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JERSEY FUTURE HOSPITAL

CO004 – SITE OPTION REPORT

APPENDIX 6 Technical Site Appraisal TN-E-001-5 - TECHNICAL NOTES – ELECTRICAL

QUALITY ASSURANCE

Sign off: Peter Thomas

Position: Senior Engineer

April 2015

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Subject	Jersey Future Hospital – Change Order 4 – Site Validation TN-E-001 Technical Note – External CCTV Cameras Rev P2. Date 20.03.2015. Final Preliminary Issue		
Date	20 March 2015	Job No/Ref	237035-00

1 Introduction

This technical note has been prepared to support the preparation of the Site Validation Exercise that forms Change Request Nr. 4 as part of the Jersey Future Hospital Scheme.

The four options being reviewed are:

Option A - Dual Site Options

Option B - Overdale Hospital Site, 100% New Build Option

Option C - Existing General Hospital, 100% New Build Option

Option D - Waterfront Site, 100% New Build Option

2 Commentary

Each site will be provided with a combination of building mounted and pole mounted CCTV cameras. These will generally be located to monitor the perimeter of the site, including building access / egress points, but will also be provided in areas where critical equipment is located e.g. loading bays, areas adjacent to the energy centre and external gas stores.

Examples of mounting arrangements are shown below.

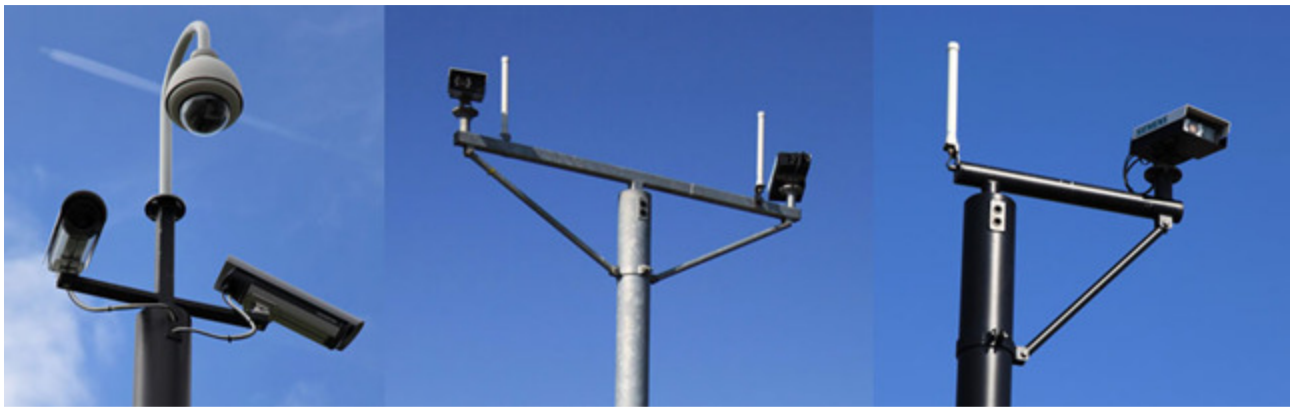

Figure 1: Pole mounted CCTV arrangements

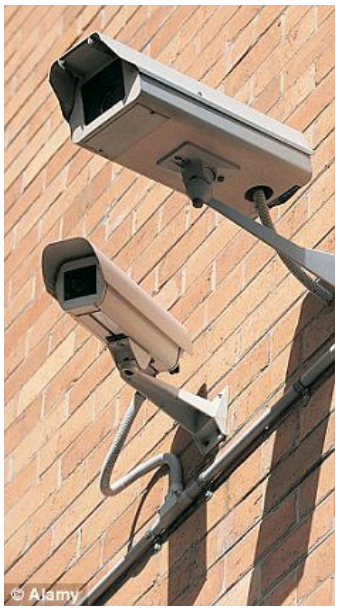

Figure 2 – Building mounted CCTV arrangements

2.1 Option A

2.1.1 Overdale

Building mounted CCTV cameras will be used to monitor the building perimeter and access / egress routes. Penetrations through the building fabric will be required to allow for the connection of power / data to the CCTV equipment.

Pole mounted CCTV cameras will be installed for the new access roads, service yard and new public car park. Where possible CCTV equipment will share poles with external lighting. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Additional building mounted CCTV may be required for any existing buildings to remain (Westmount Centre).

Drawing SK-E-OPTA-010 had been prepared to show indicative areas which would be covered by the CCTV.

2.1.2 Existing Site

Building mounted CCTV cameras will be used to monitor the building perimeter and access / egress routes. Penetrations through the building fabric will be required to allow for the connection of power / data to the CCTV equipment.

Pole mounted CCTV cameras will be installed for the new access roads and service yard. Where possible CCTV equipment will share poles with external lighting. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Additional building mounted CCTV may be required for any existing buildings to remain (Peter Crill).

Drawing SK-E-OPTA-012 had been prepared to show indicative areas which would be covered by the CCTV.

2.2 Option B

Building mounted CCTV cameras will be used to monitor the building perimeter and access / egress routes. Penetrations through the building fabric will be required to allow for the connection of power / data to the CCTV equipment.

Pole mounted CCTV cameras will be installed for the new access roads, service yard and new public car park. Where possible CCTV equipment will share poles with external lighting. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Additional building mounted CCTV may be required for any existing buildings to remain (Westmount Centre).

Drawing SK-E-OPTB-001 had been prepared to show indicative areas which would be covered by the CCTV.

2.3 Option C

Building mounted CCTV cameras will be used to monitor the building perimeter and access / egress routes. Penetrations through the building fabric will be required to allow for the connection of power / data to the CCTV equipment.

Pole mounted CCTV cameras will be installed for the new access roads and service yard. Where possible CCTV equipment will share poles with external lighting. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Additional building mounted CCTV may be required for any existing buildings to remain (Peter Crill).

Drawing SK-E-OPTC-001 had been prepared to show indicative areas which would be covered by the CCTV.

2.4 Option D

Building mounted CCTV cameras will be used to monitor the building perimeter and access / egress routes. Penetrations through the building fabric will be required to allow for the connection of power / data to the CCTV equipment.

Pole mounted CCTV cameras will be installed for the new access roads and service yard. Where possible CCTV equipment will share poles with external lighting. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Drawing SK-E-OPTD-001 had been prepared to show indicative areas which would be covered by the CCTV.

3 Risks/Opportunities

The car parking scheme for Option D to be developed to determine if external CCTV cameras are required. If a car park is located under the building in a basement arrangement, ceiling mounted cameras will be utilised.

4 Derogations

N/A

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Subject	Jersey Future Hospital – Change Order 4 – Site Validation TN-E-002 Technical Note – External Lighting Rev P2. Date 20.03.2015. Final Preliminary Issue
Date	20 March 2015
Job No/Ref	237035-00

1 Introduction

This technical note has been prepared to support the preparation of the Site Validation Exercise that forms Change Request Nr. 4 as part of the Jersey Future Hospital Scheme.

The four options being reviewed are:

Option A - Dual Site Options

Option B - Overdale Hospital Site, 100% New Build Option

Option C - Existing General Hospital, 100% New Build Option

Option D - Waterfront Site, 100% New Build Option

2 Commentary

Each site will be provided with a combination of building mounted, pole mounted and bollard type LED external lighting. These will generally be located at all building entrances / exits as well as all access roads and external walkways.

Examples of external lighting types are shown below.

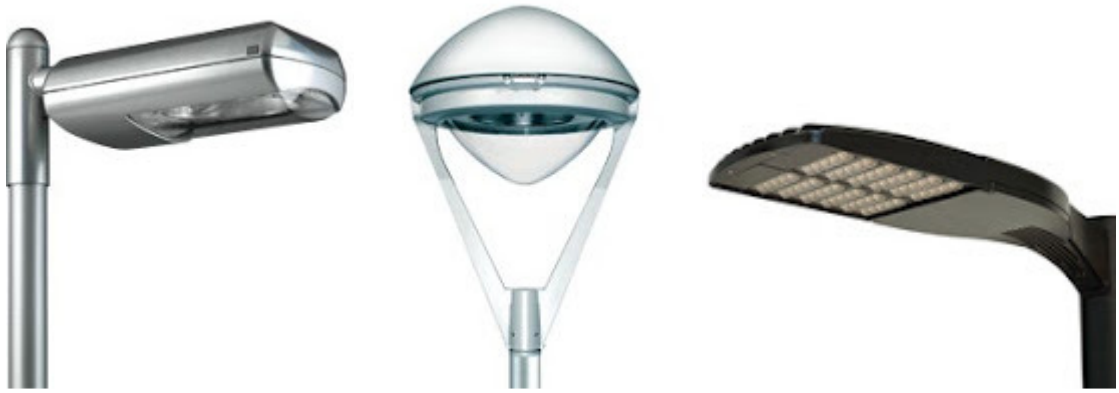

Figure 1: Pole mounted LED External Lighting

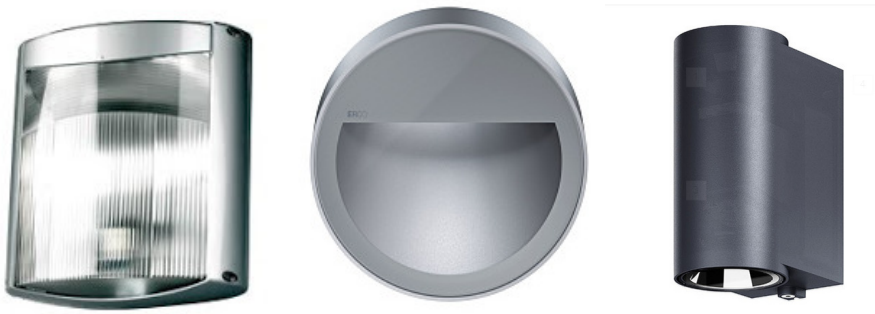

Figure 2 – Building mounted LED External Lighting

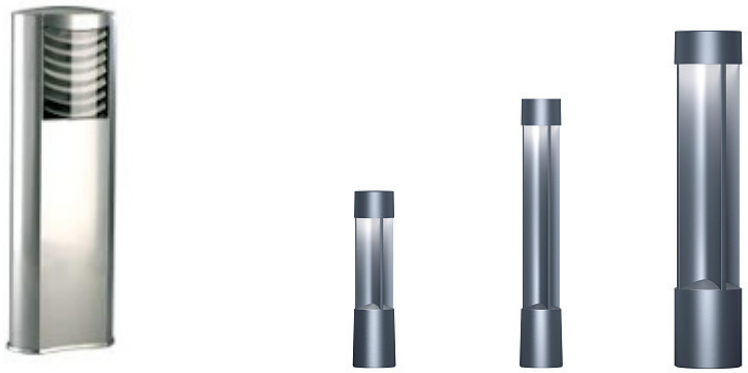

Figure 3 – Bollard Type LED External Lighting

External Lighting shall comply with the following parameters (taken from *Lighting Guide 2 (LG2): Hospitals and Health Care Buildings)*:

Table 2 General lighting schedule; external lighting

Area	Maintained average illuminance / lux	Maintained minimum illuminance / lux	Overall uniformity (not less than stated figure)	Threshold increment	Colour rendering (minimum), R_a	Environmental lighting class
CCTV:						
— monochrome	0	5	0.4	≥10%	≥60	—
— colour	—	15	0.4	≥10%	≥60	—
Roads	15	6	0.4		≥20	E1 and E2
	20	8	0.4		≥20	E3
	30	12	0.4		≥20	E4
General pedestrian areas	10	4	0.4		≥20	E1 and E2
	15	6	0.4		≥20	E3
	20	12	0.4		≥20	E4
Information and display signs	100 (vertical)					
Car park	15	6	0.4		≥20	E1 and E2
Vehicle drop-off points	10	5	0.4		≥20	E1 and E2
Steps or stairways	100	40	0.4		≥20	E1 and E2
General area lighting	20	12	0.4		≥20	
Hazardous open storage areas	50	20	0.4		≥20	

Figure 4: External Lighting Schedule

2.1 Option A

2.1.1 Overdale

Building mounted LED external luminaires will be provided at all building entrances / exits. Where possible, the building mounted lighting shall be utilised to illuminate the perimeter of the site. Where this is not possible, low level LED bollards and/or LED pole mounted luminaires will be required.

Pole mounted lighting will be provided to the new car park. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Enhanced lighting levels are required for service yard areas / any locations where service vehicles can access.

Additional road lighting to the main entrance road (Westmount Road) may be required as part of the works to meet the requirements of LG2. A study will be required to determine the current lighting levels of all roads serving this site.

Upgrades may also be required to the building mounted lighting associated with any existing buildings (Westmount Centre).

Drawing SK-E-OPTA-011 had been prepared to show indicative areas which would be covered by the external lighting.

2.1.2 Existing Site

Building mounted LED external luminaires will be provided at all building entrances / exits. Where possible, the building mounted lighting shall be utilised to illuminate the perimeter of the site. Where this is not possible, low level LED bollards and/or LED pole mounted luminaires will be required.

Pole mounted lighting will be provided to the new short stay parking / ambulance bay and amenity areas (South east corner of the site). In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Enhanced lighting levels are required for service yard areas / any locations where service vehicles can access.

Additional road lighting to Newgate Street may be required as part of the works to meet the requirements of LG2. A study will be required to determine the current lighting levels of all roads serving this site.

Drawing SK-E-OPTA-012 had been prepared to show indicative areas which would be covered by the external lighting.

2.2 Option B

Building mounted LED external luminaires will be provided at all building entrances / exits. Where possible, the building mounted lighting shall be utilised to illuminate the perimeter of the site. Where this is not possible, low level LED bollards and/or LED pole mounted luminaires will be required.

Pole mounted lighting will be provided to the new car park. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Enhanced lighting levels are required for service yard areas / any locations where service vehicles can access.

Additional road lighting to the main entrance road (Westmount Road) may be required as part of the works to meet the requirements of LG2. A study will be required to determine the current lighting levels of all roads serving this site.

Upgrades may also be required to the building mounted lighting associated with any existing buildings (Westmount Centre).

Drawing SK-E-OPTB-002 had been prepared to show indicative areas which would be covered by the external lighting.

2.3 Option C

Building mounted LED external luminaires will be provided at all building entrances / exits. Where possible, the building mounted lighting shall be utilised to illuminate the perimeter of the site. Where this is not possible, low level LED bollards and/or LED pole mounted luminaires will be required.

Pole mounted lighting will be provided to the new short stay parking / ambulance bay and amenity areas (southern section of site). In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Enhanced lighting levels are required for service yard areas / any locations where service vehicles can access.

Additional road lighting to Newgate Street may be required as part of the works to meet the requirements of LG2. A study will be required to determine the current lighting levels of all roads serving this site.

Drawing SK-E-OPTC-002 had been prepared to show indicative areas which would be covered by the external lighting.

2.4 Option D

Building mounted LED external luminaires will be provided at all building entrances / exits. Where possible, the building mounted lighting shall be utilised to illuminate the perimeter of the site. Where this is not possible, low level LED bollards and/or LED pole mounted luminaires will be required.

Pole mounted lighting will be provided to the new car park. In ground ducts will be required to supply power and data cabling to the pole mounted equipment.

Enhanced lighting levels are required for service yard areas / any locations where service vehicles can access.

Additional road lighting to the main entrance road (The Esplanade) may be required as part of the works to meet the requirements of LG2. A study will be required to determine the current lighting levels of all roads serving this site.

Drawing SK-E-OPTD-002 had been prepared to show indicative areas which would be covered by the external lighting.

3 Risks/Opportunities

It is suggested that provision be made for an additional level of façade lighting for Option D, due to the prominence of the site.

Luminaire types to be developed as part of future stages.

Light pollution planning requirements to be considered as part of future stages.

4 Derogations

N/A

Subject	Jersey Future Hospital – Change Order 4 – Site Validation TN-E-003 Technical Note – Energy Study (Electrical) Rev P4. Date 09.04.2015. Final Preliminary Issue
Date	9 April 2015
Job No/Ref	237035-00

1 Introduction

This technical note has been prepared to support the preparation of the Site Validation Exercise that forms Change Request Nr. 4 as part of the Jersey Future Hospital Scheme.

The four options being reviewed are:

Option A - Dual Site Options

Option B - Overdale Hospital Site, 100% New Build Option

Option C - Existing General Hospital, 100% New Build Option

Option D - Waterfront Site, 100% New Build Option

This document should be read in conjunction with the Energy Study (Mechanical) document.

2 Commentary

This note documents the difference in spatial / equipment requirements for both an all-electric and conventional oil or gas fuelled heating scheme.

An application was made to Jersey Electricity Company (JEC) on 28th January 2015 for the following supplies to each site, based on an all-electric scheme and a conventional heating scheme:

Table 1: Maximum Demands Submitted to JEC

Site Option	A		B	C	D
	Overdale	Existing Site			
Max Demand (all electric) kVA	2,319	7,784	10,599	10,599	10,599
Max Demand (conventional oil / gas heating) kVA	919	3,084	4,199	4,199	4,199

The information below has been based on the above demands requested.

An N+1 arrangement will be provided for transformers and generators in all options with the exception of Option A.

See the following schematic drawings for indicative substation arrangements:

Title	Drawing Number
Option A - Overdale Proposed Electrical Equipment Locations	SK-E-OPTA-008
Option A - Existing Site Proposed Electrical Equipment Locations	SK-E-OPTA-009
Option B - Proposed Electrical Equipment Locations	SK-E-OPTB-003
Option C - Proposed Electrical Equipment Locations	SK-E-OPTC-003
Option D - Proposed Electrical Equipment Locations	SK-E-OPTD-003

2.1 Option A

It should be noted, that as part of the Option A development, the available plant space is lower than that required for a building of its size. As a result of this, the level of generator back up is lower than that provided for a single site Option. Option A is provided with N+1 generators which will be capable of backing up 50% of the electrical load for 200 hours. Load shedding / load management regimes will be implemented to ensure the life safety services are supported.

2.1.1 All Electric – Overdale

The following equipment would be required for an all-electric hospital at Overdale:

- 1 No. energy centre housing:
  - 1 No. JEC HV incomer (approx. 60m^2)
  - 2 No. 1500kVA stand-by generators (approx. 180m^2 including fuel tank to supply 200 hours running at full load)

- 2 No. JFH substations housing 2 No. 1250kVA transformers in each (approx. 70m^2 each - locations as shown in drawings)

2.1.2 Conventional Heating – Overdale

The following equipment would be required for a conventionally heated hospital at the Overdale site:

- 1 No. energy centre housing:
    - 1 No. JEC HV incomer (approx. 60m^2)
    - 2 No. 550kVA stand-by generators (approx. 140m^2 – including fuel tank to supply 200 hours running at full load)
- 2 No. JFH substations housing 2 No. 550kVA transformers in each (approx. 60m^2 each - locations as shown in drawings)

2.1.3 All Electric – Existing Site

The following equipment would be required for an all-electric hospital at the existing site:

- 1 No. energy centre housing:
    - 1 No. JEC HV incomer (approx. 60m^2)
    - 3 No. 2000kVA stand-by generators (approx. 300m^2 – including fuel tank to supply 200 hours running at full load)
- 2 No. JFH substations housing 3 No. 2000kVA transformers in each (approx. 100m^2 each - locations as shown in drawings)

2.1.4 Conventional Heating – Existing Site

The following equipment would be required for a conventionally heated hospital at the existing site:

- 1 No. energy centre housing:
    - 1 No. JEC HV incomer (approx. 60m^2)
    - 2 No. 1500kVA stand-by generators (approx. 170m^2 – including fuel tank to supply 200 hours running at full load)
- 2 No. JFH substations housing 2 No. 1500kVA transformers in each (approx. 50m^2 each - locations as shown in drawings)

2.2 Options B/C/D

2.2.1 All Electric

The following equipment would be required for an all-electric hospital at site options B, C and D:

- 2 No. energy centres (in diverse locations) housing:
    - 2 No. JEC HV incomer (approx. 30m^2 located in each energy centre)
    - 6 No. 2500kVA stand-by generators (approx. 570m^2 located across energy centres 1 and 2 – including fuel tank to supply 200 hours running at full load)
- 3 No. JFH substations housing 3 No. 2000kVA transformers in each (approx. 130m^2 each - locations as shown in drawings)

2.2.2 Conventional Heating

The following equipment would be required for a conventionally heated hospital at site options B, C and D:

- 2 No. energy centres (in diverse locations) housing:
    - 2 No. JEC HV incomer (approx. 30m^2 located in each energy centre)
    - 3 No. 2500kVA stand-by generators (approx. 280m^2 located across energy centres 1 and 2 – including fuel tank to supply 200 hours running at full load)
- 2 No. JFH substations housing 2 No. 2500kVA transformers in each (approx. 100m^2 each - locations as shown in drawings)

3 Risks/Opportunities

Substation locations and numbers have been chosen to reduce long cable runs. However, the number of substations and arrangements will be reviewed as part of future stages.

It should be noted that splitting the equipment across 2 energy centre sites (for Options B, C and D only) will result in a small uplift in overall plant space required. See TN-MEP-001 Technical Note – Energy Centres for further information.

4 Derogations

The amount of fuel storage on site(s) may be reduced, based on an agreed derogation by the hospital.

Subject	Jersey Future Hospital – Change Order 4 – Site Validation TN-E-004 Technical Note - Incoming Utilities & Diversions (Electrical Services) Rev P2. Date 20.03.2015. Final Preliminary Issue
Date	20 March 2015
Job No/Ref	237035-00

1 Introduction

This technical note has been prepared to support the preparation of the Site Validation Exercise that forms Change Request Nr. 4 as part of the Jersey Future Hospital Scheme.

The four options being reviewed are:

Option A - Dual Site Options

Option B - Overdale Hospital Site, 100% New Build Option

Option C - Existing General Hospital Site, 100% New Build Option

Option D - Waterfront Site, 100% New Build Option

2 Commentary

Applications for new electrical and communications supplies were made as follows (a copy of all correspondence have been included in Section 3 of this document):

- Jersey Electric Company (JEC) 28th January 2015
- Jersey Telecom (JT) 30th January 2015

The impact of the new works on the existing in ground services (e.g. diversion / re-routing / removal) has been reviewed as part of this document, based on information provided by:

- JEC – 3rd March 2015
- JT – 27th February 2015 (information limited to a small section of each site)

See Utilities Diversions drawings for additional information.

2.1 Option A

2.1.1 Electricity

2.1.1.1 Incoming Electrical Supply

Cost information provided by JEC 13/02/2015.

Site Option A	Description of Works	Cost (£)
All Electric	11kV Substation and incoming supply	328,593
Conventional Heating	11kV Substation and incoming supply	309,680

2.1.1.2 Diversions – Overdale

The following works will be required to the existing electrical infrastructure:

- Disconnection and removal back to source of 400A Boiler House supply (fed from JEC substation (SS) on Tower Road)
- Services to remain live during the works:
    - LV supplies feeding Jersey Water
    - LV supply feeding the Crematorium
    - Existing Overdale Hospital SS
    - LV supplies from existing Overdale SS to William Knott and other LV supplies feeding buildings which will remain
    - Ocean Hotel SS
- Disconnection and removal back to source of hospital LV supplies feeding buildings to be demolished

Any diversionary works that are required will be further discussed with JEC once a final site is selected.

2.1.1.3 Diversions – Existing Site

The following works will be required to the existing electrical infrastructure:

- Network supplies provided from the JEC transformer within the Kensington Place SS shall be maintained during the works. Two possible options exist to allow this service to remain live:
    - Relocation of the JEC transformer into a space provided within the new JFH energy centre. JEC cabling would be jointed where necessary
    - Keep the JEC transformer in its current location and demolish around. It is envisaged that this would likely cause significant on site problems.
    - Options to be discussed with JEC, following site selection.
- Services to remain live during the works:
    - Gloucester Street SS
- It should be noted that JEC have previously advised that there is currently limitations on in-ground works along Gloucester Street due to recent high levels of disruption. This issue is not expected to pose a problem for the JFH project, as it is assumed that a significant amount of time will have elapsed between disruption periods. The issue will be further investigated should this site be selected.

Any diversionary works that are required will be further discussed with JEC once a final site is selected.

2.1.1.4 Original Option A Electricity

A request was made to JEC on 12th August 2014 based on a previous dual site option. The information provided below is no longer current but can be used as an indication of the scale of costs associated with Option A. The costs provided by JEC are provided below.

Site Option A	***Description of Works***	***Cost (exc GST) (£)***
Overdale Hospital (all electric)	*New 1.8MVA supply, inclusive of the customers HV switchgear, 11kV connections, Transformers and LV Incoming connections to the customers LV switchboard*	*210,000*
Existing General Hospital Site (all electric)	*New 9MVA supply, inclusive of the customers HV switchgear, 11kV connections, Transformers and LV Incoming connections to the customers LV switchboard*	*590,000*
Overdale Hospital (conventional heating)	*New 0.6MVA supply, inclusive of the customers HV switchgear, 11kV connections, Transformers and LV Incoming connections to the customers LV switchboard*	*160,000*
Existing General Hospital Site (conventional heating)	*New 3MVA supply, inclusive of the customers HV switchgear, 11kV connections, Transformers and LV Incoming connections to the customers LV switchboard*	*350,000*

2.1.2 Communications

Cost information provided by JT 27/02/2015.

Site Option A	**Description of Works**	**Cost (£)**
Overdale Hospital	2 No. diversely routed fibre supplies	10,000
Existing General Hospital Site	2 No. diversely routed fibre supplies	10,000

2.1.2.1 Diversions – Overdale

A limited amount of information was provided by JT. The following works will be required to the existing electrical infrastructure:

- Services to remain live during the works:
    - Junction boxes adjacent to the Westmount Centre
    - Junction boxes along Westmount Road
- Disconnection and removal back to source of junction boxes providing supplies to buildings to be demolished
- Relocation of services crossing areas where in-ground works will be undertaken.

Any diversionary works that are required will be further discussed with JT once a final site is selected.

2.1.2.2 Diversions – Existing Site

A limited amount of information was provided by JT. The following works will be required to the existing electrical infrastructure:

- Services to remain live during the works:
    - Junction boxes / cabling serving the Granite Block and Peter Crill House
- Disconnection and removal back to source of junction boxes providing supplies to buildings to be demolished
- Relocation of services crossing areas where in-ground works will be undertaken.
- Relocation of junction boxes / cabling which are located along site boundary's

Any diversionary works that are required will be further discussed with JT once a final site is selected.

2.2 Option B

2.2.1 Electricity

2.2.1.1 Incoming Electrical Supply

Cost information provided by JEC 13/02/2015.

Site Option B	Description of Works	Cost (£)
Overdale Hospital (all electric)	11kV Substation and incoming supply	36,239
Overdale Hospital (conventional heating)	11kV Substation and incoming supply	194,326

2.2.1.2 Diversions

The following works will be required to the existing electrical infrastructure:

- Disconnection and removal back to source of 400A Boiler House supply (fed from JEC substation (SS) on Tower Road)
- Disconnection and removal back to source of Jersey Water LV supplies (fed from Tower Road SS)
- Possible relocation and re-provision of Crematorium LV supply (currently fed from Tower Road SS)
- Services to remain live during the works:
    - Existing Overdale Hospital SS
    - LV supplies from existing Overdale SS to William Knott and other LV supplies feeding buildings which will remain
    - Ocean Hotel SS
- Disconnection and removal back to source of hospital LV supplies feeding buildings to be demolished

Any diversionary works that are required will be further discussed with JEC once a final site is selected.

2.2.2 Communications

Cost information provided by JT 27/02/2015.

Site Option B	Description of Works	Cost (£)
Overdale Hospital	2 No. diversely routed fibre supplies	10,000

2.2.2.1 Diversions

A limited amount of information was provided by JT. The following works will be required to the existing electrical infrastructure:

- Services to remain live during the works:
  - Junction boxes adjacent to the Westmount Centre
  - Junction boxes along Westmount Road
- Disconnection and removal back to source of junction boxes providing supplies to buildings to be demolished
- Relocation of services crossing areas where in-ground works will be undertaken.
- Whilst not provided on the information from JT, it is envisaged that there will be an impact on the communications equipment serving Jersey Water and the Crematorium. This will be investigated further if the site is selected as the preferred option.

Any diversionary works that are required will be further discussed with JT once a final site is selected.

2.3 Option C

2.3.1 Electricity

2.3.1.1 Incoming Electrical Supply

Cost information provided by JEC 13/02/2015.

Site Option C	Description of Works	Cost (£)
Existing General Hospital Site (all electric)	11kV Substation and incoming supply	133,769
Existing General Hospital Site (conventional heating)	11kV Substation and incoming supply	194,325

2.3.1.2 Diversions

The following works will be required to the existing electrical infrastructure:

- Network supplies provided from the JEC transformer within the Kensington Place SS and the Stafford Hotel SS shall be maintained during the works. Two possible options exist to allow these services to remain live:
    - Relocation of the JEC transformers into spaces provided within the new JFH energy centre. JEC cabling would be jointed where necessary
    - Keep the JEC transformers in their current location and demolish around. It is envisaged that this would likely cause significant on site problems.
    - Options to be discussed further with JEC, following site selection.
- Services to remain live during the works:
    - Gloucester Street SS
- It should be noted that JEC have previously advised that there is currently limitations on in-ground works along Gloucester Street due to recent high levels of disruption. This issue is not expected to pose a problem for the JFH project, as it is assumed that a significant amount of time will have elapsed between disruption periods. The issue will be further investigated should this site be selected.

Any diversionary works that are required will be further discussed with JEC once a final site is selected.

2.3.2 Communications

Cost information provided by JT 27/02/2015.

Site Option C	Description of Works	Cost (£)
General Hospital	2 No. diversely routed fibre supplies	10,000

2.3.2.1 Diversions – Existing Site

A limited amount of information was provided by JT. The following works will be required to the existing electrical infrastructure:

- Services to remain live during the works:
    - Junction boxes / cabling serving the Granite Block and Peter Crill House
- Disconnection and removal back to source of junction boxes providing supplies to buildings to be demolished
- Relocation of services crossing areas where in-ground works will be undertaken.
- Relocation of junction boxes / cabling which are located along site boundary's
- Whilst not provided on the information from JT, it is envisaged that there will be an impact on the communications equipment serving the Stafford Hotel and the Hotel Revere. This will be investigated further if the site is selected as the preferred option.

Any diversionary works that are required will be further discussed with JT once a final site is selected.

2.4 Option D

2.4.1 Electricity

2.4.1.1 Incoming Electrical Supply

Cost information provided by JEC 13/02/2015.

Site Option D	Description of Works	Cost (£)
Waterfront Site (all electric)	11kV Substation and incoming supply	216,269
Waterfront Site (conventional heating)	11kV Substation and incoming supply	194,325

2.4.1.2 Diversions

The following works will be required to the existing electrical infrastructure:

- Removal of LV supplies serving the park / fountain pond.
- Services to remain live during the works:
  - La Frigate LV supply (may require relocation based on works)
  - Waterfront Hotel SS
  - HV supplies adjacent to roundabouts (currently impinge on site boundary – may require relocation)
  - A number of JEC HV/LV services exist at the site boundaries of this option. These services shall be maintained as live during the works. These may require relocation dependant on scope of works

Any diversionary works that are required will be further discussed with JEC once a final site is selected.

2.4.2 Communications

Cost information provided by JT 27/02/2015.

Site Option D	Description of Works	Cost (£)
Waterfront	2 No. diversely routed fibre supplies	10,000

A limited amount of information was provided by JT. The following works will be required to the existing electrical infrastructure:

- Services to remain live during the works:
  - Junction boxes / cabling serving the La Frigate (may require relocation)
  - Junction boxes / cabling located along perimeter of Esplanade boundary (may require relocation)
  - Equipment serving the waterfront hotel / retail complex
- Disconnection and removal back to source of junction boxes / cabling currently running north-east to south-west across the source

Any diversionary works that are required will be further discussed with JT once a final site is selected.

5 Risks/Opportunities

Due to the early nature of this study, all costs received are high level approximations only and will be refined in further stages as more detail for the schemes is developed.

JEC have indicated that the retention / relocation / removal of existing JEC substations on the sites will be subject to further development and will not form part of their response to the request for new supplies (request dated 28th January)

The opportunity exists to negotiate further capital costs with JEC based on the understanding that the hospital will pursue an 'all-electric' scheme.

Once a final site option has been developed, additional requests will be submitted to JEC and JT to obtain more accurate costs.

6 Derogations

N/A

ARUP

Subject	Jersey Future Hospital – Change Order 4 – Site Validation TN-E-005– Electrical Services High Level Technical Note Rev. P4. Date 09.04.2015. Final Preliminary Issue
Date	9 April 2015
Job No/Ref	237035-00

1 Introduction

This technical note has been prepared to document the findings associated with the Electrical Systems to support the preparation of the Site Validation Exercise that forms Change Request Nr. 4 as part of the Jersey Future Hospital (JFH) Scheme.

The four options being reviewed are:

Option A - Dual Site Options

Option B - Overdale Hospital Site, 100% New Build Option

Option C - Existing General Hospital, 100% New Build Option

Option D - Waterfront Site, 100% New Build Option

This Technical Note has been prepared in conjunction with a separate Heating Appraisal Document which is being developed to ascertain the proposed heating fuel source and systems for the buildings.

This document therefore does not detail the specific systems and fuel sources used for heating and incoming services capacities are not defined at this time.

This document has been prepared as a general overview of systems to pre-feasibility level of detail and will be developed in subsequent design stages once the preferred option is established.

This document should be read in conjunction with the supportive drawings.

2 Commentary

2.1 Option A

2.1.1 Incoming Services

The existing hospital site will be provided with 2 No. incoming HV supplies from the Jersey Electric Company (JEC) network. The 2 No. supplies will be provided from separate JEC primary substations. Requests have been made to JEC to obtain indicative costs associated with the works.

The Overdale site will be provided with 2 No. incoming HV supplies from the JEC network. The 2 No. supplies will be provided from separate JEC primary substations. Requests have been made to JEC to obtain indicative costs associated with the works.

The supplies will be terminated into 1 No. JEC owned HV switchboards at each site, within the 'HV Intake Room' located within the Energy Centre on each site. The intake rooms will be provided with a secure grille / screen to demark the boundary between the JEC and Hospital owned equipment. A space approximately 12 x 5m will be required in each of the energy centres to house the HV equipment. The intake room will require 24 hour access at ground level and requires good vehicular access for maintenance.

2 No. JFH HV supplies will be distributed from the JFH sections of the HV switchboard to form a 'HV ring' around each site. The two supplies will be distributed in diverse routes around the sites to enhance the resilience of the system. Each incoming supply will be rated to support the full load of the buildings.

2.1.2 JFH Substations

The existing hospital site will be provided with 2 No. substations housing JFH owned ring main units (RMUs) and HV/LV transformers. Each of the substations will provide power to one half of the site.

The Overdale site will be provided with 2 No. substations housing JFH owned ring main units (RMUs) and HV/LV transformers. Each of the substations will provide power to one half of the site.

In order to provide resilience across the sites, an N+1 arrangement for all transformers will be installed (as per HTM 06-01). Additional resilience will also be provided in the form of back-up generators and through the installation of a site wide HV ring.

The two substations (per site) will be linked to form a JFH HV ring network, i.e. each substation shall have 2 No. diversely routed points of supply. The locations of the substations will be selected in order to reduce long cable lengths.

Each substation will supply an LV switchboard which will provide supplies to sub-distribution boards / equipment throughout the site.

In order to enable access and maintenance of the equipment, the substations will be housed at ground level with good vehicular access.

2.1.3 Backup Generators

It is proposed that HV generators are provided. The back-up generators and associated fuel tanks will be located within the energy centre (for each site).

The number and size of generators will be selected to provide an N+1 level of resilience for half the building electrical loads (as per HTM 06-01). With this arrangement, it was agreed that load shedding would be utilised in this extreme scenario to ensure critical facilities could be maintained.

The generators will be connected to a separate generator switchboard located in a purpose made enclosure adjacent to the generator enclosures (within the sites energy centre). A connection will then be made from the generator switchboard to the JFH sides of the HV switchboard. This arrangement will reduce the requirement for running long lengths of cable / bus bar across the site.

Each generator will be housed in a separate fire rated compartment. Where possible, there should be separation between the HV incomers and the generators to prevent the loss of both services in the event of a catastrophic event in the energy centre.

The generators shall be located at ground level with vehicular access for maintenance.

Each generator will be provided with a day fuel tank which shall be no more than the greater of 750L or 10 hours full load running time.

Fuel storage tanks will be provided on each site with the capacity to store 200 hours' worth of fuel for the generators running at full load.

The fuel tank can be located at ground level or in a purpose made basement area of the energy centres.

Interlocks will be provided to prevent the mains supply and the generator being connected to the HV switchboards whilst the incoming supply is still active.

2.2 Options B/C/D

2.2.1 Incoming Services

The site will be provided with 2 No. incoming HV supplies from the Jersey Electric Company (JEC) network. The 2 No. supplies will be provided from separate JEC primary substations. Requests have been made to JEC to obtain indicative costs associated with the works associated with each site.

The supplies will be terminated into 2 No. separate JEC owned HV switchboards at the site, within the 'HV Intake Rooms' located within each of the Energy Centres (locations to be agreed with JEC and the architect). The intake rooms will be provided with a secure grille / screen to demark the boundary between the JEC and Hospital owned equipment. A space approximately 6 x 5m will be required in each of the energy centres to house the HV equipment. The intake room will require 24 hour access at ground level and requires good vehicular access for maintenance.

1 No. JFH HV supply will be distributed from the JFH section of each HV switchboard to form a 'HV ring' around the site. The two supplies will be distributed in diverse routes around the sites to enhance the resilience of the system. Each incoming supply will be rated to support the full load of the buildings.

2.2.2 JFH Substations

The site will be provided with 2/3 No. substations (number dependant on heating scheme) housing JFH owned ring main units RMUs and HV/LV transformers. Each of the substations will provide power to one half / third of the site.

In order to provide resilience across the site, an 'N+1' arrangement for all transformers will be installed (as per HTM 06-01). Additional resilience will also be provided in the form of back-up generators and through the installation of a site wide HV ring.

The two / three substations will be linked to form a JFH HV ring network, i.e. each substation shall have 2 No. diversely routed points of supply. The locations of the substations will be selected in order to reduce long cable lengths.

Each substation will supply an LV switchboard which will provide supplies to sub-distribution boards / equipment throughout the site.

In order to enable access and maintenance of the equipment, the substations will be housed at ground level with good vehicular access.

2.2.3 Backup Generators

It is proposed that HV generators are provided. The back-up generators and associated fuel tanks will be located within the 2 No. energy centres.

It is proposed that the generators will be split across the sites energy centres. The number and size of generators will be selected to provide an 'N+1' level of resilience for the full building electrical loads (as per HTM 06-01). With this arrangement, should one of the generator locations be

compromised, although the available supply will be less than the complete site, it was agreed that load shedding would be utilised in this extreme scenario to ensure critical facilities could be maintained.

The generators will be connected to a separate generator switchboard located in a purpose made enclosure adjacent to the generator enclosures (within each of the energy centres). A connection will then be made from each of the generator switchboards to the JFH side of the HV switchboard. This arrangement will reduce the requirement for running long lengths of cable / bus bar across the site.

Each generator will be housed in a separate fire rated compartment.

The generators shall be located at ground level with vehicular access for maintenance.

Each generator will be provided with a day fuel tank which shall be no more than the greater of 750L or 10 hours full load running time.

Fuel storage tanks will be provided with the capacity to store 200 hours' worth of fuel for the generators running at full load.

The fuel tank can be located at ground level or in a purpose made basement area of the energy centres.

Interlocks will be provided to prevent the mains supply and the generator being connected to the HV switchboards whilst the incoming supply is still active.

2.3 Risks / Derogations

Site constraints associated with Option A have resulted in there being insufficient space to provide generator back up for 100% of the electrical load. In this instance generators and fuel storage will provide N+1 resilience with 200 hours run time for 50% of the electrical load.

A load shedding / load management regime will be developed to ensure that essential / life safety loads are prioritised in the event of a mains failure. It should be noted that additional resilience also will be provided in the form of two diverse HV incomers (from separate JEC substations) as well as a diversely routed site wide HV ring.