

Legend

Notes

Rev	Date	Description of Revisions	Drawn	Chkd	Appr
B	23-12-10	1st Issue - Stage 2 Design	DA	JW	CT
A	13-11-09	Final Issue	JO	MT	SW
DB	21-10-09	2nd Issue	JO	MT	SW
DA	17-07-09	1st Issue	JO	MT	SW

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Design
Scale(s): ELR & Mileage
BML1, BML2, SDP1 & SOY

Designed	Michal Taraj	Sign.	Date	17-07-09
Drawn	Jimmy Oyedele	Sign.	Date	17-07-09
Checked	Michal Taraj	Sign.	Date	17-07-09
Approved	Steve Witt	Sign.	Date	17-07-09

FTN / GSM-R Project Stage 2 Design

Millbrook (1129) to St. Denys (1130)

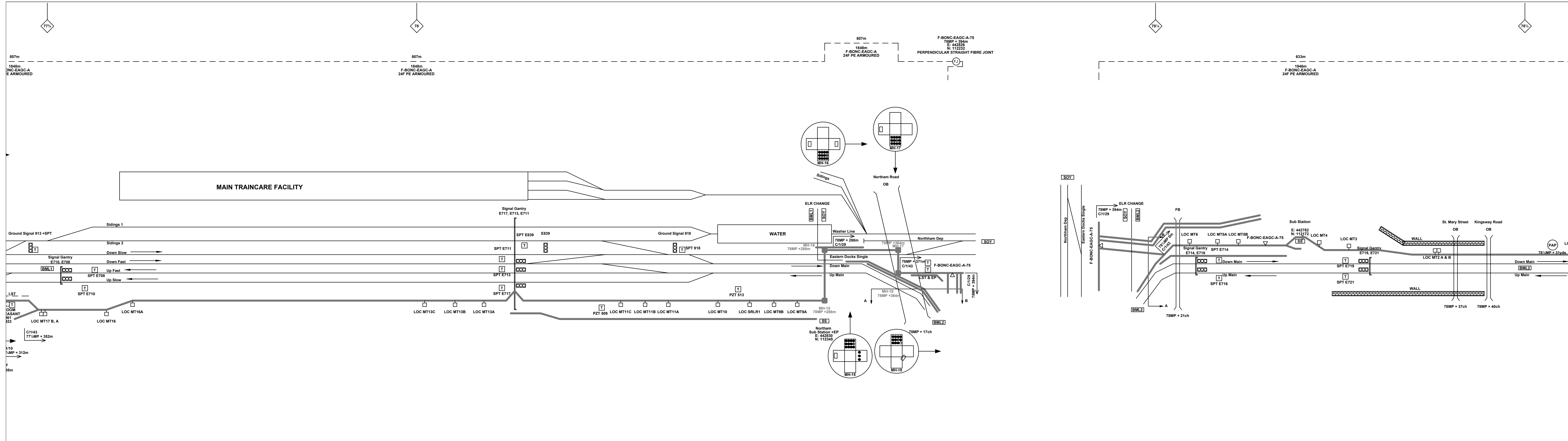
Network Rail

FTN/GSM-R Project
Tournament House
Passington
London
W2 1HA

Alternative Reference: See Layout Tab A3 Sheets 1 and 2

Drawing Number: NTP0\SLD\1129\1130\001

Sheet: 1 of 4
Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Manhole	Overbridge	Signal	Engineer's Line Reference	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code Status - as per Key Below	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Mid Length Sheath Gap Fibre	Underbridge	Vehicle Access Point	Mile Post	HV Cable
KEY	Screening Conductor Joint with/without Earth	Existing Fibre Cable	Manhole	FTN Access Node	Cabinet Routeworks	Sheath Gap Copper	Tunnel	Pedestrian Access Point	Platform	LV Cable
Proposed Fibre & Civils Elements are shown in RED	All Existing Elements are shown in BLACK	Existing Copper Cable	Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Manhole details: Cross-To be used Filled-In use Clear-Empty	Buffer Stop	Telephone	Sewer
Proposed Copper Elements are shown in BLUE	Existing Screen Cable	Existing Screen Cable	Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Manhole details: Cross-To be used Filled-In use Clear-Empty	Buffer Stop	Telephone	Telecoms
Proposed Screening Elements are shown in MAGENTA	Existing Screen Cable	Existing Screen Cable	Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Manhole details: Cross-To be used Filled-In use Clear-Empty	Buffer Stop	Telephone	Water
All Recoveries are shown in GREEN	Existing Screen Cable	Existing Screen Cable	Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Manhole details: Cross-To be used Filled-In use Clear-Empty	Buffer Stop	Telephone	AC Stanchion

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Design
ELR & Mileage
BML1, BML2, SDP1 & SOY

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**FTN / GSM-R Project
Stage 2 Design**

**Millbrook (1129)
to St. Denys (1130)**

Network Rail

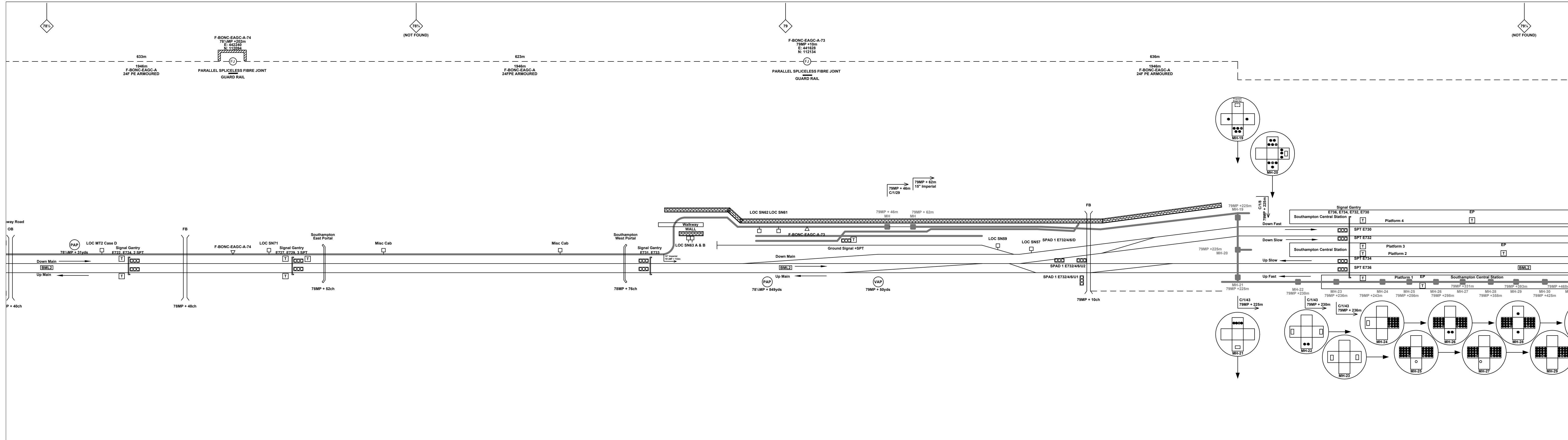
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Passington
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Alternative Reference
See Layout Tab A3 Sheets 3 and 4

Drawing Number
NTPO\SLD\1129\1130\001

Sheet
2 of 4

Revision
B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Manhole details: Cross - To be used, Filled - In use, Clear - Empty	Overbridge	Signal	Engineer's Line Reference	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Manhole	Underbridge	Vehicle Access Point	Mile Post	HV Cable
KEY	Screening Conductor Joint with/without Earth	Status - as per Key Below	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Tunnel	Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED		Existing Fibre Cable	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Buffer Stop	Telephone	Sewer	Water
Proposed Copper Elements are shown in BLUE		Existing Copper Cable							Copper Blue Fibre Red Screen Green	AC Stanchion
Proposed Screening Elements are shown in MAGENTA		Existing Screen Cable								
All Recoveries are shown in GREEN										

Notes

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Design
BML1, BML2, SDP1 & SOY

Contractor(s)
NTS

Designed: Michal Taraj
Drawn: Jimmy Oyedele
Checked: Michal Taraj
Approved: Steve Witt

Date: 17-07-09
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Date: 17-07-09

FTN / GSM-R Project Stage 2 Design

Drawing Title: Millbrook (1129) to St. Denys (1130)

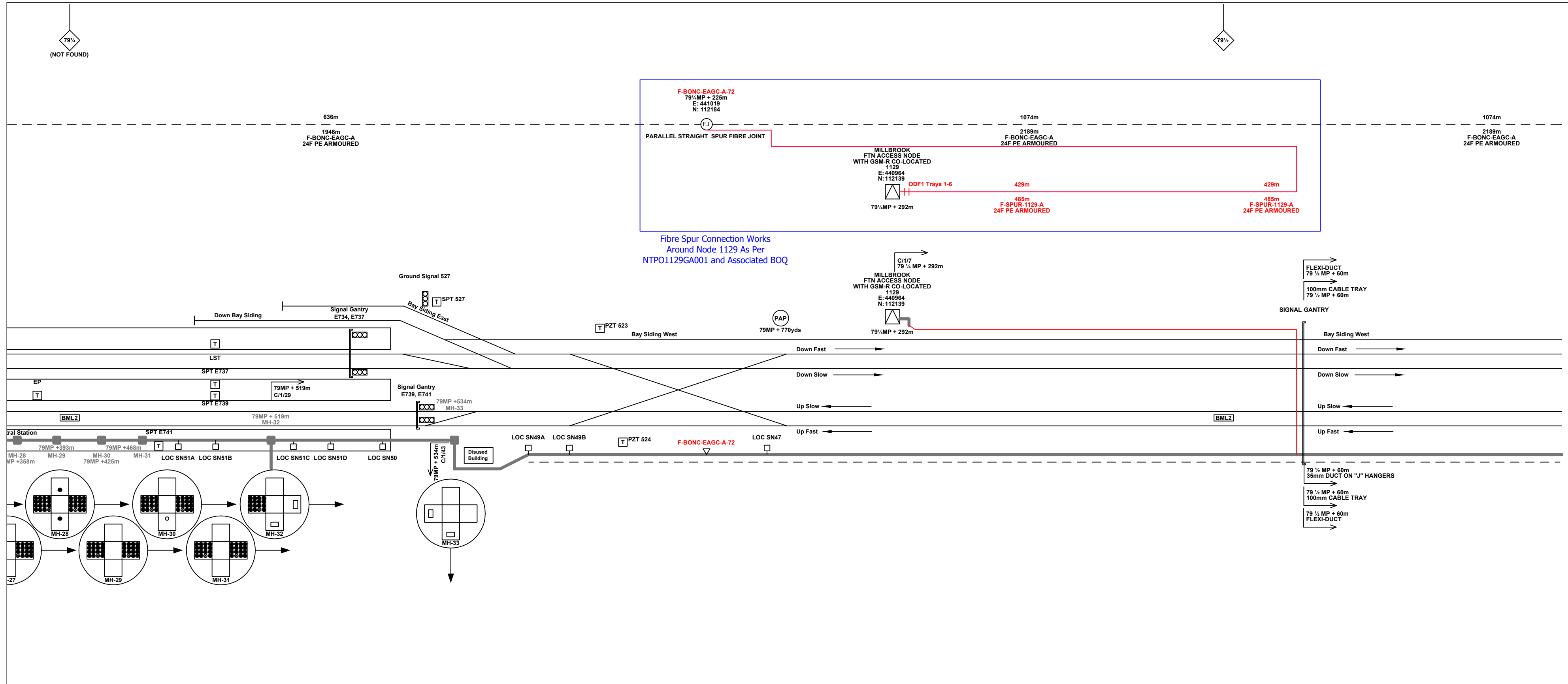
Network Rail

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W2 1HA

Alternative Reference: See Layout Tab A3 Sheets 5 and 6

Drawing Number: NTP0\SLD\1129\1130\001

Sheet: 3 of 4
Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Manhole details: Cross - To be used, Filled - In use, Clear - Empty	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Manhole	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV Cable
KEY	Screening Conductor Joint with/without Earth	Status - as per Key Below	Manhole with Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Manhole with Sheath Gap Copper	Platform	Pedestrian Access Point	Telephone	Copper Blue Fibre Red Screen Green	LV Cable
Proposed Fibre & Civils Elements are shown in RED	Existing Fibre Cable	Existing Copper Cable	Manhole with Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Manhole with Sheath Gap Copper	Earth Farm	Buffer Stop	Telephone	AC Stanchion	Sewer
Proposed Copper Elements are shown in BLUE	Existing Screen Cable	Existing Screen Cable	Manhole with Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Manhole with Sheath Gap Copper	Tunnel	Water			Water
Proposed Screening Elements are shown in MAGENTA											
All Recoveries are shown in GREEN											

Notes

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ndc consultants
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Design
ELR & Mileage
BML1, BML2, SDP1 & SOY

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FTN / GSM-R Project Stage 2 Design

Millbrook (1129) to St. Denys (1130)

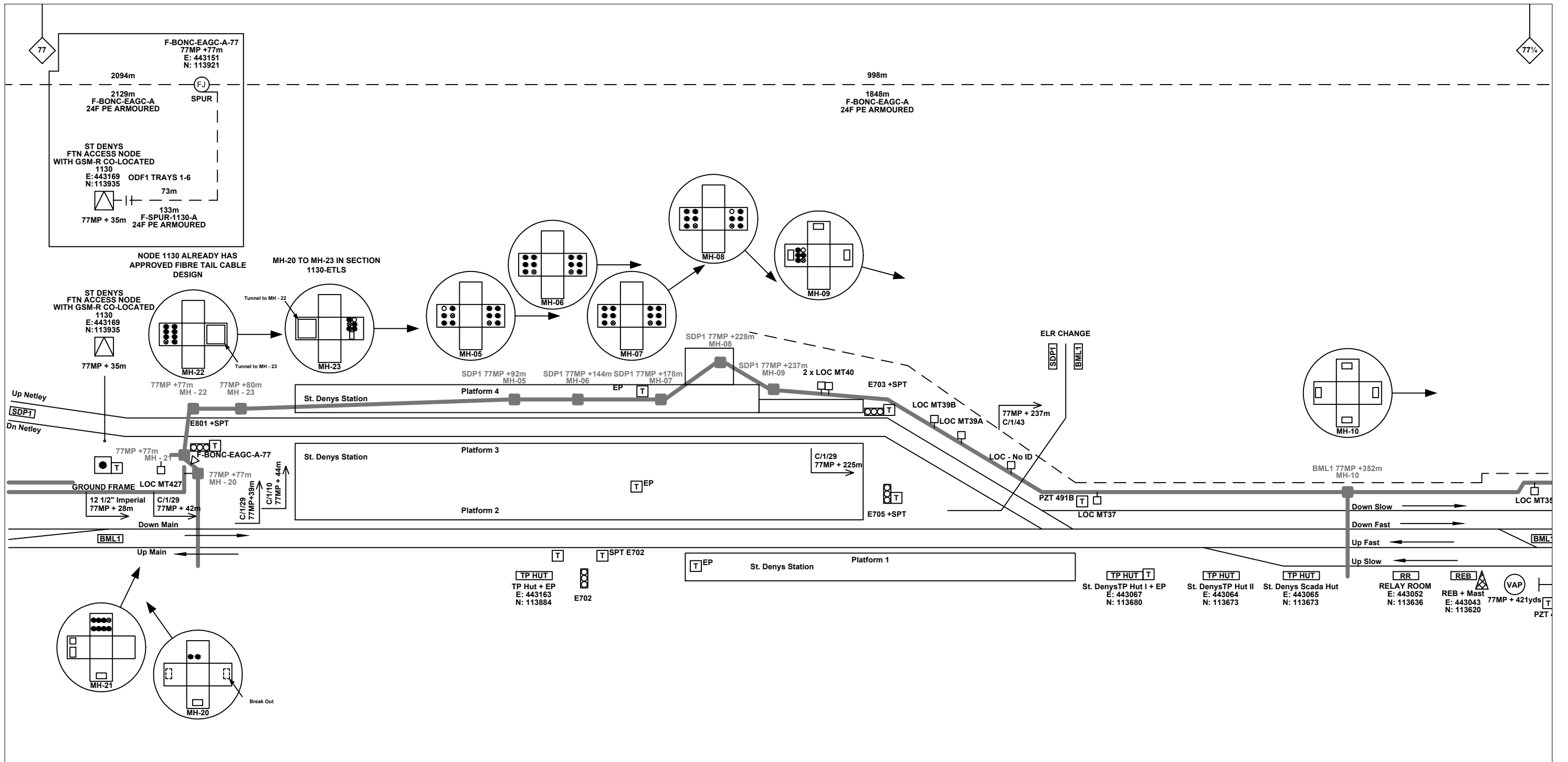
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Alternative Reference: See Layout Tab A3 Sheets 7 & 8

Drawing Number: NTP01\SLD\1129\1130\001

Sheet: 4 of 4
Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	GAS — GAS — Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV — HV — HV Cable
KEY	Screening Conductor Joint with/without Earth	Status - as per Key Below	Manhole	FTN Access Node	Cabinet Routeworks	Manhole details: Cross-To be used, Filled-In use, Clear-Empty	Pedestrian Access Point	Platform	SEW — SEW — Sewer	LV — LV — LV Cable
Proposed Fibre & Civils Elements are shown in RED	Existing Fibre Cable	Existing Copper Cable	Mid Length Sheath Gap Fibre	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Telephone	TEL — TEL — Telecoms	W — W — Water
Proposed Copper Elements are shown in BLUE	Existing Screen Cable	Sheath Gap Copper	Tunnel	Tunnel	Tunnel	Tunnel	Buffer Stop	AC Stanchion	Cable Pull	Copper Blue Fibre Red Screen Green
Proposed Screening Elements are shown in MAGENTA										
All Recoveries are shown in GREEN										

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Contractor(s)

Unit 4 Apex Park, Wainwright Road, Worcester, Worcestershire, WR4 9FN. Tel: 01905 756000

Status: **Design**

Scale(s): NTS

ELR & Mileage: BML1, BML2, SDP1 & SOY

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Project	FTN / GSM-R Project Stage 2 Design			
Drawing Title	Millbrook (1129) to St. Denys (1130)			

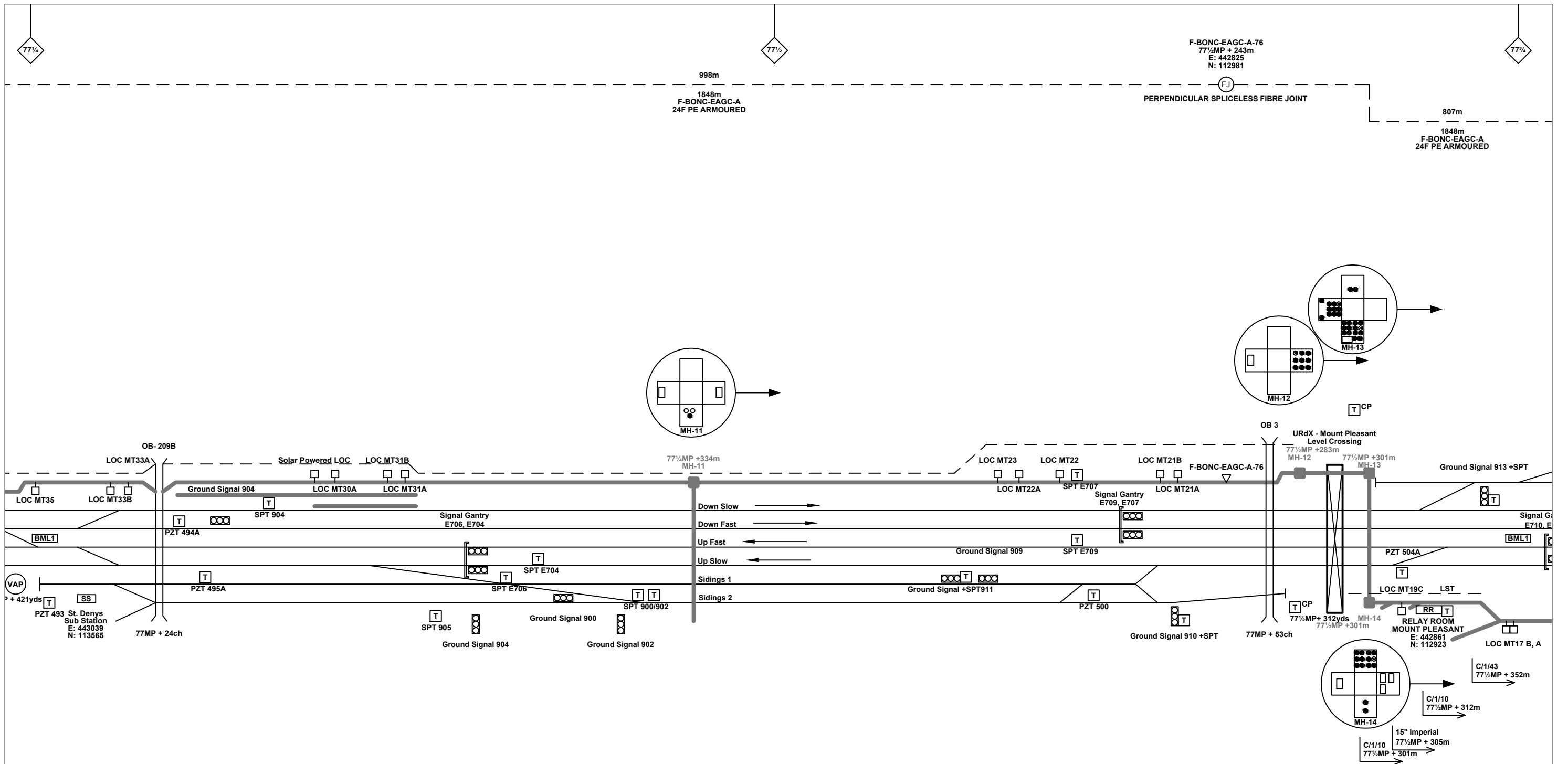
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Alternative Reference: See Layout Tab 841 x 297 Sheet 1

Drawing Number: NTPO\SLD\1129\1130\001

Sheet: 1 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	GAS — GAS — GAS Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable — Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV — HV — HV Cable
KEY	Screening Conductor Joint with/without Earth	Manhole	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Tunnel	Pedestrian Access Point	Platform	SEW — SEW — Sewer	LV — LV — LV Cable
Proposed Fibre & Civils Elements are shown in RED		Status — as per Key Below	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks		Earth Farm	Buffer Stop	Telephone	TEL — TEL — Telecoms
Proposed Copper Elements are shown in BLUE										W — W — Water
Proposed Screening Elements are shown in MAGENTA										AC Stanchion
All Recoveries are shown in GREEN										

Manhole details:
 Cross — To be used
 Filled — In use
 Clear — Empty

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Contractor(s)

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Status: **Design**

Scale(s): NTS

ELR & Mileage: BML1, BML2, SDP1 & SOY

Designed	Michal Taraj	Sign.	Date	17-07-09
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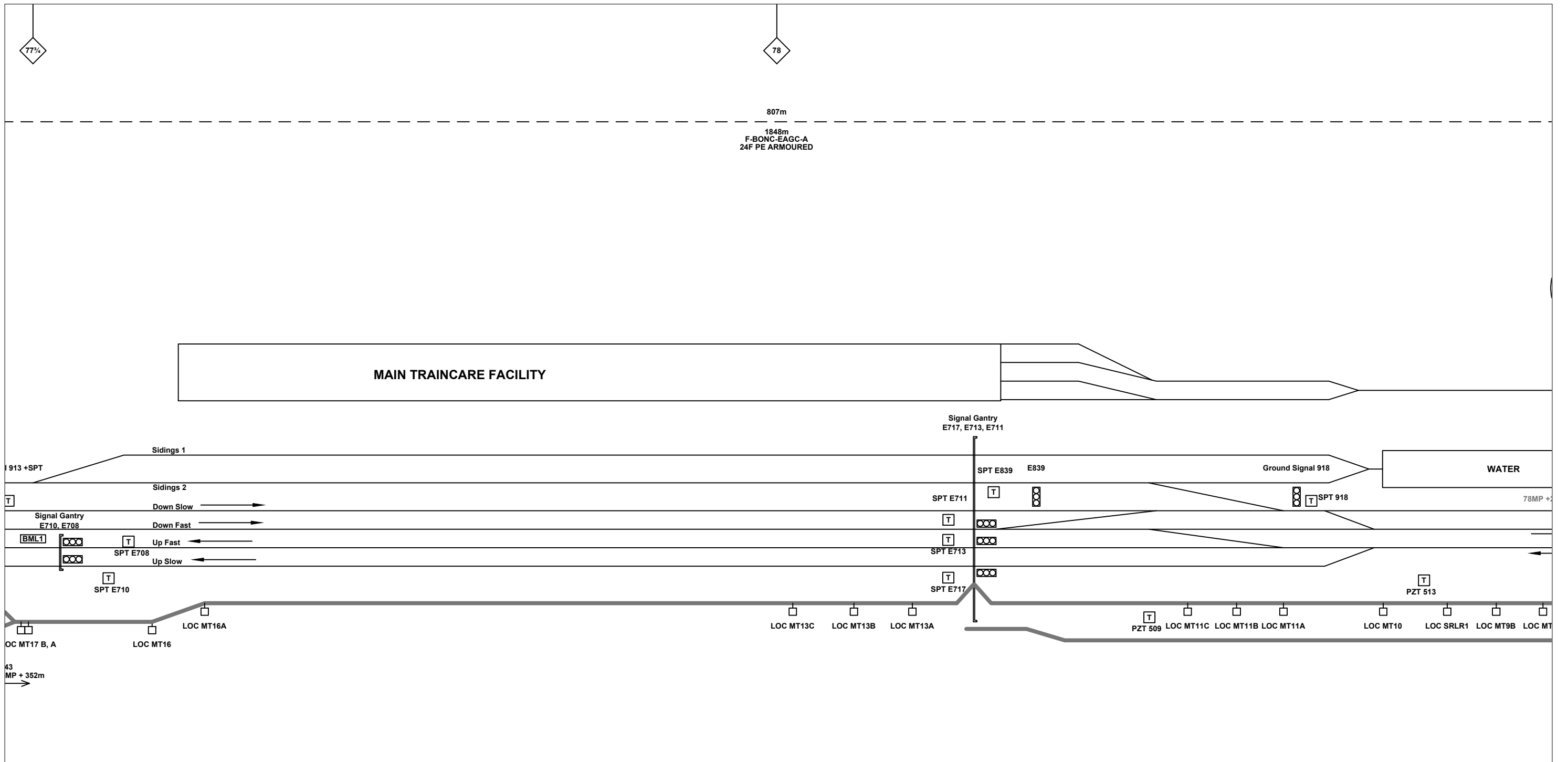
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 Tournament House
 Paddington
 London
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Alternative Reference: See Layout Tab 841 x 297 Sheet 1

Drawing Number: NTPO\SLD\1129\1130\001

Sheet: 2 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV Cable
KEY	Screening Conductor Joint with/without Earth	Manhole	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Manhole details: Cross-To be used, Filled-In use, Clear-Empty	Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED		1988m	2034m	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Buffer Stop	Telephone	Water
Proposed Copper Elements are shown in BLUE		Existing Fibre Cable	Existing Copper Cable	Existing Screen Cable	Sheath Gap Copper				Cable Pull	AC Stanchion
Proposed Screening Elements are shown in MAGENTA										
All Recoveries are shown in GREEN										

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Contractor(s)

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Status: **Design**

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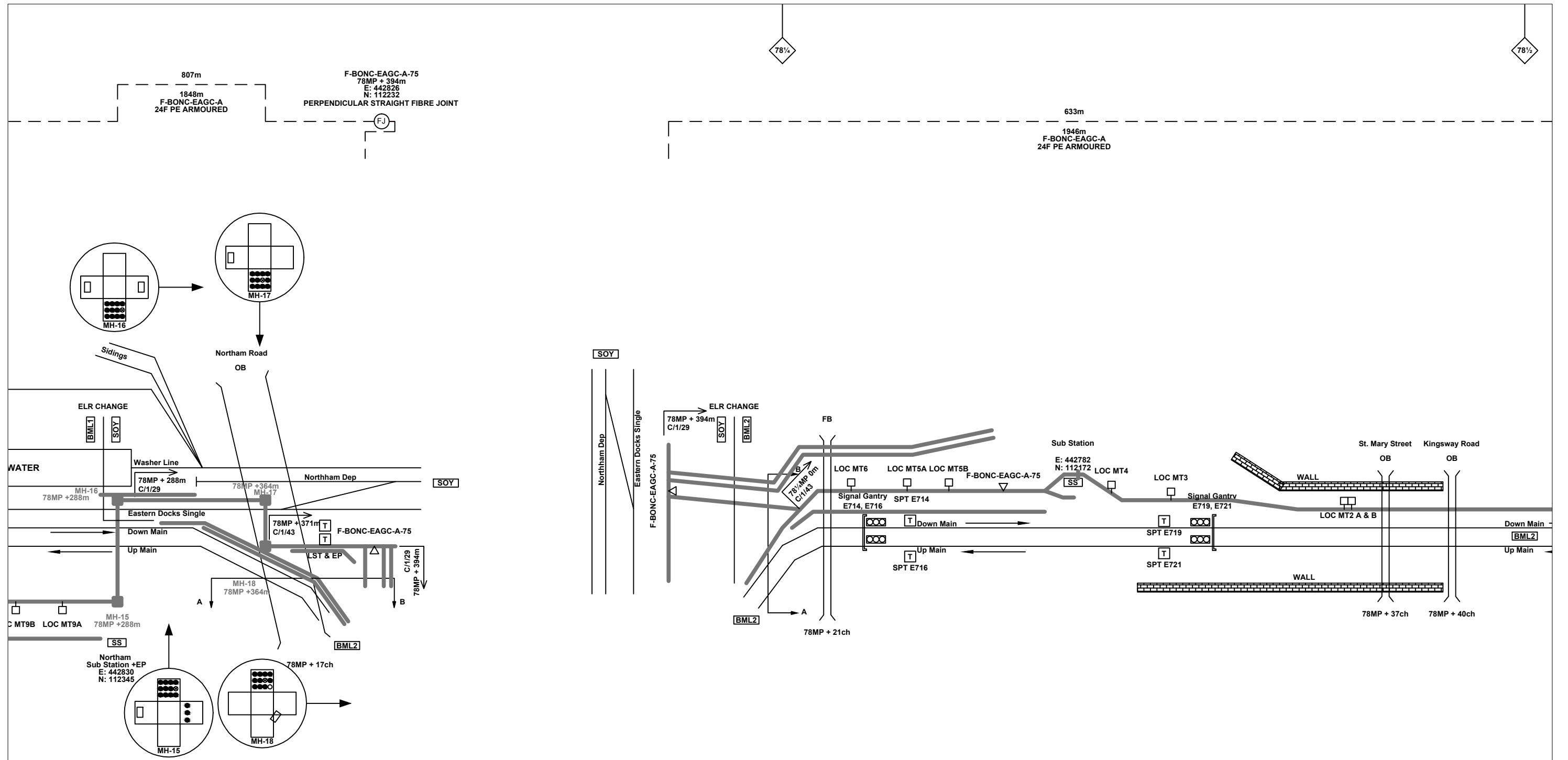
FTN/GSM-R Project
Tournament House
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London
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Alternative Reference: See Layout Tab 841 x 297 Sheet 2

Drawing Number: NTPO\SLD\1129\1130\001

Sheet: 3 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Manhole	Vehicle Access Point	Mile Post	HV Cable	Gas
KEY	Screening Conductor Joint with/without Earth	Status - as per Key Below	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Manhole details: Cross-To be used Filled-In use Clear-Empty	Pedestrian Access Point	Platform	LV Cable	Sewer
Proposed Fibre & Civils Elements are shown in RED		All Existing Elements are shown in BLACK	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Buffer Stop	Sewer	Water
Proposed Copper Elements are shown in BLUE		Existing Fibre Cable						Telephone	AC Stanchion	
Proposed Screening Elements are shown in MAGENTA		Existing Copper Cable								
All Recoveries are shown in GREEN		Existing Screen Cable								

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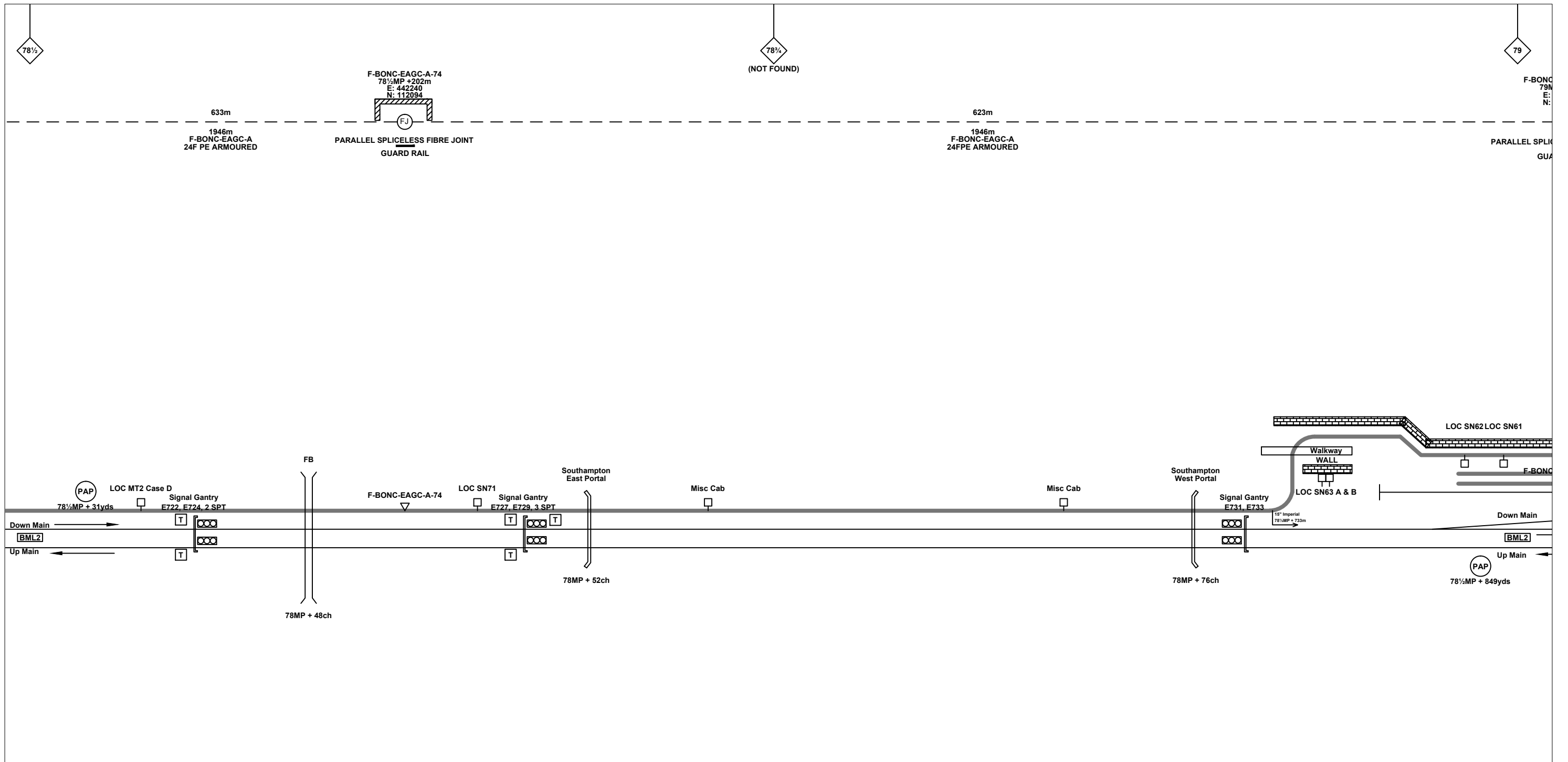
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Alternative Reference: See Layout Tab 841 x 297 Sheet 2

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Sheet: 4 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV Cable
KEY	Screening Conductor Joint with/without Earth	Manhole	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Manhole details: Cross-To be used, Filled-In use, Clear-Empty	Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED	All Existing Elements are shown in BLACK	Status - as per Key Below	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Buffer Stop	Telephone	Water
Proposed Copper Elements are shown in BLUE	Existing Fibre Cable	Existing Copper Cable	Existing Screen Cable						Cable Pull	AC Stanchion
Proposed Screening Elements are shown in MAGENTA										
All Recoveries are shown in GREEN										

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Status: **Design**

Scale(s): NTS

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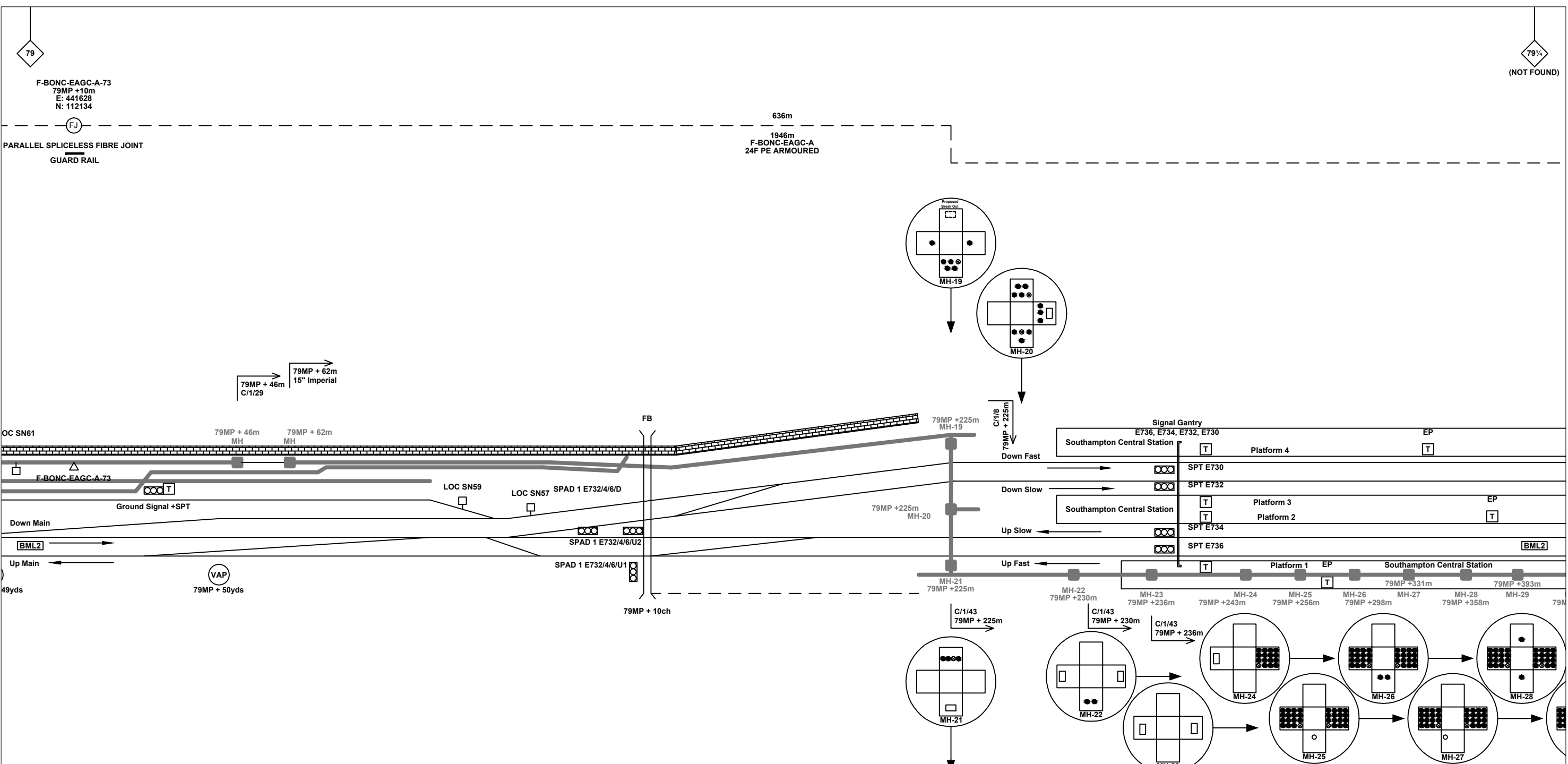
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Alternative Reference: See Layout Tab 841 x 297 Sheet 3

Drawing Number: NTPO\SLD\1129\1130\001

Sheet: 5 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV Cable
KEY	Screening Conductor Joint with/without Earth	Manhole	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Tunnel	Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED	All Existing Elements are shown in BLACK	Status - as per Key Below	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Buffer Stop	Telephone	Water	AC Stanchion
Proposed Copper Elements are shown in BLUE	Existing Fibre Cable	Existing Fibre Cable	Existing Copper Cable	Existing Screen Cable						
Proposed Screening Elements are shown in MAGENTA	Existing Copper Cable									
All Recoveries are shown in GREEN	Existing Screen Cable									

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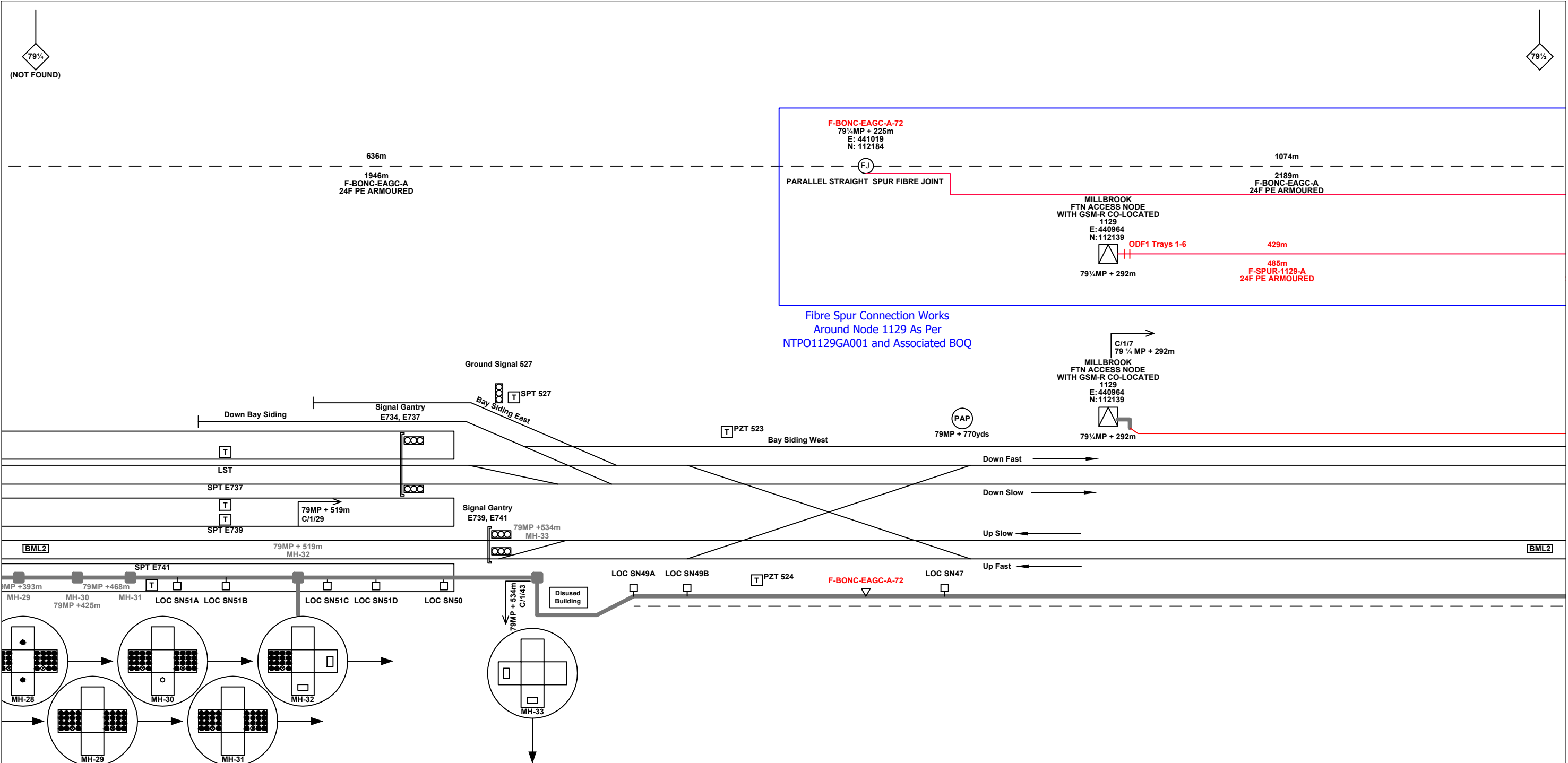
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Alternative Reference: See Layout Tab 841 x 297 Sheet 3

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Sheet: 6 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV Cable
KEY	Screening Conductor Joint with/without Earth	Manhole	Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks		Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED	Existing Fibre Cable	Disused Building	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Buffer Stop	Telecoms	Water
Proposed Copper Elements are shown in BLUE	Existing Copper Cable	Signal Gantry	Signal Gantry					Telephone		
Proposed Screening Elements are shown in MAGENTA	Existing Screen Cable									
All Recoveries are shown in GREEN										

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Rev	Date	Description of Revisions	Drawn	Chkd	Appr

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Status: **Design**

Scale(s): NTS

ELR & Mileage: BML1, BML2, SDP1 & SOY

Designed	Michal Taraj	Sign.	Date	17-07-09
Drawn	Jimmy Oyedele	Sign.	Date	17-07-09
Checked	Michal Taraj	Sign.	Date	17-07-09
Approved	Steve Witt	Sign.	Date	17-07-09
Project	FTN / GSM-R Project Stage 2 Design			
Drawing Title	Millbrook (1129) to St. Denys (1130)			

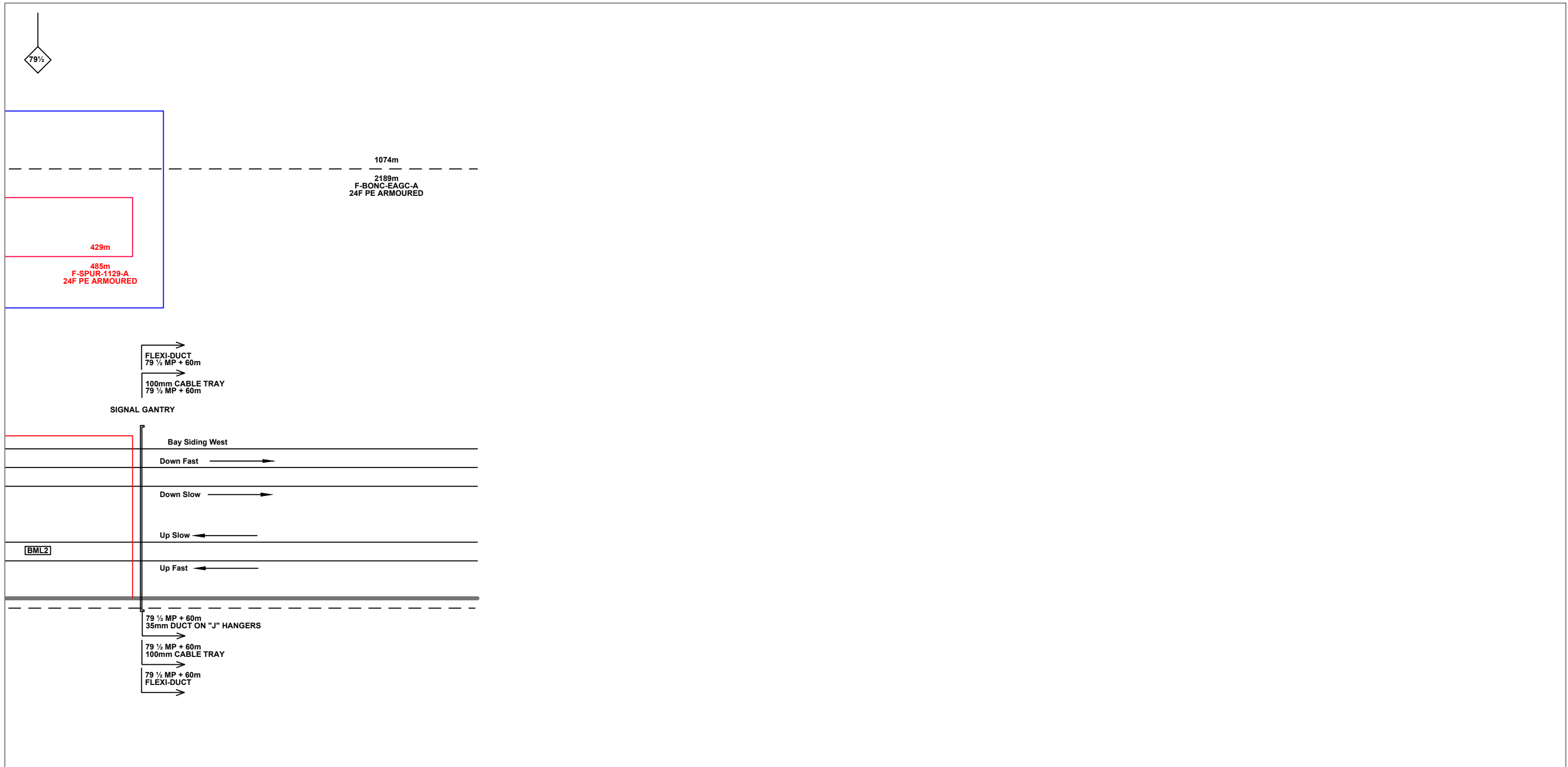
FTN/GSM-R Project
Tournament House
Paddington
London
W2 1HA

Alternative Reference: See Layout Tab 841 x 297 Sheet 4

Drawing Number: NTPO\SLD\1129\1130\001

Sheet: 7 of 8

Revision: B



Legend

Cabinet and Verts	Copper Joint	Trough Duct Cable Tray	Signal Box	FTN Core Node	Screen Joint Routeworks	Overbridge	Signal	Engineer's Line Reference	Crossing	Gas Line
Cabinet with Regenerator and Verts	Fibre Joint	Cable - Type Identified by FTN Code	Electrical Control Room	Core Node with GSM-R Colocated	Copper Joint Routeworks	Underbridge	Vehicle Access Point	Mile Post	Gantry	HV Cable
KEY	Screening Conductor Joint with/without Earth	Status - as per Key Below	Manhole	FTN Access Node	Cabinet Routeworks	Manhole details: Cross-To be used, Filled-In use, Clear-Empty	Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED	Existing Fibre Cable	Existing Copper Cable	Mid Length Sheath Gap Fibre	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Telephone	Telecoms	Water
Proposed Copper Elements are shown in BLUE	Existing Screen Cable	Sheath Gap Copper	Sheath Gap Copper				Buffer Stop	Cable Pull	AC Stanchion	
Proposed Screening Elements are shown in MAGENTA										
All Recoveries are shown in GREEN										

Notes

B	23-12-10	1st Issue - Stage 2 Design	DA	JW	CT
A	13-11-09	Final Issue	JO	MT	SW
DB	21-10-09	2nd Issue	JO	MT	SW
DA	17-07-09	1st Issue	JO	MT	SW
Rev	Date	Description of Revisions	Drawn	Chkd	Appr

Contractor(s)

Unit 4 Apex Park, Wainwright Road, Worcester, Worcestershire, WR4 9FN. Tel: 01905 756000

Status: **Design**

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