 adjacent looking north and south
23	Users of Footpath Milton 162/1 and users of the River Cam looking east
24	Residents at Biggin Abbey House and associated cottages and users of Footpaths Fen Ditton 85/7 and 85/8 looking south and east
25	Users of shared foot/cycle path along Horningsea Road looking south-east
26	Users of Footpath Horningsea 130/1, Footpath Horningsea 130/2 and Footpath Fen Ditton 85/7 (Harcamlow Way and Fen Rivers Way) (near Biggin Abbey) looking east
27	Users of Users of Footpath Milton 162/1 (Fen Rivers Way/Haling Way along the River Cam), Footpath Fen Ditton 85/6 and Wildfowl Cottage looking east
28	Residents of High St, Horningsea looking south
29	Residents of Clayhithe Road, Horningsea looking east
30	Users of Footpath Horningsea 130/5 and Footpath Horningsea 130/6 and Bridleway Horningsea 130/8 (Harcamlow Way) looking east and west (PRoW crosses the zone)
31	Residents of Allicky Farm and users of Bridleway Stow cum Quy 218/5 looking south-west
32	Quy Fen and Footpath Stow cum Quy 218/8 looking south-west
33	Users of Footpath Horningsea 130/10 (PRoW crosses the zone) and residents at Eye Hall Farm and Mulberry House Farm looking east
34	Residents of Clayhithe Road, Horningsea looking east
35	Users of the Cambridge Motorboat Club and users of Footpath Horningsea 130/12 and Footpath Horningsea 130/13 looking east
36	Residents at Northfields Farm Cottages and users of Footpath Horningsea 130/14 looking south-west
37	Residents in Burgess Road looking east
38	Residents close to Bottisham Lock and Bannold Road looking west
39	Residents in Capper Road looking north-east
40	Users of Byway Waterbeach 247/14 looking south
41	Visitors to Ely Cathedral looking south

Residential and recreational receptors in the area are highly sensitive to visual change, people travelling on rural roads have a medium sensitivity to visual change and people working in the area or travelling on main roads such as the A14 have a low sensitivity to visual change. The viewpoint locations have been grouped in areas A-E where views of the Proposed Development and effects on views are likely to be similar. The representative

viewpoints and areas are shown on Figure 5 below. Photographs illustrating typical existing views within each area are shown below the figure, with a description of the existing view looking towards the Proposed Development.

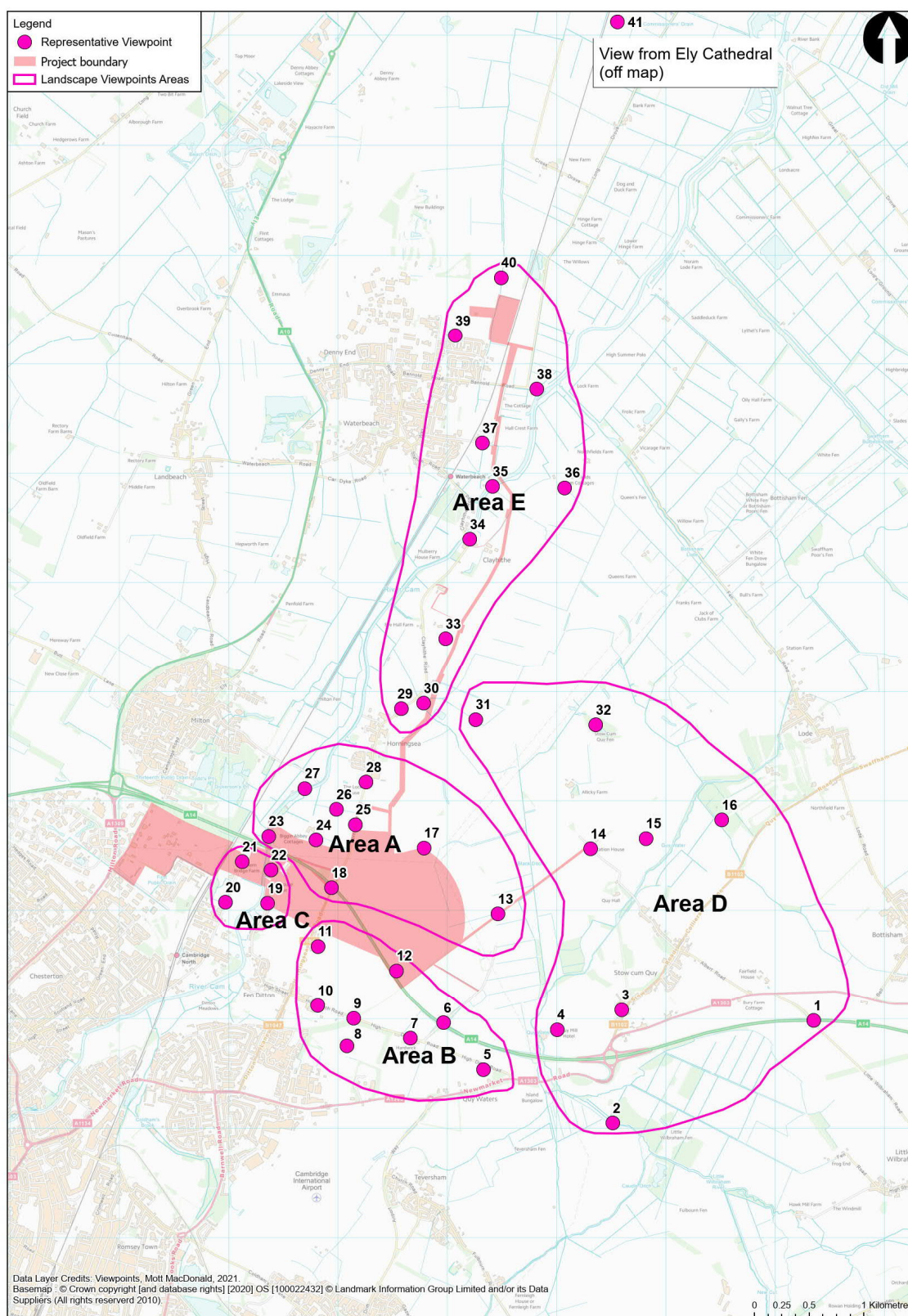


Figure 5: Representative viewpoints (pink dots) included in the assessment, grouped into areas where visual effects are likely to be similar.

Existing views

Area A: Existing views looking towards the site of the proposed WWTP and pipeline corridors in this area are expansive and rural in character, though traffic on the A14 and the pylons and power lines crossing the landscape are detracting features. The site of the proposed WWTP is clearly visible in uninterrupted views over open farmland from the B1047 Horningsea Road (Photo 4) and Low Fen Drove Way (Photo 5) and in filtered views from the Gate House (on Low Fen Drove Way). The site of the proposed WWTP is partially screened from Biggin Abbey House and associated cottages and the River Cam by a gentle rise in the landform to the east and by trees and vegetation lining the approach to Biggin Abbey House, Horningsea Road and the embankments of the bridge over the A14 (Photo 6).



Photo 4: Representative viewpoint 28 - the view south-east looking towards the site of the proposed WWTP from Horningsea Road and the cycleway. The site of the proposed WWTP is beyond Low Fen Drove Way.



Photo 5: Representative viewpoint 17 - the view south looking towards the site of the proposed WWTP from Low Fen Drove Way. The site is in the foreground.

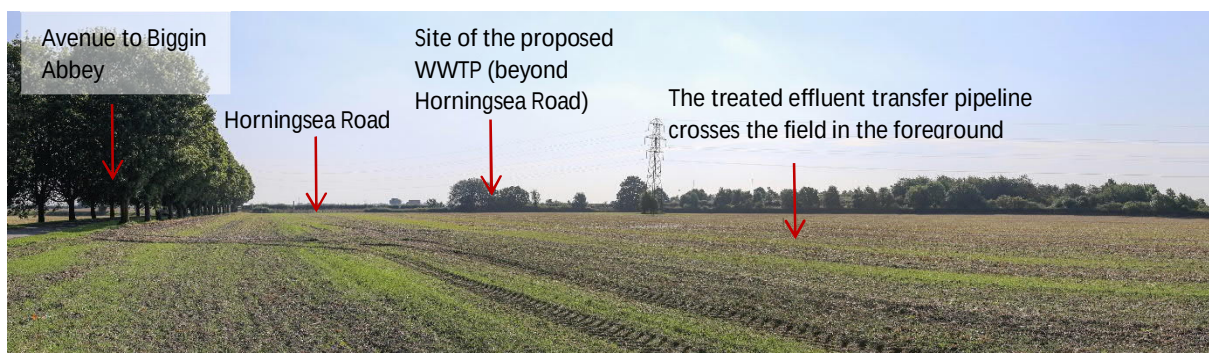


Photo 6: Representative viewpoint 24 - the view east looking towards the site of the proposed WWTP from Footpath Fen Ditton 85/8, south of Biggin Abbey. The site is beyond Horningsea Road.

Area B: Existing views looking towards the site of the proposed WWTP are over open, arable farmland. Lorries on the A14 can be seen crossing the view from High Ditch Road and from Horningsea Road in Fen Ditton but the road itself and the site of the proposed WWTP are mainly screened from Fen Ditton and the A14 by intervening vegetation (Photos 7 and 8). Pylons and overhead power lines crossing the site can be seen above the trees and hedgerows.

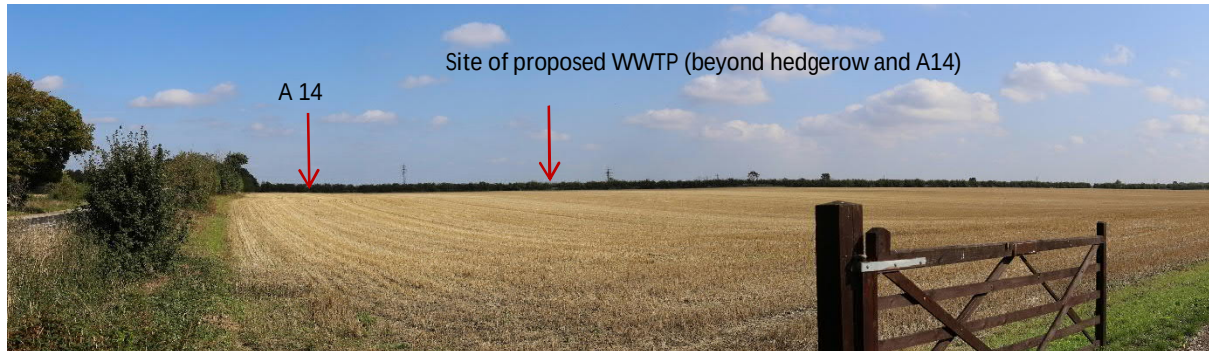


Photo 7: Representative viewpoint 11 - the view north-east looking towards the site of the proposed WWTP from Horningsea Road, Fen Ditton. The site of the proposed WWTP is beyond the A14.

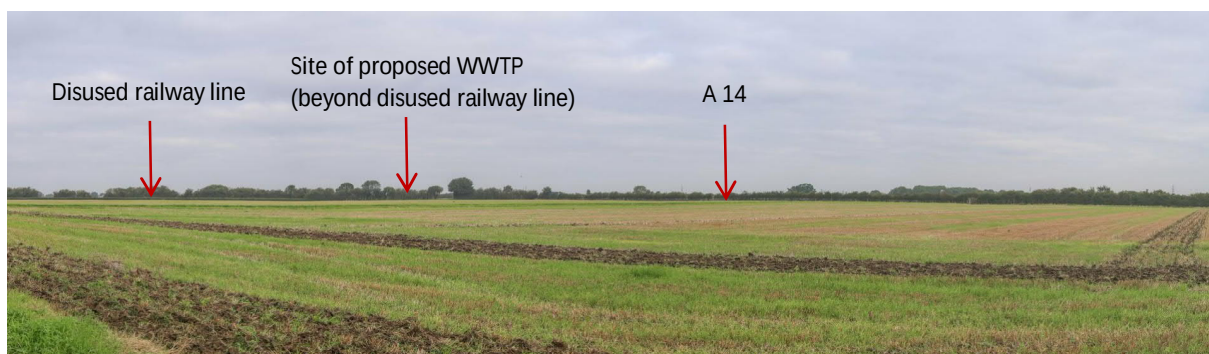


Photo 8: Representative viewpoint 7 - the view north looking towards the site of the proposed WWTP from High Ditch Road. The site of the proposed WWTP is beyond the A14 and the disused railway line

Area C: Existing views looking towards the transfer pipeline corridor are over grazing land and rough pasture, surrounded by hedgerows and belts of willow and poplar. The pipeline corridors are visible from Northern Bridge Farm (Photo 9), Poplar Hall, Poplar Hall Farmhouse, Red House Close and nearby PRoW (Photo 10).



Photo 9: Representative viewpoint 21 - the view south looking towards the transfer pipeline corridor from Fen Road, close to Northern Bridge Farm.



Photo 10: Representative viewpoint 22 - the view south looking towards the transfer pipeline corridor from Footpath Fen Ditton 85/6 close to Poplar Hall.

Area D: Existing views looking towards the site of the proposed WWTP from Stow cum Quy, Quy Mill, Quy Fen, Allicky Farm (Photo 11) and the landscape to the north and east (Photo 12) are over large arable fields and open areas of meadow, separated by tree belts and woodland. These screen most long views, but the tops of the pylons on the site are visible from some locations between gaps in the trees. The site of the proposed WWTP and the Waterbeach pipeline corridor are visible from the Harcamlow Way and Footpath Horningsea 130/6, near Horningsea, where the landscape is more open. The site of the Proposed WWTP is not visible from the grounds of Anglesey Abbey, due to the extensive woodland there and only the tops of the pylons on the site can be seen from Wilbraham Fen.



Photo 11: Representative viewpoint 31 - the view from Bridleway Stow cum Quy 218/5 (close to Allicky Farm).

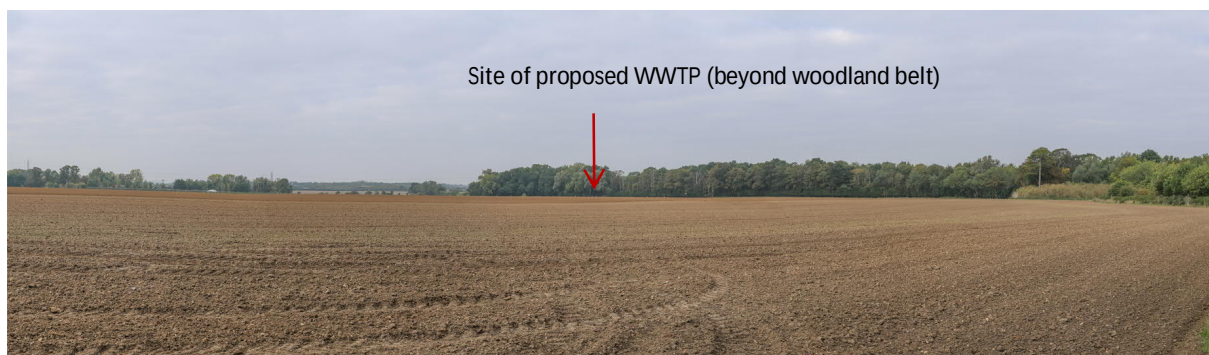


Photo 12: Representative viewpoint 4 - the view from Footpath Stow cum Quy 218/2 (between Quy Mill and Stow cum Quy).

Group E: Existing views looking towards the route of the Waterbeach pipeline between the Low Fen Drove Way and the River Cam at Waterbeach are over open arable fields separated by field drains and bordered by tree belts and woodland. Between the River Cam and the Waterbeach WRC views are less open, with lines of willow and poplar along watercourses and property boundaries screening long views over the landscape. The Waterbeach pipeline corridor is visible from the PRoW network along the route (Photo 13) and a small number of residential properties on the eastern boundaries of Horningsea, Clayhithe and Waterbeach (Photo 14).



Photo 13: Representative viewpoint 35 - the view towards the Waterbeach pipeline corridor from Footpath Horningsea 130/12 opposite the Cam Boat Club.



Photo 14: Representative viewpoint 37 - the view towards the Waterbeach pipeline corridor from Burgess Road, Waterbeach.

Greater Cambridge Shared Planning Service also asked for the view from Ely Cathedral to be included in the assessment. The cathedral is around 19km from the Proposed Development which would be difficult to discern in views from this distance. Therefore, effects on the landscape setting or visual amenity of the cathedral are unlikely.

How will the proposed relocation of Cambridge Waste Water Treatment Plant affect the landscape and change views during construction?

Effects on landscape character and visual amenity would arise from the presence in the landscape of:

- lighting in construction compounds and working areas
- cranes, tall structures, temporary buildings, materials and soil stockpiles, hard standing, fencing and equipment
- traffic movements and construction activity
- earthworks, including open cut trenching along the pipeline routes and access/drill pits where sections of pipeline are installed by tunnelling or horizontal directional drilling

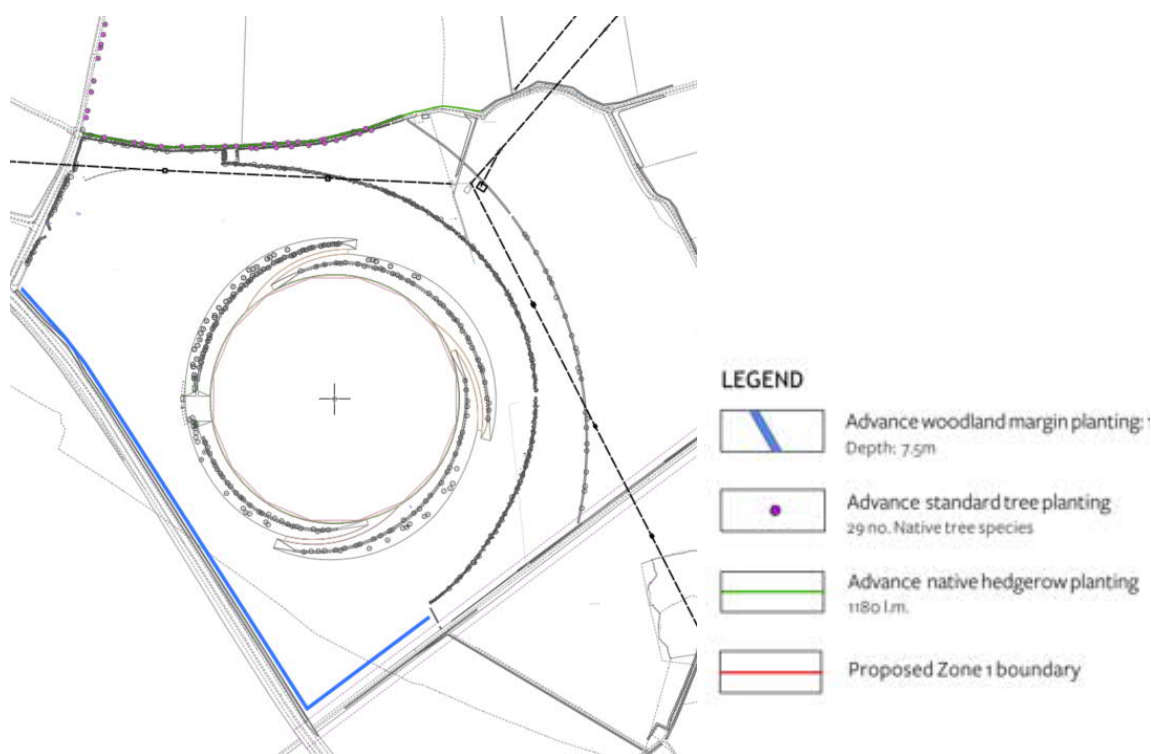
Effects in construction would be temporary apart from a small loss of trees and hedgerow, resulting in permanent effects. These are considered in the operational assessment.

Mitigation

Measures to reduce landscape and visual effects during construction include:

- initial planting, shown on Figure 6 below, would be carried out during construction including a hedge with standard trees along both sides of Low Fen Drove Way where it passes north of the site and a woodland belt approximately 7.5m wide along the southern boundary and along part of the eastern boundary of the proposed WWTP site. Trees would be planted in gaps between the existing trees along the eastern side of Horningsea Road between Low Fen Drove Way and Fen Ditton to reduce the prominence of the Proposed Development in the landscape, while maintaining open views over farmland to the south and east.¹⁰ The initial planting would advance the time when the landscape mitigation becomes effective as a screen, reducing impacts on views in the later phase of construction and in operation
- implementation of a code of construction practice (CoCP) with guidelines for the maintenance of site hoardings and fencing and the landscape treatment of stored soils (an outline CoCP is included as part of the PEI). The protection of existing trees and hedgerows to be retained would be carried out in accordance with Tree Protection Plan in the Arboricultural Assessment
- implementation of a lighting strategy to prevent glare and light spill from construction lighting and to minimise the use of lighting to areas under construction or necessary for site security

¹⁰ Many of the existing trees along Horningsea Road are ash and will potentially be affected by ash dieback.



Robert Myers Associates, 2022

Figure 6: Initial planting around the site of the proposed WWTP

Effects on landscape character in construction

The *Eastern Fen Edge LCA* would be affected by the construction of the proposed WWTP, waste water transfer tunnel and associated vent shaft, treated effluent transfer pipelines, Waterbeach pipeline and new junction on Horningsea Road. This would introduce large-scale construction works into the predominantly rural area, changing the character of the farmland between Waterbeach and Horningsea. Open arable fields would be replaced by a large construction site and construction corridors along the pipeline routes. There would be a reduction in tranquillity due to the activity generated by construction, vehicle movements and lighting. However, existing vegetation along Low Fen Drove Way, the A14, the disused railway line, the outskirts of Cambridge, Quy and Horningsea and north-east of proposed WWTP around Quy Fen would screen the majority of the construction works, associated with the proposed WWTP, from the wider landscape. A relatively small proportion of the LCA would be affected during construction, but effects on *Eastern Fen Edge LCA* would potentially be significant.

The *River Cam Corridor LCA* would be affected by the construction of a treated effluent transfer pipeline across a field south of Biggin Abbey and of a treated effluent discharge outfall on the eastern bank of the River Cam. Construction would take place close to the A14, where tranquillity is already low and would be screened from most of the LCA by riverside and roadside vegetation. However, there would be temporary PRow diversions, fencing and lighting in working areas. There would be noticeable adverse effects on the landscape during construction close to the outfall site, affecting a short stretch of the LCA between the A14 bridge over the River Cam and Bait's Bite Lock. Effects on the *River Cam Corridor LCA* in construction are unlikely to be significant.

The *Waterbeach-Lode Fen LCA* would be affected by the construction of the Waterbeach pipeline with open cut trenching for most of the route through farmland and tunnelling under the River Cam and railway line at Waterbeach. The working corridor for the open cut trenching would be approximately 30m wide and there would be drill pits at each end of the tunnels. The construction works would also require temporary P_{RoW} diversions, fencing and lighting in working areas. Tranquillity would be reduced by construction activity and traffic movements. The construction works would be screened from the wider area by existing vegetation and would affect a relatively narrow corridor of land along the pipeline route. Effects on the *Waterbeach-Lode Fen LCA* in construction are unlikely to be significant.

Effects on visual amenity in construction

The landscape of the study area is almost flat, with a gradual fall towards the River Cam. Consequently, there would be no elevated views of the construction works, except from the bridges over the A14. Construction of the proposed WWTP would take place immediately south of an existing power line which crosses the site. The pylons supporting the power line are approximately 30m above ground level. The tallest structures being built include the digesters up to 20m high and the boiler stack up to 24m high. Knowing the height of the pylons helps illustrate how visible the Proposed Development would be in construction: if more than the top third of the pylons were visible from any location, then the construction of the emerging digesters would be visible too. Cranes would be apparent above the skyline from more distant locations but they would be a narrow element in the view.

Visual effects would be most apparent from the areas close to the construction of the proposed WWTP and pipelines. Existing belts of woodland, trees and vegetation in the landscape and along the A14, the River Cam corridor and along the dismantled railway line (south-east of the proposed WWTP) would screen the majority of the construction works from the wider area, though the taller elements of construction would be visible above the trees in places.

Table 2 sets out the preliminary assessment of construction impacts to groupings of viewpoints.

Table 2: Representative viewpoints and visual effects in construction.

Areas of representative viewpoints	Representative viewpoints and visual receptors	Visual effects in construction
Area A (including representative viewpoints 13, 17, 18, 23, 24, 25, 26, 27 and 28)	Walkers and cyclists on Low Fen Drove Way, the B1047 Horningsea Road, P _{RoW} along the River Cam and north and south of Biggin Abbey. Residents of the Gate House on Low Fen Drove Way and Biggin Abbey House and associated cottages.	The construction of the proposed WWTP, treated effluent pipeline and discharge outfall would be prominent in views from Horningsea Road, Biggin Abbey House and associated cottages, the Gate House, Low Fen Drove Way and the P _{RoW} around Biggin Abbey. Construction of the treated effluent discharge outfall would be clearly visible from a short

Areas of representative viewpoints	Representative viewpoints and visual receptors	Visual effects in construction
	These receptors have a high sensitivity.	stretch of the River Cam, adjacent to the A14 bridge. Effects on the majority of visual receptors in this area in construction would potentially be significant.
Area B (including representative viewpoints 5, 6, 7, 8, 9, 10, 11 and 12)	Residents of Fen Ditton and travellers on the A14. Residential receptors have a high sensitivity and road users have a lower sensitivity.	The construction of the proposed WWTP would be a noticeable feature of the view from a small number of residential properties on High Ditch Road and Horningsea Road in Fen Ditton with open views of the site of the Proposed WWTP. The majority of views of construction from the village would be partially or fully screened by intervening vegetation in gardens and along the A14. Construction would be seen in fleeting views from the A14 through gaps in the roadside vegetation. Effects on the visual receptors in this area with open views of the site of the proposed WWTP in construction would potentially be significant.
Area C (including representative viewpoints 19, 20, 21 and 22)	Residents at Northern Bridge Farm, Red House Close, Poplar Hall and Poplar Hall Farmhouse. Walkers on the PRow network. These receptors have a high sensitivity.	The construction of the proposed waste water transfer tunnel and the ventilation shaft would be noticeable in filtered views from the residential properties and clearly visible from a short section of Footpath Fen Ditton 85/6. Effects on the visual receptors in this area in construction would potentially be significant.
Area D (including representative viewpoints 1, 2, 3, 4, 14, 15, 16, 31 and 32)	People using the PRow network in and around Quy Fen, Wilbraham Fen and Stow cum Quy, visitors to Anglesey Abbey and Quy Mill. Residents on Station Road (including Quy Hall) in Stow cum Quy and at Allicky	Cranes and the construction of the tallest structures on the proposed WWTP, such as the digesters and boiler stack, would potentially be visible from Quy Fen and Wilbraham Fen, from residential properties on Station Road, Allicky Farm, Quy Mill and the nearby PRow above

Areas of representative viewpoints	Representative viewpoints and visual receptors	Visual effects in construction
	Farm. Road users north of Little Wilbraham. Residential and recreational receptors have a high sensitivity and road users have a lower sensitivity.	intervening vegetation, but the majority of the works would be screened from view. Views of the construction works from the garden at Anglesey Abbey are unlikely due to the extensive woodland in the area and they would hard to discern from Wilbraham Fen or Little Wilbraham Road due to their distance from the proposed WWTP and intervening higher landform. Effects on the visual receptors in this area in construction are unlikely to be significant.
Area E (including representative viewpoints 29, 30, 33, 34, 35, 36, 37, 38, 39 and 40)	Residents in Horningsea, Clayhithe and Waterbeach. Walkers, riders and cyclist on the PRoW network and recreational users of the River Cam. These receptors have a high sensitivity to change.	The construction of the proposed Waterbeach pipeline between the Low Fen Drove Way and Clayhithe would be visible from stretches of the PRoW network. The excavation of the open trench and drill pits and laying of the pipeline would be noticeable in open and filtered views from a small number of residential properties on High Street, Horningsea and Clayhithe Road. The construction works between Clayhithe and the Waterbeach recycling centre would be largely screened by existing vegetation along field boundaries, the River Cam and the railway line but would be noticeable from stretches of the River Cam at Clayhithe, the nearby PRoW network and a small number of residential properties on Burgess Road and Burgess Drove in Waterbeach. Effects on the visual receptors in this area in construction are unlikely to be significant.

Once operational how will the relocated Cambridge Waste Water Treatment Plant affect the landscape and change views?

Effects on landscape character and visual amenity would arise from the presence in the landscape and views of:

- large-scale, permanent new structures including two digester towers (20m high), sludge storage tanks (14m high), cake storage area (15m high), gas handling structures (16m high), boiler building (12m high), boiler stack (24m high), gateway building, incorporating offices and the Discovery Centre (10m high) and workshops (13m high)
- a new junction on Horningsea Road, access road to the proposed WWTP and visitor parking
- an extension of the existing street lighting on Horningsea Road up to Low Fen Drove Way
- lighting and signage on the proposed WWTP
- increased traffic and activity due to the operation of the WWTP
- loss of vegetation, removed during construction, along the pipeline corridors and along Horningsea Road
- permanent new structures associated with the pipelines including the treated effluent treated discharge outfall (12m long x 5.5m wide and 4m high) set into the bank of the River Cam and a vent shaft (8m high) above the waste water transfer tunnel

How have we sought to reduce or minimise adverse landscape and visual effects through good design?

A large-scale infrastructure development in the countryside would inevitably change the character of the landscape and the composition of views in the area around the development. Following the guidance for minimising landscape and visual effects in the National Planning Policy Statement (NPS) for Waste Water, a landscape masterplan has been developed to provide the landscape context for the Proposed WWTP and long-term screening of the new structures from the surrounding area. The masterplan responds to the landscape guidelines in the Greater Cambridge Landscape Character Assessment (2021) with new hedgerows, woodland and tree belts, linear drainage features and substantial new areas of grassland. In line with the NPS, planting off site, including filling in gaps in the trees and a shelter belt along Horningsea Road, has been considered to mitigate impacts from more distant locations. The section below sets out the proposed mitigation for landscape and visual amenity.

Proposed mitigation and landscape design

The landscape masterplan for the Proposed WWTP is illustrated and described fully in the first iteration of the outline Landscape, Ecological and Recreational Masterplan (LERMP). The long-term maintenance of the landscape would be guided by the LERMP which would

outline the measures required to ensure the establishment and long-term healthy development of the new planting.

The landscape masterplan sets out the approach to the landscape design for the Proposed Development. The proposed WWTP site would occupy a circular space and would be surrounded by an earthwork bank 5-7m high, made from soils removed from the footprint of the Proposed Development and from the excavation of the tunnel and pipelines. The earthwork bank would be made up of four curved landforms, sloping down to ground level at the end of each landform to allow an air gap for ventilation across the proposed WWTP. The ends of the landforms would overlap, forming oblique gaps in the earthwork bank. The outside slopes of the earthwork bank would be gently sloped and seeded with grass and wildflowers and planted with trees. A hedgerow with standard trees would be planted around the top of the landscape earthwork. The inspiration for the earthwork bank came from nearby features such as Fleam Dyke near Fulbourn and Belsar's Hill at Willingham.

Areas of gently undulating land, resembling ridge and furrow farmland, in the meadow surrounding the earthwork bank would soften the transition between the bank and the low-lying landscape of the surrounding area. Woodland belts around much of the proposed WWTP perimeter would, when established, provide a screen between the proposed WWTP and the surrounding landscape. The woodland would vary in character with a mosaic of different habitat types including traditional, more densely planted woodland near Horningsea Road and the A14 and lighter, more informal woodland with open glades and rides nearer the proposed WWTP.

A new publicly accessible path would cross the eastern part of the site providing a new circular walk accessible from Low Fen Drove Way. A new bridleway is proposed along the existing farm track between Low Fen Drove Way and Station Road. This would open up an additional route for cyclists and walkers between Fen Ditton and Station Road, Stow cum Quay.

The new buildings and structures would be designed to minimise their prominence in the landscape. Staff parking would be sited inside the proposed WWTP, with only visitor parking visible outside the earthwork bank. The security fencing, which would surround the proposed WWTP, would be on the inner side of the earthwork bank. The lighting design would minimise skyglow and eliminate glare and light spill, with the use of light fittings that would direct light downwards. The majority of the proposed WWTP would not be continuously lit, with lighting mainly activated by sensors or by staff when needed. The existing street lighting on Horningsea Road would be extended north, up to Low Fen Drove Way.

Effects on landscape character in operation

Year 1 of operation

The *Eastern Fen Edge LCA* would be affected in year 1 of operation by the introduction of new large-scale infrastructure into the predominantly open rural landscape, substantially change the character of the farmland between Fen Ditton and Horningsea. The existing

open arable fields would be replaced by the proposed WWTP, grassed earthwork bank, access road, visitor parking area, lighting and a new junction on Horningsea Road. The lower parts of the structures of the proposed WWTP would be screened or partially screened by the earthwork bank, but the digester towers and other tall structures such as the sludge storage tanks, gas handling structures, boiler building, boiler stack and workshops would be new elements in the landscape, uncharacteristic of their rural setting. The earthwork bank itself would be a new feature in the flat landscape but the gentle gradient of the outer slopes and the undulations in the meadow would soften the transition between the bank and its surroundings.

The land affected by the construction of the treated effluent and waste water transfer tunnels would be restored to agricultural use at the end of construction but would be evident as disturbed land. There would be a loss of trees and vegetation from the eastern embankment of the Horningsea Road bridge over the A14 during construction of the proposed WWTP entrance and from adjacent to Red House Close during the construction of the 8m high vent shaft above the waste water transfer tunnel. This would open up views of the bridge and vent shaft from the wider landscape.

There would be a slight reduction in tranquillity due to the activity generated by vehicles visiting the site, but the site is close to the A14 which is a source of activity and noise in the area. Street lighting at the new Horningsea Road junction and lighting on the proposed WWTP would introduce lighting into an unlit landscape. Overall, the changes would affect a relatively small part of the LCA because existing vegetation along Low Fen Drove Way, the A14, the disused railway line and around Cambridge, Quy, Horningsea and the landscape to the north-east would screen much of the proposed WWTP from the wider landscape. Effects on the *Eastern Fen Edge* would be significant in the first year of operation.

The *River Cam Corridor LCA* would be affected in year 1 of operation by the introduction of a new treated effluent treated discharge outfall on the River Cam. The outfall would replace a section of grass river bank with a concrete structure, but it would be similar in appearance and scale to existing structures along the river associated with river engineering and drainage. The land affected by the construction of the treated effluent pipeline route would be restored to its former condition at the end of construction, but the route would be evident as a corridor of disturbed land. Street lighting at the Horningsea Road junction and in areas of the proposed WWTP would be visible against a dark background from the LCA. The outfall would affect a small stretch of the LCA as it would be screened from the wider area by existing vegetation, the A14 bridge and the curve in the River Cam to the north. Effects on the *River Cam Corridor LCA* are unlikely to be significant in the first year of operation.

The *Waterbeach-Lode Fen LCA* would be affected in year 1 of operation by the removal of a small number of trees and short sections of hedgerow during construction. The land would be restored to agricultural use at the end of construction, but the pipeline route would be evident as a corridor of disturbed land in the first year of operation. Effects on the *Waterbeach-Lode Fen LCA* are unlikely to be significant in the first year of operation.

Year 15

The *Eastern Fen Edge LCA* would remain affected in year 15 of operation by the presence of large-scale infrastructure in the predominantly rural landscape. The woodland planting of the landscape masterplan and on the earthwork bank would screen the proposed WWTP from north and west of the proposed WWTP but the upper parts of the digester towers and other tall structures including the sludge storage tanks, gas handling structures, boiler building, boiler stack and workshops would still be apparent in the landscape to the south. The maturing mitigation planting would in time change the character of the area between Horningsea and Fen Ditton, making it more wooded and less open, but similar size woodland belts are present in the LCA and in the adjacent Waterbeach-Lode Fen LCA. Thus, the new woodland would not be uncharacteristic of the local landscape. The farmland to the north of the site would remain open in character. Effects on the *Eastern Fen Edge LCA* in operation would reduce but potentially remain significant in year 15 of operation.

The *River Cam Corridor LCA* would remain affected in year 15 of operation by the presence of the treated effluent treated discharge outfall on the River Cam, but naturally regenerated riverside vegetation and the weathering of the concrete structure would aid its integration into the landscape. Effects on the *River Cam Corridor LCA* would be non-significant in year 15 of operation.

In the *Waterbeach Lode Fen LCA*, the maturing trees and hedgerow planted to replace vegetation removed during construction would restore the landscape along the pipeline corridor by year 15. Effects on the *Waterbeach Lode Fen LCA* would be non-significant in year 15 of operation.

Effects on visual amenity in operation

Year 1

The ZTV shown on Figure 7 below, shows the potential visibility of the Proposed Development in year 1 of operation, before any planting mitigation would be sufficiently established to provide screening. The areas coloured as a solid pink hatch show where the proposed WWTP would be most visible and the areas where the pink hatch is intermittent, show where it would be partially or fully screened from view. There would be no views of the Proposed Development in the areas coloured green. The ZTV shows the visibility of the most prominent of the tall structures on the proposed WWTP which are the digesters at 20m high¹¹. It suggests that the proposed WWTP would be most visible from the immediate landscape to the north, south and west, adjacent to Horningsea Road, High Ditch Road and Low Fen Drove Way. It would not be visible or visible in partially screened views from the villages of Horningsea and Stow cum Quy and would be largely screened from more distant locations including Wilbraham Fen and the open landscape to the east of the fen, Quy Fen, the River Cam, Anglesey Abbey and Cambridge. These views would be screened by variations in the local landform and/or existing belts of woodland, trees and vegetation in

¹¹ ZTVs generally overestimate the visibility of a development because they do not fully register the screening effect of existing vegetation such as tree belts. Nor do they take into account how the impact of a development on the view diminishes with distance.

the landscape and along the A14, the River Cam corridor and along the dismantled railway line. The viewpoint locations, grouped in areas A-E where views and effects on views are likely to be similar, are also shown on Figure 7 below.

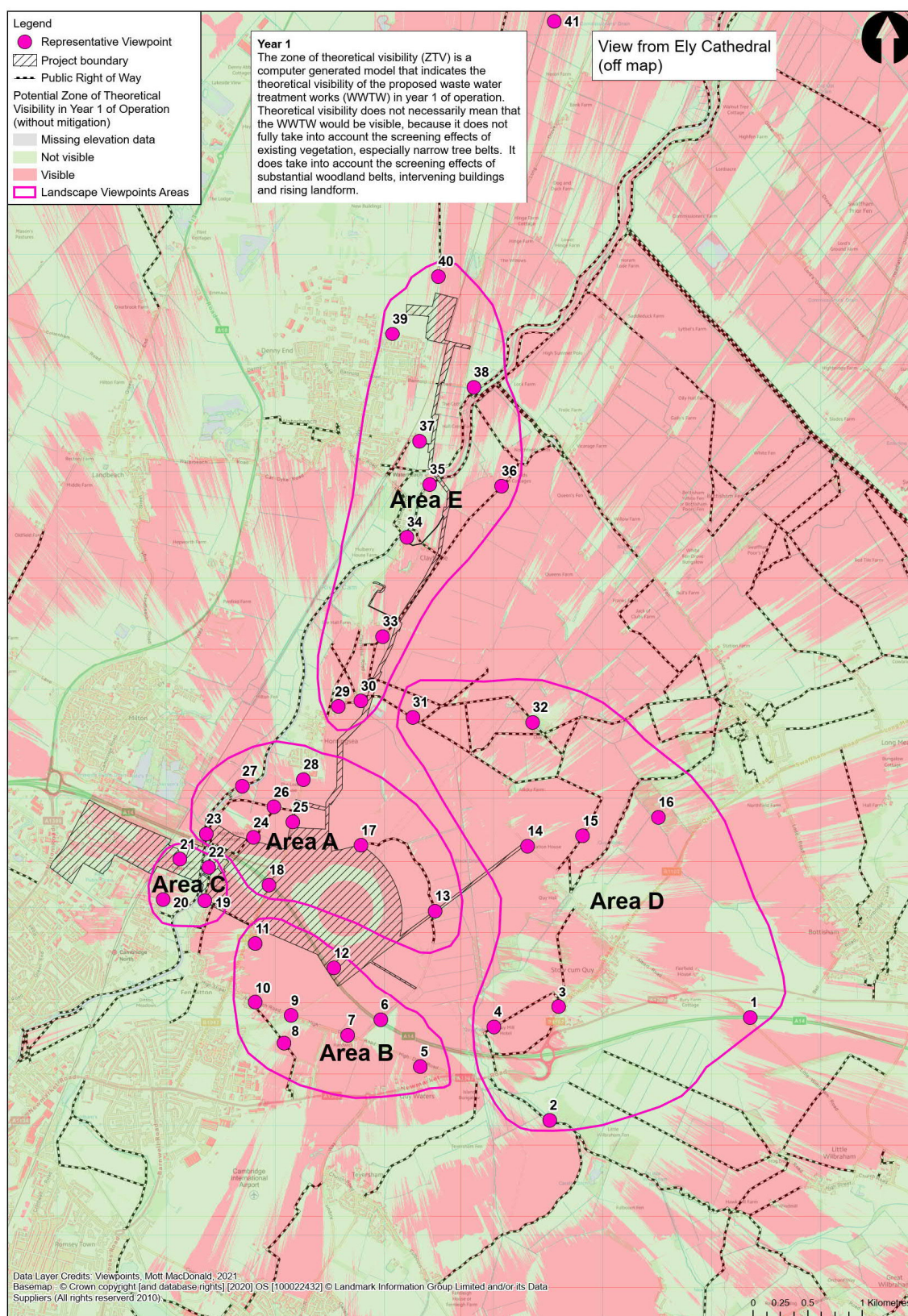


Figure 7: The ZTV in year 1 of operation and representative viewpoint locations

Visualisations illustrating the appearance of the proposed WWTP in views from Horningsea Road, High Ditch Road, Biggin Abbey and the landscape further north, near Quy Fen have been prepared and are in Appendix A.1. The views were selected in consultation with Greater Cambridge Shared Planning Service, Historic England, National Trust and Cambridge Past Present and Future¹². These are shown after the assessment below. These visualisations show the view of the proposed WWTP in winter in the first year of operation, before mitigation planting would provide any screening from the following locations:

- View north from High Ditch Road
- View east from Biggin Abbey
- View south-east from Horningsea Road near the Harcamlow Way
- View east from Horningsea Road near Low Fen Drove Way
- View east from the Horningsea Road bridge over the A14
- View south-east from Low Fen Drove Way
- View south from Footpath Horningsea 130/6
- View north from the A14

The visualisations confirm the findings of the ZTV. The views looking towards the proposed WWTP from Biggin Abbey and Horningsea Road in year 1, would be of the taller structures of the proposed WWTP above the grassed earthwork bank and beyond the existing trees on Horningsea Road. The view from further north along Horningsea Road shows the proposed WWTP clearly visible above the landscape earthwork bank but that the views over the landscape from the road would largely retain their open character. From High Ditch Road, the taller parts of the proposed WWTP would remain visible, along with the top of the earthwork bank. From the Horningsea Road bridge over the A14, there would be an elevated view from the bridge over the A14 in which the proposed WWTP, and especially the gateway building, would occupy a large proportion of the view. The view from the landscape north of the proposed WWTP (Footpath Horningsea 130/6) shows that existing intervening woodland would screen much of the Proposed development but that the taller elements and earthwork bank would be apparent from parts of the path where there is no intervening vegetation.

Table 3 sets out the preliminary assessment of impacts to groupings of viewpoints at year 1 of operation.

¹² At a Technical Working Group meeting and a follow-up meeting with Greater Cambridge Shared Planning Service on 7 12 2021 and 13 12 2021 respectively

Table 3: Representative viewpoints and visual effects in the first year of operation

Grouped representative viewpoints	Representative viewpoints and visual receptors	Visual effects in year 1 of operation
Area A (including representative viewpoints 13, 17, 18, 23, 24, 25, 26, 27 and 28)	Walkers and cyclists on Low Fen Drove Way, the B1047 Horningsea Road, PRow along the River Cam and north and south of Biggin Abbey. Residents of the Gate House on Low Fen Drove Way and Biggin Abbey House and associated cottages. These receptors have a high sensitivity.	The proposed WWTP would be prominent in views from Horningsea Road, Biggin Abbey House and associated cottages, the Gate House, Low Fen Drove Way and the PRow around Biggin Abbey. The Proposed Development would introduce large-scale infrastructure into existing views over farmland, occupying a large proportion of views from Horningsea Road and Low Fen Drove Way. Views from Biggin Abbey House and associated cottages, the Gate House, and the PRow around Biggin Abbey would be partially screened by intervening vegetation. The treated effluent discharge outfall would be clearly visible from a short stretch of the River Cam, adjacent to the A14 bridge, but would not be an uncharacteristic addition to the view since there are many similar structures associated with river engineering along the river corridor. Street lighting at the junction with Horningsea Road and on the proposed WWTP would introduce lighting into views over currently dark farmland. Effects on visual receptors in this area with open and close views of the proposed WWTP in year 1 of operation would potentially be significant.
Area B (including representative viewpoints 5, 6, 7, 8, 9, 10, 11 and 12)	Residents of Fen Ditton and travellers on the A14. Residential receptors have a high sensitivity and road users have a lower sensitivity.	The proposed WWTP would be a noticeable feature of views from residential properties on High Ditch Road and Horningsea Road in Fen Ditton. The taller structures on the proposed WWTP including the digester towers, boiler building, boiler stack and workshops would be clearly visible above intervening vegetation in gardens and along the A14. The proposed WWTP would be seen in fleeting views from the A14, through gaps in the roadside vegetation.

Grouped representative viewpoints	Representative viewpoints and visual receptors	Visual effects in year 1 of operation
		Street lighting at the junction with Horningsea Road and on the proposed WWTP would introduce lighting into views over currently dark farmland. Effects on a small number of visual receptors with open views of the proposed WWTP in year 1 of operation on High Ditch Road and Horningsea Road in Fen Ditton would potentially be significant.
Area C (including representative viewpoints 19, 20, 21 and 22)	Residents at Northern Bridge Farm, Red House Close, Poplar Hall and Poplar Hall Farmhouse. Walkers on the PRoW network. These receptors have a high sensitivity.	A vent shaft, 8m high, above the waste water transfer tunnel would be an uncharacteristic, but relatively small-scale addition to the view from Red House Close, Poplar Hall and Poplar Hall Farmhouse and a short section of Footpath Fen Ditton 85/6. The structure would be seen in the context of the A14 bridge over the River Cam. Views would be filtered from the residential properties but open from the PRoW. Effects on visual receptors in this area in year 1 of operation are unlikely to be significant.
Area D (including representative viewpoints 1, 2, 3, 4, 14, 15, 16, 31 and 32)	People using the PRoW network in and around Quy Fen, Wilbraham Fen and Stow cum Quy, visitors to Anglesey Abbey and Quy Mill. Residents on Station Road (including Quy Hall) in Stow cum Quy and at Allicky Farm. Road users north of Little Wilbraham. Residential and recreational receptors have a high sensitivity and road users have a lower sensitivity.	The tallest structures on the proposed WWTP, such as the digester towers, boiler building, boiler stack and workshops would potentially be visible in glimpsed views from Quy Fen, residential properties on Station Road, Allicky Farm, Quy Mill and the nearby PRoW above and between intervening vegetation, but the majority of the proposed WWTP would be screened from view. Views of the Proposed Development from the garden at Anglesey Abbey are unlikely due to the extensive woodland in the area and it would be hard to discern from Wilbraham Fen or Little Wilbraham Road due to their distance from the proposed WWTP and intervening higher landform.

Grouped representative viewpoints	Representative viewpoints and visual receptors	Visual effects in year 1 of operation
		Effects on visual receptors in this area in year 1 of operation are unlikely to be significant.
Area E (including representative viewpoints 29, 30, 33, 34, 35, 36, 37, 38, 39 and 40)	Residents in Horningsea, Clayhithe and Waterbeach. Walkers, riders and cyclist on the PRow network and recreational users of the River Cam. These receptors have a high sensitivity to change.	There is little vegetation along the route of the Waterbeach pipeline but a small number of trees and short sections of hedgerow would be removed during construction, potentially slightly opening up views over the landscape. The land would be restored by the end of construction, but the pipeline route would be evident as a corridor of disturbed land in the first year of operation. Effects on visual receptors in this area in year 1 of operation are unlikely to be significant.

Year 15

The ZTV shown on Figure 8 below, shows the potential visibility (areas hatched in blue) of the Proposed Development in year 15 of operation, when planting mitigation would be established. Trees and woodland were assumed to have grown to 7.5m in height and hedgerows to 2.5m in height for the ZTV. This is a fairly conservative estimate of growth rates and in practice, depending on the weather and other factors in the 15 years post planting, the vegetation could be higher than estimated for the ZTV (or of course lower).

By year 15, the ZTV shows that the mitigation planting would largely screen all the structures on the proposed WWTP from the landscape immediately to the west and north of the proposed WWTP, but that taller structures on the proposed WWTP such as the digester towers, boiler building, boiler stack and workshops would remain visible above the planting from residential properties in High Ditch Road and Horningsea Road in Fen Ditton, from parts of Low Fen Drove Way and from more distant locations to the south, east and north.

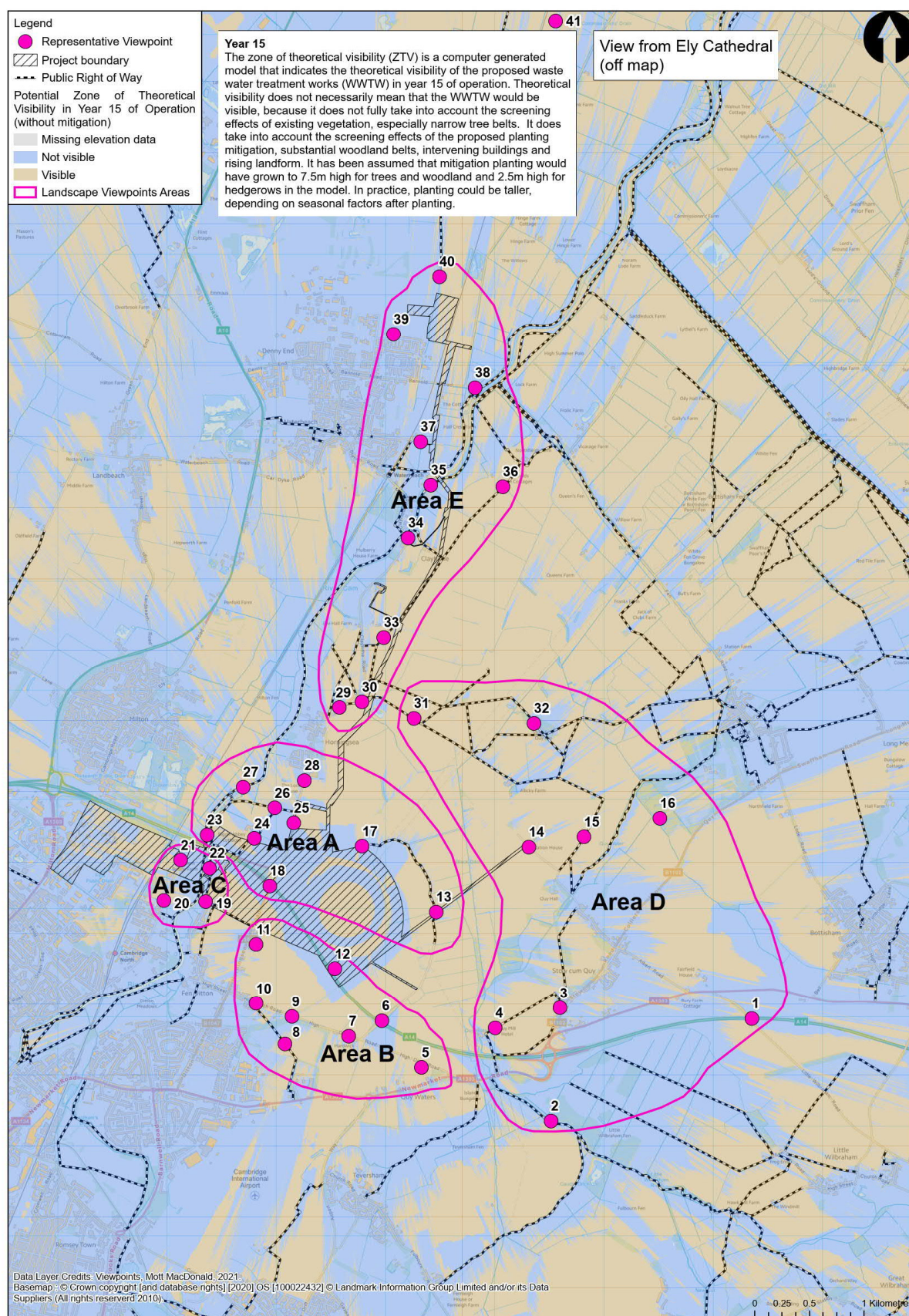


Figure 8: The ZTV in year 15 of operation and representative viewpoint locations

The growth rates used to model the ZTV in year 15 were also used to prepare visualisations showing the view of the proposed WWTP in winter in year 15 of operation from the following locations:

- View north from High Ditch Road
- View east from Biggin Abbey
- View south-east from Horningsea Road near the Harcamlow Way
- View east from Horningsea Road near Low Fen Drove Way
- View east from the Horningsea Road bridge over the A14
- View south from Footpath Horningsea 130/6
- View north from the A14

A visualisation was not prepared from Low Fen Drove Way in Year 15 because the view of the proposed WWTP would be fully screened by the trees and hedgerows along the southern side of the road (immediately adjacent to the viewpoint).

The visualisations, in Appendix A.1, confirm the ZTV. Views towards the proposed WWTP from Biggin Abbey and Horningsea Road in year 15 would be of the masterplan woodland and planting on the earthwork bank. This would screen the proposed WWTP and the traffic on the A14. The view from further north along Horningsea Road shows that the taller parts of the proposed WWTP would remain visible above woodland and planting on the earthwork bank and the views from the road would largely retain their open character. The new woodland of the masterplan would appear to merge with the existing woodland in the background of the view. From High Ditch Road, the taller parts of the proposed WWTP would remain visible in views filtered through trees on the earthwork bank. The elevated view from the Horningsea Road bridge over the A14 would be of the proposed WWTP, including the gateway building, beyond the landscape masterplan woodland. The view from Footpath Horningsea 130/6 shows that existing intervening woodland would screen much of the Proposed WWTP, but that the taller elements would remain visible from parts of the path where there is no intervening vegetation.

Table 4 sets out the preliminary assessment of impacts to groupings of viewpoints at year 15 of operation.

Table 4: Representative viewpoints and visual effects in year 15 of operation

Grouped representative viewpoints	Representative viewpoints and visual receptors	Visual effects in year 15 of operation
Area A (including representative viewpoints 13, 17, 18, 23, 24, 25, 26, 27 and 28)	Walkers and cyclists on Low Fen Drove Way, the B1047 Horningsea Road, PRow along the River Cam and north and south of Biggin Abbey. Residents of the Gate House on Low Fen Drove Way and Biggin Abbey House and associated cottages. These receptors have a high sensitivity.	The woodland surrounding the Proposed Development would screen the proposed WWTP from Horningsea Road, Biggin Abbey House and associated cottages, the River Cam, the Gate House, local PRow and Low Fen Drove Way. The taller structures on the proposed WWTP such as the boiler stack could remain apparent in gaps in the intervening vegetation. The woodland planting would however change the character of the view from places close to the proposed WWTP from an open view over farmland to a close view of a wooded landscape. Views from further north along Horningsea Road would retain an open character as the landscape masterplan planting would appear to merge into the existing background vegetation along the disused railway line and the outskirts of Cambridge. Effects on visual receptors close to the Proposed Development on Horningsea Road and Low Fen Drove Way in year 15 of operation would potentially remain significant.
Area B (including representative viewpoints 5, 6, 7, 8, 9, 10, 11 and 12)	Residents of Fen Ditton and travellers on the A14. Residential receptors have a high sensitivity and road users have a lower sensitivity.	The maturing planting on the earthwork bank would screen most views of the proposed WWTP from the A14 but the taller structures on the proposed WWTP such as the digester towers, boiler building, boiler stack and workshops would remain apparent in gaps in the vegetation in views from High Ditch Road and Horningsea Road in Fen Ditton. The proposed WWTP would remain a noticeable feature of these views. Effects on a small number of visual receptors with open views of the Proposed Development in year 15 of operation would potentially remain significant.
Area C (including representative viewpoints 1, 2, 3, 4, 14, 15, 16, 19, 20, 21, 22, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100)	Residents at Northern Bridge Farm, Red House Close, Poplar Hall and	The vent shaft would remain an uncharacteristic, but relatively small, addition to the view from Red House Close, Poplar Hall and Poplar Hall

Grouped representative viewpoints	Representative viewpoints and visual receptors	Visual effects in year 15 of operation
viewpoints 19, 20, 21 and 22)	Poplar Hall Farmhouse. Walkers on the PRoW network. These receptors have a high sensitivity.	Farmhouse and a short section of Footpath Fen Ditton 85/6 but seen in the context of the A14 bridge over the River Cam. Views would be filtered from the residential properties but open from the PRoW. Effects on visual receptors in this area in year 15 of operation are unlikely to be significant.
Area D (including representative viewpoints 1, 2, 3, 4, 14, 15, 16, 31 and 32)	People using the PRoW network in and around Quy Fen, Wilbraham Fen and Stow cum Quy, visitors to Anglesey Abbey and Quy Mill. Residents on Station Road (including Quy Hall) in Stow cum Quy and at Allicky Farm. Road users north of Little Wilbraham. Residential and recreational receptors have a high sensitivity and road users have a lower sensitivity.	Mitigation planting in year 15 would not change these receptors' views because the screening of the Proposed Development is provided by existing mature vegetation. The tallest structures on the proposed WWTP, such as the digesters towers, boiler building, boiler stack and workshops would potentially remain visible in glimpsed views from Quy Fen, residential properties on Station Road, Allicky Farm, Quy Mill and the nearby PRoW above and between intervening vegetation, but the majority of the proposed WWTP would be screened from view. Views of the Proposed Development from the garden at Anglesey Abbey are unlikely due to the extensive woodland in the area and it would hard to discern from Wilbraham Fen or Little Wilbraham Road due to their distance from the proposed WWTP and intervening higher landform. Effects on visual receptors in this area in year 15 of operation are unlikely to be significant.
Area E (including representative viewpoints 29, 30, 33, 34, 35, 36, 37, 38, 39 and 40)	Residents in Horningsea, Clayhithe and Waterbeach. Walkers, riders and cyclist on the PRoW network and recreational users of the River Cam. These receptors have a high sensitivity to change.	The land would be restored to its existing condition by year 15 and the pipeline route would no longer be evident as a corridor of disturbed land. Effects on visual receptors in this area in year 15 of operation would not be significant.

References

Cambridge Inner Green Belt Study, LDA, 2015

Greater Cambridge Landscape Character Assessment, Chris Blandford Associates, 2021

The Greater Cambridge Green Infrastructure Opportunity Mapping, LUC, 2021

Appendices

Methodology used for the preparation of the verified photomontages with a 39.6 degree x 27 degree field of view

The verified photomontages have been prepared in accordance with the Landscape Institute Technical Guidance Note 06/19 : Visual Representation of Development Proposals (September 2019).

CAMERA EQUIPMENT Camera – Sony A7rIV with Sigma 35mm lens. Panoramic mount - custom engineered to rotate the camera in a flat plane within 0.015 degrees to the horizon.

IMAGE CAPTURE The camera was mounted on a tripod 1.65m above the ground and high quality architectural photographic practice was used to capture the view in two-point perspective. For panoramic images the camera was placed on a rotating mount and a sequence of images sharing the same point of perspective and orientation with respect to the horizon were captured using a fixed 35mm lens. Images were captured in RAW format and a photograph taken of the camera in its location. Reasonable effort was made to capture images in the best weather and at the best times of day with regards to the angle of the sun.

SURVEY A Leica total station was used to record a set of 15-25 3d coordinates within the view. These coordinates were aligned to OS using a Leica Viva GNSS system. Where a view was in a rural location with no fixed survey points, temporary survey targets were placed and the survey undertaken at the same time as the photography.

IMAGE PROCESSING The RAW image was processed into a tiff image which was remapped to remove all lens distortion to ensure a perfect fit with the 3d data. For panoramic images, the individual frames were stitched together in specialist software to create a seamless image to the specified FOV in an equirectangular projection. The image was then placed into a larger background and positioned so that the calculated position of the image's optical axis was aligned with the centre of the background to compensate for any lens shift.

CAMERA ALIGNMENT The OS coordinate and orientation of the camera was calculated using the 3d OS survey coordinates and their corresponding 2d coordinates on the image. The values obtained by this process along with the OS coordinates were moved to a local point of origin to reduce their numerical size and entered into the 3ds Max Physical camera controls and the survey points rendered out over the background image to verify the alignment.

OUTPUT PACKAGE A high resolution layered tiff file with marked survey points and corresponding rendered objects as separate layers. Information describing the physical parameters of the camera and the time and date of the image capture. 3ds Max Physical Camera aligned to survey. A spreadsheet and DXF of survey points and camera coordinates in original OS and local coordinates. A photographic record of the camera in its position.

In year 1, mitigation planting is shown at planting size.

In year 15, mitigation planting is shown between 5 - 7.5m high for woodland, 7.5 - 10m high for trees and 2 - 3m high for hedgerows,. Heights vary depending on the location of planting.

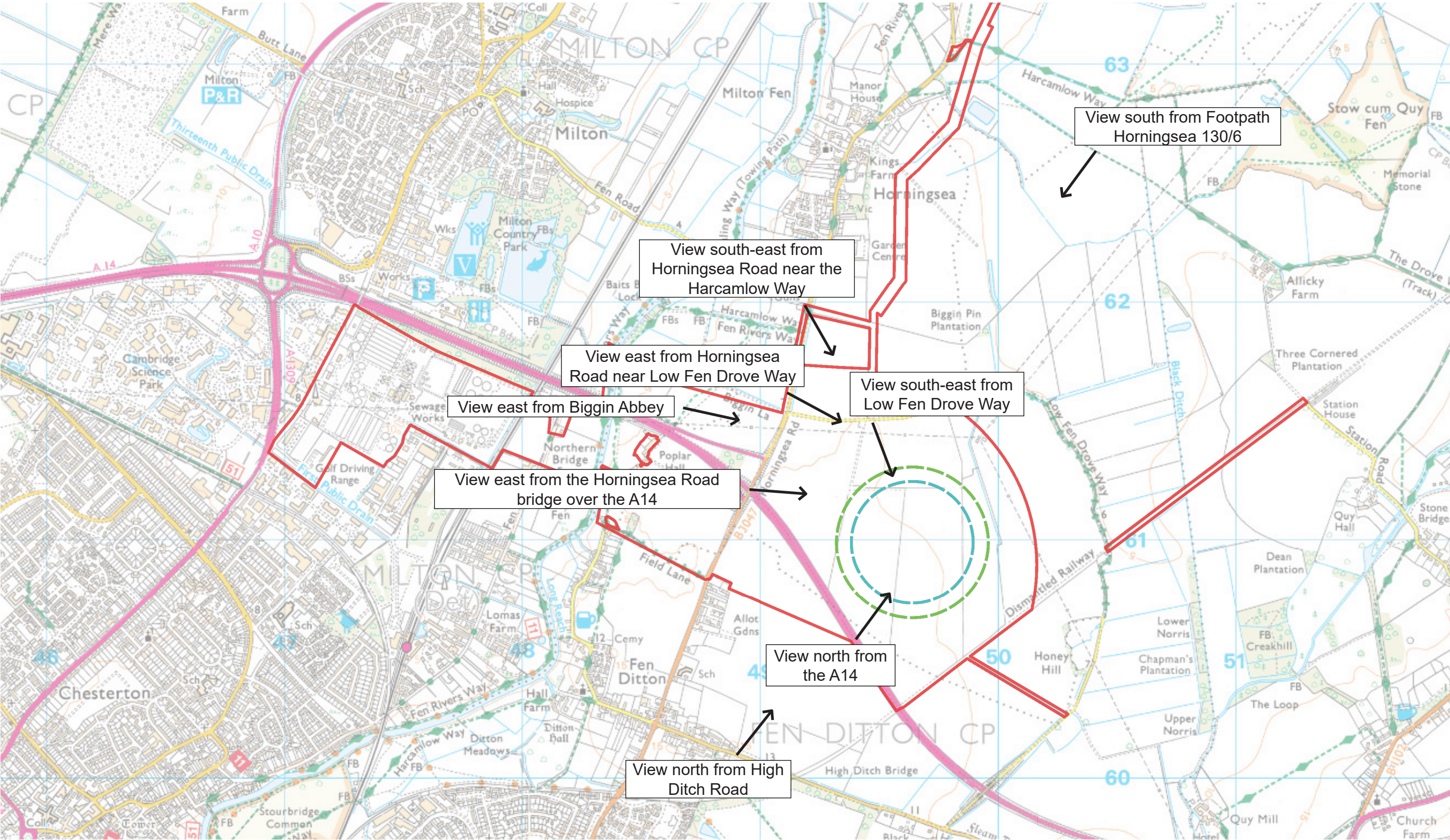
	View north from High Ditch Road	View east from Biggin Abbey	View south-east from Horningsea Road near the Harcamlow Way	View east from Horningsea Road near Low Fen Drove Way	View east from Horningsea Road bridge over the A14	View south-east from Low Fen Drove Way
Visualisation type	Type 4	Type 4	Type 4	Type 4	Type 4	Type 4
Projection	Planar	Planar	Planar	Planar	Planar	Planar
Enlargement factor	100% @ A3	100% @ A3	100% @ A3	100% @ A3	100% @ A3	100% @ A3
Date and time of capture	16.12.21, 09.53am	16.12.21, 11.42am	16.12.21, 11.17am	16.12.21, 10.21am	16.12.21, 10.09am	16.12.21, 10.50am
Make and model of camera, sensor format	Sony A7rIV	Sony A7rIV	Sony A7rIV	Sony A7rIV	Sony A7rIV	Sony A7rIV
Make, focal length of lens	Sigma 35mm	Sigma 35mm	Sigma 35mm	Sigma 35mm	Sigma 35mm	Sigma 35mm
Horizontal field of view	39.6 degrees	39.6 degrees	39.6 degrees	39.6 degrees	39.6 degrees	39.6 degrees
Vertical field of view	27 degrees	27 degrees	27 degrees	27 degrees	27 degrees	27 degrees
Direction of view	North	East	South-east	East	East	South-east
OS coordinates of lens	548899.41, 260112.828	548828.305, 261656.772	549163.877, 261813.906	549112.036, 261574.855	548946.657, 261200.709	549198.16, 261519.477
Lens height mAOD	14.859	07.256	10.378	08.785	17.958	09.423
Ground height mAOD	13.209	05.606	08.728	07.135	16.308	07.773
Distance to nearest site boundary	592m	within site boundary	within site boundary	within site boundary	within site boundary	within site boundary
Height of camera lens above ground	1.65	1.65	1.65	1.65	1.65	1.65

Methodology used for the preparation of the verified photomontages with a 39.6 degree x 27 degree field of view

The verified photomontages have been prepared in accordance with the Landscape Institute Technical Guidance Note 06/19 : Visual Representation of Development Proposals (September 2019).

	View south from Footpath Horningsea 130/6	View north from the A14
Visualisation type	Type 4	Type 4
Projection	Planar	Planar
Enlargement factor	100% @ A3	100% @ A3
Date and time of capture	16.12.21, 12.22pm	16.12.21, 09.13am
Make and model of camera, sensor format	Sony A7rIV	Sony A7rIV
Make, focal length of lens	Sigma 35mm	Sigma 35mm
Horizontal field of view	39.6 degrees	39.6 degrees
Vertical field of view	27 degrees	27 degrees
Direction of view	South	North
OS coordinates of lens	550156.111, 262799.919	549440.933, 260541.629
Lens height mAOD	05.996	14.995
Ground height mAOD	04.346	13.345
Distance to nearest site boundary	1.26km	within site boundary
Height of camera lens above ground	1.65	1.65

Photomontage location plan



View north from High Ditch Road (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View north from High Ditch Road (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View north from High Ditch Road (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Biggin Abbey (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Biggin Abbey (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Biggin Abbey (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south-east from Horningsea Road near the Harcamlow Way (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south-east from Horningsea Road near the Harcamlow Way (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south-east from Horningsea Road near the Harcamlow Way (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Horningsea Road near Low Fen Drove Way (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Horningsea Road near Low Fen Drove Way (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Horningsea Road near Low Fen Drove Way (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Horningsea Road bridge over the A14 (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Horningsea Road bridge over the A14 (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View east from Horningsea Road bridge over the A14 (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south-east from Low Fen Drove Way (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south-east from Low Fen Drove Way (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south-east from Low Fen Drove Way (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south from Footpath Horningsea 130/6 (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south from Footpath Horningsea 130/6 (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View south from Footpath Horningsea 130/6 (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View north from the A14 (existing view)



Existing view (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View north from the A14 (year 1)



Verified photomontage year 1 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)

View north from the A14 (year 15)



Verified photomontage year 15 (planar projection, field of view 39.6 degrees x 27 degrees, to be viewed at A3)