

public realm of the Northern Terrace which would in turn ensure the ongoing conservation and viability of the buildings.

8.6.62 Applying the methodology in Table 8.1, the proposed stadium development would enhance the setting of the Northern Terrace and its impact on the terrace is considered to be:

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.63 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial**. The proposed scheme, as described above, would provide an improved wider setting to the Northern Terrace and in particular Dial House.

North Tottenham Conservation Area: Views Assessment

8.6.64 The visual impact of the Project on the setting of the identified heritage assets in views across the North Tottenham Conservation Area has also been assessed using verified views produced by INK Associates that are included in the application at Appendix 12.5.

View 15: West side of the High Road at the junction with Lordship Lane

8.6.65 This view is taken from the southern end of the North Tottenham Conservation Area. The view is framed by two prominent corner buildings: on the western corner of the High Road with Lordship Lane the Grade II listed No. 639 High Road, now the 639 Enterprise Centre, is a neo-Jacobean style red brick building with a corner octagonal turret with a copper dome and scrolled and shaped gables to the High Road. Built in 1901 as the offices of Tottenham and Edmorton Gas Company by John Sherwell Corder, No.639 was extended in 1914. On the east side of the High Road on the corner of Lansdowne Road is the prominent square corner tower of Nos. 636 & 638, a locally listed, three storey, Art Deco style department store that was originally built in 1930 for the London Cooperative Society. This building was gutted by fire during the riots in 2011 and has since been fully restored. Beyond No. 639 High Road the western side of the High Road is concealed from view. The eastern side continues at the same scale with two late 20th century buildings of no architectural interest. Beyond this two large trees frame the High Road as it continues northwards.

8.6.66 The curved form of the stadium would terminate the view north along the High Road. The slender hotel tower would rise behind the trees at the centre of the view but would be largely obscured during the summer months, while the angled form of the upper storeys of the Extreme Sports Centre would be entirely obscured during the summer months. To the east the tapered top storey of the tallest residential tower would be seen. Although the mass and scale of the proposals would have an impact on the view, the Project would have a minor beneficial impact on the conservation area as a whole, with the stadium and hotel acting as a positive landmark at the centre of the view.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.67 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be **minor beneficial** as the proposed hotel and stadium would be of a better design than the consented scheme, with the hotel providing a positive landmark along the High Road.

View 16: West side of the High Road opposite the junction with Northumberland Park

- 8.6.68 This view is located at the northern end of the North Tottenham Conservation Area. On the east side of the High Road in this view are the group of buildings at the north-western corner of the Project site that are collectively known as the 'Northern Terrace'. In the forefront of the view to the east is 814 High Road, a locally listed former bank constructed in 1905. Beyond this building the early 18th century Grade II* listed buildings at 808-810 High Road are set back from the High Road behind railing enclosed front areas. The building line steps forward once more at 804-806 High Road, the blank flank wall of the unlisted late 19th century terrace, creating a rather jarring effect to the continuity of the street line from this viewpoint, before stepping back once more to the Northumberland Terrace, a continuous row of early 18th century listed buildings that terminates at the Grade II* Dial House. The development to the west side of the High Road in this view has a more continuous building line of two to three storey terraces with low quality shop fronts.
- 8.6.69 The new stadium would rise behind the buildings to the east side of the High Road. There would clearly be a substantial contrast in scale between the stadium and the Northern Terrace but in the foreground of this view the height of the stadium would not exceed the height of the brick chimneys to the Grade II* listed 808-810 High Road leaving these in silhouette against the sky. The design and materials of the stadium, including its perforated metal clad skin would be in stark contrast to the brick terraced buildings lining the High Road. The stadium would be a landmark building in this view, its simple materials and curved form adding a new dimension to the character of the conservation area and ensuring that, although clearly visible and large scale, the stadium would not detract from the strong rhythm of bays and roofline of the Northern Terrace.
- 8.6.70 In this view the proposed residential towers and hotel building would be largely concealed with very top of the hotel and the upper floors of the tallest tower only just visible above the stadium roofline. The grid like form of the top of the residential tower would allow light through this structure giving it a lightweight appearance.
- Construction phase: **Negligible**
 - Operational phase: **Minor Beneficial**
- 8.6.71 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the proposed scheme provides a much improved relationship with the Northern Terrace, particularly Dial House at 790 High Road.

View 23: West side of the High Road, at junction with Cedar Road

- 8.6.72 This view is taken from towards the southern end of the North Tottenham Conservation Area. This part of the High Road is characterised largely by mid-late 19th century development. On the western side of the High Road are the locally listed Nos. 665-683 (odd) High Road which form a terrace of mid-late 19th century red brick buildings of four storeys with projecting single storey shop units on the ground floor. On the east side of the High Road, partially visible in the immediate foreground, is the Grade II listed gate building for the former Whitbread Brewery at 676 High Road. The development continuing northwards along the High Road beyond the Whitbread gates is characterised by 20th century buildings with slightly larger plots interspersed with earlier 19th century development, including Nos. 684, 684a & 684b and 686 to 690, all of which are locally listed.

8.6.73 The proposals would see the curved form of the stadium terminating the view north along the High Road, the arched southern 'home' end extending above the terraced buildings in the far distance. The slender form of the hotel would rise in front of the stadium, its lower floors and base concealed behind the terraced buildings on the east side of the High Road, and together the stadium and hotel would form a positive landmark development. The angled upper storeys of the Extreme Sports Centre would also be visible immediately to the east of the hotel but would not be prominent in this view. Further to the east the four residential towers would also be visible, the stepped height of the grouped towers combined with the form of the upper floors, comprising a chamfered grid left open to the sky, would allow visual permeability through the upper sections and reduce the overall mass and bulk of the towers in this view. Although the mass and scale of the proposals would have an impact on the view, the Project would have a minor beneficial impact on the conservation area as a whole, with the stadium and hotel acting as a positive landmark at the centre of the view.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.74 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented.

View 26: White Hart Lane

8.6.75 This view is situated close to White Hart Lane Station on White Hart Lane which forms the most westerly boundary of the North Tottenham Conservation Area. The majority of the view takes in the buildings of the Love Lane Estate. These comprise, to the immediate right of the view, Charles House, a late 20th century ten storey tower with a T shaped plan. Adjoining this to the centre of the view (due to the curve of the road) there is more of the estate's residential housing of a smaller scale, rising to four storeys, and stretching to the south. These buildings are set back from White Hart Lane within grassed areas planted with trees, and enclosed by railings to the pavement. The foreground of the view comprises the road itself and the pavement either side, which is in poor condition. Immediately to the left of the view is one of the entrances to the Peacock Industrial Estate. Beyond, set back from White Hart Lane behind a low brick wall with railings and concealed from view, is the Grade-II listed building known as The Grange at 32, 34 and 34a White Hart Lane. The Grange is a mid-18th century building with additions dating to the early 19th century.

8.6.76 The curved form of the stadium would be seen in much of this view, rising behind the four storey residential development on the Love Lane Estate. Further to the south the edge of the hotel would just be visible adjoining Charles House and, from this angle, the 32 storey residential tower would appear to rise to the same height as the hotel. The lower towers of the southern residential development would only be partially visible above the roofline of the stadium and in the summer the trees in the middle distance of this view, would conceal all of the towers and much of the stadium. Overall the proposed development would have a positive impact on the character and appearance of the conservation area by introducing high-quality architecture in this view that, although large scale, would be a positive landmark on the High Road. It would have no direct impact on the immediate setting of the listed buildings comprising The Grange (32-34a White Hart Lane) which, as described above, are set back from the road within an enclosed forecourt.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.77 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented.

View 27: West side of the High Road, at the junction with White Hart Lane

8.6.78 This view is located at the junction between the High Road and White Hart Lane at the northern end of the North Tottenham Conservation Area. This view is only a wireline but a rendered view has been produced for the night time version of this view. On the east side of the High Road in this view are Nos. 790-796 High Road, comprising the Grade-II* listed Percy House (796) and Dial House (790) and Grade-II listed 792 and 794 High Road. These buildings, forming part of the group of buildings at the north-western corner of the application site that are collectively known as the 'Northern Terrace', are set back from the High Road behind railing-enclosed front areas, the striking gate posts and boundary wall to Percy House being separately listed. At the centre of the view is Dial House which is the oldest building in the Northern Terrace, dates to the late 17th century and incorporating parts of an earlier 17th century building. South of Dial House the stadium development site comprises a large gap in the street scene and this, together with the exposed northern return elevation of 750 High Road further south, detracts from the character and appearance of the conservation area.

8.6.79 Apart from the Northern Terrace, this view is dominated by the High Road itself which is almost always busy with traffic. The west side of the High Road is largely concealed in this view, characterised by a terrace of three storey 19th century buildings with commercial uses at ground floor level. Traffic lights, safety bollards and a bus shelter clutter the view, while a couple of street trees provide some welcome greenery.

8.6.80 The new stadium would rise behind the Northern Terrace infilling the current gap in the building line on the east side of the High Road immediately south of Dial House. There would clearly be a substantial contrast in scale and materials between the stadium and the Northern Terrace, but the metal clad stadium would be a landmark building in this view, its simple materials and curved form adding a new dimension to the character of the conservation area and ensuring that, although clearly visible and large scale, it would not detract from the strong rhythm of bays and roofline of the Northern Terrace.

8.6.81 As explained above, the proposed multiple entrances and areas of glazing at lower level on the western stadium elevation, including the glazed escalator enclosure, would create visual interaction between the stadium interior and the street and introduce an active street-level frontage. Dial House would adjoin the proposed media café, which would project forward from the stadium at ground-floor level and complement the scale and building line of the ground floor level of the Northern terrace.

8.6.82 The proposed enhancements to the public realm along the High Road frontage, including the addition of street trees in front of the stadium, would also substantially enhance the streetscape in this view and, overall, it is considered that the proposals would have a minor beneficial impact on the character and appearance of the conservation area and setting of the listed Northern Terrace.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

- 8.6.83 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the proposed scheme provides a better quality stadium design and a much improved visual relationship between the stadium development and the High Road and the Northern Terrace, particularly Dial House.

View 31: South side of Church Road, looking northeast

- 8.6.84 This view is taken from the western boundary of the North Tottenham Conservation Area adjoining the northern boundary wall to Moselle House. Church Road is a secondary road adjoining the High Road at its southern end. The road is well screened by mature trees; to the north of the viewpoint is an open hard landscaped car park and school playground and further east, to the south of Church Road, an area of open green with trees with two early 19th century buildings set back from the road. 707 High Road (Moselle House) is Grade-II listed and 705 High Road is a locally listed building. Views of these buildings are largely obscured from Church Road and the High Road by the trees and their set back position. Looking east the existing stadium and the south stand are visible with the THFC merchandise shop in the foreground. To the northeast, between the trees, the front façade and the return blind façade of the former Tottenham and Edmonton Dispensary (746 High Road) can be seen, with the upper levels of the stadium rising behind.
- 8.6.85 The curved western façade of the stadium and its southern prow over the south podium, the main 'home-end' South Stand, would be prominent above the tree line in this view, with glimpsed views of the Tottenham Experience building possible between the trees. Adjoining the stadium in the middle of the view rises the western façade of the hotel which has been designed by Populous to complement the design and materials of the stadium, and also to follow the angle of the building line further south along the High Road so that in longer views it reinforces the directionality of the building line. The high-quality design of the proposed development in addition to the way in which it would reinforce the line of the High Road would ensure that it has a positive impact on the character of the conservation area in this view. The proposals would have a negligible impact on the immediate setting of the listed Moselle House and adjacent locally listed 705 High Road which is very clearly defined by the boundary wall to Church Road and the concealed green behind it.
- Construction phase: **Negligible**
 - Operational phase: **Minor Beneficial**

- 8.6.86 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented and provides a better relationship between the stadium development and the High Road.

View 32: West side of the High Road, at the junction with Ruskin Road

- 8.6.87 This view is taken towards the southern end of the North Tottenham Conservation Area. On the western side of the High Road, in the immediate forefront of the view is the locally listed Nos. 685 – 689, three mid-late-19th century red brick buildings of four storeys with projecting single storey ground floor shop units, which form part of the same development as Nos. 665-683 (odd) seen in View 23 and continue the same building line. Beyond this terrace, the Grade-II listed buildings at Nos.695-697 are set back from the High Road behind a courtyard enclosed by a boundary wall and railings and are therefore concealed from view. Nos. 695-697, comprise a large pair of three storey early 19th century villas that are now in office

use. Beyond these buildings is the locally listed Baptist Hall and The Tottenham Baptist Chapel, a classical Grade II listed building constructed in 1825. The Baptist Chapel is also set back from the High Road with railings to the street and some green planting in its forecourt, and as such is concealed from view, while the Baptist Hall is positioned away from the High Road to the rear of the Chapel. The large trees within the open green space fronting the sports centre form the terminus to the built form along the west side of the High Road in this view.

8.6.88 The buildings on the east side of the High Road in the forefront of the view are Nos. 686 to 690 (even), a terrace of three late-19th century buildings with bay windows at first-floor level and later projecting shopfronts with modern signage. Nos. 694-692 adjacent to the north are also of three storeys and originally part of the same terrace, however the cornice and parapet to the buildings has been lost and the facades rendered. The terrace continues in the middle distance with the locally listed 700, 704 & 706 High Road, also 19th century buildings with later projecting shopfronts, and beyond these are a cluster of street trees.

8.6.89 The proposals would see the curved form of the stadium terminating the view north along the High Road. The slender hotel tower would rise in front of the stadium, its lower floors and base concealed behind the terraced buildings on the east side of the High Road, and together the stadium and hotel would form a positive landmark development. The angled upper storeys of the Extreme Sports Centre would also be visible immediately to the east of the hotel but would not be prominent in this view. Further east, two of the four residential towers would rise above the roofline of the late-19th century terrace on the east side of the High Road. The stepped height of the towers combined with the form of the upper floors, comprising a chamfered grid left open to the sky, would allow visual permeability through the upper sections and reduce the overall mass and bulk of the towers in this view. Although the mass and scale of the proposals would have an impact on the view, the Project would have a minor beneficial impact on the conservation area as a whole, with the stadium and hotel acting as a positive landmark at the centre of the view.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.90 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented.

View 33: West side of the High Road opposite, and just north of junction with Bromley Road

8.6.91 This view is taken from the southern end of the North Tottenham Conservation Area looking north. The buildings on the west side of the High Road in this view are screened by an almost continuous row of trees. These trees and the open green area behind them add a welcome punctuation along an otherwise urban road. Hidden from view beyond the trees are 707 High Road, otherwise known as Moselle House, a Grade II listed building dating from the early 19th century, and 705 High Road, a locally listed building also dating from the early 19th century. To the south of these buildings is 701-703 High Road, a mid-20th century Community Sports Centre, also set back behind the open green.

8.6.92 The centre of the view is dominated by the High Road itself, with pavements either side. On the east side of the High Road to the far right of the view is Coombes House, a low quality post-war apartment block. North of this building the pavement widens and the terraced row of buildings immediately south of the Project site are set back from the High Road on a diagonal line. These comprise a three storey red brick

public house (formerly the Bell and Hare, now No.8) dating to the interwar period; a three storey 20th century building and, on the corner of Park Lane, a two storey mid-19th century building. On the opposite corner of Park Lane is a temporary Tottenham Hotspur ticket office and merchandise shop which detracts from the streetscape. Beyond this the Grade-II listed Warmington House is partially visible, its chimney stacks rising above a large tree located in the foreground and to the pavement. The adjoining Tottenham and Edmonton Dispensary is positioned much closer to the High Road so that in the middle distance of the view its blank return wall is prominent, with the eaves and front elevation of The Red House visible just beyond.

- 8.6.93 The hotel and stadium would be the most prominent elements in this view, with the dynamic prow over the southern podium, the main 'home-end' South Stand and heart of the proposed stadium development, and the elegant hotel tower forming a striking focal point. The arched glass façade within the stadium south stand would allow a sense of the scale of the single-tier home stand as it is approached from the south and give views directly through the stadium bowl to the sky beyond. The hotel would tower above the three-storey buildings on the eastern side of the High Road but would have no impact on the immediate setting of those buildings set back behind trees on the western side of the road. Although the scale and design of the stadium and hotel would clearly differ from the retained surrounding buildings in this view, both would form a positive new landmark development adding a new dimension to the character and appearance of the conservation area.
- 8.6.94 At street level below, The Tottenham Experience building would reinforce the High Road building line in the form of a new two-storey terrace flanking the retained and fully restored Grade-II listed Warmington House. This new terrace, with glazed ground-floor shop fronts and cast-iron cladding to the upper levels, would match the scale and mass of the historic buildings flanking the High Road to the north and south and would also be in keeping with the scale of the locally listed Church of St Francis de Sale immediately opposite the site. The Tottenham Experience building would be a significant improvement on the arrangement of the buildings at 746-750 High Road which have lost their historic setting and have no coherent visual relationship with the High Road or each other. The proposed southern range of the Tottenham Experience building would be abutted by a fully-glazed entrance pavilion at the southern end that would also be prominent in this view. This would adjoin the southern steps to the podium, flanked on the opposite side by the landmark hotel building, providing a welcoming and obvious entrance to the Tottenham Experience building.
- 8.6.95 The proposed enhancements to the public realm along the High Road frontage, including the addition of street trees in front of the Tottenham Experience building, would substantially enhance the streetscape in this view.
- 8.6.96 Immediately east of the hotel the upper storeys of the western return elevation of the Extreme Sports Centre, articulated as a climbing wall, would be visible. This building would rise above the roofline of the public house on the east side of the High Road, and would be partially obscured by a large tree adjoining the pub. Its position, set back from the conservation area along Park Lane, and its subtle design would mean that it would have a neutral impact on the character of the conservation area overall, and in this view its height forms an appropriate step between the roofline of the stadium and that of the closest residential tower further east. The upper storeys of two of the four residential towers located further east along Park Lane would be visible in this view, the form of the upper floors, comprising a chamfered grid left open to the sky, allowing for visual permeability and reducing the mass and bulk of the towers.

8.6.97 Overall the proposals would enhance the character and appearance of the conservation area in this view and would enhance the immediate setting of the Grade-II listed Warmington House. The proposed development would have a negligible impact on the setting of the Grade-II listed Moselle House which is set back from the High Road within its own tree-lined area.

- Construction phase: **Negligible**
- Operational phase: **Moderate Beneficial**

8.6.98 The operational phase of the Project if assessed against the baseline of the consented scheme would also be **moderate beneficial** as the proposed scheme provides a much improved solution to this part of the High Road, seeing Warmington House reincorporated into a terrace.

View 34: West side of the High Road, just north of junction with Hampden lane

8.6.99 This view is taken from the southern end of the North Tottenham Conservation Area. On the western side of the High Road are the locally listed Nos. 641-663 (odd) High Road, a terrace of mid-late 19th century red brick buildings of four storeys with projecting single storey shop units on the ground floor. On the east side of the High Road, in the foreground is a Georgian terrace set back from the High Road behind large and small street trees. This terrace includes the Grade-II listed No. 662 (at the far right of the view), which was gutted by fire during the 2011 riots and is undergoing renovation. Adjacent to the north are Nos. 664 & 666 (Moore House) also Grade-II listed and of three storeys with a semi-basement, round-headed doorcases, fanlights and panelled entrance doors approached by entrance steps. Adjoining Moore House to the north, but concealed from view by the large trees on the High Road, are Nos. 668 & 668A, which are also Grade-II listed and retain their original Regency blind boxes on the first floor windows. Partially visible in the middle distance is the stock brick front elevation and clock tower of the Grade-II listed gate building for the former Whitbread Brewery at 676 High Road. Beyond this the development along the east side of the High Road is characterised by wider 20th century buildings interspersed with earlier 19th century development, all of a similar approximately three-storey height. Of these buildings Nos. 684, 684a & 684b and 686 to 690 are locally listed.

8.6.100 The Project would see the curved form of the stadium terminating the view north along the High Road behind the slender hotel tower, which would rise above the roofline of the stadium in the centre of the view, its lower levels concealed by the terraced High Road buildings. Although clearly of a much larger scale, the stadium and hotel would form a positive landmark development in this view. The angled upper storeys of the Extreme Sports Centre would also be visible immediately to the east of the hotel; this would rise up above the top of the clock tower to the Grade-II listed Whitbread gate building and would arguably have a minor adverse impact on the setting of the building in this view. Further to the east the four residential towers would be concealed from view, behind the trees on the east side of the High Road in the summer months. They would be partially visible behind and to the west of the Georgian terrace in this view in the winter months but the trees would still form an effective visual buffer and this limited impact in one view of the listed terrace would not be harmful to the overall significance of the listed buildings.

8.6.101 The Extreme Sports Centre would have a minor adverse impact on the wider setting of the Whitbread gate building. The overall impact on the conservation area in this view, however, would be minor beneficial as the stadium and hotel would act as a positive landmark at the centre of the view.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

- 8.6.102 The operational phase of the Project if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented and provides an iconic landmark for Tottenham.

Potential Environmental Impacts and Effects on the Heritage Assets in the Wider Area: Views Assessment

- 8.6.103 The visual impact of the Project on the setting of the identified heritage assets in the wider area has also been assessed using verified views produced by INK Associates that are included in the application at Appendix 12.5.

View 1: Alexandra Palace and Park Conservation Area

- 8.6.104 This view is located within the Alexandra Palace and Park Conservation Area. The viewpoint looks east and is taken from an area of high ground in the park. The ground, which is turfed in the forefront of the view slopes down until it reaches a bank of trees in the middle distance. Beyond the bank of trees the urban development of North London spreads out to the horizon. A number of tall buildings are visible breaking the general building line and these add interest to the view.
- 8.6.105 The proposals would be visible close to the centre of the view. the Project would be a new landmark for Tottenham defining its position in North London. The tallest residential tower would rise up behind the proposed hotel building at the centre of the cluster of proposed buildings south of the stadium. The stepped form of the proposed towers, including the hotel, would break up the overall mass of development. The lower lying stadium would sit adjacent to the proposed hotel, with the diagonal line of its home stand end rising up towards the southern development.
- Construction phase: **Negligible**
 - Operational phase: **Major Beneficial**

- 8.6.106 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be **major beneficial** as the proposed scheme offers an overall improved design and landmark building in this view.

View 10: Tottenham Cemetery Conservation Area

- 8.6.107 This view is located within the Tottenham Cemetery Conservation Area and looks east. The cemetery is also designated as Metropolitan Open Land in Haringey's UDP and is a cemetery on the Council's Register of Public Parks, Gardens, Squares, Cemeteries and Churchyards of Local Historic Interest. The view is taken from in front of, and looking towards a Grade II listed War Memorial. The foreground of the view is characterised by a flagstone path leading to an area of gravestones and a bench which forms the memorial. The path is flanked by grass verges and manicured hedges that also enclose the area of gravestones. The middle ground of the view is entirely screened by a wall of large mature trees beyond which there are further trees, both within the area of the cemetery and along its eastern boundary.
- 8.6.108 This view shows that the proposed stadium and towers would not be visible in the summer months, being entirely concealed behind the wall of trees. In the winter months the Project may be partially visible but would still be partly screened by the trees. The proposals would therefore have a neutral impact on the

setting of the cemetery in this view.

- Construction phase: **Negligible**
- Operational phase: **Negligible**

8.6.109 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **negligible** as neither would be visible.

View 11: Bruce Castle Conservation Area, north-western edge of Bruce Castle Park

8.6.110 This view is located within the Bruce Castle Conservation Area towards the north western edge of the park. Bruce Castle Park, in addition to Tottenham Cemetery, is also designated as Metropolitan Open Land in Haringey's UDP and is a park on the Council's Register of Public Parks, Gardens, Squares, Cemeteries and Churchyards of Local Historic Interest. The view looks northeast towards the largely two storey residential development to the edge of the park; further to the east is a school building with a clay-tile covered pitched roof. The foreground of the view is characterised by the flat lawns of the park.

8.6.111 The proposed stadium would rise behind the existing development stepping up to the residential towers to the south. There would be a marked increase in the scale of development visible from the park in this view and the impact on the wider setting of the Bruce Castle Conservation Area would be moderate adverse. However, during the summer months the stadium would most likely be entirely concealed by the trees in the park.

- Construction phase: **Moderate Adverse**
- Operational phase: **Moderate Adverse**

8.6.112 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be **minor adverse** as the consented scheme would also be visible, its scale also a marked increase on the existing conditions.

View 12: Bruce Castle Conservation Area, southern end of Bruce Castle Park

8.6.113 This view is also located within the Bruce Castle Conservation Area. The viewpoint is located adjacent to and in front of the Grade-I listed Bruce Castle and looks north east. The topography of the park is very flat and views across it are largely screened by large mature trees. The park comprises large grassed areas traversed by footpaths, with areas of planting and a railing-enclosed children's play area.

8.6.114 The proposals would not be visible in this view, being concealed behind successive banks of trees.

- Construction phase: **Negligible**
- Operational phase: **Negligible**

8.6.115 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be **negligible** as neither scheme would be visible.

View 13: Tottenham Green Conservation Area, at the junction with Monument Way

- 8.6.116 This view is taken from the Tottenham Green Conservation Area. On the west side of the High Road, partially visible in the immediate corner is the locally listed Nos. 389 & 391, the former Tottenham Library, built in 1896 and more recently converted to flats. Beyond this building, set back from the road, is the Grade-II listed No. 401 High Road, a three storey late 18th century pair of semi-detached houses that now form a single building. In the middle distance of the view is the locally listed No. 413 High Road, formerly the Felters Hall. Built in 1925, the hall has pitched roofs and mullion and transom fenestration. In the foreground of the view on the east side of the High Road is a disused single-storey public toilet, constructed in brick in a mock-Tudor style with pitched roofs that have deep eaves and mock strapwork, its windows are currently boarded. Adjacent to this further north along the High Road the buildings are set back from the road behind a large area of public realm planted with bushes, beyond which the low scale development of the High Road continues.
- 8.6.117 The slender southern elevation of the hotel tower would just be visible in this view, but would be partly obscured by mature trees along the High Road. The curved form of the stadium would also be partly visible at the centre of the view. The proposed development would act as a major landmark for Tottenham, with the hotel tower providing an important marker for North Tottenham and the stadium development in this longer view. The residential towers would not be visible in this view.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

- 8.6.118 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial**, as the proposed stadium and hotel would provide a positive landmark development in this view.

View 35: Bruce Castle Conservation Area, Bruce Grove adjoining Edmansons Close

- 8.6.119 This view is located in the Bruce Castle Conservation Area looking northeast over Edmansons Close. In the foreground of the view is Bruce Grove road. In the middle distance are railings, bushes and trees which screen an open area of lawn forming the setting to a group of terraced Grade-II listed almshouses. The Sailmaker's Almshouses date from circa 1870 and flank three sides of the enclosed lawn with detached wings at either end. The buildings, which in this view are almost entirely concealed by the vegetation lining Bruce Grove, are two storeys and constructed from yellow stock brick with stone dressings and red brick eaves cornices with bands at first floor level. Visible at the centre of the view is the spire of the central gabled Gothic chapel. There are additional tall trees behind the terrace that extend up above its roofline in this view.
- 8.6.120 The majority of the proposed development would sit below the roofline of the Grade-II listed almshouses in this view. The upper sections of the two tallest residential towers extend above the general roofline but the tallest tower would be concealed behind the gabled roof form of the central chapel, while the second tower would be concealed by trees.

- Construction phase: **Negligible**
- Operational phase: **Negligible**

- 8.6.121 The operational phase of the Project if assessed against the baseline of the consented scheme would

also be **negligible** as neither scheme would be visible in this view.

View 36: Scotland Green Conservation Area, west side of High Road opposite Aldi

- 8.6.122 This view is located with the Scotland Green Conservation Area. On the west side of the High Road in this view the buildings are set back from the pavement line behind front areas enclosed with boundary walls and railings. These buildings include Charlton Cottage, a late 18th century house of two storeys that is listed Grade II, and the Grade II* listed Nos. 583 and 585 High Road, a substantial early to mid-18th century house which now forms two dwellings. The second floor sash windows of this building can just be seen through the trees. The front railings to 583-585 High Road, set in a low brick wall and linked by brick pillars, are also listed Grade II. On the east side of the High Road there is an almost continuous terrace of three storey buildings with shopfronts at ground floor level. No. 596 in the foreground is a locally listed building of three storeys with single brick semi-circular brick arches supported by simple brick pilasters to the second floor sash windows. Beyond the terraced buildings on the east side of the High Road, the view is terminated by trees either side of the road that conceal views of the buildings further north.
- 8.6.123 The four residential towers would be seen from this position on the High Road rising above the tree line, but the stadium and hotel would be largely concealed to the west by the curve in the road. The towers would be prominent in the view along the High Road and would have a minor adverse impact on the setting of the Scotland Green Conservation Area. This impact would be mitigated by the design of the towers, the upper storeys of which are chamfered and incorporate a grid left open to the sky, allowing for visual permeability and reducing their overall mass and bulk. The impact on the setting of the listed buildings on the eastern side of the High Road would be mitigated by the fact that these buildings are set back away from the High Road and the proposed development would have no impact on their immediate forecourt setting.
- Construction phase: **Negligible**
 - Operational phase: **Minor Adverse**
- 8.6.124 The operational phase of the Project if assessed against the baseline of the consented scheme would also be minor adverse as the consented scheme would not be visible from this location.

View 37: Bruce Grove Conservation Area, High Road, just north of junction with Bruce Grove

- 8.6.125 This view is located within the Bruce Grove Conservation Area. On the west side of the High Road, forming a terrace are the locally listed Nos. 513 to 525 (odd) and 527 to 543 (odd) High Road, with modern shopfronts at ground floor level. Visible in the distance on the west side of the High Road are the tall brick chimneys of No. 549. This is a substantial three storey mid-19th century locally listed bank building. On the east side of the High Road are Nos. 522 to 528 (even), a three storey locally listed building, with a curved corner to its façade, that incorporates bands of deep blue glazed brick and large timber casement windows with glazing bars on the upper floors divided by cast iron fluted Corinthian pilasters. It is a building of architectural merit which has poorly integrated supermarket retail units at ground floor level that detract. Adjacent is a modern red brick building on a single plot between Factory Lane to the south and Dowsett Road to the north, and beyond this the corner bay of Windsor Parade, Nos. 538 to 554 (even) High Road with its octagonal stucco turret supported on fan-shaped corbel vaults above a canted round headed recessed entrance porch. The elaborately detailed three storey terrace is locally listed and was constructed in 1907. The group of lower modern buildings further north are just visible beyond which the view is terminated by a number of mature trees.

8.6.126 Only the form of the residential towers would be seen from this position on the High Road rising above the tree line at the terminus to the view along the High Road. The towers would have a moderate adverse impact on the wider setting of the Bruce Grove Conservation Area. This impact would be mitigated by the design of the towers, the upper storeys of which are chamfered and incorporate a grid left open to the sky, allowing for visual permeability and reducing their overall mass and bulk.

- Construction phase: **Negligible**
- Operational phase: **Minor Adverse**

8.6.127 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor adverse** as the consented scheme would not be visible from this location.

8.7 Assessment Summary and Residual Environmental Impacts and Effects

Demolition and Construction

8.7.1 With the implementation of the mitigation measures as set out above, the potential impacts of the demolition and construction phase should be minimised as far as practically possible. As such, the residual impact during the demolition and construction phase on the retained significant fabric is envisaged to be, at worst, minor adverse.

Completed Development

8.7.2 The proposed development would see the transformation of this area of north London with investments leading to substantial and essential regeneration. The new twelve-months-a year international-quality sports stadium designed by Populous Architects would substantially raise the profile of Tottenham, more so than the consented stadium due to its additional uses, bringing more visitors to the area and increasing its economic vitality, particularly the immediate environs of Tottenham High Road. The proposed residential development would provide much-needed additional housing in Tottenham, the hotel and other commercial uses within the stadium development would provide additional jobs contributing towards the wider regeneration of the area, while the Extreme Sports Centre and proposed health centre would benefit the health of the local community, a key priority for the London Borough of Haringey. These major positive impacts must be taken into account when assessing the overall impact of the proposals on heritage assets.

8.7.3 It is essential to take into account that a stadium of similar proportions and scale was consented in 2011 with the ground works for its construction already underway. The principle of the construction of a stadium immediately abutting the High Road and adjoining nearby listed buildings within the boundary and setting of the North Tottenham Conservation Area has therefore been established. The consented scheme also allows the construction of four large residential blocks between the stadium and Park Lane. The principle of large-scale development, albeit of a maximum height of approximately fifty-seven metres, within the area of the proposed residential towers; Extreme Sports Centre and hotel, that would contrast with the smaller scale of nearby historic buildings, has therefore also been established.

8.7.4 The following table summarises the potential impacts of the Project and the resulting residual impact against the existing baseline conditions. This assessment takes into account the impacts on the designated and non-designated heritage assets which form part of the Project Site, the impact on views across the North Tottenham Conservation Area and the impact on the wider setting of six conservation

areas within the wider area.

Table 8.2 Cultural Heritage Assessment Summary

Heritage Asset	Description of Potential Impact/Description of View Location	Residual Impact
Warmington House, Grade-II listed building	Restoration and re-use of Warmington House as part of the proposed Tottenham Experience Museum	Major Beneficial
Northern Terrace, Grade-II and Grade-II* listed buildings	Construction of the proposed development within the wider setting of the listed terrace	Minor Beneficial
North Tottenham Conservation Area	Demolition and replacement of three locally listed buildings in the conservation area with new buildings forming the proposed Tottenham Experience	Moderate Beneficial
	Restoration and re-use of Warmington House and construction of the proposed Tottenham Experience building in the conservation area	Moderate Beneficial
	Construction of new stadium in, and within the setting of, the conservation area	Moderate Beneficial
	Construction of hotel within the setting of the conservation area	Minor Beneficial
	Construction of four residential towers within the setting of the conservation area	Negligible
	Construction of Extreme Sports Centre within the setting of the conservation area	Negligible
North Tottenham Conservation Area, Views Assessment:	Impact of proposed development on views within the conservation area (view locations described below):	
View 15	West side of the High Road at the junction with Lordship Lane	Minor Beneficial
View 16	West side of the High Road opposite the junction with Northumberland Park	Minor Beneficial
View 23	West side of the High Road, at junction with Cedar Road	Minor Beneficial
View 26	White Hart Lane	Minor Beneficial
View 27	West side of the High Road, at the junction with White Hart Lane	Minor Beneficial
View 31	South side of Church Road, looking northeast	Minor Beneficial
View 32	West side of the High Road, at the junction with Ruskin Road	Minor Beneficial

View 33	West side of the High Road opposite, and just north of junction with Bromley Road	Moderate Beneficial
View 34	West side of the High Road, just north of junction with Hampden lane	Minor Beneficial
Alexandra Palace and Park Conservation Area: View 1	Impact of proposed development on wider setting of conservation area.	Major Beneficial
Tottenham Cemetery Conservation Area: View 10	Impact of proposed development on wider setting of conservation area.	Negligible
Bruce Castle Conservation Area:	Impact of proposed development on wider setting of conservation area (view locations described below):	
View 11	Bruce Castle Conservation Area, north-western edge of Bruce Castle Park	Moderate Adverse
View 12	Bruce Castle Conservation Area, southern end of Bruce Castle Park	Negligible
View 35	Bruce Castle Conservation Area, Bruce Grove adjoining Edmansons Close	Negligible
Tottenham Green Conservation Area: View 13	Impact of proposed development on wider setting of conservation area	Minor Beneficial
Scotland Green Conservation Area: View 36	Impact of proposed development on wider setting of conservation area	Minor Adverse
Bruce Grove Conservation Area: View 37	Impact of proposed development on wider setting of conservation area	Minor Adverse

9. Ecology

9.1 Introduction

9.1.1 This chapter of the ES has been produced by CSa Environmental Planning and assesses the likely significant effects of the Project in terms of Ecology.

9.2 Assessment Criteria and Methodology

Previous Assessment

Ecological Assessment & Nesting Bird Survey

9.2.1 The full methodology and results of surveys undertaken as part of the 2008 ecological assessment are provided in the Ecological Assessment report in Appendix 9.1.

9.2.2 The full methodology and results of a nesting bird survey undertaken in April and May 2014 are provided in the Nesting Bird Survey Report in Appendix 9.2.

9.2.3 Table 9.1 below summarises these surveys and their findings:

Table 9.1: Summary of Previous Survey Work

Survey	Summary of survey findings
Extended Phase 1 Habitat Survey (15 May 2008)	- The vast majority of the site comprises buildings and hardstanding, with very limited areas of habitat present, none of which have significant ecological value. - A small quantity of Japanese knotweed <i>Fallopia japonica</i> was recorded in the north-west of the site. - Brief assessment of the buildings on site identified several buildings that could potentially support roosting bats.
Bat Transect Surveys (dusk and dawn 26-27 June 2008 and 08-09 July 2008)	- Low levels of bat activity at the site, limited to a small number of passes by noctule <i>Nyctalus noctula</i> bats. - Additional noctule passes and very low levels of common pipistrelle foraging detected from land adjacent to the site boundary. - No behavioural evidence to suggest that bats roost at the site or use it for any significant foraging.
Nesting Bird Survey (Four breeding bird between 23 April and 29 May 2014)	- A pair of kestrels <i>Falco tinnunculus</i> (amber-listed Bird of Conservation Concern (BoCC); London Species of Conservation Concern) were recorded nesting in the lower rear half of the north stand monitor screen. - A pair of starlings <i>Sturnus vulgaris</i> (red-listed BoCC; UK & London BAP Priority Species; London Species of Conservation Concern) were recorded nesting above a doorway into the stadium, beneath a concrete ledge. - Swifts <i>Apus apus</i> (amber-listed BoCC; London Species of Conservation Concern) were recorded flying over the site.

Legislative Context

9.2.4 In relation to wildlife and nature conservation, two key Directives have been adopted by the European Union, namely:

- Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive); and

- Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

9.2.5 These Directives provide for the protection of animal and plant species of European importance and the habitats which support them, particularly through the establishment of a network of protected sites, called Natura 2000.

Bats

9.2.6 All species of British bats are legally protected under part 3 (section 41) of the Conservation of Habitats and Species Regulations 2010. These Regulations make it an offence to:

- Deliberately capture, injure, kill or capture a bat;
- Deliberately disturb bats, impairing their ability to survive, breed, reproduce or rear/nurture their young;
- Damage or destroy a breeding site or resting place used by bats; or
- Be in possession of, transport, sell, exchange or offer to sell/exchange a bat (dead or alive) or any part of a bat.

9.2.7 All bats and their roosts in England, Scotland and Wales were originally protected under the Wildlife & Countryside Act 1981. Subsequent amendments to the legislation for England and Wales has removed bats from most of the provisions of the Act, however it remains an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any structure or place that a bat uses for shelter or protection.

9.2.8 Disturbance of bats is covered by both the 2010 Regulations and the 1981 Act, with the magnitude of disturbance critical. Disturbance that impairs survival or successful reproduction would be covered by the Regulations with no legal defence existing. Less significant acts of disturbance may only be covered by the Wildlife & Countryside Act 1981, which includes some legal defences that may be applied in certain circumstances.

9.2.9 It is important to note that bat roosts are protected throughout the year, regardless of whether or not bats are present at the time. Under the Conservation of Habitats and Species Regulations the offence of damaging or destroying a breeding site or resting place of bats is not subject to any legal defence, i.e. an offence will have been committed even if the damage or destruction occurs accidentally.

Licensing

9.2.10 Where development is proposed that would result in an offence under the Habitats and Species Regulations a European Protected Species (EPS) licence needs to be granted by the appropriate authority (Natural England in England) to permit an act that would otherwise be unlawful. This provides for a specific derogation from the legislation, to prevent a legal infringement occurring. To obtain an EPS licence for development it must be demonstrated that the purpose of the act to be licensed is for:

"preserving public health or public safety or other imperative reasons of overriding public interest including those of social or economic nature and beneficial consequences of primary importance for the

environment" (Regulation 53(2))"

9.2.11 In addition Natural England will not grant an EPS licence unless they are satisfied that:

- "There is no satisfactory alternative" (Regulation 53(9)(a)); and
- The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range" (Regulation 53(9)(b))."

Planning Policy and Guidance

National Planning Policy

9.2.12 There are several pieces of national legislation relating to wildlife and biodiversity. Those that are of particular relevance to ecology and development are the Conservation of Habitats and Species Regulations 2010 (as amended), which enacts the Habitats and Birds Directives into UK law, the Wildlife and Countryside Act 1981 (as amended) and, regarding specific protection of badgers, the Protection of Badgers Act 1992. Legislation relating to specific protected sites, habitats and species is set out under the relevant subheadings under Baseline Conditions below.

9.2.13 The Natural Environment and Rural Communities (NERC) Act 2006 requires planning authorities to consider impacts on "species of principal importance for the conservation of biodiversity" when determining planning applications, as described under Biodiversity and Priority Species below. These pieces of legislation and the species and habitats to which they afford protection have been addressed in this Chapter.

9.2.14 Natural England Standing Advice regarding protected species aims to support local authorities and forms a material consideration in determining applications.

9.2.15 The National Planning Policy Framework (DCLG, 2012) (NPPF) sets out planning policies for England and how they should be applied. With regards to ecology and biodiversity, Chapter 11: Conserving and Enhancing the Natural Environment, paragraph 109, states that the planning system and planning policies should:

- Minimise impacts on, and provide net gains in, biodiversity where possible, "contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures"; and
- Recognise the wider benefits of ecosystem services.

9.2.16 Under these aims, paragraph 117 states the need to plan for biodiversity at a landscape scale, linked to national and local targets. Paragraph 118 sets out the principles that local planning authorities should apply when determining planning applications:

- Refuse planning permission if significant harm cannot be avoided, adequately mitigated, or, as a last resort, compensated for;
- Encourage opportunities to incorporate biodiversity in and around developments;
- Permission should not normally be permitted where an adverse effect on a nationally designated Site of Special Scientific Interest (SSSI) is likely, either individually or in combination with other developments; and

- Refuse planning permission if development will result in the loss or deterioration of irreplaceable habitats, such as ancient woodland and the aged or veteran trees, unless the need for, and benefits of, the development in that location clearly outweigh the loss.

9.2.17 The core theme of the NPPF is a “*presumption in favour of sustainable development*” (Paragraph 14). This does not, however, apply where Appropriate Assessment under the Birds or Habitats Directives is being considered, planned or determined (paragraph 119). Appropriate Assessment is required where a plan or project may affect a European Special Protection Area (designated SPA and proposed pSPA) or Special Area of Conservation (designated SAC and candidate cSAC), either alone or in combination with other plans or projects. Together SPA and SAC sites form the network of protected sites known as Natura 2000. Designated and proposed Ramsar sites are also attributed the same protection as Natura 2000 sites under the NPPF.

9.2.18 Government Circular 06/2005 Biodiversity and Geological Conservation, which is referred to in the NPPF, provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

9.2.19 On 6 March 2014 the Department for Communities and Local Government (DCLG) launched the National Planning Practice Guidance as a web-based resource¹. Guidance categories that are considered relevant to ecology include Light pollution (ID:31; paragraph 007), which considers the potential impacts of light pollution on ecology, and Natural Environment (ID: 8; paragraph 007), which provides guidance in terms of biodiversity, ecosystems and green infrastructure.

Regional Planning Policy

London Plan (adopted July 2011), Revised Early Minor Alterations to the London Plan (REMA) (adopted October 2013), draft Further Alterations to the London Plan (adopted March 2015).

9.2.20 The London Plan forms the overall strategic plan for the capital. It provides a framework for economic, environmental, transport and social development to 2031. The Local Plans of each London Borough should be written in general conformity with the London Plan.

POLICY 2.18: GREEN INFRASTRUCTURE: THE MULTI FUNCTIONAL NETWORK OF GREEN SPACES

9.2.21 Policy 2.18 of the London Plan relates to green infrastructure and states that development proposals should incorporate appropriate elements of green infrastructure that are integrated into the wider network.

POLICY 7.19: BIODIVERSITY AND ACCESS TO NATURE

9.2.22 Policy 7.19 of the London Plan considers biodiversity. Where possible, development should make a positive contribution to the protection, enhancement, creation and management of biodiversity (green roofs and living walls are suggested measures to enhance biodiversity).

POLICY 7.21: TREES AND WOODLANDS

9.2.23 Existing trees of value should be retained. Where appropriate, the planting of additional trees should be included in new developments.

Local Planning Policy

Haringey Local Plan: Strategic Policies (adopted March 2013)

- 9.2.24 The Local Plan: Strategic Policies sets out a vision and key policies for the future development of the borough of Haringey up to 2026. Policies considered relevant to the proposed development in terms of ecology include:
- 9.2.25 **Policy SP11: Design** - All new development should enhance and enrich Haringey's built environment and create places and buildings that are high quality, attractive, sustainable, safe and easy to use. To achieve this all development shall... Promote high quality landscaping on and off site, including improvements to existing streets and public spaces...
- 9.2.26 **Policy SP13: Open Space and Biodiversity** – All development shall protect and improve sites of biodiversity and nature conservation, including private gardens through its... Contribution to wildlife and ecological habitats and, where possible, include green and brown roofs, rainwater harvesting, green walls, bird and bat nesting/roosting opportunities... Protection, management and maintenance of existing trees and the planting of new trees where appropriate...

Haringey Unitary Development Plan Saved Policies (adopted July 2006; saved March 2013)

- 9.2.27 **UD3: General Principles** – The council will require development proposals to demonstrate that... e) opportunities for soft landscaping, including appropriate tree retention and tree planting, have been taken into account.
- 9.2.28 **ENV7: Air, Water and Light Pollution** – The Council will control potential pollution resulting from development in the borough by... b) requiring developments to include measures to avoid, reduce and only then mitigate the emissions of pollutants, where appropriate; c) separating potentially polluting activities from sensitive areas (green belt, MOL or ecologically valuable sites) or uses (schools, hospitals, homes)...
- 9.2.29 **OS17: Tree Protection, Tree Masses and Spines** – The Council will seek to protect and improve the contribution of trees, tree masses, and spines to local landscape character by... b) encouraging tree planting wherever possible and appropriate... c) ensuring that road proposals and traffic management schemes are adequately landscaped where appropriate with new trees... d) ensuring that, when unprotected trees are affected by development, a programme of tree replanting and replacement of at least equal amenity and ecological value and extent is approved by the Council...

Biodiversity Action Plans & Biodiversity 2020 Strategy

- 9.2.30 The Natural Environment and Rural Communities Act 2006 Section 40(1) states that each public authority "must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity".
- 9.2.31 This legislation makes it clear that Local Planning Authorities should consider impacts to biodiversity when determining planning applications, with particular regard to the Section 41 list of 56 habitats and 943 species of principal importance, even where they are not covered by other legislation. The S41 list was taken forward for action under the UK BAP (first published in 1994). The UK BAP has now been superseded by the Biodiversity 2020 Strategy (published August 2011), which continues to prioritise the

S41 list, setting national targets for the period to 2020, and the UK Post-2010 Biodiversity Framework (published July 2012), which shows how these contribute to targets at the European level.

- 9.2.32 At a regional level the Site is covered by the London BAP and at a local level by the BAP for the Borough of Haringey. Species Action Plans (SAPs) and Priority species listed within the UK and London BAP that could be potentially relevant to this site include Bats (UK, London and Haringey BAPs), House Sparrow (UK and London BAP, Species of Local Conservation Concern), Swift (Local Species of Conservation Concern) and Kestrel (Local Species of Conservation Concern). Bats (all species) are also included as a SAP within the Haringey BAP. A Built Structures Habitat Action Plan (HAP) and Gardens HAP also form part of the Haringey BAP and this is also considered relevant.

Guidance/ Best Practice

- 9.2.33 The methodology for this assessment is based on the 2006 Guidelines for Ecological Impact Assessment (EclA) in the United Kingdom, published by the (Chartered) Institute of Ecology and Environmental Management²⁰. These guidelines provide a robust framework for ecological assessment, which is then further informed by professional judgement and interpretation.

Baseline Data Collection

Desk Study

- 9.2.34 The Multi-Agency Geographic Information for the Countryside²¹ (MAGIC) online database was searched to identify all relevant statutory nature conservation sites. The following two searches were undertaken, taking into account the level of designation and the distance over which effects could potentially occur:
- A 3km-radius search around the Site to search for nationally and locally important sites (i.e. Local Nature Reserves (LNRs), National Nature Reserves (NNRs), Sites of Special Scientific Interest (SSSIs)); and
 - A 10km-radius search around the site to search for internationally important sites (i.e. Ramsar sites, Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)).
- 9.2.35 A biological records search was also conducted for the area of land encompassing the site and adjacent land within a 1km-radius area of the site's central grid reference. Greenspace information for Greater London (GiGL) was contacted for records of non-statutorily designated wildlife sites, protected and notable habitats and species.
- 9.2.36 Waterbodies within a 0.5km radius of the Site boundary were also identified using online Ordnance Survey mapping (Promap)²² such that these may be considered in line with Natural England Great Crested Newt Mitigation Guidelines (English Nature, 2001²³).

²⁰ IEEM (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom*

²¹ Available online at www.magic.gov.uk

²² Available online at www.promap.co.uk

²³ English Nature (2001) *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

Field Survey

Extended Phase 1 Habitat Survey

- 9.2.37 An extended Phase 1 Habitat survey was carried out on 29 May 2015 during fine and dry weather conditions by Dr Martin Brammah MCIEEM, encompassing the site and immediately adjacent habitats that could be viewed. This survey technique is at a level intermediate between the Phase 1 survey (JNCC, 2010)²⁴ (where standardised habitat mapping is undertaken, together with making notes on dominant and notable species) and the more detailed survey techniques that may be used to specifically record or survey particular habitats or species. In this survey, plant species observed within each habitat type are recorded and habitats are classified and mapped. Scientific names of botanical species are referenced in accordance with Stace (2010)²⁵. Note is also taken of the more conspicuous fauna present during the survey, with particular attention paid to any evidence of, or potential for, the presence of protected or notable species.

Protected/Notable Species Surveys

- 9.2.38 A range of surveys has also been undertaken to assess the potential for significant negative effects on bats as a result of development at the Site. A summary of these surveys is presented in Table 9.2 below.

Table 9.2 – Summary of Protected / Notable Species Surveys Undertaken in 2015

Taxa	Surveys Undertaken
Bats	- Building assessment and inspection survey for bat roost potential (29 May 2015) - Transect surveys (9, 22 June and 8 July 2015) - Static detector surveys (10-22 June 2015; 9-20 July; 3-10 August)

Bats: Building Inspection

- 9.2.39 A detailed external and, where possible, internal inspection of all accessible buildings on the site was carried out on 29 May 2015 during fine and dry weather conditions by Dr Martin Brammah MCIEEM, holder of a Natural England bat licence (Class Survey Licence WML-CL18; Registration Number 2015-14077-CLS-CLS).
- 9.2.40 Buildings were inspected using binoculars and a high-powered torch, as necessary, to search for direct evidence of roosting bats (i.e. live/dead bats, droppings, insect feeding remains, grease/urine stains associated with roosting features) or features offering potential roosting opportunities to bats (e.g. holes/crevices associated with roof eaves/tiles, gaps in brickwork/ mortar etc.).
- 9.2.41 Based on the amount of bat roosting evidence recorded, buildings were rated in terms of their bat roost potential from 'negligible' (i.e. buildings of no value to roosting bats) to 'high' (i.e. buildings with significant associated bat roosting evidence).

Bats: Static Detector Surveys

- 9.2.42 In order to better understand general levels of bat activity on site over an extended period of time, three Wildlife Acoustics SM2 bat detectors were positioned in three locations on site (A, B and C on the Bat

²⁴ JNCC, (2010) *Handbook for Phase 1 habitat survey - a technique for environmental audit*. ISBN 0 86139 636 7

²⁵ Stace (2010) *New Flora of the British Isles*. Third Edition.

Survey Plan in Appendix 9.5) and left to record automatically for three periods of several nights. The SM2s were collected at the end of each recording period and calls from the three nights with the most suitable weather were analysed. Table 9.3 below provided details of the weather conditions during each of the three recording periods.

- 9.2.43 Data recorded on each SM2 during the three recording periods was downloaded and analysed using AnalookW v.4.1t to identify the species present and the total number of bat passes within each recording period, for each species, at each location, calculated from the number of recorded files containing a bat call. Although not synonymous with actual numbers of bats, this 'bat pass' information provides an indication of the relative abundance of bat species across a site. The total number of bat passes was then used to calculate the mean number of bat passes per hour for each species.

Table 9.3 –Static Bat Detector Survey Weather Conditions

	Date (2015)	Time	Temp (°C)	Rain (mm)	Cloud (%)	Wind speed (mph)	Comments on weather conditions in relation to bat activity
9.2.44	10/11 June	21:00	13	0	0	15	Suitable
		00:00	8	0	12	13	Suitable
		03:00	9	0	17	15	Suitable
	11/12 June	21:00	15	0	14	15	Suitable
		00:00	12	0	22	13	Suitable
		03:00	12	0	23	12	Suitable
	12/13 June	21:00	18	1.4	33	9	Suitable, with suboptimal period of rain
		00:00	15	2.1	100	5	Suitable, with suboptimal period of rain
		03:00	14	0.3	100	18	Suitable, with suboptimal period of rain
	19/10 July	21:00	18	0	4	1	Suitable
		00:00	14	0	43	7	Suitable
		03:00	13	0	12	7	Suitable
	10/11 July	21:00	18	0	74	8	Suitable
		00:00	17	0	32	8	Suitable
		03:00	15	0	8	5	Suitable
	11/12 July	21:00	17	0	42	9	Suitable
		00:00	14	0	59	8	Suitable
		03:00	14	0.1	100	11	Suitable, with suboptimal period of rain
	7/8 August	21:00	19	0	6	1	Suitable
		00:00	16	0	6	6	Suitable
		03:00	14	0	11	5	Suitable
	8/9 August	21:00	19	0	14	8	Suitable
		00:00	19	0	0	4	Suitable
		03:00	16	0	0	6	Suitable
	9/10 August	21:00	22	0	37	6	Suitable
		00:00	16	0	33	7	Suitable
		03:00	15	0	66	7	Suitable

9.2.45 Three dusk bat activity transect surveys were carried out at the Site on 9 June, 22 June and 8 July 2015. All three surveys were undertaken by experienced bat surveyors Dr Martin Brammah MCIEEM, Michelle Bullock GradCIEEM and Alexandra Cole GradCIEEM, with due consideration of the Bat Conservation Trust Good Practice Guidelines²⁶.

9.2.46 Three transect routes were designed to cover features with potential bat interest, such as possible flight lines and foraging areas. The transect routes were walked by three surveyors, with surveyors pausing for five-minute periods at ten pre-selected points along the route to record bat activity and provide a representative sample of the habitat-types present on site. When bats were encountered, notes were

²⁶ Hundt (2012) *Bat Surveys: Good Practice Guidelines*. 2nd edition. Bat Conservation Trust.

recorded on the likely species and, when bats could be seen, their behaviour, such as direction of flight, numbers of bats and type of activity e.g. foraging/commuting. Any bat activity observed between transect points was also recorded and described.

- 9.2.47 The transect surveys commenced 15 minutes before sunset and continuing for two hours after sunset. During each survey, bat activity was recorded using broadband Batbox Duet and Wildlife Acoustics EM3 bat detectors, recording all bat calls for later analysis. All transect surveys were undertaken during suitable weather conditions. These are summarised with dates in Table 9.4 below.

Table 9.4 - Bat Transect Survey Weather Conditions

Survey Date (2015)	Sunset Time	Survey Duration (mins)	Temp (°C)	Rain	Cloud (n/8)	Wind (Beaufort scale)
09 June	21:16	135	19	No rain	2	1
22 June	21:22	135	17	No rain	6	1
08 July	21:18	135	13	No rain	7	3

- 9.2.48 As well as making a qualitative assessment of bat activity at the site based on surveyor observations, a quantitative analysis of the data recorded during the transect surveys was also undertaken. This allowed for a more thorough assessment of the value of the site for bats to be made, in combination with observational data on factors such as direction of flight, numbers of bats or type of activity i.e. foraging / commuting observed during the survey.
- 9.2.49 Data recorded during the surveys was downloaded and analysed using AnalookW v.4.1t to identify the species present and quantify the number of bat passes. As each transect point was consistently sampled for multiple five minute periods the relative number of passes/minute in total, and for each species, could be calculated for different parts of the site. Bat passes recorded during the time spent walking between transect points were not included within the calculation of bat passes/minute but are included within the discussion and overall evaluation of bat activity at the site.

Assessment Methodology

- 9.2.50 The methodology for this assessment is based on the 2006 Guidelines for Ecological Impact Assessment (EclA) in the United Kingdom, published by the (Chartered) Institute of Ecology and Environmental Management. These guidelines provide a robust framework for ecological assessment, which is then further informed by professional judgement and interpretation.

- 7.1.1. The main aims of this assessment are to:

- Consider the activities and biophysical changes likely to be associated with the proposed development and its zone of influence;
- Identify the baseline conditions within the zone of influence, with particular reference to those valued ecological receptors/features that are likely to be affected;
- Describe and assess the potential effects on the structure and function of the systems on which these features depend, in the absence of mitigation;
- Describe any mitigation needed to avoid or minimise adverse effects and explain how such actions have been incorporated into the scheme;
- Describe any compensation needed where an effect cannot be reduced to an insignificant level; and

- Set out the net anticipated effects of the proposed development, complete with mitigation.

Significance Criteria

Identification of Valued Ecological Receptors

9.2.51 The geographic frame of reference used for assigning value to ecological receptors/features is based on that recommended in the IEEM guidelines, where ecological resources are assessed as having value at the following levels:

- International
- UK
- National
- Regional
- County
- District (or Borough)
- Local (or Parish)
- Site

9.2.52 Valuing ecological features can be complex. Other considerations include their potential value, social value to the local community, any important function they serve within a wider ecosystem and the level of legal protection they receive. Ecological features considered to be of value at the Local level or above are classed as Valued Ecological Receptors (VERs).

Determination of Significance

9.2.53 The significance of an ecological effect, whether adverse or beneficial, has been assessed in accordance with the IEEM guidelines. An effect is considered to be significant if it is likely to result in a change in the conservation status or degree of integrity of any VER.

Geographical Scope

9.2.54 For the purpose of this assessment the zone of influence is different in relation to the various ecological resources under consideration.

9.2.55 Three zones of influence are recognised as follows:

- **Internationally important designations:** The area occupied by a 10km radius around the site boundary, to take into account variation in individual zones of influence relating to such sites.
- **Nationally important designations:** The area occupied by a 3km radius around the site boundary, to take into account variation in individual zones of influence relating to such sites.
- **Locally important designations:** The area occupied by a 1km-radius around the site's central grid reference (i.e. the GiGL search area for biological records and non-statutory designations).
- **Non-statutory designation:** Identical zone of influence to previous.
- **Protected and notable species:** Identical zone of influence to previous, except where the species in question is a qualifying feature of a nationally or internationally important designation, in which case the relevant zone of influence for these designations applies.

Cumulative Development

- 9.2.56 All committed development sites identified on the Cumulative Development Schedule have been taken into consideration in order to assess the potential for in-combination effects on VERs. Fully operational sites have not been included in this assessment as it is considered that these sites are already having an established effect.

Assumptions and Limitations

- 9.2.57 No assumptions have been made and there have been no limitations to our survey work.

9.3 Baseline Conditions

- 9.3.1 The results of the GiGL data search are provided in Appendix 9.3. This includes a summary of the results and plans highlighting statutory and non-statutory designated wildlife sites identified within the data search area.

Designated Wildlife Sites

- 9.3.2 No statutory wildlife site designations cover any part of the Project Site. Two internationally important designations are present within 10km of the Project Site: Lee Valley Ramsar and Special Protection Area (SPA); and Epping Forest Special Area of Conservation (SAC). Two nationally important designations are present within 3km of the Project Site: Walthamstow Reservoirs Site of Special Scientific Interest (SSSI); and Chingford Reservoirs SSSI. No locally important sites occur within 3km of the site boundary.
- 9.3.3 Descriptions of the statutory sites are provided in Table 9.5 below.

Table 9.5 – Statutory Sites

Site Name & Designation	Distance & Direction from Survey Area	Brief Description of Designated Site
Internationally Important Sites Within 10km		
Lee Valley SPA and Ramsar site	c. 1.2 km south-east	Supports internationally important numbers of migratory gadwall <i>Anas strepera</i> and shoveler <i>Anas clypeata</i> duck and nationally important numbers of bitterns <i>Botaurus stellaris</i> which winter in the Valley. Many other waterbirds reach levels of national significance. The wintering numbers of many other birds are of regional or local importance. Overall the wetlands of the Lee Valley Regional Park represent one of the major inland wintering areas for birds in the UK, supporting over 10,000 birds every winter.

Site Name & Designation	Distance & Direction from Survey Area	Brief Description of Designated Site
Epping Forest SAC	c. 4.6 km	Epping Forest is a large woodland area in which records of stag beetle <i>Lucanus cervus</i> are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species. Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss <i>Zygodon forsteri</i> . The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates.
Nationally Important Sites Within 3km		
Walthamstow Reservoirs SSSI	c. 1.2 km south-east	The Walthamstow Reservoirs contain one of the country's major heronries and a particularly large concentration of breeding wildfowl. They are also an important gathering area for moulting tufted duck <i>Aythya fuligula</i> and in winter attract nationally significant populations of wildfowl and other wetland birds. In addition to the heronry, Walthamstow supports the most notable variety and numbers of breeding wetland birds among all of London's drinking water reservoirs.
Chingford Reservoirs SSSI	c. 2.6 km north-east	The Chingford Reservoirs are one of the major wintering grounds for wildfowl and wetland birds in the London area and hold nationally important numbers of some species. The reservoirs also form a moult refuge for large populations of wildfowl during the late summer months. During the winter months the reservoirs regularly support nationally important populations of shoveler and great crested grebe <i>Podiceps cristatus</i> . Other wildfowl which winter on the reservoirs in important numbers include goldeneye <i>Bucephala clangula</i> , tufted duck and goosander <i>Mergus merganser</i> , with populations of the latter two species occasionally reaching levels of national significance.

Non-statutory Sites

- 9.3.4 The desk-based information search provided by GiGL highlights the presence of two non-statutory Sites of Importance for Nature Conservation (SINCs) located within the data search area. These sites are identified by the Greater London Authority on account of their flora and fauna and are graded on the basis of their importance to a particular defined geographic area in the following order of importance:

Metropolitan > Borough Grade I > Borough Grade II > Local

- 9.3.5 Both SINCs are Sites of Borough Importance (SBI) Grade II and are located within 1km of the Project Site. Given their proximity to the Project Site, they are considered to be within the potential zone of influence of the Project. The two sites are briefly described in Table 9.6 below.

Table 9.6 – Non-statutory Sites

Site Name & Designation	Direction & Distance From Site	Brief Description of Designated Site
Non-statutory Sites Within 1km		
Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park SBI Grade II	c. 0.37 km west	A large area of open parkland, with veteran oak trees in the park, churchyard and cemetery. The cemetery contains a large pond with two islands that provide nesting site for common waterfowl.
Tottenham Hale to Northumberland Park Railsides SBI Grade II	c. 0.75 km east	A long stretch of vegetated railsides comprising a mosaic of grassland and scrub, with scattered silver birch <i>Betula pendula</i> . Some areas of woodland are present, dominated by sycamore <i>Acer pseudoplatanus</i> . Wurzell's wormwood <i>Artemisia vulgaris</i> x <i>verlotiorum</i> is abundant around Northumberland Park. The site is inaccessible to the public and can only be viewed from adjacent paths or roads.

Habitats and Flora

- 9.3.6 The habitats present on the Project Site are shown on the Habitats Plan in Appendix 9.4.
- 9.3.7 The Project Site is bordered to the north Lillywhite House, to the east by Worcester Avenue, to the South by Park Lane and to the west by High Road. At the time of survey the Project Site was bisected by Paxton Road, running west to east between High Road and Worcester Avenue. Approximately two thirds of the area of the site to the south of Paxton Lane is occupied by the existing football stadium, which contains habitat in the form of an intensively managed amenity grassland football pitch. The area to the west of the stadium is dominated by hardstanding with a row of predominantly multi-storey brick buildings at its western extent, along High Road. The single-storey Spurs Mega Store building occupies the south-west corner of this area.
- 9.3.8 The area of the site to the north of Paxton Road comprises two distinct areas, one to the north and one to the south. The southern area is dominated by a bare ground building site that is under colonisation in some areas by ephemeral/short perennial and tall ruderal vegetation. Located within this building site, in the middle and adjacent to the north of Paxton Road lies the Archway Sheet Metal Works and its associated industrial/warehouse-type buildings.
- 9.3.9 To the north of the Project Site is the northern development (of the previous application and now built out and operational), it is dominated by Lilywhite House/Sainsbury's, which has multiple turfed green roofs. To the east of this building is a row of terraced houses on Worcester Avenue (Nos. 2 – 32), all with rear gardens. All of these houses are off-site.
- 9.3.10 To the west of Lilywhite House/Sainsbury's is a row of multi-storey town houses and office buildings along High Road. Two of these properties have rear gardens (Nos. 808 and 810 High Road).
- 9.3.11 A list of all plant species recorded during the 2015 extended Phase 1 Habitat survey of the site (accessible areas only) is provided in Appendix 9.4. All habitats present on site are discussed in turn

briefly below.

Amenity grassland

- 9.3.12 Regularly managed amenity grassland is present in several locations on site including back gardens and the stadium pitch. The majority of these amenity grassland areas were dominated by perennial rye-grass *Lolium perenne*.

Trees

- 9.3.13 Mature and semi-mature trees are scattered around the Project Site. These are either located within paved areas to either side of the roads bordering the site, or present within the rear gardens of the houses in the north-west (properties 808-810) and north-east (properties 20-32) of the site. Almost of all of the roadside trees are sycamore *Acer pseudoplatanus*, although a mature London plane *Platanus x acerifolia* tree is present on the corner of High Road and Brereton Road.
- 9.3.14 A mature red horse chestnut *Aesculus x carnea* tree is present in the car park to the rear of No. 800 High Road, in the north-west of the Project Site. A mature sycamore is present in the garden of No. 808 High Road.
- 9.3.15 Various semi-mature trees are present in the rear gardens of the terraces in the north-east of the Project Site, including cherry *Prunus* spp. and elder *Sambucus nigra*.

Ornamental planting

- 9.3.16 A limited range of ornamental shrubs and trees were recorded to the north of the Project Site including *Photinia x fraseri* 'Red Robin' - in large troughs to the east and west of Sainsbury's - and birch *Betula* sp. saplings, planted on the roof of Lilywhite House.
- 9.3.17 Other ornamental species recorded in front gardens along High Road include yucca *Yucca* sp., bay *Laurus nobilis*, and rose *Rosa* sp.

Bare ground

- 9.3.18 The vast majority of bare ground habitat on site comprises the building site to the north of Paxton Road. Small areas at the margins of this bare ground have been sparsely colonised by a range of common ephemeral/short perennial and tall ruderal plant species including pineappleweed *Matricaria discoidea*, oilseed rape *Brassica napus*, shepherd's purse *Capsella bursa-pastoris*, groundsel *Senecio vulgaris*, knotgrass *Polygonum aviculare*, dandelion *Taraxacum*, annual meadowgrass *Poa annua*, and red dead-nettle *Lamium purpureum*.
- 9.3.19 Colonising plant species were also recorded in other, small, areas of bare ground on site. Sowthistle *Sonchus oleraceus*, poppy *Papaver rhoeas*, hedge mustard *Sisymbrium officinale* and quaking grass *Briza maxima* were all recorded on bare ground in the front garden of No. 796 High Road. The front garden of No. 794 High Road has been colonised by cleavers *Gallium aparine*, bramble *Rubus fruticosus* agg., butterfly bush *Buddleja davidii*, willowherb *Epilobium* sp., herb Robert *Geranium robertianum*, spear thistle and creeping thistle.

Invasive species

- 9.3.20 Two shoots of Japanese knotweed were recorded growing at the southern end of the brick wall along the east side of the off-site astro-turf football pitch (see Target Note 1 on the Habitats Plan in Appendix 9.4. A stand of Japanese knotweed was also identified in the grounds of the school, c. 5 m to the east of the two shoots. All of the Japanese knotweed appeared to be under treatment with glyphosate-based herbicide.
- 9.3.21 No Japanese knotweed was recorded in any of the areas accessed during the 2015 extended Phase 1 Habitat survey.

Hardstanding

- 9.3.22 Roads, pavements and car parks within the Site boundary all comprise hardstanding.

Buildings

- 9.3.23 All of the buildings on Site were assessed as part of the bat survey work and are therefore described in detail in Table 9.7 below.

Fauna

Local records

- 9.3.24 The habitats present on site are only considered to be of potential value to bats and birds and therefore only records of these two taxa are discussed.
- 9.3.25 Several local bat records collated by the London Bat Group have been provided by GiGL for the data search area (see Appendix 9.1). These include a single record of a roost of pipistrelle *Pipistrellus* sp. bats, from c. 0.44 km west of the centre of the Project Site. Sightings of pipistrelle are recorded from c. 0.31 km west, c. 1.06 km north-east and c. 1.42 km south-east of the Project Site. The latter location to the south-east also has records of serotine *Eptesicus serotinus* and noctule *Nyctalus noctula* bats, and it is assumed that this corresponds with habitat along the River Lee corridor, which is likely to be valuable for bat foraging.
- 9.3.26 GiGL have provided a number of records of protected and notable bird species for the data search area. These include species specially protected under Schedule 1 of the Wildlife and Countryside Act 1981 such as hobby *Falco subbuteo*, kingfisher *Alcedo atthis*, black redstart *Phoenicurus ochruros*, fieldfare *Turdus pilaris* and redwing *Turdus iliacus*. The highly urbanised nature of the Project Site reduces its value to bird species, and no habitats are present that would typically support any of the Schedule 1 species listed above.
- 9.3.27 The small proportion of the Project Site comprising trees and residential gardens is likely to be used by bird species commonly associated with urban gardens.

Bats: Building Inspection

- 9.3.28 Full descriptions of all of the buildings inspected on site during the June 2015 survey and an assessment of their potential to support bats are provided in Table 9.7 below.

Table 9.7 – Building Inspection Results

Building Reference	Building description	External features/ evidence	Internal features/ evidence	Bat roost potential
Spurs Mega Store	Single-storey rendered brick building with shallow-pitched sheet metal roof over main shop and flat concrete/felt roofs on southern building extensions.	No external features or evidence.	Building well-sealed about the exterior, therefore not inspected internally.	Negligible
744	Warmington House. Grade II listed early C19 three-storey brick building. Access to roof void is via a staircase. Roof void has floor boards along centre of floor and is divided into three areas, with a semi-circular window at the southern end, letting in light. Tiled roof lined with intact bitumastic felt liner.	No external features or evidence. Roof tiles not visible from ground level due to parapet walls, but roof tiles appear well sealed on current aerial photographs.	No internal features or evidence.	Negligible – Void well-sealed and no obvious crevice-roosting opportunities
746	Three-storey red brick Edwardian local listed building with stone ground floor façade and an arched central entrance flanked by stone columns. Well-sealed slate tiled roof lined with sarking boards. No insulation in void.	No external features or evidence.	No internal features or evidence.	Negligible – No gaps in external tiling and no means of accessing void.
748	The Red House. Three-storey local listed late Victorian building constructed of red brick with a steeply pitched double gable ends to the High Road, slate roofs and tall red brick chimney stacks. Well-sealed double-pitched roof covered in thin slates. Void lined with bitumastic felt and sarking. Tiles well-sealed on single-storey extension to rear.	No external evidence. Missing ridge tile at south-east corner of northern pitched roof, however this is an unlikely roosting location as any emerging bats would be highly exposed to predators as they would exit over the Bill Nicholson Way car park.	Gaps in decorative brickwork at west end of north roof clearly used by sparrows to nest in the void, but no associated bat roosting evidence and no roosting evidence elsewhere in the void. Southern roof void not accessible.	Negligible – Gap caused by missing ridge tile highly unlikely to be attractive to bats. No evidence of bats accessing void via holes in decorative brickwork.
750	Three-storey local listed Victorian building constructed of red brick,	No external evidence. Missing roof tile on southern	No internal features or evidence.	Negligible – Gap caused by missing

	with stone mullioned casement windows and decorated moulded double gables on both street elevations. Roof well-sealed, covered in thin slate tiles. Void lined with sarking.	aspect of roof, however this is an unlikely roosting location as any emerging bats would be highly exposed to predators.		ridge tile highly unlikely to be attractive to bats. No external evidence of bats.
Spurs Shop	Single storey rendered brick building with glass front. Flat sheet-material roof. No roof void.	No external features or evidence.	Building well-sealed about the exterior, therefore not inspected internally.	Negligible
794 - 802	Row of statutory listed three-storey Georgian buildings with pitched tiled roofs, many of which have low parapet walls.	No external features or evidence. All visible roof tiles appear well-sealed.	No access to survey interior.	Negligible
804 – 806	Three-storey Victorian buildings constructed of London stock brick with hipped slate roofs.	No external features or evidence. All visible roof tiles appear well-sealed.	No access to survey interior.	Negligible
808 – 810	Pair of four storey brick-built semi-detached Grade II* listed properties, dated to 1715.	No external features or evidence. All visible roof tiles appear well-sealed.	No access to survey interior.	Negligible
814	Two-storey local listed Victorian building constructed of red brick. Flat concrete roof with parapet wall.	No external features or evidence.	No access to survey interior.	Negligible
B1	Two-storey building constructed of red brick. Flat concrete roof with parapet wall.	No external features or evidence.	No access to survey interior.	Negligible
20	Brick-built terraced house with unlined, clay-tiled roof. Mineral wool insulation.	Gaps beneath some tiles, but no associated bat droppings or grease staining.	No internal features or evidence.	Negligible – roof void unlined and draughty. Unsuitable for roosting bats.
22	Brick-built terraced house with clay-tiled roof. No lining directly beneath tiles, but roof void lined with polythene, fastened between rafters. No insulation between ceiling joists.	Gaps beneath some tiles, but no associated bat droppings or grease staining.	No internal features or evidence: The plastic roof lining is affixed to the bottom of the rafters, leaving a draughty c. 10 cm gap between the clay tiles and the sheet. As a result no suitable roosting crevices are present.	Negligible - gap between plastic sheeting and unlined roof tiles is draughty and unsuitable for roosting bats.

24	Brick-built terraced house with unlined, clay-tiled roof. Mineral wool insulation.	Gaps beneath some tiles, but no associated bat droppings or grease staining.	No internal features or evidence.	Negligible – roof void unlined and draughty. Unsuitable for roosting bats
26	Brick-built terraced house with new, well-sealed, clay-tiled roof.	No bat roosting features or evidence.	Not surveyed internally as tenanted, but no potential roosting opportunities presented by new roof.	Negligible – new roof is well-sealed and offers no roof access or crevice roosting features.
28	Brick-built terraced house with clay-tiled roof.	Gaps beneath some tiles, but no associated bat droppings or grease staining.	Not surveyed internally as tenanted. However it is understood that the roof void is not lined, as all buildings in the terrace are identical in layout and construction.	Negligible – roof void unlined and draughty. Unsuitable for roosting bats
30	Brick-built terraced house with clay-tiled roof. Roof void timber framed and completely unlined, therefore poorly insulated from external temperatures and wind.	Gaps beneath tiles.	No internal features or evidence.	Negligible – no internal roosting evidence and no crevice-roosting opportunities due to lack of roof lining.
32	Brick-built terraced house with clay-tiled roof. Roof void timber framed and mostly unlined save for one area at southern gable end. Void poorly insulated from external temperatures and wind.	Gaps beneath tiles, particularly large gaps at gable end where neighbouring house (No. 34) has been demolished.	No internal features or evidence.	Negligible – no internal roosting evidence and void too exposed to external weather conditions to be attractive to bats, as mostly unlined.
Archway Sheet Metal Works	Collection of breeze block/brick/metal-built workshops or varying height, typically with large glass-paned windows and metal sheet roofs containing skylights. Very light inside. Large metal warehouse on Paxton	No external features or evidence.	No internal features or evidence.	Negligible

	Road totally burnt out on the upper floors.			
Stadium	Concrete/brick/breeze block/metal-built football stadium.	No external features or evidence.	No internal features or evidence.	Negligible - clearly unsuitable to support roosting bats due to exposure to external weather and thermally unstable construction materials.

- 9.3.29 Given the highly urban context of the Project Site and the total lack of any bat roosting evidence recorded in association with any of the buildings inspected, all of the onsite accessible buildings inspected in June 2015 are considered to have negligible potential to support roosting bats.

Bats: Static Detector Surveys

- 9.3.30 The results of the static detector survey are presented in Table 9.8 below. The locations in which the static detectors were installed are shown on the Bat Survey Plan in Appendix 9.5.

Table 9.8 – Static Detector Survey Results

Location	Recording Period (2015)	Bat Species	Mean calls per hour	Total calls per recording period
A	June	Common pipistrelle	0.13	3
A	June	Noctule	0.27	6
B	June	Common pipistrelle	1.39	31
B	June	Soprano pipistrelle	0.22	5
C	June	Common pipistrelle	3.67	82
C	June	Soprano pipistrelle	1.79	40
C	June	Nathusius' pipistrelle	0.04	1
C	June	Noctule	0.09	2
A	July	Common pipistrelle	0.04	1
A	July	Soprano pipistrelle	0.04	1
A	July	Noctule	0.48	11
B	July	Common pipistrelle	0.52	12
B	July	Soprano pipistrelle	0.09	2
B	July	Noctule	0.48	11
C	July	Common pipistrelle	6.41	147
C	July	Soprano pipistrelle	0.13	3
C	July	Noctule	0.61	14
C	July	<i>Nyctalus</i> sp. bat	0.04	1

A	August	Common pipistrelle	0.41	11
A	August	Noctule	0.56	15
B	August	Common pipistrelle	1.60	43
B	August	Soprano pipistrelle	0.74	20
B	August	Nathusius' pipistrelle	0.04	1
B	August	Noctule	0.33	9
C	August	Common pipistrelle	4.84	130
C	August	Soprano pipistrelle	0.15	4
C	August	Noctule	0.15	4

- 9.3.31 In overall terms, the above results reflect very low levels of bat activity around the Project Site, with a maximum of just 6.41 passes per hour, recorded at location C.
- 9.3.32 A total of at least four bat species were recorded by the detectors: common pipistrelle, soprano pipistrelle, noctule, Nathusius' pipistrelle and a *Nyctalus* sp. bat.
- 9.3.33 The highest levels of bat activity were recorded by the SM2 bat detector in location C (428 passes across all species recorded), on the East Stand, facing out onto Worcester Avenue. The lowest levels of activity were recorded by the detector in location A (48 passes across all species recorded), within the construction compound.
- 9.3.34 In June, common pipistrelle bats were responsible for the largest number of passes (n=116), followed by soprano pipistrelle (n=45), noctule (n=8) and Nathusius' pipistrelle (n=1). Common pipistrelle bats were also responsible for the largest number of passes in July (n=160), followed by noctule (n=36), soprano pipistrelle (n=6) and *Nyctalus* sp. bats (n=1). In August the largest number of passes was again recorded from common pipistrelle bats (n=184). Noctules were responsible for the second largest number of passes (n=28), followed by soprano pipistrelle (n=24) and Nathusius' pipistrelle (n=1).
- 9.3.35 In all but three instances, the first bat to be recorded by any of the three SM2 bat detectors was recorded well after the typical emergence time for the species recorded. The three exceptions are a common pipistrelle recorded at 21.07 (8 minutes before sunset) by the detector in location C on 11 June; a common pipistrelle recorded at 21.42 (25 minutes past sunset) by the detector in location B on 10 July and a common pipistrelle recorded at 20.37 (26 minutes past sunset) by the detector in location C on 8 August. The timing of these recordings suggests that the bats in question emerged from roosting locations in the vicinity of the Site.
- 9.3.36 No bats were recorded at a time to suggest that they were returning to roost on site.

Bats: Transect Surveys

- 9.3.37 The transect routes are shown on the Bat Survey Plan in Appendix 9.5. A summary of the passes per min for each species recorded on each transect, across all three survey dates, is provided in Table 9.9 below, with full results tables provided in Appendix 9.6.

Table 9.9 – Transect Survey Results

Transect point	Transect Route								
	A			B			C		
	Survey minutes	Com. pip. pass/min	Noctule calls/min	Survey minutes	Com. pip. pass/min	Noctule calls/min	Survey minutes	Com. pip. pass/min	Noctule calls/min
1	25	-	-	10	-	0.10	10	-	-
2	40	-	-	15	-	-	15	0.07	0.07
3	40	-	-	15	-	-	15	0.20	-
4	35	-	0.03	10	-	0.30	10	-	0.20
5	30	-	-	10	-	0.10	10	-	-
6	30	-	-	10	-	0.10	10	-	0.30
7	30	-	-	10	-	-	10	-	0.10
8	35	-	-	10	-	-	10	-	0.10
9	35	-	-	10	-	-	10	-	-
10	20	-	0.05	5	-	-	5	-	0.20

- 9.3.38 Only two bat species were recorded during the transect surveys: common pipistrelle and noctule. No bats were recorded or seen by any of the surveyors during any of the three dusk transect surveys at a time to suggest that the bat had emerged from a roost on or near to the Project Site.
- 9.3.39 Common pipistrelles were only recorded at points 2 and 3 on transect route C, at the south end of Worcester Avenue, and were not recorded at any of the stopping points on transect routes A and B. A total of four common pipistrelle calls were recorded across 530 minutes of recording, giving an average rate of 0.008 bat passes/min (0.45 passes/hour) for the Project Site as a whole.
- 9.3.40 Noctules were recorded at stopping points 4 and 10 of transect route A; points 1, 4, 5 and 6 of transect route B; and at points 2, 4, 6, 7, 8 and 10 of transect route C. On every occasion that surveyors saw bats of this species, they were commuting high overhead and had clearly come from off-site roosts. A total of 17 noctule calls were recorded across 530 minutes of recording, giving an average rate of 0.032 bat passes/min (1.92 passes/hour) for the Project Site as a whole.
- 9.3.41 As per the results of the static detector survey work, the results of the transect surveys are indicative of very low levels of bat activity associated with the Project Site. No bats were observed during any of the surveys behaving in a way to suggest that they might be roosting on site, or that they rely on the Project Site as an important foraging location.

Valued Ecological Receptors

- 9.3.42 Potential Valued Ecological Receptors (VERs) have been evaluated and assigned a level of ecological value, as summarised in Table 9.10.

Wildlife sites

- 9.3.43 Both the Lee Valley SPA and Ramsar site and Epping Forest SSSI and SAC are considered to be VERs at the International level.
- 9.3.44 Walthamstow Reservoirs SSSI and Chingford Reservoirs SSSI are considered to be VERs at the National level.
- 9.3.45 Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park Site of Borough Grade II Importance, and Tottenham Hale to Northumberland Park Railsides Site of Borough Grade II Importance are both considered to be VERs at the Borough level, in accordance with their grading.

Habitats and Flora

- 9.3.46 No habitats listed under Schedule 41 of the NERC Act (2006) or either of the London or Haringey BAPs are present at the Project Site, with the exception of 'built structures', for which a Habitat Action Plan (HAP) exists as part of both BAPs, and 'gardens', for which a HAP exists as part of the Haringey BAP. The 'built structures' habitat does not have intrinsic ecological value, but is listed to acknowledge that some types of wildlife (e.g. bats and nesting birds) are dependent upon buildings and other structures. None of the remaining habitats present are considered to be of sufficient ecological value to qualify as VERs.

Fauna

- 9.3.47 Given the low/negligible ecological value of the habitats present on site and their isolation in a highly urban context, the Project Site is considered either completely unsuitable for or highly unlikely to support any notable or protected fauna other than common bird species, which may use the buildings and trees to nest and possibly bats, which again could roost in the buildings. Bats and nesting birds are therefore discussed in more detail below.

Bats

- 9.3.48 Very low levels of bat activity by at least four bat species were recorded as part of the transect and static detector surveys undertaken in 2015, these results and those of the building inspections do not suggest that bat species roost at, forage within or regularly commute through the Project Site. This conclusion is identical to that of the bat survey work carried out previously at the site in 2008. The local bat assemblage is therefore not considered to be a VER and does not require assessment.

Nesting Birds

- 9.3.49 The highly urbanised nature of the site reduces its value to bird species, and no habitats are identified that would typically support any notable species. Trees and buildings at the site are likely to be used for nesting by common bird species. Nesting by common bird species is considered to be of ecological value at the site level only and hence does not qualify as a VER.
- 9.3.50 During the 2014 nesting bird survey, a pair of kestrels (amber-listed Bird of Conservation Concern (BoCC); London Species of Conservation Concern (LSCC)) was recorded nesting in the lower rear half of the north stand monitor screen. A pair of starlings (red-listed BoCC; UK & London BAP Priority Species; LSCC) was also recorded nesting above a doorway into the stadium, beneath a concrete ledge. Although both species are of conservation concern, particularly in London, they are well-adapted to living in urban

environments and as such the nesting habitats on site are considered unlikely to be of significantly higher value than those available elsewhere in the vicinity of the Project Site. As such, nesting by both species is considered to be of ecological value at the site level only and hence does not qualify as a VER.

- 9.3.51 Appropriate mitigation measures will be implemented, as outlined below under 'Additional Mitigation, Compensation and Enhancement Measures', to comply with current legislation that protects nesting wild birds.
- 9.3.52 All wild birds, their nests and eggs are protected under subsection 1(1) of the Wildlife and Countryside Act 1981. It is an offence to kill or injure any wild bird, to take or destroy their eggs, or to take, damage or destroy their nests while in use or being built. As such, any demolition should be scheduled to occur outside of the bird breeding period (1 March – 31 July), or failing that, immediately following confirmation by a suitably qualified ecologist that birds are not nesting in the building/structure.

Flying/Migratory Birds

- 9.3.53 The Project proposals include several tall buildings (i.e. hotel, extreme sports centre and several residential buildings), which potentially could pose a collision risk to flying/migratory birds. The primary causes of significant bird collision with tall structures are large expanses of glass and night time illumination. The former because it renders buildings invisible by reflecting the sky, or by presenting an invisible barrier between the bird and vegetation it can see beyond the glass. The latter because excessive external illumination and light spill at altitude can cause migratory birds to become disorientated, as these species often rely upon the stars for navigation. In the case of the proposed high-rise buildings it is understood that none of these buildings presents any large expanses of glass, nor do they include large amounts of external illumination that would be likely to disorient migratory birds. To that end, the collision risk to flying/migratory birds is considered too low for their inclusion as a VER.

Table 9.11 – Evaluation of Valued Ecological Receptors

Receptor	Level of Ecological Value	Does the Receptor Qualify as a VER?
Lee Valley SPA and Ramsar site	International	Yes
Epping Forest SSSI and SAC	International	Yes
Walthamstow Reservoirs SSSI	National	Yes
Chingford Reservoirs SSSI	National	Yes
Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park SBI Grade II	Borough	Yes
Tottenham Hale to Northumberland Park Railsides SBI Grade II	Borough	Yes
Local bat assemblage – very low levels of activity recorded on site. No evidence to suggest the presence of onsite roosts, or that bats rely on the site in any way for foraging.	None	No
Nesting common birds	Site	No
Nesting kestrel	Site	No
Nesting starling	Site	No

9.4 Inherent Design Mitigation

- 9.4.1 Demolition will be timed to avoid the bird breeding period (1 May to 31 July), or failing that will take place immediately following confirmation by a suitably qualified ecologist that birds are not nesting in the buildings/structures to be demolished.

9.5 Potential Environmental Impacts and Effects

- 9.5.1 An effect is considered to be potentially significant if it could result in a change in the conservation status or degree of integrity of any VER.
- 9.5.2 Several non-statutory wildlife sites located within 1km of the site boundary qualify as VERs by virtue of their ecological value at the Local level or above.

Construction

Wildlife Sites

- 9.5.3 No statutory or non-statutory wildlife sites cover any part of the Project Site or occur on adjacent land. Given their significant distance from the site, the project is predicted to have no impacts during the construction phase on the ecologically valuable features of any of the identified sites.

Occupation

Wildlife Sites

Lee Valley SPA & Ramsar Site and Walthamstow Reservoirs SSSI

- 9.5.4 Walthamstow Reservoirs is the only unit of the SPA within 10km, at approximately 1.2km. Consultation with Natural England confirms that the SSSI is only notified for one of the bird species that the SPA is designated for, namely a nationally significant number of overwintering shoveler. Several additional wetland bird species also occur at nationally significant numbers, and gadwall occur in smaller numbers.
- 9.5.5 The reservoirs are owned and managed by Thames Water with public access by permit only. The wetland bird populations using the site are not particularly vulnerable to disturbance by its current use by anglers and birdwatchers. Any increase in visitor numbers from new residents of the Project is predicted to be minor and unlikely to have a significant effect on shoveler, gadwall or any other wildfowl species at the SPA/SSSI.
- 9.5.6 The Lee Valley forms a wetland corridor through the densely urbanised northern areas of Greater London, which has a roughly north-south orientation and is likely to provide a topographical feature for bird migration. Shoveler, gadwall and other wildfowl migrate to Walthamstow Reservoirs SSSI from summer breeding grounds in northern and eastern Europe. The Project Site occurs over 1km to the west of the SSSI and river corridor. It is considered highly unlikely that the construction of tall buildings and the use of artificial light sources at the Project Site would have any significant effect on the migratory routes of wildfowl using the SPA. In summary, no effects to the integrity of the SPA/SSSI are predicted as a result of this project.

Epping Forest SSSI and SAC

- 9.5.7 This site is primarily notified for its woodland habitat types and population of stag beetle, although it also

contains smaller areas of internationally important heathland habitats. These qualifying features are sensitive to recreational pressure and nitrogen deposition caused by local traffic emissions.

- 9.5.8 The SAC/SSSI is approximately 4.6km from the Project Site at its closest point, and is a large linear site extending over 12km in length. At this distance, no significant operational impacts are predicted from the increase in visitor numbers to, or additional traffic in the vicinity of, the SAC/SSSI. No significant effects to the habitats or species that the SAC/SSSI is designated for are predicted as a result of this project.

Chingford Reservoirs SSSI

- 9.5.9 The SSSI comprises the King George V and William Girling Reservoirs, both owned by Thames Water. The reservoirs are one of the major wintering grounds for wildfowl and wetland birds in the London area and hold nationally important numbers of some species.
- 9.5.10 Public access is only allowed to the King George V Reservoir (North and South basin) and requires a permit from Thames Water. The wetland bird populations that make use of this reservoir are unlikely to suffer significant effects resulting from the project, as the only recreational use of the reservoir is by the King George Sailing Club (under permit from Thames Water) and birdwatchers, who are by definition unlikely to have any effect on these bird populations.
- 9.5.11 No significant effects to the habitats or species supported by the William Girling Reservoir are predicted, as there is no public access to this part of the SSSI.
- 9.5.12 Any increase in visitor numbers from new residents of the Project is predicted to be minor and unlikely to have a significant effect on any bird species at the SSSI.

Non-statutorily Designated Sites

- 9.5.13 The project is likely to increase visitor numbers to the closest SINC of Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park. This site comprises open parkland that is reportedly visited by over 100,000 people per year. With this number of visitors the SINC is not considered to contain any wildlife habitats or species that are particularly sensitive to disturbance and the potential minor increase in recreational use from the project is considered to have a negligible effect on the ecological value of the site.
- 9.5.14 There is no public access to Tottenham Hale to Northumberland Park Railsides SINC and no effects from the project are likely.
- 9.5.15 No adverse effects to VERs are identified and therefore no significant effects, i.e. effects that would be likely to result in a change in conservation status or degree of integrity of any VER, are considered likely from the project.

9.6 Additional Mitigation, Compensation and Enhancement Measures

Mitigation

- 9.6.1 No potentially significant effects are predicted to any VER as a result of the project and therefore, based on the available survey information, no mitigation measures are required.
- 9.6.2 Potential legal issues have been identified concerning features that do not qualify as VERs, namely the

likely presence of nesting birds at the site.

9.6.3 All wild birds, their nests and eggs are protected under subsection 1(1) of the Wildlife and Countryside Act 1981, making it an offence to kill or injure any wild bird, to take or destroy their eggs, or to take, damage or destroy their nests while in use or being built.

9.6.4 Any demolition on site will be scheduled to occur outside of the bird breeding period (1 March – 31 July), or failing that, immediately following confirmation by a suitably qualified ecologist that birds are not nesting in the buildings/structures.

Compensation

9.6.5 No potentially significant effects are predicted to any VER as a result of the project and therefore no compensation measures are required.

Enhancement

9.6.6 The provision of new habitats and/or features for wildlife would provide biodiversity gains, in line with guidance within the NPPF, London Plan Policy 7.19, Haringey Policy SP13 and the UK, London and Haringey BAPs.

9.6.7 Green roof

9.6.8 The Project will incorporate areas of green and brown roof to offer a significant biodiversity enhancement. Extensive sedum roofs are proposed for the new Health Centre in the north-east of the Project Site and also on the southern portion of the Tottenham Experience building. In addition, green and brown roofs are proposed on the new residential towers in the south-east of the Project Site, as part of roof gardens and Community Amenity Space. The installation of these roofs will attract a range of invertebrates and generate seeds, which should provide food sources for local bat and bird species. Certain areas of green roof habitat may also provide nesting opportunities for bird species.

9.6.9 New tree and shrub planting will be included within the landscape scheme for the site. The nature of this Project means that high levels of pedestrian traffic and the demands of CCTV coverage impose constraints on the extent and type of planting that can be provided. However, the planting of native species of local provenance and other shrub species of known benefit to wildlife will be provided where possible. These could include nectar-rich species to attract invertebrates and fruit bearing species to provide food for birds.

9.6.10 The 2014 nesting bird survey recorded pairs of starling and kestrel nesting at the site, and replacement nesting opportunities will be provided. Two new kestrel nest boxes will be provided in appropriate locations on new buildings at the Project Site. Additional bird boxes will also be provided to offer new potential nesting sites, with a wide range of suitable products available for buildings such as sparrow terraces and swift boxes. The final selection of boxes should take into account the species recorded from the 2014 nesting bird survey, in particular starling.

9.6.11 The results of the bat surveys suggest that the site is of no real significance to bats, and siting bat boxes across the majority of the new Project is unlikely to be successful at attracting bats. However, bat commuting/foraging activity was recorded along Worcester Avenue, next to the East Stand of the existing stadium. Bat roosting units located on new buildings in this location have the highest potential to be

occupied. Four bat roosting units will be installed in appropriate location on the eastern wall of new buildings in the south-east corner of the Site.

9.7 Assessment Summary and Residual Environmental Impacts and Effects

- 9.7.1 No potentially significant effects are predicted to any VER as a result of the Project and therefore no residual environmental impacts or effects are anticipated.

Cumulative Effects

- 9.7.2 No potentially significant effects are predicted to any of the wildlife sites identified as VERs, as none of these sites is particularly vulnerable to increases in recreational pressure and all of them are sufficiently far from the Project Site to avoid any significant effects during the construction phase. As a result, no significant cumulative effects are anticipated as a result of the construction of any of the identified committed developments.

10. Surface Water Drainage and Flood Risk

10.1 Introduction

- 10.1.1 This chapter of the ES has been produced by AECOM Infrastructure and Environment UK Ltd (AECOM) and addresses the potential surface water drainage and flood risk effects the project may have on the area surrounding the Project Site. The assessment includes a summary of the current conditions found within the area and identifies mitigation measures where appropriate for significant effects that may arise as part of the Project.

10.2 Assessment Criteria and Methodology

Previous Assessment

- 10.2.1 An ES was produced for the May 2010 planning application for the redevelopment of the existing Tottenham Hotspur Football Club and adjacent area, north of known as Wingate (disused) industrial site.

Scoping Opinion

- 10.2.2 The scoping has identified the need to include surface water drainage and flood risk in the environment statement. Whilst the Scoping report was not formally issued to the Council a draft Scoping request was issued and comments were received in relation to the Scope set out in that document.

Legislative Context

- 10.2.3 The Water Resources Act 1991 sets out the main regulatory controls and restrictions that provide protection to the water environment through controls on abstractions, impoundment and discharges. The Act also identifies, among other things, conservation, water quality and drought provisions. It also identifies exemptions such as Section 29 where, for example, in order to prevent interference with building operations, groundwater can be abstracted without an abstraction licence by construction projects. It should be noted that even in this case the Environment Agency must still be notified under Section 30.
- 10.2.4 The Water Resources Act 1991 was amended by the introduction of the Water Act 2003 which modernised the regulations of water resources and abstraction and updated most of the Water Resources Act.
- 10.2.5 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 transposed the EU Water Framework Directive (WFD) (2000/60/EC) into law in England and Wales. The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater.
- 10.2.6 The Water Resources Act is supplemented by other regulatory controls, such as:
- The Flood and Water Management Act 2010;
 - The Environment Act 1995, which established the Environment Agency; and
 - The Environmental Protection Act 1990, which provides for integrated pollution control measures.

10.2.7 A number of regulations have since been implemented to enact the previously mentioned statutory law. These regulations include:

- Water Resources (Environmental Impact Assessment) (England and Wales) Regulations 2003;
- The Anti-Pollution Works Regulations 1999;
- The Control of Pollution (Oil Storage) (England) Regulations (2001);
- The Groundwater Regulations (England and Wales) (2009) which transposed the EU Groundwater Directive (2006) (2006/118/EC) into UK law;
- The Environmental Damage Regulations (2009);
- The Water Resources Act (Amendment) (England and Wales) Regulations (2009);
- The Environmental Permitting (England and Wales) Regulations (2010) which control discharge of water to surface water and groundwater; and
- Water Supply (Water Quality) Regulations (2010).

10.2.8 The Flood and Water Management Act 2010 is largely aimed at delivering the recommendations of the Pitt Review following the 2007 floods whose key recommendations include the use of sustainable drainage systems, SuDS.

- The Act amends section 106 of the Water Industry Act 1991 to make the right to connect surface water runoff to the Public sewers conditional on approval of the drainage system by the approving body. The automatic right for foul sewer connections is retained;
- In a consultation document entitled "Delivering Sustainable Drainage Systems" September 2014, the Department for the Environment Food and Rural Affairs and the Department for Communities and Local Government jointly announced that responsibility for approving and maintaining SuDS would fall to the planning system and local planning authorities. Schedule 3 of the Flood and Water Management Act 2010 would not be implemented; and
- A further consequence of the Flood and Water Management Act 2010 is that responsibility for the local management of flood risk from surface water and groundwater flooding now lies with the Lead Local Flood Authority, which for the Project Site is the London Borough of Haringey. It is also responsible for managing flood risk from ordinary watercourses, whilst the Environment Agency remains responsible for managing the flood risk from the sea and from main rivers. The Moselle Brook is a "main river" and is along the west side of the Project Site adjacent to the High Road. It is culverted under the High Road from the junction with White Hart Lane to Scot Gardens (approx. 900m) and then it turns in an easterly direction and discharges into the Pymmes Brook.

10.2.9 Schedule 4 of the Flood and Water Management Act 2010 made a number of changes to the Reservoir Act 1975. The changes came into force in England in July 2013.

- A large reservoir is high risk if the Environment Agency thinks that in the event of an uncontrolled release of water from the reservoir, human life could be endangered; and
- For large high risk reservoirs, at least once every 12 months, supervising engineers must provide a written statement to the reservoir owner or operator of any steps taken to maintain it.

National Planning Policy and Guidance

National Planning Policy Framework (2012)

- 10.2.10 The National Planning Policy Framework (NPPF) outlines the Government's planning policies for England. The NPPF sets out the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. On 6th March 2014, the Government published its National Planning Practice Guidance, a web-based resource to support the NPPF. The NPPF sets out 12 planning principles as guidance for local councils for the creation of their local plan; the following principles are directly applicable to the water environment:

"Meeting the challenges of climate change, flooding and coastal change - support transition to a low carbon future in a changing climate taking full account of (inter alia) flood risk and coastal change; and Conserving and enhancing the natural environment - development should minimise pollution and other adverse impacts on the local and natural environment and should plan positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure."

- 10.2.11 The NPPF requires that Local Planning Authorities to only consider development in flood risk areas where, informed by a site-specific Flood Risk Assessment, FRA, following the Sequential Test (which ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding) and if required the Exception Test (which is a method to demonstrate and ensure that the flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available) it can be demonstrated that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
- The development is flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed; and it gives priority to the use of sustainable drainage systems; and
- Residual risks that remain after applying the sequential approach can be safely managed.

National Planning Practice Guidance (2015)

- 10.2.12 The National Planning Practice Guidance (NPPG) provides additional advice and technical information on how planning can and should take account of the risks associated with flooding and coastal change in plan-making and the planning application process, to ensure the effective implementation of the policies in the NPPF. This Flood Risk and Coastal Change guidance section provides further information on the application of the Sequential and Exception Tests and the technical scope of site-specific Flood Risk Assessments.
- 10.2.13 The NPPG also contains guidance in relation to water supply, wastewater and water quality and provides advice and information on how planning can and should protect water quality and ensure the delivery of adequate water and wastewater infrastructure for new development.

Regional Planning Policy

The London Plan (2015)

10.2.14 The London Plan (2015)²⁷ is the overall strategic development plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2036.

10.2.15 Policy 5.11 is about GREEN ROOFS AND DEVELOPMENT SITE ENVIRONS and states:

"Major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:

- *adaptation to climate change (i.e. aiding cooling);*
- *sustainable urban drainage;*
- *mitigation of climate change (i.e. aiding energy efficiency);*
- *enhancement of biodiversity;*
- *accessible roof space;*
- *improvements to appearance and resilience of the building; and*
- *growing food."*

10.2.16 Policy 5.12 is about FLOOD RISK MANAGEMENT and states:

"Development proposals must comply with the flood risk assessment and management requirements set out in the NPPF and the associated technical Guidance on flood risk¹ over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 (TE2100 – see paragraph 5.55) and Catchment Flood Management Plans."

10.2.17 Policy 5.13 is about SUSTAINABLE DRAINAGE and states:

"A Development should utilise sustainable urban drainage systems (SuDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. *store rainwater for later use*
2. *use infiltration techniques, such as porous surfaces in non-clay areas*
3. *attenuate rainwater in ponds or open water features for gradual release*
4. *attenuate rainwater by storing in tanks or sealed water features for gradual release*
5. *discharge rainwater direct to a watercourse*
6. *discharge rainwater to a surface water sewer/drain*
7. *discharge rainwater to the combined sewer."*

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation."

10.2.18 The above hierarchy reflects the intent of the Flood and Water Management Act 2010.

10.2.19 Guidance²⁸ has been produced by the Mayor of London to aid developers in meeting the policies stating

²⁷ London Plan 2015, [http://www.london.gov.uk/sites/default/files/London%20Plan%20March%202015%20\(FALP\).pdf](http://www.london.gov.uk/sites/default/files/London%20Plan%20March%202015%20(FALP).pdf)

²⁸ (2014) Sustainable Design and Construction, Supplementary Planning guidance, Mayor of London

that (3.4.8):

"Most developments referred to the Major have been able to achieve at least 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. This is the minimum expectation from the development proposal."

10.2.20 It also states (3.4.10):

"On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate". There are two exceptions to this rule (i) where the surface water is to tidal water and (ii) when there is the use of pumped discharge."

Local Planning Policy

Current Planning Policy

10.2.21 On 18 March 2013, Haringey's Local Plan²⁹: Strategic Policies was formally adopted by its Full Council.

10.2.22 Policy SP5: WATER MANAGEMENT AND FLOODING states:

"The Council will require all development in Haringey to be water efficient during construction and operation and to reduce all forms of flood risk. All development shall:

- *Improve the water environment, water quality and drainage systems;*
- *Minimise water use and illustrate how development would contribute to general and flash flooding;*
- *Take account of flood risk vulnerability classification as set out in paragraph 100 of the NPPF and will apply the NPPF Sequential Test and Exception Test;*
- *Implement measures to prevent (or mitigate as last resort) local surface water and downstream flooding;*
- *Implement Sustainable Drainage Systems from strategic to individual site level to improve water attenuation, quality and amenity;*
- *Restore and enhance the Blue Ribbon Network including Pymmes Brook, Moselle Brook, the River Lee and its tributaries, deculverting wherever feasible, to improve water quality and amenity of these waterways and to help reduce flood risk (in line with London River Action Plan); and*
- *Require higher resilience and levels of flood protection for critical infrastructure to ensure the protection of essential services such as water and power."*

10.2.23 In order to facilitate this, the Council:

- Has carried out a joint SFRA (Strategic Flood Risk Assessment) Stage 1 for the whole borough;
- Has carried out a Sequential Test for the Areas of Development (Growth Areas and Areas of Change); and
- Is carrying out, in association with other north London Boroughs in the Drain London sub-region, a Surface Water Management Plan to identify issues with drainage networks and the effects of new development.

²⁹ (2013) Haringey's Local Plan Strategic Policies 2013 to 2026, Haringey's Spatial Strategy, Chapter 2-4

- 10.2.24 The Project is in the Critical Drainage Area, CDA, Group 4_061, "Tottenham High Road and area surrounding Halefield Road, Tottenham" as defined by the Surface Water Management plan 2011³⁰. Eight CDAs have been identified and five were identified as priority CDAs. Group 4_061 was not identified as a priority CDA. The Surface Water Management Plan describes this CDA as "Surface water is observed to pond around Halefield Road as a result of overland flow from the west. Ponding water is also observed at the low point along Tottenham High Road. The largest depths of water occur along the roads with some residential properties and their back gardens flooded." Validation: "There is good correlation between the modelling results and the EA Surface Water Maps for both 30 year and 200 year event. There are no other supporting flood records in the area."
- 10.2.25 As a Lead Local Flood Authority and Local Planning Authority, the London Borough of Haringey has produced a Level 2 Strategic Flood Risk Assessment³¹, February 2015, to contribute to the evidence base for the London Borough of Haringey's Local Development Documents (LDDs) in accordance with the National Planning Policy Framework.

Emerging Planning Policy

- 10.2.26 Due to the extent of the flooding risk in Haringey it is important to have a Multi-Agency Flood Plan, MAFP,³² to ensure a coordinated response to a flood event within the London Borough of Haringey. This plan has been written in accordance with national guidance and only contains actions related to flood events. This Multi-Agency Flood Plan covers the response to flood risks; it does not cover a response to burst water mains or foul sewage floods, although these are noted as a potential risk. The Project is adjacent to the Tottenham Flood Zone as defined in the MAFP.

Guidance/ Best Practice

- 10.2.27 The Environment Agency Pollution Prevention Guidance Notes (PPG) provide advice on statutory responsibilities and good environmental practice. The Guidance Notes of particular relevance to the Project include:
- PPG 1: General Guide to the Prevention of Pollution which provides an introduction to pollution prevention and the pollution prevention guidance notes;
 - PPG 2: Above Ground Oil Storage Tanks which provides guidance to those responsible for the storage of oil on construction sites;
 - PPG 3: Use and Design of Oil Separators in Surface Water Drainage Systems;
 - PPG 5: Works and maintenance in or near water;
 - PPG 6: Working at Construction or Demolition Sites is a document that mirrors much of PPG 5 but with particular emphasis on the situations likely to occur at demolition and construction sites;
 - PPG 7: Refuelling Activities, which provides information on the correct delivery, storage and dispensing of fuel to help reduce the risk of pollution; and
 - PPG 21: Pollution Incident Response Planning assists those developing site-specific pollution

³⁰ Capita Symonds, (2011), LB Haringey Surface Water Management Plan (Drain London)

³¹ JBA Consulting (2015), Haringey Council Strategic Flood Risk Assessment, Draft Report

³² (2012) Multi Agency Flood Plan for London Borough of Haringey,

incidents response plans to prevent and mitigate damage to the environment caused by accidents such as spillages and fires.

- 10.2.28 Guidance C532 "Control of Water Pollution from Construction Sites" brings together the guidance above but goes into more detail with regard to sources of water on construction sites, pollutants and pathways in addition to providing guidance on planning for the type and location of suitable control measures.
- 10.2.29 CIRIA C697 "The SuDS Manual, (CIRIA 2007, Reprinted 2011) provides best practise guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their best effective implementation within developments.
- 10.2.30 Defra has published Non Statutory technical standards for Sustainable Drainage Systems³³ in March 2015. The guidance should be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance. Standards 7, 8 and 9 refer to "Flood risk within the development":
- S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event;
 - S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development; and
 - S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

Baseline Data Collection

- 10.2.31 Baseline conditions have been established through a desk study and via consultation with the following bodies:
- Environment Agency (correspondence included within FRA); and
 - Thames Water (TW) (correspondence included within FRA).
- 10.2.32 Additional data and reports have also been collected from the following sources:
- Environment Agency website;
 - URS Flood Risk Assessment (2010);
 - London Borough of Haringey website; and
 - AECOM Flood Risk Assessment (2015).

³³ DEFRA Non Statutory technical standards for Sustainable Drainage Systems March 2015

Assessment Methodology determining Construction and Occupation Effects

- 10.2.33 Throughout the construction phase and occupation phase of the Project there are potential sources of pollution / contamination in addition to the construction process itself that may potentially affect water resource and flood risk receptors; these are identified using the source-pathway-receptor model. For each of the sources / processes, there are particular 'triggers' - these are on-site actions that cause the potential for significant effects.
- 10.2.34 The likely pathways between the source of contamination or demolition and construction process and the associated water resource feature or attribute have been identified. The potential effects (pre-mitigation) have been assessed and stated, and are fundamentally the result of the interaction between the contamination source / process and the water resource feature, via a defined pathway.

Significance criteria

- 10.2.35 The degree of the effects of the Project on drainage and flood risk have been determined from the interaction of the sensitivity of identified receptors and impact magnitude, as follows:
- Drainage and flood risk resources / features / receptors have been identified and their value, importance or sensitivity to change have been determined and categorised from the range of scale from very high to negligible. See Table 2.1;
 - Potential impacts that will affect any identified resource / receptor have then been determined and their magnitude, scale or severity assessed and categorised from very high to negligible. See Table 2.2; and
 - The significance of the effects caused by the identified impacts on the resource / receptors has then been assessed using a matrix (see Table 2.2) and categorised as either substantial, major, moderate minor or neutral. The definition of the categories of the effect significance is given in Table 2.3.
- 10.2.36 Potential impacts as a result of the Project have been considered for both the construction occupation phases of the Project.

Geographical Scope

- 10.2.37 The assessment will cover the water bodies which are connected hydraulically to the Project Site, e.g. the Moselle Brook and the Thames Water Sewers adjacent to the site.

Assumptions and Limitations

- 10.2.38 The assessment is a desk top study and is based on data reviewed for the baseline conditions.
- 10.2.39 The potential effects of the construction works are assessed based on the assumption of a reasonable worst-case scenario.
- 10.2.40 Where there is uncertainty regarding a process or receptor, for example relating to the classification of an aquifer, or soils, a reasonable worse-case scenario in terms of vulnerability/sensitivity has been assumed.
- 10.2.41 In order to ensure that the reasonable worst-case conditions have been assessed with respect to

occupation, the Project is assumed to be completed.

10.3 Baseline Conditions

Surface Water

- 10.3.1 There are no surface watercourses within the Project Site boundary, however Moselle Brook has been culverted and the culvert lies beneath High Road immediately west of the Project Site.
- 10.3.2 In accordance with the findings of the North London Strategic Flood Risk Assessment³⁴, Moselle Brook was "originally a natural tributary of the River Lee but has since been mostly culverted and in now artificially flows into Pymmes Brook". The culvert outfalls into the Pymmes Brook approximately 1.9 km southeast of the project site. Pymmes Brook joins the Thames River approximately 12km south of the Project Site.
- 10.3.3 The River Thames drains a catchment area extending to approximately 12,936km². The Thames catchment is one of the driest in Great Britain with an average annual rainfall of 690mm, approximately 250mm of which contributes to river flows and groundwater recharge. The remainder is lost to evapotranspiration.
- 10.3.4 The freshwater section of the River Thames receives water from 38 tributaries including the rivers Churn, Leach, Cole, Windrush, Evenlode, Cherwell, Ock, Thame, Pang, Kennet, Loddon, Coin, Wey and Mole. Downstream of Teddington, the tributaries include the rivers Brent, Wandle, Ravensbourne, Lee, Darent and Ingrebourne. The River Thames also receives waste and stormwater discharge from a population of over 12 million people.

Surface Water Quality

- 10.3.5 The River Thames forms part of the River Thames and Tidal Tributaries Site of Metropolitan Importance (SMI) for nature conservation. From the 1950s onwards, the water quality in the River Thames has been consistently improving, mainly as a result of improved effluent discharge management and improvement in the quality of industrial and sewer discharges. The water quality of the River Thames today is considered sufficient to support a wide range of flora and fauna. A good indicator of water quality is the salmon population, which has been growing steadily.
- 10.3.6 The waters of the River Thames run the greatest risk of pollution during the summer months, when the river flows are at their lowest. During low flows, the water is not sufficient to dilute the discharge loads from the combined sewer overflows, which comprise both storm and wastewater.
- 10.3.7 Effluent from the combined sewer overflows serves to increase biological oxygen demand and decrease the dissolved oxygen content of the River, both of which decrease the water's potential to support fish life. In severe circumstances, the dissolved oxygen content may drop as low as zero, potentially resulting in fish deaths. In order to prevent oxygen depletion, TWUL runs a number of oxygenating vessels that can pump up to 30 tonnes (t) of oxygen directly into the River per day.
- 10.3.8 The 2013 WFD classification for Moselle Brook gives the ecological status as "Moderate" and states that it is a "Heavily Modified Water Body", HMWB. The objective set in the 2009 River Basin Management

³⁴ Mouchel, 2008, "North London Strategic Flood risk assessment" (Prepared for the North London Waste Plan)

Plan is "Good Ecological Potential" by 2027.

Surface Water Abstraction and Discharges

- 10.3.9 The 2013 WFD classification for the Moselle Brooke states that the flow is not impacted by abstraction.
- 10.3.10 The Environment Agency does not have any consented surface water discharges or licensed surface water abstraction points within 1000m of the Project Site. Under the Water Act 2003, abstractions equal or less than 20 cubic metres per day were deregulated as of 1 April 2005 hence the Environment Agency does not hold records below this level.
- 10.3.11 The Moselle Brook discharges into the Pymmes Brook which then flows into the River Lee, a tributary of the River Thames. The River Thames is of high importance for wastewater overflows. Thus any activity that would reduce baseflow to the River Thames and/or flow rates and thus the dilution available would have a major adverse impact on the quality of the receiving waters.

Groundwater

- 10.3.12 The Environment Agency Source Protection Zones (SPZ) maps show that the Project Site is mostly within the outer zone of a groundwater SPZ. The northwest corner is outside the groundwater SPZs. The Source protection Outer zone (Zone 2) is defined by a 400 day travel time from a point below the water table to the abstraction point.
- 10.3.13 Map 12 'Groundwater Contours' in Appendix A of the North London SFRA⁷ indicates that the groundwater in the region is between 10m and 20m below ground level.
- 10.3.14 A review of the groundwater vulnerability map for the Project Site indicates that the south-eastern third of the Project Site is located over a non-aquifer of negligible leaching potential. Non-aquifers are described as formations that are generally regarded as containing insignificant quantities of groundwater. Groundwater flow through such rocks, although imperceptible, does take place and should be considered in assessing the risk associated with persistent pollutants. The north-western two thirds of the Project Site are located over a minor aquifer of high leaching potential. Minor aquifers are either fractured or potentially fractured rocks, which do not have a high primary permeability, or formations of variable permeability including unconsolidated deposits. Although minor aquifers rarely produce large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers. Soils of high leaching potential have the potential to allow pollutants to move rapidly. For the Project Site enabling works, much of the gravel has already been extracted.
- 10.3.15 The BGS soil and drift map for North London (Sheet 256) indicates that the south-eastern third of the Project Site is underlain by Brickearth (Enfield Silt), which overlies Kempton Park Gravel. Kempton Park Gravel overlies London Clay, which in turn overlies Lambeth Group, the Thanet Sand formation and then lastly Chalk. The northwest two-thirds of the Project Site underlain by the same strata as the south east third beginning with the Kempton Park Gravel layer.
- 10.3.16 Further details of the ground conditions beneath the Project Site can be found in Chapter 11.
- 10.3.17 The deeper groundwater, located in the Chalk aquifer beneath the London Clay, was rising as a result of decreased abstraction. In response to this situation, TWUL, London Underground Limited (LUL) and the Environment Agency formed GARDIT (General Aquifer Research Development and Investigation Team)

in 1992. GARDIT have since been attempting to mitigate the problem by increasing groundwater abstraction in London by up to 50 million litres per day (ML/d). It is now considered³⁵ that the water level has been stabilised.

- 10.3.18 There is considerable depth between the groundwater levels and any underground structures. However, if the groundwater were to rise it could lead to the re-saturation of the London Clay. This could result in a reduction in its load bearing capacity, a reduction of skin friction of piles and differential heave affecting the foundations of buildings. Water levels in the shallow aquifer are unlikely to be affected by any rise in groundwater levels in the Chalk aquifer.

Groundwater Quality

- 10.3.19 The deep groundwater is the principal aquifer of the Thames region and is classified as a major aquifer. At the Project Site, it is expected that the confining London clay and Lambeth Group formations would act as a barrier between surface pollutants and the deep aquifer.
- 10.3.20 Haringey Council has advised that there are no premises/sites in Haringey registered as contaminated land under Part IIA of the Environmental Protection Act 1990.
- 10.3.21 The WFD quantitative status of the chalk aquifer ground water is poor³⁶.

Groundwater Abstraction and Discharge

- 10.3.22 The Environment Agency does not have any consented ground water discharge points within 1000m of the Project Site but there is a Licence ground water abstraction point along Garman Road which is within 1000m of the Project Site for laundry use. Under the Water Act 2003, abstractions equal or less than 20 cubic metres per day were deregulated as of 1 April 2005 hence the Environment Agency does not hold records below this level.

Underground / Lost Rivers

- 10.3.23 Based on a study of existing data and the geological maps of the Project Site, it is not considered likely that there are any lost rivers beneath the Project Site.

Existing Drainage Network

- 10.3.24 The Moselle Brook is classified as main river and is culverted under White Hart Lane and then flows south in a culvert parallel to the High Road. The Thames Water Services utility drawings show Moselle Brook to the west side of the High Road. The High Road is along the western boundary of the Project Site.
- 10.3.25 The Thames Water Services maps show the approximate location of public surface water and foul sewers and water mains adjacent to the Project Site. Based on these maps the nearest public sewers are separate surface water and foul sewers located beneath all roads surrounding the Project Site and beneath Paxton Road that crosses through the Project Site.
- 10.3.26 The Thames Water surface water sewer along Northumberland Park drains into the Thames Water

³⁵ Environment Agency, 2015, Management of the London Basin Chalk Aquifer, Status Report.

³⁶ Environment Agency, 2009, Water for life and livelihoods, River Basin Management Plan.

surface water sewer under the High Road which drains south into the Moselle Brook at the junction of White Hart Lane and the High Road. There are short sections of Thames Water surface water sewers that drain from the Project site across the High Road directly into the Moselle Brook. The sewer along Paxton Road drains into the Moselle Brook. The Thames Water sewer along Park Lane drains eastward and the Thames Water surface water sewer along Worcester Avenue drains into the surface water sewer beneath Park Lane. An overflow from the Moselle Brook enters the top end of the Thames Water surface water sewer along Park Lane.

- 10.3.27 Internal, private surface water sewers convey the surface water from within the Project Site to the Thames Water surface water sewer mains beneath the surrounding roadways.

Flood Risk

- 10.3.28 The flood risk assessment has been prepared by AECOM for the planning application and is included in Appendix 10.1.
- 10.3.29 The Environment Agency website indicates that the majority of the Project Site is located in Flood Zone 1 having a low probability or less than 1 in 1000 annual probability of river flooding in any year (<0.1%). The western edge of the scheme that abuts High Road is located in Flood Zone 2 having a medium probability or between a 1 in 100 and 1 in 1000 annual probability of river flooding in any year (1% - 0.1%). The Environment Agency has supplied TUFLOW modelled flood levels for Moselle Brook adjacent to the Project Site for the extents of Flood Zone 2. Predicted 1:1000 yr event flood levels range from 11.6m AOD (at the junction of White Hart Lane and High Road) at the north west corner of the Project Site to 10.99m AOD (at the junction of Park Lane and the High Road) at the southwest corner of the Project Site.
- 10.3.30 The FRA concludes that the Project Site is not at significant risk of fluvial flooding during normal or even extreme storm events.
- 10.3.31 The National Reservoir Inundation maps⁵ show that the low lying areas in the south east of the Project Site and along the roads adjacent to the Project Site are in the Haringey Reservoir Flood outline. The reservoirs are strictly inspected and monitored.
- 10.3.32 The Project Site is outside the extents of various historic flood events.
- 10.3.33 In the Surface Water Management Plan⁴, 2011, only one Thames Water sewer flooding was reported with a postcode of N17 which was for a 1 in 10 year event.
- 10.3.34 In April 2012, flooding occurred on High Road Tottenham. Anecdotal evidence suggests that this was due to blocked drains in the area⁵.
- 10.3.35 There has not been any evidence of groundwater flooding on or near the Project Site.
- 10.3.36 The Strategic Flood Risk Assessment⁵ 2015 summaries the flood risk in Haringey as: "Surface water runoff is the source of flood risk that potentially has the greatest effect in Haringey and is the flooding most likely to be experienced. There is also significant residual risk as a result of reservoir breach effecting large areas of the borough which is much less likely to be experienced, but the consequences would be significant."

- 10.3.37 It is considered that the Project Site is at minor risk of fluvial flooding from the culverted Moselle Brook and at minor risk of sewer flooding from the Thames Water sewerage network, groundwater and overland flow and from reservoir breaches.

Receptor sensitivity

- 10.3.38 A summary of the groundwater resources and surface water resources receptors sensitivity and WFD status Table 10.2 and 10.3

Consultation

- 10.3.39 The Environment Agency, EA, was consulted for the 2010 drainage strategy and they agreed in principle that the discharge from the Project could be 150 l/s/hectare. The 2010 application met this target.
- 10.3.40 The EA have been consulted for the revised FRA for flooding data. The EA have produced flood maps and flood levels similar to those used in the 2010 FRA.
- 10.3.41 Thames Water was consulted for the 2010 drainage strategy and stated a rate of 150l/s/ha will be accepted providing it is proved to be a reduction on the existing discharge rate and stated that they typically require brownfield sites to use the existing connections to the Thames Water sewers. Should the existing connections be incompatible with the proposed drainage design then a further restriction to the allowable discharge rate may be sought by Thames Water.
- 10.3.42 Further consultation with Thames Water in 2015 has been carried out and they stated that the allowable discharge rate to their sewers will be restricted to the flows occurring during the 1:15 year event critical storm duration factoring in the capacity of the existing sewers and area already draining to the sewer.
- 10.3.43 Final agreement of the 2015 drainage strategy with Thames Water is on-going (August 2015).
- 10.3.44 Discussions were held with Adam Littler, senior drainage engineer, and Ray Mathews at the London Borough of Haringey Council offices on 18 August 2015. The council representatives stated that they do not want to receive a completely new Flood Risk Assessment, FRA, for the Southern Development as there is already a consented 2010 FRA for the Northumberland Development Project. The concepts used in the 2010 FRA are to be used for the FRA for the Project

Cumulative Development Drainage and Flood Risk

- 10.3.45 The area to the north of the Project Site and south of the Northumberland Park, the northern development, has recently been constructed. The northern development drainage system is separate from the Project Site drainage system. The runoff from the 1 in 100 year plus climate change event from the Project Site will be contained within the Project Site drainage system and will not affect the northern development site and vice versa. Hence there is not a cumulative effect on drainage and flood risk to either site.
- 10.3.46 Basement S73 permission has been granted to the Project. The construction of the basement car parks will not affect the runoff volume and discharge from the Project Site. The drainage flow paths will be directed away from the ramps entering the basement car parks.
- 10.3.47 The current planning applications and on-going developments in the vicinity of the Project have been

assessed and it is considered that the drainage and flood risk of the Project does not cause a cumulative effect on any other development as the Flood Risk Assessment has shown that the Project is not creating a flood risk elsewhere and the discharge rates from the Project will be less than the existing.

10.4 Inherent Design Mitigation

- 10.4.1 At the Project Site, contaminated land is being removed before construction commences.

10.5 Potential Environmental Impacts and Effects

Construction

i. Suspended Sediments

- 10.5.1 Potential sources of suspended sediments on demolition and construction sites include excavations, exposed ground and stockpiles, plant and wheel washing, dust and mud on site access roads and de-watering. Suspended sediments can reach surface water bodies through runoff during rainfall events or when areas are being washed down.
- 10.5.2 Increased suspended sediment affects both flora and fauna within surface water bodies and can have a long-lasting effect. Excessive levels of sediment can result in the suffocation of fish, smothering of plants, reduction in light levels and quality of surface water abstractions. Any organic matter contained within the sediment will increase the biological oxygen demand of the water and result in a lowering of dissolved oxygen. If the Project Site is contaminated, sediments may also contain toxic particles such as heavy metals, which may directly impact flora and fauna, and bio-accumulate in the food chain.
- 10.5.3 Good practice mitigation measures should be applied to ensure the impact during the construction phase on ecologically valuable features is negligible.

ii. Oils and Hydrocarbons

- 10.5.4 Oils and hydrocarbons can have a major adverse and long-term effect on the water quality of controlled waters. Oils bind to sediments, strata and organisms and can form emulsions that float on the water surface.
- 10.5.5 Sources of oils and hydrocarbons on demolition and construction sites include storage tanks, plant and machinery, spillage and leakage at refuelling areas and vandalism.
- 10.5.6 Without control measures, impacts associated with the accidental release of oil and fuel during construction works is considered to be a significant adverse effect.

iii. Concrete and Cement Products

- 10.5.7 Concrete and cement products are highly alkaline and their release into the environment can have a major adverse, albeit short-term, effect on flora and fauna, and on water quality in general. This could result in poor tasting potable water and an increase in pH, potentially to levels above the legal drinking water standard.
- 10.5.8 On-site concrete mixing and the washing down of mixing areas results in the production of large volumes

of contaminated wastewater, which can end up in the surface water drainage system.

- 10.5.9 Without control measures, the impacts associated with concrete and cement products are considered to be a significant adverse effect.

iv. Contaminated Land

- 10.5.10 At the Project Site, identified contaminated land is being removed before construction commences although it is possible that areas of contamination, associated with historic land usage, could exist within the Project footprint. There is therefore the potential for disturbance and mobilisation of contaminants into the surface water or groundwater. Refer to ES Chapter 11 "Ground Conditions and Hydrogeology" for information regarding contaminated land.

- 10.5.11 Without control measures, the impacts associated with mobilisation of contaminants is considered to be a significant adverse effect.

v. Groundwater

- 10.5.12 Potential pathways could result in adverse impacts on controlled waters from the disturbance of contaminated groundwater. Consideration will be given to the possibility of encountering shallow groundwater within the made ground strata within and around the perimeter of the Project Site during excavations for foundations or extension of basement levels. Refer to ES Chapter 11 "Ground Conditions and Hydrogeology" for information regarding groundwater.

- 10.5.13 Without control measures, the impacts associated with the contamination of groundwater are considered to be a significant adverse effect.

vi. Existing Drainage Network

- 10.5.14 Disturbance of the existing drainage network has the potential for pollutants within the sewerage system to be re-released in an uncontrolled manner, particularly during heavy rainfall when the system may be overloaded and when there is significant runoff. During redevelopment the surface water drainage, sewerage and wastewater from the Project Site may be connected to existing services. As such, it may contain suspended sediments, oils and hydrocarbons, sewage, alkaline water and any other potential contaminants that may have been used on site.

- 10.5.15 Without control measures potential impacts to the existing drainage network are considered to be a significant adverse effect.

vii. Preferential Pathways

- 10.5.16 There may be disused drainage piping on Project Site from earlier developments, which could provide a preferential pathway to surface waters via abandoned overflows.

- 10.5.17 Without control measures the potential impact associated with pollution to surface or groundwater via preferential pathways is considered to be a significant adverse effect.

viii. Physical Disturbance of Aquifers

- 10.5.18 There is one Environment Agency licensed ground water abstraction point within 1000m of the Project Site. It is anticipated that piling will be required as part of the redevelopment so control measures are required to ensure the confining impermeable clay layer to the chalk aquifer remains intact.

Operation

i. Contamination from In-Situ Materials

- 10.5.19 There is a possibility that foundation materials could be in contact with the perched ground water. There are basements for the residential blocks and hotel which will be used for parking. These basements will be waterproofed with WRc approved products to ensure no contamination of the perched ground water.

ii. Surface Water Run-off and Foul Drainage

- 10.5.20 The completed Project is not anticipated to involve a significant change in impermeable surface coverage of the Project Site.

- 10.5.21 It is anticipated that the water use of the completed project will be the same as the existing and hence it is not expected that there will be a need to abstract water from the aquifer below the Project Site. However, in the event that a need for abstraction does arise, a separate feasibility study will be carried out to confirm the availability and quality of groundwater beneath the Project Site, and to determine whether such abstraction is economically and environmentally viable or sustainable. This feasibility study would include consultation with the Environment Agency and other appropriate bodies to identify the impacts of such abstraction.

iii. Water Quality

- 10.5.22 Once completed, the Project's surface water runoff will be collected into on-site sustainable urban drainage systems (SuDS). The on-site SuDS consist of underground storage tanks and over sized pipes to create attenuation volume so that the peak runoff can be stored on site and released at the agreed discharge rate. The runoff is then discharged into the Thames Water storm water sewerage network mainly utilising existing connection points in Northumberland Park, High Road, Worcester Avenue and Park Lane and into Moselle Brook at agreed discharge rates.

- 10.5.23 Storm water from the roof areas and from the paved areas will be collected separately.

- 10.5.24 Implementing attenuation into the surface water drainage design will allow for the slowing of drainage flows. One such SuDS device, underground storage, temporarily detains water to be discharged over time to help reduce the volume of water being conveyed at any one time downstream. The additional detention time will allow solid pollutants to settle out of the surface water drainage. These measures will aid in keeping sewer flows within their sewerage networks, help to reduce flash flooding and improve surface water runoff quality. The implementation of this SuDS device will result in a permanent minor beneficial impact on surface water quality.

iv. Flood Risk

- 10.5.25 AECOM Corporation has prepared a flood risk assessment as a separate document located in Appendix 10.1.

- 10.5.26 In accordance with PPG 2015, buildings used for assembly and leisure activities are classed as less vulnerable. There are also residential or dwelling houses planned for the Project, which are classed as more vulnerable. In accordance with PPG2015, more vulnerable and less vulnerable uses are appropriate in Flood Zones 1 and 2.
- 10.5.27 The Environment Agency has supplied TUFLOW modelled flood levels for Moselle Brook adjacent to the Project Site for the extents of Flood Zone 2. AECOM has reviewed the data and the review confirms only the western edge of the Project Site is located in Flood Zone 2 and the remainder is located in Flood Zone 1. The residential and hotel development is not in Flood Zone 2 and all dwelling areas will be above the 1 in 100 plus climate change flood water level.
- 10.5.28 The Project's surface water discharge rates relative to the worse case storm of 15 minute duration shall be restricted to meet the requirements of the Environment Agency and Thames Water, see section 10.3.40 to 44.
- 10.5.29 The Project covers 6.5 hectares and the area has been divided onto nine catchments depending on the type of runoff e.g. roof or paved area and position of drainage outlet. Each catchment has been considered entirely impermeable.
- 10.5.30 A 20 % allowance has been made for climate change for the stadium and 30% allowance for the residential and hotel development.
- 10.5.31 Surface water runoff from the catchments has been modelled using WinDes drainage software to determine the maximum storage requirements to obtain the required discharge rates and to ensure that the 1: 100 year storm event plus climate change is contained in the Project.
- 10.5.32 Exceedance paths for extreme events or a failure of the drainage system will direct runoff to the stadium hence reducing the flood risk outside the Project.
- 10.5.33 The project is considered to be at a negligible risk of fluvial flooding from the culverted Moselle Brook and at negligible risk of flooding from sewer flooding from the Thames Water sewerage network, groundwater, overland flow and a breach of a reservoir.
- 10.5.34 As stated section 10.5.31, the drainage system has been designed not to flood for the 1:100 year event plus the recommended allowance for climate change. Consequently the effects of climate change on flooding will not materially affect the flood risk for the Project Site up to the 1:100 year event.
- 10.5.35 As the discharges into the Moselle Brook and the drainage system will not be increased and the Project does not obstruct a flow path, the flood risk to the areas upstream and downstream of the Project will not be increased.

v. Sustainable Drainage Systems

- 10.5.36 The CIRIA SuDs Manual describes the SuDs Management train, prevention, source control, site control and regional control to reduce flow rates and volumes. Due to the urban environment and confined space, creating a SuDS train was not considered practical.
- 10.5.37 Attenuation will be created by underground geocellular storage tanks and oversized pipes. The majority of

runoff from the Project will discharge into an attenuation tank before being discharged into the receiving water body at the agreed discharge rates. In the Project, runoff from the roofs will be stored separate from the runoff from the paved areas. All runoff from the paved areas will discharge via an appropriate trap before entering the drainage system. The paved areas should be regularly cleaned/swept to reduce the build-up of pollution.

10.5.38 On site attenuation has produced a 85% betterment in the 1 in 100 year storm event discharge rate compared with the Brown field runoff rate.

10.5.39 Green roofs are used for a Hotel and Residential development areas.

vi. Conventional Drainage Scheme

10.5.40 The conventional surface water drainage scheme is designed to remove runoff from the impervious surfaces by collecting flows in pipes, channels and gullies. The main objective is to minimise the flood risk to the Project Site buildings and paved areas while minimising the impact of the water quality of the runoff. See section 10.5.37.

10.5.41 The surface water runoff from 5.7 hectares will be pumped from the underground storage to the receiving water body. The runoff from the remaining 0.6 hectares will discharge to the receiving water bodies by gravity.

vii. Storage / Attenuation of Surface Water Runoff

10.5.42 Hydraulic models of the proposed drainage systems were developed by Buro Happold using underground storage to determine on-site attenuation. The attenuation volume for each drainage catchment area is listed in Table 10.1

Table 10.1 Attenuation Volumes and Discharge Rates

Area	Ares (Ha)	Out-fall	Receiving Water Body	Attenuation volume (m3)	Design outfall rate (l/s)	P – pumped G – gravity Outfall	Brown Field discharge rates
A	0.419	2	Moselle Brook	30	160	G	151
A1	2.668			1352	70	P	961
B	0.107	3		20	5	G	39
C	0.084	7		21	5	G	30
D	0.192	9	TW sewer –	45	35	P	69
E	0.614	6	Park Lane	230	35	P	221
F	1.876	4	TW sewer –	827	30	P	676
G	0.19	5	Worcester Avenue		13	P	68
H	0.32	8	TW sewer – Northumberland Park	160	5	P	115
Total	6.47	-	-	-	358		2330

10.5.43 Buro Happold design is shown on drawing BHC-XX-9403 in Appendix D of the revised FRA . The revised FRA is in Appendix 10.1.

- 10.5.44 The Project Site is at negligible risk of fluvial flooding from the culverted Moselle Brook and at negligible risk of flooding from sewer flooding from the Thames Water sewerage network, groundwater and overland flow both now and after construction of the project. The effects of climate change on flooding have also been considered and found not to materially affect the flood risk for the Project Site.

10.6 Additional Mitigation, Compensation and Enhancement Measures

Construction

- 10.6.1 Mitigation measures should include:

- Settling ponds to ensure the silt content of the runoff is low before it is pumped into the tidal;
- Any runoff should pass through a separator to ensure hydrocarbons are removed;
- Drip trays should be used under all construction equipment;
- Fuel on site should be stored in a bunded fuel storage area;
- Bio oils should be used in the construction equipment where appropriate;
- If the aquifer is exposed then an impermeable layer will be placed over the exposed chalk before construction;
- The soil contaminated by a spillage should be removed and disposed to land fill;
- The correct strength of pipe should be used for the drainage system for the size of vehicles being stored; and
- The contractor should follow an Environmental Action Plan specifically for the Project Site.

i. Preferential pathways and disturbance to groundwater

- 10.6.2 In order to reduce the movement of contamination via these pathways, a number of mitigation measures in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) should be undertaken, which are:
- The use of geotextile bunding to isolate and minimise the ingress of surface water run-off to non-decommissioned boreholes or exposed surface water drainage pipes;
 - Decommissioning of boreholes to the satisfaction of the Environment Agency;
 - If perched groundwater is encountered during establishment of the core foundations dewatering may be required. The most appropriate methods to dewater excavations should be selected, for example, prior to dewatering, the perimeter of the excavation could be enclosed with either sheet-pile or a diaphragm wall. Piezometers (standpipes) could then be placed outside the sheet pile wall to monitor groundwater levels; and
 - Water arising from excavations will need to be disposed of to the Moselle Brook or the Thames water sewer system (subject to agreement with the EA and TWUL), if uncontaminated and following the removal of silt via settlement ponds or alternative measures.
- 10.6.3 The adoption of these mitigation measures will reduce the magnitude of effect and so the residual effect from preferential pathways is assessed as of "minor-neutral" significance in relation to the Secondary and Principal Aquifer.

ii. Disturbance of existing drainage system

10.6.4 A number of mitigation measures in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) will be implemented at the Project:

- All existing utilities should be identified and marked prior to works commencing;
- Signs should be used to warn of the presence of utility infrastructure;
- Any damage to the drainage network should be immediately repaired; and
- An emergency response plan should be produced to ensure spillages and leakages are immediately contained.

10.6.5 The mitigation measures described above are intended to reduce the magnitude of effect and likelihood of damage occurring to water supply infrastructure, mobilisation of pollutants and to restrict their passage to controlled waters. This will reduce the likely residual effects to that of "minor-neutral" significance.

iii. Disturbance of contaminated land

10.6.6 Regular monitoring should be undertaken during the construction period to enable identification for any potential contamination. In the event that contamination is discovered, work should stop immediately and measures taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed off-site disposal or treatment.

10.6.7 Therefore, with the appropriate methodology and control measures in place (mitigation measures), the potential magnitude of effect associated with the presence of undiscovered areas of contamination on-site will be reduced to negligible and the residual effect is therefore considered to be of "minor-neutral" significance.

iv. Leaks and Spillages

10.6.8 Measures should be taken in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) to protect controlled waters from the release of oils and hydrocarbons at the Project Site. These measures comprise:

- Oils and hydrocarbons should be stored in designated locations with specific measures to prevent leakage and release of their contents, including the siting of storage areas away from surface water drains and on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use;
- Wherever possible, plant and machinery should be kept away from the drainage system and should have drip trays beneath oil tanks/ engines/ gearboxes/ hydraulics which should be checked and emptied regularly via a licensed waste disposal operator;
- Following the discharge of surface run-off and de-watering effluents to settling tanks the drainage would be routed to oil separators prior to discharge to sewer; and
- An emergency spillage action plan should be produced, which site staff will have read and understood. On-site provisions should be made to contain a serious spill or leak through the use of

bunding and absorbent material.

- 10.6.9 Implementation of the above mitigation measures will reduce the magnitude of the potential impact (and minimise the risk occurring in the first instance) to the environment and thus result in a residual effect of "minor-neutral" significance.

v. Suspended sediments

- 10.6.10 A number of mitigation measures in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) should be employed at the Project Site to prevent the release of suspended sediments and reduce the effect to negligible. These comprise:

- Cut-off ditches and / or geotextile silt-fences which should be installed around excavations or exposed ground and stockpiles to prevent the uncontrolled release of sediments from the Project Site;
- The Project Site access points which should be regularly cleaned to prevent build-up of dust and mud;
- Earth movement should be controlled to reduce the risk of construction silt combining with the Project Site run-off;
- Properly contained wheel wash facilities should be used where required, to isolate sediment rich run-off; and
- Drainage of surface run-off and de-watering effluents to settling tanks to remove suspended solids prior to discharge the Moselle Brook or the Thames Water sewer system or removal via a licenced waste operator.

- 10.6.11 Adoption of these mitigation measures will minimise the magnitude and the likelihood of uncontrolled release of sediment, therefore resulting in a residual impact of negligible magnitude and therefore an effect of "minor-neutral" significance on the Secondary Aquifer (shallow groundwater) and surface water receptors.

vi. Concrete Product and cement products

- 10.6.12 A number of precautions in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) will be taken on-site to reduce the potential magnitude of an effect. These comprise:

- The majority of concrete used will be pre-mixed and delivered from an off-site source, thereby negating the need to mix concrete on-site and reducing the creation of alkaline wastewater;
- Wherever possible, any mixing and handling of wet concrete on-site will be undertaken in designated impermeable areas, away from any drainage channels or surface water;
- A designated impermeable area will be used for any washing down or equipment cleaning associated with concrete or cementing processes and wastewater will be contained and removed by tanker to a suitable discharge location via a licensed waste operator; and
- Pre-cast units will be used in construction where feasible.

- 10.6.13 These control (mitigation) measures will reduce the volume of potentially contaminated wastewater being produced and therefore the residual potential effect to both surface water, groundwater and the drainage network will be of "minor-neutral" significance. The effect on the Secondary and Principle Aquifer and surface water receptors will therefore be of "minor-neutral" significance.

vii. Surface Runoff

- 10.6.14 Runoff from Project Site during construction should be controlled for rate and for quality issues, such as suspended sediments. Appropriate control measures, such as settlement ponds and bunds around the Project site, should be utilised during construction in order to temporarily store runoff prior to discharge. Surface water runoff will be discharged into the Moselle Brook or Thames Water sewer system at agreed rates. There is no residual impact as a result of the Project.

viii. Flood risk

- 10.6.15 The underground storage/attenuation tanks will be within an impermeable membrane to ensure the runoff from the Project Site is separate from the ground water hence the impact on the perched water table will be negligible.
- 10.6.16 The discharge rates into the Moselle Brook and Thames Water Sewers will be regulated during the construction phase to an agreed rate ensuring no increase in flood risk during the construction stage.

Operation

- 10.6.17 Mitigation measures should include:

- Hydrocarbons should be removed from any runoff before entering the receiving water body;
- Fuel on the Project Site should be stored in a double bunded storage area;
- The soil contaminated by a spillage should be removed and disposed to land fill;
- The drainage system, including the pumping system, and SuDS should be inspected and maintained on a regular basis to ensure integrity of the system; and
- Back up pumping facilities should be available.

i. Leaks, spillages, application of fertilisers and pesticides

- 10.6.18 An emergency spillage response plan would be put in place and education/information on waste treatment/emergency events/spills etc. should be provided to THFC staff on the Project Site.
- 10.6.19 The risk of spillages of fuels and oils occurring should be partially managed through mitigation by design, such as speed limits, road markings and procedures during delivery or movement of materials.
- 10.6.20 The use of a management plan to regulate the frequency, type and volume of application of fertilisers, pesticides and herbicides on landscaped areas/green roofs should also ensure that the optimum type and volumes are applied so as not to have an adverse impact on underlying groundwater or runoff into the drainage system.
- 10.6.21 All pumps should be regularly maintained to reduce the risk of oil leaks.

- 10.6.22 Implementation of the above measures ensures that the potential impact on all receptors, including the Secondary and Principal Aquifer, and surface water receptors is reduced to "minor-neutral" significance.

ii. Contamination from in-situ materials

- 10.6.23 Where the Project involves the construction of foundations, damp-proof membranes should be incorporated. Such construction should therefore lie within the damp-proof membranes and will not be exposed to underground strata or groundwater. Therefore the residual impact on groundwater quality post-mitigation is likely to be negligible.
- 10.6.24 It is envisaged that all the proposed drainage/service runs will be surrounded by appropriate granular bedding materials and located above the static level of any shallow groundwater. Some confirmatory tests of the new drainage systems will be carried out in accordance with statutory requirements. The drainage network installed as part of the Project will be constructed to meet with Building Regulations Part H³⁷. As a consequence, the impact of any permanent horizontal pathways on water flows and on groundwater quality is considered to be of "minor-neutral" significance.

iii. Flood Risk

- 10.6.25 The discharge from the Project Site will be attenuated by storage tanks to agreed discharge rates. The impact on increase flood risk to areas downstream of the Project Site will be negligible.
- 10.6.26 The Project Site is designed to contain the runoff from the 100 year event plus climate change flood in the underground storage tanks and oversized pipes, in excess of the agreed discharge rates.
- 10.6.27 The Project Site is designed so that in the case of an extreme weather event or drainage system failure, runoff will be directed to the stadium.

10.7 Assessment Summary and Residual Environmental Impacts and Effects

Residual Effects

- 10.7.1 No significant impacts to water resources are expected throughout the construction works or the operational stage of the Project provided that the mitigation measures, as discussed, are applied. Should this be the case, no residual effects would occur as a result of the Project.

Construction

- 10.7.2 A summary and Residual Environmental Impacts and Effects are given in Table 10.4

Operation

- 10.7.3 A summary and Residual Environmental Impacts and Effects are given in Table 10.5.

³⁷ Building Regulations 2010, Drainage and Waste disposal, Part H , 2015 edition