

Lower Thames Crossing

Pre-Consultation Scheme Assessment Report

Volume 6: Environmental Appraisal

Section 10: Appendices

Volume 6

Lower Thames Crossing
Route Consultation 2016

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Environmental Drawings

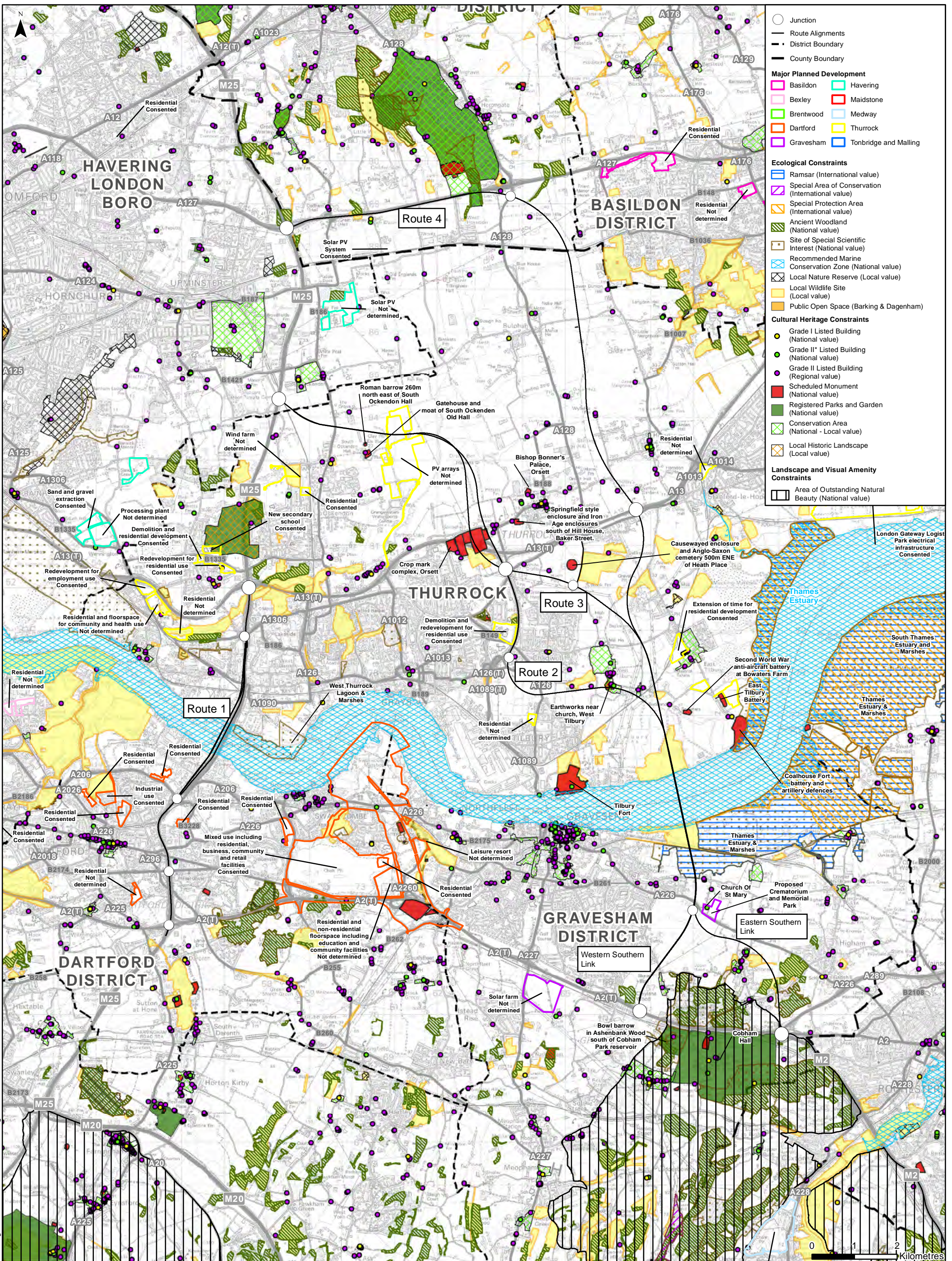
Drawing reference		Description
1	HA540039-HHJ-EGN-ZZZZZZZEG-MP-EN-0001	Landscape / Townscape Constraints
2	HA540039-HHJ-EGN-ZZZZZZZEG-MP-EN-0002	Biodiversity, Historic Environment and Planning Constraints
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15	HA540039-HHJ-EGN-CD2ZZZZZEG-MP-EN-0003	Route 2 Immersed Tunnel Land Take High Level Constraints
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17	HA540039-HHJ-EGN-CD3ZZZZZEG-MP-EN-0005	Route 3 Bridge Land Take High Level Constraints
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19	HA540039-HHJ-EGN-CD3ZZZZZEG-MP-EN-0001	Route 3 Bored Tunnel Land Take High Level Constraints
20	HA540039-HHJ-EGN-CD3ZZZZZEG-MP-EN-0002	Route 3 Bored Tunnel Land Take Water Constraints
21	HA540039-HHJ-EGN-CD3ZZZZZEG-MP-EN-0003	Route 3 Immersed Tunnel Land Take High Level Constraints
22	HA540039-HHJ-EGN-CD3ZZZZZEG-MP-EN-0004	Route 3 Immersed Tunnel Land Take Water Constraints
23	HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0005	Route 4 Bridge Land Take High Level Constraints
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25	HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0001	Route 4 Bored Tunnel Land Take High Level Constraints
26	HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0002	Route 4 Bored Tunnel Land Take Water Constraints
27	HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0003	Route 4 Immersed Tunnel Land Take High Level Constraints
28	HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0004	Route 4 Immersed Tunnel Land Take Water Constraints



— Route Alignments
 ○ Junction
Constraints
 ▨ Area of Outstanding Natural Beauty (National value)
 ■ Green Belt (Regional value)
 - - District Boundary
 - - County Boundary

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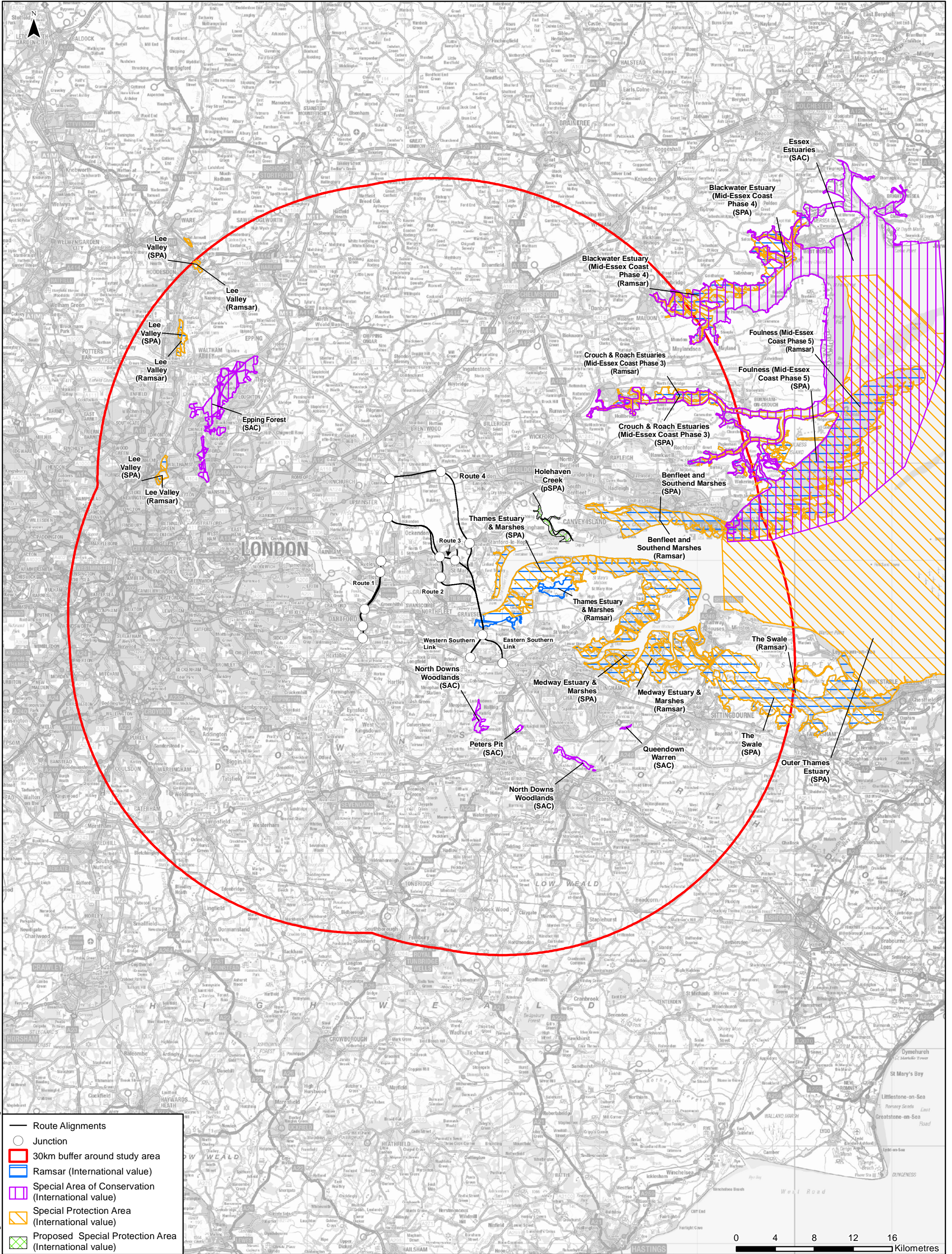
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Rev Status Rev. Date Purpose of revision Drawn Chk'd Appr'd				HHJ-EGN-ZZZZZZZEG-MP-EN-0001			



- Junction
 - Route Alignments
 - - - District Boundary
 - County Boundary
- Major Planned Development**
- Basildon
 - Bexley
 - Brentwood
 - Dartford
 - Gravesham
 - Havering
 - Maidstone
 - Medway
 - Thurrock
 - Tonbridge and Malling
- Ecological Constraints**
- Ramsar (International value)
 - Special Area of Conservation (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
 - Public Open Space (Barking & Dagenham)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
 - Local Historic Landscape (Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

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- Route Alignments
- Junction
- ▭ 30km buffer around study area
- ▭ Ramsar (International value)
- ▭ Special Area of Conservation (International value)
- ▭ Special Protection Area (International value)
- ▭ Proposed Special Protection Area (International value)

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Project **LOWER THAMES CROSSING**

Drawing Title

Internationally Designated Sites

Status S5 Revision P01

Scale 1:350,000 Date 18/01/16

Drawn By L.HULME

Checked By S.RIMMEL

Approved By A.SAUNDERS

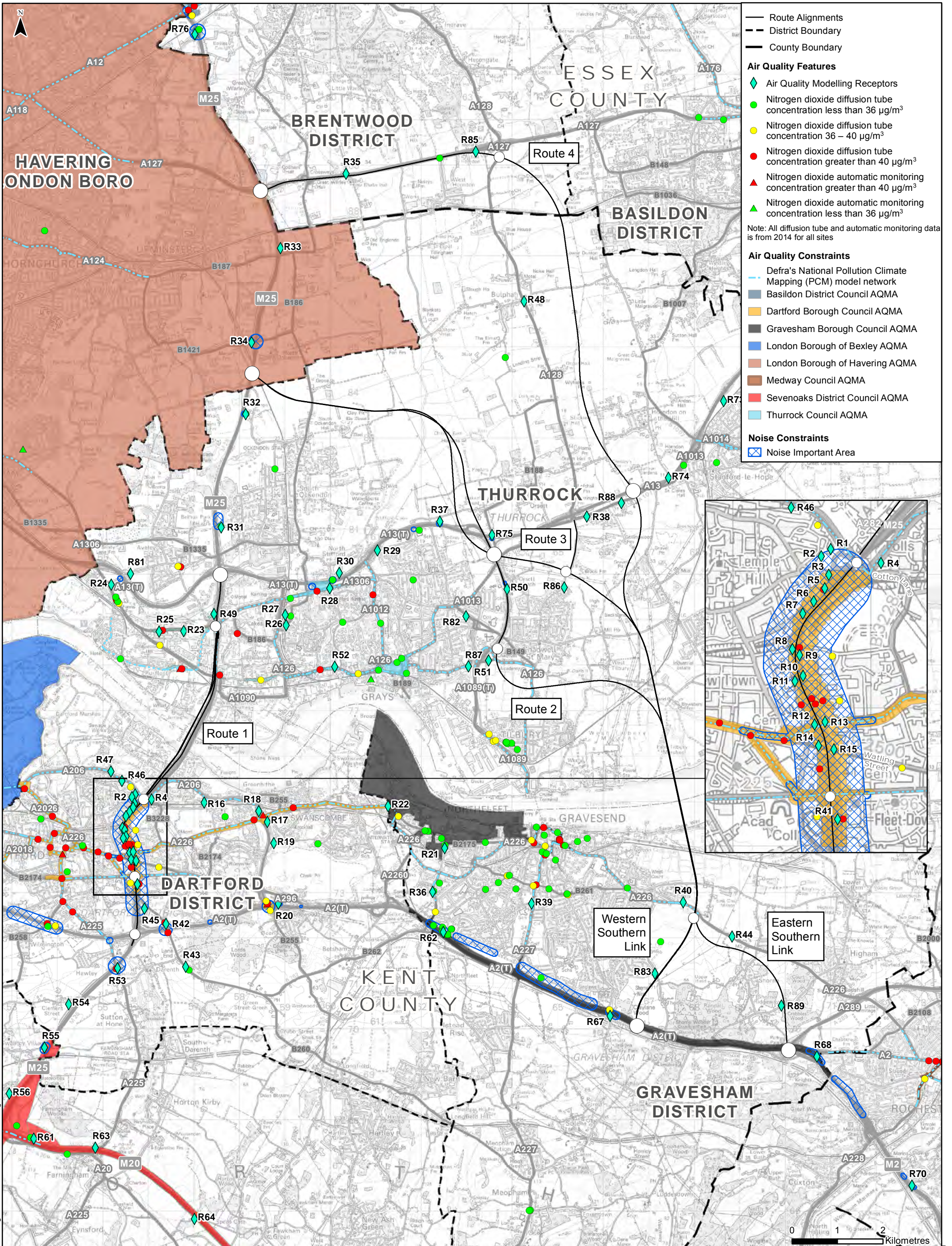
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Drawing Number
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— Route Alignments
 - - - District Boundary
 — County Boundary

Air Quality Features

- ◆ Air Quality Modelling Receptors
- Nitrogen dioxide diffusion tube concentration less than 36 µg/m³
- Nitrogen dioxide diffusion tube concentration 36 – 40 µg/m³
- Nitrogen dioxide diffusion tube concentration greater than 40 µg/m³
- ▲ Nitrogen dioxide automatic monitoring concentration greater than 40 µg/m³
- ▲ Nitrogen dioxide automatic monitoring concentration less than 36 µg/m³

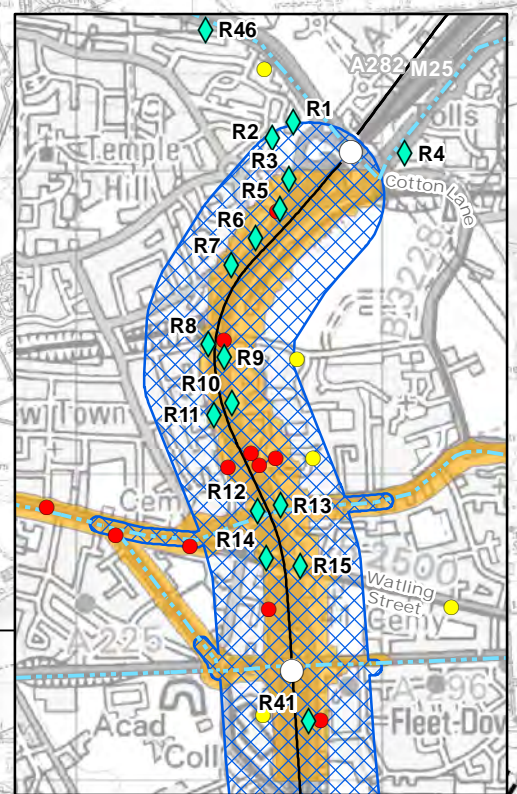
Note: All diffusion tube and automatic monitoring data is from 2014 for all sites

Air Quality Constraints

- Defra's National Pollution Climate Mapping (PCM) model network
- Basildon District Council AQMA
- Dartford Borough Council AQMA
- Gravesham Borough Council AQMA
- London Borough of Bexley AQMA
- London Borough of Havering AQMA
- Medway Council AQMA
- Sevenoaks District Council AQMA
- Thurrock Council AQMA

Noise Constraints

- Noise Important Area



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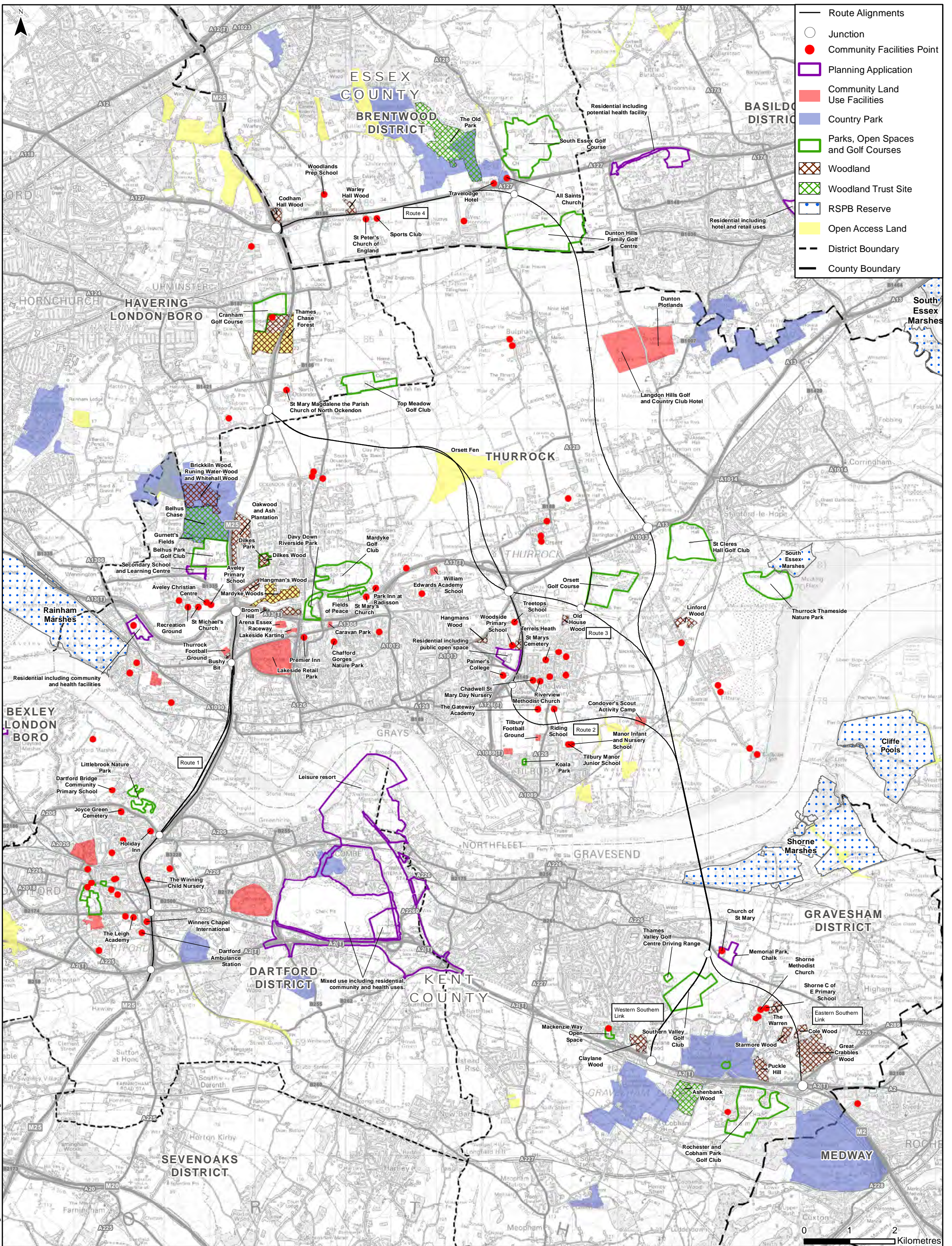
Client

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing Title **Air and Noise Constraints and Air Quality Modelling Receptor Locations**

Status	S5	Revision	P01
Scale	1:75,000	Date	18/01/16
Drawn By	L.HULME		
Checked By	S.RIMMEL		
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-ZZZZZZZEG-MP-EN-0004		



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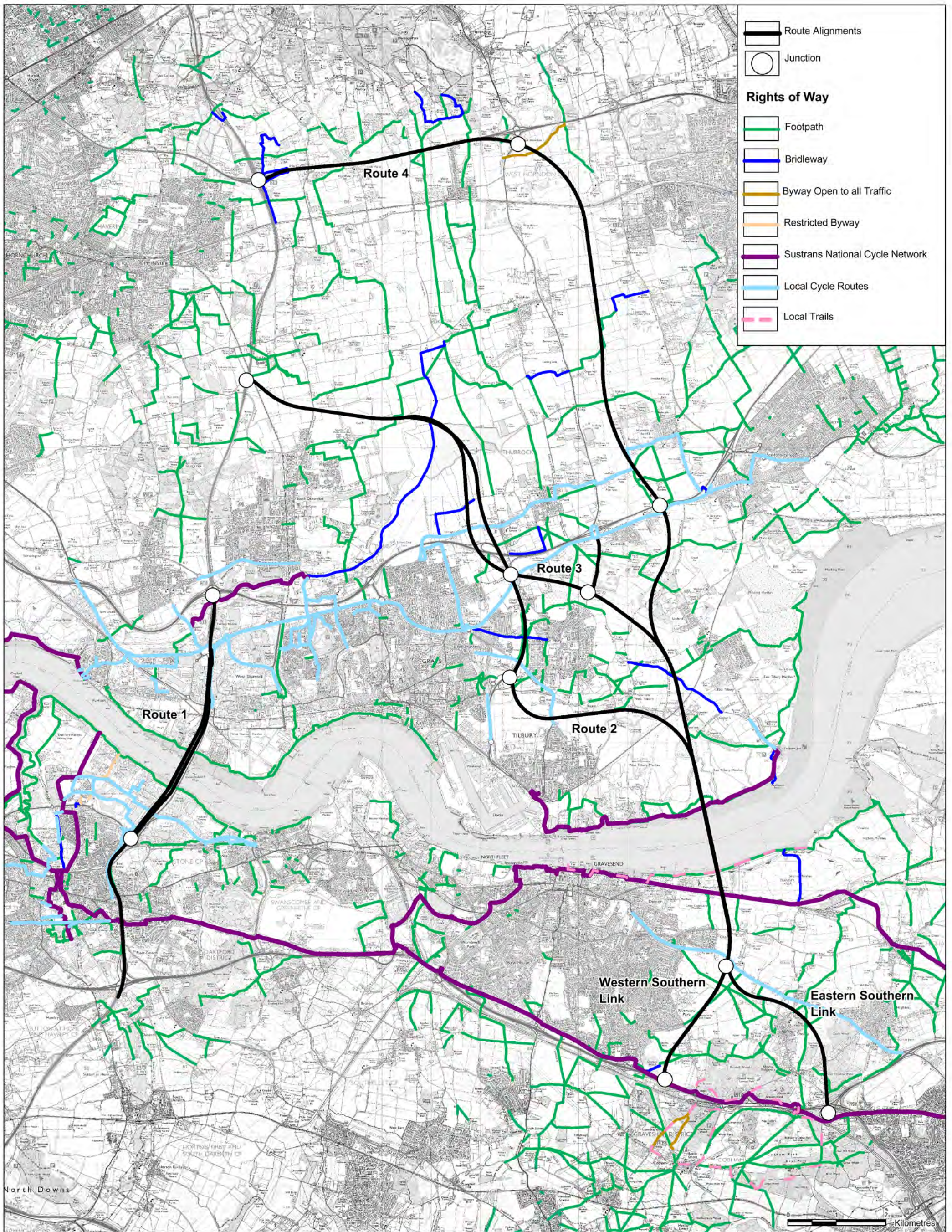


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Drawing Title **Community Land Use
Constraints**

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Checked By	S.RIMELL		
Approved By	A.SAUNDERS		
Project No.	HA	PIN	Originator
HA540039	HHJ		Original Size
Drawing Number			A3
HHJ-EGN-ZZZZZZZZEG-MP-EN-0005			

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Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



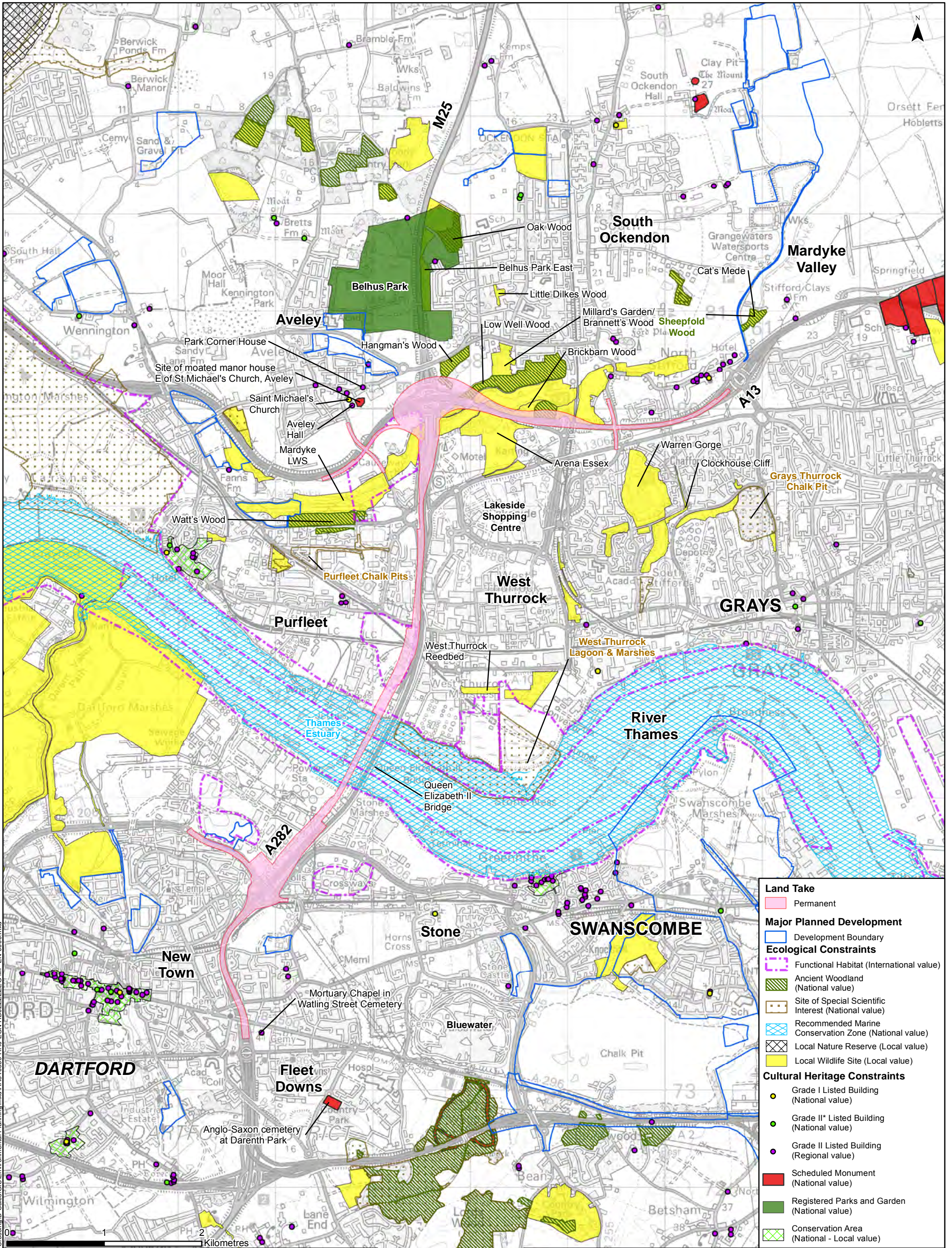
Route Alignments

- Route Alignments
- Junction

Rights of Way

- Footpath
- Bridleway
- Byway Open to all Traffic
- Restricted Byway
- Sustrans National Cycle Network
- Local Cycle Routes
- Local Trails

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ILLUSTRATIVE DESIGN		Halcrow Hyder Joint Venture Burdopp Park Swindon, SN4 0QQ Tel: +44(0)1793812479		Drawing Title Public Rights of Way and Cycle Routes		Scale 1:70,000		Date 18/01/2016	
		Halcrow Hyder				Drawn By M.MUTALE			
P01 S5 18-01-2016 SAR Issue NM SR AS						Checked By S.RIMELL			
Rev Status Rev Date Purpose of revision Drawn Chk'd App'd						Approved By A.SAUNDERS			
						Project No. HA540039		Originator HHJ	
						Drawing Number HHJ-EGN-ZZZZZZZEG-MP-EN-0006		Original Size A3	



Land Take	
	Permanent
Major Planned Development	
	Development Boundary
Ecological Constraints	
	Functional Habitat (International value)
	Ancient Woodland (National value)
	Site of Special Scientific Interest (National value)
	Recommended Marine Conservation Zone (National value)
	Local Nature Reserve (Local value)
	Local Wildlife Site (Local value)
Cultural Heritage Constraints	
	Grade I Listed Building (National value)
	Grade II* Listed Building (National value)
	Grade II Listed Building (Regional value)
	Scheduled Monument (National value)
	Registered Parks and Garden (National value)
	Conservation Area (National - Local value)

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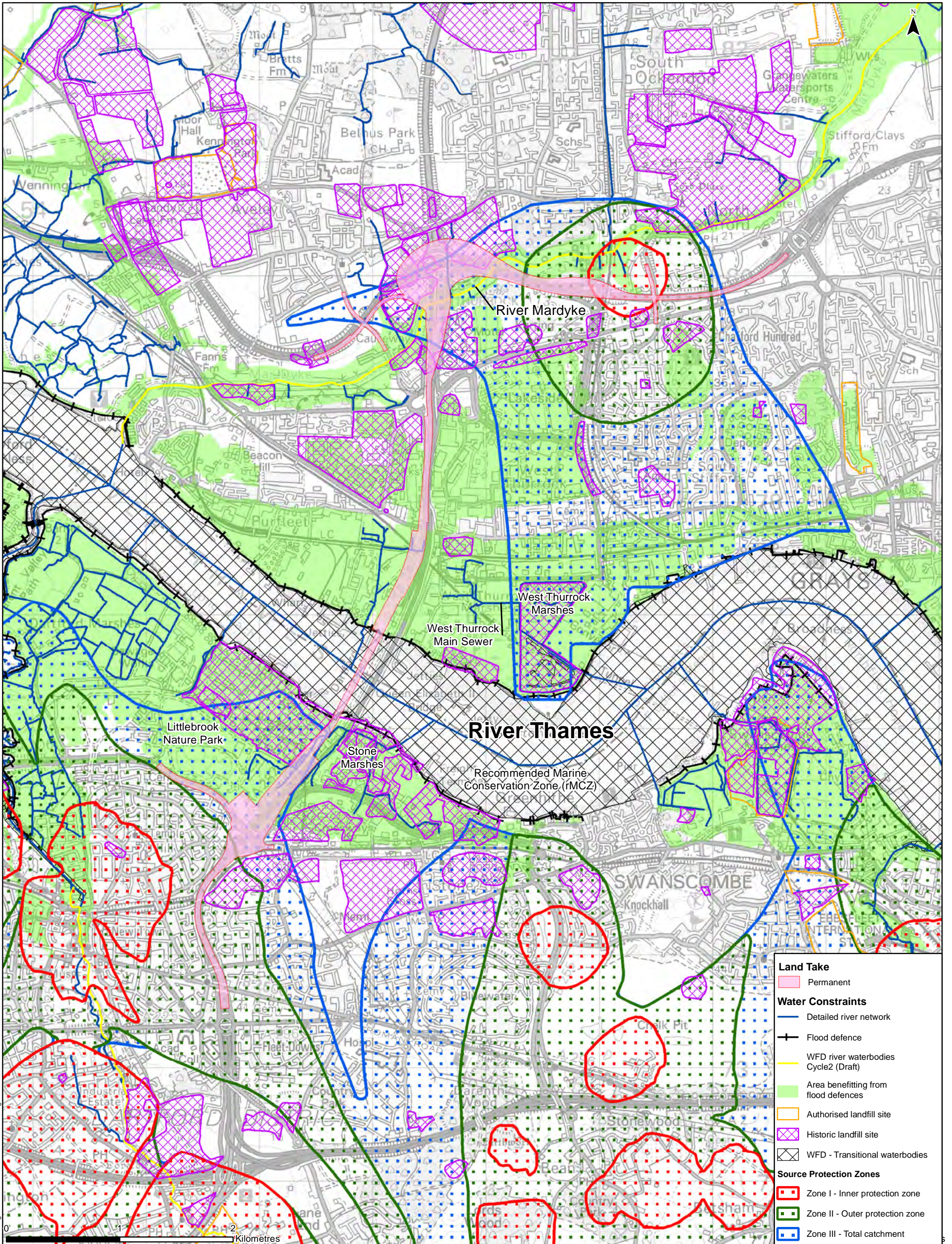
Client

Halcrow Hyder Joint Venture
Burdorp Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing Title Route 1 Bridge Land Take High Level Constraints

Status	S5	Revision	P01
Scale	1:35,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
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Drawing Title	Route 1 Bridge Land Take Water Constraints					
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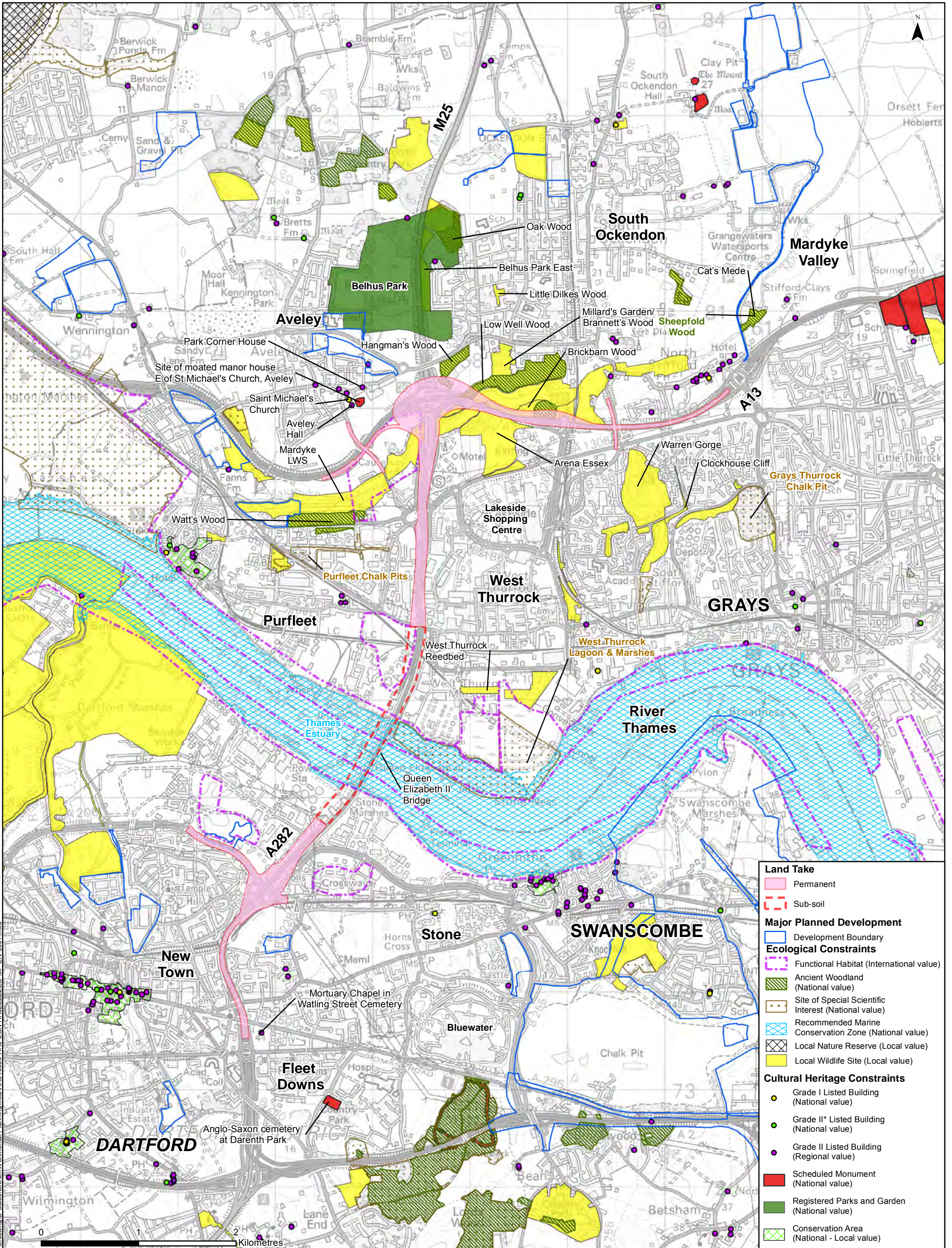
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Status	S5	Revision	P01
Scale	1:30,000		
Drawn By	L.HULME		
Checked By	S.RIMELL		
Approved By	A.SAUNDERS		

Project No.	HA	PIN	Originator	Original Size	A3
HA540039			HHJ		
Drawing Number	HHJ-EGN-AD0ZZZZEG-MP-EN-0004				



Land Take

- Permanent
- Sub-soil

Major Planned Development

- Development Boundary

Ecological Constraints

- Functional Habitat (International value)
- Ancient Woodland (National value)
- Site of Special Scientific Interest (National value)
- Recommended Marine Conservation Zone (National value)
- Local Nature Reserve (Local value)
- Local Wildlife Site (Local value)

Cultural Heritage Constraints

- Grade I Listed Building (National value)
- Grade II* Listed Building (National value)
- Grade II Listed Building (Regional value)
- Scheduled Monument (National value)
- Registered Parks and Garden (National value)
- Conservation Area (National - Local value)

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Project

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Drawing Title

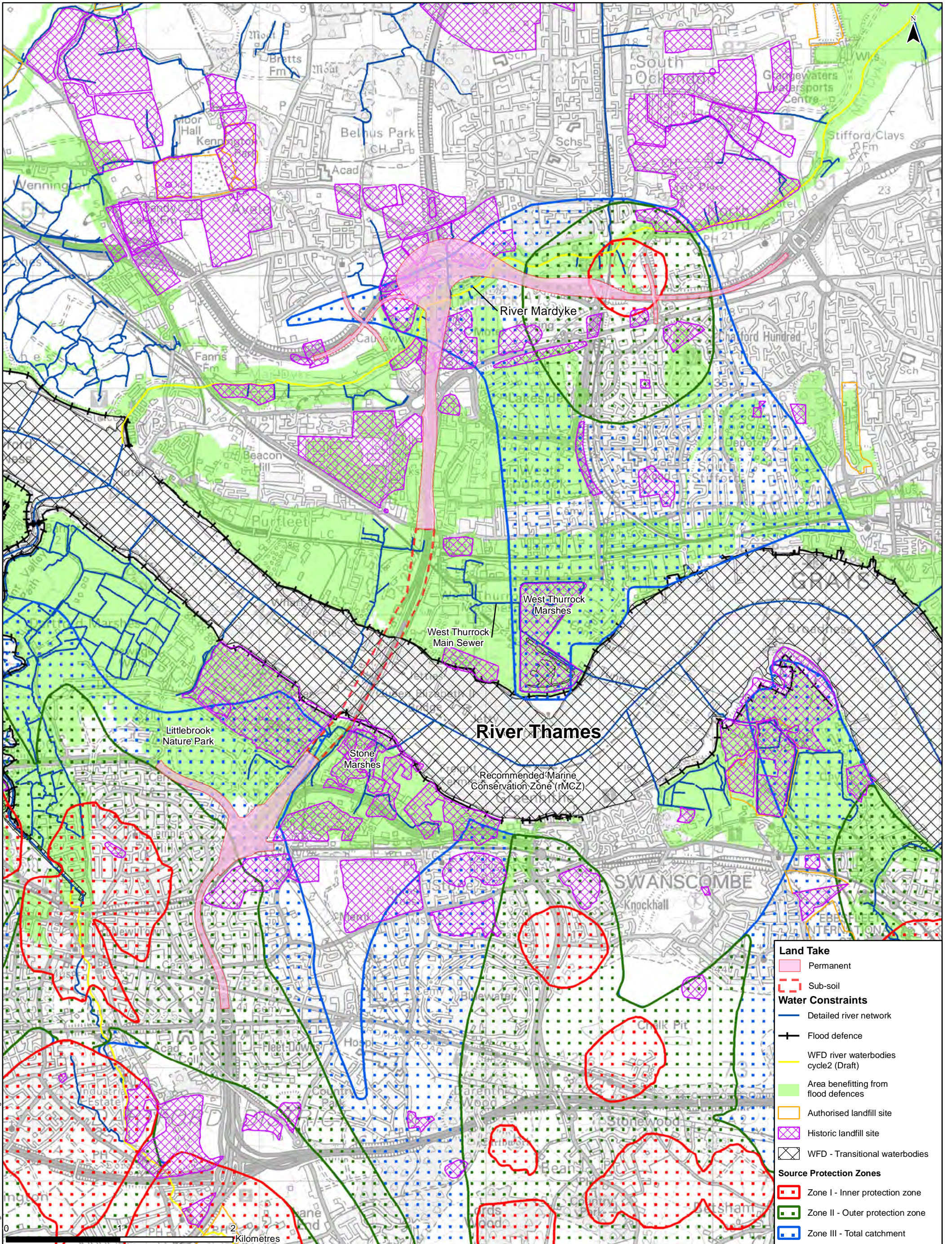
**Route 1 Bored Tunnel
 Land Take
 High Level Constraints**

Client

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Status	S5	Revision	P01
Scale	1:35,000	Date	18/01/16
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Checked By	S.Rimell		
Approved By	A.SAUNDERS		
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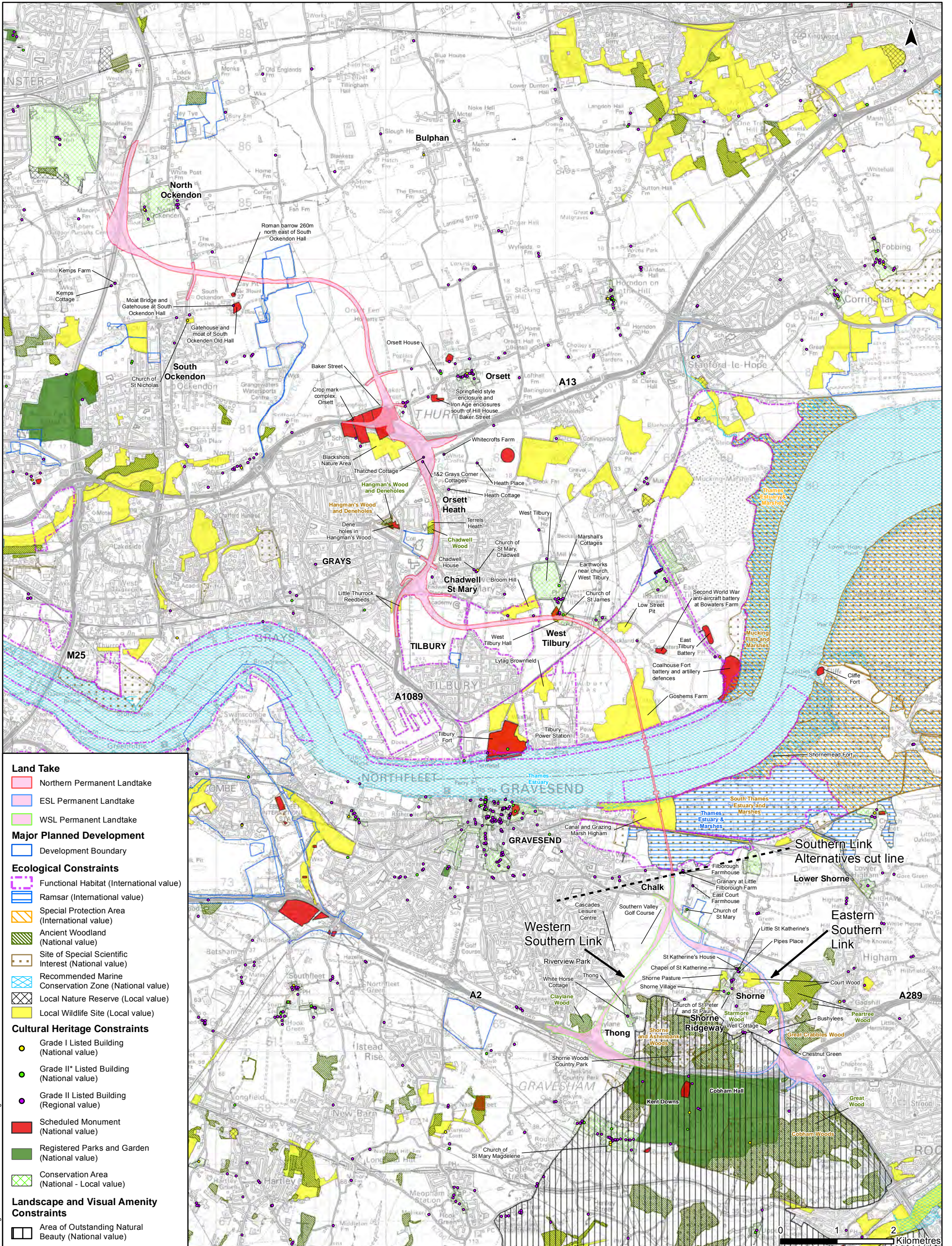
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Project **LOWER THAMES
CROSSING**

Drawing Title **Route 1 Bored Tunnel
Land Take
Water Constraints**

Status	S5	Revision	P01
Scale	1:30,000	Date	18/01/16
Drawn By	L.HULME		
Checked By	S.RIMELL		
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-AA0ZZZZEG-MP-EN-0002		



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Major Planned Development**
- Development Boundary
- Ecological Constraints**
- Functional Habitat (International value)
 - Ramsar (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

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Project **LOWER THAMES CROSSING**

Drawing Title **Route 2 Bridge Land Take High Level Constraints**

Status S5 Revision P01

Scale 1:60,000 Date - 18/01/16

Drawn By L.HULME
 Checked By S.RIMELL
 Approved By A.SAUNDERS

Project No. HA 540039
 HA PIN | Originator
 HHJ Original Size **A3**

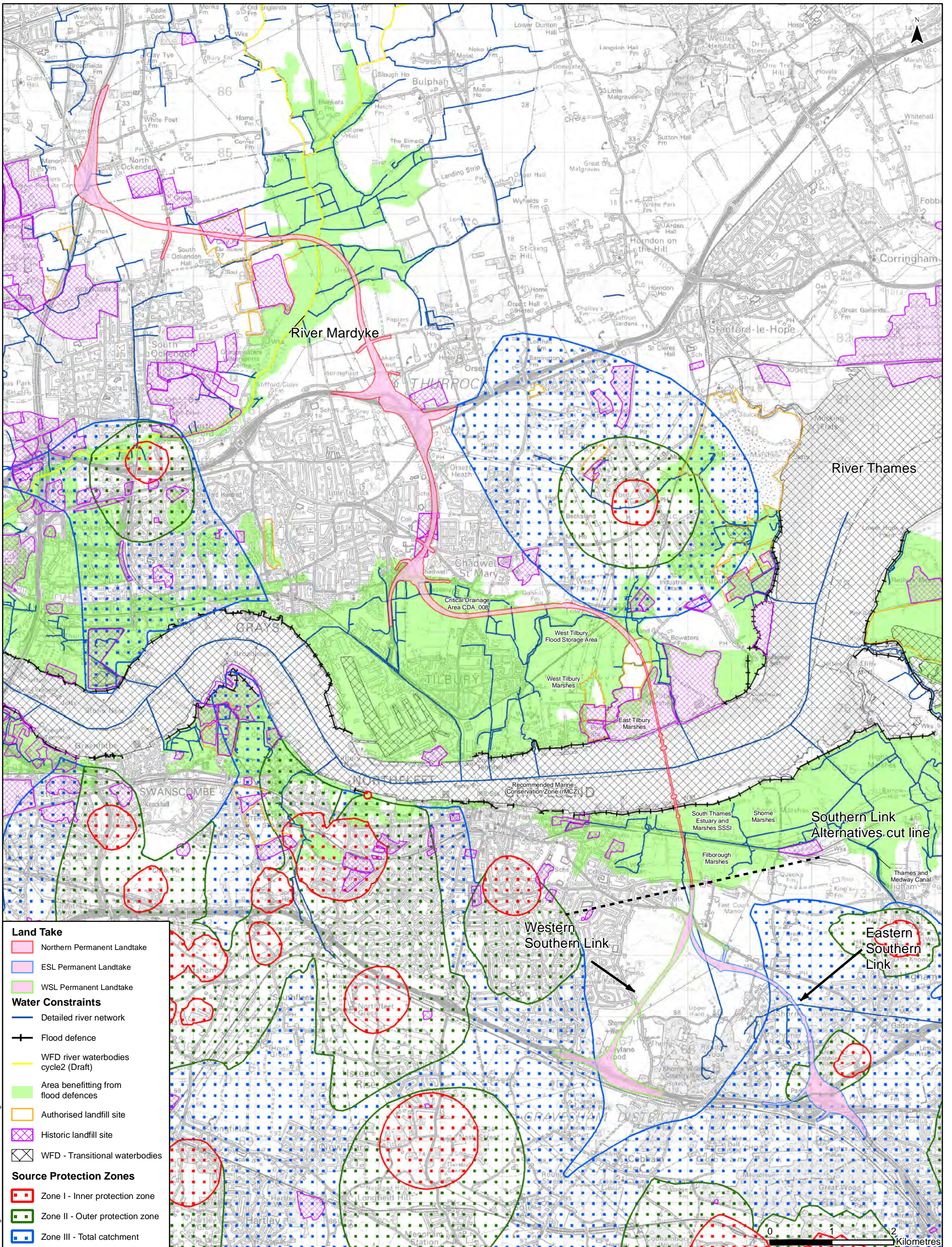
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- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Area benefitting from flood defences
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment

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Client

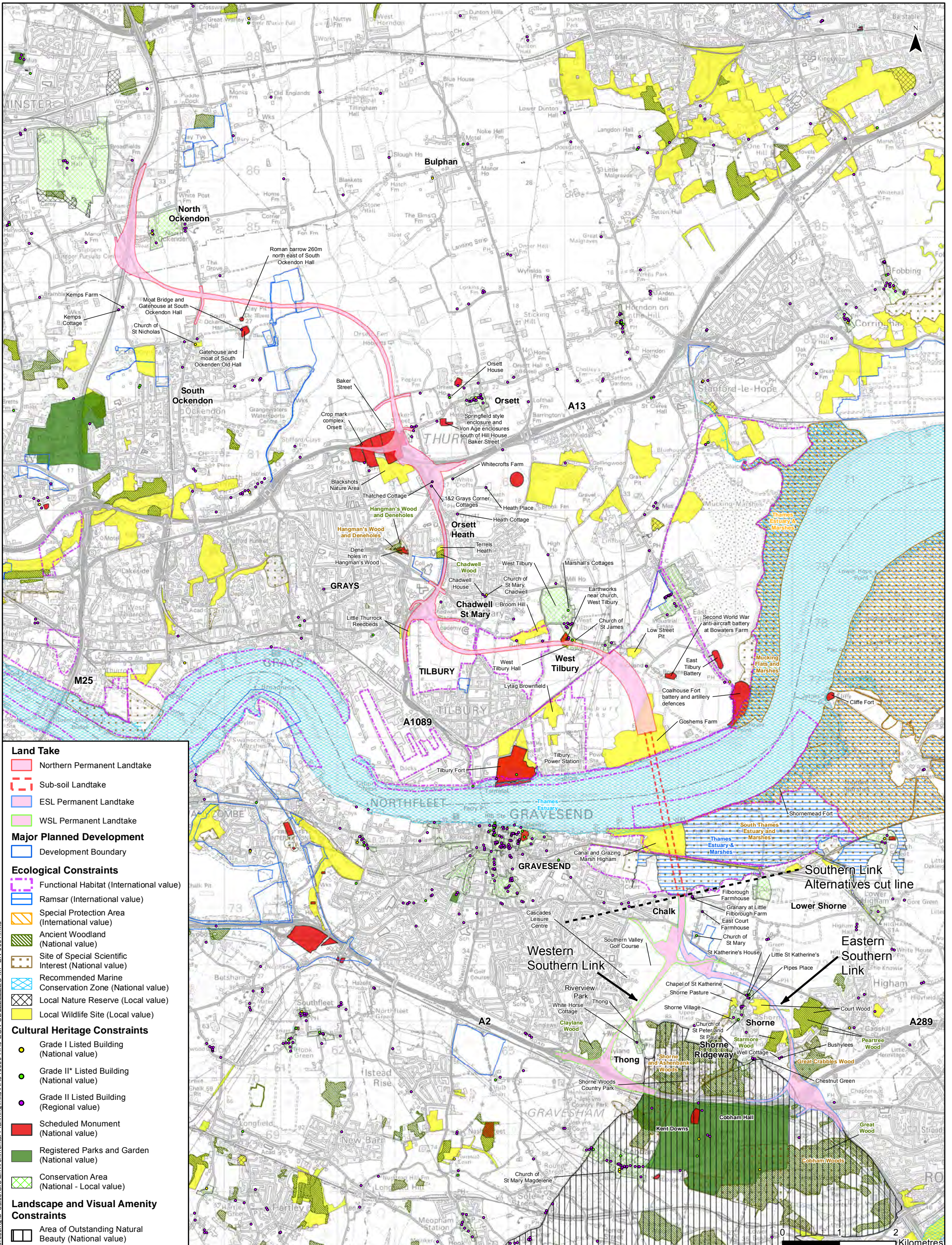
Halcrow Hyder Joint Venture
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Project **LOWER THAMES CROSSING**

Drawing Title **Route 2 Bridge Land Take Water Constraints**

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Approved By	A.SAUNDERS		
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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



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<div style="border: 2px solid red; padding: 5px; display: inline-block; color: red; font-weight: bold;">ILLUSTRATIVE DESIGN</div> The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.	Halcrow Hyder Joint Venture Burderop Park Swindon, SN4 0QD Tel. +44(0)1793 812479 	Drawing Title Route 2 Bored Tunnel Land Take High Level Constraints	Scale 1:60,000	Date - 18/01/16
			Drawing Number 	Drawing Date
Rev P01 Status S5 Rev. Date 18/01/16 Purpose of revision SAR ISSUE Drawn LH Chk'd SR Appr'd AS	Project No. HA PIN Originator HA540039 HHJ Original Size A3		Drawing Number HHJ-EGN-CD2ZZZZZEG-MP-EN-0001	

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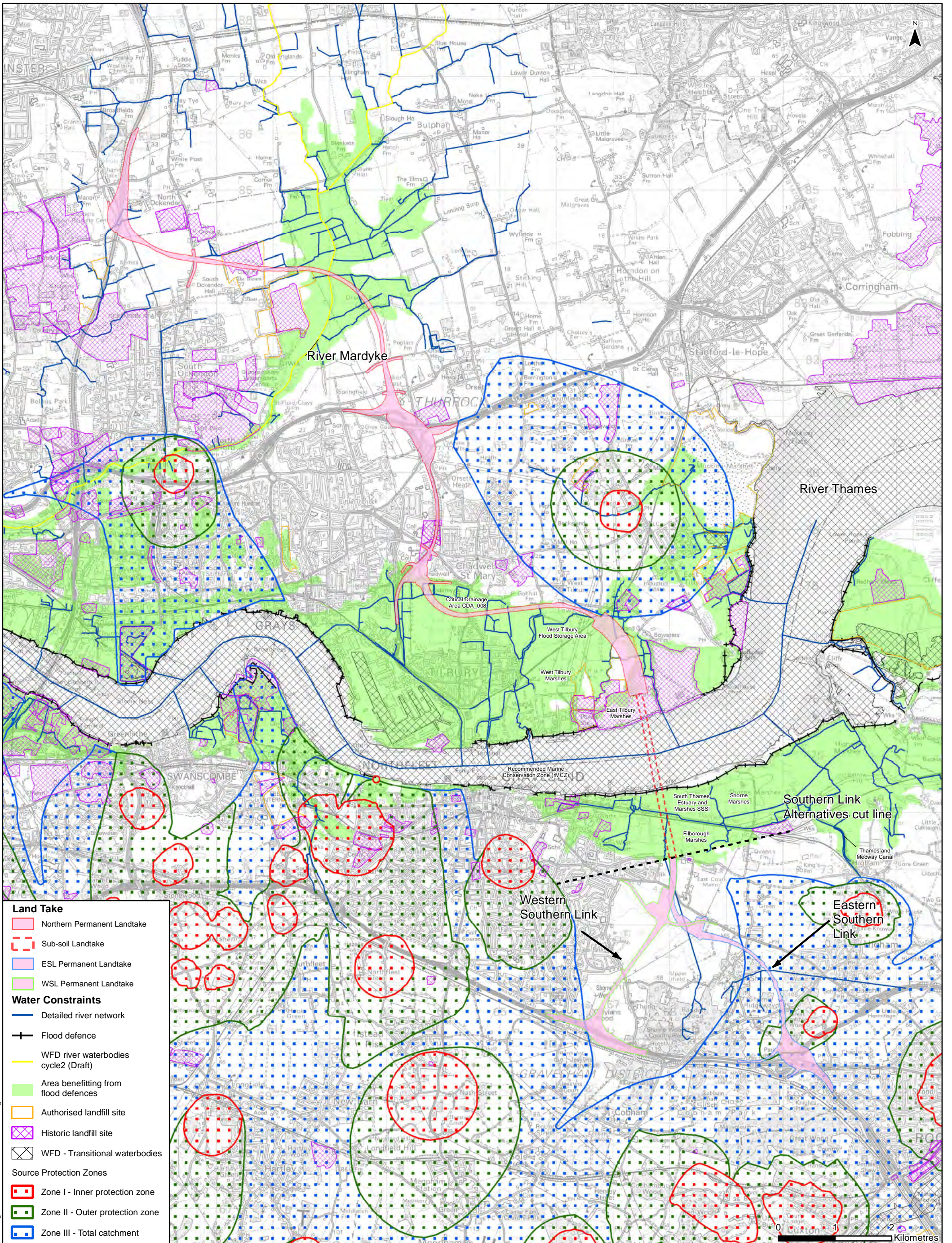
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Client
**highways
england**

Project
**LOWER THAMES
CROSSING**

Drawing Title
**Route 2 Bored Tunnel
Land Take
High Level Constraints**

Status	S5	Revision	P01
Scale	1:60,000	Date -	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS	Project No.	HA PIN Originator
	HA540039	HHJ	Original Size
			A3
Drawing Number			
HHJ-EGN-CD2ZZZZZEG-MP-EN-0001			



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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Appr'd

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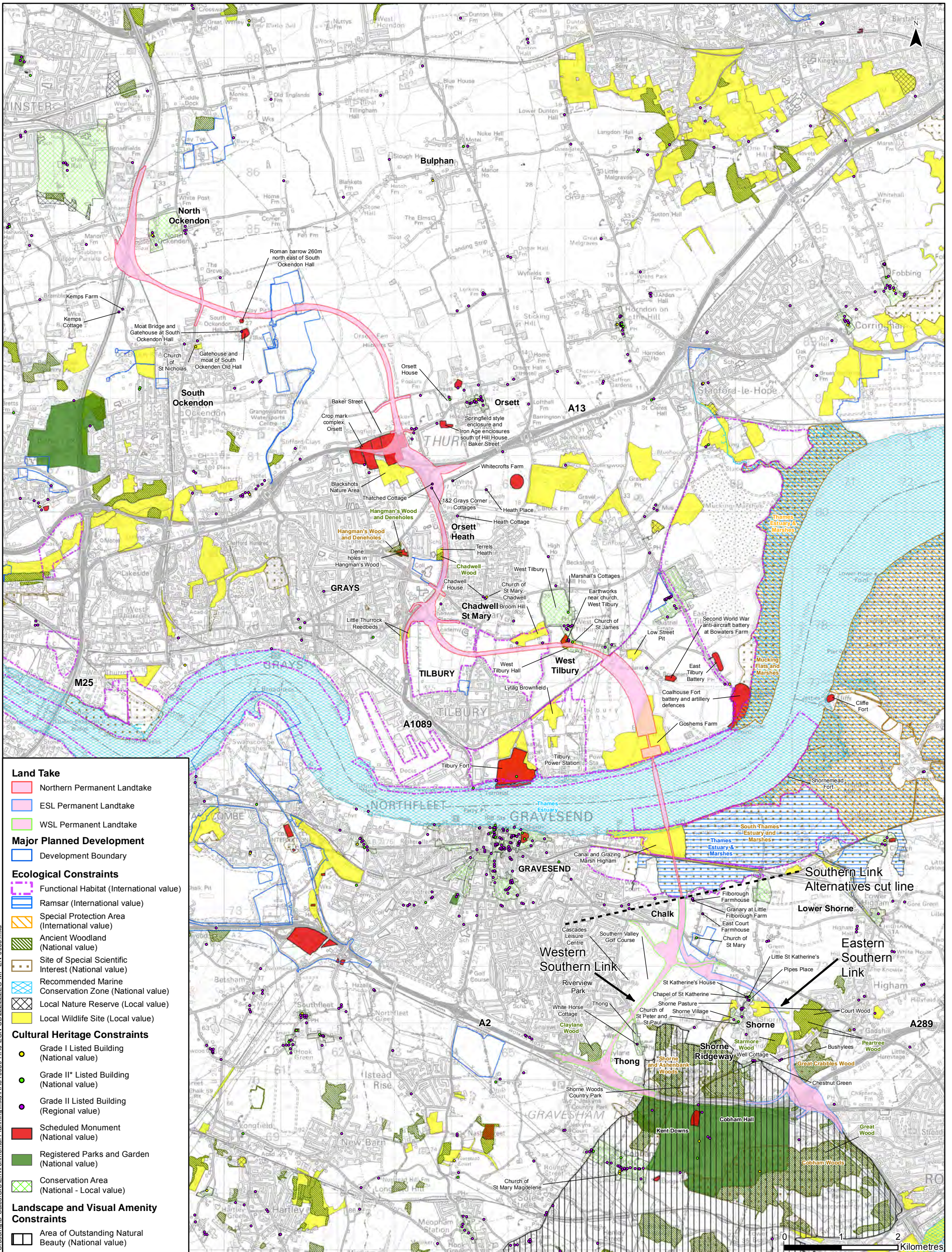
Client

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Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing Title **Route 2 Bored Tunnel Land Take Water Constraints**

Status	S5	Revision	P01
Scale	1:60,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD2ZZZZZEG-MP-EN-0002		



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Scale 1:60,000	Drawn By L.HULME	Checked By S.RIMMEL	Approved By A.SAUNDERS	Project No. HA540039	HA PIN HHJ	
Project No. HA540039	HA PIN HHJ	Originator HHJ	Original Size A3	Drawing Number HHJ-EGN-CD2ZZZZZEG-MP-EN-0003		
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P01	S5	18/01/16	SAR ISSUE	LH	SR	AS

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Client
**highways
england**

Project
**LOWER THAMES
CROSSING**

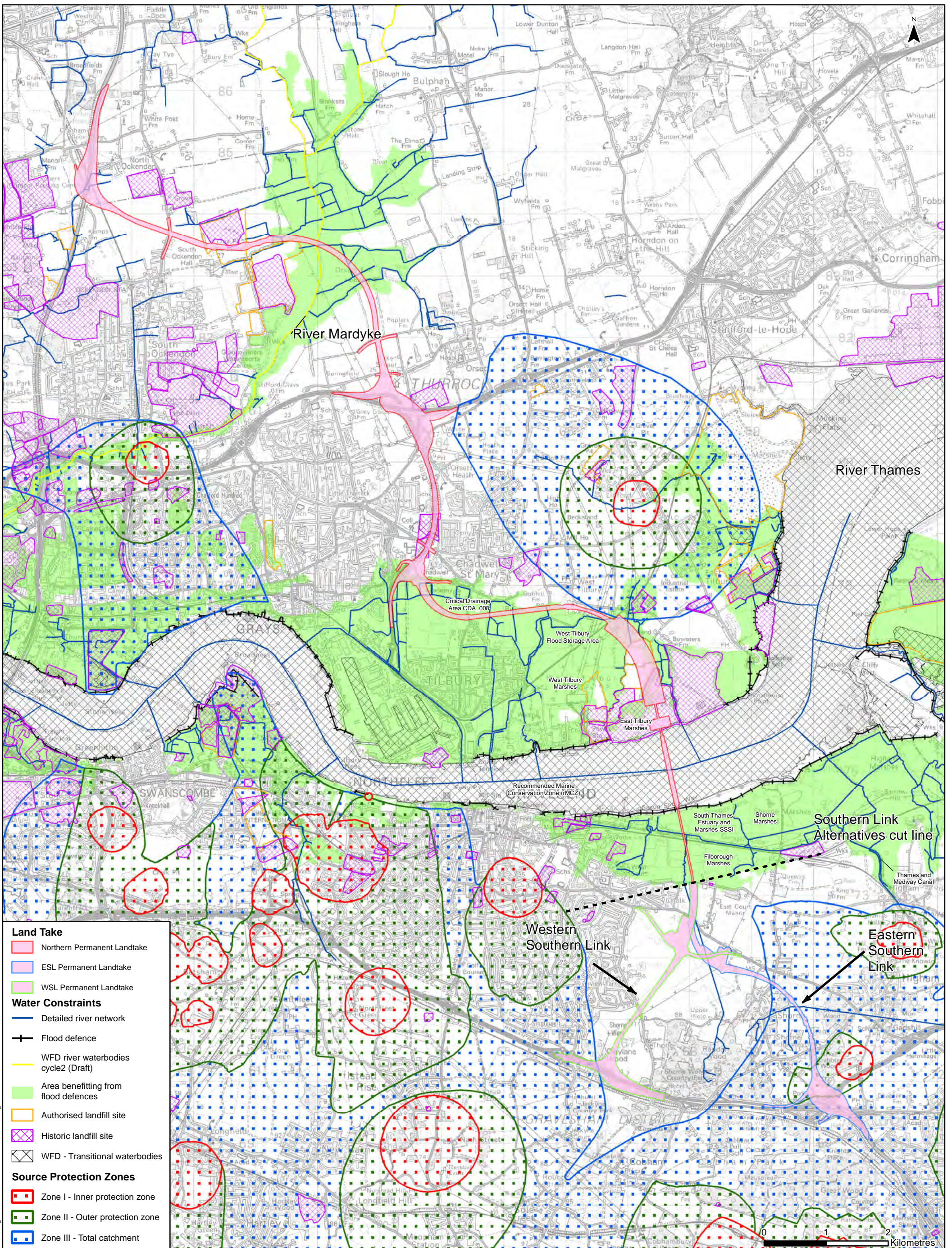
Drawing Title
**Route 2 Immersed Tunnel
Land Take
High Level Constraints**

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Halcrow Hyder

Status S5	Revision P01
Scale 1:60,000	Date - 18/01/16
Drawn By L.HULME	Checked By S.RIMMEL
Approved By A.SAUNDERS	Project No. HA540039
HA PIN HHJ	Originator HHJ
Original Size A3	Drawing Number HHJ-EGN-CD2ZZZZZEG-MP-EN-0003

Scale 1:60,000	Date - 18/01/16
Drawn By L.HULME	Checked By S.RIMMEL
Approved By A.SAUNDERS	Project No. HA540039
HA PIN HHJ	Originator HHJ
Original Size A3	Drawing Number HHJ-EGN-CD2ZZZZZEG-MP-EN-0003



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Area benefitting from flood defences
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment

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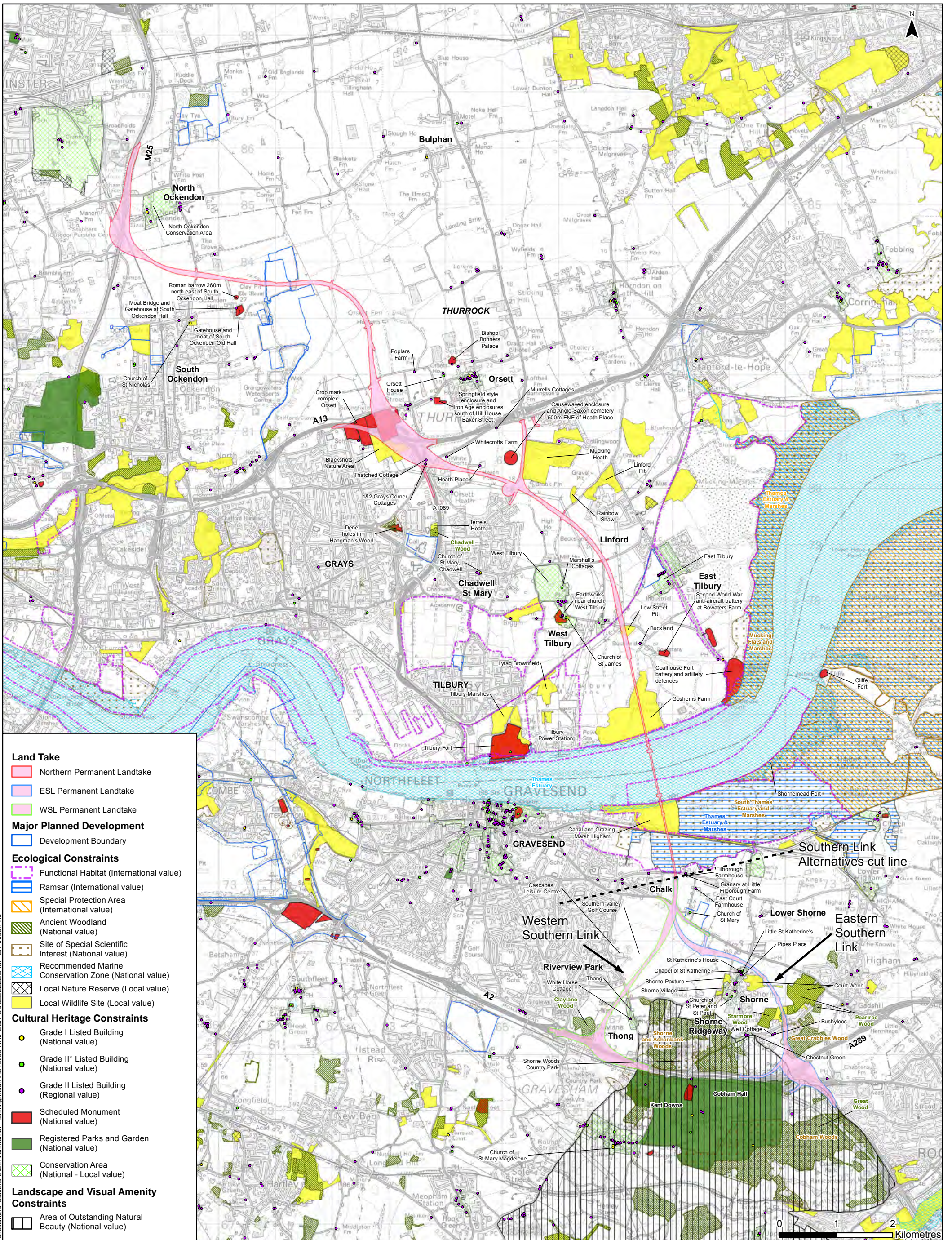
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Project **LOWER THAMES CROSSING**

Drawing Title **Route 2 Immersed Tunnel Land Take Water Constraints**

Status	S5	Revision	P01
Scale	1:55,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD2ZZZZZEG-MP-EN-0004		

P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Major Planned Development**
- Development Boundary
- Ecological Constraints**
- Functional Habitat (International value)
 - Ramsar (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

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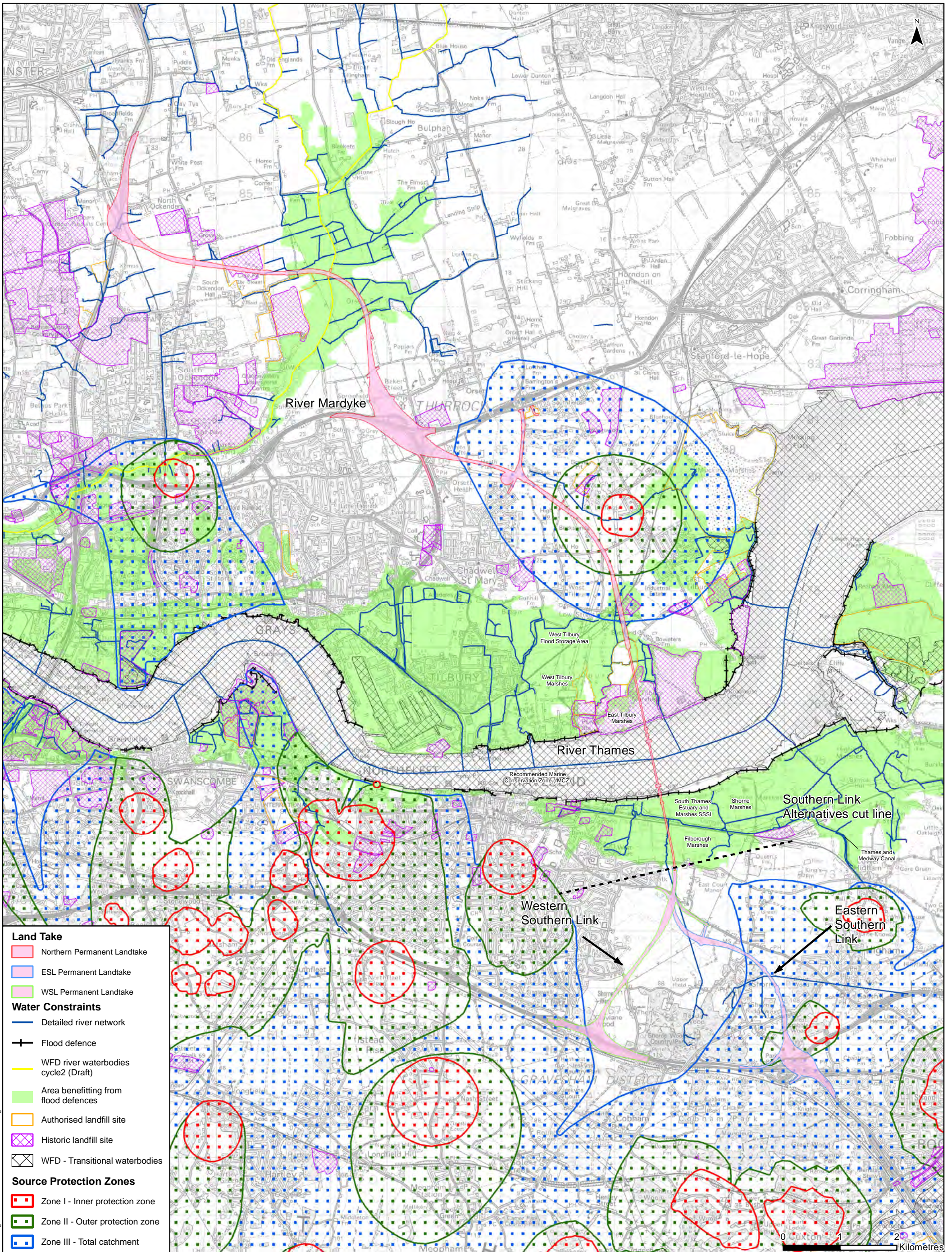
Project

**LOWER THAMES
 CROSSING**

Drawing Title

**Route 3 Bridge Land Take
 High Level Constraints**

Status	S5	Revision	P01
Scale	1:60,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD3ZZZZEG-MP-EN-0005		



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Area benefitting from flood defences
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment

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Project **LOWER THAMES CROSSING**

Drawing Title **Route 3 Bridge Land Take Water Constraints**

Status S5 Revision P01

Scale 1:60,000 Date 18/01/16

Drawn By L.HULME
 Checked By S.RIMELL
 Approved By A.SAUNDERS

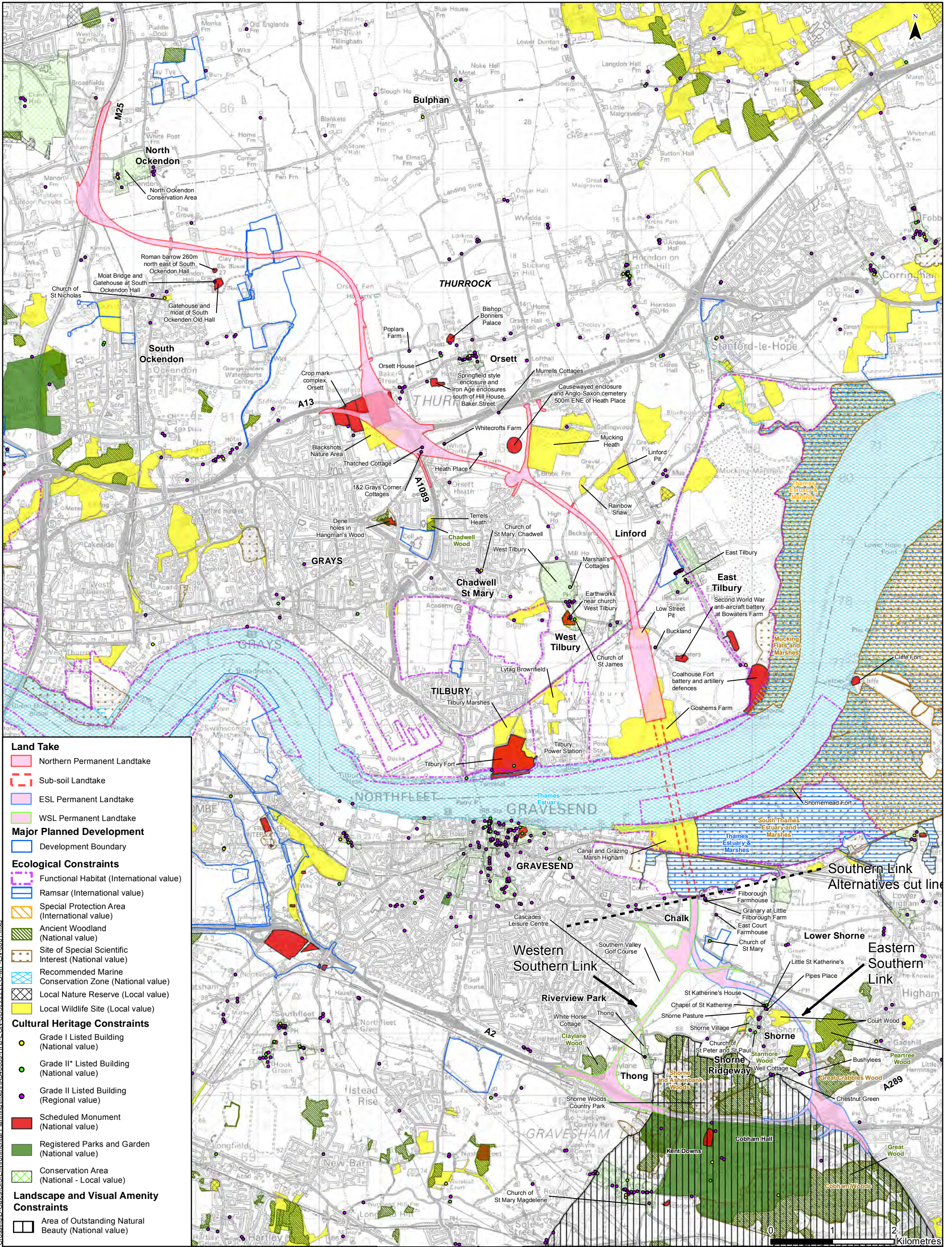
Project No. HA540039 HA PIN | Originator HHJ Original Size A3

Drawing Number | | |
 HHJ-EGN-CD3ZZZZZEG-MP-EN-0006

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Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P01	S5	18/01/16	SAR ISSUE	LH	SR	AS



Land Take

- Northern Permanent Landtake
- Sub-soil Landtake
- ESL Permanent Landtake
- WSL Permanent Landtake

Major Planned Development

- Development Boundary

Ecological Constraints

- Functional Habitat (International value)
- Ramsar (International value)
- Special Protection Area (International value)
- Ancient Woodland (National value)
- Site of Special Scientific Interest (National value)
- Recommended Marine Conservation Zone (National value)
- Local Nature Reserve (Local value)
- Local Wildlife Site (Local value)

Cultural Heritage Constraints

- Grade I Listed Building (National value)
- Grade II* Listed Building (National value)
- Grade II Listed Building (Regional value)
- Scheduled Monument (National value)
- Registered Parks and Garden (National value)
- Conservation Area (National - Local value)

Landscape and Visual Amenity Constraints

- Area of Outstanding Natural Beauty (National value)

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highways england

Project
LOWER THAMES CROSSING

Drawing Title
Route 3 Bored Tunnel Land Take High Level Constraints

Client
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 Swindon, SN4 0QD
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Project
LOWER THAMES CROSSING

Drawing Title
Route 3 Bored Tunnel Land Take High Level Constraints

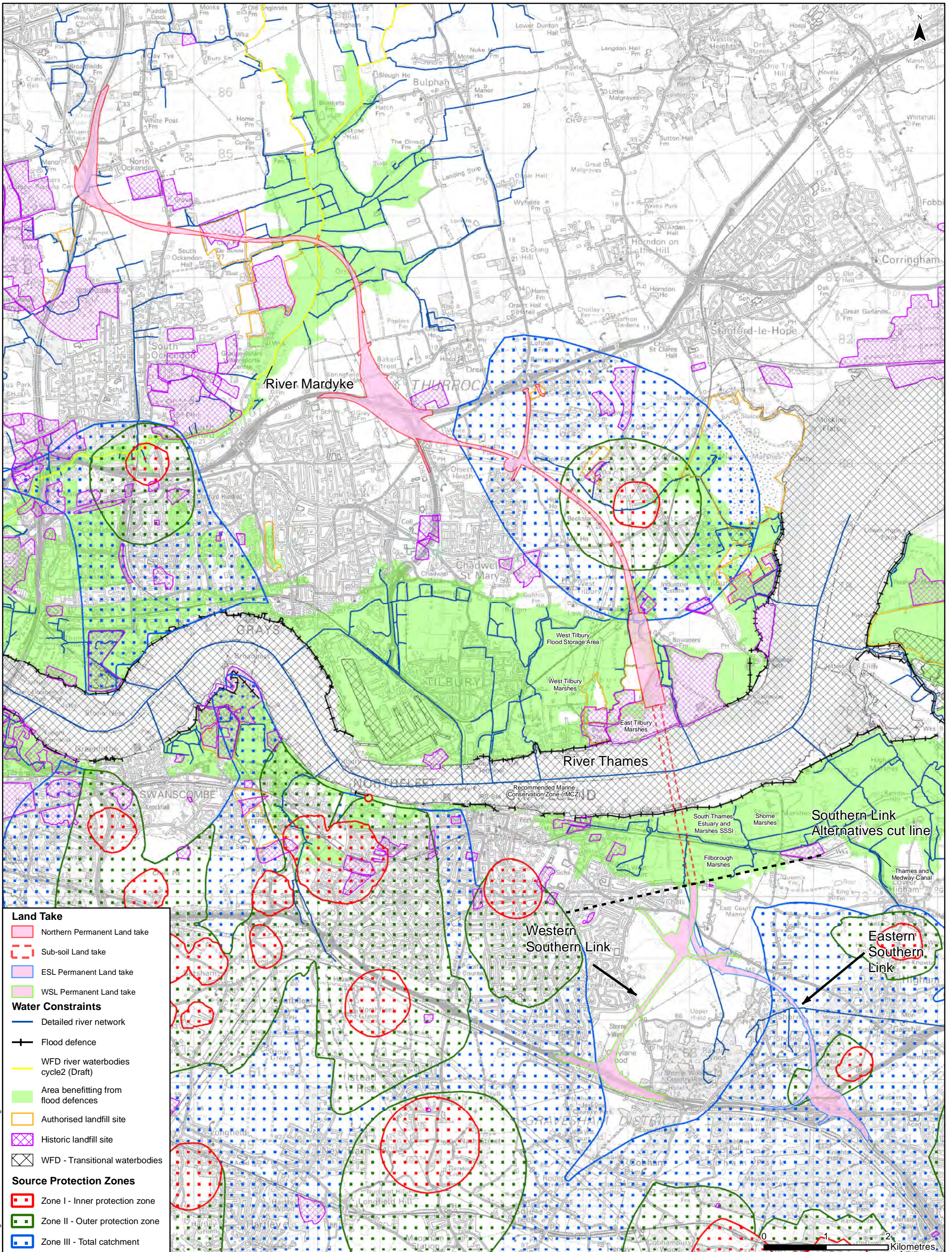
Status	S5	Revision	P01
Scale	1:55,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS	Project No.	HA PIN Originator
	HA540039	HHJ	Original Size
			A3
Drawing Number	HHJ-EGN-CD3ZZZZEG-MP-EN-0001		

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Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S5	18/01/16	SAR ISSUE	LH	SR	AS

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- Land Take**
- Northern Permanent Land take
 - Sub-soil Land take
 - ESL Permanent Land take
 - WSL Permanent Land take
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Area benefitting from flood defences
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment

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Project **LOWER THAMES CROSSING**

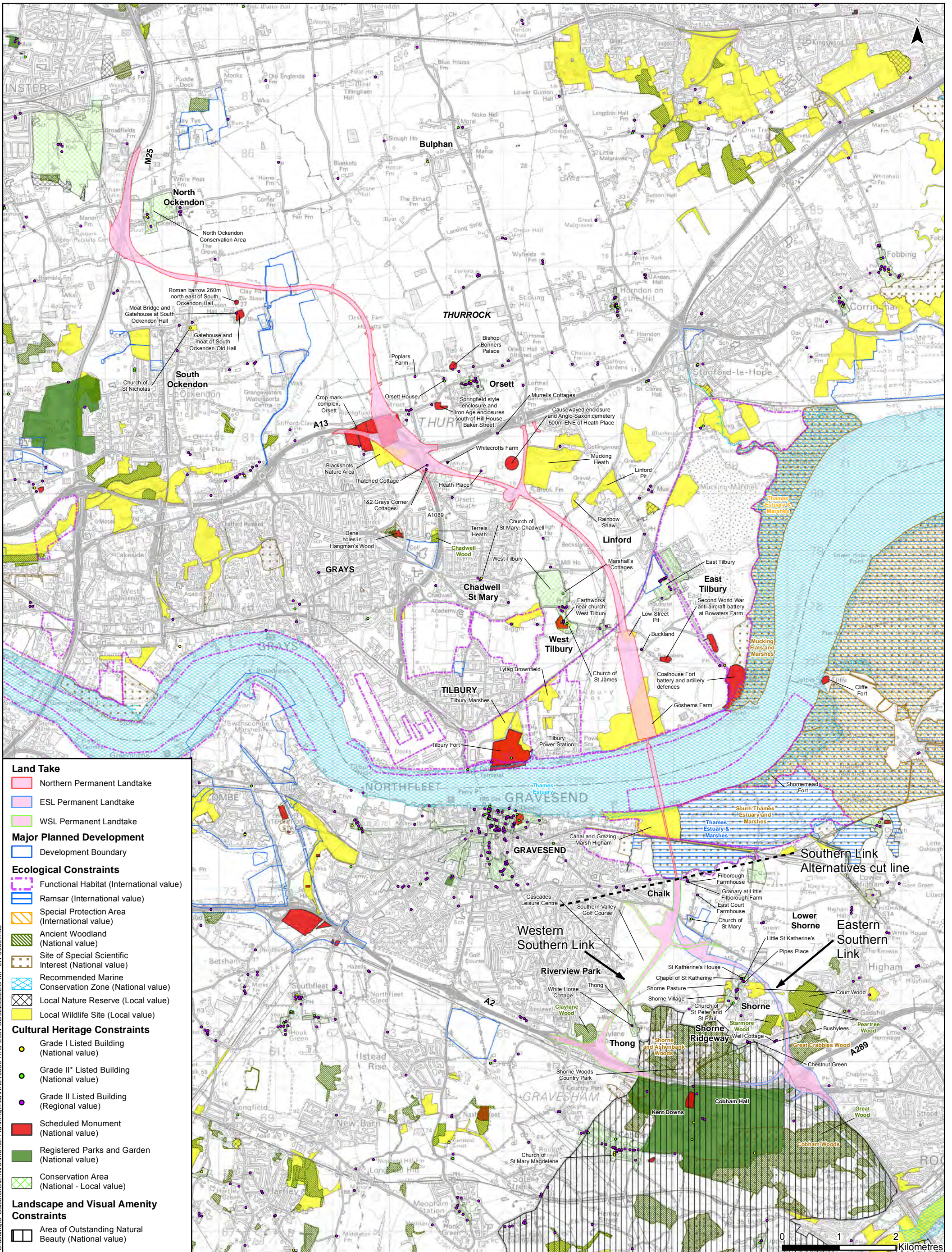
Drawing Title **Route 3 Bored Tunnel Land Take Water Constraints**

Status	S5	Revision	P01
Scale	1:55,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD3ZZZZZEG-MP-EN-0002		

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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Appr'd



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Major Planned Development**
- Development Boundary
- Ecological Constraints**
- Functional Habitat (International value)
 - Ramsar (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

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Halcrow Hyder

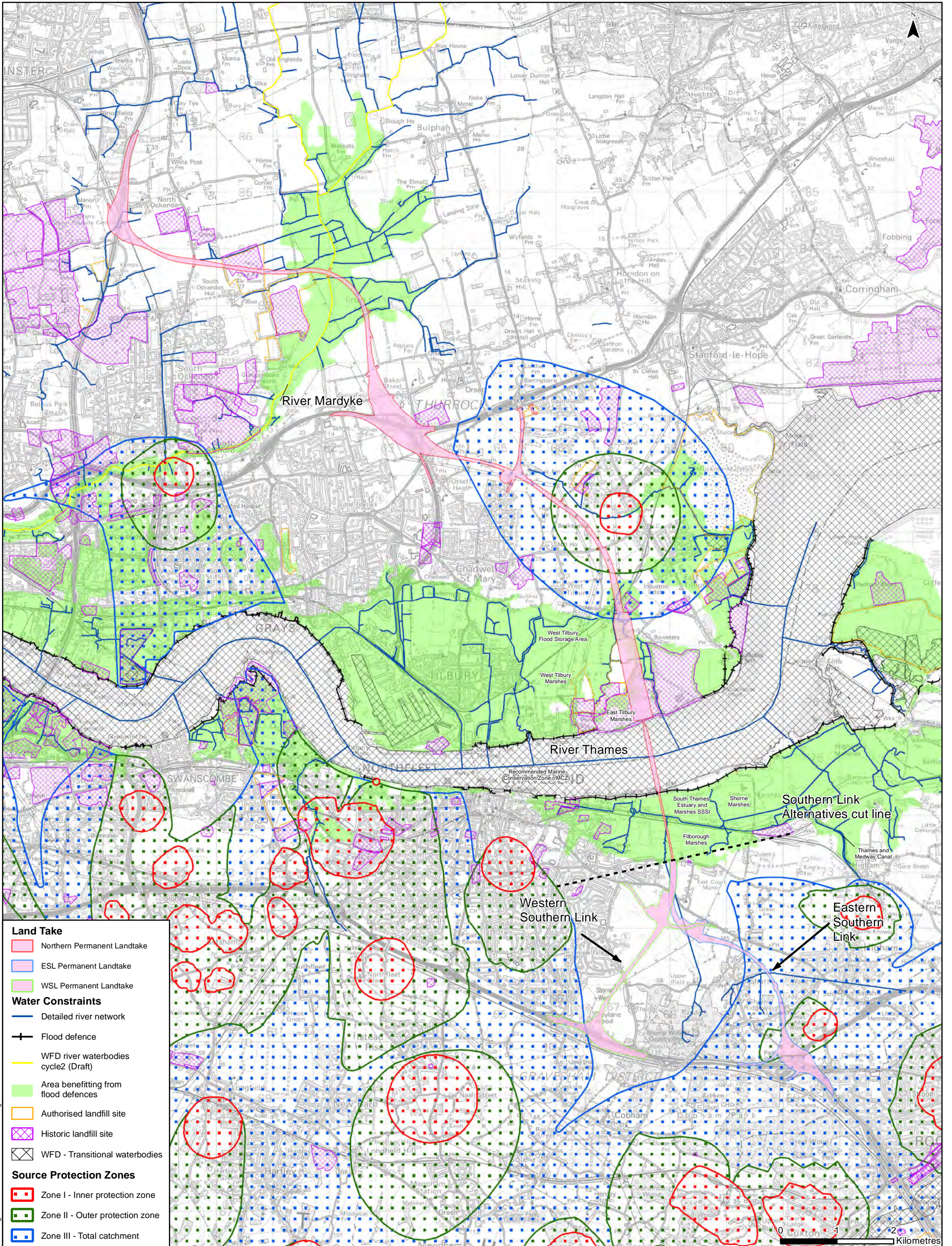
Project **LOWER THAMES CROSSING**

Drawing Title **Route 3 Immersed Tunnel Land Take High Level Constraints**

Status	S5	Revision	P01
Scale	1:60,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD3ZZZZEG-MP-EN-0003		

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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Area benefitting from flood defences
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment

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Project **LOWER THAMES CROSSING**

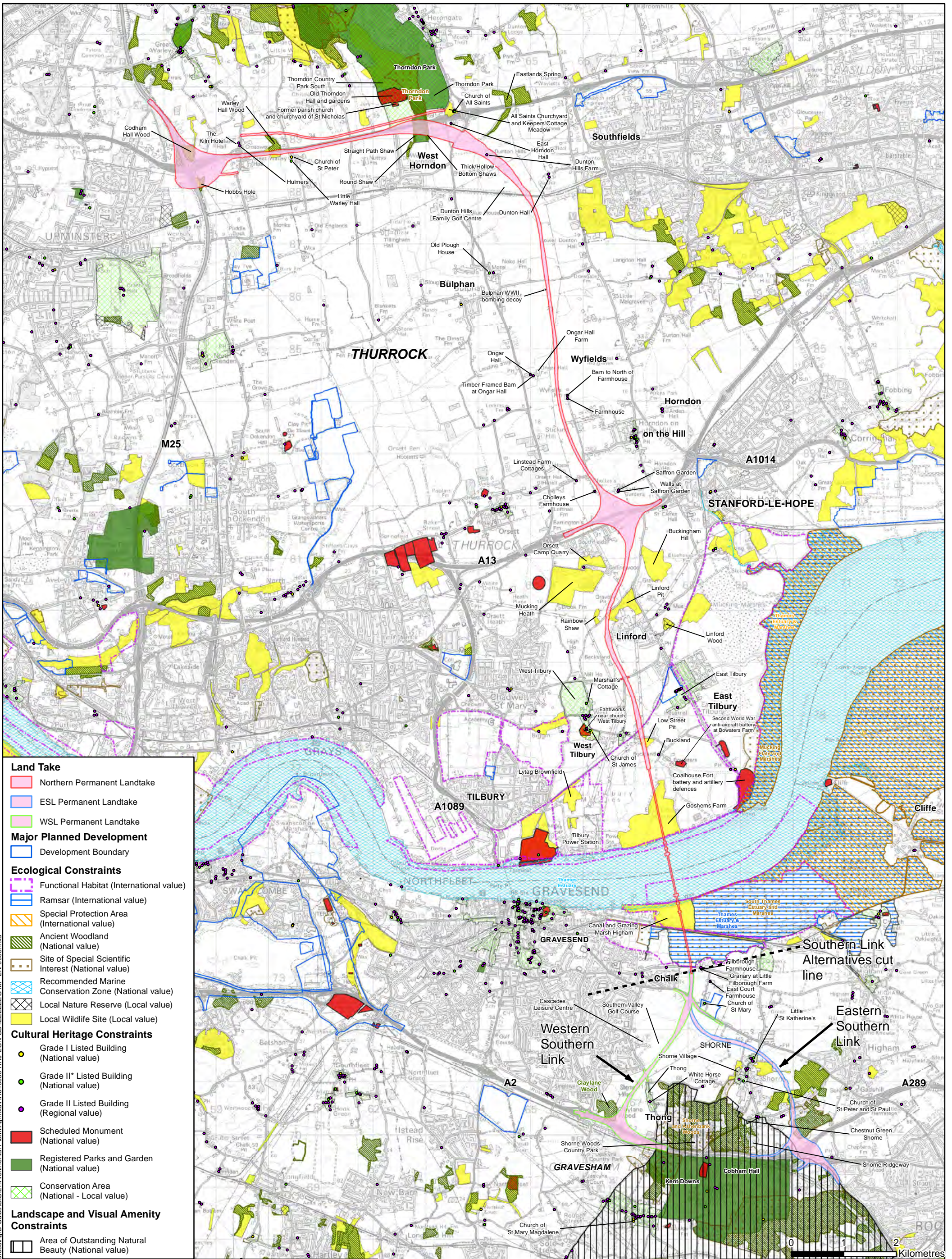
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Status	S5	Revision	P01
Scale	1:60,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD3ZZZZZEG-MP-EN-0004		

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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Appr'd



- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Major Planned Development**
- Development Boundary
- Ecological Constraints**
- Functional Habitat (International value)
 - Ramsar (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

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Client

Project

**LOWER THAMES
 CROSSING**

Drawing Title

**Route 4 Bridge Land Take
 High Level Constraints**

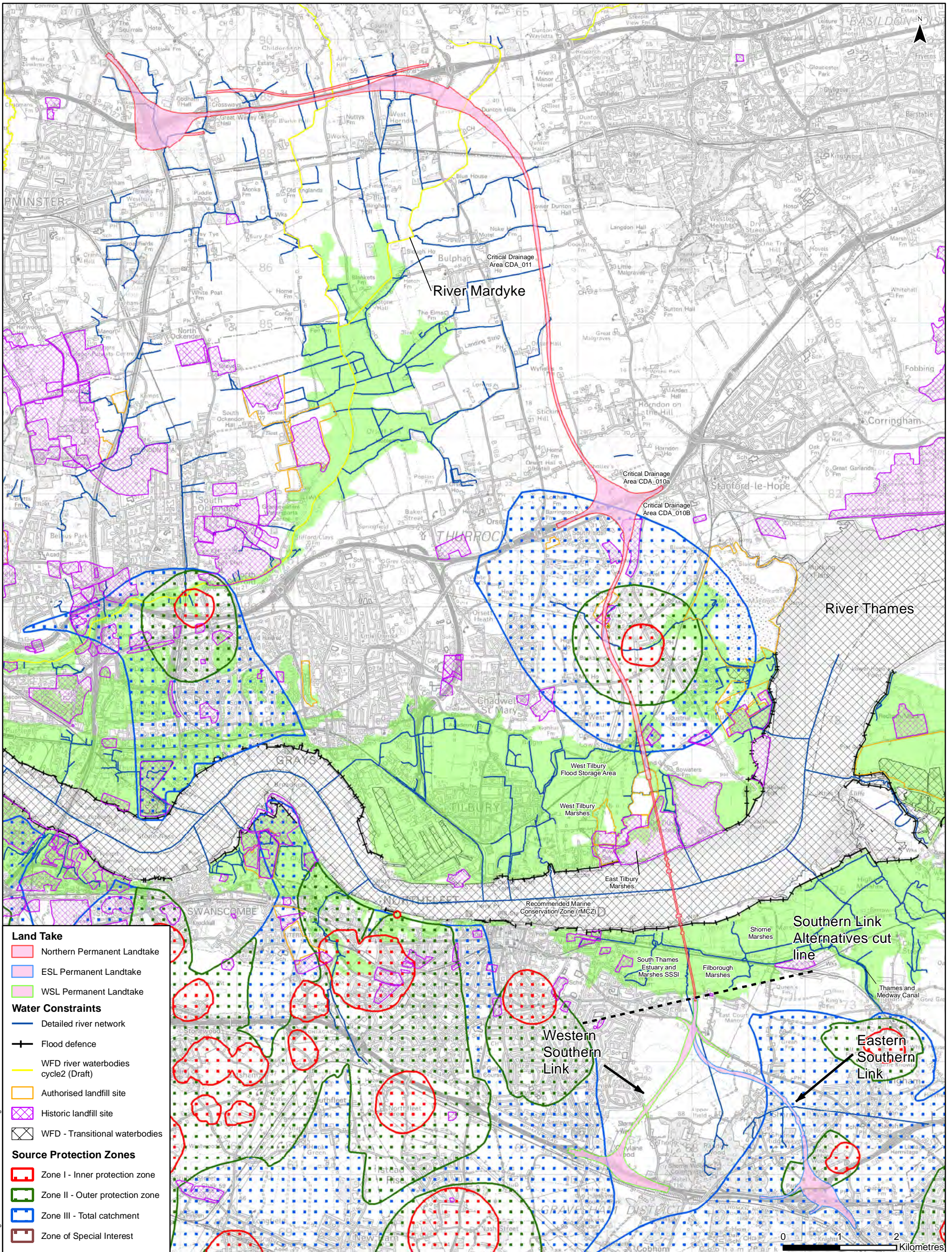
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Status	S5	Revision	P01
Scale	1:65,000	Date	18/01/16
Drawn By	L.HULME		
Checked By	S.RIMELL		
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number			
HHJ-EGN-CD4ZZZZEG-MP-EN-0005			

P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

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- Land Take**
- Northern Permanent Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment
 - Zone of Special Interest

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Project **LOWER THAMES CROSSING**

Drawing Title **Route 4 Bridge Land Take Water Constraints**

Route 4 Bridge Land Take Water Constraints

Status	S5	Revision	P01
Scale	1:60,000	Date	18/01/16

Drawn By	L.HULME
Checked By	S.RIMELL
Approved By	A.SAUNDERS

Project No.	HA	PIN	Originator	Original Size	A3
	HA540039		HHJ		

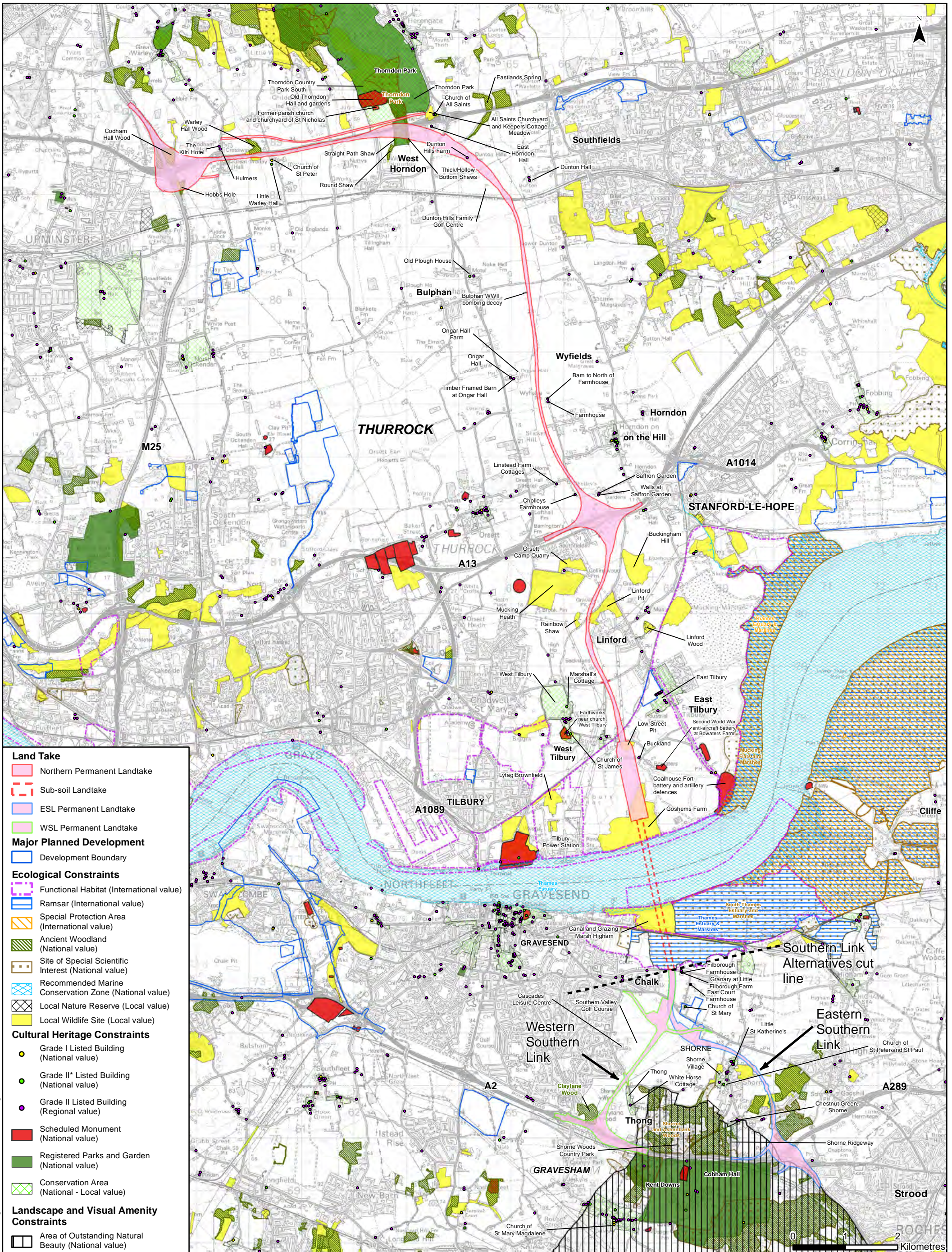
Drawing Number

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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

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- Land Take**
- Northern Permanent Landtake
 - Sub-soil Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Major Planned Development**
- Development Boundary
- Ecological Constraints**
- Functional Habitat (International value)
 - Ramsar (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

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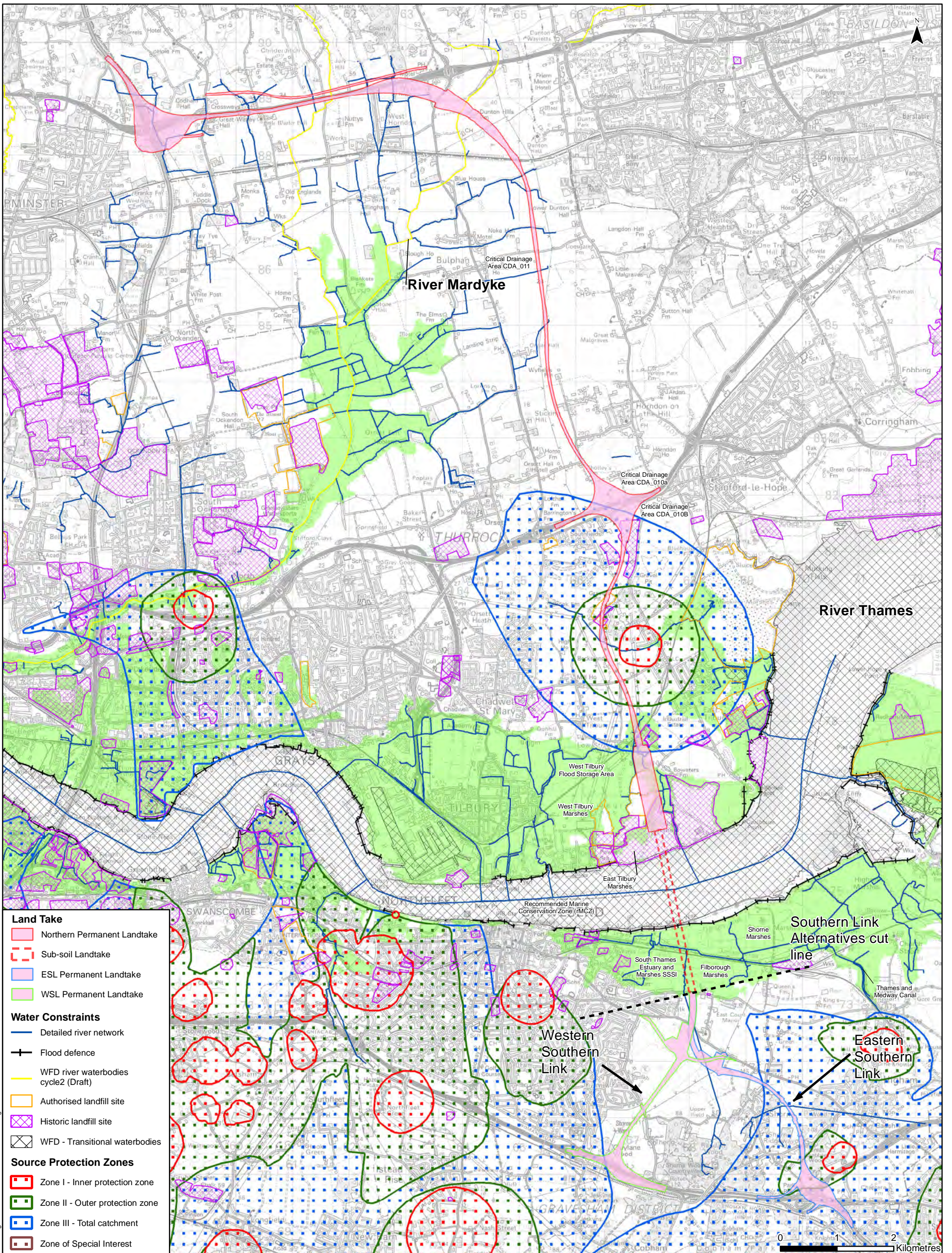
Halcrow Hyder

Project **LOWER THAMES CROSSING**

Drawing Title **Route 4 Bored Tunnel Land Take High Level Constraints**

Status	S5	Revision	P01
Scale	1:65,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD4ZZZZEG-MP-EN-0001		

P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



- Land Take**
- Northern Permanent Landtake
 - Sub-soil Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment
 - Zone of Special Interest

Path: K:\U\Projects\UA007080-Lower Thames Crossing\GIS\Environmental Planning\mxd\HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0002.mxd

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Client

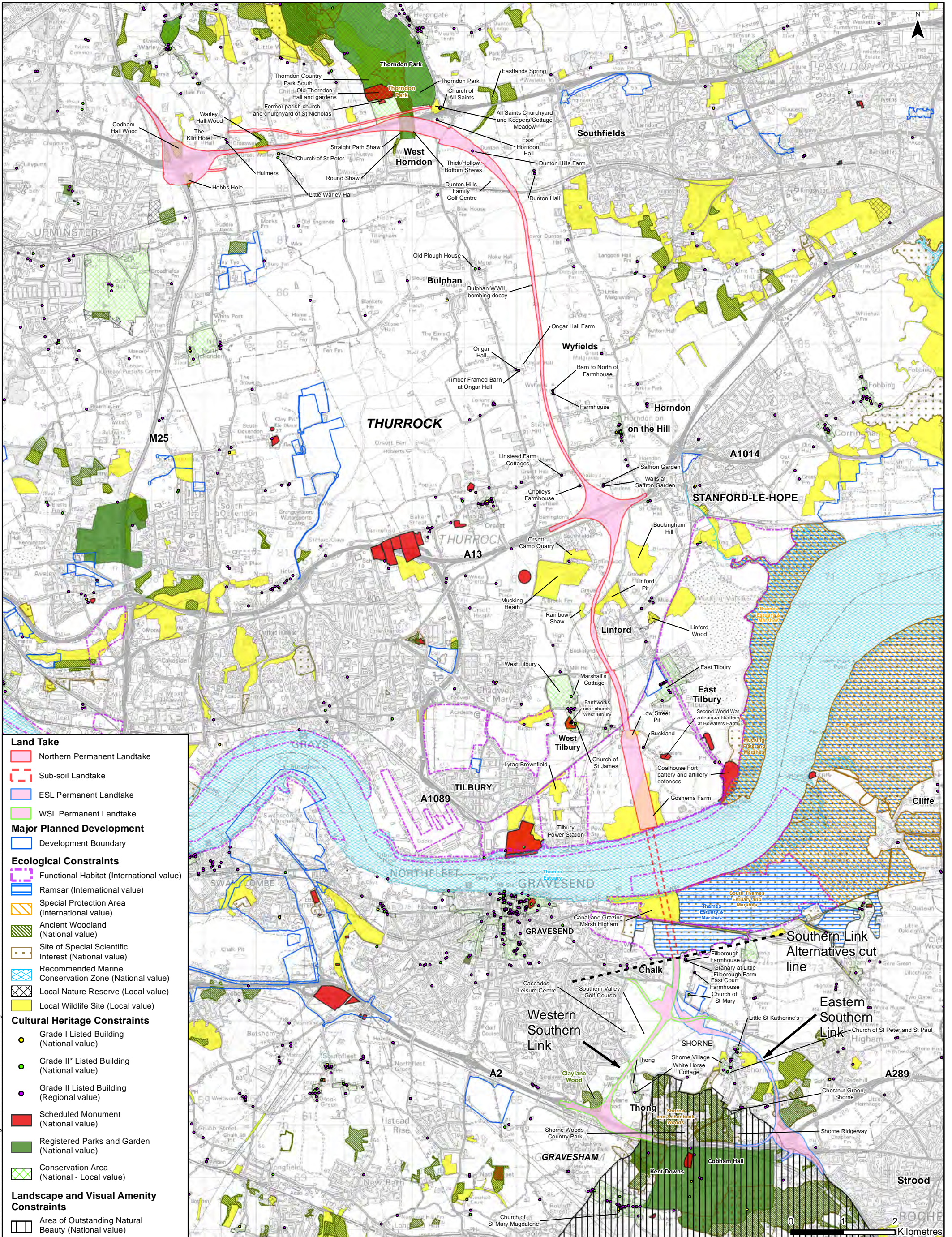
Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479

Project **LOWER THAMES
CROSSING**

Drawing Title **Route 4 Bored Tunnel
Land Take
Water Constraints**

Status	S5	Revision	P01
Scale	1:60,000	Date	18/01/16
Drawn By	L.HULME		
Checked By	S.RIMELL		
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD4ZZZZZEG-MP-EN-0002		

P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



- Land Take**
- Northern Permanent Landtake
 - Sub-soil Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Major Planned Development**
- Development Boundary
- Ecological Constraints**
- Functional Habitat (International value)
 - Ramsar (International value)
 - Special Protection Area (International value)
 - Ancient Woodland (National value)
 - Site of Special Scientific Interest (National value)
 - Recommended Marine Conservation Zone (National value)
 - Local Nature Reserve (Local value)
 - Local Wildlife Site (Local value)
- Cultural Heritage Constraints**
- Grade I Listed Building (National value)
 - Grade II* Listed Building (National value)
 - Grade II Listed Building (Regional value)
 - Scheduled Monument (National value)
 - Registered Parks and Garden (National value)
 - Conservation Area (National - Local value)
- Landscape and Visual Amenity Constraints**
- Area of Outstanding Natural Beauty (National value)

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Project

**LOWER THAMES
 CROSSING**

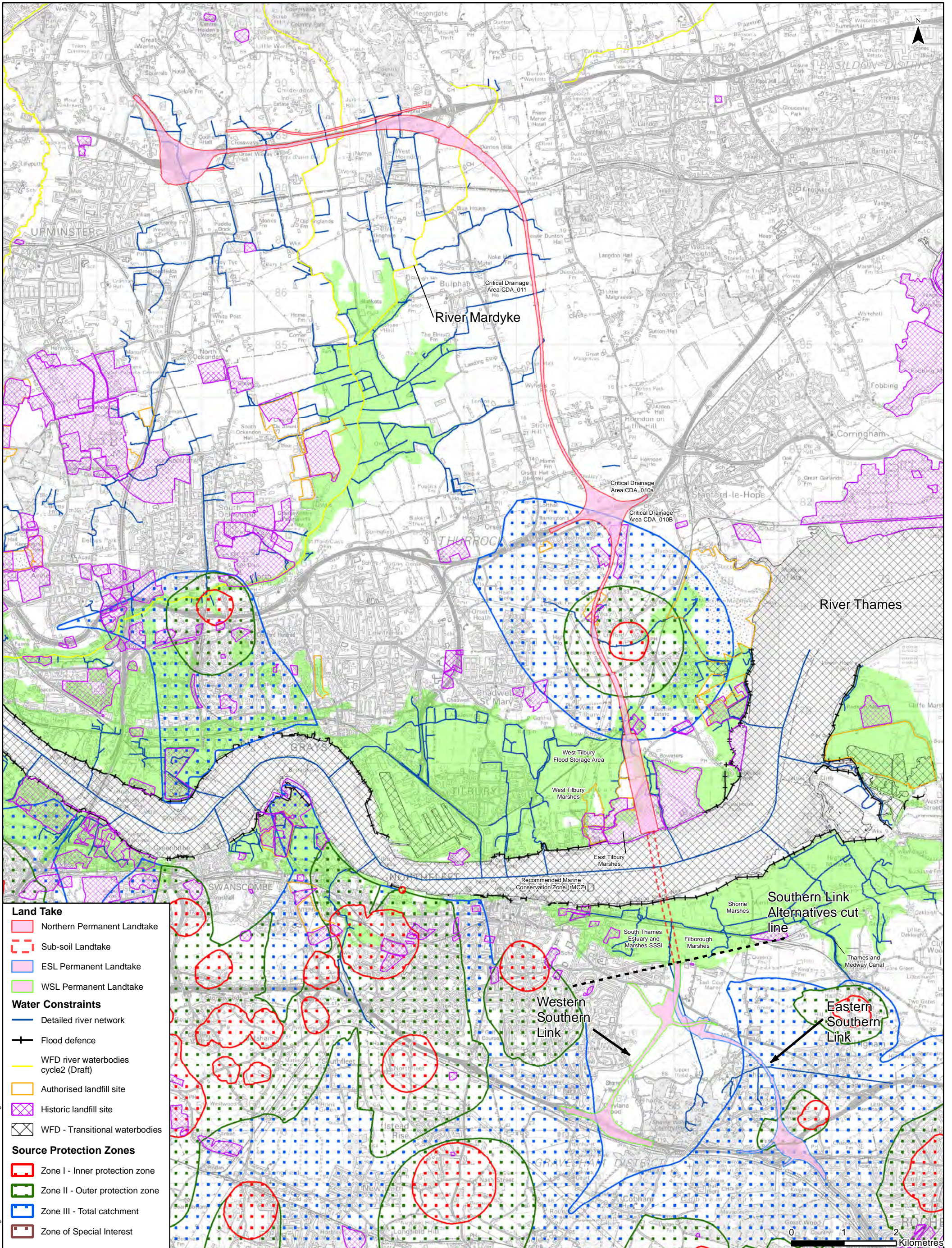
Drawing Title

**Route 4 Immersed Tunnel
 Land Take
 High Level Constraints**

Status	S5	Revision	P01
Scale	1:65,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD4ZZZZZEG-MP-EN-0003		

P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

Path: K:\U\Projects\Lower Thames Crossing\Lower Thames Crossing\GIS\Environmental Planning\mxd\HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0003.mxd



- Land Take**
- Northern Permanent Landtake
 - Sub-soil Landtake
 - ESL Permanent Landtake
 - WSL Permanent Landtake
- Water Constraints**
- Detailed river network
 - Flood defence
 - WFD river waterbodies cycle2 (Draft)
 - Authorised landfill site
 - Historic landfill site
 - WFD - Transitional waterbodies
- Source Protection Zones**
- Zone I - Inner protection zone
 - Zone II - Outer protection zone
 - Zone III - Total catchment
 - Zone of Special Interest

Path: K:\U\Projects\UA007080-Lower Thames Crossing\ID-Calcis\GIS\Environmental Planning\mxd\HA540039-HHJ-EGN-CD4ZZZZZEG-MP-EN-0004.mxd

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Client

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Project **LOWER THAMES CROSSING**

Drawing Title **Route 4 Immersed Tunnel Land Take Water Constraints**

Status	S5	Revision	P01
Scale	1:65,000	Date	18/01/16
Drawn By	L.HULME	Checked By	S.RIMELL
Approved By	A.SAUNDERS		
Project No.	HA PIN	Originator	Original Size
HA540039	HHJ		A3
Drawing Number	HHJ-EGN-CD4ZZZZZEG-MP-EN-0004		

ILLUSTRATIVE DESIGN

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P01	S5	18/01/16	SAR ISSUE	LH	SR	AS
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

Appendix 6.2

Engagement with Environmental Bodies

Engagement with Environmental Bodies

Meeting Date	Purpose of Meeting	Attendees	Key Findings
22/01/2015	<p>Workshop Update on project and options development, share draft approach to environmental appraisal and reporting, seek feedback on key environmental issues and opportunities.</p>	Environment Agency, Natural England, Marine Management Organisation (MMO), Historic England and Kent Downs Area of Outstanding Natural Beauty (AONB).	SEBs provided feedback on approach and data sources for the purposes of the appraisal. Agreed future lines of communication with the SEBs and confirmed key points of contact.
04/03/2015	<p>Bilateral Meeting To share the methodology and updated environmental constraints mapping</p>	Historic England	<p>Provided details about sensitivity of the Scheduled Monuments along the River Thames. Recommended engaging with the county archaeologists (Kent and Essex) to present the scheme details to them and to obtain baseline data. Consult with the Greater London Archaeology Advisory Service. Potential for significant archaeological remains across study area based on crop mark information. This will require thorough assessment and mitigation at the next development phase of the project. Provided information about a number of the designated assets and the linkages between them e.g. East and West Tilbury.</p>
24/04/2015	<p>Bilateral Meeting To provide project update and present scheme options, provide an overview of the appraisal process, review constraints and understand potential option effects</p>	Essex County Council Archaeology	<p>Advised review of the Historic Environment Record and collation of the Historic Environment Characterisation Data. Provided cropmark data during the meeting and highlighted the high potential for there to be non designated archaeological remains that could be affected.</p>
05/05/2015	<p>Bilateral Meeting To provide project update and present scheme options, provide an overview of the appraisal process, review constraints and understand potential option effects</p>	Greater London Archaeology Advisory Service	<p>Advised that information would be provided on potential heritage constraints. Highlighted that archaeological assets were previously identified at a construction compound for the M25 works.</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
07/05/2015	<p>Bilateral Meeting</p> <p>To provide project update and present scheme options, provide an overview of the appraisal process, review constraints and understand potential option effects</p>	Kent Downs AONB	<p>Highlighted the importance of considering the Kent Downs AONB Management Plan.</p> <p>Kent Downs AONB is keen to examine any potential opportunities from LTC to enhance the AONB.</p> <p>Highlighted the need for the costs associated with mitigation to be incorporated into scheme costs and this should inform the decision-making process.</p> <p>Consideration should be given to the impact of Options at A and C on the A2 at Canterbury and on the M20 at Roundhill.</p>
11/05/2015	<p>Bilateral Meeting</p> <p>To provide project update and present scheme options, provide an overview of the appraisal process, review constraints and understand potential option effects</p>	Kent County Council – Archaeology	<p>Kent CC highlighted the sensitivity of the Scheduled Monuments along the River Thames to setting impacts; they are an integral part of the military landscape.</p> <p>Advised review of the Historic Environment Record and collation of the Historic Environment Characterisation Data.</p>
03/06/2015	<p>Bilateral Meeting</p> <p>To provide project update and present scheme options, provide an overview of the appraisal process, review constraints and understand potential option effects</p>	Royal Society for the Protection of Birds	<p>RSPB welcomed the approach and also the completion of an HRA Screening Report for the options.</p> <p>RSPB advised that a GIS layer of their reserves can be presented on the constraints maps.</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
17/06/2015	<p>Workshop</p> <p>To seek feedback on the draft shortlist and the rejected options, to explore and seek feedback on the detailed appraisal of the short list, to provide further details on the crossing types</p>	<p>Environment Agency, Natural England, MMO and Historic England.</p>	<p>Natural England requested a more detailed bilateral meeting to discuss HRA issues further – highlighted concerns and risks associated with an immersed tunnel and bridge options at Location C and the impact on European Sites.</p> <p>EA highlighted the need to consider potential contamination risks when considering the options, for example, locations of casting basins for an immersed tunnel.</p> <p>Contact DP World to discuss the ecological data that they hold as this may inform the next development stage of the project.</p> <p>EA highlighted that a new Thames Barrier is a major future development that could have implications for selection of the proposed solution.</p> <p>EA highlighted works undertaken as part of the TE2100 Plan and issues associated with HRA and habitat creation/compensation. Recommended that a further meeting be held to discuss the likely potential to recreate habitat in the event of it being affected by the Scheme (relating to loss of habitat associated with European Sites).</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
01/07/2015	<p>Bilateral Meeting</p> <p>To seek detailed feedback on elements of the water environment appraisal, to discuss contaminated land constraints and to understand the Environment Agency (EA) future plans with regards to TE2100</p>	Environment Agency	<p>There is a Flood Storage Area located between Tilbury and Chadwell St Mary that could be affected by Route 2. This is potentially a significant issue for this option as there would be a need to create compensatory storage in the event of this area being affected.</p> <p>Groundwater conditions are very complex and constantly changing, the need for early monitoring data to inform the design of the proposed solution should be considered.</p> <p>There are limited opportunities to create compensatory habitat within the L TC area owing to coastal squeeze and managed realignments.</p> <p>Engage with the London Gateway Partnership to discuss compensatory land and how they have approached the issue.</p> <p>Highlighted the need for the scheme to also consider opportunities e.g. road embankments could provide a flood defence function that may support proposals in TE2100, there is potential for enhancement measures at Mardyke.</p> <p>Must consider presence of historic landfills as there may be asbestos present and there are associated high costs associated with disposal.</p> <p>Should a tunnel at location A be progressed it will be important to consider the impacts of any dewatering on Dartford Marshes. Dewatering at location C could have a significant impact on habitats.</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
28/07/2015	<p>Bilateral Meeting</p> <p>To seek feedback on the proposed approach to the HRA of the short list</p>	Natural England	<p>Advised that a Part One Appropriate Assessment Report should be completed as there is a likelihood of significant effects as a result of the options.</p> <p>Approach to the Part One Appropriate Assessment was discussed including the fact that there would be a lot of uncertainty at this stage and that a traffic light system should be considered in the reporting.</p> <p>Highlighted the need for the assessment of a Ramsar site to cover more than just the bird interest.</p> <p>Natural England stated that the wider project team must be made aware of the risks associated with options and the potential effects on European Sites. Project costings also need to consider 'whole life costs' and compensation requirements (securing management of compensatory habitat in perpetuity). Natural England stated that assessment of alternatives is a key consideration and that discounting of an option with a higher cost but with a lesser impact on a European Site would not be a reason to discount an option.</p> <p>Natural England advised that the Part One Appropriate Assessment should consider other schemes and the potential for cumulative effects.</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
<p>28/07/2015</p>	<p>Bilateral Meeting To discuss the approach to identifying mitigation/ compensation land.</p>	<p>Natural England and the Environment Agency</p>	<p>Highlighted that it would be difficult to create fresh water habitat and tidal habitats and that there would be long lead in times associated with this and the time it would take for the habitat to be viewed as functional.</p> <p>For each option where there may be a loss of habitat within a European Site it will be necessary to quantify the area affected (e.g. construction, operation and sterilisation due to other effects) before addressing the issues of availability and re-create ability.</p> <p>EA/NE advised that the scheme should aim to work within the bounds of presumption to compensate ahead of any impact on a Natura 2000 site (or its qualifying species) at a minimum ratio of 1:1. However, the ratio of compensatory habitat to be provided needs to be considered on a case by case basis. The challenge will be identifying a suitable ratio of compensatory habitat related to the time taken before the compensatory habitat becomes 'functional' and the stability of that habitat once it has become established (i.e. loss of intertidal habitat over time as saltmarsh develops). There is also a risk that compensatory habitat does not work, i.e. freshwater habitat creation much more difficult to achieve than intertidal habitats.</p> <p>There are no 'fixed' timescales for assessing when the condition of the compensatory habitat would be of comparable (or higher) value to that of the habitat which has been lost. Instead, it would be compared to the wider Natura 2000 network of adjacent habitats. Ultimately, the requirement would be for the compensatory habitat to form part of the surrounding Natura 2000 network of sites.</p> <p>All meeting attendees highlighted that the HRA process cannot be 'short-cut' and that each stage must be followed and that consideration of the least damaging alternative will be essential.</p> <p>Some potential areas for compensatory habitat were discussed within the LTC area.</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
14/08/2015	<p>Bilateral Meeting</p> <p>To provide an update on the proposed HRA methodology</p>	RSPB	<p>RSPB advised the inclusion of Holehaven Creek pSPA and SSSI within the HRA.</p> <p>Advised that hydrology impacts on wetland habitats should be considered.</p> <p>RSPB will provide information received from Rainham Marshes regarding bird movements and effects from the existing Dartford Crossing.</p> <p>Recommended looking at Kent Wildlife Trust's biodiversity area mapping which identified existing ecological networks.</p>
24/09/2015	<p>Bilateral Meeting</p> <p>To provide an update on the environmental appraisal and crossings and to discuss opportunities and risks.</p>	Environment Agency	<p>Advised that the Water Framework Directive (WFD) assessment guidance may be available in January 2016 and it would be advisable to use the new guidance at the next development phase of the project.</p> <p>The Tilbury Flood Storage Area and the potential constraints for Route 2 was highlighted. A route through the Flood Storage Area is feasible so long as mitigation is put in place but cautioned it may be difficult to find a feasible option because of lack of capacity.</p> <p>Mardyke is an important area for water vole population.</p> <p>Opportunities for ecological enhancement should be considered.</p> <p>WFD salt marsh survey is likely to be undertaken in 2016 and the results of this survey may be useful for the next development stage of the project.</p>
5/10/2015	<p>Bilateral Meeting</p> <p>To discuss the draft Part 1 Appropriate Assessment</p>	Natural England	<p>Natural England highlighted the importance of the ditch network in the Ramsar site and its sensitive hydrology.</p> <p>Natural England reiterated the points raised in previous meetings about HRA and the need for the results of this to inform the selection of the proposed solution.</p>

Meeting Date	Purpose of Meeting	Attendees	Key Findings
30/11/2015	<p>Bilateral Meeting To provide a project update and initial results of the appraisal</p>	Natural England, MMO and Historic England.	<p>Further meeting during the consultation would be beneficial with the SEBs to enable discussion of the appraisal results.</p> <p>Natural England raised concern about the loss of wildlife sites and severance of ancient woodland for the ESL although they are pleased regarding the selection of a bored tunnel.</p> <p>Natural England stated that mitigation such as a green bridge for the ESL is potentially something that Highways England could consider.</p> <p>Historic England stated that whilst there may be some heritage concerns it will be easier for them to understand the impacts once more detail of the road alignment is made available and in particular how close the road will be to heritage assets. It was acknowledged that there is a greater concentration of heritage assets around the ESL compared to the WSL.</p>
30/11/2015	<p>Bilateral Meeting To provide a project update</p>	Kent Downs AONB	<p>The AONB requested the opportunity to be involved in the methodology for a future Landscape and Visual Impact Assessment for the proposed solution.</p> <p>The AONB welcomed the discounting of certain options that would have had a greater impact on the AONB.</p>

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Report No HA540039-HHJ-ZZZ-REP-ZZZ-010

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The Pre-Consultation Scheme Assessment Report details the assessment of options leading up to consultation. A final Scheme Assessment Report will be published post consultation.