

# **Title: East London**

**LPN Regional Development Plan** 

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### **East London**

All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

# **Document History**

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#### **East London**



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# **1 Executive Summary**

This Development Plan reviews the East London EHV network supplied from Barking 'C' and Barking West grid supply points (GSP's) and West Ham 66kV substation which supply 7 primary substations and one Network Rail single phase supply point within the London Boroughs of Newham, Barking and Dagenham.

With the exception of the Barking 'C' to Brunswick Wharf 132kV interconnection, the network is radial with an estimated 2015 peak winter demand of 460MW which is forecast to increase to 570MW by 2023.

A significant project is the asset replacement of a 2.5km section of gas pressure cable in the Barking to Brunswick Wharf interconnection. The circuit was commissioned in 1950 with replacement sections installed during diversions associated with A13 road improvements. Despite a number of repair attempts the No2 circuit is currently out of service due to a fault beneath the Docklands Light Railway resulting in the transfer of Simpsons Road and Nutmeg Lane to West Ham. Replacing the cable will allow the normal running arrangement to be resumed thereby deferring the need for reinforcement at West Ham and reinstating GSP diversity to the Canary Wharf and Isle of Dogs business districts.

### Proposed Projects >£1M

•	Barking 'C' - Brunswick Wharf 132kV gas cable replacement	£15.2M
•	Barking 'C' Substation 132kV circuit breaker replacement	£7M
•	Glaucus Street 11kV switchboard replacement	£1.5M

# Cost Profiles (£k)

Cat.	Reference	Description	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
A&H		Total Asset Replacement	0	1,995	9,201	9,071	2,369	464	0	0	393	1,062
R		Total Reinforcement	0	0	0	0	0	439	510	194	3,955	5,403
		Grand Total	0	1,995	9,201	9,071	2,369	903	510	194	4,349	6,466

### **Output Measures – Load Index**

The chart below illustrates the LI profile of the grid and primary substations covered in this RDP.



#### **East London**

UK Power Networks

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### **Output Measures – Health Index**

The forecast health indices for 2015 and 2023, with and without intervention, for each plant category are detailed below:











### **Principle Risks and Dependencies**

High levels of street service congestion may adversely impact on cable installation for replacement of the Barking-Brunswick gas circuits.

The delivery programme for the replacement of Barking 'C' feeder circuit breakers is dependent on National Grid (site owners), land purchase and obtaining Planning Permission.

### **East London**



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# **2** Network configuration

### 2.1 Existing Network

This Development Plan reviews the East London LPN EHV network supplied from Barking 'C' 132kV, Barking West 33kV grid supply points (GSP's) and West Ham 66kV substation.

Geographic and single line network diagrams (SLD's) are attached in Appendices A & B.

### Barking C 132kV:

Barking 'C' is a shared LPN and EPN substation supplied by 2x 240MVA and 2x 180MVA 275/132kV super grid transformers connected to a 30 panel, 3 section switchboard equipped with Reyrolle OB14 800amp feeder panels. Within LPN, the substation supplies 1 primary, 1 grid (132/66kV) substation and 1 Network Rail single phase supply point.

A double circuit cable provides interconnection to West Ham GSP via Brunswick Wharf. Under normal running arrangements the Barking circuits are selected to a dedicated section of the Brunswick Wharf busbar to supply Simpsons Road (part) substation which is a principle feed to Canary Wharf business district.

The aggregated LPN winter peak group demand is 145MW which is forecast to increase to 195MW by 2022.

### **Barking West 33kV Substation**

Barking West is a shared LPN and EPN substation supplied by 5x 100MVA 275/33kV SGT's connected to a 54 panel, 4 section switch board. The substation supplies 4 LPN primary substations. SSE occupies 4 switch bays to supply their two inset networks at Dagenham Docks and Thamesmere.

The aggregated LPN winter peak group demand is 195MW which is forecast to increase to 230MW (including Whiston Road).

A schedule of LPN substations is given in Table 1.

### Table 1. Barking 'C' & Barking West Primary Substations

Substation	Voltage	Transfo	ormers
	kV	No	Rating MVA
Barking 'C'	275/132	4	180 / 240
Barking BR	132/25	2	15
Barking Grid	132/66	4	30
Nelson Street	66/11	4	15
Simpsons Road	132/11	3	60
Barking West	275/33	5	15
Axe Street	33/11	4	15
Barkng West 11kV	33/11	3	12 / 24
Sewell Road	33/11	4	15
Whiston Road	33/11	4	15

#### **East London**



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### West Ham 66kV Site Overview

West Ham 66kV is located within the Bidder Street site complex adjacent to the 132kV switch house. It is supplied by 2x 90MVA 132/66kV transformers connected to a 6 panel switch board equipped with dead tank AIS circuit breakers. The substation supplies 2 primary substations and the SSE Mayer inset network.

### Table 2. West Ham 66kV Primary Substations

Substation	Voltage	Transfo	ormers
	kV	No	Rating MVA
West Ham 66kV	132/66	2	90
Glaucus Street	66/11	3	15
Silvertown	66/11	4	15
Meyer (S&S)	66/11	2	20





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### 2.2 G59 Connected Generation

East London includes 187MW of commissioned distributed generation of which 33MW is CHP with the remainder either diesel or PV, detailed below.

### Table 3. G59 Generation

Customer Name	Site Name	Туре	Mode of Operation	Installed DG (MW)	Volts (kV)	Substation Name
Thames Water	Crossness	Diesel	Long Term	19.2	11	Barking West
Utilities Ltd	Sewage		Parallel			
(Import)	Treatment Works		· _			
Thames Water Utilities Ltd		Diesel	Long Term Parallel	10	11	Barking West
T-Mobile UK Ltd	1-2-1 Ex Perless Folis Site	Diesel	Standby	1.5	11	Nelson Street
Greenwich Millenium Village	Landlords Supply - Maurer Court	CHP	Long Term Parallel	0.06	11	West Ham
London City Airport	Civil Aviation House	Diesel	Short Term Parallel	0.9	11	Silvertown
Ansco Management Ltd	Cylinder 1; 1/5	Diesel	Short Term Parallel	5	11	West Ham Grid
Tate & Lyle Industries Ltd		СНР	Long Term Parallel	28.53	11	Silvertown
Southern Electric Power Distribution Plc.	Royal Docklands Inset Network	CHP	Long Term Parallel	4.5	11	Silvertown
	LUL Greenwich Power Station	Diesel	Long Term Parallel	44.25	11	Stephenson Street 22kV (LUL)
Thames Water Utilities Ltd (Import)	Thames Water (Non Postal) - Abbey Mills Power Station	Diesel	Long Term Parallel	5	11	West Ham Grid
Thames Water Utilities Ltd (Import)	Abbey Mills Pumping Station	Diesel	Long Term Parallel	4.8	11	West Ham Grid
Thames Water Utilities Ltd	Becton Sewage Works	PV	Long Term Parallel	0.456	33	Axe Street
Thames Water Utilities Ltd	Crossness Sewage Treatment Works	PV	Long Term Parallel	0.149	11	Sewell Road
HM Prison Service	Belmarsh Prison	Diesel	Standby	1	11	Sewell Road
London Int Exhib Centre Plc.	Royal Victoria Dock	PV	Long Term Parallel	3.2	11	Silvertown
Riverside Resource Recovery Limited	Riverside Resource Recovery Limited (RRRL)	Waste	Long Term Parallel	90	132	Barking C 132kV

### **East London**



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### **2.3 Network changes in progress**

Four schemes are in progress with a further 3 schemes programmed to commence in DPCR5, summarised below:

Silvertown: Asset replacement of the 11kV switchboard

**Nelson Street:** Reinforcement with 2x 132/11kV transformers. The scope of work involves up rating the existing Barking – East Ham OHL to 132kV with new 132kV cables completing the connection to Nelson Street. This project facilitates removal of 2x 132/66kV transformers at Barking.

West Ham to Brunswick Wharf 132kV circuits: Installation of new 132kV circuits (2x1600sq mm)

Asset replacement of selective sections of the Barking to West Ham and Barking to Brunswick Wharf circuits is programmed to commence in 2014 together with asset replacement of the Barking 'C' 132kV switchgear.

# Table 4. NAMP Table J (less indirect costs) 19th February 2014

Cat.	Reference	Description	2013/14	2014/15	2015/16	2016/17
A	1.07.07.8300	Barking-West Ham 132kV Gas Cable Replacement	16	62	47	0
A	1.50.01.5375	Silvertown 11kV: Switchboard Replacement	1,514	839	5	0
R	1.35.01.3660	Nelson Street: Establish new 132/11kV substation	4,521	5,942	676	0
R	1.37.06.3523	West Ham to Brunswick Wharf 132kV Circuits	3,012	0	0	0



### **East London**

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# **3 Summary of Issues**

# 3.1 Development Areas & Local Development Framework

The East London supply area covers the London Boroughs of Barking and Dagenham and eastern Newham.

### Figure 1. Borough Boundaries



The area is predominantly residential but also encompasses 2 areas of significant development potential (a) exmarsh land bordering the Thames and (b) agricultural land to the north at Marks Gate. Barking is within the Thames Gateway development zone which is one of four priority areas identified by Central Government for development of new residential communities with the Local Development framework predicting a 60,000 population increase by 2020.

Although timescales are not yet known, two areas that may require new connections from Silvertown and/or Nelson Street are:

<u>London Riverside</u> is within the Gateway zone stretching from Dagenham Dock to Havering and will accommodate a large proportion of the borough's new housing estimated at 10,800 homes including 3 schools and riverside access

<u>South Dagenham</u> development site covers 198 acres and has also been identified as a key regeneration area for a mixed urban community.





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### 3.2 Asset Replacement

The existing and forecast health indices 2015 - 2023 <u>without</u> intervention are detailed below:

# Table 5. HV Circuit Breakers (11kV)

			2015					2023		
Substation	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5
BARKING WEST 11KV		16					16			
GLAUCUS ST			20						3	17
NELSON ST 11KV		26	1				1	25	1	
SEWELL RD		22	4				6	20		
SEWELL RD B 11KV	21					21				
SILVERTOWN	1	19	10				1	21	8	
WHISTON RD	2	26				1	1	26		

### Table 6. EHV Circuit Breakers (33kV)

		2015					2023				
Substation	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5	
BARKING WEST 33KV		20					11	9			
BECKTON SEWAGE WORKS 33KV	4						4				

## Table 7. 66kV and 132kV Circuit Breakers

			2015					2023		
Substation	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5
BARKING C 132KV	1		11				1		9	2
NORMAN RD 132KV	1					1				
WEST HAM TS 66KV	7						7			

### Table 8. Primary Transformers

		2015						2023		
Substation	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5
AXE ST		4					2	2		
BARKING WEST 11KV		3					3			
GLAUCUS ST		2	1					3		
NELSON ST 11KV		3						3		
SEWELL RD		2						2		
SEWELL RD B 11KV		2						2		
SILVERTOWN		4						4		
WHISTON RD		4					1	3		

# Table 9. Grid Transformers

			2015					2023		
Substation	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5	No. HI1	No. HI2	No. HI3	No. HI4	No. HI5
BARKING GRID 132KV		2	1					3		
WEST HAM TS 66KV		2					2			

#### **East London**



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## **3.3 Security of supply analysis**

# Table 10. P2/6 Assessment Table

Sub-station	Secondary Voltage ▼	Firm Capacity (MW)	Transfer (MW)	P. F.	Winter 12/13 Summer 2012 (MW)	Winter 13/14 Summer 2013 (MW)	Winter 14/15 Summer 2014 (MW)	Winter 15/16 Summer 2015 (MW)	Winter 16/17 Summer 2016 (MW)	Winter 17/18 Summer 2017 (MW)	Winter 18/19 Summer 2018 (MW)	Winter 19/20 Summer 2019 (MW)	Winter 20/21 Summer 2020 (M W)	Winter 21/22 Summer 2021 (MW)	Winter 22/23 Summer 2022 (M W)
Barking BR	25kV	15.00		0.94	11.89	11.89	11.89	11.89	11.89	11.89	11.89	11.89	11.89	11.89	11.89
Barking BR	25kV	15.00		0.92	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50
Barking C 132kV	132kV	698.40		0.97	114.56	115.07	115.95	116.89	117.66	118.54	119.44	120.36	121.30	122.53	123.79
Barking C 132kV	132kV	610.56		0.96	72.30	72.60	73.10	73.65	74.20	74.84	75.49	76.15	76.83	77.72	78.63
Nelson Street	11kV	35.50	13.68	0.97	38.87	39.14	39.60	40.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nelson Street	11kV	29.10	9.54	0.97	25.07	25.24	25.53	25.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nelson Street (132/11)	11kV	82.37		0.96	0.00	0.00	0.00	0.00	40.53	4100	41.49	41.98	42.49	43.16	43.85
Nelson Street (132/11)	11kV	63.36		0.96	0.00	0.00	0.00	0.00	26.27	26.74	27.23	27.72	28.23	28.90	29.59
Simpsons Road Total	11kV	151.00		0.96	101.63	102.05	102.76	103.52	104.13	104.83	105.55	106.29	87.32	88.29	89.28
Simpsons Road Total	11kV	126.30		0.94	86.54	86.89	87.48	88.10	88.61	89.18	89.78	90.39	78.91	79.71	80.53
Axe Street	11kV	57.33	16.56	0.98	33.68	34.04	34.61	35.21	35.71	36.27	36.85	37.43	38.03	38.77	39.53
Axe Street	11kV	42.30		0.94	23.66	23.90	24.29	24.70	25.04	25.42	25.81	26.21	26.62	27.12	27.63
Barking West	11kV	45.40		0.97	10.09	10.49	11.07	11.67	12.17	12.72	13.29	13.87	14.46	15.15	15.84
Barking West	11kV	34.56		0.96	8.26	8.60	9.11	9.62	10.05	10.53	11.02	11.52	12.03	12.62	13.22
Barking West 33kV	33kV	282.00		0.94	158.30	169.62	174.77	177.00	178.84	132.15	133.71	135.30	136.92	138.98	141.08
Barking West 33kV	33kV	282.00		0.94	127.23	139.66	144.15	145.73	147.04	115.44	116.58	117.75	118.93	120.42	121.95
Sew ell Road	11kV	57.13	27.20	0.98	51.04	5129	5176	52.29	52.73	37.23	37.74	38.26	38.78	39.54	40.32
Sew ell Road	11kV	42.30	39.66	0.94	35.97	36.14	36.46	36.82	37.12	26.64	26.98	27.33	27.69	28.20	28.72
Whiston Road	11kV	46.09	11.14	0.96	45.05	45.57	46.39	47.24	47.93	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60
Whiston Road	11kV	42.30		0.94	32.28	32.63	33.18	33.76	34.22	0.00	0.00	0.00	0.00	0.00	0.00
Glaucus Street	11kV	37.40	22.58	0.96	29.51	29.80	30.28	30.79	31.21	3168	32.17	32.68	19.20	19.86	20.52
Glaucus Street	11kV	34.50		0.92	22.11	22.32	22.67	23.04	23.34	23.68	24.04	24.40	14.63	15.11	15.60
Mayer	11kV	19.60		0.96	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18
Mayer	11kV	19.60		0.92	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Silvertown	11kV	57.92	16.00	0.99	32.64	35.04	41.56	41.96	42.18	45.54	45.78	46.03	46.29	57.77	63.37
Silvertown	11kV	43.65	20.00	0.97	24.29	25.99	30.60	30.88	31.03	33.40	33.58	33.76	33.94	42.05	46.00
West Ham 66kV	66kV	112.32		0.96	61.56	63.83	69.75	70.52	71.05	74.29	74.91	75.55	62.21	72.46	77.76
West Ham 66kV	66kV	82.80		0.92	44.91	46.51	50.66	51.21	51.59	53.87	54.31	54.77	45.09	52.29	56.02

# Table 11. Load Index Forecast (without investment)

	East Lond	on	
Substation	Voltage	Load	Index
Substation	kV	2015	2023
Barking C			
Nelson Street	66/11	5	5
Nelson Street	132/66/11	new sul	ostation
Simpsons Road	132/11	1	1

#### **Barking West**

Axe Street	33/11	1	1
Barking West	33/11	1	1
Sewell Road	33/11	2	2
Whiston Road	33/11	4	5

### West Ham 66kV

Glaucus Street	66/11	2	2
Silvertown	66/11	1	5
West Ham 66kV	132/66	1	2

There is intervention planned for Whiston Road covered in the North London RDP.

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### **3.4 Operational and Technical Constraints**

No issues have been identified.

### 3.5 National Grid

As site owners, National Grid are proposing to asset replace the entire Barking 'C' 132kV substation which is capacity constrained by equipment ratings and has structural defects with the reinforced concrete building. The exact location and programme for the new site is dependent on negotiations with adjacent landowners who are developing the ex-Power Station site. This project will impact on LPN and EPN feeder circuit bays which, due to the integral nature of the site, are required to be replaced concurrently.

There are ongoing asset replacement programmes for SGT's at both sites which will be planned under the normal 'Modification Notice' process.

#### **East London**



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# 4 **Recommended strategy**

The network strategy for East London is designed to ensure:

- Continued adherence to the security of supply criteria defined in Engineering Recommendation P2/6
- Maintaining reliable network operation by asset replacement, or refurbishment, of selected equipment identified through asset condition monitoring (HI) techniques

With the exception of the 132kV double circuit interconnection between Barking and Brunswick Wharf adopting this framework results in no major network reconfigurations.

The proposals are summarised below:

### 4.1 Asset Replacement

### 4.1.1 Switchgear

The health index (HI) analysis predicts two sites with an HI5 categorisation by 2024:

### 2545 - Barking 'C' 132kV

As owners, National Grid is proposing to replace Barking 'C' with a new AIS substation (3.5 refers). NAMP provision has been made for the replacement of the 8 LPN feeder circuit breakers. Subject to agreement with Network Rail the opportunity exists to double bank their Barking 132/25kV feeders with 2 of the Nelson Street circuits thereby reducing the total number of circuit breakers.

To cater for future reinforcement and/or customer connections double banking boxes are to be fitted on the remaining 2 Nelson Street circuit breakers and space reserved for an additional 4 bays.

### 7788 - Glaucus Street 11kV

Provision has been made for the replacement of the 11kV switchboard. There is space within the existing switch room to facilitate a phased replacement. Alternatively, the site footprint is sufficient to accommodate an 'off-line' build if this is assessed to be the more economic solution.

### 4.1.2 Transformers

There are no transformer replacements or refurbishments planned during the review period.

### 4.1.3 Cables

It is proposed to undertake replacement of selective sections of the Barking-Axe Street No1 33kV FFC cable and the Barking–Brunswick double circuit 132kV gas cables during ED1.

### 4.2 Reinforcement

#### 8676 - Barking West 33kV: Uprate 33kV Circuit Breakers

The predicted fault level at Barking West Substation will exceed the rating of the existing switchgear due to increasing generation connections at EHV and HV. Thirty circuit breakers are Oil insulated REY L42T. The fault rating of the oil circuit breakers (circa 1969) is 17.5kA. It is not possible to lower the fault level without compromising operational and planning requirements. It is therefore proposed to uprate the existing 30 circuit breakers.

### 2638 - Silvertown 66/11kV ITC (add 2x33.3MVA)

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Due to forecast increasing demand levels, it is proposed to add two 33.3MVA transformers fed via two new circuits from West Ham 66kV to be commissioned in ED2.

### 4387 - Glaucus St and Simpsons Rd Permanent 11kV transfers to Wellclose Square

This scheme is to reconfigure the City-East London 11kV network to optimise network utilisation and create headroom at heavily loaded adjacent substations following commissioning of the new Wellclose Square 132/11kV substation (covered in the New Cross RDP). Permanent 11kV transfers of the Glaucus St NW Group and the Simpsons Rd W and part NW Groups to Wellclose Square 132/11kV.

# 6327 - West Ham 132kV GSP - 5th SGT (240MVA) (N-2)

The expected demand at West Ham 132kV GSP is forecast to exceed the N-2 capacity of 508MVA in 2017, with P2/6 compliance maintained by the interconnection to Barking C 132kV and load being transferred to the new Islington GSP. By 2022, the demand growth will have outstripped the capacity of the interconnection and load transfer. It is then proposed to apply to National Grid to install a fifth 240MVA 400/132kV super grid transformer at this site.

### 4.3 Barking 'C' to Brunswick Wharf 132kV Interconnection

The 9.3km Barking 'C' to Brunswick Wharf 132kV interconnection is a composite gas pressure and XLPE cable double circuit illustrated in Figures 2 & 3 below.

### Figure 2. Cable Route - Geographical



The connection was originally commissioned in 1950 with Glover 0.75 sq in copper conductor gas pressure cable. At Brunswick Wharf, a 1.3km section was replaced in 1985 linked to the construction of the Lower Lea crossing elevated road where the cable is installed in the void beneath the road surface. A further 1.6km was replaced with 630 sq mm XLPE aluminium cable during diversions required by the Department for Transport for the A13 improvement scheme.

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All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

Despite a number of repair attempts, the No2 circuit has been out of service since 2008 due to a fault on the gas section beneath the Docklands Light Railway (DLR) and this has resulted in Nutmeg Lane and Simpsons Road (part) reconfigured from Barking to West Ham GSP.

### Figure 3. Network Schematic



There are a number of factors supporting asset replacement of the 1950's gas cables;

- It will allow an 80MW reduction of demand at West Ham GSP by reconfiguring Nutmeg Lane and Simpsons Road (GT2) to Barking with consequent deferral of reinforcement at West Ham GSP
- It will provide diversity of supplies to the Canary Wharf business district
- Access to the cable is restricted due to the need for DLR railway possession should further faults develop

It is therefore proposed to asset replace the 2.5km 1950 gas section of the No1 & 2 cables between the Newham Way and Victoria Dock Road.

To improve the reliability of the complete route it is also proposed to remove from service the remaining section of vintage gas cable between Barking 'C' and East Ham. This can be achieved by installing a new 150m length of XLPE cable between the A13 and East Ham overhead line terminal tower, re-commissioning the East Ham tee point and connecting the cable to the OHL which is currently being up rated from 66kV to 132kV for the Nelson Street reinforcement scheme, Figure 4 refers. The exact timing of this second phase of work will be dependent on results of ongoing condition surveys.

The stage by stage schematics are included below:

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All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

# Figure 4. Existing



132kV double circuit cable connection Barking 'C' - Brunswick Wharf

# Figure 5. Nelson Street Reinforcement



132kV double circuit cable connection Barking 'C' - Brunswick Wharf

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All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

# Figure 6. 132kV Gas Cable East Ham - Barking Decommissioned





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# 4.4 **Proposed interventions**

### Table 12. Proposed Interventions

Substation	Driver	Commissioning Year	Scope of works	New Firm capacity
Glaucus St 11kV	Asset Replacement	2024	Replace 11kV switch board	n/a
Barking 'C' 132kV	Asset Replacement	2018	Replace 132kV circuit breakers (linked to EPN and National Grid)	n/a
Barking-Brunswick Wharf 132kV Cable	Asset Replacement	2017	Replace 2.5km double circuit Glover gas pressure cable.	n/a
Barking-Axe Street No1 33kV	Asset Replacement	2017	FFC cable replacement	n/a
Silvertown Primary	Reinforcement	2024	Increase transformer capacity	121.3MVA
Barking West	Reinforcement	2021	Uprate 33kV circuit breakers	

# 4.5 Costs and phasing

# Table 13. NAMP Table J (less indirect costs) 19<sup>th</sup> February 2014

Cat.	Reference	Description	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
A	1.02.03.7938	LL - Barking/East Ham Tee Tower Line - Conductor Replacement	0	0	0	0	196	464	0	0	0	0
A	1.07.07.8400	Barking-Brunswick Wharf 132kV Gas Cable Replacement	0	1,908	7,631	5,723	0	0	0	0	0	0
A	1.48.06.2545	Barking 132kV GSP - 132kV Switchgear Replacement LPN (NG*)	0	88	1,489	3,257	2,173	0	0	0	0	0
A	1.50.01.7788	Glaucus St - Replace 11kV Switchgear	0	0	0	0	0	0	0	0	393	1,062
н	1.29.01.7946	Barking West 33kV-Axe St (Circuit 1-A) - 33kV FFC Replacement	0	0	81	91	0	0	0	0	0	0
R	1.33.01.2638	Silvertown 66/11kV - ITC (add 2x33.3MVA)	0	0	0	0	0	0	0	0	965	4,052
R	1.34.02.4387	Glaucus St and Simpsons Rd Permanent 11kV Transfers to Wellclose Sq	0	0	0	0	0	439	510	0	0	0
R	1.36.01.6327	West Ham 132kV GSP - 5th SGT (240MVA) (N-2)	0	0	0	0	0	0	0	194	2,991	1,352

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All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

### 4.6 LI profile Post Interventions

A summary of the Load Index (LI) rating of each substation is detailed in Table 14.

Whiston Road; Load index remains at 5 with Licence compliance maintained by post fault transfers and demand side response'

**Silvertown**: Provision for reinforcement has been made commencing 2022 with the additional capacity forecast to commission in ED2.

**Sewell Road:** The reduction to LI1 is a result of permanent demand transfers to the new Eglington main substation supplied from Eltham Grid 132kV

**Glaucus Street:** The reduction to LI1 is a result of permanent demand transfers of 14MVA to the new Wellclose Square 132/11kV main substation.

**West Ham 66kV:** The reduction to LI1 is a result of the permanent demand transfer from the downstream Glaucus Street substation.

**Nelson Street:** Nelson Street is currently supplied by 3x 15MVA 66/11kV transformers. Following reinforcement the substation is to be supplied by 2 existing 66/11kV plus 2x132/11kV transformers. It is re-designated in the Tables 10, 11 and 14 as Nelson Street 132/66/11kV to identify the change from one to two primary voltage sources and the associated increase in firm capacity.

### Table 14. 2023 Forecast LI Profile with intervention

	East London							
Substation	Voltage kV	2023 Loa Without Investment	ad Index With Investment					
Barking C								
Nelson Street	66/11	5	n/a					
Nelson Street	132/66/11	n/a	1					
Simpsons Road	132/11	1	1					
Barking West								
Axe Street	33/11	1	1					
Barking West	33/11	1	1					
Sewell Road	33/11	2	1					
Whiston Road	33/11	5	5					

#### West Ham 66kV

Glaucus Street	66/11	2	1
Silvertown	66/11	5	5
West Ham 66kV	132/66	2	1



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All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

# **5 References**

References	Description
Reference 1	Planning Load Estimates LPN Area 2012-2023 (Feb 2013, Element Energy)
Reference 2	Primary Distribution Systems Standard Running Arrangements 2012 Overview Diagrams
Reference 3	NAMP LPN Table J Less Ind 19 <sup>th</sup> February 2014
Reference 4	

# 5.1 Appendices

Appendix	Description
Appendix A	Geographical diagram
Appendix B	Single Line Diagrams – Existing Network (part 1)
Appendix C	Single Line Diagram – existing Network (part 2)



### **East London**

All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects.

# 6 Document Approval

# Recommended by:

Name	Role	Signature	Date
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# Approval by:

Name	Role	Signature	Date
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# APPENDIX A: GEOGRAPHICAL DIAGRAM





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# **APPENDIX B: SINGLE LINE DIAGRAM (PART 1) EXISTING NETWORK**



to Brunswick Wharf B 132kV

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# **APPENDIX C: SINGLE LINE DIAGRAM (PART 2) EXISTING NETWORK**



Regional Development Plan