

accommodate new built development without significantly diminishing the sense of separation between the settlements or the rurality of the remaining undeveloped land. This land parcel is located adjacent to an industrial site and opposite a petrol station on the A12, which separates the land from the wider belt of countryside to the south.'

'One parcel of land on the southern edge of Mark's Tey, identified as providing a low contribution to the separation of settlements, has the most potential in relative terms to accommodate new built development, as the land is under a strong urban influence and is already partly developed as a vehicle storage area.'

- 3.4.27 On the basis of this Study, most of the land between Mark's Tey and Easthorpe is considered to provide a high contribution to the physical and visual separation between the settlements. The sense of separation between the settlements is achieved due to distances between the villages and by the visual enclosure provided by hedgerows and woodland cover and by the strength of the rural character of fields, which is essential in helping retain the character and identity of these settlements. It is therefore considered desirable to safeguard this part of the Site from inappropriate development.
- 3.4.28 At the western end of Mark's Tey, arable fields on either side of Dobbies Lane is considered to provide a contribution to separation between the two settlements. However, large scale buildings are located adjacent to an industrial site and a petrol station on the opposite side of the A12. Consequently, they appear more as an extension of the adjacent settlement rather than isolated features in the countryside. In this context, these fields and their associated greenhouses are considered to have no more than a medium contribution to the sense of separation between Mark's Tey and Easthorpe.
- 3.4.29 There is an area of hardstanding extending southeast from Mark's Tey, south of the intersection of the A12 and A120, that has a predominantly urban fringe character and makes a low contribution to the sense of separation between the settlements. The adjacent field is enclosed by built development on three sides and also makes only a low contribution to the separation of settlements.
- 3.4.30 In addition to the green gaps identified by the Study, it is considered desirable to safeguard land to the south of Great Tey and land to the east of Coggeshall from development, to provide green gaps between these settlements and future development within the Site.

Further Work Recommendations

- 3.4.31 The following further studies/surveys are recommended to inform the masterplanning, environmental assessment and mitigation for development on the Site:

- A detailed visual impact assessment should be carried out from key locations during winter and summer to assess impact of development proposals on sensitive receptors in and around the Site as appropriate.
- A detailed landscape character assessment of the Study Area should be undertaken to inform assessment of potential landscape impacts and detailed mitigation measures.
- A detailed age and condition tree survey is required to inform the masterplanning process, by setting out the required distance between retained trees and development as defined by British Standard BS 5837:2012.

3.5 Summary

- 3.5.1 The Environmental Audit has demonstrated that development would change the character of the Site from a rural arable landscape to a residential dominated landscape, and change the nature of views within the Site. The degree of this change would depend on the scale of development and the extent to which mature hedgerows and trees are retained as part of the structural landscape framework for the Site.
- 3.5.2 The majority of land within the Site provides a high contribution to the separation of Colchester and adjacent settlements in the west, including Mark's Tey and Eight Ash Green, which is essential in helping retain the character and identity of these settlements. It is therefore considered desirable to safeguard these parts of the Site from inappropriate development, including land to the south of Great Tey, and land to the east of Coggeshall.
- 3.5.3 In recognition of the Site's high to moderate value and sensitivity in most areas, care is needed through site masterplanning and design to mitigate potential adverse impacts on the adjacent townscape or wider landscape. In particular, care should be taken to avoid loss of the woodlands and hedgerows/field boundaries that form screening elements in views from the edge of the Marks Tey area and the eastern area of the Site, at Eight Ash Green, and smaller settlements within and adjacent to the Site. The existing landscape structure across the site should be retained and strengthened.

4.0 WATER QUALITY AND FLOOD RISK

4.1 General

4.1.1 This section identifies the constraints and opportunities for development of the Site in relation to ground/surface water quality and flood risk.

4.2 Audit Methodology

4.2.1 The methodology comprises a review of the baseline conditions of surface and groundwater through a desktop study of available data. The potential issues for development of the Site with regards to the water environment are then considered.

4.2.2 The Study Area for the audit extends 1km around the Site.

4.3 Existing Conditions

Groundwater

4.3.1 The Site is located on Thames Group bedrock (previously known as London Clay) – this is silty clay/mudstone, sandy silts and sandy clayey silts of marine origin. Much of the bedrock within the Marks Tey area of the Site is overlain by glacial till, with a small area of clay in the east. The superficial deposits for the Eight Ash Green area are predominantly glacial sand and gravel. The clay, silt, sand and gravel has led to the presence of a secondary aquifer beneath the majority of the Study Area.

4.3.2 Due to the nature of this Environmental Audit and the lack of borehole information at this stage, the extent and how deep underground the aquifer is located is not known. However due to the variable permeability of the geology, groundwater would tend to be perched in the more permeable bands and lenses and may be encountered close to the surface.

4.3.3 The nearest groundwater protection zones are to the east of Kelvedon (to the south west of the Site), and along the River Colne corridor at Fordstreet and West Bergholt (to the north of the Site). There is also one in the centre of Colchester. These groundwater protection zones are delineated by the Environment Agency to protect groundwater sources of public water supply.

Surface Water

- 4.3.4 As shown of **Figure 3.2**, a number of watercourses run through or close to the Site. Roman River runs west-east through the northern part of the Site, to the north of Marks Tey. To the east of the Site, the river runs south east and then east, before joining the River Colne to the south of Wivenhoe. In the south of the Site, to the west of Easthorpe, is Domsey Brook, which runs south west from the Site, and joins the River Blackwater to the east of Kelvedon.
- 4.3.5 In addition, there are a number of ditches and small streams located across the Site, and several small ponds and reservoirs scattered across the area. The reservoirs are predominantly associated with farms.

Water Quality

- 4.3.6 The Site lies within the Combined Essex Catchment of the Anglian River Basin District. Since 2009 the implementation of the Water Framework Directive has led to the provision of detailed classification information about the ecological and chemical status of UK rivers. Under the directive, the UK will have to ensure that there is no deterioration in the quality of our water bodies, and that all water bodies improve to reach ‘good ecological status’ as soon as possible. The current chemical and ecological status (most recent data available from 2014), and comparable status from 2009, where available, is set out in **Table 5.1**.

Table 5.1: Summary of Water Quality Monitoring Data¹⁴

River	Property	Date	Grade ¹⁵
River Blackwater	Chemical (overall)	2009	Fail
	Chemical (overall)	2014 (Cycle 1)	Fail
	Chemical (overall)	2014 (Cycle 2)	Fail
	Ecological (overall)	2009	Poor
	Ecological (overall)	2014 (Cycle 1)	Poor
	Ecological (overall)	2014 (Cycle 2)	Moderate
Domsey Brook	Chemical (overall)	2009	N/A
	Chemical (overall)	2014 (Cycle 1)	N/A
	Chemical (overall)	2014 (Cycle 2)	Good
	Ecological (overall)	2009	Moderate
	Ecological (overall)	2014 (Cycle 1)	Poor
	Ecological (overall)	2014 (Cycle 2)	Moderate
Roman River	Chemical (overall)	2009	N/A
	Chemical (overall)	2014 (Cycle 1)	N/A
	Chemical (overall)	2014 (Cycle 2)	Good
	Ecological (overall)	2009	Moderate

¹⁴ Based on available water quality monitoring data from the Environment Agency between 2009 and 2014

¹⁵ Chemical status: is recorded as good or fail. A status of good means that concentrations of priority substances and priority hazardous substances do not exceed the environmental quality standards in the EQS Directive. Ecological Status: There are five classes of ecological status (high, good, moderate, poor or bad). Ecological status applies to surface water bodies and is based on the following quality elements: biological quality, general chemical and physico-chemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic), and hydromorphological quality.

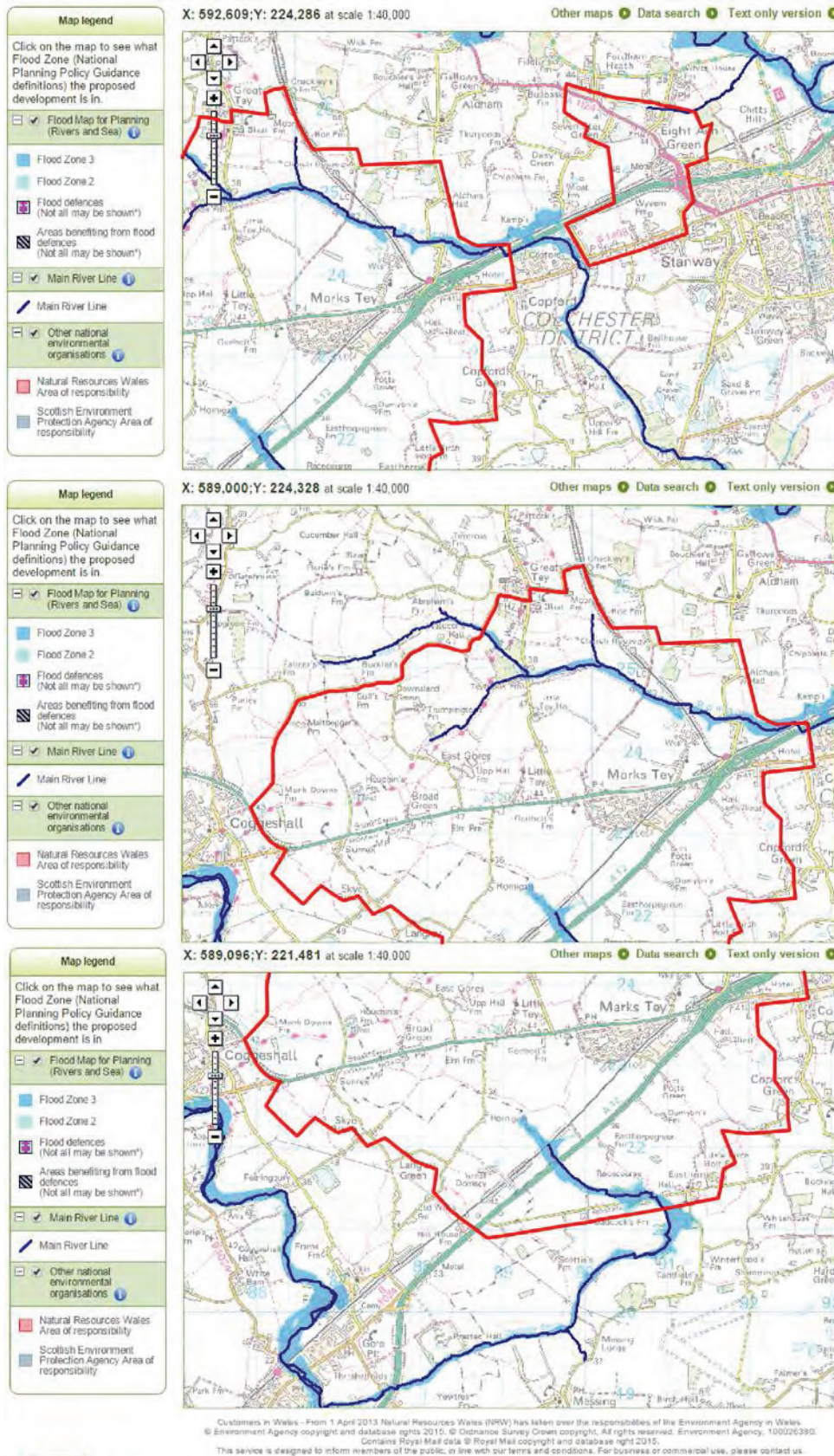
River	Property	Date	Grade ¹⁵
	Ecological (overall)	2014 (Cycle 1)	Poor
	Ecological (overall)	2014 (Cycle 2)	Moderate
River Colne	Chemical (overall)	2013 (Cycle 2)	Good
	Chemical (overall)	2014 (Cycle 1)	Good
	Ecological (overall)	2013 (Cycle 2)	Moderate
	Ecological (overall)	2014 (Cycle 2)	Moderate

- 4.3.7 The results in **Table 5.1** show that the ecological quality of the River Blackwater is yet to reach the required 'Good' standard, scoring 'Poor' for phytobenthos (during the first measurement cycle of 2014). The river also has a 'Poor' score for presence of phosphates. The river fails its chemical assessment and has done so consistently since 2009 due to the presence of Tributyltin compounds.
- 4.3.8 Domsey Brook is yet to reach the required 'Good' ecological standard, due to only a 'Moderate' score for dissolved oxygen, and also gaining a 'Poor' score for phytobenthos during the first cycle of 2014. It does however have 'Good' chemical status.
- 4.3.9 The Roman River is yet to reach the required 'Good' ecological standard, gaining a 'Poor' score for phytobenthos during the first cycle of 2014. The river also has a 'Poor' score for presence of phosphates during the first measurement cycle of 2014. It does however have 'Good' chemical status.
- 4.3.10 The ecological quality of the River Colne is yet to reach the required 'Good' standard, due to only a 'Moderate' score for presence of invertebrates, the cause of which is noted to be 'unknown'. The river also has only a 'Moderate' score for quantities of dissolved inorganic nitrogen, preventing an overall score of 'Good'. It does however have 'Good' chemical status.

Flood Zones

- 4.3.11 As shown on **Figure 4.1**, the Environment Agency's Flood Zone mapping within the Study Area includes the Roman River and Domsey Brook.
- 4.3.12 Flood Zone 3 shows the area that could be affected by flooding, if there were no flood defences. This area could be flooded: from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year; or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

Figure 4.1 - Environment Agency Flood Zones



- 4.3.13 Flood Zone 2 shows the additional extent of an extreme flood. The combination of Zones 2 and 3 show the extent of the natural floodplain if there were no flood defences.
- 4.3.14 Within the Site, small areas of Flood Zones 2 and 3 are associated with both the Roman River and Domsey Brook. There is also a small, unnamed stream just within the site in the north at Eight Ash Green which has some tiny areas of floodplain associated with it, but these are too small to be visible at the available map scale. The floodplain of the Roman River runs along the majority of its length where it crosses the site to the north of Marks Tey, and is over 100m wide in places. The floodplain of Domsey Brook also extends along the full length of the brook within the Site.

4.4 Constraints and Opportunities

Pollution Effects on Groundwater Quality

- 4.4.1 The presence of an underlying secondary aquifer beneath the Site provides the potential for contamination of groundwater through leaching of water through the ground during construction and operational activities.
- 4.4.2 During construction, certain activities such as piling could create a pathway for pollutants at the surface to reach groundwater. This could be an issue where and if ground containing elevated concentrations of contaminants were to be encountered. There would also be a risk during piling of spillage or leakage of oil or fuel or other liquid chemicals, which could reach the hole into which the pile is being sunk with a resultant risk to groundwater.
- 4.4.3 Once any future development is completed, assuming there are no proposed discharges to groundwater from the development, the risk to groundwater would be low. Where piped drainage systems are proposed there would be minimal risk of infiltration of drainage water into the ground. Where filter drains or open channels are used to convey drainage water there would be a risk of infiltration into the ground with a potential low risk of contamination to groundwater.
- 4.4.4 The groundwater protection zones are too far from the Site to be potentially significantly affected by development.

Pollution Effects on Surface Water Quality

- 4.4.5 During the construction and operation of any proposed development there would be potential for debris and liquid pollutants to fall into the ditches that cross the Site that would drain into

the Roman River, Domsey Brook, other small ditches and watercourses, and subsequently into the Rivers Blackwater and Colne. There would also be a risk of release of dust into the atmosphere, some of which could be deposited in the nearby water bodies. This risk could be minimised through effective pollution control measures including the use of Sustainable Urban Drainage Systems (SUDS).

Flood Risk

- 4.4.6 The overwhelming majority of the Site is located outside Flood Zones 2 and 3. The only areas within Flood Zones 2 and 3 are located immediately adjacent to the main watercourses which flow across the Site, which present a constraint to development. Through the use of SUDS and balancing ponds, the rate of discharge to the surrounding watercourses could be controlled minimising the risk of flooding downstream of the Site.

Further Work Recommendations

- 4.4.7 The following further studies/investigations are recommended to inform masterplanning, environmental assessment and mitigation for development on the Site:
- A detailed study to identify the extent and type of aquifer that potentially underlies the site in order to assess potential impacts on groundwater.
 - A detailed study of the impacts on surface runoff including confirmation of the present drainage arrangements and points of discharge.
 - Confirmation of the need for detailed water quality modelling in receiving bodies in consultation with the Environment Agency.
 - Establishment of 100-year flood levels for the Site.

4.5 Summary

- 4.5.1 With implementation of effective mitigation measures, no significant constraints to development of the Site are anticipated in relation to protection of ground or surface water from pollution. The floodplain of the Roman River or Domsey Brook presents a constraint to development in these areas.

5.0 RECOMMENDED MITIGATION MEASURES

5.1 General

5.1.1 The Environmental Audit provides information on the potential constraints and opportunities for development within the Site with regards to ecological, landscape/visual and water quality/flood risk considerations. This section identifies recommended mitigation measures and principles that should be considered for future masterplanning of the Site in relation to these environmental topics.

5.1.2 There are considerable opportunities to minimise potential adverse effects of development and provide green infrastructure benefits through the Site masterplanning process. The mitigation measures outlined below would support the objectives of the Colchester Borough Green Infrastructure Strategy for conserving and enhancing areas of existing wildlife habitat; responding to landscape character; and the conservation and enhancement of landscape assets. Strengthening the Public Rights of Way corridors through the retention and enhancement of adjacent hedgerows and vegetation belts across the Site would help provide screening for development land parcels, as well as providing habitat corridors to aid the dispersal for protected species.

5.1.3 It should be noted that the mitigation measures outlined below are not exhaustive; they are intended to provide broad guidance on the type of measures that are likely to be necessary in order to achieve a sustainable development on the Site.

5.2 Ecological Mitigation

5.2.1 It is recommended that masterplanning of the Site should seek to:

- Retain and safeguard important habitats and areas, including those identified in Section 2.3 above.
- Buffer sensitive habitats, such as woodland and wetland, from any proposed development using strips of undeveloped land between the relevant habitats and proposed development.
- Retain wide green corridors, for example building upon the existing hedgerow network, especially where this includes mature trees, within and through developed areas, and linking other retained (and created) areas of habitat, both within and outside any development.
- Retain mature trees (including or especially those in hedgerows), within any proposed development, preferably as part of wider areas of semi-natural habitat or green corridors.

- Enhance retained habitats by appropriate positive management, such as coppicing, grazing etc..
- Create new areas of habitat, such as woodland, scrub, grassland and wetland, including ponds, targeted especially adjacent to or between retained existing habitats in order to expand and link them, thus making them more resilient.
- Retain and enhance (through habitat creation and management) habitat links to the wider landscape, for example to the valleys or corridors of the River Blackwater (e.g. along the Domsey Brook corridor), Roman River (especially to the south east) and River Colne (to the north).

5.2.2 During the design of the development it would be advisable to include the retention of habitats and protected species wherever possible. The habitats of greatest nature conservation importance within the Site are the:

- woodlands, especially Ancient/probable Ancient Woodland (Church House Wood LWS (TN34) and Stonefield Strip LWS (TN27));
- hedgerow network, especially where this is in relatively good condition, well connected and where it includes mature trees;
- more species-rich grassland, such as that at Seven Star Green LWS (TN50);
- wetland habitats, including the Roman River and Domsey Brook and associated marsh/marshy grassland, pond and swamp; and
- traditional orchards, such as those at TN35, TN36 and TN47.

5.2.3 Other habitats, such as the species-poor grassland, ruderal and arable are of less importance, although locally they may have significance for some species, such reptiles and skylark.

5.2.4 Based on the distribution of habitats within the Site the most important areas are considered to be:

- the Domsey Brook corridor, including the associated marsh/marshy grassland pond/swamp, hedgerows and woodland/plantation; and
- the Roman River corridor, including adjoining grassland and hedgerows (e.g. TN37), nearby Church House Wood Ancient Woodland and LWS (TN34) and Stonefield Strip LWS (TN27), other small wooded areas (e.g. TN 26) and traditional orchards (TN35 and TN36) and Marks Tey Pit SSSI and LWS (TN29).

5.2.5 The cluster of habitats in the Seven Star Green area, including Choats Wood (TN49), the grassland of Seven Star Green LWS (TN50) and the (derelict?) traditional orchard with scrub and grassland (TN47) is also of importance.

5.3 Landscape and Visual Mitigation

- 5.3.1 Consideration should be given to retaining key landscape features within the Site through the masterplanning process. These would include the field hedgerows, mature trees and the woodland copses. Ancient woodland should also be protected wherever possible. In addition to providing benefits for ecology and nature conservation, the retention of these landscape features would help screen development from the existing residential properties in settlements surrounding the edge of the Site, as well as maintaining the existing views. Where there are gaps in hedgerows, new planting with native species would help enhance the existing hedgerows and strengthen screening.
- 5.3.2 Where access and other infrastructure is required to cross an existing hedgerow, consideration should be given to using existing gaps and weaknesses in the hedgerows wherever possible. Mature hedgerows and hedgerow trees are not easy to recreate and their removal should be avoided as far as possible. There is also the opportunity to screen key views from the existing public rights of way that cross the Site by enhancing hedgerows along footpaths.
- 5.3.3 In addition, careful consideration should be given to the design and siting of street lighting to reduce the night-time visual impact of development on the surrounding countryside.

5.4 Water Quality and Flood Risk Mitigation

- 5.4.1 There is the opportunity to provide protection for the water quality of surrounding water bodies and the secondary aquifer located beneath the Site through incorporation of Sustainable Urban Drainage Systems (SUDS) into the Site layout, and also through the use of pollution prevention systems to control the risk of contamination to groundwater and surface water.
- 5.4.2 Development should avoid being located within the floodplains of the Roman River and Domsey Brook (Flood Zones 2 and 3). If development is required to be located in the floodplains, flood storage compensation measures would be required to minimise changes to the capacity of the floodplain and therefore minimise the risk of downstream flooding.

6.0 SUMMARY AND CONCLUSIONS

6.1 General

6.1.1 The key findings and conclusions of the Environmental Audit are summarised in this section, and the key areas of constraint are set out in **Figure 6.1**.

6.2 Ecology and Nature Conservation

6.2.1 Much of the Site consists of arable fields set within a more or less intact hedgerow network, which includes mature and veteran trees. There are concentrations of important habitat along and adjoining the corridors of the Domsey Brook and Roman River, as well as around Seven Star Green, and it is recommended that habitats in these areas in particular are retained and enhanced in relation to any potential or proposed development within the Site. The Site also has the potential to support a number of protected species and other species of conservation importance and more detailed surveys will be required for these, as appropriate, in relation to any proposed development.

6.3 Landscape and Visual Amenity

6.3.1 The Environmental Audit has demonstrated that development would change the character of the Site from a rural arable landscape to a residential dominated landscape, and change the nature of views within the Site. The degree of this change would depend on the scale of development and the extent to which mature hedgerows and trees are retained as part of the structural landscape framework for the Site.

6.3.2 The majority of land within the Site provides a high contribution to the separation of Colchester and adjacent settlements in the west, including Mark's Tey and Eight Ash Green, which is essential in helping retain the character and identity of these settlements. It is therefore considered desirable to safeguard these parts of the Site from inappropriate development, including land to the south of Great Tey, and land to the east of Coggeshall.

6.3.3 In recognition of the Site's high to moderate value and sensitivity in most areas, care is needed through site masterplanning and design to mitigate potential adverse impacts on the adjacent townscape or wider landscape. In particular, care should be taken to avoid loss of the woodlands and hedgerows/field boundaries that form screening elements in views from the edge of the Marks Tey area and the eastern area of the Site, at Eight Ash Green, and smaller

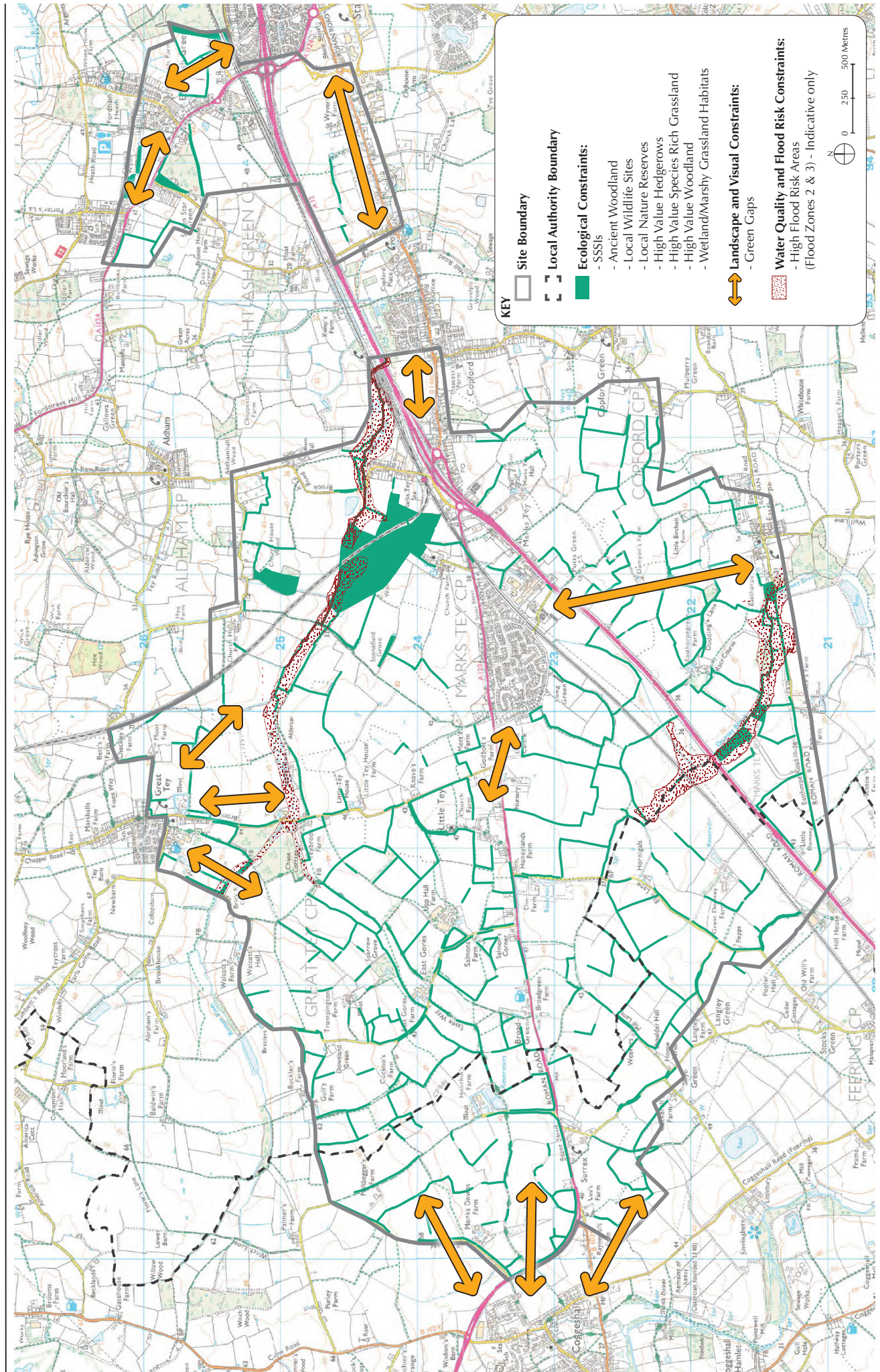


FIGURE 6.1
KEY CONSTRAINTS

WEST COLCHESTER GROWTH AREA OPTION
ENVIRONMENTAL AUDIT
COLCHESTER BOROUGH COUNCIL

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settlements within and adjacent to the Site. The existing landscape structure across the site should be retained and strengthened.

6.4 Water Quality and Drainage

6.4.1 With implementation of effective mitigation measures, no significant constraints to development of the Site are anticipated in relation to protection of ground or surface water from pollution. The floodplain of the Roman River or Domsey Brook presents a constraint to development in these areas.

6.5 Overall Conclusions

6.5.1 In accordance with the Council's requirements, this Environmental Audit has provided a preliminary appraisal of the constraints and opportunities for development of the Site in respect of the following environmental considerations:

- Ecology and Nature Conservation.
- Landscape/Townscape Character and Visual Amenity.
- Water Quality and Flood Risk.

6.5.2 Within the scope of this Environmental Audit, no constraints have been identified that would at this stage preclude further consideration of the Site as a potential growth area (assuming that the recommended mitigation measures are implemented and the further surveys/studies undertaken).

6.5.3 Other environmental considerations may present constraints to development on the Site, such as cultural heritage and agricultural land use. These have not been considered in the scope of this Environmental Audit, and may need to be taken into account in determining the suitability of the Site for development.



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