

Legend

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

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

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

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)

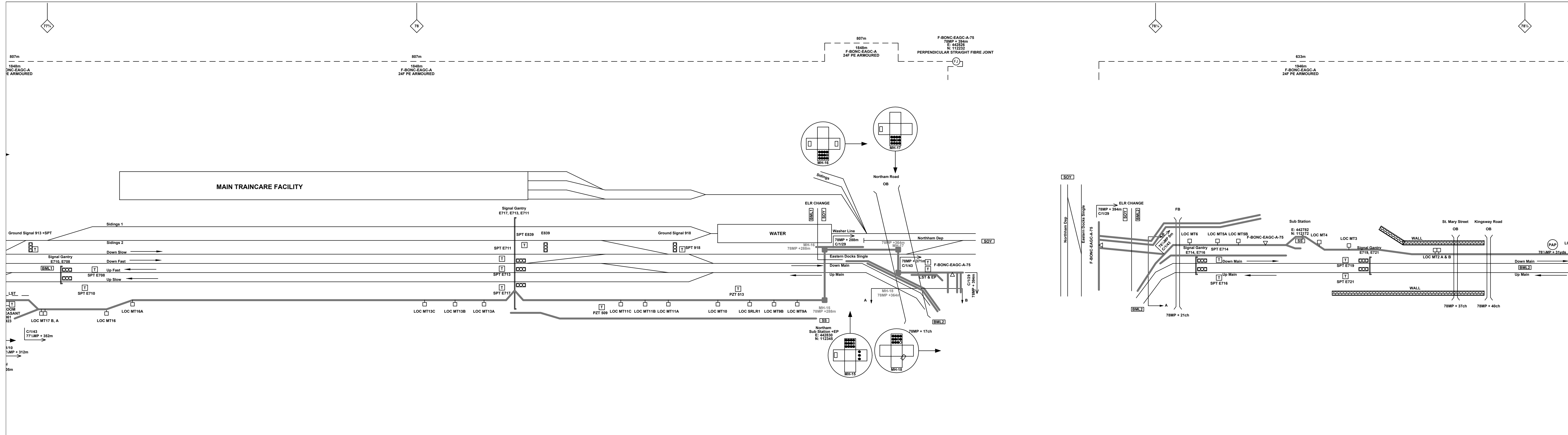
Network Rail

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
	Existing Copper Cable	Existing Screen Cable	Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Buffer Stop	Telephone	Cable Pull	Sewer
			Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Buffer Stop	Telephone	Cable Pull	Telecoms
			Manhole	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Buffer Stop	Telephone	Cable Pull	Water

Notes

Rev	Date	Description of Revisions	Drawn	Chkd	Appr
B	23-12-10	1st Issue - Stage 2 Design	DA	JW	CT
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Design
ELR & Mileage
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Approved	Steve Witt	Sign.	Date	17-07-09

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

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

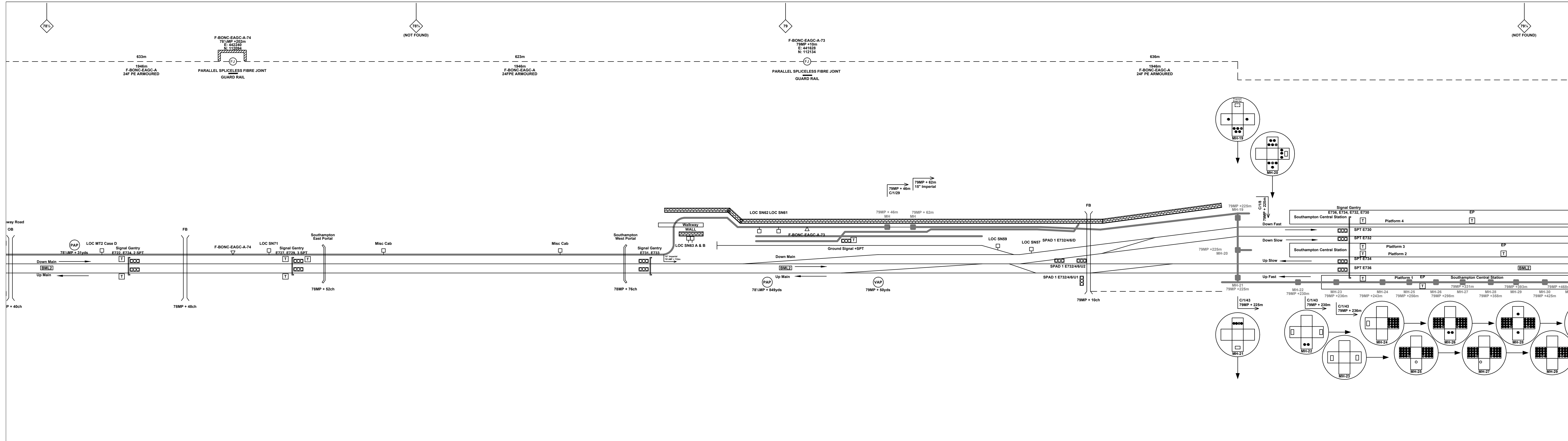
Network Rail

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Alternative Reference: See Layout Tab A3 Sheets 3 and 4

Drawing Number: NTP0\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	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	F-DIDC-RGAC-A	Manhole with Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Manhole with Sheath Gap Copper	Tunnel	Pedestrian Access Point	Platform	Copper Blue Fibre Red Screen Green	LV Cable
Proposed Fibre & Civils Elements are shown in RED		Existing Fibre Cable	Mid Length Sheath Gap Fibre	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Earth Farm	Buffer Stop	Telephone	Cable Pull	Sewer	Water
Proposed Copper Elements are shown in BLUE		Existing Copper Cable	Sheath Gap Copper							AC Stanchion	
Proposed Screening Elements are shown in MAGENTA		Existing Screen Cable									
All Recoveries are shown in GREEN											

Notes

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DA	17-07-09	1st Issue	JO	MT	SW
Rev	Date	Description of Revisions	Drawn	Chkd	Appr

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Design
BML1, BML2, SDP1 & SOY

Contractor(s): NTS

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

Signatures and Dates:
Date: 17-07-09
Date: 17-07-09
Date: 17-07-09
Date: 17-07-09

FTN / GSM-R Project Stage 2 Design

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

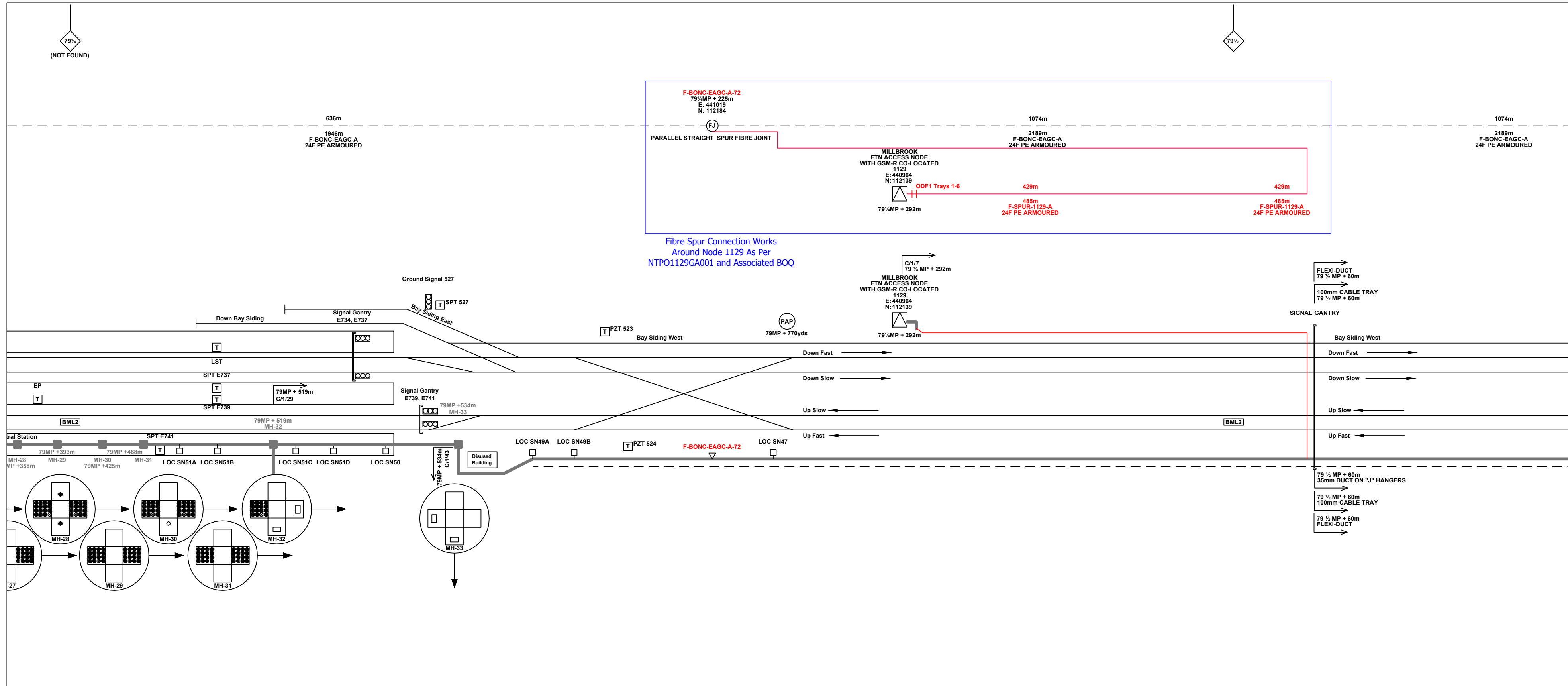
Network Rail

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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		Existing Fibre Cable	Manhole with Mid Length Sheath Gap Fibre	FTN Access Node	Cabinet Routeworks	Sheath Gap Copper	Tunnel	Pedestrian Access Point	Platform	Sewer	LV Cable
Proposed Fibre & Civils Elements are shown in RED		Existing Copper Cable	Mid Length Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks		Earth Farm	Buffer Stop	Telephone	Telecoms	Water
Proposed Copper Elements are shown in BLUE		Existing Screen Cable								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	Status
A	13-11-09	Final Issue	JO	MT	SW	Design
DB	21-10-09	2nd Issue	JO	MT	SW	Scale(s)
DA	17-07-09	1st Issue	JO	MT	SW	ELR & Mileage
Rev	Date	Description of Revisions	Drawn	Chkd	Appr	

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FTN / GSM-R Project Stage 2 Design

Millbrook (1129) to St. Denys (1130)

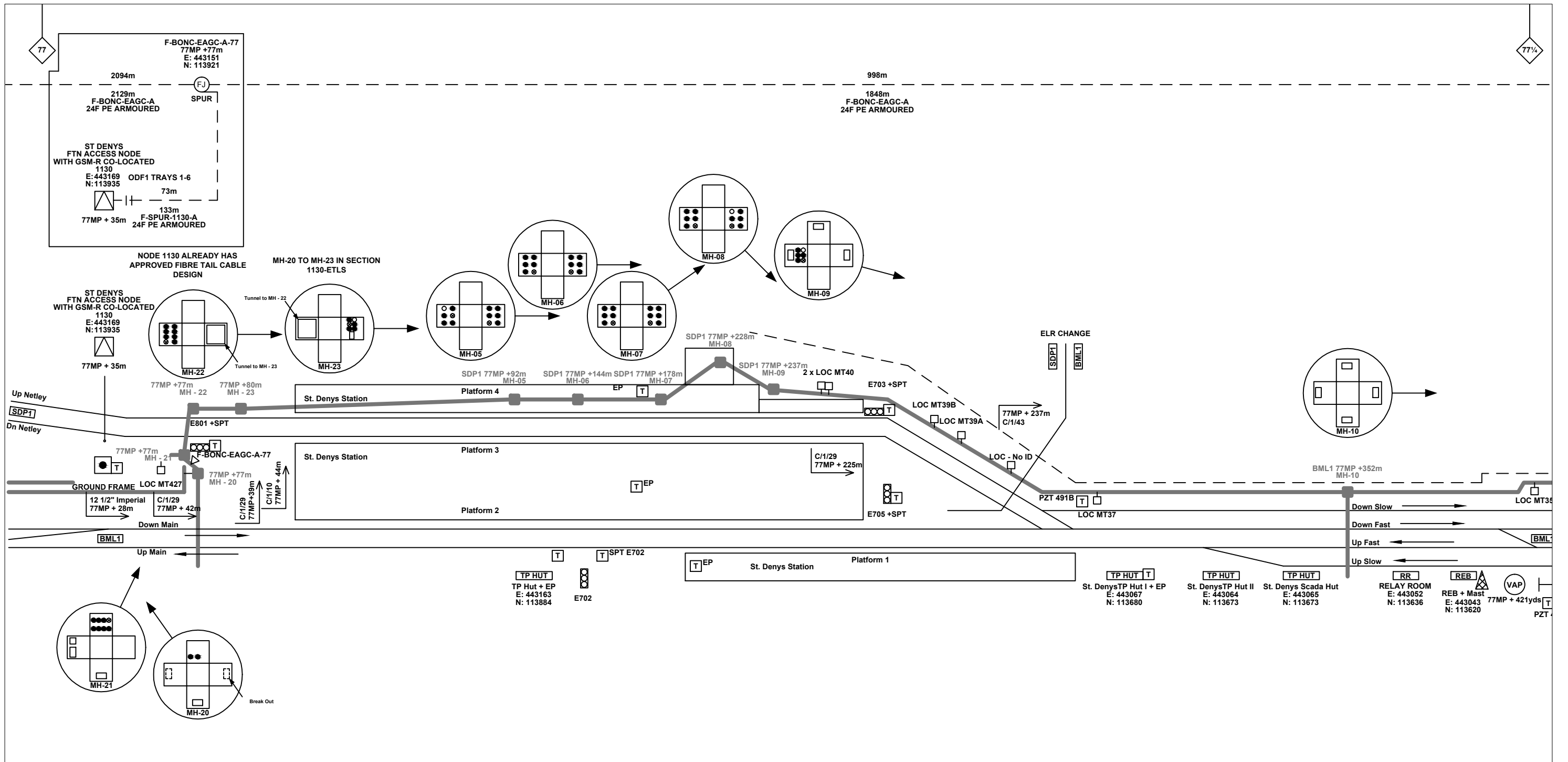
Network Rail

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London
W2 1HA

Alternative Reference: See Layout Tab A3 Sheets 7 & 8

Drawing Number: NTP0\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	Sheath Gap Copper				Buffer Stop	Cable Pull	AC Stanchion	
Proposed Screening Elements are shown in MAGENTA										
All Recoveries are shown in GREEN										

Notes

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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**

Scale(s): NTS

ELR & Mileage: BML1, BML2, SDP1 & SOY

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

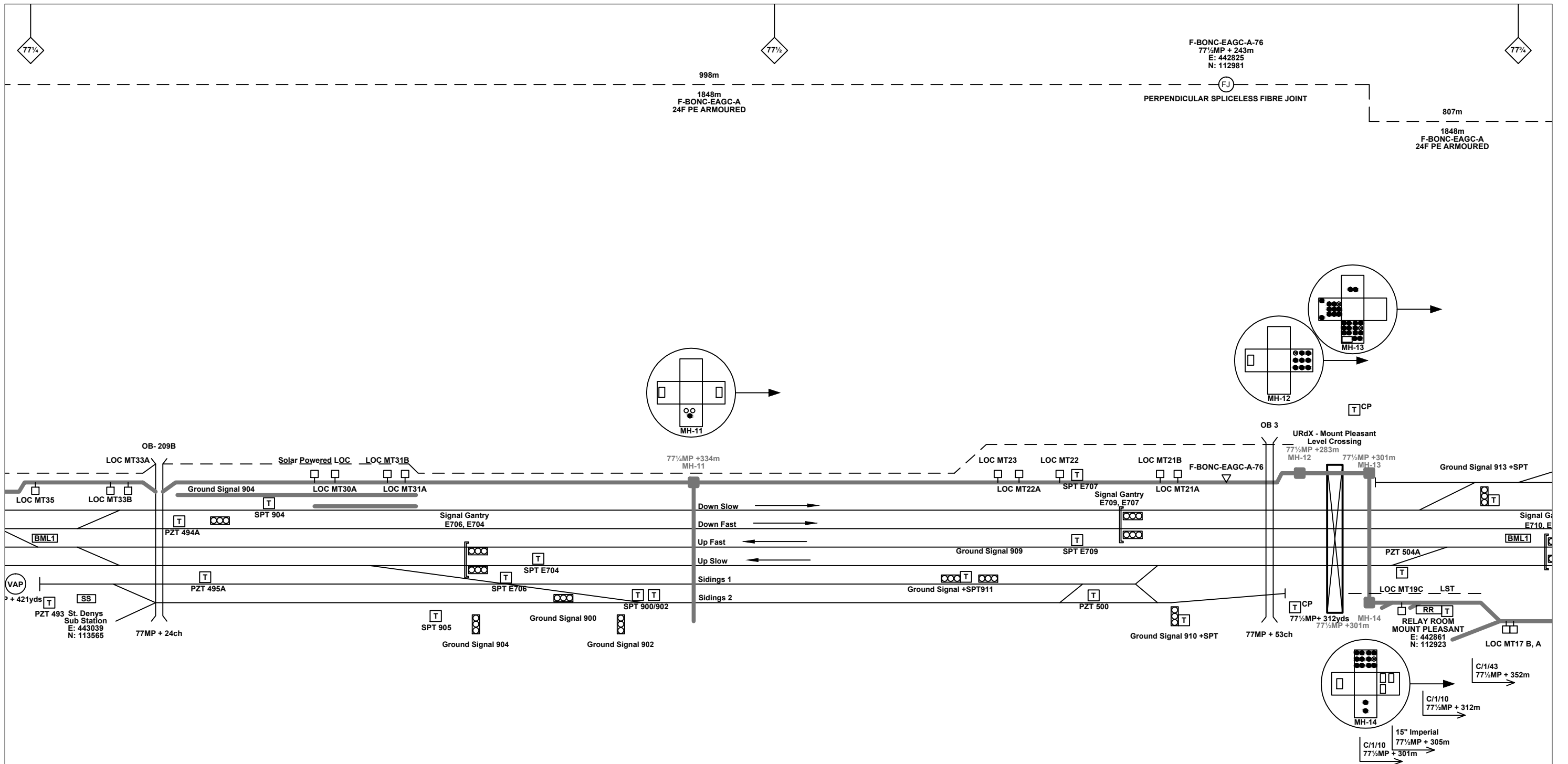
FTN/GSM-R Project
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Paddington
London
W2 1HA

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 Line
	Cabinet with Regenerator and Verts		Fibre Joint		Electrical Control Room		Core Node with GSM-R Colocated		Manhole		Copper Joint Routeworks		Underbridge		Vehicle Access Point		Mile Post		Gantry		HV Cable
			Screening Conductor Joint with/without Earth		Manhole		FTN Access Node		Mid Length Sheath Gap Fibre		Cabinet Routeworks		Pedestrian Access Point		Platform		Sewer		Gantry		LV Cable
			Manhole		Sheath Gap Copper		FTN Access Node with GSM-R Colocated		Tunnel		Fibre Joint Routeworks		Earth Farm		Buffer Stop		Telephone		Cable Pull		Water
					Manhole																

KEY
 Proposed Fibre & Civils Elements are shown in RED
 Proposed Copper Elements are shown in BLUE
 Proposed Screening Elements are shown in MAGENTA
 All Recoveries are shown in GREEN

Notes

Contractor(s) _____

1988m
2034m
F-DIDC-RGAC-A

Status - as per Key Below

Existing Fibre Cable
Existing Copper Cable
Existing Screen Cable

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DA	17-07-09	1st Issue	JO	MT	SW

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

Status: **Design**

Scale(s): NTS

ELR & Mileage: BML1, BML2, SDP1 & SOY

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

Network Rail

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

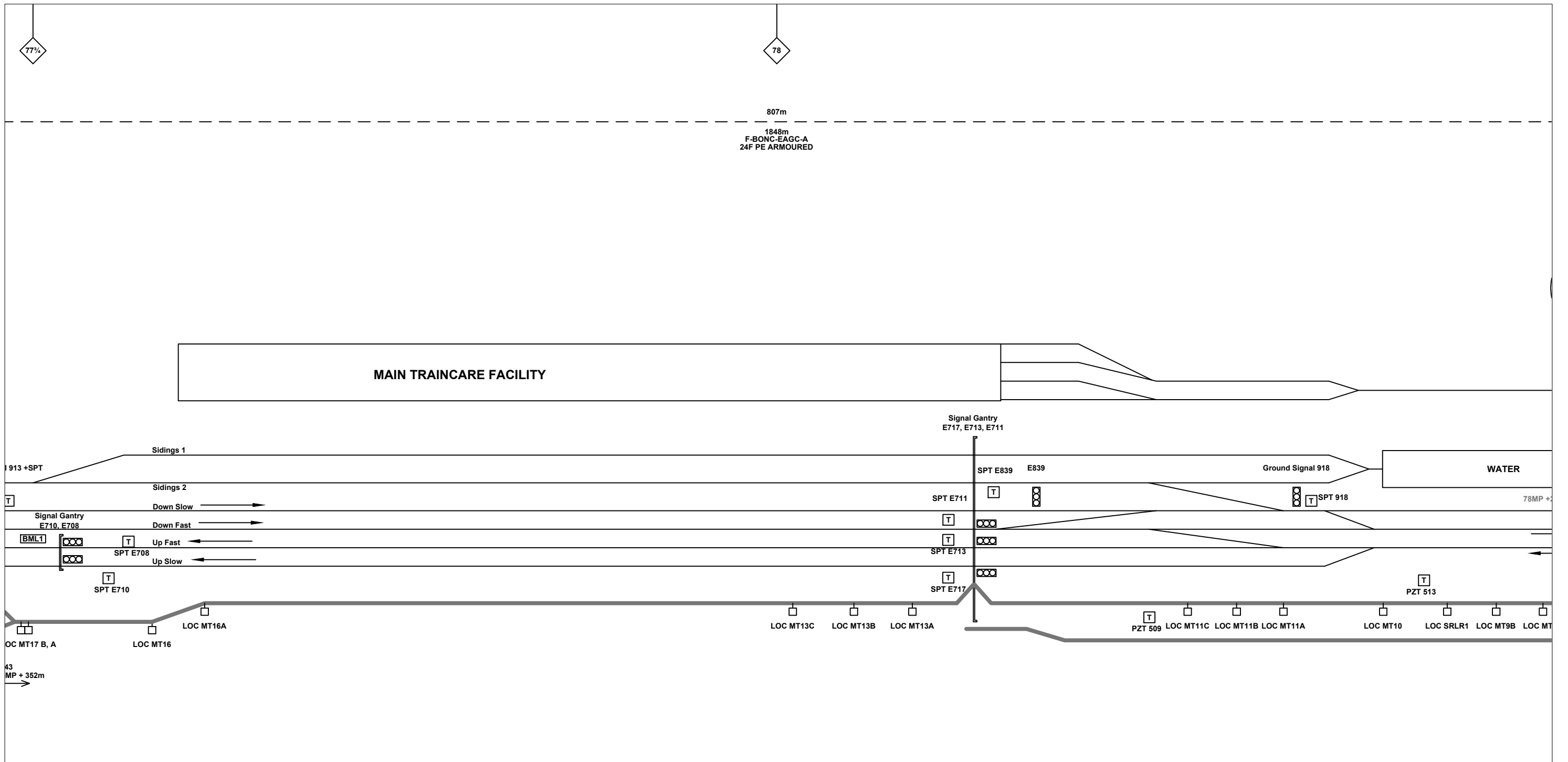
Alternative Reference: See Layout Tab 841 x 297 Sheet 1

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

Sheet: 2 of 8

Revision: B

Sheet Size A3 297x420



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	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		2034m F-DIDC-RGAC-A						Telephone	Cable Pull	AC Stanchion
Proposed Screening Elements are shown in MAGENTA		Status - as per Key Below								
All Recoveries are shown in GREEN		All Existing Elements are shown in BLACK								
		--- Existing Fibre Cable								
		- - - Existing Copper Cable								
		--- Existing Screen Cable								

Notes

B	23-12-10	1st Issue - Stage 2 Design	DA	JW	CT
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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**

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)			

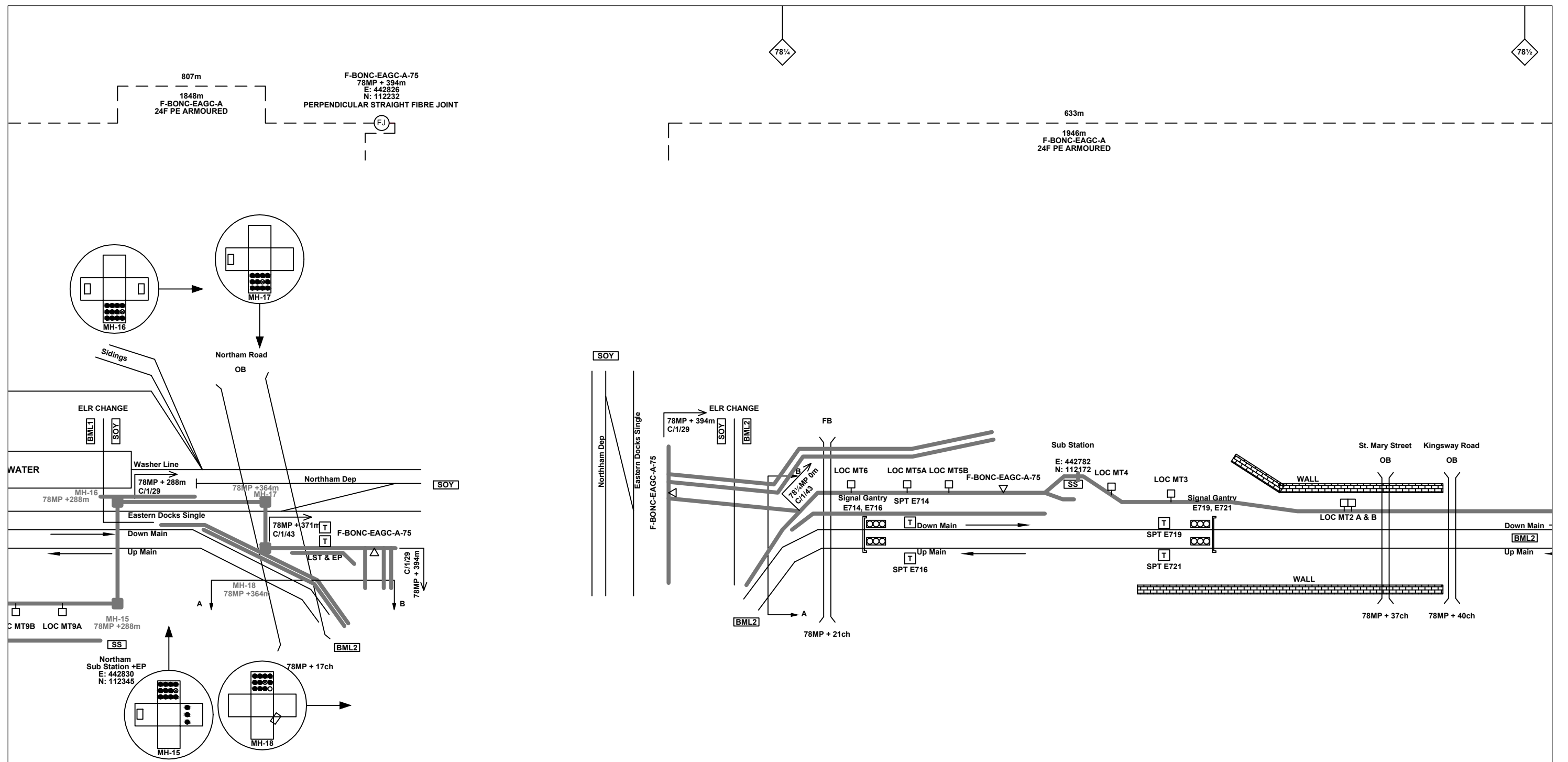
FTN/GSM-R Project
Tournament House
Paddington
London
W2 1HA

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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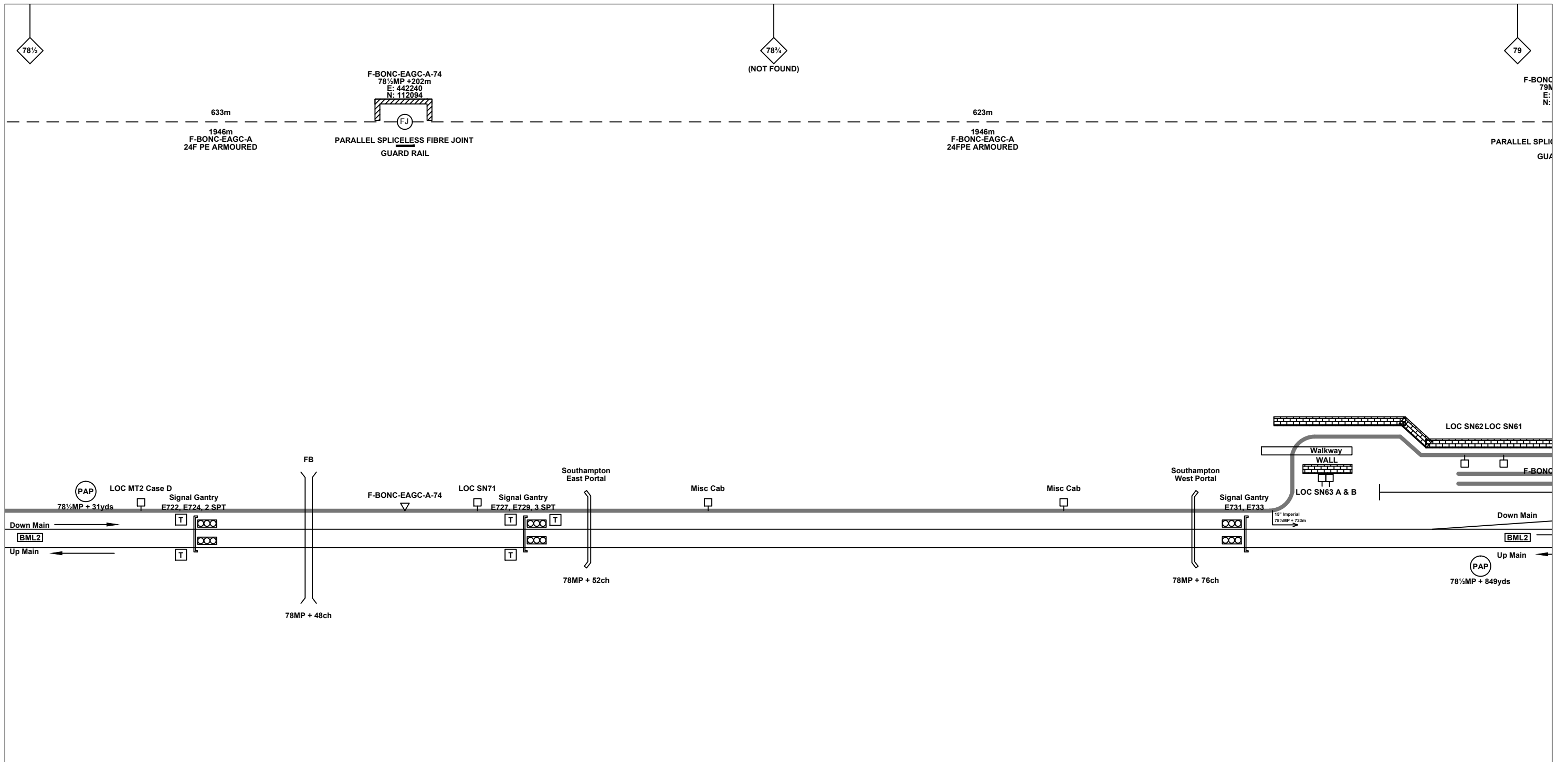
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Alternative Reference: See Layout Tab 841 x 297 Sheet 2

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

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 Fibre Cable								Copper Blue Fibre Red Screen Green
Proposed Screening Elements are shown in MAGENTA	--- Existing Copper Cable	Existing Copper Cable								AC Stanchion
All Recoveries are shown in GREEN	--- Existing Screen Cable	Existing Screen Cable								

Notes

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Contractor(s)

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

Status: **Design**

Scale(s): NTS

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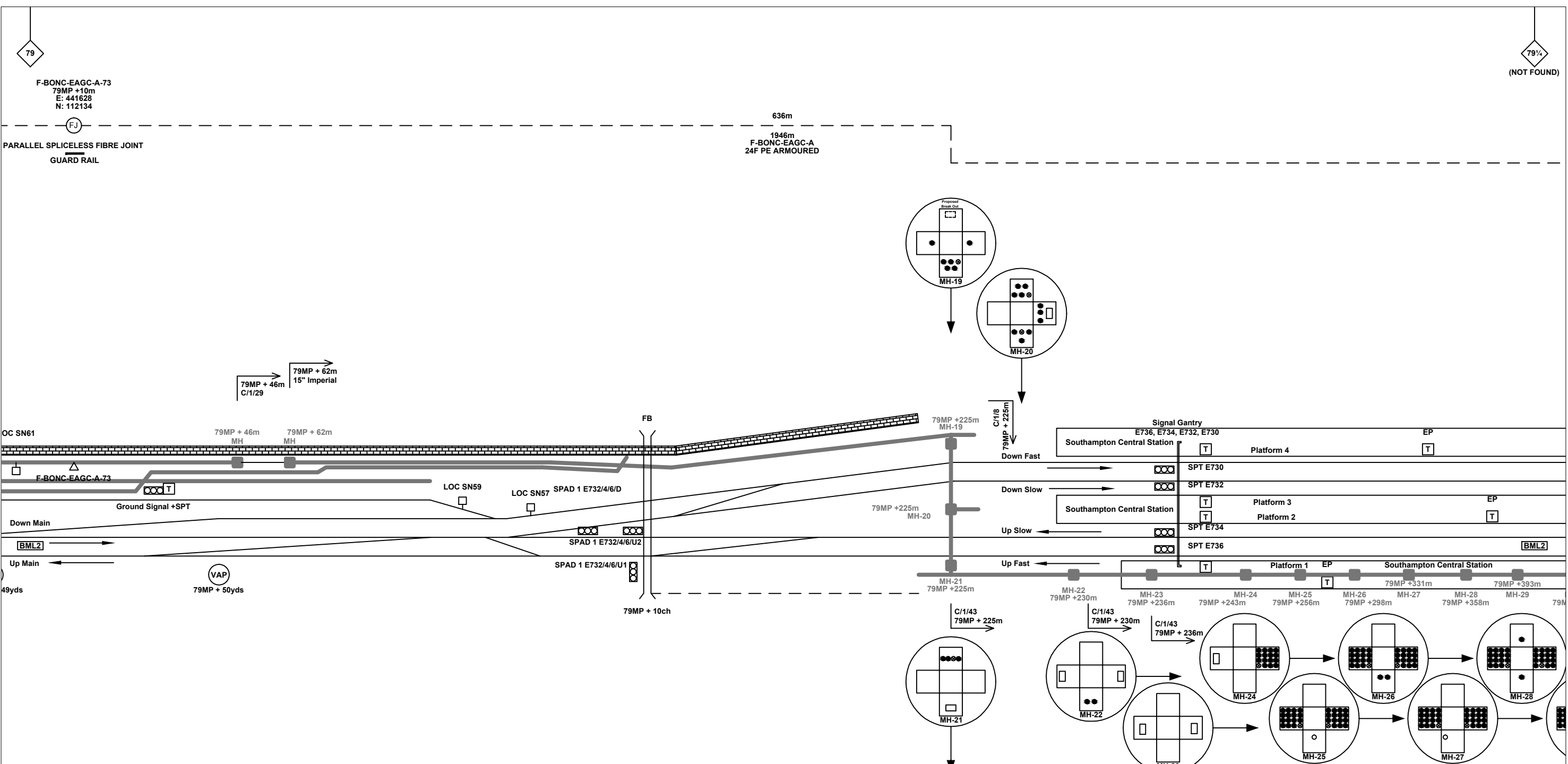
FTN/GSM-R Project
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Alternative Reference: See Layout Tab 841 x 297 Sheet 3

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		Status - as per Key Below	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks		Earth Farm	Buffer Stop	Telecoms	Water
Proposed Copper Elements are shown in BLUE								Telephone	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**

Scale(s): NTS

ELR & Mileage: BML1, BML2, SDP1 & SOY

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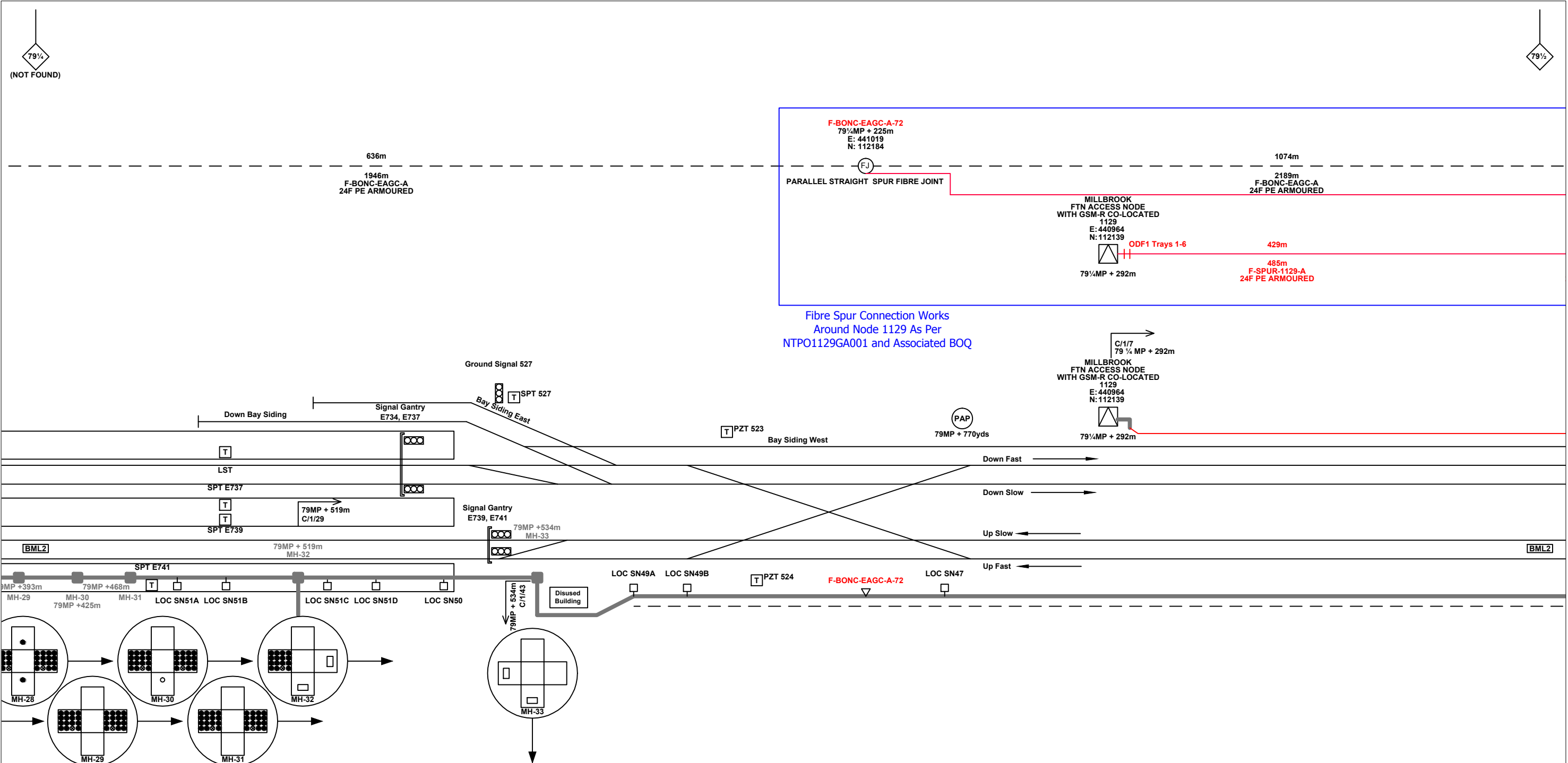
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Alternative Reference: See Layout Tab 841 x 297 Sheet 3

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

Sheet: 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	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	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										

Notes

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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**

Scale(s): NTS

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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

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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	Gantry	HV Cable
KEY Proposed Fibre & Civils Elements are shown in RED Proposed Copper Elements are shown in BLUE Proposed Screening Elements are shown in MAGENTA All Recoveries are shown in GREEN	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	Underbridge	LV Cable
All Existing Elements are shown in BLACK	Existing Fibre Cable	Existing Copper Cable	Sheath Gap Copper	FTN Access Node with GSM-R Colocated	Fibre Joint Routeworks	Tunnel	Earth Farm	Buffer Stop	Telephone	Sewer
	Existing Screen Cable									Water

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**

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
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