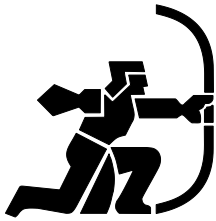
Northern Line

Road Knowledge Modules Book



This book was originally designed to standardise the training given to trainees when performing road training. It also maximises the time that the trainee has with an Instructor Operator.

From my own experiences, I know that there were some subjects I would shy away from because I felt that my knowledge was lacking. When talking to other Instructor Operators I found that they were doing the same. An example is substations. I did not think they were of great importance whereas other Instructor Operators and Managers did.

This book sets out to be an aide-mémoire for the items taught by each Instructor Operator.

Some Instructor Operators may think that this book goes too deeply into signal operations. I believe that should you decide not to go that deep in your explanation, you must inform the trainee that certain signals will initially always be seen as being red. With the aid of this book, you can explain why they are that aspect or should the trainee ask why, you have the information to explain why.

While having this opportunity to be able communicate to all Instructor Operators. I would like to remind you all of the hundred and one things that you wanted to ask your Instructor Operator when you were sent to a depot on your first day of training. Think back to how apprehensive you felt. What will I be doing today?, what will the I/O be like?, how will I get home if the last train as departed? To enable a trainee to absorb all the information you are about to give them, you should make them feel at ease. Solve any problems that you can. This way a person is more receptive to learning and therefore maximises their ability to learn. That is why the section on meeting a trainee for the first time is included.

Please use this book as your reminder of what to teach trainees and how to get the best from them.

Tim Goodfellow

I/Op Roger Mather
Train Operations Managers Office
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Divided into modules from one end of the line to the other, the book is laid out as if you are taking a cab ride from A to B. The journey will normally begin at the starter of the first station and end at the starter of the last station. To save repetition, some information may only be shown in a single module. E.g. the main details of Stockwell starter U10 will appear in the module Stockwell to Kennington because the module is beginning with that starter and so the information is relevant to that module. In the previous module (Tooting Broadway to Stockwell), starter U10 is just the end of the module and has no particular significance.

A reversing point will normally be covered separately, at the junction of two modules. E.g. module TOOTING BROADWAY to MORDEN, then reversing point module TOOTING BROADWAY, then module TOOTING BROADWAY to STOCKWELL.

An Instructor Operator should already be familiar with the basic information that they pass on to a trainee. The trainee will also have this information in the line information book that they will have been issued with. Details of moves are not normally included here - they can be found elsewhere, such as in the line information book - although key points may be mentioned. Likewise, full depot information / hiking information is not included. One of the ideas of this book is to provide some additional “background” information for the Instructor Operator so that they have an understanding of why things happen, should a trainee have a query.

Some line mapping information has been included where relevant.

Substations are listed if there is a substation within that module. E.g. Stockwell substation is listed in the Tooting Broadway to Stockwell module, and in the Stockwell to Kennington module.

The Line Speed is shown, together with any Permanent Speed Restrictions. Some long term Temporary Speed Restrictions may be included. The speed for going over points when joining or leaving the main line is normally 10 mph. Where the PSR is different to that, then that is normally shown.

The reference to “outer home” means the signal that protects a train in the platform ahead. This is the signal that a following train will be held at. When a signal is mentioned as clearing, it should be remembered that this is only a guide. It should never be assumed that a signal will clear or is already clear.

This book is a joint work between myself and Tim. We hope that you will find it useful.

Roger

Approach-controlled signals and signal clearance
Most semi-automatic signals are approach-controlled, but when they clear can depend on the location and whether they are in automatic working or not. In this book, I have used the term “approach-controlled” to mean a signal (automatic or semi) that normally remains at danger until the train has entered the platform, possibly not clearing until after the train has stopped.

Most speed-controlled / approach-controlled signals are cleared by the detection of a train at a position detector or by the occupation of a track circuit.

It is important that trains draw right up to signals. This allows the following train to get as close as possible and prevents the locking of any points etc. Likewise, some signals will not clear until the train is on the approach track for that signal. When reversing, always ensure that the train is stopped fully on the stopping mark before changing ends. Drivers of short trains (such as some engineering trains etc.) should stop on the stopping mark, change ends, then draw up to the wrong road starter or shunt signal.

If running empty and following directly behind a train, it is common practice to wait at the entrance of the platform until the starter clears to save being held in the platform. Remember that the starter may not clear until the train has occupied a track circuit in the platform. Therefore, where you know that the starter is approach-controlled or is semi-automatic, carry on into the platform. If you are waiting outside the station and the starter is still at danger after about half a minute, then carry on into the platform.

‘X’ signals
On the Northern Line, many ‘X’ signals have been changed to ‘A’. As a consequence, some controlled areas may not have an ‘X’ signal. Some automatic signals that were ‘X’ signals still have a signal phone.

FNX signals
About half the FNX signals have signal phones. Usually they are in a larger or different shape box than normal. Most of these phones go to the floodgate, the Floodgate Controller or the station headwall and will not be answered. They are usually the magneto telephone type. Those that can be used go to the telephone panel at the station ahead.

Regulating points
Trains can be held by the timetable at a regulating point via the programme machine or computer, or they can be held by the Service Operator. Some controlled areas, such as where there is only an emergency crossover, do not have a programme machine / computer and usually work automatically. They can be controlled directly by the Signal Operator as required.

Track Circuit Interrupters
Sidings, and most dead-end parts of the track such as where there are buffers or sand drags, have track circuit interrupters. These are fixed onto the running rail on a part of the track where the wheel of a train should not go and are used to detect if a train has overrun. A train wheel passing over the interrupter will set off an alarm, normally in the Supervisor's office, but the driver may not be aware of it. A driver should always report an overrun to the Service Controller.

Sidings
Sidings have countdown markers along the tunnel wall or on the track. These show how many cars are left outside the siding area. E.g., if you stop on marker 1, there is still one car not in the siding. The look of the stopping mark in a siding can vary, and may just be a diamond. Usually the stopping mark is close to the buffer. Make sure that you draw right up to the stopping mark when entering the siding.

Tunnel sidings have a row of yellow lights. This is a reminder to you that you are entering a siding.

Most sidings have a policeman, usually halfway down the siding. The maximum speed in a siding is 10 mph, and the master switch should be in Forward unless instructed otherwise.

Some sidings have traction protection and the traction current in the siding will be discharged if the train is motoring when the points are normal - see Siding Traction Fuse Protection at the end of this book.

Emergency Crossovers
Some controlled areas where there is an emergency crossover have a SHUNT or REVERSE sign, normally in the vicinity of the station starter, that can be illuminated by the Service Operator. This sign is to tell the driver that the train is reversing there and for the driver to carry out the relevant procedure. If you see the sign illuminated, but you haven't been told that the train is reversing there, contact the Service Operator or Service Controller. The sign does not have to be illuminated for a train to reverse.

The northbound inner home signal normally protects the crossover when the crossover is north of the station (as all Northern Line emergency crossovers except Totteridge are). However, in some locations, such as Moorgate, a train can be allowed into the platform before the crossover is reversed. The starter then protects the crossover.

Positive Train Identification
Depending on which mode the Service Operator is working in for that area, the destination description set up on the train's PTI can be used to route the train at a junction. If the PTI is not set correctly, a wrong route could be given. If there is a fault with the PTI equipment, the line computer might not be receiving any PTI information. This usually means that OOO and XXX are displayed on the Service Operator's panel instead of the PTI information. This is the "noughts and crosses". Different messages or destinations may be shown on the platform dot matrix displays. If you suspect that there might be a problem with the PTI, check that you have the correct destination set up. Be extra vigilant when approaching a diverging junction to ensure that the correct route is set for you. Wrong or a lack of PTI information may mean delays at juntions or when a train is going to depot.

A trainee's introduction
When meeting a trainee for the first time, remember that they may have enquiries, whether it be the times of staff taxis, the possibility of a certain rest day, or what the training program consists of. Remember the trainee will have a lot to learn in a short time so the sooner these questions are answered, the sooner they can settle into learning everything to reach the required standard of road knowledge.
Remember, you will be driving over these routes several times. Do not give the trainee an information overload. As you travel a section, choose a subject, such as speed restrictions, and concentrate on this. Next time you cover the section, choose another subject.
The trainee will be issued with a line information book. This contains the information they need to pass the road test.

The following booklets may be of some use if you require further information:
Northern Line Signal Reference Book
Northern Line Signal Post Telephone List book
Northern Line Point Types book
Track Circuit Interrupters, Position Detectors and Positive Train Identification book

INDEX

MORDEN to TOOTING BROADWAY

NB

Substation	Morden. South Wimbledon
Section ahead	South Wimbledon
Section in rear	none
Route secured	Y27. $W12^{B}$
PSR LS = 35:	15 then 25 from Morden platform 2
	25 from Morden platforms 3/4 and 5

Headwall tunnel telephones at the northbound end of Morden platforms.
- platform 2 (41 road) is fed from the South Wimbledon to Morden traction current section.
- platforms 3/4 (42 road) are normally fed from the Morden to South Wimbledon traction current section.
- platform 5 (43 road) is fed from the Morden to South Wimbledon traction current section.

A728 pop-up signal

A728 normally shows no aspect. This is to ensure that there is no risk of read-through by a train in the platform. It illuminates when the first pair of wheels goes over the blockjoint of the station starter and goes out when the last pair of wheels passes the blockjoint of A728.
A728 may occasionally remain illuminated, the aspect displayed depending on whether the track ahead is occupied or not. This is not a signal irregularity, but should be reported to the Service Controller.

Tooting Broadway outer home $W12^{A}$ protects the crossover and the platform and will remain at danger if there is a train reversing or a train in the platform.

TOOTING BROADWAY to MORDEN

SB

Substation	South Wimbledon. Morden
Section ahead	none
Section in rear	South Wimbledon
Route secured	W2^{A}. Y2 (route 1)
PSR LS=35:	25 then 20 to Morden platforms 2 and 3/4 15 to Morden platform 5. 15 in all platforms

Regulating point Tooting Broadway - timetable and Service Operator

Be aware!

Colliers Wood inner home may remain at danger for longer than normal if following a train.
South Wimbledon inner home may remain at danger if following a train.

South Wimbledon starter is approach-controlled.

15 mph sign at South Wimbledon is illuminated if advance starter A7151 is at danger.

Y2 Green (route 1) - to platform 2.
Green with diagonal route indicator (route 2) - to platforms 3/4.
Green with horizontal route indicator (route 3) - to platform 5.

Platform 2 has two policemen, platforms 3/4 and 5 have one.

If going to depot from the middle platform, open the doors on platform 4 only.

TOOTING BROADWAY (W)

Regulating point NB and SB - timetable and Service Operator

Siding S-N. N-N
Policeman in siding
Wide-to-gauge points at siding
Traction protection (via circuit breaker)

Tunnel Telephone wires discharge current from the siding only.
Supervisor answers TT handset.
“Plunge to reset traction circuit breaker” plunger at driver’s end. This plunger should reset the circuit breaker that feeds traction current to the siding when pressed.

Procedure for entering the siding (both platforms)
Procedure for departing the siding

Be aware!
Inner home W11 might be at danger when departing the siding.

Walkway to / from the siding - arrange procedure with Supervisor.

TOOTING BROADWAY to STOCKWELL

NB

Substation	Balham. Clapham Common. Stockwell
Section ahead	none
Section in rear	Balham
Route secured	none
PSR LS = 35:	15 approaching Clapham Common
	25 departing Clapham Common

Regulating point Tooting Broadway - timetable and Service Operator

Clapham Common rail gap is between Clapham South and Clapham Common.

Special detrainment instructions for Clapham Common and Clapham North island platforms.

UX670
Clapham North starter UX670 is the 'X' signal for Stockwell.

UX670 has a short overlap (30.8m) which means that Clapham North inner home can clear quickly to let a following train into the platform.
UX670 will remain at danger until the train in front is berthed in Stockwell platform.
The combination of these two things means that if a train is following another train into Clapham North, the starter will often still be red when the train is ready to depart the platform.

Stockwell outer home A668^{A} can act as a speed signal if there is a train in the platform at Stockwell, allowing the following train as far as A668^{B}.

Stockwell inner home U11 protects the crossover.

U100 draw-up
Will normally be yellow if inner home U11 is green.

Be aware!
U100 is partially hidden under the platform and may still be at danger.

Stockwell starter U10 is approach-controlled.

If there is a train reversing N-S or S-N ahead, U100 will remain red and act as a normal draw-up signal. U11 and U100 become speed signals. This allows the approaching train into the platform by reducing the required braking distance. U10 will now protect the crossover.

STOCKWELL to TOOTING BROADWAY

SB

Substation	Stockwell. Clapham Common. Balham
Section ahead	Balham
Section in rear	none
Route secured	none
PSR LS = 35	25 approaching Clapham Common 30 departing Clapham Common

Regulating point Stockwell - Service Operator

Special detrainment instructions for Clapham North and Clapham Common island platforms.

Clapham Common rail gap is between Clapham Common and Clapham South.

Be aware!

Can be held at Tooting Broadway inner home A701^{C}.
- train ahead slow going into siding.
- or Service Operator taking a release.
  Because of the delay when taking a release, it's possible that the signal may be green then go to red as the train approaches it.

Regulating point NB and SB - Service Operator

Crossover N-S. S-N

Procedure for reversing N-S
SHUNT sign may be illuminated.
U5, to go south over the emergency crossover, is a colour light signal.

Procedure for reversing S-N
REVERSE sign may be illuminated.
Plunger on north end headwall for wrong road starter U9.
- U9 may not clear unless the plunger is operated.
    - the Service Operator can clear U9 without the plunger being operated.
- always plunge before boarding the train unless U9 has already cleared.

note
Automatic S-N reversing can be set up at Stockwell. Usually this is done when there is special working and all trains are reversing there. This means that the Service Operator doesn't have to set up the move each time. In automatic working, the plunger must be pressed before U9 will clear.

STOCKWELL to KENNINGTON

NB

Substation	Stockwell
Section ahead	none
Section in rear	none
Route secured	U10. B33, B31^{A} (route 1, route 2). B31/1^{B}
PSR LS = 35:	15 to Kennington platform 1

Regulating point Stockwell - Service Operator

Speed-controlled signalling if there is a train at Oval.
A662^{A} - 25 mph, then A662^{B} - 20 mph.

If the train ahead is still in the platform and the following train has arrived at A662^{C}, as the train departs the platform, A662^{C} will clear, followed by A662^{D} then A662^{E}.
If the train ahead has already started to leave the platform, A662^{C} will remain at danger; then A662^{C}, A662^{D} and A662^{E} will all clear at the same time.
A662^{E} (in the platform) is the inner home, not a draw-up.

Be aware!
A662^{E} is partially hidden under the platform and may still be at danger.

"Accept any signal" sign at Oval headwall.
Oval starter BX660 is the 'X' signal for Kennington.

B34
Protects running to / from the NB main and the siding.
B32 Protects platform 3. A train may be held at this signal if the PTI code is not recognised.

B31^{A} Green (route 2) - via Bank, with route indicator (route 1) - via CX.
Accept wrong route after two minutes if unable to contact anybody.

Rail gap indicator on opposite side to B31^{A}, near points. This rail gap indicator refers to trains going to the Charing Cross branch only, where there is a new current section. A "Charing X Line" sign underneath the RGI is illuminated when the RGI is illuminated.
If the RGI and sign are illuminated, Bank branch trains should ignore the RGI and proceed as normal. The current section on the Bank branch is from Stockwell to Elephant & Castle.

Be aware!
B34 can remain at danger.

KENNINGTON to STOCKWELL

SB

Substation	Stockwell
Section ahead	none
Section in rear	none
Route secured	B8. B3 (route 1, route 2)
PSR LS = 35:	15 from Kennington platform 2 to SB main

Regulating point Kennington - timetable and Service Operator

B3 Green (route 1) - to loop, with route indicator (route 2) - to SB main.

Stockwell outer home U1^{A} protects the crossover and the platform and will remain at danger if there is a train reversing ahead or a train in the platform.

KENNINGTON (B)

Regulating point all platforms - timetable and Service Operator

Siding	S-N	plat 2 (CX) - plat 1 (CX)	plat 2 (CX) - plat 3 (Bank)
		plat 4 (Bank) - plat 1 (CX)	plat 4 (Bank) - plat 3 (Bank)
Siding	N-N	plat 3 (Bank) - plat 1 (CX)	plat 3 (Bank) - plat 3 (Bank)
Loop	S-N	plat 2 (CX) - plat 1 (CX)	

The northbound main is at a higher level than the southbound main. The siding is level with the northbound main. The approach to the siding from platforms 2 and 4 is via a long uphill gradient.

The siding is long - it used to be able to accommodate two trains, with shunt signals half way down and trains used to stable there. Now it is just used for reversing, although a train can be stabled there if required. Halfway down the siding is a stopping mark, fixed red lights and a fixed trainstop. There is also a signal phone there.

Drivers of reversing trains must stop at the stopping mark before the fixed red lights and change ends.
Trains must not pass the fixed red lights unless instructed.

There is no policeman in the siding.
Tunnel Telephone wires discharge current from the siding only.
Supervisor answers TT handset.

Procedure for entering the siding (platforms 2, 3 and 4)
Procedure for departing the siding to the northbound main
Procedure for walking to / from a train in the siding
-arrange with Supervisor at Kennington or Service Controller as appropriate

KENNINGTON to MOORGATE

NB

Substation	Elephant & Castle
Section ahead	Elephant & Castle
Section in rear	none
Route secured	none
PSR LS = 35:	30 after departing Kennington, then 15 to Elephant & Castle. 20 departing Elephant & Castle. 30 between Elephant & Castle and Borough. 25 between London Bridge and Bank. 25 Between Bank and Moorgate. 15 approaching Moorgate.

Regulating point Kennington - timetable and Service Operator

There are FNX signals between Kennington and Moorgate.
FNX640^{A}, FNX640^{B}, FNX632 and FNX6341 do not have an illuminated 'A'.
FNX632 and FNX640^{A} have a signal phone that goes to the station panel.

Regulating point London Bridge - Service Operator
Starter X638 is approach-controlled.
X638 is an automatic signal that can be held at danger.

Be aware!

London Bridge starter can remain at danger.

Moorgate inner home M11 protects the crossover and may be held at danger if there is a train reversing ahead.

MOORGATE to KENNINGTON

SB

Substation	Elephant & Castle
Section ahead	Elephant & Castle
Section in rear	none
Route secured	none
PSR LS = 35:	15 departing Moorgate. 25 Between Moorgate and Bank 25 departing Bank. 25 approaching Borough 30 departing Borough. 20 approaching Elephant & Castle 30 departing Elephant & Castle

There are FNX signals between Moorgate and Kennington.
All have illuminated 'A's.

Regulating point Moorgate - Service Operator

Regulating point London Bridge - Service Operator
Starter X643 is approach-controlled.
X643 is an automatic signal that and be held at danger.

Be aware!
London Bridge starter can remain at danger.

Kennington
B800 - draw-up in platform 4.
Platform 4 starter B8 is approach-controlled.

10 mph sign near platform entrance is illuminated if B800 is at danger.

B800 initially protects the crossover.

B800 can clear in three ways:
1) 4.5 seconds after the first pair of wheels goes over A655^{C} blockjoint.
   - B8 remains red and B800 goes to yellow.
   - this is what normally occurs if the train is running early.
2) After the first pair of wheels goes over A655^{C} blockjoint.
   - B8 clears and so will B800.
   - this is what normally occurs if the train is on time or running late.
3) In advance, when B8 is green.
   - the Service Operator has manually cleared B8.

Never assume that B800 will clear.

MOORGATE (M)

Regulating point NB and SB - Service Operator

Crossover N-S. S-N

Procedure for reversing N-S

Procedure for reversing S-N
- trains reversing S-N must ensure that they draw fully up to the stopping mark in the platform to ensure that the position detector detects the train is fully berthed. If not, signal lever M2 cannot return to normal and wrong road starter M8 cannot be cleared.

MOORGATE to EUSTON

NB

Substation	Old Street. Euston
Section ahead	Old Street
Section in rear	none
Route secured	none
PSR LS = 35:	30 departing Old Street. 30 Approaching Euston

Regulating point Moorgate - Service Operator

Angel starter is approach-controlled.

Be aware!

Kings Cross inner home J11 may remain at danger if a train is entering or leaving Kings Cross loop.

Regulating point Kings Cross - Service Operator

Tripcock tester at Kings Cross.
Kings Cross starter is approach-controlled.

J10 Green (route 1) - to NB main.
With route indicator (route 2) - to Euston loop.
Signal phone at 7^{A} points.

EUSTON to MOORGATE

SB

Substation	Euston. Old Street
Section ahead	none
Section in rear	Old Street
Route secured	none
PSR LS = 35:	

Regulating point Euston - timetable and Service Operator

Kings Cross starter is automatic and is approach-controlled.
Tripcock tester at Kings Cross.
Angel starter is approach-controlled.
Old Street starter MX629 is the 'X' signal for Moorgate.

Moorgate outer home M1 protects the crossover and the platform and will remain at danger if there is a train reversing or a train in the platform.

KINGS CROSS and EUSTON (J)

Kings Cross

Kings Cross NB
Controlled area

Regulating point - Service Operator

Kings Cross starter J10
Green (route 1) - to NB main.
With route indicator (route 2) - to Euston loop.
Kings Cross loop outlet signal
J12 Green (route 1) - to NB main.
With route indicator (route 2) - to Euston loop.

N-S via Euston loop to Euston SB platform
Procedure for reversing N-S
Can take passengers if instructed (colour light move).

J900 will not clear until the train reaches its position detector - speed approximately 5 mph.
J9 will not clear (if it is going to) until 18.5 seconds after the train has reached its position detector. The train will have to come to a stop.
J9 is on the track on the left. The signal phone is at cab level on the right, accessible from the cab door.

Be aware!
The points to the SB platform can be reversed at any time, but J9 may remain at danger.
J9 may be obscured if the train is drawn forward in order to use the signal phone.

Kings Cross SB is an automatic area

KINGS CROSS and EUSTON (J)

Euston

Euston NB is an automatic area

Euston SB
Controlled area

Regulating point - timetable and Service Operator

S-N via Euston loop and Kings Cross loop
Procedure for reversing S-N
"Three parts"

1) J3^{B} shunt as far as J8.
2) when J8 clears, go south along the northbound main and into Kings Cross loop as far as L22.
   - Kings Cross loop can be thought of as a siding when reversing.
   - no stopping mark. Stop at L22. L22 should be red. If it is green, do not pass it. (next signal is Kings Cross Piccadilly Line EB starter L9). Inform the Service Controller.
   - trap points (7^{B}) ex Kings Cross loop.
3) Kings Cross loop to Euston NB.

10 mph in and out of Kings Cross loop.

Be aware!
If tripped in the Euston loop, **do not move** unless instructed.

The signal phone at J12 goes to the Northern Line platform at Kings Cross.
The signal phone at L22 goes to the Piccadilly Line platform at Kings Cross.

L22 is 90m from the Piccadilly Line crossover.
The area around L22 is on the Piccadilly Line radio channel.

EUSTON (Bank) to CAMDEN TOWN

NB

Substation	Euston. Camden Town
Section ahead	Camden Town platform 1. Camden Town platform 3
Section in rear	none
Route secured	$E11^B$ (route 1, route 2)
PSR LS = 35:	15 approaching Camden Town 1 and Camden Town 3

15 mph sign illuminated at Euston if advance starter A608 is at danger.
Euston starter is automatic.
Overrun signal phone approximately 200 feet north of EX602.

$E11^B$ Green (route 1) - to platform 1.
With route indicator (route 2) - to platform 3.
Accept wrong route after two minutes if unable to contact anybody.

CAMDEN TOWN to EUSTON (Bank)

SB

Substation	Camden Town. Euston
Section ahead	Camden Town platform 2. Camden Town platform 4
Section in rear	none
Route secured	E37 (route 1, route 2), E41 (route 1, route 2)
PSR LS = 35:	20 departing Camden Town platforms 2 and 4 There is no terminating sign Resume line speed about 2½ car lengths before S601

Regulating point Camden Town - timetable and Service Operator

E37, E41 Green (route 1) - via CX, with route indicator (route 2) - via Bank.

Sprung points (were spring toggle points) at the junction of the route from platforms 2 and 4. They always appear to be set for a train from platform 4. A train from platform 2 will push the points over a wheel at a time. A train must not be moved in the wrong direction over these points unless the points are secured.

$J1^A$ at danger protects a train that is entering Euston from the Euston loop This signal may be at danger, even when not following a train.

Outer home $J1^B$ protects the platform.

CAMDEN TOWN to ARCHWAY

NB

Substation	Camden Town. Kentish Town
Section ahead	Camden Town platform 3. Kentish Town
Section in rear	none
Route secured	none
PSR LS = 35:	30 approaching Archway (TSR)

Regulating point Camden Town - Service Operator

Camden Town starter A304 is an automatic signal that can be held at danger.

Kentish Town

The rail gap indicator is on the headwall and cannot be seen when the train is correctly berthed.

The rail gap is short and if the driver carries on when traction current is discharged, the train will liven up the section ahead.

ARCHWAY to CAMDEN TOWN

SB

Substation	Kentish Town. Camden Town
Section ahead	Kentish Town
Section in rear	none
Route secured	none
PSR LS = 35:	

Regulating point Archway - timetable and Service Operator

Be aware!

Can be held at Camden Town platform 4 inner home A301^{C} if the Service Operator is taking a release at Camden Town. Because of the delay when taking a release, it's possible that the signal may be green then go to red as the train approaches it.

ARCHWAY (NN)

Regulating point NB and SB - timetable and Service Operator

Siding N-S
Policeman in siding
Wide-to-gauge points at siding
Traction protection (via circuit breaker)

Tunnel Telephone wires discharge current from the siding only.
Supervisor answers TT handset.
Signal phone is in cross passage to northbound track, opposite shunt signal.

Procedure for entering the siding
Procedure for departing the siding

Walkway to / from the siding - arrange procedure with Supervisor.

ARCHWAY to EAST FINCHLEY

NB

Substation	Highgate
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 40:	25 then 30 departing Archway

Regulating point Archway - timetable and Service Operator

Highgate rail gap is between Archway and Highgate.

Refuge signs

There is a refuge sign at every northbound signal (except starters) between Archway and East Finchley tunnel mouth and one at nearly every southbound signal between the tunnel mouth and Archway. An arrow points to the nearest cross passage or place of refuge - a place where a person could stand out of the way of a passing train. Not relevant to drivers.

Policeman in Highgate platform. It is still operational.

NP16/20

Two signal levers control one signal. Reversing one or the other lever will allow the signal to clear. 16 lever is the inner home. 20 lever is a speed signal. If the route is set for a train to go north from the middle platform, 16 lever cannot be reversed and NP16/20 cannot be cleared.
Reversing 20 lever can clear NP16/20 and allow the train to proceed into the platform. To ensure that the speed of the train is reduced, the signal will not clear until 15 seconds after the train has been detected by the position detector which is 40 feet before NP16/20. This effectively means that the train comes to a stop before the signal clears.

note - this speed signal operation normally only occurs during timetabled moves from the middle platform. At other times, NP16/20 may remain at danger until the route ahead is set from platform 1.

Be aware!

NP16/20 may remain at danger.

EAST FINCHLEY to ARCHWAY

SB

Substation	Highgate
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 40:	35 then 25 between Highgate and Archway

Regulating point East Finchley - timetable and Service Operator

Highgate rail gap is between Highgate and Archway.

Headwall tunnel telephone at East Finchley platform 4.

Highgate starter A513 cannot clear until the the train ahead has almost cleared A507. This is approximately the same distance as between West Finchley and Woodside Park. If you are following a train, you will be held at Highgate.

Speed signals A507 (35) NN14/15^{A} (25).

NP14/15^{A}

Two signal levers control one signal. Reversing one or the other lever will allow the signal to clear.
15^{A} lever protects the crossover from the siding. 14 lever is a speed signal.
If the route is set for a train to depart the siding, 15^{A} lever cannot be reversed and so NN14/15^{A} cannot be cleared.

Reversing 14 lever can clear NN14/15^{A} and allow a train to proceed as far as NN15^{B}. To ensure that the speed of the train is reduced, the signal will not clear until 4.5 seconds after the train has been detected by the position detector 42 feet before NN14/15^{A}. This effectively means that the train has to almost stop before the signal clears.

Be aware!

NN14/15^{A} may remain at danger.

RNN15^{B} permanently displays a yellow aspect, regardless of whether NN15^{B} is green or red. This can be thought of as a reminder that there is a 25 mph speed restriction as far as the platform.

Be aware!

NN15^{B} is the outer home and protects a train in the platform. It will be at danger if there is a train in Archway platform.

EAST FINCHLEY (NP)

Regulating point NB and SB - timetable and Service Operator

Crossover N-S. S-N
Siding plat 2 - plat 2. plat 2 - plat 3. plat 3 to plat 2. plat 3 to plat 3

There is no policeman in the siding.

N-S via crossover
S-N via crossover, siding shunt, or depot

Procedure for reversing N-S over the crossover
- “three bridges”.

Procedure for reversing S-N over the crossover
- shunt signal, not colour light wrong road starter.
- cannot take passengers.

A train departing south over 23 crossover that is held at NP4^{A} will not have cleared the crossover. A northbound train can be allowed as far as NP14, which protects 23 crossover, until the reversing train passes NP4^{A}. Therefore, if there is a delay with the train in front of the reversing train at platform 4, there will be no movement northbound or southbound until the train has started to depart platform 4 and allow NP4^{A} to clear.

Procedure for entering the siding (both platforms)
Procedure for departing the siding (both platforms)
- trap points protect the southbound main should a train in the siding attempt to pass the shunt signal at danger.

Trains can also reverse S-N via Highgate sidings: platform 3 - platform 2.

EAST FINCHLEY to FINCHLEY CENTRAL

NB

Substation	East Finchley. Finchley Central
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	20 approaching Finchley Central

Regulating point East Finchley - timetable and Service Operator

NP14 protects 23 emergency crossover and will remain at danger if the crossover is reversed.

NQ280^{A}, NQ280^{B}
Draw-up signals associated with NQ28.

If NQ28 is going to clear, it will normally do so by the time the train reaches the school on the left. NQ280^{A} and NQ280^{B} will also clear.
If NQ28 remains at danger, NQ280^{A} will clear when train reaches the position detector 124 feet before the signal. NQ280^{B} will clear when the train reaches the position detector 149 feet before the signal.

If there is a train at NQ28, NQ280^{A} is protecting that train and remains at danger.

NQ28 may remain at danger if the PTI code is not recognised. This means that a train will have to slow down for NQ280^{A} to clear and NQ28 / NQ280^{B} may then clear after the train has passed NQ280^{A}.

Be aware!
NQ280^{A} may remain at danger.

NQ28 Green (route 1) - platform 1 (MHE, siding).
With route indicator (route 2) - platform 2 (MHE, High Barnet, siding).
Accept wrong route after two minutes if unable to contact anybody.
It is not a wrong route if the train is going to MHE and is given a route indicator.
- ensure platform 2 starter shows a plain green if going to MHE.

Trap points in platform 1. If passing NQ28 at danger under rule, ensure that the trap points are secured in reverse for movement over them if going into platform 1.

Tripcock tester at Finchley Central platform 2.

FINCHLEY CENTRAL to EAST FINCHLEY

SB

Substation	Finchley Central. East Finchley
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	25 approaching East Finchley

Regulating point Finchley Central - timetable and Service Operator

NP1 protects 23 emergency crossover and will remain at danger if the crossover is reversed.

NP4^{A} Green (route 2) - to platform 3.
With route indicator (route 1) - to platform 4.

NP4^{B} clearance
- if route 1 (plat 4), then the signal doesn't clear until the train approaches NP2.
- if route 2 (plat 3) then the signal can clear at anytime.

A driver would normally see one yellow signal (RNP4^{AB})when coming round the curve approaching NP2 (two yellow signals, FR4NP^{A} and RNP4^{AB}, if NP4A is is red). If all the signals are green, then the route is set for platform 3. If the train is a southbound train, then be prepared to stop at NP4^{B} as you will have the wrong route.

Accept wrong route after two minutes if unable to contact anybody (unless train is to stable at Highgate).

FINCHLEY CENTRAL to MILL HILL EAST

NB

Substation	Finchley Central
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	30 departing Finchley Central platform 1 15 departing Finchley Central platform 2 15 Approaching Mill Hill East

Regulating point Finchley Central - timetable and Service Operator

'C' sign at Finchley Central platform 1 starter - wait for connection with train arriving at platform 2 if the sign is illuminated.

A1004 speed signal.
Policeman in Mill Hill East platform.

Tripcock Tester at Mill Hill East.

Procedure for Mill Hill East shuttle
- via platform 1.
- via platform 3.

MILL HILL EAST to FINCHLEY CENTRAL

SB

Substation	Finchley Central
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	15 from end of single line, then 30 to Finchley Central platform 3

NQ9 Green (route 2) - to platform 1.
With route indicator (route 1) - to platform 3.

Tripcock Tester at FInchley Central platform 1 (SB) and platform 3.

Trap points platform 1 SB.

FINCHLEY CENTRAL (NQ)

Regulating point NB and SB - timetable and Service Operator

North siding	N-S	plat 1 - plat 3	plat 2 - plat 3
South siding	S-N	plat 3 - plat 2	

North siding
Policeman at entrance to siding.

Procedure for entering the siding (platform 1 and platform 2)
Procedure for departing the siding

South siding
Policeman in siding.
Wide-to-gauge points at siding.
Traction fuse protection.

Procedure for entering the siding
Procedure for departing the siding

FINCHLEY CENTRAL to TOTTERIDGE

NB

Substation	Finchley Central. Woodside Park
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	15 departing Finchley Central platform 2, then 25

Regulating point Finchley Central - timetable and Service Operator

TOTTERIDGE to FINCHLEY CENTRAL

SB

Substation	Woodside Park. Finchley Central
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	25 approaching Finchley Central platform 3

West Finchley starter NQX201 is the 'X' signal for Finchley Central.

NQ3 protects the crossover and platform 3.

Be aware!
NQ3 sighting can be obstructed by the trees and vegetation, especially in the summer.

Tripcock tester at Finchley Central platform 3.

TOTTERIDGE (NT)

Crossover N-S. S-N

Totteridge has an emergency crossover that is hand worked from a ground frame south of the station. There are controlled signals at Totteridge and these are controlled by the ground frame at the south side of the station.

The NT signals follow the automatic signal numbering and have an illuminated ‘A’. These are the only signals on the Northern Line that have an illuminated ‘A’ that are not FNX signals.

When the ground frame is not being used, the area is working automatically and the ‘A’ will be illuminated. When the ground frame is in use, the ‘A’ on the signals is not illuminated.

Because the crossover is worked manually, it is rarely used. When it is used, this is normally during special working and details are published in advance.

The building in the car park at Totteridge is a switch house, not a substation. The traction current sections are Woodside Park to High Barnet / High Barnet to Woodside Park, with a substation at Woodside Park and High Barnet.

Procedure for reversing N-S
- permission to depart must be given by a yellow hand signal.
- check the points are correctly secured.

Procedure for reversing S-N
- detrain.
- green starter.
- permission to depart north over the crossover must be given by a yellow hand signal.
- check the points are correctly secured.

TOTTERIDGE to HIGH BARNET

NB

Substation	High Barnet
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	30 to platforms 1 and 2. 10 to platform 3. 10 in all platforms

Draw-up signal NU300 is speed-controlled and has two position detectors. The first one has a 4.5 seconds timer. If the train reaches the second position detector after 4.5 seconds, then NU300 will clear. If the train reaches the second position detector before 4.5 seconds, it is going too fast and the signal will remain at danger. A second 4.5 seconds timer is triggered and NU300 will clear after 4.5 seconds unless the train has already passed over the signal's blockjoint.

Be aware!

Ensure the speed of the train is reduced to 15 mph or less. Be prepared to stop at NU300.

NU3 Green (route 1) - to platform 1.
Green with diagonal route indicator (route 2) - to platform 2.
Green with horizontal route indicator (route 3) - to platform 3.

Platforms 1 and 3 have three policemen, platform 2 has four.

HIGH BARNET to TOTTERIDGE

SB

Substation	High Barnet
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 45:	15 from platforms 1 and 3. 30 from platform 2 35 approaching Totteridge

KENNINGTON to CHARING CROSS

NB

Substation	Lambeth. Embankment
Section ahead	Embankment
Section in rear	none
Route secured	none
PSR LS = 30:	40 departing Kennington, then 30 from R62^{A}/RFNX62^{BCD}

There are FNX signals between Kennington and Charing Cross.
FNX72 does not have an illuminated 'A'. It has a signal phone which goes to the station panel at Charing Cross.

Regulating point Kennington - timetable and Service Operator

Speed-controlled signalling if there is a train at Waterloo.
A62^{A} - 25 mph, then FNX62^{B} - 20 mph.

If the train ahead is still in the platform, as it departs, FNX62^{C} will clear, followed by FNX62^{D} then FNX62^{E}.
If the train ahead has already started to leave the platform, FNX62^{C} will remain at danger; then FNX62^{C}, FNX62^{D} and FNX62^{E} will all clear at the same time FNX62^{E} in the platform is the inner home, not a draw-up.

Tripcock tester at Waterloo.

Regulating point Embankment - Service Operator

Embankment starter C1 is the start of the Charing Cross controlled area and is the outer home for Charing Cross.

Be aware!
C1 can remain at danger.

Charing Cross inner home C2 protects the crossover and may be held at danger if there is a train reversing ahead.

Charing Cross starter C3 is approach-controlled - two speeds:

1) If the train enters the platform below approximately 15 mph, then C3 will clear before the train has stopped.

2) If the train is faster than this, then there is an additional 15 seconds delay before C3 clears and it is normally still red when the train has stopped.

CHARING CROSS to KENNINGTON

SB

Substation	Embankment. Lambeth
Section ahead	Embankment
Section in rear	none
Route secured	none
PSR LS = 30:	35 departing Embankment. 35 departing Waterloo

There are FNX signals between Charing Cross and Kennington.
All have illuminated 'A's. None have any useable signal phones.

Regulating point Charing Cross - Service Operator

20 mph sign at FNX55 is illuminated if Kennington outer home BX51^{A} is at danger.
15 mph sign at A5511 is illuminated if Kennington outer home BX51^{A} is at danger.

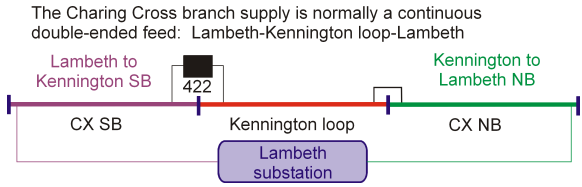
Be aware!
B2 may remain at danger.

KENNINGTON LOOP

Substation	Lambeth
Section ahead	none
Section in rear	none
Route secured	B3 (route 1, route 2) B36^{B}
PSR LS = 15:	20 departing Kennington, then 15

Loop can hold three trains: at A50, A52, B36^{A} - always draw up to the signals.

The current section for the Kennington CX branch is fed from Lambeth substation to Lambeth substation. Discharging traction current between Lambeth rail gap SB and Lambeth rail gap NB will result in the section between the two rail gaps, including the loop, being dead.



CHARING CROSS (C)

Regulating point NB and SB - Service Operator

Crossover N-S. S-N

Procedure for reversing N-S

Procedure for reversing S-N
REVERSE sign may be illuminated
Rear cab clear plunger - SB headwall cabinet.
- wrong road starter C4 may not clear unless this plunger is operated.
  - the Service Operator can clear C4 manually without the plunger being operated (via 11 lever).
- always plunge before changing ends unless C4 has already cleared.

note
Automatic S-N reversing can be set up at Charing Cross. Usually this is done when there is special working and all trains are reversing there. This means that the Service Operator doesn't have to set up the move each time. In automatic working, the plunger must be pressed before C4 will clear.

CHARING CROSS to MORNINGTON CRESCENT

NB

Substation	Leicester Square. Euston
Section ahead	Leicester Square
Section in rear	Euston
Route secured	none
PSR LS = 30:	25 departing Charing Cross

There are FNX signals between Charing Cross and Tottenham Court Road. All have illuminated ‘A’s. None have useable signal phones.

Regulating point Charing Cross - Service Operator

Mornington Crescent inner home E1 protects the crossover and may be held at danger if there is a train reversing ahead.

Mornington Crescent starter E2 is approach-controlled - two speeds:

1) If the train enters the platform below approximately 15 mph, then E2 will clear before the train has stopped.

2) If the train is faster than this, then there is an additional 15 seconds delay before E2 clears and it is normally still red when the train has stopped.

MORNINGTON CRESCENT to CHARING CROSS

SB

Substation	Euston. Leicester Square
Section ahead	Euston. Leicester Square
Section in rear	none
Route secured	none
PSR LS = 30:	25 after departing Leicester Square

There are FNX signals between Tottenham Court Road outer home and Charing Cross.
All have illuminated 'A's.

Regulating point Mornington Crescent - Service Operator

Regulating point Euston - Service Operator

Euston starter A99 is approach-controlled.
A99 is an automatic signal that can be held at danger.

Tripcock tester at Leicester Square.

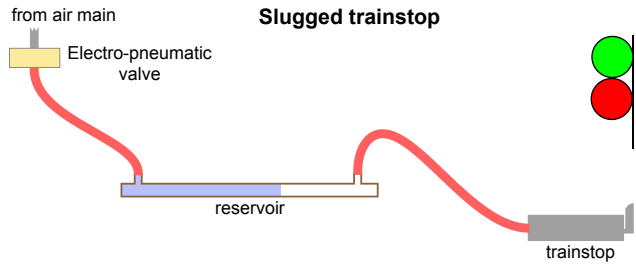
Leicester Square starter CX81 is the 'X' signal for Charing Cross.

$C10^{A}$ protects the crossover and may be held at danger if there is a train reversing ahead.
Outer home $C10^{B}$ protects the platform and will remain at danger if there is a train in the platform.

Charing Cross starter C7 is approach-controlled - two speeds:

1) If the train enters the platform below approximately 15 mph, then C7 will clear before the train has stopped.

2) If the train is faster than this, then there is an additional 15 seconds delay before C7 clears and it is normally still red when the train has stopped.



MORNINGTON CRESCENT (E)

Regulating point NB and SB - Service Operator

Crossover N-S. S-N

Procedure for reversing N-S
- no Limit Of Shunt board - stop at E4.

Procedure for reversing S-N

MORNINGTON CRESCENT to CAMDEN TOWN

NB

Substation	Camden Town
Section ahead	Camden Town platform 1. Camden Town platform 3
Section in rear	none
Route secured	E2. E4 (route 1, route 2). E6. $E9^{B}$
PSR LS = 30:	25 departing Mornington Crescent
	20 between E4 and Camden Town

Regulating point Mornington Crescent - Service Operator

E4 Green (route 2) - to platform 3.
With route indicator (route 1) - to platform 1.
Accept wrong route after two minutes if unable to contact anybody.

There is an overrun signal phone just north of E4.

Slugged trainstops (temporary dual aspect) at E122 and E193.
E122 is a draw-up associated with E6, E193 is a draw-up associated with $E9^{A}$.

$E9^{A}$ protects the crossover. A train will be held here if there is a train due to go to the Barnet branch from the Bank side.

$E9^{B}$ protects the platform.

Slugged trainstop

A slugged trainstop has an extra long hose or, more usually, a “reservoir” which is a long pipe around 11 - 12 feet long.
The track ahead is clear and so a green aspect is shown. The valve is opened to allow air to the trainstop to push the trainstop down. Because the air has to fill the reservoir first, there is a delay before full air pressure builds up in the trainstop (usually 2.5 secs). A red aspect is still shown because the trainstop is up.

CAMDEN TOWN to MORNINGTON CRESCENT

SB

Substation	Camden Town
Section ahead	CT2. CT4
Section in rear	none
Route secured	E32[B]. E34. E37 (route 1, route 2). E39 E41 (route 1, route 2)
PSR LS = 30:	20 departing CT2 and CT4. 25 approaching Mornington Crescent

Regulating point Camden Town - timetable and Service Operator

E37 Green (route 1) - via CX, with route indicator (route 2) - via Bank.
E41 Green (route 1) - via CX, with route indicator (route 2) - via Bank.

Slugged trainstops (temporary dual aspect) at E233 and E234.
E233 is a draw-up associated with E39.
E234 and E340 are both draw-up signals associated with E34.
Short distance (16 feet) between E340 and E34.

E34 and E39 protect the junction of the two SB Charing Cross branches.

E32[A] protects the crossover and may be held at danger if there is a train reversing ahead.
Outer home E32[B] protects the platform and will remain at danger if there is a train in the platform.

Mornington Crescent starter E30 is approach-controlled - two speeds:

1) If the train enters the platform below approximately 15 mph, then E30 will clear before the train has stopped.

2) If the train is faster than this, then there is an additional 15 seconds delay before E30 clears and it is normally still red when the train has stopped.

CAMDEN TOWN to HAMPSTEAD

NB

Substation	Camden Town. Belsize Park
Section ahead	Camden Town plat 1. Camden Town plat 3. Belsize Park
Section in rear	none
Route secured	none
PSR LS = 35:	

Regulating point Camden Town - timetable and Service Operator

Belsize Park
The rail gap indicator is on the headwall and cannot be seen when the train is correctly berthed.
The rail gap is long and cannot be bridged by a train.

Hampstead station starter F2 protects the crossover. Therefore, a train can be brought fully into the platform even though the points ahead may be reversed.

Hampstead starter is approach-controlled.

HAMPSTEAD to CAMDEN TOWN

SB

Substation	Belsize Park. Camden Town
Section ahead	Belsize Park
Section in rear	none
Route secured	none
PSR LS = 35:	

Regulating point Hampstead - Service Operator

Be aware!

Can be held at Camden Town platform 2 inner home A189^{C} if the Service Operator is taking a release at Camden Town. Because of the delay when taking a release, it's possible that the signal may be green then go to red as the train approaches it.

A189^{C} follows a curve and has restricted sighting. Two repeaters are provided for this signal. A train approaching platform 2 should always be prepared to stop if either of the repeaters are yellow.

HAMPSTEAD (F)

Regulating point NB and SB - Service Operator

Crossover N-S. S-N
Crossover is some distance (662 feet) from the platform.

Procedure for reversing N-S
SHUNT sign above cross passage at north end of platform.
There are two signals, F8 and F7, between the shunt signal and the platform.

Procedure for reversing S-N

HAMPSTEAD to GOLDERS GREEN

NB

Substation	Golders Green
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 35:	20 approaching Golders Green. 10 in loop

Regulating point Hampstead - Service Operator

Bull and Bush is an emergency evacuation point - act on Service Controller's instructions.

G39 is speed-controlled and has two position detectors. The first one has a 4.5 seconds timer. If the train reaches the second position detector after 4.5 seconds, then G39 **may** clear. If the train reaches the second position detector before 4.5 seconds, it is going too fast and the signal will remain at danger. A second 4.5 seconds timer is triggered and G39 **may** clear after 4.5 seconds unless the train has already passed over the signal's blockjoint.

G39 Green (route 1) - to NB main, with route indicator (route 2) - to loop.

Be aware!
G39 may remain at danger.

G38 shows no aspect with G39 route 2 (to loop).

G33 Green (route 2) - to plat 3, with route indicator (route 1) - to plat 2.
G37 Green (route 1) - to plat 2, with route indicator (route 2) - to plat 3.

5 mph sign at start of platform 2 is illuminated if draw-up signal G350 is at danger.
5 mph sign at start of platform 3 is illuminated if draw-up signal G340 is at danger.

Draw-up signal G350 or G340 can only clear in advance (to green or yellow, depending on the aspect of the station starter) if the points from that platform are set to allow a train to go north.
If you are approaching the platforms and a train is already going north from the other platform, then the draw-up signal for your platform will be at danger.

Be aware!
The relevant draw-up signal will normally clear as the first pair of wheels pass the blockjoint at G33 / G37. The draw-up signal may remain at danger.

GOLDERS GREEN to HAMPSTEAD

SB

Substation	Golders Green
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 35:	30 then 25 approaching Hampstead crossover

Regulating point Golders Green - timetable and Service Operator

Be aware!

G6 may remain at danger.

Bull and Bush is an emergency evacuation point - act on Service Controller's instructions.

FII protects the crossover.

F10 protects the platform.

Hampstead starter is approach-controlled.

GOLDERS GREEN (G)

Regulating point all platforms - timetable and Service Operator

1 siding is also known as 24 siding or 24 road
2 siding is also known as 25 siding or 25 road
4 siding is also known as 26 road
The shunting neck is also known as 27 road
Policeman in 1 siding and 2 siding
No policeman in 4 siding, loop or shunting neck
Correct side to open doors on middle platform

Procedure for reversing N-S:
Platform 2.
Plat 2 via shunt G10 and plat 4.
Plat 3 / plat 4.
Plat 5 via 4 siding (not passenger).
4 siding.

Procedure for reversing S-N:
Plat 4 / plat 3.
Plat 4 via shunting neck or SB main and plat 2 or plat 3.
Plat 4 via 1 siding, 2 siding or loop and plat 2 or plat 3.
Plat 5 via shunting neck or SB main and plat 2 or plat3.

Procedure for entering / stabling / departing 1 and 2 siding
Procedure for entering / stabling / departing loop
- Train Stabled In Loop switch.
    - G33 cannot be cleared if Train Stabled In Loop switch is set to **IN**.
    - Cross Now light cannot be illuminated if train in loop and switch not set to **IN**.

Procedure for entering / stabling / departing 4 siding (both ends)

Plungers.

Procedure for entering shunting neck
- south end car 1 off current when stopped in the shunting neck.
- ensure “train berthed” sign is illuminated.

Procedure for departing shunting neck
- shunt signal G41 has two trainstops.
    - the one nearest the shunt signal is for longer, older stock.
    - you may get tripped if you draw up too close to the shunt signal.

Procedure for reversing on the main

GOLDERS GREEN to COLINDALE

NB

Substation	Golders Green. Hendon
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 40:	

Regulating point Golders Green - timetable and Service Operator

A4340, A434^{A}, A434^{B} - automatic signals. Normal aspect is red. Will go to green in advance if AC1 is green.

Tripcock tester at Colindale.

COLINDALE to GOLDERS GREEN

SB

Substation	Hendon. Golders Green
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 40:	

Regulating point Colindale - timetable and Service Operator

G2 Green (route 1) - to platform 5.
With route indicator (route 2) - to platform 4.

If a train in platform 5 is going to depot, it will normally go via 4 siding (route 1). The following southbound train will normally go via the middle platform. That way the stabling train doesn't delay the southbound train. The same principle applies if a train is going north into platform 5 from 4 siding.

COLINDALE (AC)

Regulating point NB and SB - timetable and Service Operator

Siding N-S
Policeman in siding
Traction fuse protection

Procedure for entering the siding
Procedure for departing the siding

COLINDALE to EDGWARE

NB

Substation	Burnt Oak, Edgware
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 40:	20 approaching all platforms at Edgware, then 15 in the platforms

Regulating point Colindale - timetable and Service Operator

Draw-up signal AE100 is speed-controlled and has two position detectors. The first one has a 4.5 seconds timer. If the train reaches the second position detector after 4.5 seconds, then AE100 will clear. If the train reaches the second position detector before 4.5 seconds, it is going too fast and the signal will remain at danger. A second 4.5 seconds timer is triggered and AE100 will clear after 4.5 seconds unless the train has already passed over the signal's blockjoint.

Be aware!
Ensure the speed of the train is reduced to 10 mph or less. Be prepared to stop at AE100.

AE1 Green with left route indicator (route 1) - to platform 1.
Green (route 2) - to platform 2.
Green with right route indicator (route 3) - to platform 3.

Platform 1 has two policemen, platforms 2 and 3 have three.

Be aware!
If stabling in Edgware sidings, you will need a route 2 (plat 2) or route 3 (plat 3).

EDGWARE to COLINDALE

SB

Substation	Edgware. Burnt Oak
Section ahead	none
Section in rear	none
Route secured	none
PSR LS = 40:	20 departing Edgware platform 1
	15 departing Edgware platform 2 route 1
	20 departing Edgware platform 2 route 2
	25 departing Edgware platform 3

AE32^{B} Green with horizontal route indicator (route 1) - to left.
Green with diagonal route indicator (route 2) - straight ahead.
AE32^{B} does not have a plain green aspect.

If a train is going to / from platform 3 and the sidings, the train in platform 2 will normally get a route 2. This way the train in platform 3 doesn't delay the train in platform 2 from departing.

Colindale outer home AC12^{A} protects the crossover and the platform.

Tripcock tester at Colindale.

EDGWARE STABLING SIDINGS

The stabling sidings are only accessible from platforms 2 and 3
There is a Shunter at Edgware
The points are hand-worked.
There is no separate radio channel for Edgware sidings
Permission to proceed is given by hand signal from the Shunter
- If going to / from the shunting neck (35 road) and 4 - 11 roads, you must also get permission from the Shunter before departing the shunting neck

5 mph in the sidings
Check route is correctly set - train must not push points over

Procedure for entering the sidings
- from platforms 2 and 3 only.
- via shunting neck if going to north end of sidings (4 - 11 roads).
- Shunter must give you permission before moving from the shunting neck.
- engineers sidings are not used by 95 stock.

Procedure for departing the sidings
- called up by a hand signal from the Shunter.
- the hand signal must be clear and not be given so that another driver could mistake it for permission for them to move.
- if in doubt, do not move.

- via shunting neck if coming from north end of sidings (4 - 11 roads).
    - permission from Shunter to depart 4 - 11 roads and permission from the Shunter again before departing shunting neck.
- stop at stop board before outlet shunt signal AE6.

Be aware!
Clear hand signal from Shunter.

16 siding
- can be used for stabling if required.
- only accessible from platform 1.
- no policeman.
- traction fuse protection.
- plunger.

Procedure for entering the siding
Procedure for departing the siding

GOLDERS GREEN DEPOT

All depot moves are controlled by a Shunter from the Shunter's cabin
Golders Green depot has its own radio channel
5 mph in the depot
Shunting neck (27 road) has traction fuse protection
Check route is correctly set - train must not push points over

Procedure for going to depot from platforms
- via 4 siding or SB main to shunting neck.
  - south end car 1 off current when stopped in the shunting neck.
  - ensure "train berthed" sign is illuminated.
- reversing on the SB main.

Be aware!
Shunt signal G9 may still be at danger if going to the shunting neck from platform 5 via 4 siding.

Procedure for departing the depot to platforms
- called up on radio.
- stop at stop board and not outlet shunt signal G11.
- via the shunting neck.
    - south end car 1 off current when stopped in the shunting neck.
    - ensure "train berthed" sign is illuminated.
- via the SB main.

Procedure for going to depot over the main from Hampstead
- G40 route 1 to 4 siding, route 2 to depot.
- keep in Full Speed until the stop board. 10 mph over crossover.

Procedure for departing the depot to the main for Hampstead
- called up on radio.
- stop at stop board and not outlet shunt signal G11.
- Full Speed. 10 mph to tunnel mouth to clear crossover.

Be aware!
If reversing on the main or going to Hampstead, be aware that G6 may remain at danger.

Be aware!
There is a risk of getting gapped when going from the depot to the main, especially if there are shoe(s) missing.

HIGH BARNET STABLING SIDINGS

There is no Shunter at High Barnet. The sidings moves are controlled via the programme machine / Service Operator.
There is no separate radio channel for High Barnet sidings
10 mph in the sidings

Procedure for entering the sidings
- J key switch.
    - within 4 minutes of stopping in platform.
- route 4 from shunting neck - will not know what road the train is stabling on.

Procedure for departing the sidings
- train number on theatre-type route indicators.
- plunge.
- check shunt signal clear.

Be aware!
Ensure shunt signal has cleared after plunging.

HIGHGATE STABLING SIDINGS

There is no Shunter at Highgate. The sidings moves are controlled automatically or via the panel in the DMTs' office.
There is no separate radio channel for Highgate sidings
10 mph in the sidings, 5 mph when moving through sheds
Position light shunt signals
No trainstops associated with the position light shunt signals

Procedure for entering the sidings
- road number is one less than route number.
- train can stable on engineers siding (via route 1) if instructed.

Procedure for departing the sidings
- plunge - no more that three minutes before booked departure time.
- check shunt signal clear.

Be aware!
Ensure shunt signal has cleared after plunging
If departing from a back road, ensure that the front road shunt signal is clear. If not, stop and plunge at that signal.

NP19 shunt signal may remain at danger.

MORDEN DEPOT

All depot moves are controlled by a Shunter from the Shunter's cabin
Morden Shunters have their own radio channel
10 mph in the depot, 5 mph when moving through sheds
Check route is correctly set - train must not push points over

Procedure for going to depot
- Full Speed as far as Shunt Ahead board.
- do not roll back - catch points.
- at present, stabling instructions cannot be given over the radio. They must be given personally by the Shunter.

Be aware!

Do not set back from the leading cab.
If the train has to be set back for any reason, change ends. Ensure the train is not over the catch points. If you cannot see the outlet shunt signal (Y28 or Y30) when you are in the north end cab, the train may be over the catch points. DO NOT MOVE. Act on the Service Controller's instructions. Do not pass Y28 or Y30 at danger.

Procedure for departing the depot
- called up on radio.
- check route is correctly set.
- wait at stop board for hand signal from Shunter.
- train can go through wash, or down either bank.
- Full Speed from shunt signal - max 10 mph to platform.
- open the doors both sides if going to the middle platform.

SIDING TRACTION FUSE PROTECTION

The traction supply to the siding is protected by a fuse in the positive supply. Traction current for the siding normally passes through the fuse. If the points are set for a train to enter or leave the siding (whether or not the signal is clear) a contactor by-passes the fuse, allowing full traction current to the siding. The fuse has a high enough rating to provide all a train's stationary needs. However, if the train attempts to motor when the route is not set, the additional current that is being drawn may blow the fuse.

Traction current will be restored to the siding when the route is set. An override switch is provided so that the contactor can be closed if required, irrespective of the position of the points.

These arrangements apply to:
Colindale siding
Edgware 16 siding
Finchley Central south siding (35 road)
Golders Green shunting neck (27 road)
Tooting Broadway siding*
Archway siding*
* - excess current trips the circuit breaker instead of blowing a fuse

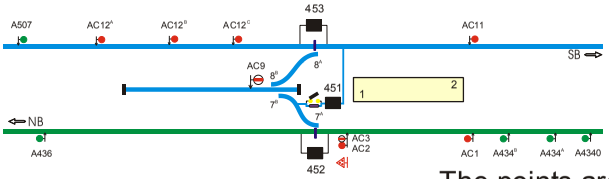
In order for a train to move, it needs air. Amongst other things, the air operates the linebreakers which close to allow the 630v traction current supply to go to the equipment on the train. This 630v equipment includes the compressors which supply the air. When the 630v feed is lost, the compressors will not run and the air could gradually leak off. As the air leaks off, there may be insufficient air to close the linebreakers. Even though traction current may be restored, the compressors will not start because the linebreakers are open. No air - no movement.

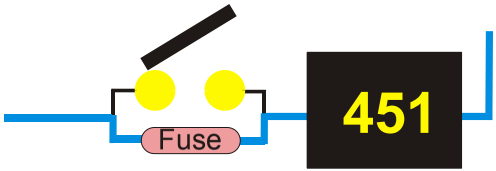
Drivers are instructed that, when the traction current supply is lost to a train, after 20 minutes the driver closes the Traction Supply Isolating Cock in order to retain the air in a reservoir for the linebreakers on that car. When the traction current is restored, the driver will put the TSIC back to normal allowing air to the linebreakers. The linebreakers can now close and the compressors will start.

These instructions also apply to trains in sidings when the traction current supply is lost.

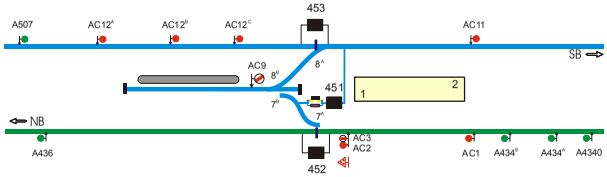
SIDING TRACTION FUSE PROTECTION

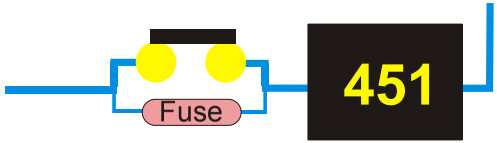
-using Colindale as an example



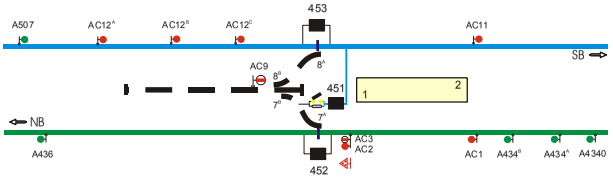


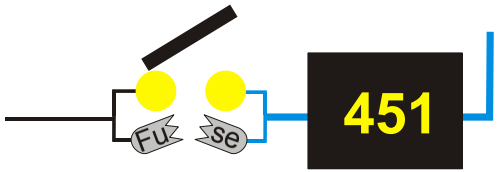
The points are normal
Current is being fed to the siding via the fuse





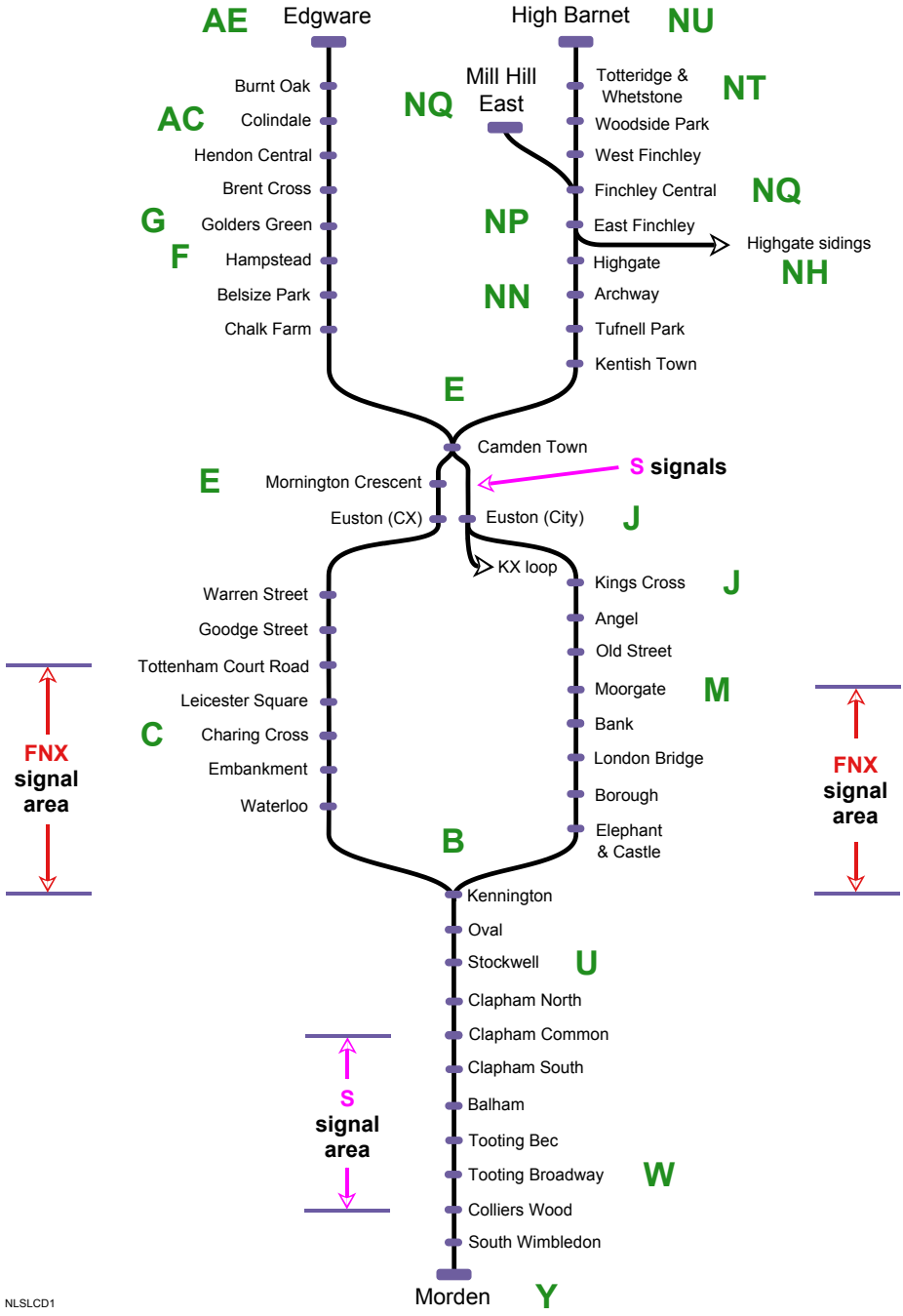
The points are reversed - current is being fed to the siding via the contactor
Current will also flow through the fuse





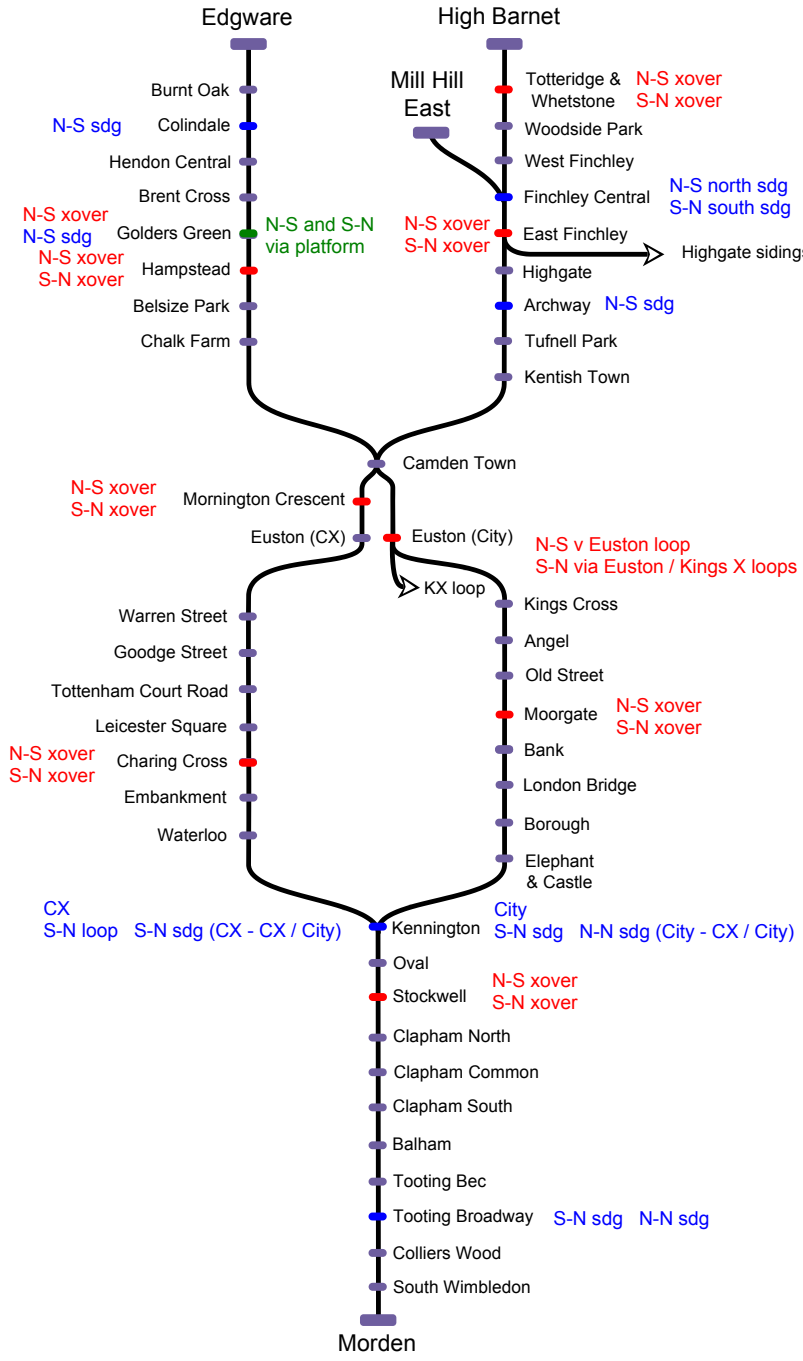
The points are normal - the fuse has blown
Current is lost in the siding unless the points are reversed

Northern Line - signal location by code



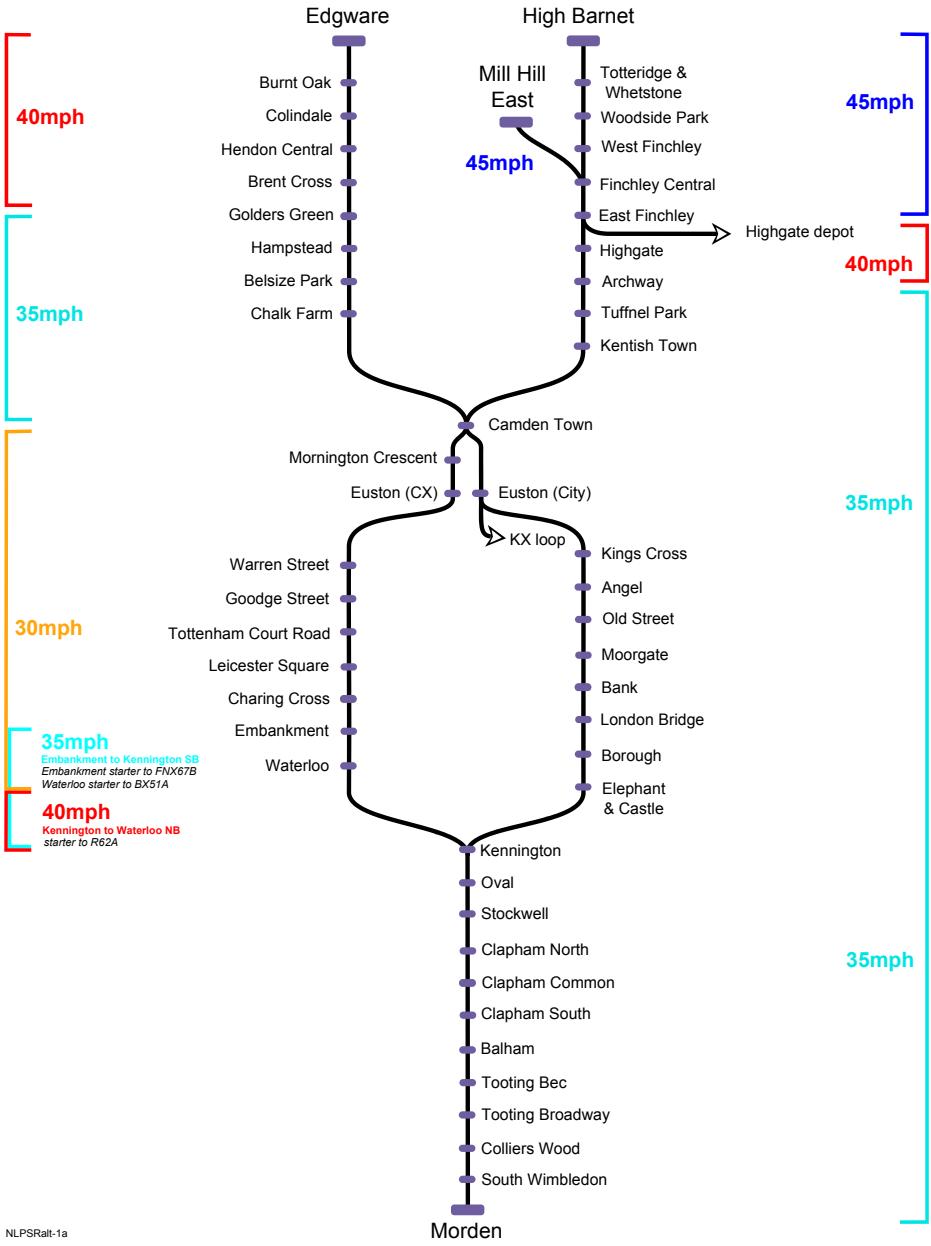
NLSLCD1

Northern Line reversing points

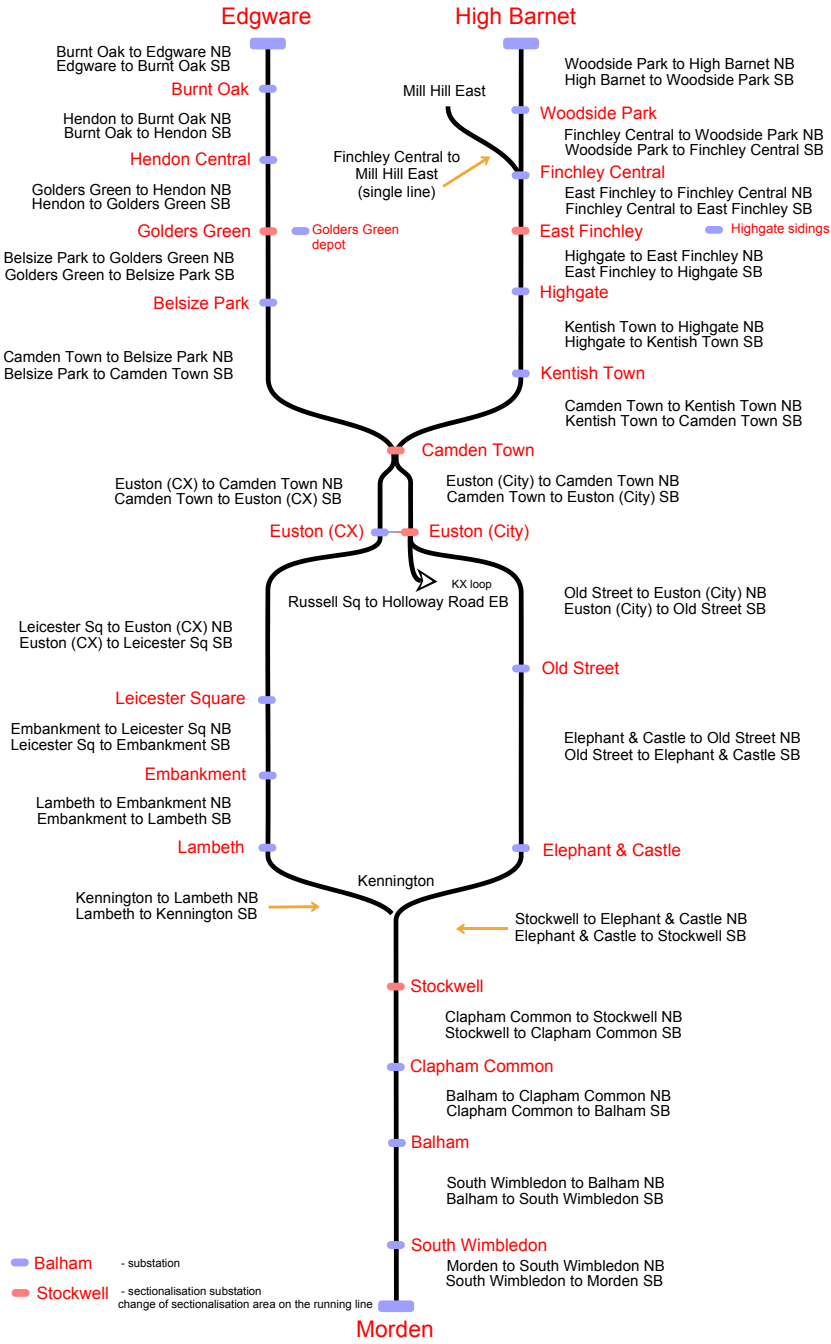


NLRD1c

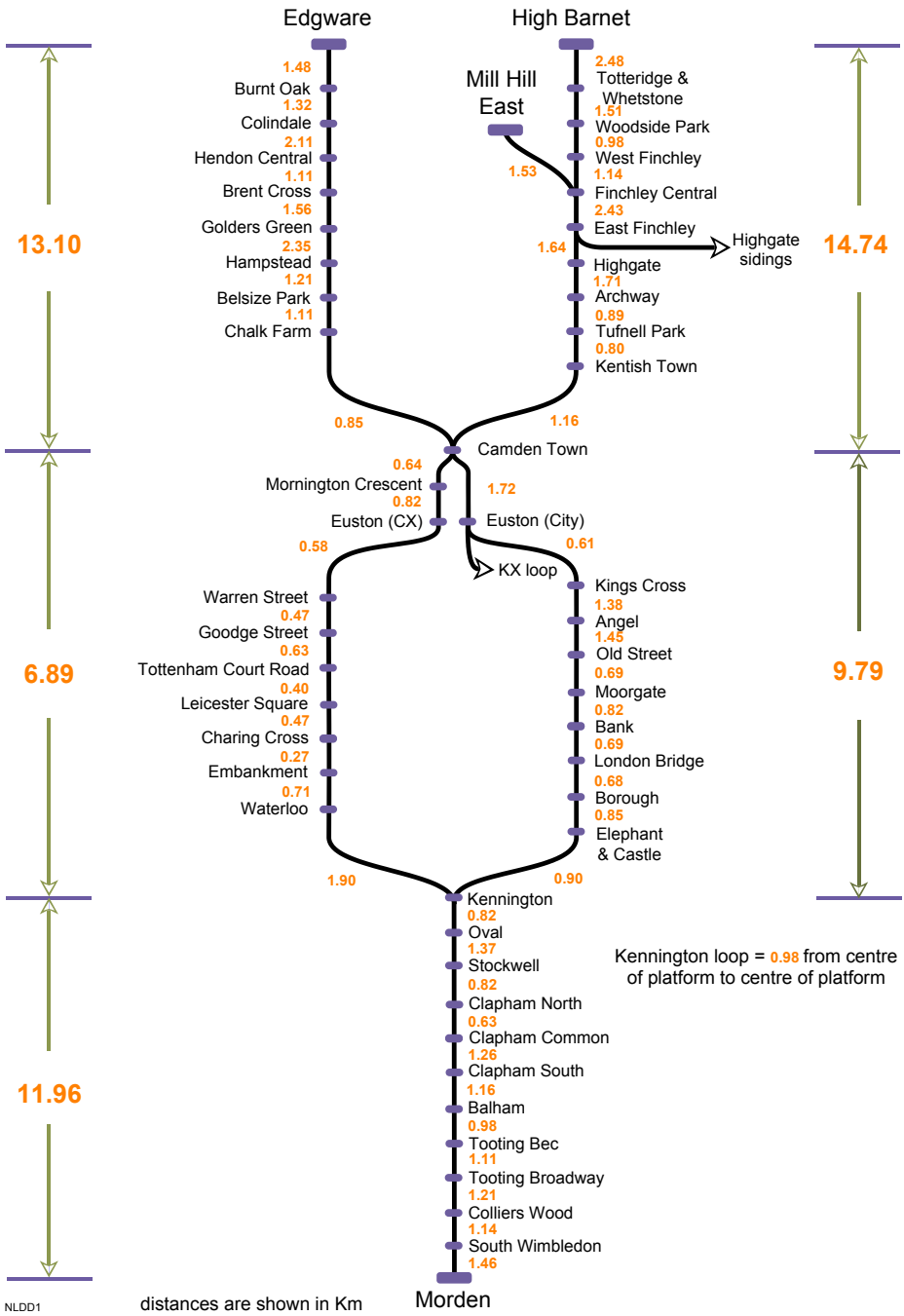
Northern Line Permanent Speed Restrictions



Northern Line traction current sections naming



Northern Line - distances between stations



Northern Line - off-peak running times