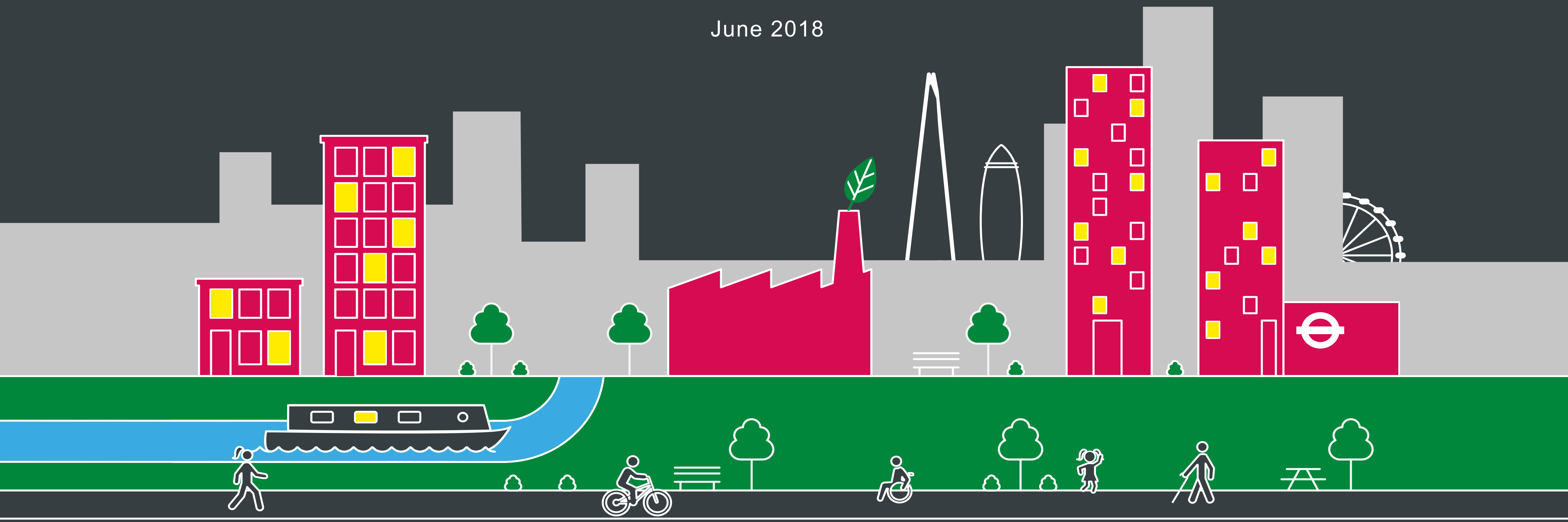
OPDC
OLD OAK AND
PARK ROYAL
DEVELOPMENT
CORPORATION

Park Royal Transport Strategy

LOCAL PLAN SUPPORTING STUDY

June 2018



MAYOR OF LONDON

38. Park Royal Transport Strategy

Document Title	Park Royal Transport Strategy
Lead Author	Steer Davies Gleave
Purpose of the Study	Strategic assessment of the existing transport provision in Park Royal, the impact of the planned future growth and identification of the transport interventions required to mitigate those impacts.
Key outputs	• A review of the existing performance of transport modes in Park Royal • Analysis of future demand in Park Royal and its impact on the transport modes • Identification of six packages of interventions required to improve existing performance and to mitigate the impact of future demand on transport modes.
Key recommendations	Emerging recommendations include providing transport networks that enhance the communities they serve and help local business to operate and grow sustainably, both now and in the future.
Key changes made since Reg 19 (1)	N/A
Relations to other studies	Interfaces with the Old Oak Strategic Transport Study, Public Realm, Walking and Cycling Strategy, North Acton study and the Smart Strategy Interim Report
Relevant Local Plan Policies and Chapters	• Policy SP6 (Places and Destinations) and Policy SP7 (Connecting People and Places) • Place policies P4 (Park Royal West), P5 (Old Park Royal), P6 (Park Royal Centre), P7 (North Acton and Acton Wells), P8 (Old Oak Lane and Old Oak Common Lane) and P9 (Channel Gate) • All transport chapter policies

Current public realm in centre of Park Royal

steer davies gleave

Park Royal Transport Strategy

Final Report
January 2016

TfL and OPDC

Our ref: 22857301
Client ref: Task 15

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Final Report

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Executive Summary

Overview

The Old Oak and Park Royal Development Corporation (OPDC) was officially established on 1 April 2015 with the purpose of managing the opportunity presented by investment in HS2 and Crossrail to develop an exemplar community and new centre in north-west London.

This **Park Royal Transport Strategy (PRTS)** is a joint study for OPDC and Transport for London (TfL) and forms a supporting consultation document to OPDC's draft Local Plan for the Old Oak and Park Royal Opportunity Area (OA).

It sets out a long-list of potential transport interventions to support the future expected growth in travel demand within the OA. Each intervention has then been ranked based on its ability to meet the strategic transport objectives for Park Royal and views are sought on these before a final shortlist of interventions is further developed at the next stage of consultation.

Park Royal Transport Vision & Objectives

In consultation with stakeholders, an overarching Vision for Park Royal's transport network was developed to guide the study. To meet this Vision, ten objectives were identified for the network across a range of criteria.

PARK ROYAL TRANSPORT VISION:
"Park Royal's transport networks should enhance the communities they serve and help local businesses to operate and grow sustainably, both now and in the future"

Provision of a transport network that will serve the existing and future needs of Park Royal by:

1. **CONNECTING:** Delivering an accessible and inclusive transport network that connects Park Royal with the existing and future strategic transport links;
2. **MITIGATING:** Managing, and mitigating, the cumulative wider OA construction and demand growth impacts upon the Park Royal transport network, for both businesses and residents;
3. **OPTIMISING:** Improving the quality, efficiency and interoperability of the existing transport infrastructure;
4. **SUPPORTING:** Enabling existing businesses to operate more effectively and enhancing liveability for existing residents;
5. **INNOVATING:** Delivering an innovative and aspirational transport network that is befitting London's leading industrial location;
6. **FACILITATING (HOMES):** Supporting the creation of a minimum additional 1,500 new homes on specific non industrial land in Park Royal;
7. **FACILITATING (EMPLOYMENT):** Supporting the growth and intensification of Park Royal businesses and facilitating the creation of 10,000 additional jobs;
8. **ENHANCING:** Improving the existing physical environment and creating opportunities for new green and public spaces that encourage healthy lifestyles, walking and cycling;
9. **SUSTAINING:** Supporting a modal shift for trips to/from Park Royal away from private motor vehicle trips towards more sustainable modes;
10. **PROTECTING:** Improving safety, particularly for vulnerable users, and providing streets where people feel secure.

Future Transport Challenges

There are numerous drivers of economic growth in the region, either within the Old Oak and Park Royal Opportunity Area itself or in other OAs and housing zones nearby. These include:

- **Old Oak & Park Royal OA** –
  - Park Royal will provide 10,000 new jobs and a minimum of 1,500 new homes concentrated in the north-eastern and south-western corners of Park Royal.
  - Old Oak will become a new commercial and office hub, providing 55,000 new jobs and approximately 24,000 new homes focused around the new Crossrail and HS2 interchange station.
- **Wembley OA –** with 11,000 new jobs and 11,500 new homes.
- **White City OA** – with 10,000 new jobs and 6,000 new homes.
- **Kensal OA –** with 2,000 jobs and 3,500 new homes.

The combined effect of these planned future developments will be to generate a significant increase in demand for all modes of travel across the area.

The Proposed Transport Interventions

Thirty transport interventions have been developed under four broad headings (Planning, Highway Improvements, Demand Management and Public Transport Improvements) to deliver the Transport Vision and address the future transport challenges.

To determine the most appropriate and effective interventions for Park Royal, an Assessment Framework was established based on the Park Royal Transport Objectives and the Mayor's Roads Task Force (RTF) Street Functions. Each of the 30 interventions was then scored using this framework.

OPDC seeks views as part of the Local Plan consultation process on the Park Royal Transport vision and objectives and on the list of interventions that has been developed.

Potential Funding Sources

The PRTS has also identified several funding options to support the introduction of new transport measures in Park Royal. This includes a range of public and private funding opportunities that will need to be leveraged to deliver the transport improvements needed to support the economic growth of the area.

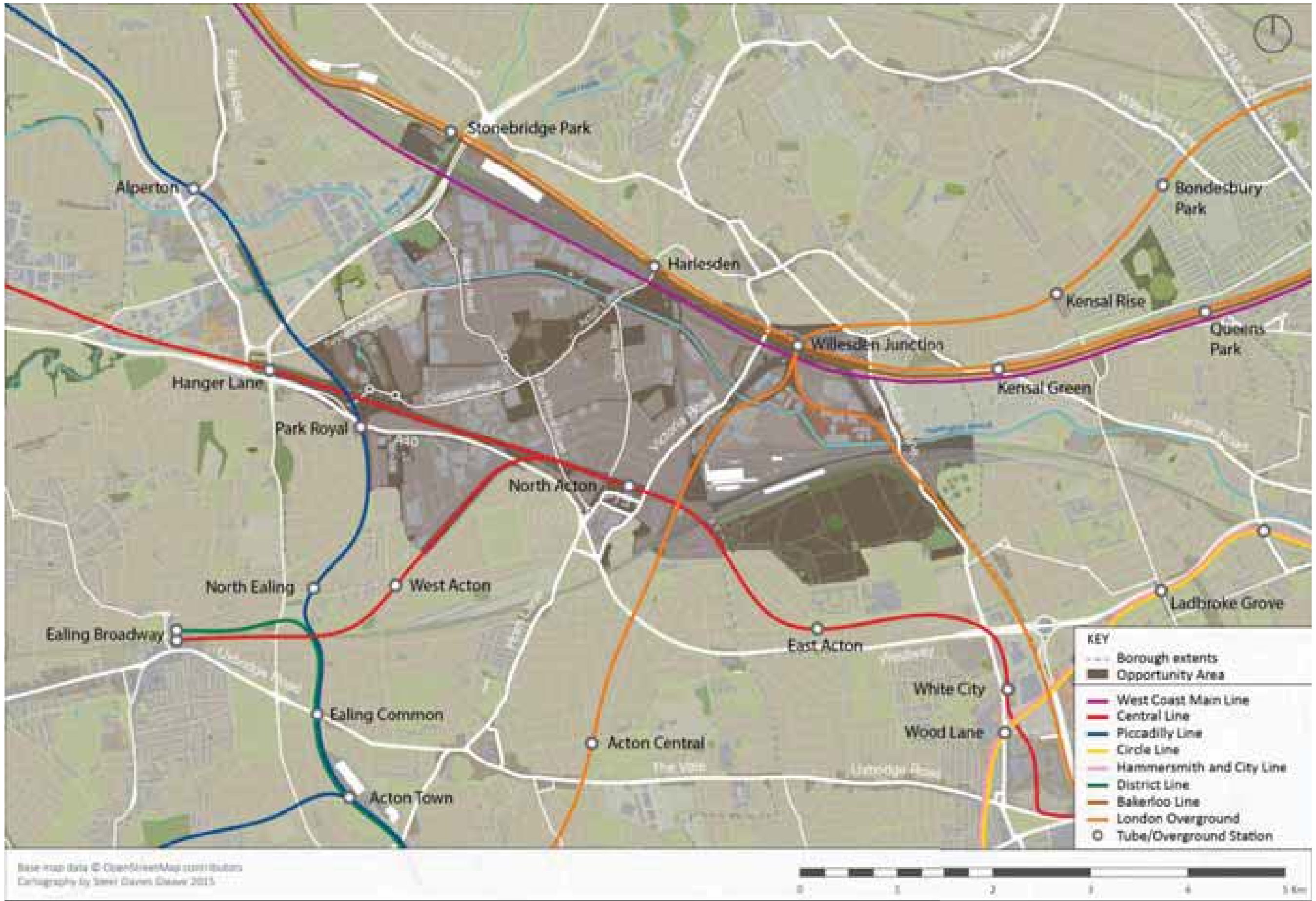
Conclusions

This Park Royal Transport Strategy defines and presents a range of potential interventions to meet the Park Royal Transport Vision of *"Providing networks that enhance the communities they serve and help local businesses to operate and grow sustainably, both now and in the future."*

Following the first stage of the Local Plan consultation process on these interventions, further work will be undertaken to specify suitable funding options in more detail and to short-list a preferred package of transport interventions.

1 Introduction

Figure 1.1: Old Oak & Park Royal Opportunity Area – Transport Connections



Background

1.1 The Old Oak and Park Royal Development Corporation (OPDC) was officially established on 1 April 2015 with the purpose of managing the opportunity presented by investment in HS2 and Crossrail to develop an exemplar community and new centre in north-west London.

1.2 The OPDC, along with Transport for London (TfL), is tasked with securing the maximum benefits for London and Londoners from the transport investment planned for the area. To this end OPDC and TfL have jointly commissioned this Park Royal Transport Strategy to provide a framework for transport investment in the Opportunity Area.

1.3 Park Royal is a large business district which employs approximately 30,000 employees. There are also approximately 1,500 residential units in the area. It has excellent links to the strategic road network and is served by three Underground lines, London Overground and 15 bus routes. The layout of Park Royal and the main transport networks are shown in Figure 1.1.

Purpose of this Report

1.5 This report forms a supporting document to OPDC's draft Local Plan for the Old Oak and Park Royal OA.

1.6 It sets out a long-list of potential transport interventions to support the future expected growth in travel demand within the OA.

1.7 These individual interventions have been assessed and ranked to provide a coordinated and balanced approach for increasing transport capacity and managing future levels of demand.

1.8 Comments are invited from the community on the interventions and their prioritisation so that a preferred package of measures can be taken forward for inclusion in the adopted Local Plan.

Strategic Context

1.9 The Park Royal Transport Strategy has been developed in accordance with the national, regional and local planning policies described in the following sections.

The National Planning Policy Framework

1.10 The National Planning Policy Framework (NPPF), published in March 2012, sets out Central Government's planning policies for England and how these are expected to be applied.

1.11 The NPPF recognises that transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives.

1.12 In doing this, the transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel, but it must be tailored to the local area and its needs.

The London Plan

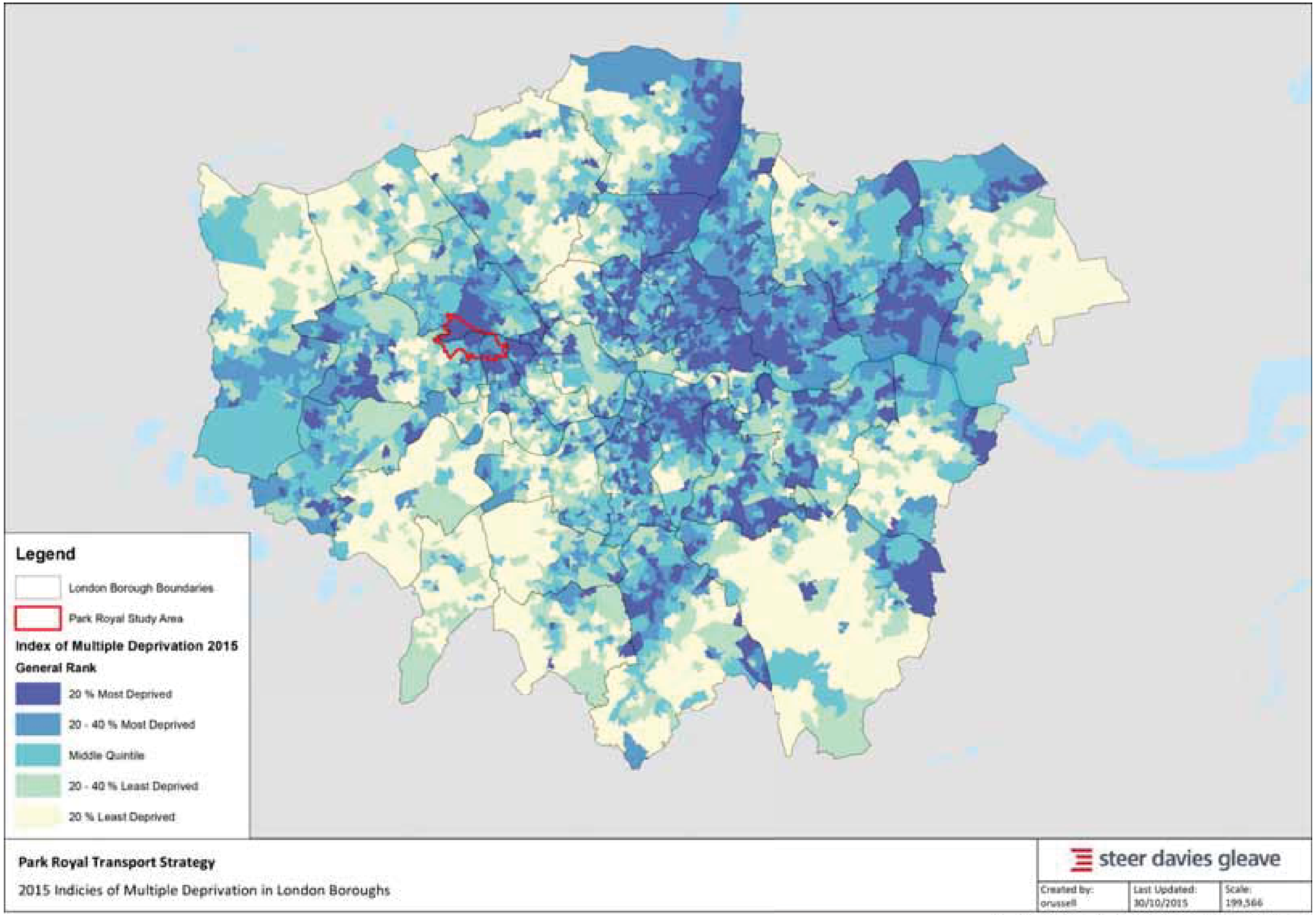
1.13 The London Plan is the overall strategic plan for London. It sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2036 and forms part of the development plan for Greater London.

1.14 Within the London Plan the Park Royal area has been identified as an existing area of disadvantage, as demonstrated in Figure 1.2. The Indices of Multiple Deprivation is a Government measure covering aspects of employment, housing, health, education and access to services.

1.15 Park Royal is already one of London's key industrial locations, with the potential to meet modern logistics and waste management requirements as well as other industrial type functions. A range of opportunities exist for industrial related development and, in selected locations outside of Strategic Industrial Land (SIL), for mixed-use intensification where there is good public transport accessibility.

1.16 The introduction of a new strategic public transport infrastructure hub, with the only direct interchange between High Speed 2 to Birmingham and beyond and Crossrail at nearby Old Oak Common, presents an opportunity to address the existing levels of disadvantage in Park Royal and unlock significant development potential. This development potential has been acknowledged by the identification of the Old Oak and Park Royal OA.

Figure 1.2: Index of Multiple Deprivation



Mayor's Transport Strategy

1.17 Developed in parallel with the London Plan, the Mayor's Transport Strategy (MTS) sets out the transport vision for London. The MTS prepares for the Capital's predicted growth of 1.25 million more people and 0.75 million more jobs by 2031 and supports sustainable growth across London.

1.18 Transport policy in London is shaped by this and other supporting documents such as the Major's Cycle Vision and as such they play a significant role in defining the transport priorities within Park Royal.

Old Oak & Park Royal Opportunity Area Planning Framework

1.19 The Old Oak & Park Royal Opportunity Area Planning Framework (OAPF) provides supplementary detail to the planning policies contained within the London Plan for the Old Oak and Park Royal areas.

1.20 The OAPF has recently been adopted as Supplementary Planning Guidance (SPG) to the London Plan following a consultation undertaken in March and April 2015.

1.21 The OAPF sets out an ambitious vision and planning guidance to capitalise on future transport improvements to deliver transformative change at Old Oak, regenerate Park Royal and continue the protection of Wormwood Scrubs.

1.22 One of the key challenges to achieving these ambitious targets is ensuring that a fit-for-purpose, multi-modal transport network is in place to support the inevitable increase in travel demand.

The Old Oak and Park Royal Local Plan

1.23 Local Plans, produced by the local planning authority, need to be in general conformity with the London Plan, and their policies guide decisions on planning applications.

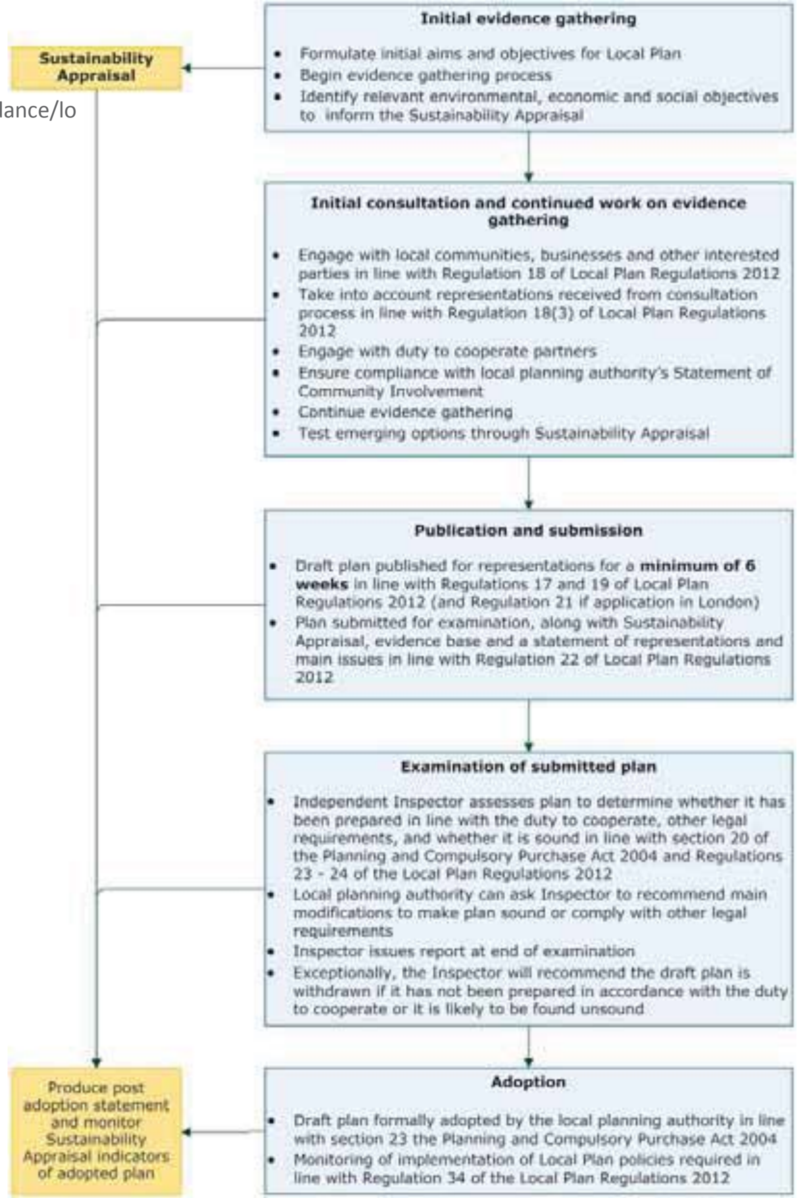
1.24 The OAPF, being linked to the London Plan, will in turn provide the basis for the production of the Local Plan for Old Oak and Park Royal. The Local Plan will provide greater detail, evidence and policies than are contained within the OAPF and has greater material weight in the determination of planning applications.

1.25 As the local planning authority for the Park Royal area, the OPDC is following the process set out in Figure 1.3 to produce, consult and adopt a Local Plan for the entire Opportunity Area.

1.26 A key element of the Local Plan is a supporting transport strategy that will address the future needs of the local area.

Figure 1.3: Local Plan Development Process

(http://planningguidance.planningportal.gov.uk/blog/guidance/local-plans)



Local Relevant Planning Guidance

1.27 Whilst the OPDC has adopted the role as planning authority within the Old Oak & Park Royal Opportunity Area, the local Borough's planning policies are still highly relevant, particularly when considering infrastructure connections beyond Park Royal.

1.28 Park Royal sits within three London Boroughs:

- Brent
- Ealing
- Hammersmith & Fulham

1.29 Relevant policies in relation to Park Royal for each of these boroughs are shown in Table 1.1.

Table 1.1: Park Royal - Borough Planning Policies

Borough	Relevant Policy	Assumed Development Potential within Park Royal
London Borough of Brent	Brent's Core Strategy (2010) recognises the need for regeneration in Park Royal to provide new business opportunities and jobs and Policy 12 states that the Council will work with the GLA and neighbouring Boroughs to secure the 'opportunity area' objectives for Park Royal.	4,400 jobs
London Borough of Ealing	Ealing Council's Core Strategy (2012) seeks to retain business and industry throughout Park Royal, promote Park Royal as a centre for green industry, to improve cycle access, promote the use of the Grand Union Canal for freight transport and promote a Green Enterprise District.	1,500 homes 2,000 jobs
London Borough of Hammersmith & Fulham	Hammersmith and Fulham's Core Strategy (2011) recognises Park Royal as a regeneration area with a long-term vision to transform it with substantial mixed-use development, made possible principally by the projected HS2 rail line and Crossrail.	5,000 jobs

Study Context

1.30 This Park Royal Transport Strategy (PRTS) has been commissioned by the OPDC, to make recommendations for improvements to transport infrastructure and planning processes to feed into the Local Plan and future stages of planning for the OA.

1.31 The PRTS has been developed in line with the policies set out earlier and in consultation with a broad range of local stakeholders that include:

- Park Royal Business Group
- London Borough of Brent
- London Borough of Ealing
- London Borough of Hammersmith & Fulham
- Royal Borough of Kensington and Chelsea
- TfL Surface Planning
- TfL Planning
- TfL Bus Planning
- TfL Freight Team
- WestTrans

1.32 The development of the strategy has included a highway modelling exercise to understand the level of increase in demand on the highway network, to aid identification of potential interventions and to provide justification for these measures.

Old Oak Strategic Transport Study

1.33 The PRTS builds on earlier analysis undertaken as part of the Old Oak Strategic Transport Study (OOSTS), published in February 2015. This study undertook wide area strategic modelling and forecasting to understand the future demands that would be placed on the public transport and highway network as a result of development at Old Oak.

1.34 The OOSTS identified a number of highway and public transport infrastructure measures focused on Old Oak but, when implemented in isolation, found they did not provide sufficient capacity to avoid future widespread congestion.

1.35 In order to limit congestion to reasonable levels, the study found mode shares similar to Canary Wharf would be required (i.e. approximately 5% of employees travel to work by car). Even with the full package of infrastructure and management measures there would still be some increase in congestion.

1.36 It is recognised that Park Royal would never achieve such mode share targets owing to its specific freight and employee needs, but the OOSTS study of the adjacent area demonstrates the challenges in delivering growth with existing modal splits.

Other Relevant Studies

1.37 The PRTS has a number of links with other studies in the area, some of which are running in parallel to feed into either OPDC planning policies or TfL's wider strategic planning.

1.38 These studies are illustrated in Figure 1.4 and they have been used to guide development of the interventions described in this report.

Figure 1.4: PRTS Related Studies

A40 Study

1.39 In parallel to the PRTS, TfL has commissioned a study focused on developing options to improve the operation of the A40 corridor between Hanger Lane and Savoy Circus. Given the importance of the A40 in providing connections to the motorway network, Heathrow airport and Central London, the outcomes of this study will benefit the Park Royal area. To ensure this parallel study integrates with the PRTS, representatives from the OPDC and TfL PRTS team form part of the A40 Study stakeholder working group.

Park Royal – Schemes already in the Pipeline

1.40 There are several transport schemes which have been developed by the local boroughs and which are in the process of being implemented. These schemes include:

- Further improvements around Coronation Road/Park Royal Road by TfL - delivery in 2016
- North Action Station Square Improvement Scheme – delivery in 2017
- North Acton Gyratory improvements – study identifying £1.5m of pedestrian and cycle improvements – delivery over 2016 to 2017
- North Acton Station capacity and accessibility upgrades - implementation over 2016-2018
- Twyford Abbey Road/Rainsford Road Area scheme to reduce collisions, improve signage and enhance access to the Grand Union Canal towpath for cyclists – implementation over 2016-2018

1.41 Further schemes will be developed by the Boroughs as part of the preparation of the Local Implementation Plan for each Borough. These Plans will reflect the Park Royal Transport Strategy for schemes in the Park Royal area. Schemes are to be identified in summer 2016 for implementation in 2017 to 2020.

Park Royal - Transport Vision & Objectives

1.42 In consultation with stakeholders at several workshops, an overarching Vision for Park Royal’s transport network was developed.

1.43 Based on this Vision, ten key objectives for Park Royal’s transport network were determined following further consultation with the stakeholder group.

1.44 These objectives align with the wider OAPF Vision and recognise the specific needs of Park Royal due to its mix of residential and industrial uses.

1.45 The transport vision and objectives for Park Royal are shown in Figure 1.5 overleaf.

Figure 1.5: Park Royal Transport Vision & Objectives

PARK ROYAL TRANSPORT VISION:

"Park Royal's transport networks should enhance the communities they serve and help local businesses to operate and grow sustainably, both now and in the future"

Provision of a transport network that will serve the existing and future needs of Park Royal by:

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9. **SUSTAINING:** Supporting a modal shift for trips to/from Park Royal away from private motor vehicle trips towards more sustainable modes;
10. **PROTECTING:** Improving safety, particularly for vulnerable users, and providing streets where people feel secure.

2 Existing Conditions

2.1 This Chapter describes current transport conditions in the Park Royal area. It begins by presenting existing Travel to Work (TTW) mode share data, before providing additional detail on the existing network provision and demand for each specific mode.

Travel to Work Mode Share

2.2 Due to the vast majority of land uses within Park Royal being employment generators, Travel to Work (TTW) statistics produced from 2011 Census data provide a good indicator of modal splits for journeys to and from Park Royal. The TTW mode share is shown in Figure 2.1.

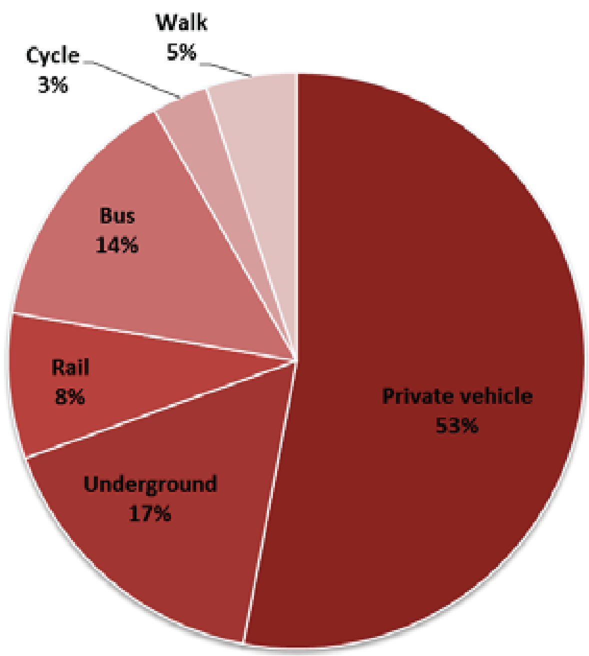
2.3 Travel to work is heavily dominated by private vehicles (53%), with average car occupancy being extremely low at 1.06 people per vehicle compared to the Outer London average occupancy rate of 1.41 (Travel in London, Report 5, TfL 2012).

2.4 This dependence upon private vehicles is likely to be due to a combination of low accessibility to public transport, shift-working patterns of employees and a low-quality urban environment which does not encourage walking and cycling.

2.5 Although accessible by three Underground lines and also Overground services, only 25% of trips are made by Underground and Rail. This is likely to be due to the stations all being located on the fringes of Park Royal.

2.6 This low public transport mode share is also a consequence of the poor walking and cycling conditions across the area which is reflected in the low walking (5%) and cycling (3%) shares.

Figure 2.1: Existing Travel to Work Mode Share



Source: Census 2011

Public Transport Accessibility Levels (PTAL)

2.7 TfL's PTAL measure provides a detailed and accurate measure of the accessibility of an area to the public transport network taking into account walk access time and service availability.

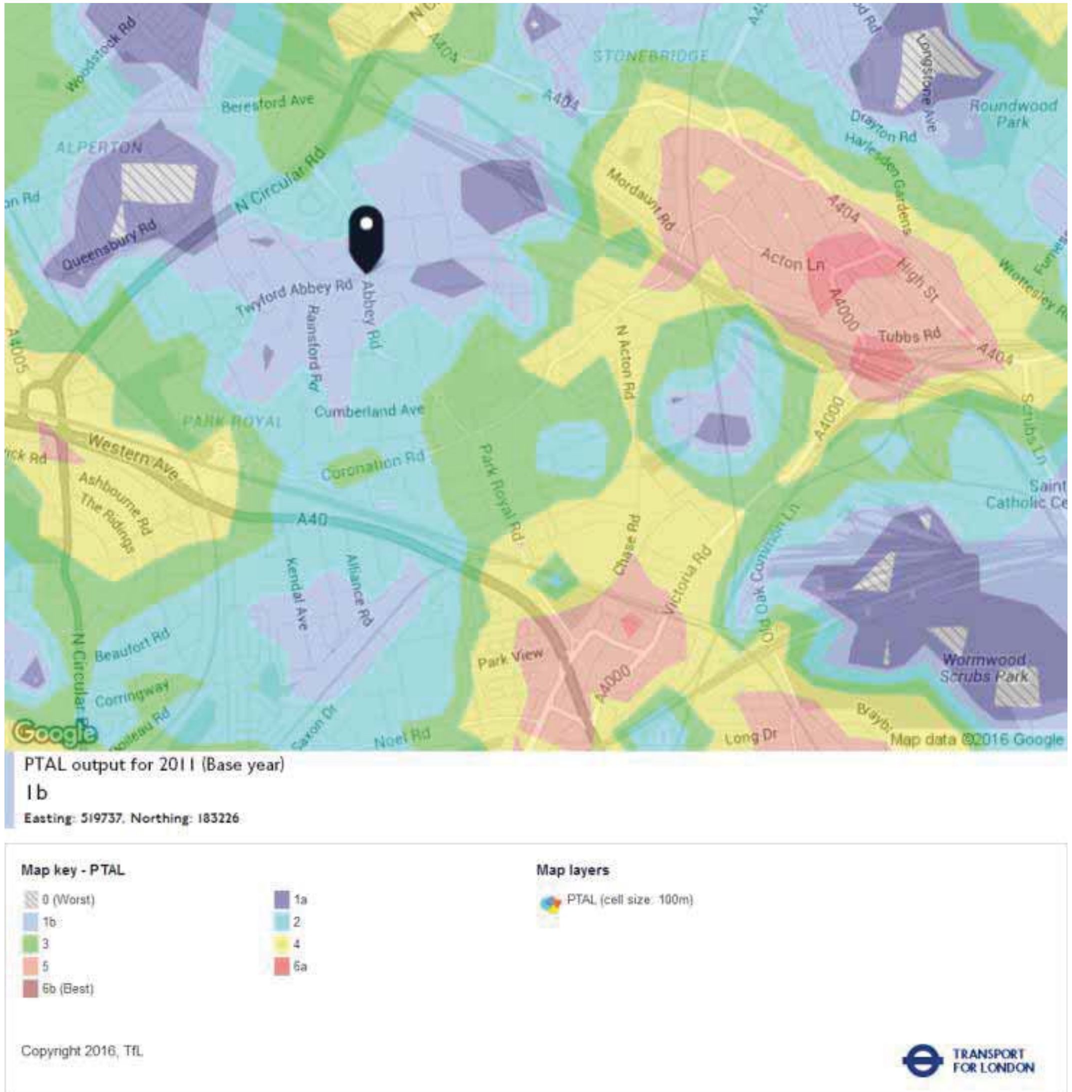
2.8 Each area is graded between 0 and 6b where a score of 0 is "very poor" access to public transport and 6b represents "excellent" access.

2.9 The PTAL scores for the Park Royal area are shown in Figure 2.2. This figure demonstrates the poor PTAL levels in parts of Park Royal with almost half of the study area scoring a PTAL below 3.

2.10 These poor levels of public transport accessibility discourage the use of public transport and contribute to the high level of car mode share as discussed in the previous section.

Figure 2.2: Park Royal PTAL Scores

Source: TfL WebCAT



Travel to Work Distribution

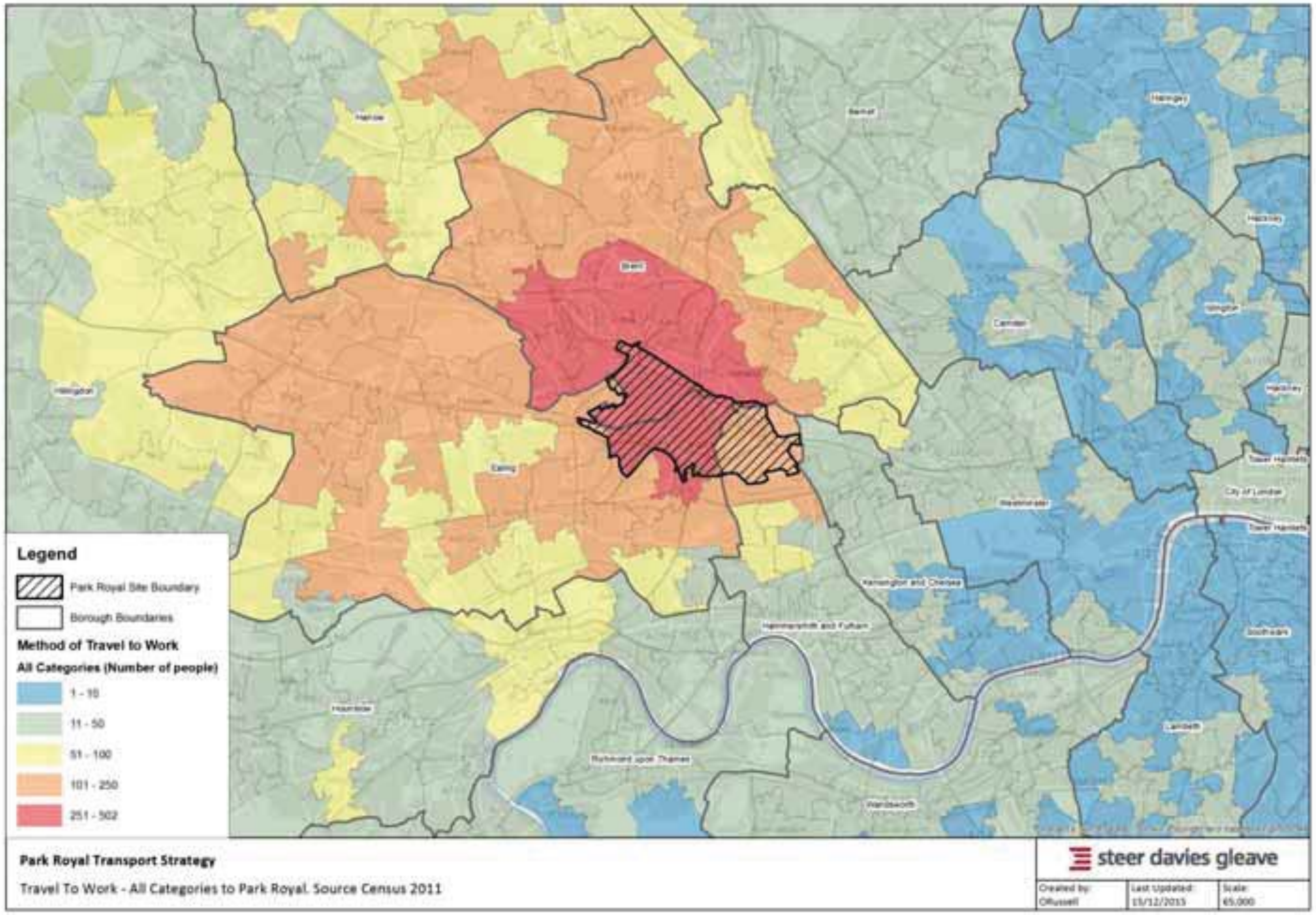
2.11 An employment study undertaken by the Greater London Authority and presented in the Park Royal Atlas indicated that over 30,000 people worked in the Park Royal area. Figure 2.3 presents further analysis of where these trips originated based on 2011 Travel to Work (TTW) Census data.

2.12 This data shows a significant majority of employees live to the west of Park Royal, likely due to the lower average pay levels of employees and the availability of more affordable housing further west.

2.13 It also shows that a significant number of employees either live within or in suburbs adjacent to Park Royal.

2.14 Within a 5km radius, approximately 60% of the employees come from Brent and 30% from Ealing.

Figure 2.3: Distribution of Employee Trips to Park Royal



Traffic & Parking

Existing Road Network

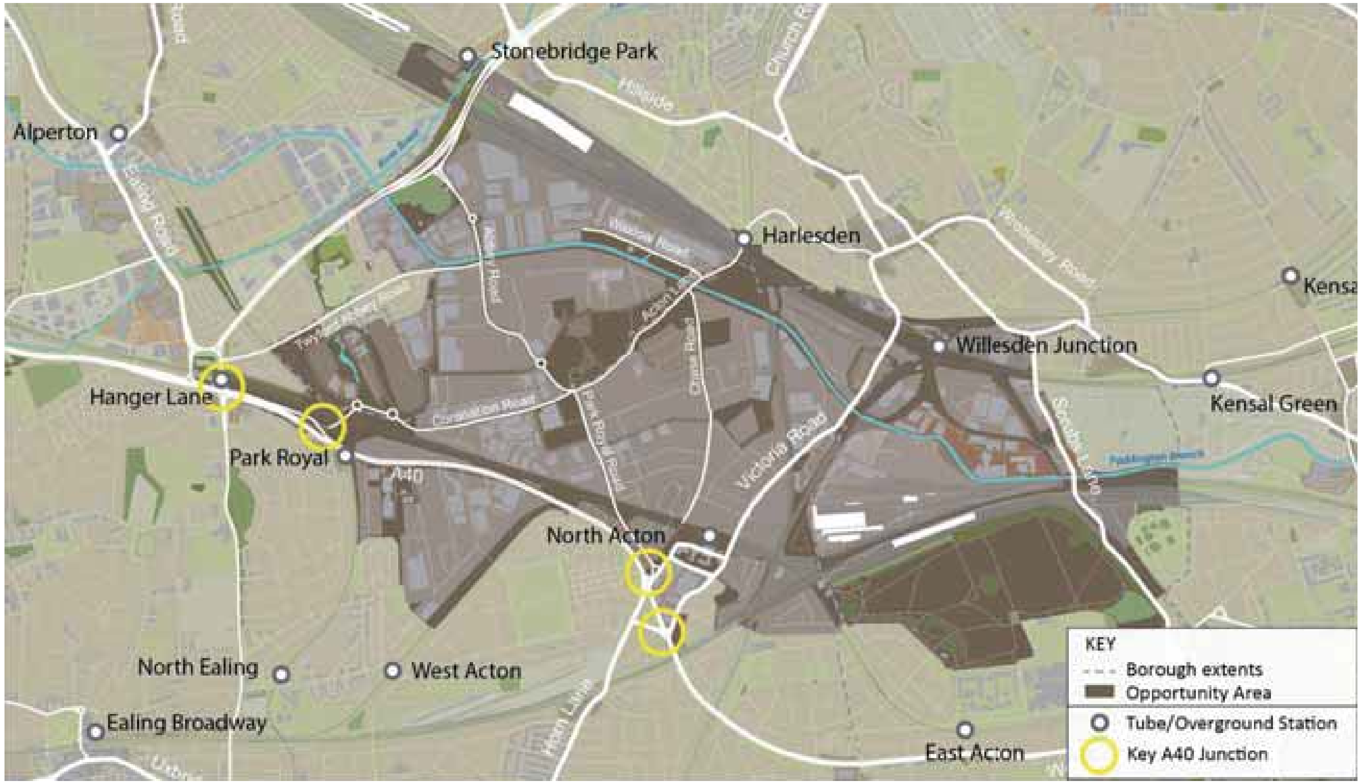
2.15 Park Royal is adjacent to the strategic highway network, with the A40 running along its southern boundary and the North Circular running along its western boundary, both of which are part of the Transport for London Road Network (TLRN). These strategic links provide a direct connection to central London, onward connections to the rest of the country via the motorway network (M1, M4, M40, M25) and access to Heathrow Airport. It is this level of connectivity that makes the area so attractive to businesses.

2.16 There are seven key internal roads that provide important connections to the strategic road network, as shown in Figure 2.4 and listed below:

- Abbey Road
- Acton Lane
- Chase Road
- Coronation Road
- Park Royal Road
- Twyford Abbey Road
- Victoria Road

2.17 Traffic congestion is a regular occurrence on the strategic road network surrounding Park Royal and on the roads providing links to the employment areas. This causes delays to businesses moving goods to and from the area.

Figure 2.4: Park Royal Key Internal Roads



Existing Car Travel to Work Data

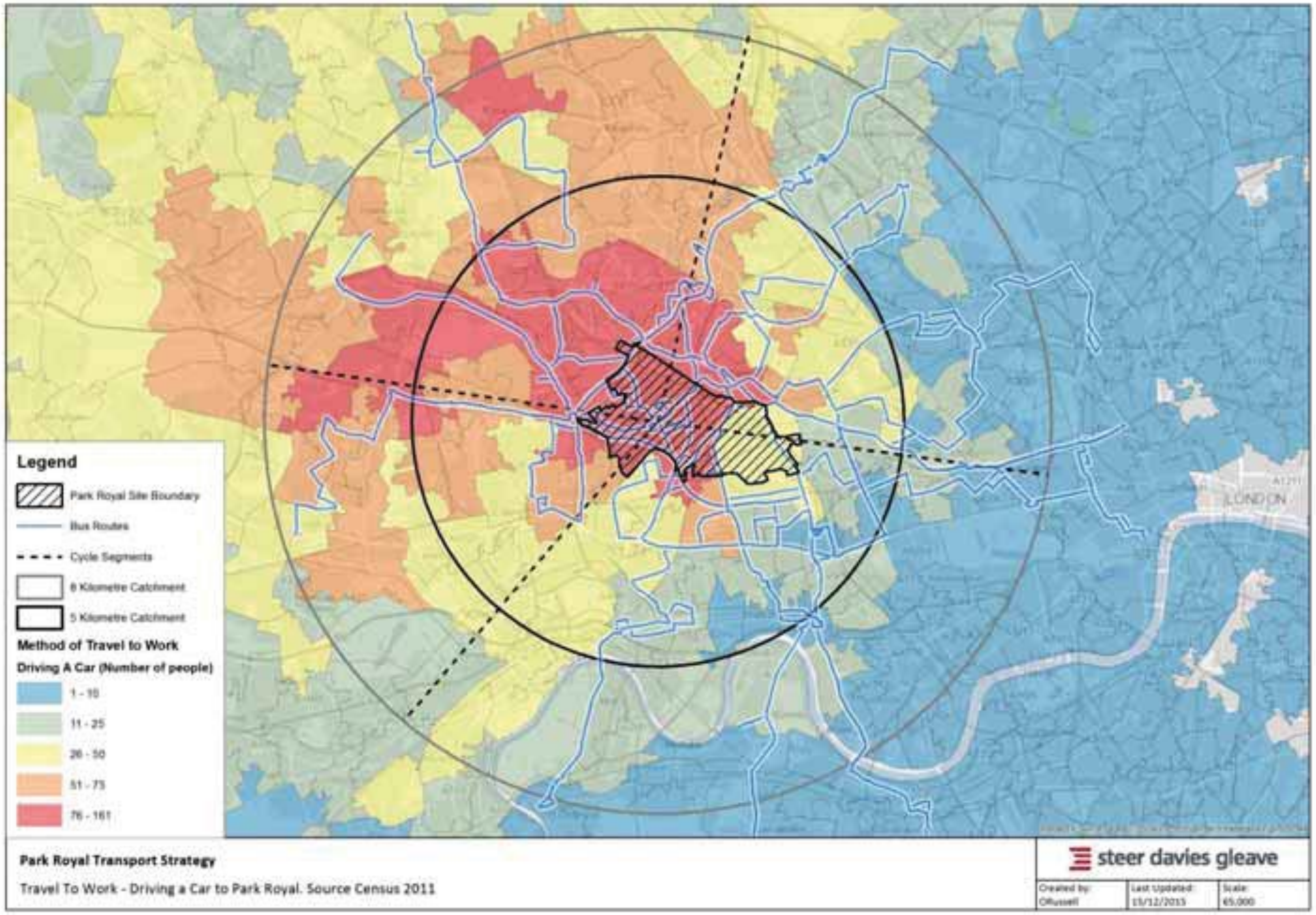
2.18 Analysis of TTW data for car trips shows that as with the general pattern for work trips, the majority of employees live to the west of Park Royal (see Figure 2.5).

2.19 Those areas with the greatest concentration of employees who travel by car live within an 8km radius of the centre of Park Royal. Approximately 40% of the total trips made by car are within this 8km radius.

2.20 Furthermore, approximately 35% of the total car trips are within a smaller 5km radius.

2.21 These distances are significant as 5km represents the average cycle trip length in the UK, while 46% of cycle trips in Central London were found to be of 5-8km in distance (Analysis of Cycling Potential, TfL 2010). As such they are car trips that could be made by sustainable modes rather than private car if suitable infrastructure is provided.

Figure 2.5: No. of Employees Travelling by Car to Park Royal



Existing Traffic Demand

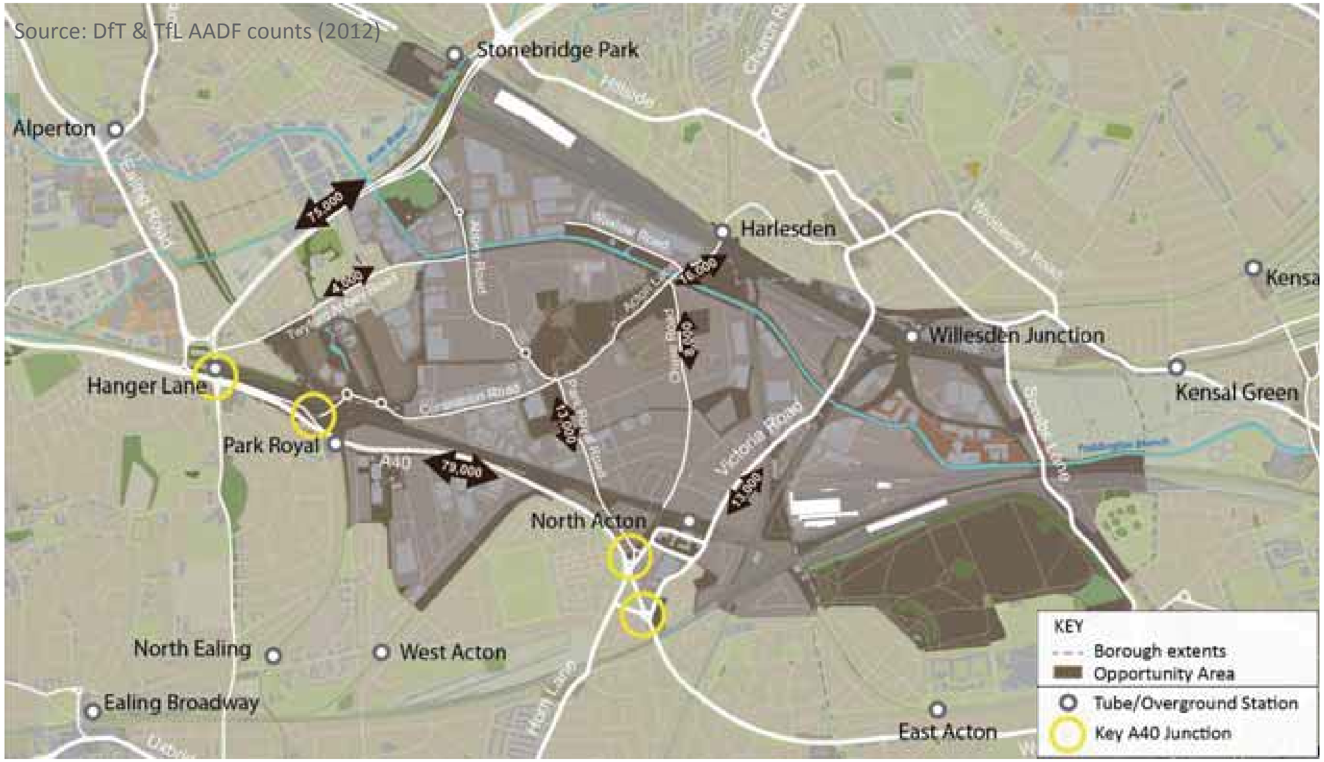
2.22 Daily traffic flows on the TLRN and key internal roads to Park Royal are shown in Figure 2.6.

2.23 These figures show the dominance of the A40 and North Circular, both of which are in the top 10% of London's busiest roads.

2.24 A number of the internal Park Royal Roads also carry a significant volume of traffic with Acton Lane carrying over 16,000 vehicles a day and Park Royal Road and Victoria Road each carrying over 13,000 vehicles a day. Figure 2.7 shows traffic demand on the internal Park Royal roads. The flows ramp up steadily from a low base overnight (10% of peak traffic levels) to a morning peak at about 8am. Traffic then tends to remain steady through the rest of the day, at levels approximately 15% below the morning peak hour. From about 3pm traffic flows begin to increase again until they reach a peak around 5pm, before traffic slowly dissipates over the late evening.

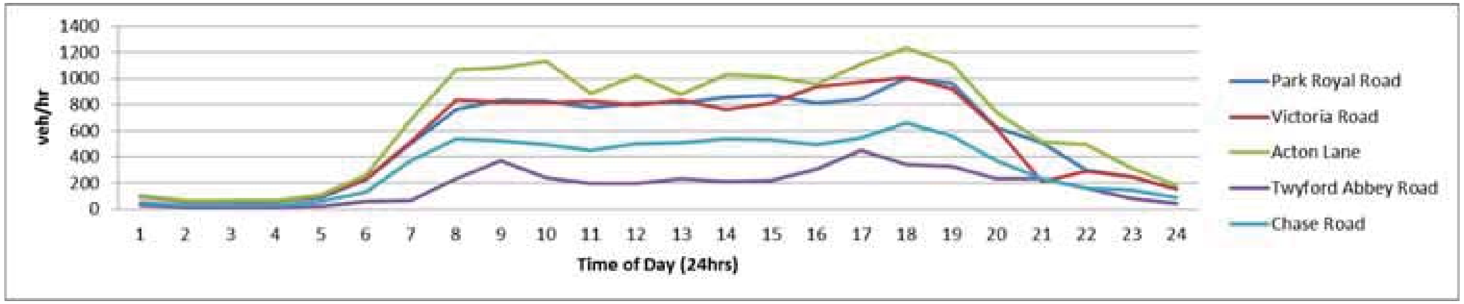
2.25 Congestion is a regular occurrence on the strategic roads surrounding Park Royal.

Figure 2.6: Total Daily Two-way Traffic Flows in Vehicles



Source: DfT & TfL AADF counts (2012)

Figure 2.7: Daily Flow Profile on Key Park Royal Roads (2012)



Source: Radial Cordon Counts (TfL, 2012)

Existing Parking Demand

2.26 To understand the existing level of parking provision within the Park Royal study area, an analysis of aerial photography was undertaken that measured on-street and off-street parking provision. The analysis provides a breakdown of the following parking types:

- On-street formal parking (residential) – kerbside parking on the public highway in residential streets.
- On-street formal parking (employment) – kerbside parking on the public highway adjacent to places of employment.
- Off-street formal parking (employment) – parking on private employment land within marked bays or designated parking areas.
- Informal parking – parking that is not in defined parking areas. This is usually on private industrial land, but may also include ad-hoc parking on shared access roads such as Johnson's Way.

2.27 This analysis is shown in Figure 2.8 and Figure 2.9 and identifies a total of approximately 20,500 existing car spaces across the Park Royal study area with the following breakdown of uses:

- Some 3,800 spaces are within residential areas and therefore assumed to be used solely by Park Royal residents.
- A further 15,000 are likely to be used by Park Royal employees based on the 2011 TTW data and transport assessments for more recent major employment generators (i.e. Origin Business Park and First Central).
- The 1,700 spaces that remain are therefore being used by a combination of commuters and other business uses, such as customer parking and delivery vehicles.

2.28 Approximately 7% of these parking spaces are informal, usually making use of any available private land that can be accessed by employees' vehicles. The use of these areas may, in some instances, be in breach of planning conditions placed on the property, but given the age of many of these units it is likely that the majority of sites have no restrictions on on-site parking.

2.29 Based on the Park Royal Atlas total employment floor areas, the 16,700 non-residential spaces equate to 1 space per 140sqm, which is at the upper end of Ealing & Brent Parking Standards.

2.30 This high existing parking space ratio represents a challenge in reducing car use which would require a behavioural change for employees. This could be made through the implementation of a range of measures including improved public transport services, pedestrian and cycle facilities and restrictions on parking provision through the planning system.

Figure 2.8: Estimated Parking in the Study Area

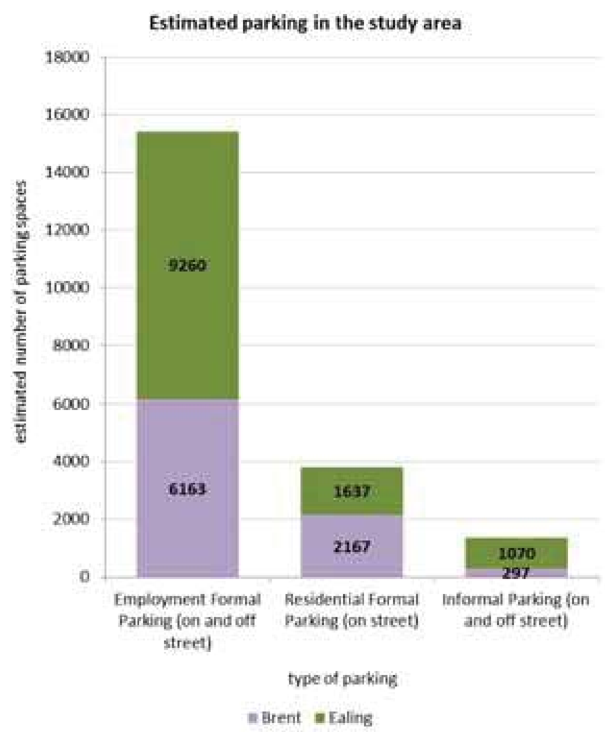
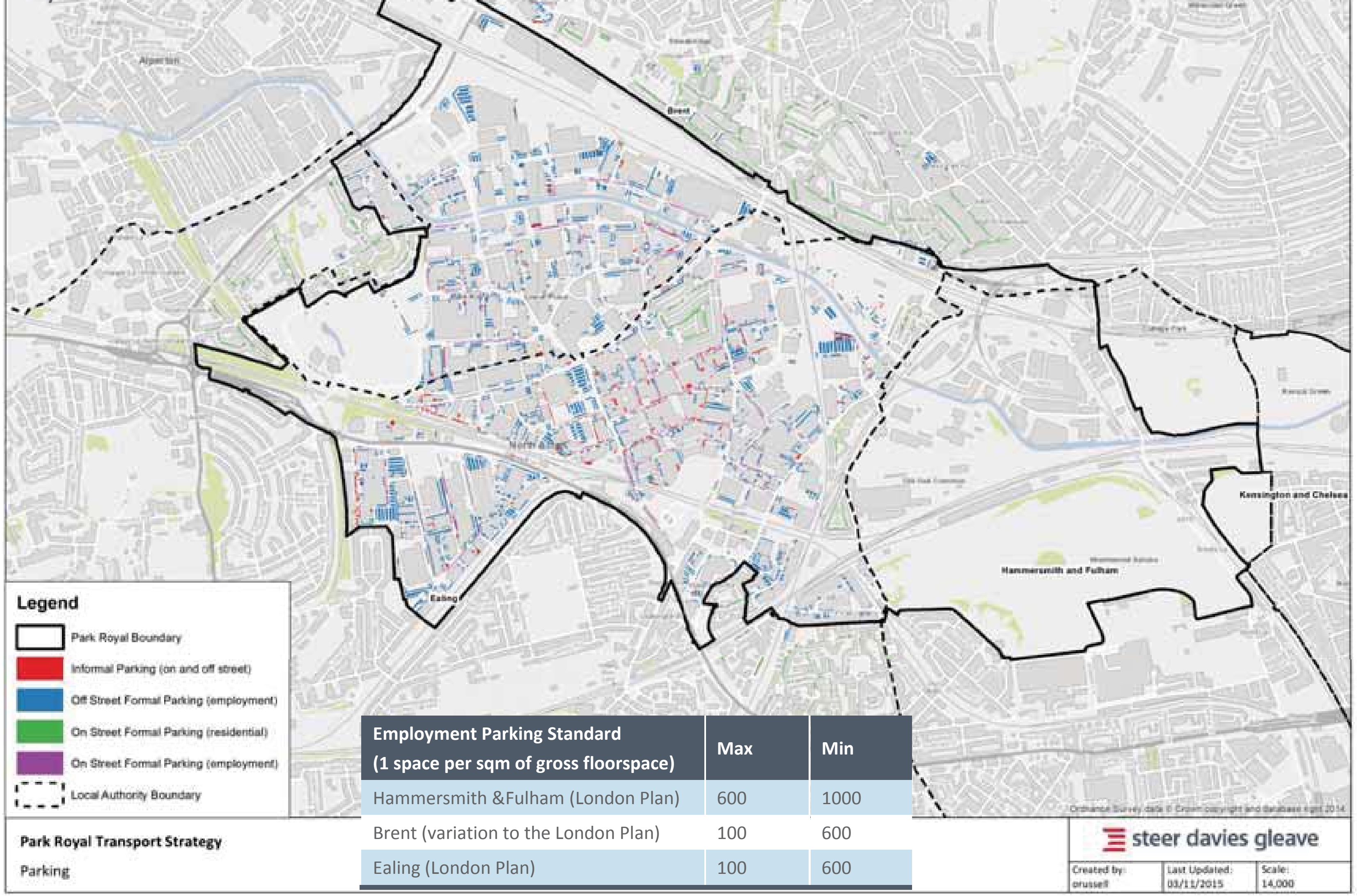


Figure 2.9: Existing Parking Provision within the Park Royal Study Area



Employment Parking Standard (1 space per sqm of gross floorspace)	Max	Min
Hammersmith &Fulham (London Plan)	600	1000
Brent (variation to the London Plan)	100	600
Ealing (London Plan)	100	600

Freight

Existing Road Freight Demand

2.31 Daily freight (LGV and HGV) flows on the TLRN and key internal roads to Park Royal from 2012 are shown in Figure 2.10.

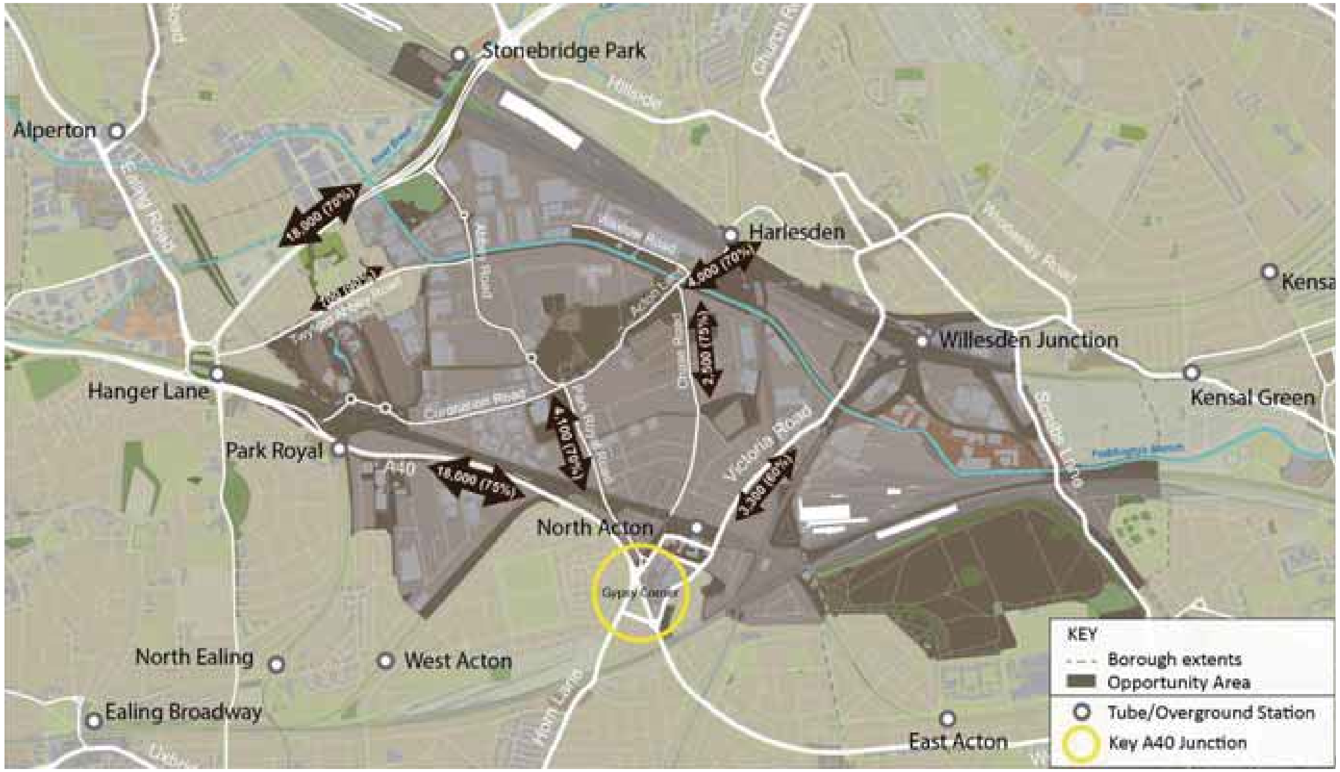
2.32 With the exception of Twyford Abbey Road freight movements are relatively evenly spread across Park Royal's internal roads along the north-south and east-west arterial roads.

2.33 The lower volumes of freight on Twyford Abbey Road could be influenced by the narrower width and predominance of largely residential uses.

2.34 LGVs and HGVs account for approximately 30% of daily traffic flows on these internal roads.

2.35 Of these, LGVs account for approximately 70% of the total freight movements.

Figure 2.10: 2012 Daily Two-way Freight Movements in Vehicles (%LGVs)



Source: Radial Cordon Counts (TfL, 2012)

Key Road Freight Movements

2.36 To aid understanding of the current freight movements into and out of Park Royal, analysis of TfL's AM peak WelHAM model for a base year of 2012 has been undertaken.

2.37 Victoria Road carries a significant amount of freight traffic, some 3,300 movements a day, but 90% or more of these movements are not associated with Park Royal. Victoria Road is the "eastern by-pass" for the Park Royal area with the North Circular providing a similar function to the west.

Inbound Road Freight Trips

- **Abbey Road** acts as the main inbound corridor from the north via the North Circular. Once within Park Royal, approximately 50% of freight movements have destinations before the junction with Coronation Road, with a further 40% continuing to destinations near Gypsy corner. A small percentage of LGV trips (10%) are through trips which continue south along Horn Lane.
- **Acton Lane** feeds traffic into Park Royal from dispersed origins to the north and east. It also acts as an alternative route for freight traffic that leaves the North Circular early to avoid congestion via Neasden Lane. Only a small percentage of LGV trips (10%) are through trips which continue south along Horn Lane. A significant proportion of traffic (25-30%) is headed to the distribution centres off Waxlow Road, north of the Grand Union Canal.
- **Chase Road** acts as an alternative route to Park Royal Road from the A40 east (approx. 60% of Chase Road traffic originates from here) while the remaining comes from the south and west via Horn Lane and the A40 west respectively**.**
- **Coronation Road** acts as the major inbound corridor for traffic from the A40 west. The majority (60%) have destinations within Park Royal but circa 40% continue to destinations around Harlesden.
- **Park Royal Road** acts as the main inbound corridor from the east via the A40 and the south via Horn Lane and Noel Road. Approximately 10% of freight traffic are through trips that continue to the north past Harlesden station and onto Church Road.
- **Twyford Abbey Road** is not a heavily utilised inbound freight corridor.

Outbound Road Freight Trips

- **Abbey Road** acts as the primary heavy vehicle corridor out of Park Royal. Of freight traffic exiting via Abbey Road, approximately 70% of freight trips travel northbound along the North Circular, while 15% head westbound on the A40 via Hanger Lane. The remaining 15% disperse across routes to the south and west.
- **Acton Lane** carries a significant amount of through freight traffic towards the northeast from the A40 west. Through trips account for circa 20% of LGV and 50% of HGV movements on Acton Lane.
- **Chase Road** does not appear to be heavily utilised by exiting Park Royal freight Traffic.
- **Coronation Road** acts as the main feeder for movements to the A40 east and central London. Some LGV/HGV movements also make use of the U-turn facility on the A40 at Mansfield Road to head westbound along the A40.
- **Park Royal Road** acts as a major feeder onto the A40 east and Horn Lane. Up to 30% of the total freight traffic exiting the OA via Park Royal Road are through trips from the North Circular, by-passing delays at Hanger Lane.
- **Twyford Abbey Road** carries twice the volume of outbound trips compared to its inbound movement due to its unsignalised entry to the Hanger Lane gyratory. From the gyratory, traffic disperses along all the key strategic routes.

Existing Rail Freight Lines

2.38 There is also rail freight activity within the wider Park Royal area utilising:

- Great Western Main Line (GWML)
- West Coast Main Line
- North London Line
- West London Line
- Dudding Hill Line

2.39 Rail freight facilities are available at and in the vicinity of Willesden Junction (e.g. the Euro Freight Terminal) and handle inbound flows of aggregates and cement and outbound flows of waste and mail.

2.40 Additional aggregate depots on the rail network are located just to the west of North Acton Station and south of the OA near Acton Main Line Station (Acton Goods Yard).

2.41 TfL is working with Network Rail as part of their Freight Network Study process to make the case for better utilisation of freight paths in the London area and to encourage, where possible, freight traffic to operate off-peak along routes that avoid London.

2.42 OPDC are working with TfL to produce a Construction and Logistics Strategy for the OPDC area to ensure a coordinated approach which will minimise the disruption to surrounding residents and businesses

WestTrans Freight Strategy

2.43 Westrans is currently in the process of developing a wider freight strategy for west London. Once complete this will form a framework for future freight planning and integration.

Buses

Existing Bus Network

2.44 Park Royal is served by 15 bus routes that serve a diverse set of origins and destinations as shown in Figure 2.11.

2.45 The focus of the existing bus network in Park Royal is the Central Middlesex Hospital.

2.46 The following bus priority measures are present in Park Royal:

- Bus gate on Coronation Road to allow buses to bypass queues on approach to the junction with Abbey Road and Park Royal Road.
- Bus only lanes on entry and exit from the hospital
- Bus lanes on Rainsford Road
- Westbound bus lane on Twyford Abbey Road between Abbey Road and Rainsford Road

2.47 The above measures are limited in terms of coverage and effectiveness and as a result, buses are subject to increased delays from traffic congestion which impacts journey time reliability.

Existing Bus Travel to Work Data Existing

2.48 TTW data for 2012 showed a 14% bus mode share with the distribution of trips shown in Figure 2.11.

2.49 As with the other modes this shows a concentration of employees within a 5km catchment, mainly focused to the north and west of the OA.

Existing Bus Demand

2.50 Existing bus demands and capacities by route for the AM and PM peak periods have been provided by TfL for a range of dates during 2014 and 2015. This Keypoint bus loadings data provides passenger demand and capacity by route at key stops. The figures presented in Table 2.1 and Table 2.2 are taken from stops either within or on the fringes of Park Royal.

2.51 AM Peak Bus Demand

Table 2.1: AM Peak Hour Existing Bus Demand & Capacity

Source: 2014/15 TfL Keypoint Bus Loadings

Route No	No. Buses	Demand (pax)	Capacity (pax)	Load Factor
7	9	170	590	29%
18	19	880	1240	71%
72	9	160	390	41%
83	9	390	590	66%
95	5	200	220	91%
112	4	130	170	76%
187	6	30	260	12%
220	12	240	780	31%
224	5	100	220	45%
226	7	240	300	80%
228	6	50	260	19%
260	6	190	390	49%
266	8	290	520	56%
283	9	100	390	26%
440	6	60	260	23%
487	4	160	170	94%
611	1	40	70	57%
Totals	**125**	**3430**	**6820**	**50%**

2.52 Whilst no routes suffer from overcrowding during the AM peak within the Park Royal area, some are close to capacity:

- Route 95 which runs between Shepherd's Bush station and Southall Town Hall via Park Royal Station and the A40
- Route 226 which runs between Golders Green and Ealing Broadway via the Central Middlesex Hospital
- Route 487 which runs between Willesden Junction and South Harrow via the Central Middlesex Hospital

2.53 All other routes in or around Park Royal have spare capacity with an average load factor of approximately 50%.

PM Peak Bus Demand

Table 2.2: PM Peak Hour Existing Bus Demand & Capacity

Source: 2014/15 TfL Keypoint Bus Loadings

Route No	No. Buses	Demand (pax)	Capacity (pax)	Load Factor
7	9	130	590	22%
18	20	770	1300	59%
72	9	110	390	28%
83	9	380	590	64%
95	6	170	260	65%
112	5	140	220	64%
187	7	10	300	3%
220	14	260	910	29%
224	4	90	170	53%
226	5	130	220	59%
228	6	50	260	19%
260	5	220	330	67%
266	9	220	590	37%
283	8	40	340	12%
440	5	80	220	36%
487	5	110	220	50%
611*	n/a	n/a	n/a	n/a
Totals	**126**	**2910**	**6910**	**42%**

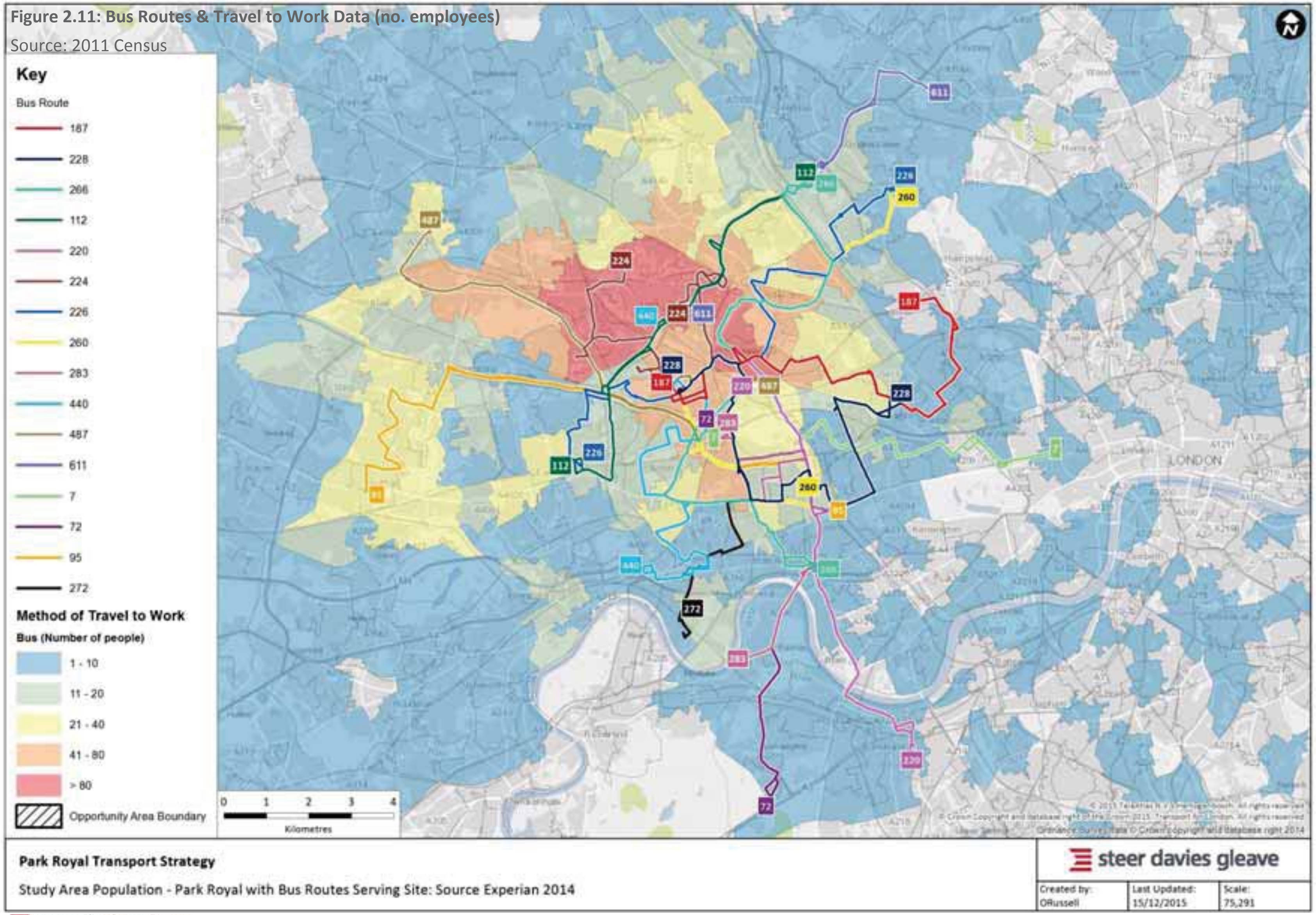
*Special school service that operates outside the PM peak hour.

2.54 Total demand in the PM peak hour is approximately 15% lower than during the AM peak and as a result none of the existing routes experience overcrowding in or around the Park Royal area.

2.55 The reduced journey time reliability identified previously is likely a contributory factor to the low levels of bus ridership seen on a number of routes in the area.

Figure 2.11: Bus Routes & Travel to Work Data (no. employees)

Source: 2011 Census



Walking & Cycling

Existing Walking and Cycling Network

2.56 The existing cycling network has relatively good coverage as shown in Figure 2.12. However other than the off-road sections (shown in green), no segregation is provided for cyclists and supporting infrastructure such as bike stands and wayfinding is infrequent and of limited quality.

2.57 National Cycle Route 6 (NCR 6) runs along the Grand Union Canal. The route is popular with cyclists although its current width and facilities do not allow for a good level of service.

2.58 There are various points at which NCR 6 links to Park Royal but these points would benefit from better signage, maintenance and better facilities, including cycle parking.

2.59 A signed cycle route is also available along Coronation Road linking to Harlesden to the north and to Hanger Lane, via a green route, to the south.

2.60 A series of quiet routes, recommended for cyclists, is also available in the south-eastern part of the area, although some of these roads still carry significant traffic volumes and are important heavy vehicle corridors e.g. Park Royal Road.

2.61 There is a need for a more widespread and permeable network across Park Royal and better links to the already signed and formalised cycle routes.

2.62 The residential and employment areas are segregated and plots lack permeability making walking and cycling more difficult.

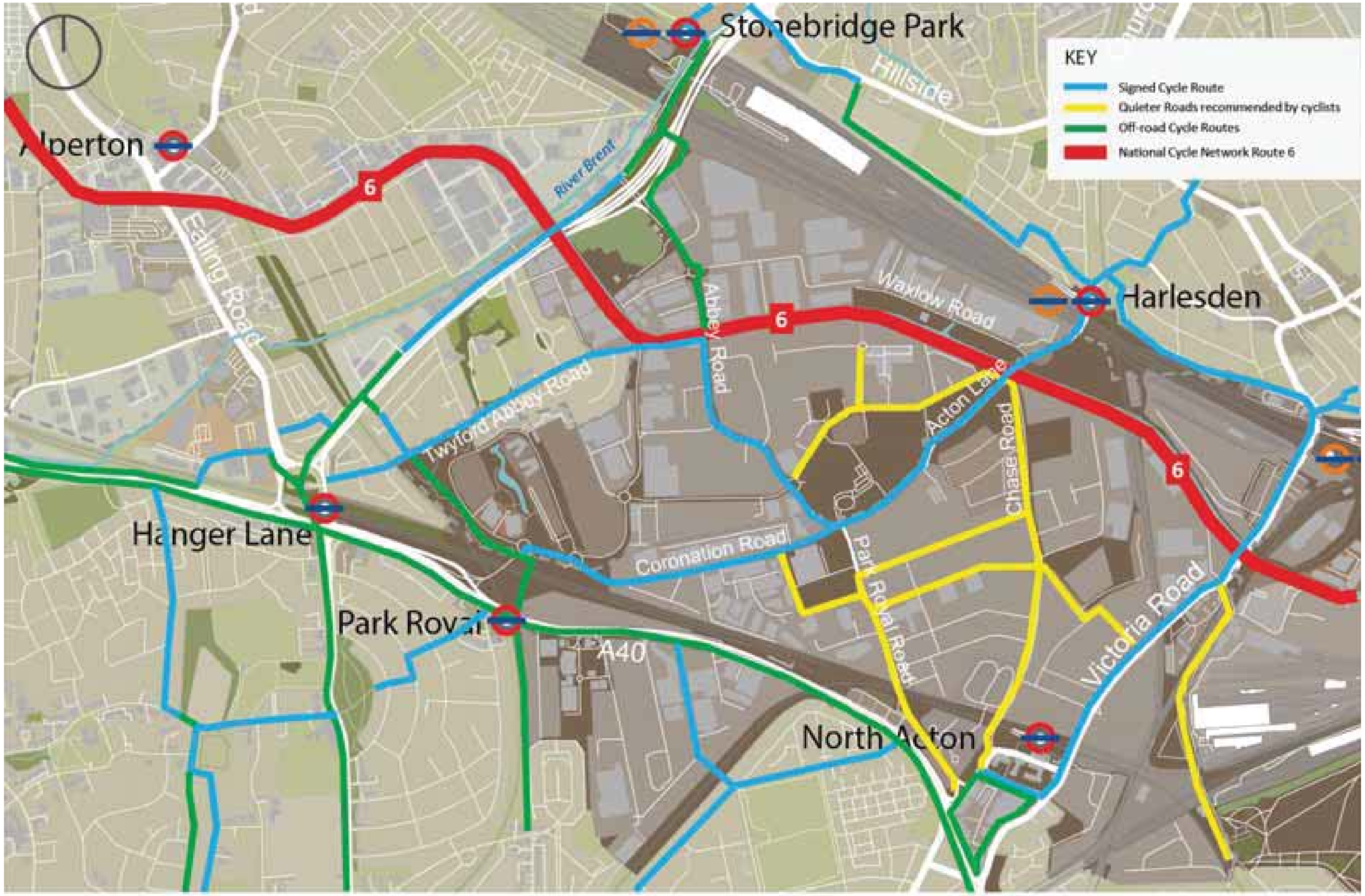
2.63 The existing main routes are dominated by vehicle traffic and parking. Footways tend to be relatively narrow, crossing facilities are very few and signage and maintenance is generally to a lower standard than other parts of London.

2.64 There is also a lack of active frontages to provide passive surveillance along most road corridors and, when combined with the lack of wayfinding, the area can be intimidating for both walkers and cyclists unfamiliar with the area.

2.65 Access to the canal for both residents and employees is limited and lacks seating or other facilities that would encourage usage.

2.66 Routes to/from the Underground stations, especially along the southern fringe, are narrow, poorly lit, inaccessible and lack consistent and comprehensive signage.

Figure 2.12: Existing Cycle Network



Base map data © OpenStreetMap contributors
Cartography by Steer Davies Gleave 2015

TTW data (walking/cycling)

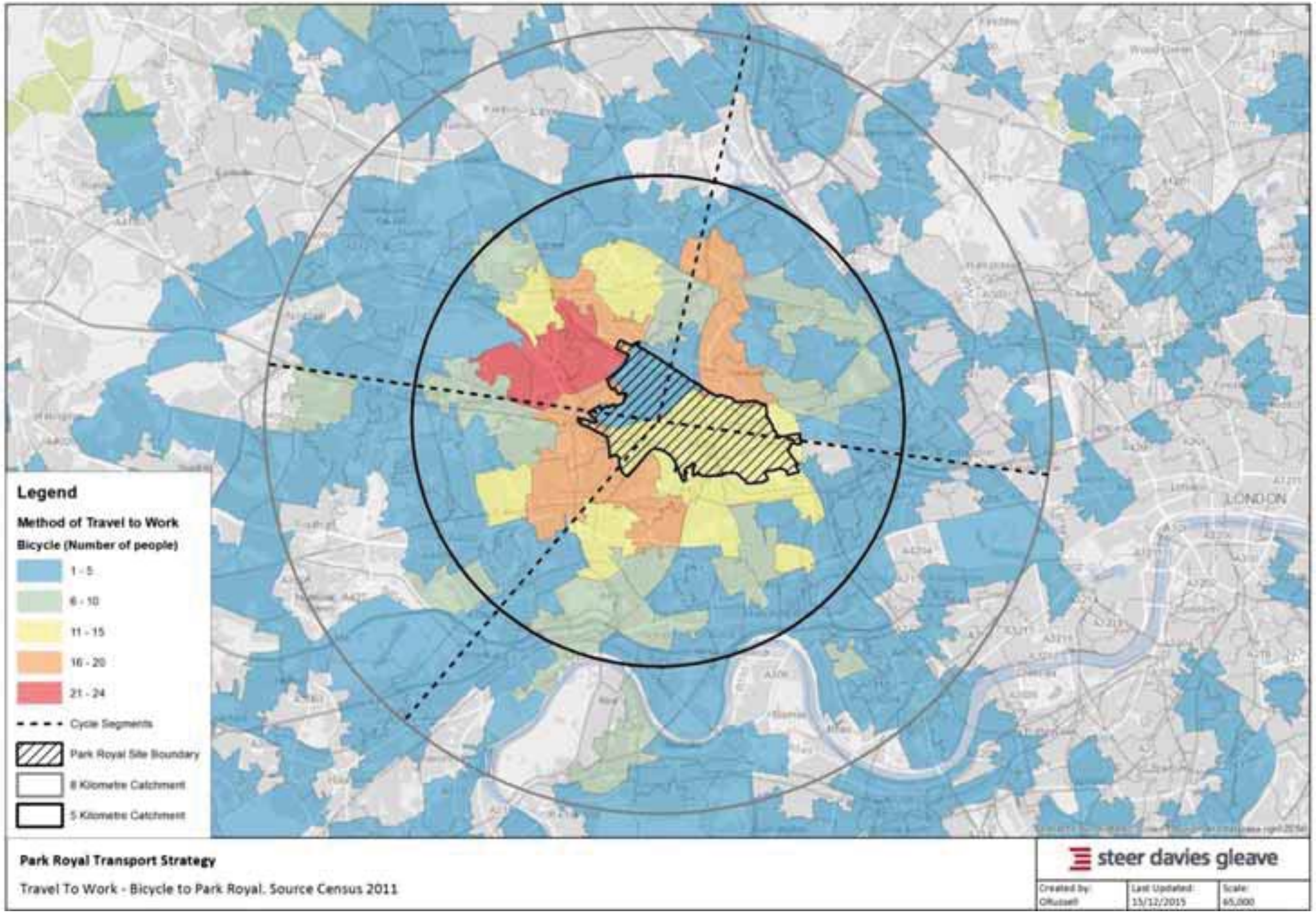
2.67 The TTW data shows that walking and cycling are more popular modes of travel for people living within 5km of Park Royal as shown in Figure 2.13.

2.68 Approximately 60% of the cycling trips and 85% of the walking trips come from within this 5km catchment area.

2.69 Walking and cycling account for 5% and 3% respectively of the travel to work trips. Employees that chose to walk mainly arrive from the areas immediately to the south west and north of Park Royal.

2.70 The high distribution of cycle trips from the northwest is likely due to the presence of the NCR 6 along the Grand Union Canal, offering a direct and segregated connection to Park Royal and further along the canal into Central London.

Figure 2.13: No. of Employees Cycling to Park Royal TTW Data



2.71 These numbers show there is potential for cycling and walking to service a higher numbers of employees.

2.72 Removal of barriers to walking and cycling, especially along the western (North Circular) and southern (A40) edges of Park Royal and better links to stations such as Park Royal and Hanger Lane are extremely important to maintaining and potentially improving the levels of cycling and walking.

Walking and Cycling Demand within Park Royal

2.73 No specific count data is available regarding walking within Park Royal itself. During the site visits, most of the observed walking trips were to/from public transport stops and to/from the Asda centre on Park Royal Road.

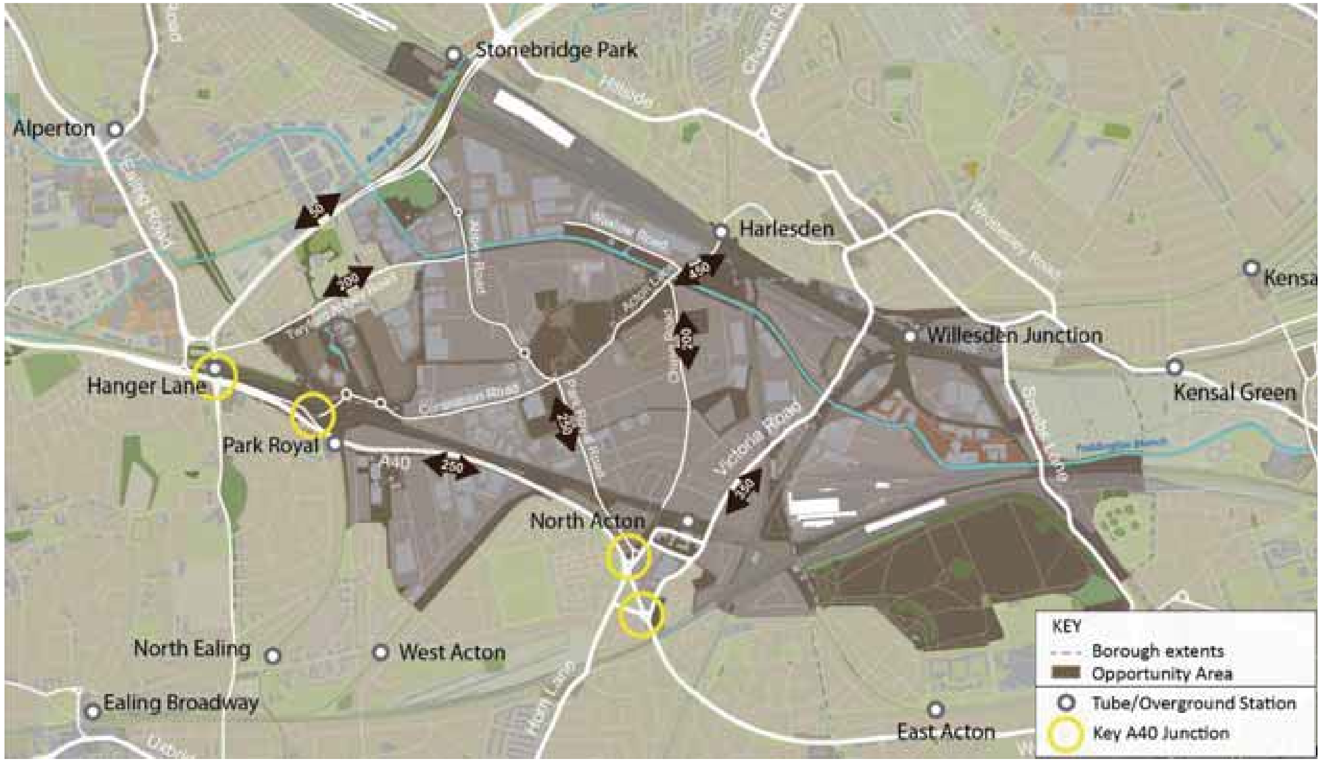
2.74 The overall number of walking trips from the Travel To Work Census captures roughly 1,440 employee trips. During the day, the internal walking trips within the site are likely to be higher than the reported travel to work trips, nevertheless the level remains relatively low compared to the total number of employees on site.

2.75 Surveys undertaken in April and May 2012 by TfL (TfL Radial Cordon Counts) show that the daily numbers of cyclists along the main corridors are also very low (see Figure 2.14).

2.76 During the morning peak hour the most popular routes along Acton Lane and Victoria Road have approximately 85 cyclists.

2.77 In comparison to the total daily traffic recorded on the same routes, cycling accounts for a maximum 4-5% of vehicle flows.

Figure 2.14: Daily Cycling Volumes (TfL, 2012)



Source: Radial Cordon Counts (TfL, 2012)

2.78 There are no records of cycling activity along the canal but site visits confirmed the route is well used especially during the morning peak hours by both cyclists and pedestrians.

2.79 Due to the current level of maintenance it is believed that the canal is underutilised and represents an important asset that could be better integrated in future plans to increase levels of walking and cycling.

Existing Challenges for Walking and Cycling

2.80 Due to its varied uses and multiple business typologies and sizes, the challenges for walking and cycling are very diverse.

2.81 For the purposes of this study, they have been grouped into the following categories:

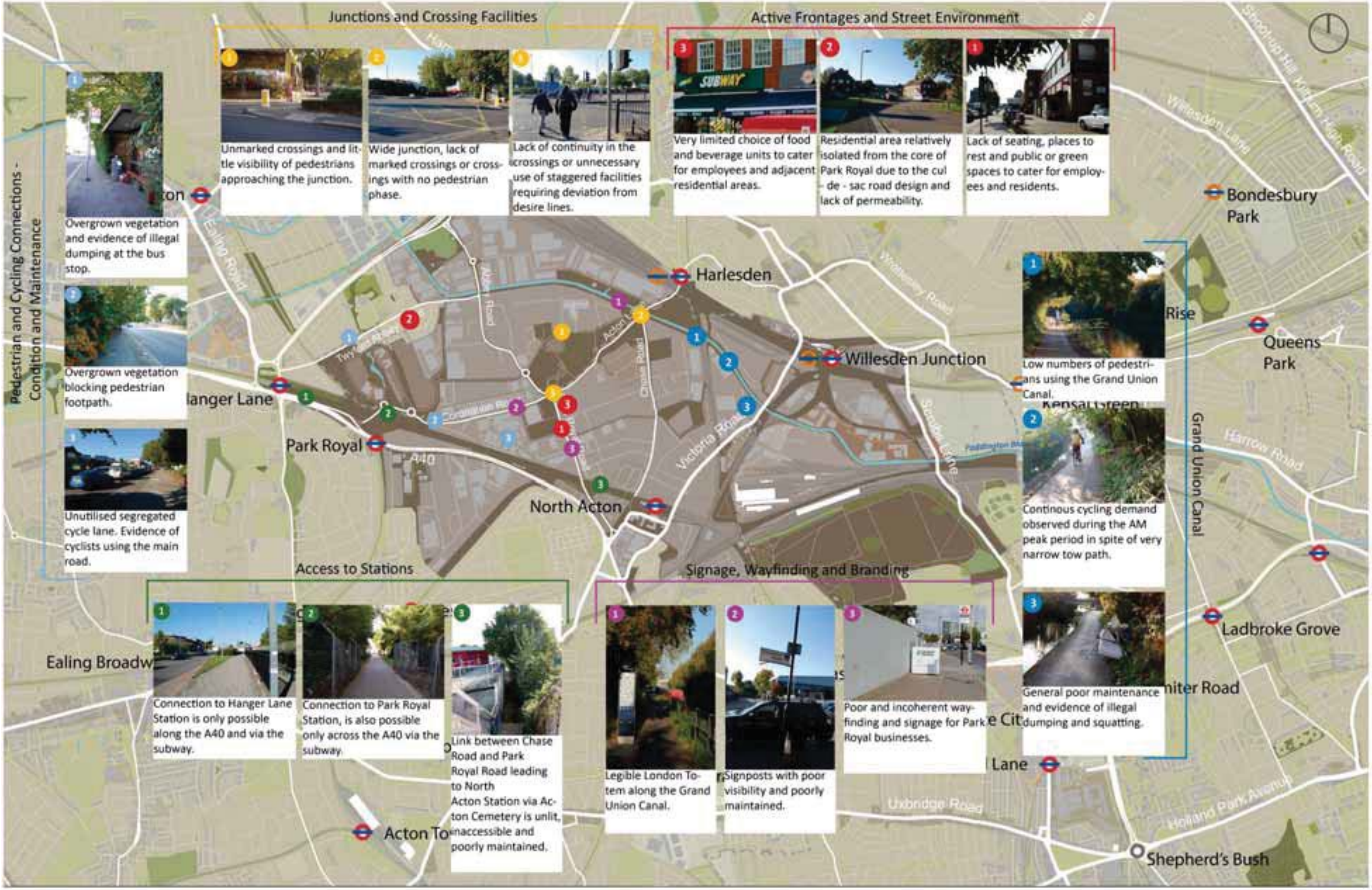
- Junctions and crossing facilities
- Active frontages and street environment
- Access to stations
- Signage, wayfinding and branding
- Walking and cycling connections
- Grand Union Canal

2.82 Figure 2.15 shows examples of some of the key challenges identified on site in all of the above categories.

2.83 To address these challenges an overarching programme of rehabilitation and improvement of existing routes and places should be integrated with more radical interventions such as:

- Creating more walking and cycling links
- Designating public and green spaces
- Introducing new crossing facilities and
- Creating more active frontages and diversity of uses.

2.84 A Cycling Environment Review System (CERS) audit would assist in the identification and prioritisation of these interventions to improve cycle routes and public spaces, whilst supporting the effective targeting of resources.



Base map data © OpenStreetMap contributors
Cartography by Steer Davies Gleave 2015

Figure 2.15: Examples of Existing Challenges for Walking and Cycling

Rail

Existing Rail Network

2.85 Park Royal is well served by a total of six Overground and Underground rail stations; however these stations are all on the fringes of the OA as can be seen in Figure 2.16.

2.86 Park Royal station located in the south-western corner of the OA provides connections to Central London and Heathrow via the Piccadilly Line.

2.87 Hanger Lane station also located in the south-western corner of the OA provides connections to Central London and West Ruislip via the Central Line.

2.88 North Acton Station located in the south-eastern corner of Park Royal, is also on the Central Line.

2.89 Harlesden and Stonebridge Park on the northern side of Park Royal are both located on the Bakerloo Line providing connections to Central London and Harrow & Wealdstone and the London Overground Line to Watford.

2.90 Willesden Junction acts as a major interchange between the Bakerloo Line and London Overground services.

Figure 2.16: Existing Passenger Rail Network

Station Accessibility

2.91 Of the six stations serving Park Royal, only one, Willesden Junction, has step-free access from street to platform.

2.92 There are also limited onward journey facilities such as cycle hire docks and high quality bus interchange due to the age and constrained locations of these stations.

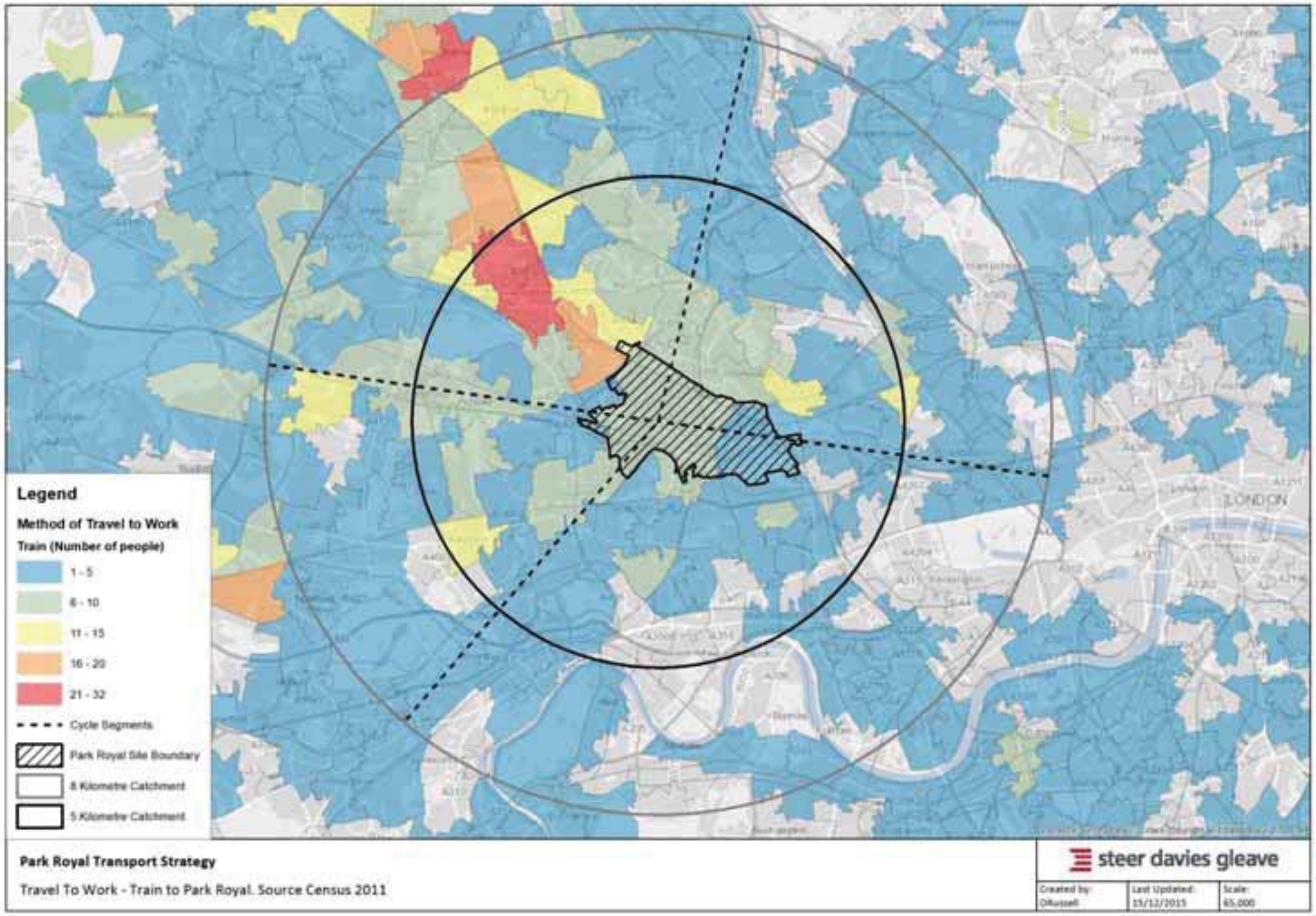
Rail and Underground TTW Data

2.93 TTW data for Park Royal employees travelling by Overground rail services is presented in Figure 2.17. It shows that only a very low number of employees use this mode with the vast majority living to the west at stations along the London Overground line to Watford.

2.94 Overall approximately 2,300 employees use rail to travel to work.

2.95 15% of these live within 5km and 26% within 8km of Park Royal.

Figure 2.17: No. of Employees Travelling by Rail to Park Royal

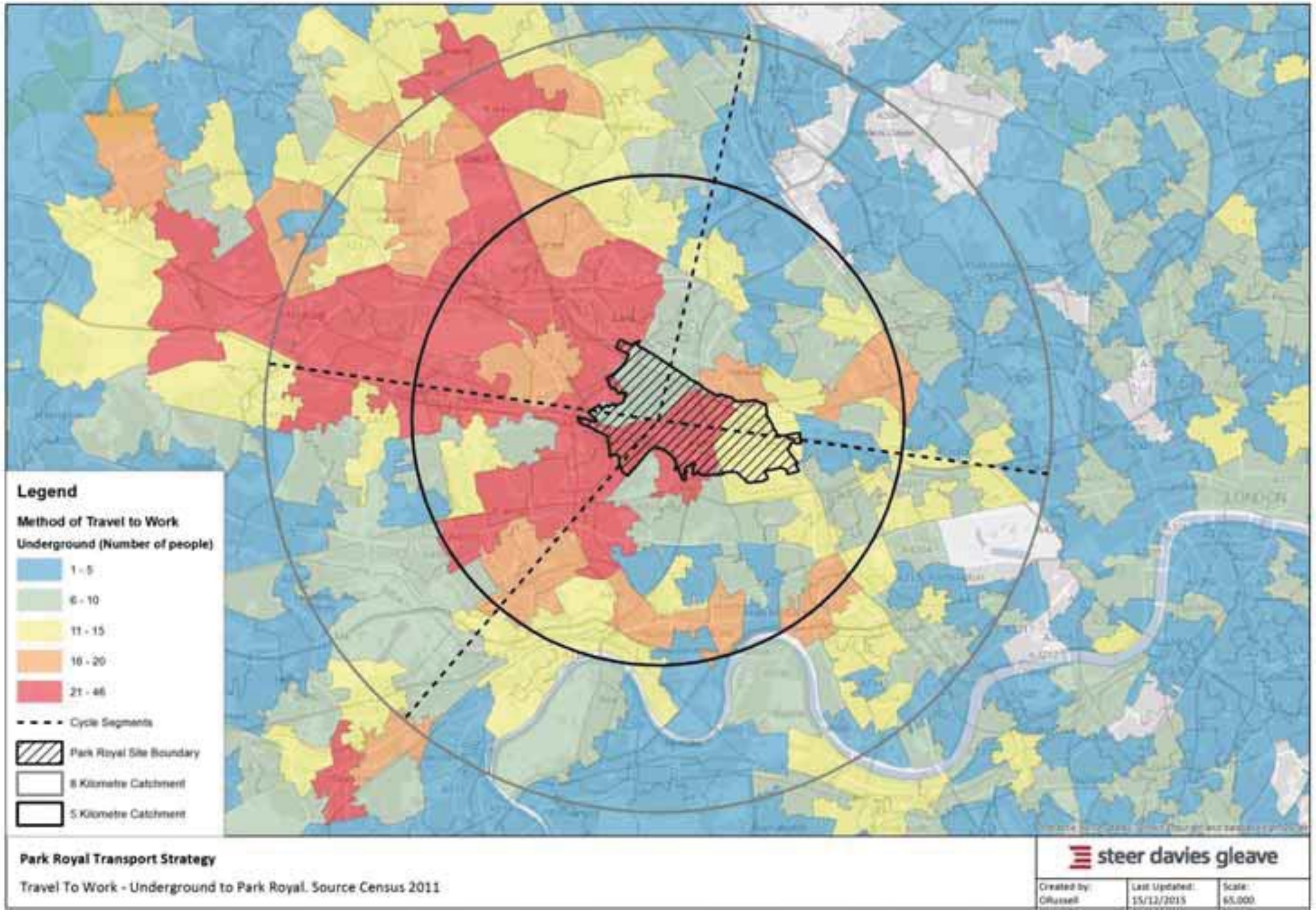


2.96 TTW data for Park Royal employees travelling by London Underground services is presented in Figure 2.18. It shows the 17% mode share is generally spread along lines running to the North West namely the Central and Piccadilly Lines.

2.97 A concentration of employees also live in the south west on the Heathrow branch of the Piccadilly line.

2.98 Approximately 40% of the Underground trips come from within an 8km radius of Park Royal.

Figure 2.18: No. of Employees Travelling by Underground to Park Royal



Existing Station Demand

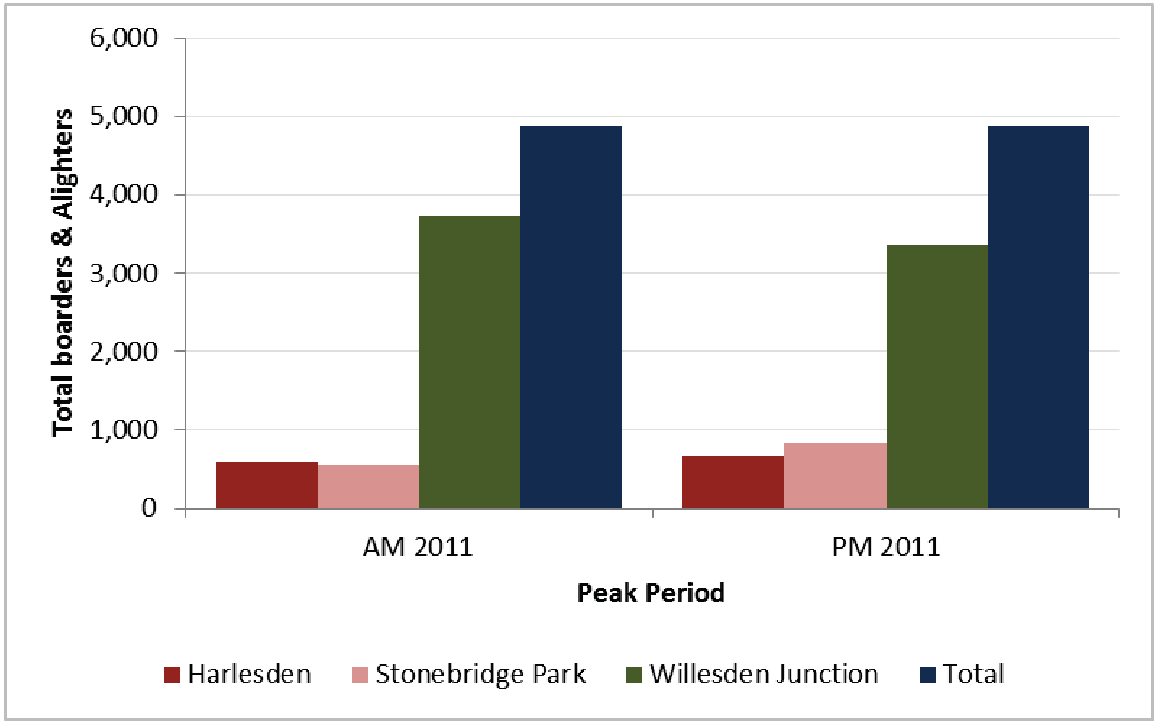
2.99 Existing peak demand in each of the AM and PM peak periods at the Overground stations has been extracted from TfL's 2011 RailPlan model. This demand comprises Park Royal employees as well as local residents and other users of the stations.

Overground Demand

2.100 These outputs are summarised in Figure 2.19 and show:

- Willesden Junction accounts for 70-75% of station movements across both the AM and PM peaks as a result of its important interchange status.
- In the AM peak total movements into and out of Stonebridge Park and Harlesden are similar at approximately 550 passengers.
- Both Stonebridge Park and Harlesden are busier in the PM peak with around 800 and 700 passenger entries and exits.

Figure 2.19: AM & PM Peak Overground Station Demand (pax/hr)



Underground Demand

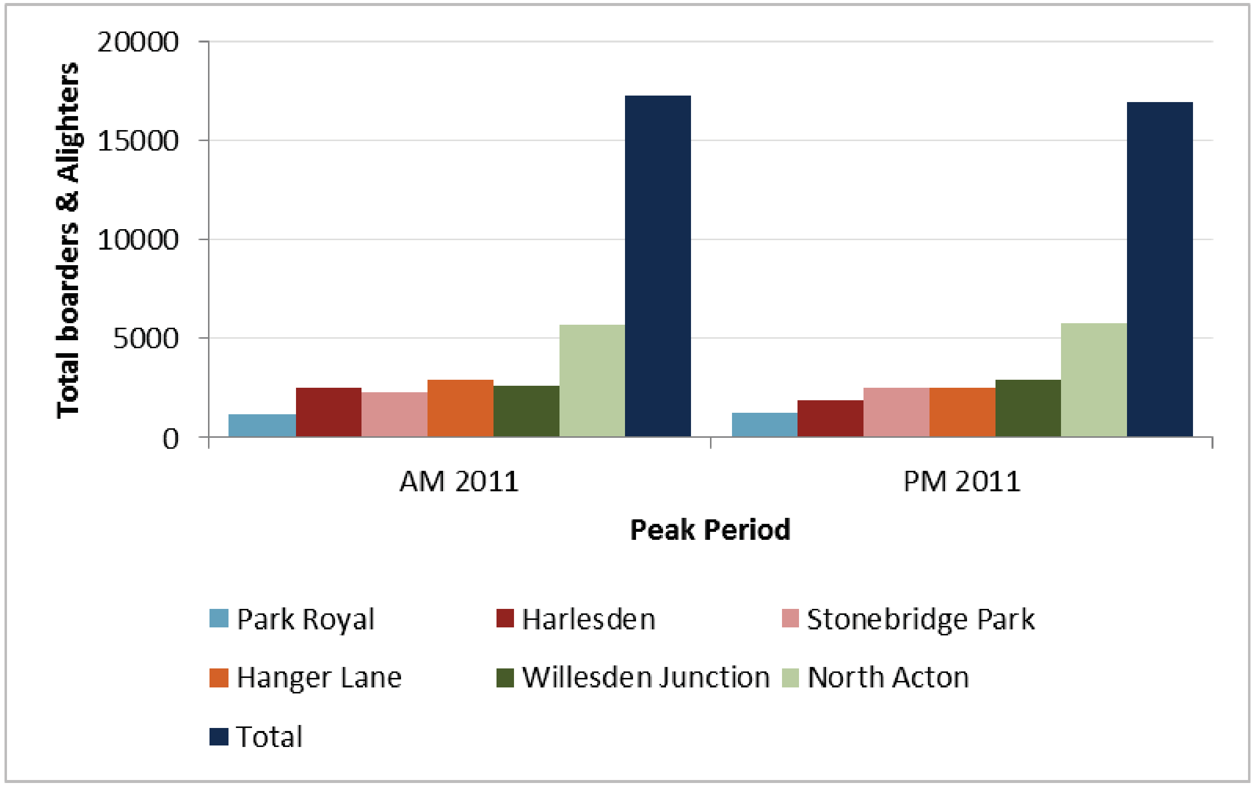
2.101 These outputs are summarised in Figure 2.20 and show:

- Total number of passengers using the six stations is around 17,000 during each of the peak periods
- North Acton is the heaviest used underground station in the area with some 6,000 entries and exits during each peak.
- Park Royal is the quietest station with around 1,200 entries and exits during each peak.
- Whilst Willesden Junction only has between 2,500-3,000 Underground passengers each peak it is a busier station when considering Overground passenger numbers as well.

Impact of Station Accessibility on Demand

2.102 The issues identified in paragraphs 2.93 and 2.94 relating to limited station accessibility and quality of onward connections, is likely limiting the attractiveness of rail as the preferred mode choice for Park Royal employees.

Figure 2.20: AM & PM Peak Underground Station Demand (pax/hr)



Grand Union Canal

2.103 The Grand Union Canal acts as a natural barrier along the northern edge of Park Royal.

2.104 Its movement and transportation function has diminished over time, nevertheless it remains a very important asset for the area that could play an important role in the improvement of the quality of Park Royal as a place to work and live.

2.105 The canal is fenced both on the northern and southern banks. The south embankment, which accommodates the only tow path, tends to be steep, poorly maintained, with overgrown vegetation and signs of illegal rubbish dumping as shown in Figure 2.21.

Figure 2.21: Local Environment along the Canal

2.106 There are various points along the canal where access to/from Park Royal is possible on foot and by cycle. Nevertheless these places are not very visible and generally lack seating or any other type of facilities.

2.107 The Power Day wharf is still functional on the north-eastern bank and can be seen below in Figure 2.22. Future improvements to the canal should consider the potential of utilising the facilities further and integrate them with proposals for freight and access along the canal.

Figure 2.22: Powerday Canal Wharf

2.108 The potential for greater freight use of the canal is also aided by the absence of locks in the area which provides quicker and easier access for barges.

3 Future Travel Demand

Drivers of Growth

3.1 There are numerous drivers of growth in the region, either within the Old Oak and Park Royal Opportunity Area itself or in other OAs and housing zones nearby (see Figure 3.1).

3.2 A new commercial and office hub, providing 55,000 new jobs and approximately 24,000 new homes is focused around the new Old Oak Common Station.

3.3 Alongside this investment, an additional 10,000 new jobs and a minimum of 1,500 new homes are planned in the north eastern and south western corners of Park Royal respectively.

3.4 To be able to capitalise on the substantial investment taking place, the connectivity and permeability between Old Oak and Park Royal needs to be increased by providing continuous routes and encouraging a more sustainable balance of travel modes.

Wembley OA

3.5 The Wembley OA Masterplan shows the potential for the area to create at least 5,500 new jobs and 5,000 new homes by 2026 with a further aspiration to more than double that in the future.

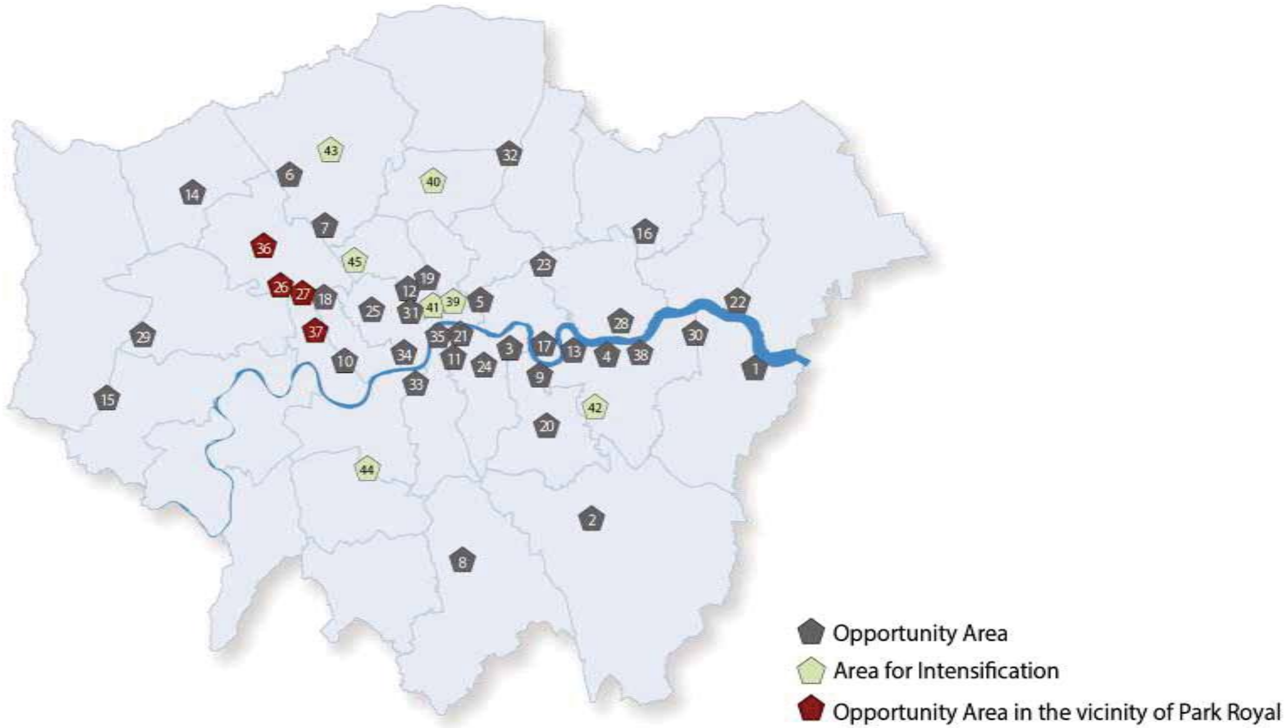
White City OA

3.6 The White City OAPF targets 10,000 new jobs, roughly 6,000 new residential units and further investment in the metropolitan town centre.

3.7 This development is likely to further increase the attractiveness of the White City/Shepherd’s Bush leisure and shopping cluster and create demand for better connections to the northwest across the A40 into Old Oak.

3.8 The combined effect of these planned future developments will be to generate a significant increase in the demand for all modes of travel across the area.

Figure 3.1: Opportunity and Intensification Areas Overview (GLA, 2015)



Opportunity Areas
1 Bexley Riverside
2 Bromley
3 Canada Water
4 Charlton Riverside
5 City Fringe/Tech City
6 Colindale/Burnt Oak
7 Cricklewood/Brent Cross
8 Croydon
9 Deptford Creek/Greenwich Riverside
10 Earls Court & West Kensington
11 Elephant & Castle
12 Euston
13 Greenwich Peninsula
14 Harrow & Wealdstone
15 Heathrow
16 Ilford
17 Isle of Dogs
18 Kensal Canalside
19 King's Cross - St Pancras
20 Lewisham, Catford & New Cross
21 London Bridge, Borough & Bankside
22 London Riverside
23 Lower Lee Valley (including Stratford)
24 Old Kent Road
25 Paddington
26 Park Royal
27 Old Oak Common
28 Royal Docks and Beckton Waterfront
29 Southall
30 Thamesmead & Abbey Wood
31 Tottenham Court Road
32 Upper Lee Valley
33 Vauxhall, Nine Elms & Battersea
34 Victoria
35 Waterloo
36 Wembley
37 White City
38 Woolwich

Areas for Intensification
39 Farringdon/Smithfield
40 Haringey Heartlands/Wood Green
41 Holborn
42 Kidbrooke
43 Mill Hill East
44 South Wimbledon/Colliers Wood
45 West Hampstead Interchange

Future Walking & Cycling Conditions

Likely Growth in Walking and Cycling

3.9 Walking and cycling are very important aspects of the Mayoral Transport Strategy. The increased pressure and congestion on roads and public transport networks is expected to further increase the shift towards more active modes such as walking and cycling.

3.10 The cycling "revolution" is expected to deliver infrastructure and programmes that will support a considerable increase in cycling from 2% to 5% of the total mode share across London.

3.11 Also, significant investment is being channelled to improve walking conditions across London, and achieve increased levels above the current 24% mode share.

3.12 Within the OA, a significant growth in walking and cycling trips will occur as a result of people making onward journeys from the new Old Oak Common Station to their place of residence or work within Park Royal.

3.13 Links between existing public transport nodes and areas of significant future development such as First Central and the former HS2 construction site will also see significant growth in walking and cycling trips.

3.14 One of the major investments that is likely to have a significant impact on cycling uptake in the area is the proposed East-West Cycle Superhighway (CSH) route along the A40 including the Westway (consultation planned to start at the end of 2015) . This would create a continuous high quality connection between North Acton and Central London. As a result it will be important to ensure good cycle links to the new CSH route from Park Royal are provided.

3.15 Further investment is also being directed towards new Quietways through parks and along waterways across London.

3.16 Improved cycling and walking connections to/from Victoria Road and to/from future Old Oak Common Station have been investigated as part of the North Acton Pedestrian and Cycle Link Study developed by Farrells.

3.17 Although the main focus of the study was on the connectivity with Old Oak Common, it also recommended that a new east-west connection between Victoria Road and Chase Road, just to the north of the Central Line be provided. This is also recommended as part of the proposed new northern entrance to North Acton station.

3.18 This could be tied into the existing footpath alongside the Central Line between Chase Road and Park Royal Road to provide a continuous link into Park Royal from Old Oak Common.

3.19 This existing route alongside the Central Line would need to be improved to ensure it is fully accessible, attractive and well lit.

3.20 In addition, the Gypsy Corner improvements proposed by LB Ealing will need to be complemented by formalising the currently quiet routes on Chase Road and Park Royal Road. This is likely to require a more detailed investigation regarding the transition at junctions.

3.21 The Grand Union Canal has strong potential to attract considerably more users and offers opportunities to improve both walking and cycling conditions.

Potential Walking and Cycling Improvements

3.22 A set of potential walking and cycling network improvements has been identified as part of this study and the improvements aim to address the current challenges as set out in Figure 2-14 and create an environment that can accommodate and sustain the planned future growth.

3.23 The focus of potential improvements that improve the general environment and urban realm for both cyclists and pedestrians is shown in Figure 3-2 and can be generally summarised as:

- increasing permeability across the site and at the fringes
- enhancing access to/from public transport nodes
- improving crossings and junctions for both pedestrians and cyclists
- integrating the canal within a wider, well signed walking, cycling and public space network.

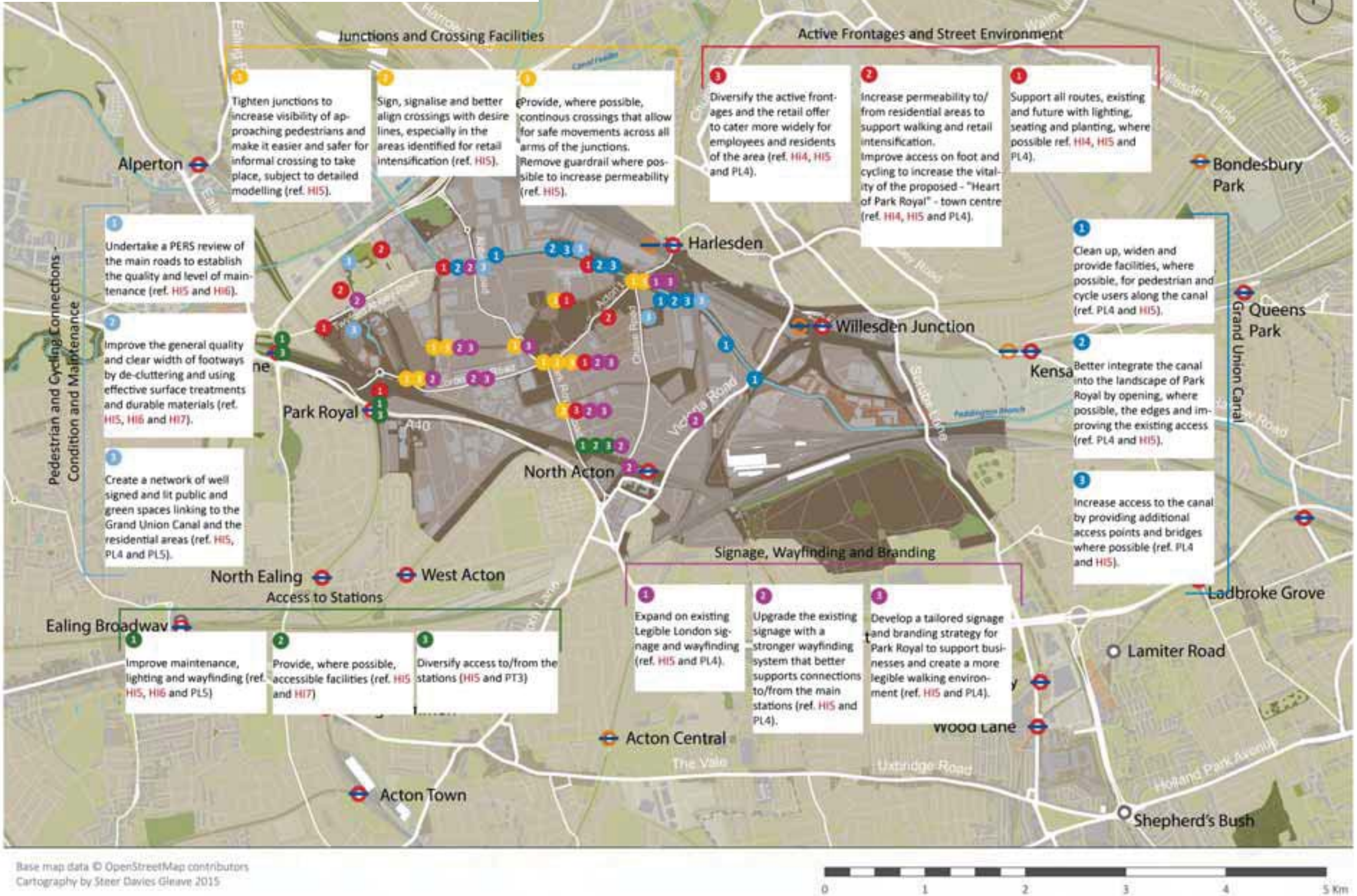
3.24 In parallel with these, further improvements to the signed cycle network as shown, in Figure 3-3, would provide missing connections, create more opportunities to join the National Route 6 along the Grand Union Canal and provide signage to ease wayfinding. These new connections also have the benefit of helping improve pedestrian connectivity.

3.25 Additional improvements to the walking network (see Figure 3-4) focus on higher permeability to/from residential areas and across some of the larger plots that would be beneficial for supporting short walking trips and also increase the viability of creating a “Heart of Park Royal” town centre.

Conclusions

3.26 All of the potential improvements identified will deliver benefits to walking and cycling and should be considered as an entire package where possible. However these will need to be subject to further analysis, design and prioritisation to ensure those elements that deliver the greatest value for money are bought forward first.

Figure 3.2: Overview of Potential Walking & Cycling Improvements



Examples of Potential Cycling Improvements and New Connections

Extending the cycling route to join with Twyford Abbey Rd is likely to require removal of on-street parking due to the restricted width of the carriageway.

Increase permeability of the network by signing and introducing new cycle lanes to better serve all the plots.

Improve the existing route by integrating it with the existing network, signing and linking with the canal path.

There is potential to enhance the existing access to the canal by extending and signing the cycle route.

There is potential to extend the cycle route by considering signage as well as a shared pedestrian and cycle path.

The recently introduced route should be signed and integrated with the existing network.

A new, more direct route to Coronation Road is likely to require land acquisition and structural works to bridge the gap in levels.

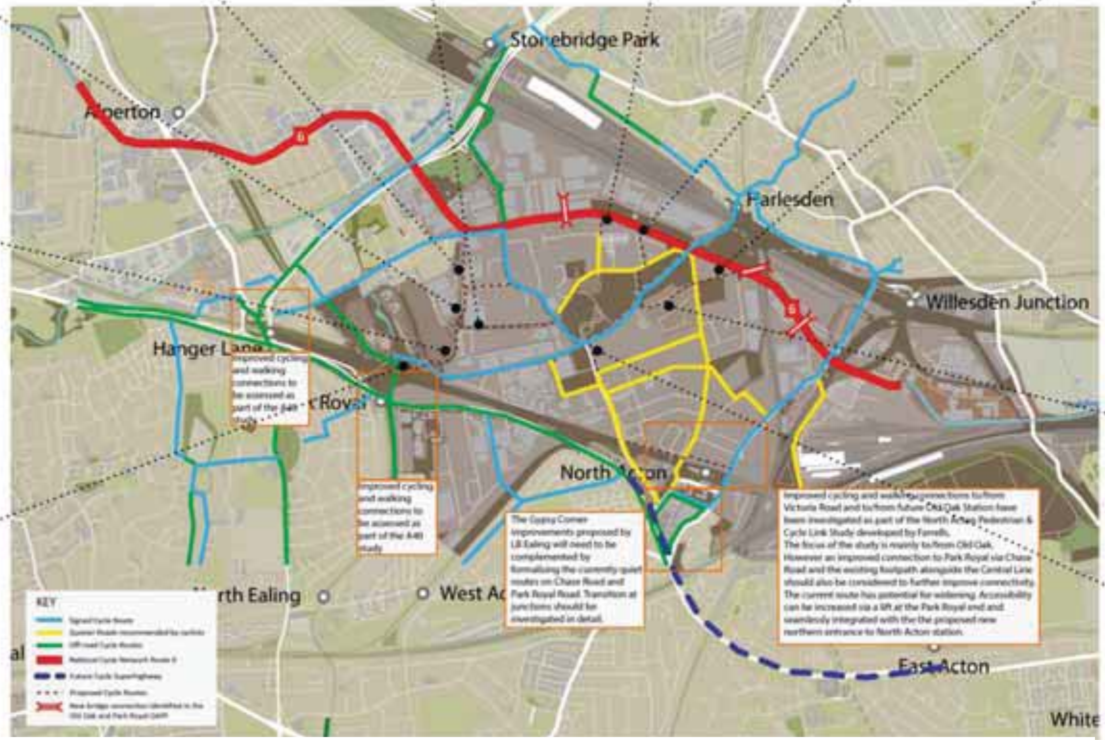


Figure 3.3: Examples of Potential Cycle Network Improvements (also captured in proposed intervention HI4: Cycle improvements)

Open up a new access to the canal via a walking and cycling route. This proposed route would create opportunities to link up and create new green spaces. Implementation is likely to require the adoption of a public right of way.
The link can also be joined up with the proposed bridge.

The extended route would need to be signed and potentially some removal of on-street parking will be required.

The small segment on Park Royal Rd should be well signed and consideration to cyclists should be given in the new design of the junction.

Examples of Potential Pedestrian Improvements and New Connections

Figure 3.4: Examples of Potential Walking Network Improvements (also captured in proposed intervention HI5: Pedestrian improvements and PL4: Greening of corridors and placemaking)

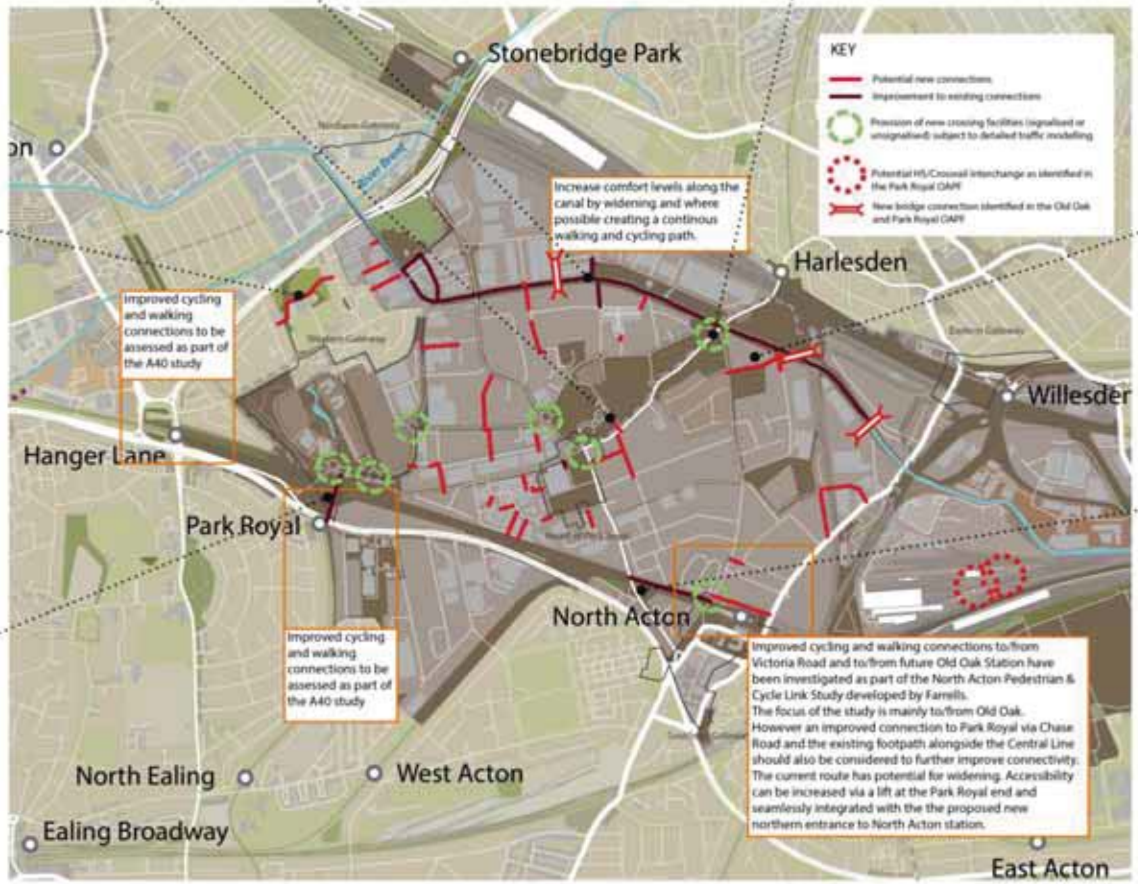
Potential to formalise the existing pedestrian connection from Acton Lane to the Central Middlesex Hospital.

Potential new pedestrian connection increasing permeability for the residential areas and re-using a green space asset around Twyford Abbey.

The connection to Park Royal Station should be better signed, lit and, where possible widened.

There is potential to enhance the existing access to the canal by extending and signing a walking and cycling route.

Potential to review the provision of crossing facilities and reduce corner radii to improve pedestrian visibility and safety at the junction.



Open up a new access to the canal via a walking and cycling route. This proposed route would create opportunities to link up and create new green spaces. Implementation is likely to require the adoption of a public right of way.
The link can also be joined up with the proposed bridge.

The current pedestrian connection to North Acton Station could be widened and accessibility increased.

Future Traffic Conditions

Overall Forecast Traffic Growth

3.27 TfL's WeLHAM traffic model has been used to determine forecast traffic volumes for three key future years:

- 2021 – during HS2 construction
- 2026 – Opening of HS2
- 2041 – Full build out of the OA

3.28 In and around the Park Royal Study area, traffic flows on the key roads are forecast to increase by about 5% by 2021 which is when construction of HS2 will be at its peak. This growth will consist of background traffic growth and additional construction traffic.

3.29 Between 2021 and 2026 when HS2 construction is complete and in operation, very little additional growth in overall traffic levels is forecast.

3.30 By 2041 however, traffic is expected to have increased by approximately 7-9% from current levels as a result of further background growth and full build out of the Old Oak and Park Royal OA.

3.31 The relatively modest increase in traffic volumes on the roads surrounding Park Royal is due to existing capacity constraints that prevent any further increases.

Changes in Traffic Flow on Key Roads

3.32 Traffic volumes on the key roads through the study area have been determined using TfL's HAM modelling which has been updated to provide greater detail in the Park Royal area as part of this study.

AM Peak Traffic Flow Changes

3.33 Table 3.1 summarises the key traffic flow changes on the network in the AM peak. All values quoted have been rounded in recognition of the level of confidence that can be attributed to this level of strategic road modelling.

3.34 The most significant flow changes in 2021 are:

- A total of 136 two-way heavy vehicle movements per hour associated with HS2 construction.
- A 35%-45% increase on Coronation Road is likely as a result of First Central and Origin Business Park developments being operational.
- A 10-15% increase in traffic entering Park Royal via Park Royal Road, Acton Lane and Abbey Road.
- A 15% increase in traffic exiting the OA via Abbey Road.

3.35 Flow changes in 2026 on the strategic road network are comparable to the 2021 scenario indicating that the capacity previously utilised by construction vehicles on these roads is taken up by an induced through traffic demand and that HS2 does nothing to reduce local traffic volumes. However some key entry/exit routes to Park Royal see further increases:

- Coronation Road flows increase further to levels 40-70% higher than existing due to the full build out of the First Central Development which is assumed to accommodate all of the 1,500 additional homes in Park Royal.
- Traffic exiting Park Royal by Abbey Road is forecast to increase further with a 35% increase from existing levels. This is attributable to the trips from First Central heading to destinations in the north via the North Circular and to a lesser degree general employment growth across Park Royal.

3.36 The most significant flow changes in 2041, driven by the increased development demand are:

- A 10% increase on traffic accessing Park Royal via Park Royal Road.
- A 40%-75% increase on Coronation Road.
- A 45% increase in traffic exiting Park Royal via Abbey Road.

Table 3.1: AM Peak hour Traffic Flow Changes on Key Roads

Road and Direction of Travel	Existing Flow (pcu/hr)	2021		2026		2041	
		Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing
A40 Eastbound (west of Hanger Lane)	4780	4760	0%	4820	1%	4890	2%
A40 Westbound (west of Hanger Lane)	3310	3480	5%	3430	4%	3590	8%
North Circular Northbound	3230	3260	1%	3300	2%	3310	2%
North Circular Southbound	3180	3330	5%	3350	5%	3410	7%
Park Royal Road Northbound	400	430	8%	410	2%	440	10%
Park Royal Road Southbound	270	290	7%	300	11%	290	7%
Victoria Road Northbound	430	440	2%	460	7%	450	5%
Victoria Road Southbound	680	660	-3%	630	-7%	600	-12%
Acton Lane Southbound	440	520	18%	520	18%	560	27%
Acton Lane Northbound	870	880	1%	890	2%	900	3%
Twyford Abbey Road Eastbound	160	170	6%	150	-6%	160	0%
Twyford Abbey Road Westbound	240	250	4%	250	4%	240	0%
Chase Road Northbound	240	240	0%	240	0%	220	-8%
Chase Road Southbound	190	170	-11%	180	-5%	200	5%
Coronation Road Eastbound	780	1060	36%	1070	37%	1090	40%
Coronation Road Westbound	270	390	44%	450	67%	470	74%
Abbey Road Southbound	770	900	17%	890	16%	910	18%
Abbey Road Northbound	640	740	16%	860	34%	940	47%
Total	**20800**	**21890**	**5%**	**22150**	**6%**	**22590**	**9%**

PM Peak Traffic Flow Changes

3.37 Table 3.2 summarises the key traffic flow changes on the network in the PM peak. All volumes have been rounded in recognition of the level of confidence that can be attributed to this level of strategic road modelling.

3.38 The most significant flow changes in 2021 are:

- A 30% increase in traffic accessing Park Royal via Coronation Road, likely as a result of First Central and Origin Business Park developments being operational.
- A 25% increase in traffic on Victoria Road northbound in part due to the HS2 construction traffic.
- A 30% increase in southbound traffic on Chase Road, although this is from a low base so is not a significant increase in total numbers.
- A 15% increase in traffic exiting the OA via Abbey Road.
- A 20% increase in traffic exiting the OA via Park Royal Road.

3.39 As with the AM peak, flow changes in the 2026 PM peak are comparable to the 2021 scenario, indicating that the capacity previously utilised by construction vehicles on these roads is taken up by an induced through traffic demand and that HS2 does nothing to reduce local traffic volumes. The one exception to this is Coronation Road eastbound which sees further flow increases, to levels 50% higher than existing due to the full build out of the First Central Development which is assumed to accommodate all of the 1,500 additional homes in Park Royal.

3.40 The most significant flow changes in 2041, driven by the increased development demand, are:

- A 35% increase on traffic exiting Park Royal via Park Royal Road.
- A 20% increase in traffic on Victoria Road northbound, which represents a slightly lower increase when compared to the HS2 construction scenario.
- Further increases on Coronation Road resulting in 60% higher eastbound volumes than existing.
- Further increases on Chase Road southbound resulting in 70% higher volumes than existing.

Conclusions

3.41 The above flow increases of up to 75% on some key internal roads to Park Royal have the potential to significantly increase congestion and journey times to and from the area. These increases require targeted measures at existing key pinch points in the network to address these potential future issues. The key pinch points are:

- Abbey Road between the North Circular and Twyford Abbey Road
- Junction of Park Royal Road / Coronation Road / Abbey Road
- Junction of Acton Lane / North Acton Road

3.42 In addition to the growth on the local road network, strategic roads and associated junctions such as the A40, North Circular, Hanger Lane and Gypsy Corner will also see demand increases. These strategic connections are vital to the operation of Park Royal businesses and residents.

3.43 To address the future challenges of these strategic connections, TfL is currently undertaking a detailed study into the A40 and its associated junctions in the vicinity of Park Royal.

Table 3.2: PM Peak hour Traffic Flow Changes on Key Roads

Road and Direction of Travel	Existing Flow (pcu/hr)	2021		2026		2041	
		Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing
A40 Eastbound (west of Hanger Lane)	4340	4520	4%	4500	4%	4570	5%
A40 Westbound (west of Hanger Lane)	4260	4310	1%	4330	2%	4330	2%
North Circular Northbound	3440	3470	1%	3480	1%	3580	4%
North Circular Southbound	3080	3290	7%	3240	5%	3400	10%
Park Royal Road Northbound	450	450	0%	450	0%	440	-2%
Park Royal Road Southbound	290	350	21%	320	10%	390	34%
Victoria Road Northbound	510	650	27%	610	20%	610	20%
Victoria Road Southbound	470	460	-2%	460	-2%	480	2%
Acton Lane Southbound	770	690	-10%	700	-9%	710	-8%
Acton Lane Northbound	550	580	5%	570	4%	620	13%
Twyford Abbey Road Eastbound	90	100	11%	100	11%	100	11%
Twyford Abbey Road Westbound	320	300	-6%	300	-6%	280	-13%
Chase Road Northbound	170	140	-18%	150	-12%	160	-6%
Chase Road Southbound	70	90	29%	90	29%	120	71%
Coronation Road Eastbound	260	340	31%	390	50%	420	62%
Coronation Road Westbound	650	680	5%	710	9%	690	6%
Abbey Road Southbound	440	410	-7%	470	7%	510	16%
Abbey Road Northbound	920	1060	15%	1050	14%	1120	22%
Total	**20990**	**21810**	**4%**	**21860**	**4%**	**22450**	**7%**

Future Freight Demand

3.44 In February 2013 the University of Westminster produced a freight study for TfL entitled “High Speed 2 – Identifying opportunities for freight at Euston and Old Oak Common”.

3.45 This study established a series of forecasts for the increased level of road freight transport that could occur as a result of the construction of HS2 and the redevelopment of the Old Oak Common & Park Royal Opportunity Area. These forecasts, for a range of commercial development mixes, are presented below in Figure 3.5: .

Figure 3.5: Commercial Road Freight Trip Forecasts

Table 6: Forecast road freight transport vehicle trips generated by additional commercial development in the Park Royal City OA on a typical weekday (based on an additional 45,000 jobs)

Scenario	Daily vehicle trips
All office development only	2,520
All industrial development only	6,630
All retail development only – low estimate	11,340
All retail development only – high estimate	21,000
One-third office, one-third retail, one-third industrial – low estimate	6,830
One-third office, one-third retail, one-third industrial – high estimate	10,050

Source: High Speed 2 – Identifying opportunities for freight at Euston and Old Oak Common, 2013 (University of Westminster)

3.46 In addition to these commercial trips the study identified an additional 900 daily freight trips associated with the residential land uses.

3.47 This analysis provides a large range of daily trips between 3,500-22,000 vehicles per day.

Conclusions

3.48 Based on the mixed use low estimate scenario, circa 7,000 new daily road freight trips can be expected. This level of increase will place additional pressure on existing road infrastructure and highlights the importance of managing the growth through initiatives that can reduce the overall number of road freight trips made, without curtailing economic growth.

Future Bus Demand

3.50 Forecasts for bus passenger numbers by route have been determined for the future AM and PM peaks using RailPlan growth factors applied to the 2014/15 Keypoint Loadings provided by TfL.

3.51 These forecasts have been calculated for two future years: 2026 (HS2 opening); and 2041.

3.52 Buses could provide an important connection between Park Royal and the new Overground, Crossrail and HS2 links in Old Oak. As a result, demand for new direct east-west bus services could increase significantly.

Bus Passenger Forecasts 2026

AM Peak

3.53 Table 3.3 shows that during the AM peak within Park Royal, there is forecast to be an approximate 3% increase in bus passengers by 2026. This is mainly due to development at First Central and growth outside the OA at locations such as Alperton.

3.54 A 4% increase in bus capacity is planned and so a majority of routes do not experience significant additional overcrowding.

3.55 The exceptions to this are:

- Route 112 towards Ealing Broadway, whose demand increases by 15% and thus is operating close to capacity
- Route 226 towards Ealing Broadway (via the Central Middlesex Hospital) which experiences a 21% increase in demand and as a result is operating at capacity.
- Route 487 towards Willesden Junction (via the Central Middlesex Hospital) which sees a 13% increase in demand and so is operating at capacity.

3.56 These figures demonstrate a potential future need for additional capacity on certain routes that serve the hospital and central areas of Park Royal during the AM peak.

Table 3.3: AM Peak Hour 2026 Bus Demand Changes

Route No	Base Demand (pax)	2026 Demand (pax)	Change in Demand	2026 Capacity (pax)	Load Factor
7	170	240	41%	610	39%
18	880	740	-16%	1290	57%
72	160	190	19%	410	46%
83	390	370	-5%	620	60%
95	200	180	-10%	230	78%
112	130	150	15%	180	83%
187	30	40	33%	270	15%
220	240	250	4%	810	31%
224	100	110	10%	230	48%
226	240	290	21%	310	94%
228	50	60	20%	270	22%
260	190	200	5%	410	49%
266	290	290	0%	540	54%
283	100	100	0%	400	25%
440	60	120	100%	270	44%
487	160	180	13%	180	100%
611	40	40	0%	70	57%
TOTALS	**3430**	**3550**	**3%**	**7100**	**50%**

PM Peak

3.57 Table 3.4 shows that during the PM peak within Park Royal, there is forecast to be an approximate 5% increase in bus passengers by 2026. This is mainly due to development at First Central and growth outside the OA at locations such as Alperton.

3.58 A 4% increase in bus capacity is planned and due to the existing low levels of crowding in the PM peak all routes are forecast to continue to operate with spare capacity in 2026.

Table 3.4: PM Peak Hour 2026 Bus Demand Changes

Route No	Base Demand (pax)	2026 Demand (pax)	Change in Demand	2026 Capacity (pax)	Load Factor
7	130	180	38%	620	29%
18	770	690	-10%	1360	51%
72	110	130	18%	410	32%
83	380	360	-5%	620	58%
95	170	180	6%	270	67%
112	140	170	21%	230	74%
187	10	10	0%	310	3%
220	260	250	-4%	910	27%
224	90	130	44%	180	72%
226	130	150	15%	230	65%
228	50	60	20%	270	22%
260	220	250	14%	350	71%
266	220	240	9%	610	39%
283	40	40	0%	350	11%
440	80	120	50%	230	52%
487	110	100	-9%	230	43%
611*	n/a	n/a	n/a	n/a	n/a
TOTALS	**2910**	**3060**	**5%**	**7180**	**43%**

*Special school service that operates outside the PM peak hour.

Bus Passenger Forecasts 2041

AM Peak

3.59 By 2041 AM peak bus passenger demand within Park Royal is forecast to have increased by 10% from current levels, as shown in Table 3.5.

3.60 Between 2026 and 2041 no further increase in bus capacity has been considered at this stage. As a result a number of routes experience overcrowding due to the increase in demand:

- Route 95 towards Shepherds Bush is expected to see a 5% increase in passenger demand which results in the route operating close to capacity.
- Route 112 towards Ealing Broadway, whose demand increases by 30% and thus is operating at capacity
- Route 226 towards Ealing Broadway (via the Central Middlesex Hospital) which experiences a 40% increase in demand and as a result is operating over capacity.
- Route 487 towards Willesden Junction (via the Central Middlesex Hospital) which sees a 19% increase in demand and so is operating over capacity.

3.61 These results further demonstrate the need to increase capacity on bus routes servicing the hospital and central area of Park Royal, a number of which will be overcrowded by 2041.

Table 3.5: AM Peak Hour 2041 Bus Demand Changes

Route No	Base Demand (pax)	2041 Demand (pax)	Change in Demand	2041 Capacity (pax)	Load Factor
7	170	290	71%	610	48%
18	880	600	-32%	1290	47%
72	160	220	38%	410	54%
83	390	430	10%	620	69%
95	200	210	5%	230	91%
112	130	170	31%	180	94%
187	30	50	67%	270	19%
220	240	240	0%	810	30%
224	100	120	20%	230	52%
226	240	340	42%	310	110%
228	50	70	40%	270	26%
260	190	250	32%	410	61%
266	290	310	7%	540	57%
283	100	100	0%	400	25%
440	60	130	117%	270	48%
487	160	190	19%	180	106%
611	40	40	0%	70	57%
TOTALS	**3430**	**3760**	**10%**	**7100**	**53%**

PM Peak

3.62 By 2041 PM peak bus passenger demand within Park Royal is forecast to have increased by 9% from current levels, as shown in Table 3.6.

3.63 Between 2026 and 2041 no further increase in bus capacity has been considered at this stage, but forecasts of future PM peak hour demand indicate all routes will still operate with spare capacity.

Table 3.6: PM Peak Hour 2041 Bus Demand Changes

Route No	Base Demand (pax)	2041 Demand (pax)	Change in Demand	2041 Capacity (pax)	Load Factor
7	130	180	38%	620	29%
18	770	570	-26%	1360	42%
72	110	140	27%	410	34%
83	380	400	5%	620	65%
95	170	200	18%	270	74%
112	140	180	29%	230	78%
187	10	10	0%	310	3%
220	260	270	4%	910	30%
224	90	140	56%	180	78%
226	130	170	31%	230	74%
228	50	60	20%	270	22%
260	220	290	32%	350	83%
266	220	270	23%	610	44%
283	40	40	0%	350	11%
440	80	150	88%	230	65%
487	110	110	0%	230	48%
611*	n/a	n/a	n/a	n/a	n/a
TOTALS	**2910**	**3180**	**9%**	**7180**	**44%**

*Special school service that operates outside the PM peak hour.

Conclusions

3.64 This analysis shows the need for additional buses to accommodate the predicted increases in demand during the AM peak on a number of routes that serve Park Royal (Routes 95, 112, 226 & 487).

3.65 The level of spare capacity on other routes through the area, particularly during the PM peak, may indicate that existing routes do not serve the optimal locations for Park Royal employees.

3.66 Improved usage of available capacity may offer a cost-effective approach of increasing bus mode share and should be considered as part of the bus planning process for the entire OA. This needs to include the improvement of connections between other OAs in west London such as Wembley and White City.

3.67 One such scheme that may be suitable for consideration is Fastbus, the Wembley Park to North Acton express orbital public transport route first proposed in 2009.

3.68 New bus priority measures would also help improve the quality of the services and make them more attractive for use by employees, so helping to reduce car use.

Future Passenger Rail Demand

3.69 The new Crossrail and HS2 connections provided by Old Oak Common Station along with TfL's proposals for two new Overground stations within Old Oak will transform the area's public transport connectivity.

3.70 The combined effects on rail demand at stations serving Park Royal as a result of these major pieces of rail infrastructure and the OA development, are presented in the following sections.

London Overground

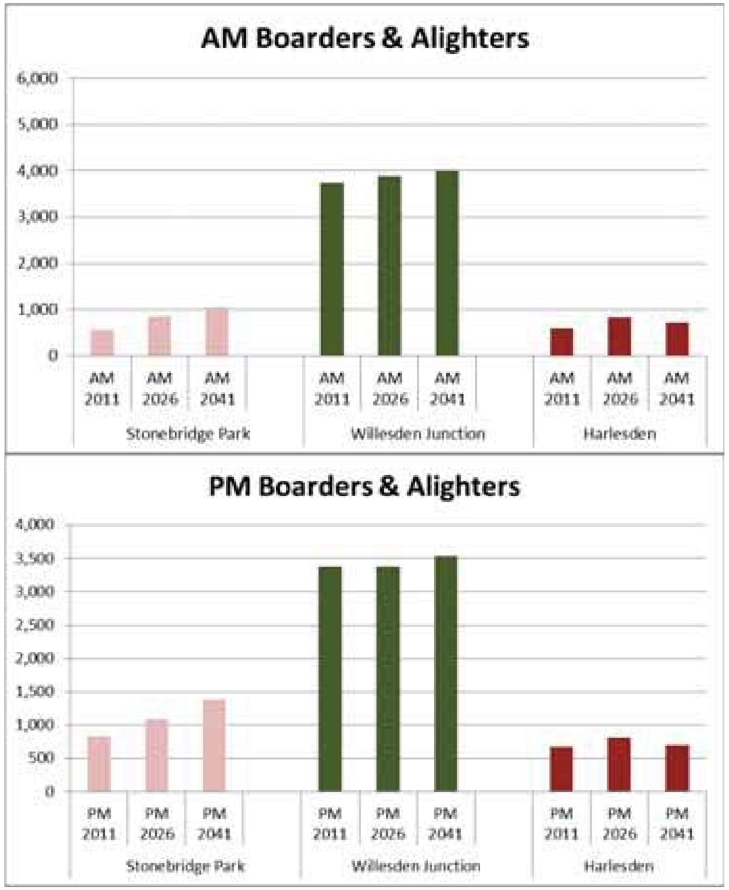
3.71 Forecast peak demand in each of the AM and PM peak periods at the Overground stations has been extracted from TfL's 2026 & 2041 RailPlan modelling and is shown in Figure 3.6.

3.72 Stonebridge Park shows a substantial increase in usage across the AM and PM peaks, albeit from a low base. It is forecast to be busiest in the PM peak with a 30% increase by 2026 and a 66% increase by 2041 to 1,400 passengers per hour.

3.73 Harlesden station is expected to see a significant increase in passengers by 2026 with a 40% increase to 820 pax per hour. However between 2026 and 2041 forecasts suggest passenger levels will fall slightly.

3.74 Willesden Junction will remain by far the busiest Overground station in the vicinity of Park Royal although growth will not be as great as at Stonebridge Park & Harlesden stations. It will be busiest in the AM peak when nearly 4,000 boarders & alighters are expected by 2041. This represents a 7% increase on current levels.

Figure 3.6: London Overground Future Peak Hour Boarders & Alighters



London Underground

3.75 Forecast peak demand in each of the AM and PM peak periods at the Underground stations has been extracted from TfL's 2026 & 2041 RailPlan modelling and is shown in Figure 3.7.

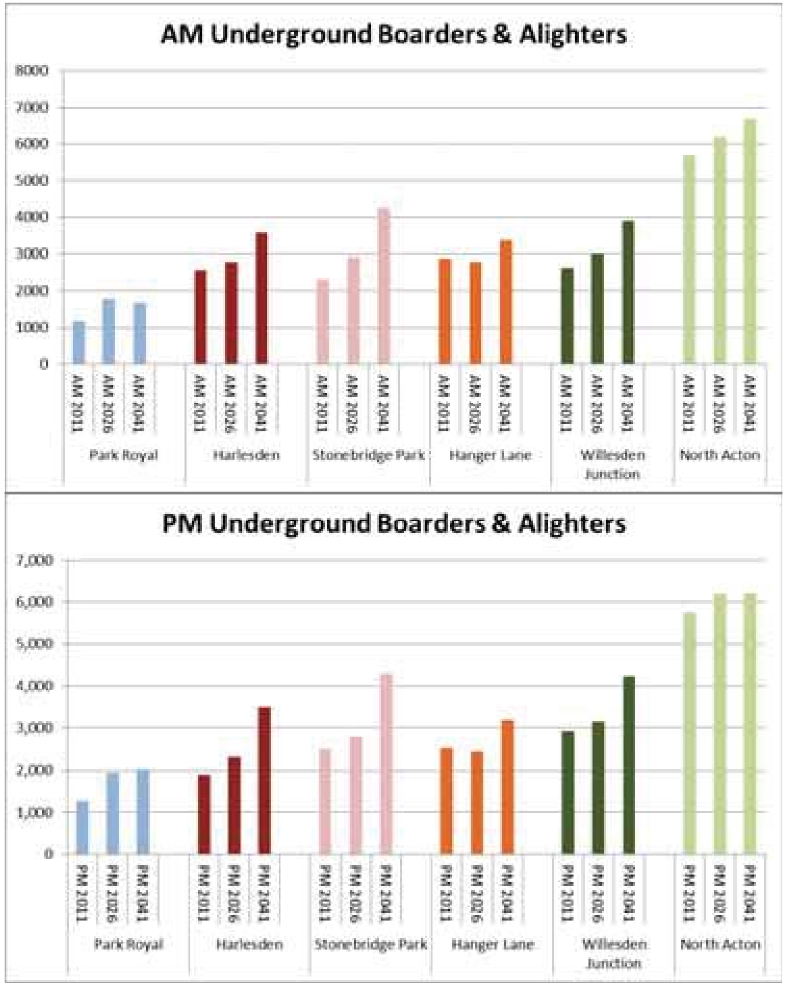
3.76 By 2026 the majority of stations are expected to see an increase in passenger activity in the region of 10-20%. The exceptions to this are:

- Park Royal and Stonebridge Park which are expected to see greater increases in the region of 30-50%
- Hanger Lane which is forecast to experience a slight reduction with the opening of Crossrail & HS2

3.77 By 2041 all stations experience a significant increase due to the level of development in and around the OA. Generally these increases are in the range of 40-60% with the exception of:

- Harlesden in the PM peak is expected to see an 80% increase, which accounts for some of the reduced flow on Overground services at this station.
- Stonebridge Park is expected to see a 70-85% increase likely due to major developments at Alperton as well as OA growth in Wembley & Park Royal
- North Acton growth is generally lower at 10-20% due to the draw of the new Old Oak station nearby.

Figure 3.7: London Underground Future Peak Hour Boarders & Alighters



Total Rail Demand

3.78 Peak hour rail passenger movements at the stations surrounding Park Royal grow from approximately 22,000 in 2011 to 25,000 by 2026, a 13% increase.

3.79 By 2041 there is a further increase expected to 29,000, a 33% increase on today's numbers.

3.80 The mode share between Overground and Underground rail services remains constant to 2026, but by 2041 a slight increase in Underground mode share is expected, indicating the nature of development associated with the OA will induce travel between locations better served by the Underground network.

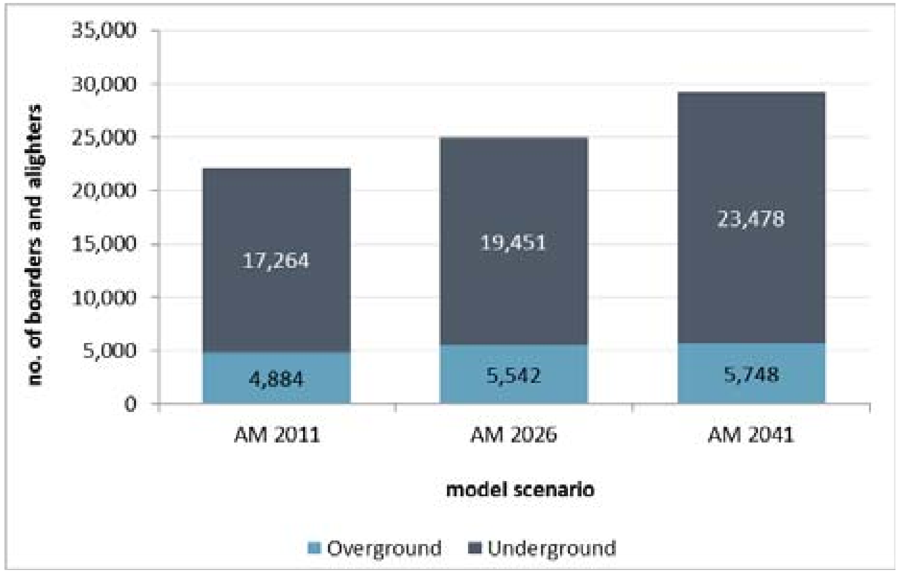
3.81 These total figures are shown in Figure 3.8.

Conclusions

3.82 These figures demonstrate the need to improve station facilities to accommodate the increased passenger volumes and ensure Rail and Underground are increasingly important mode choices for Park Royal employees and residents.

3.83 The increased passenger numbers will also place additional pressure on facilities that provide onward connections from stations in the vicinity of Park Royal such as cycle parking and connecting bus services.

Figure 3.8: Total Rail Demand Growth



Source: TfL Railplan

4 Proposed Transport Interventions

Intervention Objectives

4.1 Based on the future transport challenges and the Park Royal transport objectives presented in Chapter 1, a series of transport interventions have been developed to meet these needs.

4.2 The key challenges that are likely to arise as the OA is developed are a result of increased demand for travel in a constrained transport network.

4.3 The substantial uplift in public transport capacity and connectivity for the OA that results from HS2 and Crossrail will accommodate a large majority of the increased travel demand.

4.4 It will not however accommodate it all, particularly in relation to the forecast additional freight and servicing movements.

4.5 The strategic road network surrounding Park Royal is already at capacity at key locations such as Hanger Lane and Gypsy Corner. These pinch points in turn impact on feeder roads through the site either due to queues extending into the site e.g. Abbey Road on approach to the North Circular, or increased rat running on roads such as North Acton Road.

4.6 Any future increase in traffic demand at these key pinch points will result in a disproportionate increase in delay and congestion throughout the Park Royal network.

4.7 Further corridor and junction improvements along the A40 are being investigated as part of TfL's separate A40 study that is currently underway.

4.8 For these reasons an important focus of this study is to release existing capacity potential within the OA through more efficient use of existing road space, infrastructure improvements for sustainable modes (which are currently poorly catered for) and incentivising a modal shift.

4.9 Successful implementation of this multi-pronged approach will offer viable alternative modes, particularly during peak periods, to those users who have a greater potential to change their travel habits (e.g. commuters) and release that capacity for users with fewer options e.g. vulnerable users or freight.

Investigation of Potential Rail Schemes in Park Royal

4.10 During the development of the transport strategy, the potential to provide significant new rail infrastructure was considered. This could be in the form of a new station and /or rail lines to serve the central part of the Park Royal area – an area that currently suffers from low levels of public transport accessibility. Several studies have previously examined the potential for this type of scheme including:

- Connection between Willesden Junction and Ealing Broadway - both would require a station underground and a new rail tunnel
- New station on Central Line between North Acton and Hanger Lane
- New orbital rail route around London including stops at Acton and Old Oak (to be delivered 2040+)

4.11 Although these schemes would lead to a significant improvement in access to Park Royal by public transport, they would have extremely high costs in the order of hundreds of millions of pounds. They would also be highly challenging to deliver and would require an extended period of disruption due to construction. They would also necessitate the demolition of a large number of existing industrial units. Introducing the new rail infrastructure would also potentially place pressure on industrial land-uses through a likely increase in land values.

4.12 These very high costs and difficulties in implementation mean that the potential for a new rail station or line through the Park Royal area has not been considered in detail as part of the preparation of this transport strategy. Further assessments being delivered by OPDC which examine the very long-term needs of the area (e.g. to 2080) are likely to consider the need for this type of fundamental change to public transport in the area.

Intervention Categories

4.14 Individual interventions fall into four categories which deliver against the transport objectives and help accomplish the vision set for Park Royal.

4.15 These categories recognise that not one approach to managing the impact of increased development and resulting travel demand can be successful in isolation.

4.16 Only a combination of interventions across all four categories will respond to the challenges and will maximise opportunities to deliver long-lasting physical improvements and behavioural change.

Long-List of Interventions

4.17 A total of 30 potential transport interventions have been identified across the four categories. These are summarised on the following pages with a short description of what each includes.

4.18 Further details of each intervention, its assessment score and how this was calculated can be found in Appendix A of this report.

Planning (PL)

Area-wide overarching planning controls for new developments and enforcement for existing developments to limit and discourage the use of the car as a main mode of transport and support sustainable travel choices

Demand Management (DM)

Multi – stakeholder/framework agreements and programmes to reduce car dependency, improve efficiency, reduce costs and lower emissions

Highway Improvements (HI)

Physical interventions to the highway, junctions and walking and cycling infrastructure to increase total transport capacity and interoperability

Public Transport Improvements (PT)

Physical interventions to improve the connectivity, accessibility and inclusivity of the public transport network

	ID	Intervention Name	Intervention Description
PLANNING	PL1	Transport Panel	Establishment of a stakeholder group, coordinated by OPDC and TfL, tasked with identifying and delivering the transport improvements identified in this strategy.
	PL2	Smart management of the transport network	Adoption of advanced technologies to manage the transport network and to maximise the efficiency of its use. Potential for Park Royal to become a test bed for emerging technologies to ensure it is first to benefit.
	PL3	Improved workplace cycle facilities	The provision of end of journey cycle facilities such as bike stands, lockers, showers as well as training and maintenance support and assistance encourage cycling uptake
	PL4	Greening of corridors and placemaking	The creation of green routes and corridors across the study area to create an environment more conducive to walking and cycling and to enhance quality of life for residents.
	PL5	Enhance personal security to encourage walking	Measures to improve personal security both perceived and actual. To include physical improvements such as lighting, CCTV coverage and security patrols but also improve levels of passive surveillance wherever possible.
	PL6	HGV corridors	Designation of HGV corridors to help focus these vehicle movements on specific routes with design enhancements focused on these users and those most vulnerable. Could also free up capacity on the remaining part of the network.
	PL7	Low emissions zone	Enforcement of a low emissions zone in and around Park Royal to encourage fleet reorganization and to bring vehicles up to the required emissions standards.
	PL8	Incentives for electric vehicles	Provision of facilities and financial incentives for residents and businesses that adopt electric vehicles
	PL9	Car club/car sharing strategy	Development of a strategy to ensure Car Clubs and Car sharing opportunities for residents and commuters to Park Royal are maximised to reduce local congestion levels and reduce on-street parking requirements

DEMAND MANAGEMENT

ID	Intervention Name	Intervention Description
DM1	Development control strategy	Development control is an efficient way to manage future travel demand arising from new developments It includes measures such as parking standards, servicing and delivery requirements and provision for cycle and walking including investment. The OAPF and Local Plan are the mechanisms by which this is implemented.
DM2	Travel plans	A long term management strategy to encourage sustainable travel for new and existing developments. It sets out transport impacts, establishes targets and identifies a package of measures to encourage sustainable travel.
DM3	Delivery and service plans	A Delivery and Servicing Plan (DSP) establishes a framework for the effective management of freight vehicle activity. Provides benefits to participating organisations, suppliers and the local community.
DM4	Freight consolidation	Limiting the number of freight and servicing trips either through consolidation sites, provision of consolidated services to businesses, delivery coordination or a combination of all three.
DM5	Parking and loading controls	Integrated, cross-borough Controlled Parking Zones (CPZ) can reduce confusion and facilitate enforcement. Combined with facilitation of kerbside loading facilities to allow businesses to function provides potential to better utilize existing road space.
DM6	Waterborne freight movements	Movement of freight by water can be more efficient and environmentally sustainable than road freight. The Grand Union Canal running through the area provides a potential route for waterborne freight – Powerday have an operational freight wharf.
DM7	Mode share targets	With the expected future growth in both employment and residential uses it is important to manage travel demand in order to achieve a reduction in the car mode split. The mode share targets can be delivered through framework agreements and strategies such as travel plans and development planning control.
DM8	Rail freight	Park Royal is located in close proximity to the North and West London Lines and Dudding Hill Line with established freight facilities at Willesden Junction. Future investments in rail capacity may create opportunities for more freight to use this mode and be taken off the roads.

Highway Improvements

ID	Intervention Name	Intervention Description
HI1	Abbey Road junction improvements	Conversion of roundabout to signals and coordination of traffic signals along Abbey Road between the North Circular and Twyford Abbey Road.
HI2a	Park Royal Road junction improvements (Coronation Road to Standard Road) – Basic intervention	Review and installation of SCOOT to coordinate and optimise timings along Park Royal Road within existing layouts to improve performance and coordination of traffic movements
HI2b	Park Royal Road junction improvements (Coronation Road to Standard Road) – Intermediate intervention	Adoption of designs identified by MVA in 2011 as part of a study commissioned by LB Ealing. Includes new controlled pedestrian crossings at the Central Middlesex Hospital junction, removal of bus gate on Coronation Road, provision of Advanced cycle stop lines and installation of SCOOT to optimise timings along Park Royal Road.
HI2c	Park Royal Road junction improvements (Coronation Road to Standard Road) – Extensive intervention	Realignment of Park Royal Road at the Central Middlesex Hospital junction to remove stagger arrangement. This would require significant land acquisition from the existing ASDA car park.
HI3	Acton Lane/North Acton Road junction improvements	Subject to local junction modelling improvements could include: Review and optimisation of traffic signals; Extension of parking restrictions along Barretts Green Road; Review of right turning movements with view to banning some to increase junction capacity.
HI4	Cycle improvements	Cycle infrastructure improvements to encourage increased cycle use – focused on existing signed routes and provision of new connections to better integrate with major cycle infrastructure (NCR6 and proposed East-West Cycle Super Highway)
HI5	Pedestrian improvements	Improved connections focusing on facilitating direct, safe walking routes from the stations to places of work with objective of improving rail catchments and use of sustainable modes
HI6	Road resurfacing/repairs	Road surface and footway quality varies quite significantly throughout Park Royal, with some sections showing need of repair. A conditions assessment will identify and prioritise areas for maintenance.
HI7	Decluttering of streets	Removal of unnecessary street clutter that reduces the attractiveness of an area and presents obstructions to pedestrian movement.
HI8	New strategic road connections	New links through the site and with the strategic network to open up potential development sites and improve connections for existing users

PUBLIC TRASNPORT IMPROVEMENTS

ID	Intervention Name	Intervention Description
PT1	Modified bus services in the Park Royal area	Service improvements to be investigated in three main areas: • Improved frequency and route coverage between residential areas with high car mode share for journey-to-work trips to Park Royal. • Potential to provide bus priority on key internal roads should DM5 (Parking Controls) be implemented. • Review of bus stop locations to improve catchment area and junction operations
PT2	Shuttle bus services	Provision of shuttle buses between stations and centres of work within Park Royal.
PT3	Improved station facilities	Existing station facilities are of a poor standard with lack of step-free access. Increased rail mode share could be achieved by improving the station environment and linking these with enhanced onward connections into the heart of Park Royal.

Intervention Assessment

Scoring Criteria

4.19 To determine the most appropriate and effective interventions for Park Royal an assessment framework was established based on the Park Royal Transport Objectives and the Mayor's Roads Task Force (RTF) Street Functions. The interrelationship between these criteria is shown in Figure 4.1.

4.20 Each of the Park Royal Transport Objectives was used as an individual scoring criterion, all with equal weighting.

4.21 Each objective has in turn been mapped to the RTF Street Type Functions to ensure consistency between these local goals and the Mayoral Vision for London's street and transport networks.

Assessment Approach

4.22 Unweighted scores relating to the performance of each intervention against each objective were scored on a scale of 0 to 3 as follows:

Criteria Scoring	
0	Does not meet objective
✓	Partially meets objective
✓ ✓	Meets objective
✓ ✓ ✓	Meets objective across multiple criteria

4.23 In addition to these functional assessments each intervention was assessed in terms of deliverability using the following three criteria:

- Cost with five ratings:
  - Very Low Cost (<£2m)
  - Low Cost £2m-£10m
  - Medium Cost (£10m-£50m)
  - High Cost (£50m-£100m)
  - Very High Cost (£100m+)
- Difficulty level for delivery with five ratings:
  - Very Low (no/minimal infrastructure requirements, follows established processes)
  - Low (minor works, small number of stakeholders affected, can be considered "business as usual" type works)
  - Medium (requires substantive works, interfaces with multiple stakeholders and some short term negative impacts during construction)
  - High (small scale land acquisition, multiple stakeholders with disbenefits to some and major closures during construction)
  - Very High (large scale land acquisition, complex stakeholder interactions and long term disruption)
- Timescales for delivery with three ratings:
  - Short Term (0-2 years)
  - Medium Term (2-5 years)
  - Long Term (5 years+)

Summary of intervention scores

4.24 Following the above approach and scoring criteria, all options were initially scored and these draft scores consulted on with the stakeholder group over three workshops.

4.25 The agreed scores are presented overleaf in Figure 4.2.

Figure 4.1: PRTS Objective & RTF Function Mapping

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE

Figure 4.2: Individual Intervention Scores

		RTF FUNCTIONS =>		Moving		Functioning		Unlocking		Living	Sustaining	Protecting		Deliverability	
		PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PLANNING	PL1	Transport Panel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Very Low	Very Low	Short Term
	PL2	Smart management of the transport network	0	✓✓	✓✓	✓✓	✓✓	✓	✓	0	✓✓	✓	Low	Medium	Medium Term
	PL3	Improved workplace cycle facilities	✓	✓	✓	✓	0	✓✓	✓✓	✓	✓✓	0	Very Low	Low	Short Term
	PL4	Greening of corridors and placemaking	✓✓	✓	✓	✓✓	0	✓	✓	✓✓✓	✓✓	✓✓	Low	Medium	Medium Term
	PL5	Enhance personal security to encourage walking	✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓✓	Very Low	Low	Short Term
	PL6	HGV corridors	✓	✓✓	✓	✓✓	✓	0	✓✓	0	0	✓	Medium	Medium	Medium Term
	PL7	Low emissions zone	0	✓✓	0	0	✓✓	✓	0	✓✓	✓✓	0	Medium	High	Medium Term
	PL8	Incentives for electric vehicles	0	✓	0	✓	✓✓✓	✓	0	✓	✓✓	0	High	Medium	Medium Term
	PL9	Car club/car sharing strategy	0	✓✓	0	✓	✓✓	✓	✓	✓	✓✓	0	Very Low	Low	Medium Term
DEMAND MANAGEMENT	DM1	Development control strategy	✓✓	✓✓	0	✓✓	0	✓✓	✓✓	✓	✓	✓	Low	Very Low	Short Term
	DM2	Travel plans	✓	✓✓	✓	✓	✓	✓	✓	0	✓✓	✓	Very Low	Low	Short Term
	DM3	Delivery and service plans	✓	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Very Low	Low	Short Term
	DM4	Freight consolidation	0	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Medium	Medium	Short Term
	DM5	Parking and loading controls	0	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓✓	✓	Very Low	Medium	Short Term
	DM6	Waterborne freight movements	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓	0	✓✓	Medium	High	Long Term
	DM7	Mode share targets	✓	✓✓✓	✓✓	0	✓	✓	✓	✓	✓✓	✓	Very Low	Medium	Long Term
	DM8	Rail freight	✓✓	✓✓	✓	✓✓	0	✓	✓✓	✓	0	✓	Medium	Medium	Long Term
HIGHWAY IMPROVEMENTS	HI1	Abbey Road junction improvements	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓	✓✓	Low	Low	Medium Term
	HI2a	Park Royal Rd junction improvements - Basic intervention	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term
	HI2b	Park Royal Rd junction improvements - Intermediate intervention	✓✓	✓	✓✓	✓✓	0	✓	✓	✓	✓	✓	Low	Low	Medium Term
	HI2c	Park Royal Rd junction improvements - Extensive intervention	✓✓	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓	✓✓	High	High	Long Term
	HI3	Acton Lane/North Acton Road junction improvements	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term
	HI4	Cycle improvements	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓✓	✓	Low	Medium	Short Term
	HI5	Pedestrian improvements	✓✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓	Low	Low	Short Term
	HI6	Road resurfacing/repairs	✓	✓	✓✓✓	✓✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term
	HI7	Decluttering of streets	✓✓	✓	✓	✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term
	HI8	New strategic road connections	✓✓✓	✓✓	✓	✓✓	0	✓✓	✓✓	0	0	0	Very High	Very High	Long Term
PUBLIC TRANSPORT IMPROVEMENTS	PT1	Modified bus services in the Park Royal area	✓✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	0	✓✓	0	Low	Medium	Medium Term
	PT2	Shuttle bus services	✓✓	✓	✓	0	✓	✓	✓	0	✓✓	0	Low	Medium	Medium Term
	PT3	Improved station facilities	✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	✓	✓	✓	High	Medium	Long Term

Framework Interventions

4.26 Following an initial review it was clear that a number of the interventions were either covered by initiatives already underway or that represented sound transport planning practice.

4.27 These interventions were therefore considered to be overarching i.e. they would sit above all the other identified measures which are proposed.

4.28 All of the framework interventions listed below have either already been implemented or are in the process of being implemented.

Framework Interventions
PL1 : Transport Panel
DM1 : Development control strategy
DM2 : Travel plans
DM3 : Delivery and service plans

PL1: Transport Panel

4.29 Established in November 2015 the Transport Panel brings together senior representatives from the local Boroughs, WestTrans, TfL, Network Rail, Crossrail and HS2. Coordinated and led by OPDC and TfL, it ensures a cross-agency planning and delivery approach for the achieving the transport objectives for Park Royal.

DM1: Development Control Strategy (OAPF & Local Plan)

4.30 Having a clearly established development strategy in place is critical to ensuring infrastructure is efficiently delivered and of a standard capable of delivering the large levels of growth expected.

4.31 The OAPF provides this strategy whilst the Local Plan will provide greater detail, on the specific controls and standards in the determination of planning applications.

DM2: Travel Plans

4.32 Each travel plan is a long-term management framework for the OA to encourage sustainable travel for new and existing developments. It sets out transport impacts, establishes targets and identifies a package of measures to encourage sustainable travel. It requires ownership, monitoring and enforcement together with selected/self-appointed champions.

DM3: Delivery and Service Plans

4.33 Delivery and Servicing Plans (DSPs) help commercial organisations to better manage deliveries, improve customer service and operate more efficiently. They are widely used across London and should as standard form part of the planning conditions for new commercial developments within the OA.

Interventions and Objectives

4.34 The assessment of each intervention shows how it meets the objectives defined for the Park Royal Transport Strategy. Figure 4-3 presents the results of this process, with the interventions ordered in terms of how well each intervention meets the defined objectives.

4.35 This ordering of the interventions does not take direct account of the cost or difficulty of implementing each scheme. These factors have been incorporated by including the scores for cost and difficulty which favours low cost, straight-forward schemes. The results of this process are shown in Figure 4-4.

4.36 OPDC seeks views as part of the consultation process on the list of interventions.

Figure 4.3: Interventions Ordered by Objective Scores

	RTF FUNCTIONS ->	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Total Score
Intervention Reference	PRTS OBJECTIVES ->	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	
DM6	Waterborne freight movements	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓	0	✓✓	16
PL4	Greening of corridors and placemaking	✓✓	✓	✓	✓✓	0	✓	✓	✓✓✓	✓✓	✓✓	15
HI2c	Park Royal Rd junction improvements - Extensive intervention	✓✓	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓	✓✓	15
PL5	Enhance personal security to encourage walking	✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓✓	14
HI5	Pedestrian improvements	✓✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓	14
PT1	Modified bus services in the Park Royal area	✓✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	0	✓✓	0	14
PT3	Improved station facilities	✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	✓	✓	✓	14
PL2	Smart management of the transport network	0	✓✓	✓✓	✓✓	✓✓	✓	✓	0	✓✓	✓	13
DM5	Parking and loading controls	0	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓✓	✓	13
DM7	Mode share targets	✓	✓✓✓	✓✓	0	✓	✓	✓	✓	✓✓	✓	13
HI1	Abbey Road junction improvements	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓	✓✓	13
HI4	Cycle improvements	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓✓	✓	13
HI6	Road resurfacing/repairs	✓	✓	✓✓✓	✓✓	0	✓	✓	✓✓	✓	✓	13
DM8	Rail freight	✓✓	✓✓	✓	✓✓	0	✓	✓✓	✓	0	✓	12
HI2b	Park Royal Rd junction improvements - Intermediate intervention	✓✓	✓	✓✓	✓✓	0	✓	✓	✓	✓	✓	12
HI8	New strategic road connections	✓✓✓	✓✓	✓	✓✓	0	✓✓	✓✓	0	0	0	12
PL3	Improved workplace cycle facilities	✓	✓	✓	✓	0	✓✓	✓✓	✓	✓✓	0	11
HI7	Decluttering of streets	✓✓	✓	✓	✓	0	✓	✓	✓✓	✓	✓	11
PL6	HGV corridors	✓	✓✓	✓	✓✓	✓	0	✓✓	0	0	✓	10
PL9	Car club/car sharing strategy	0	✓✓	0	✓	✓✓	✓	✓	✓	✓✓	0	10
DM4	Freight consolidation	0	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	10
PL7	Low emissions zone	0	✓✓	0	0	✓✓	✓	0	✓✓	✓✓	0	9
PL8	Incentives for electric vehicles	0	✓	0	✓	✓✓✓	✓	0	✓	✓✓	0	9
PT2	Shuttle bus services	✓✓	✓	✓	0	✓	✓	✓	0	✓✓	0	9
HI2a	Park Royal Rd junction improvements - Basic intervention	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	8
HI3	Acton Lane/North Acton Road junction improvements	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	8

Figure 4.4: Interventions Ordered with Cost & Difficulty Considered

	RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability			Total Score
Intervention Reference	PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE	
PL5	Enhance personal security to encourage walking	✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓✓	Very Low	Low	Short Term	23
HI6	Road resurfacing/repairs	✓	✓	✓✓✓	✓✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term	23
PL4	Greening of corridors and placemaking	✓✓	✓	✓	✓✓	0	✓	✓	✓✓✓	✓✓	✓✓	Low	Medium	Medium Term	22
HI5	Pedestrian improvements	✓✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓	Low	Low	Short Term	22
DM5	Parking and loading controls	0	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓✓	✓	Very Low	Medium	Short Term	21
DM6	Waterborne freight movements	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓	0	✓✓	Medium	High	Long Term	21
DM7	Mode share targets	✓	✓✓✓	✓✓	0	✓	✓	✓	✓	✓✓	✓	Very Low	Medium	Long Term	21
HI1	Abbey Road junction improvements	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓	✓✓	Low	Low	Medium Term	21
HI7	Decluttering of streets	✓✓	✓	✓	✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term	21
PT1	Modified bus services in the Park Royal area	✓✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	0	✓✓	0	Low	Medium	Medium Term	21
PL2	Smart management of the transport network	0	✓✓	✓✓	✓✓	✓✓	✓	✓	0	✓✓	✓	Low	Medium	Medium Term	20
PL3	Improved workplace cycle facilities	✓	✓	✓	✓	0	✓✓	✓✓	✓	✓✓	0	Very Low	Low	Short Term	20
HI2b	Park Royal Rd junction improvements - Intermediate intervention	✓✓	✓	✓✓	✓✓	0	✓	✓	✓	✓	✓	Low	Low	Medium Term	20
HI4	Cycle improvements	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓✓	✓	Low	Medium	Short Term	20
PL9	Car club/car sharing strategy	0	✓✓	0	✓	✓✓	✓	✓	✓	✓✓	0	Very Low	Low	Medium Term	19
HI2c	Park Royal Rd junction improvements - Extensive intervention	✓✓	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓	✓✓	High	High	Long Term	19
PT3	Improved station facilities	✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	✓	✓	✓	High	Medium	Long Term	19
DM8	Rail freight	✓✓	✓✓	✓	✓✓	0	✓	✓✓	✓	0	✓	Medium	Medium	Long Term	18
HI2a	Park Royal Rd junction improvements - Basic intervention	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term	18
HI3	Acton Lane/North Acton Road junction improvements	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term	18
PL6	HGV corridors	✓	✓✓	✓	✓✓	✓	0	✓✓	0	0	✓	Medium	Medium	Medium Term	16
DM4	Freight consolidation	0	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Medium	Medium	Short Term	16
PT2	Shuttle bus services	✓✓	✓	✓	0	✓	✓	✓	0	✓✓	0	Low	Medium	Medium Term	16
PL7	Low emissions zone	0	✓✓	0	0	✓✓	✓	0	✓✓	✓✓	0	Medium	High	Medium Term	14
PL8	Incentives for electric vehicles	0	✓	0	✓	✓✓✓	✓	0	✓	✓✓	0	High	Medium	Medium Term	14
HI8	New strategic road connections	✓✓✓	✓✓	✓	✓✓	0	✓✓	✓✓	0	0	0	Very High	Very High	Long Term	14

Potential Funding Sources

4.37 Several funding options are available to support the introduction of new transport measures in Park Royal and they are described in the following sections. This analysis is based on a similar assessment undertaken for TfL/GLA on funding potential in the Upper Lee Valley.

TfL, DfT, Local Borough (LIP) Funding

4.38 There are several sources of capital funding for transport schemes in TfL and the local boroughs e.g. funds for safety schemes and junction improvements.

4.39 Each Borough will be preparing a Local Implementation Plan (LIP) in early 2016 and this will identify suitable transport schemes for introduction in 2017 to 2020. These LIPs could include schemes identified as part of the Park Royal Transport Strategy.

4.40 TfL and the Department for Transport also have funds available for “Major Schemes” and these would be applicable for larger schemes such as new rail lines or similar. Each potential schemes would need to be submitted and approved by TfL/DfT and would be competing against other schemes located across London to obtain funds.

Mayoral Development Corporations

4.41 The Localism Act 2011 granted the Mayor of London the ability to establish Mayoral Development Corporations (MDCs) and on 1 April 2015 the Old Oak and Park Royal Development Corporation (OPDC) was established to help transform the area which is to benefit substantially from investment in HS2 and Crossrail.

4.42 Within the boundaries of its jurisdiction, an MDC has the power to:

- purchase land;
- reclassify land;
- apply development levies; and
- allow the densification of an area in order to help maximise the value of developments.

4.43 There are two methods to consider in capturing greater value from developers using the MDC approach:

1. Applying an MDC specific CIL to MDC areas.
2. The MDC taking an active role in development of land in the MDC areas.

4.44 An MDC has planning and CIL-levying powers which are similar to those in a borough. Therefore Borough CIL would not apply in an MDC. Instead the MDC can apply an MDC- specific CIL (‘MDC CIL’). This is a complex task which requires forecasting the amount that could be raised by developments and needs a significant number of assumptions, many of which are highly volatile – for example the annual rate of house price increases in London. Considerations need to be given to when developers will be expected to contribute within the development timetable.

4.45 The OPDC is currently developing its MDC CIL charging regime.

Mayoral CIL

4.46 Under London Plan Policy 8.2B, the Mayor introduced a CIL charging schedule to enable him to use the Levy to fund strategically important infrastructure. Mayoral CIL is currently being used to fund Crossrail. The Regulations restrict the Mayor to use of the CIL to fund “roads or other transport facilities, including, in particular, for the purposes of, or in connection with, scheduled works within the meaning of Schedule 1 to the Crossrail Act 2008” (Community Infrastructure Levy Regulations 2010 59(2)).

4.47 In the Crossrail 2 Funding and Financing Study[1], following the repayment of the Crossrail 1 loan, Mayoral CIL contributions have been assumed to become available to fund the Crossrail 2 project. Under the scenario where Crossrail 2 does not go ahead, Mayoral CIL could theoretically be used to fund transport infrastructure in Park Royal.

4.48 However, Mayoral CIL has been excluded from the base scenario as it is unlikely that Park Royal infrastructure would be considered strategic to London as a whole.

S106 Contributions

4.49 The introduction of a local CIL regime does not eliminate the potential for developers to provide funding for specific schemes directly associated with a new development. This includes localised highway changes, public realm improvements and new public transport infrastructure.

Tax Increment Financing

4.50 Tax Increment Financing attempts to isolate the increase in certain specific tax revenues which arise as a consequence of a project. This additional tax can be captured and used to make a funding contribution to a given project. TIF has been used extensively for a wide range of infrastructure projects internationally and recently within the UK on the Northern Line Extension. The Northern Line Extension funding sources included an Enterprise Zone to capture Incremental Business Rates Income (IBRI). Borough CIL and S106 contributions arising from new developments were also included as separate funding streams.

4.51 A key benefit of an IBRI TIF is that it uses sources of taxation that already exist: it would neither require tax rate increases to be made, nor new taxes to be levied. Given that an IBRI TIF is a mechanism already used for other projects it is seen as a potentially useable value capture mechanism.

4.52 However, the nature of the development will have a substantial impact on the effectiveness of IBRI as a potential funding mechanism. The level of IBRI will be maximised in schemes which include high levels of commercial development e.g. Old Oak.

4.53 One of the challenges of an IBRI TIF mechanism is that in order to isolate the increase in tax revenues resulting from a specific project, a baseline business rate income level must be established – the business rates revenue generated if the infrastructure investment did not go ahead. Once the baseline is established, any business rate income above this level is set aside as an additional source of funding.

Contributions from Council Tax

4.54 Council tax has been considered under two alternatives: a borough-wide levy; and using a proportion of the council tax revenue from the 1,500 proposed new homes.

4.55 An additional borough-wide levy could be raised on council tax that is set aside for the Park Royal area, if this was set up as an Authority. Similar levies are already paid as part of the council tax bill, for instance to the North London Waste Authority and to the Lee Valley Regional Park Authority. An increase in council tax is likely to be politically challenging for the boroughs and may require a local ballot to be held. In recent discussions with TfL regarding the funding of transport projects it was mentioned that when a similar scheme was proposed for the Bakerloo line extension (i.e. at the local level as opposed to the London-wide Olympic precept) this did not prove popular with the GLA.

4.56 An alternative to this is to ring-fence a proportion of the council tax on the proposed new

[1] PwC, 'Crossrail 2 Funding and financing study', 27 November 2014 (See **http://crossrail2.co.uk/funding/** for the full report)

homes to fund investment. Where 100% of the increased council tax revenue is not needed to provide additional services for the increased population, this could be used to fund the required infrastructure investment. Given the political challenges associated with council tax and the already stretched authority budgets, using this mechanism in practice is likely to be difficult. However, we have included the total council tax generated from the new homes within the model. The primary reason for this is to highlight the additional revenue which will be generated through new development. From this, it can be determined whether any of this additional revenue could be used to fund the required infrastructure or alternatively, whether it could be used in any negotiations with the boroughs on obtaining potential grant funding.

New Homes Bonus

4.57 Under the New Homes Bonus scheme, the Government matches the council tax raised on each new home (previously empty or entirely new build) for six years as a form of grant funding. Affordable homes obtain an additional £350 per unit. As a result of this measure, local authorities get an automatic, six-year, 100 per cent increase in the amount of revenue derived from each new house built in their area. Providing this scheme continues, local authorities will have flexibility on how to spend the grant and this grant funding could therefore potentially be ring-fenced to fund new infrastructure. In London, 100 per cent of the grant goes to the London borough as opposed to GLA. For the circa 1,500 new homes proposed in the Park Royal, the grant funding from the New Homes Bonus could be used to pay for some of the strategic infrastructure needed, providing it is not needed to fund gaps in the budget for core services in the area.

4.58 There are two main challenges with using this mechanism. First, there is the possibility that the grant may not continue in its current form which would mean this funding may not be available once the properties in the Park Royal area are built. Second, given the stretched local authority budgets, local authorities may be intending to use the grant for delivering key services in the local area.

Contributions from Stamp Duty Land Tax

4.59 The building of c1,500 new homes will generate additional Stamp Duty Land Tax (SDLT) income. At present SDLT receipts are not devolved to London or its local authorities so this income would not be a local funding source and would instead benefit Her Majesty's Treasury (HMT). However the potential income from SDLT has been included to highlight the additional revenue the scheme is likely to generate for central government. The analysis could potentially be used as a negotiation tool in trying to obtain grant funding for the scheme from central government. This approach has also been used by TfL for the Crossrail 2 Financial Case as part of the Strategic Outline Business Case submission to DfT.

Local Levy

4.60 A local levy is added to all council tax bills within the Thames River catchment area. This provides approximately £10.5m funding per year, the spending of which is controlled by a committee with representatives from the Local Authorities and Environment Agency. Little of the available funding has been spent within London boroughs in the past few years, so proposals within London may be received favourably. This is a potential source of funding for drainage and flood defence schemes within the Park Royal area.

Workplace Parking Levy

4.61 A Workplace Parking Levy (WPL) is a charge on employers who provide workplace parking. The Transport Act 2000 (Part III) put the legislation in place to allow local authorities to implement congestion charging zones or workplace parking levies.

4.62 The scheme introduced by Nottingham City Council is the first of its kind. It was introduced to tackle problems associated with traffic congestion by both providing funding for local transport and by acting as an incentive for employers to manage and potentially reduce their workplace parking. In 2013/14 the scheme raised £7.6m net of expenses. The revenue is ring fenced for investment in improving public transport in Nottingham. Money raised from the WPL is to fund an extension to the existing tram system, the redevelopment of Nottingham Railway Station and supporting the Link bus network.

4.63 It is understood that Oxford City Council are planning to introduce a similar WPL in 2017.

4.64 Although feasible in Park Royal, implementing the levy in such a small area may cause businesses to relocate to other office or industrial units where they would not be liable to pay for the levy, to the detriment of the local workforce.

Business Improvement District

4.65 The mechanism of a Business Improvement District (BID) works by applying a small levy on non-domestic rate payers in a defined area. Its objective is to provide additional services and investment over and above the baseline provided by statutory bodies. The businesses who pay are the ones who benefit from the new activities.

4.66 Although BIDs have typically been used for city centre tourism related activities and other city centre services, such as street cleaning projects, Sheffield City Council has developed a BID to fund flood defence infrastructure in the Lower Don Valley. Over 90% of the cost of the project is to be financed by public funds, with a contribution of £1.4 million from the private sector raised through the BID.

4.67 Given that businesses in the Park Royal already pay the Business Rates Supplement put in place for Crossrail it could be a challenge to obtain a successful outcome from a ballot of local businesses which is required under legislation. There are already BIDs in place in London, for instance in Southwark and Hammersmith, however these are for measures such as freight consolidation and increased security patrols. A strong evidence base would need to exist which shows that the new infrastructure proposed would significantly benefit the businesses that would be responsible for paying the levy. Similar to the WPL, forming a BID may cause businesses to relocate outside of the district where they would not be liable to pay for the levy, to the detriment of the local workforce.

EU and Transport Catapult

4.68 Both the EU and the UK's Transport Catapult are potential sources of funding, particularly for transport interventions involving new technology. Specific schemes would need to be proposed to each organisation for funding and would compete for funds against other schemes.

Summary of Suitable Funding Mechanisms

4.69 The most suitable sources of funding for transport interventions in the Park Royal area are therefore:

Large schemes:

- TfL and DfT through "Major Schemes" process
- MDC and Mayoral CIL providing funding over several years
- Tax Increment Financing

Medium and Small Schemes

- Borough funding via LIP process
- S106 contributions
- Contributions from Council Tax
- Business Improvement District
- EU funding / Transport Catapult

4.70 Council Tax, New Homes Bonus, Stamp Duty Land Tax, Local Levies and Workplace Parking Levies are not expected to be a significant source of funding for schemes in Park Royal.

5 Conclusions and Next Steps

Conclusions

5.1 As a result of major transport infrastructure improvements as part of Crossrail and HS2, the Old Oak & Park Royal Opportunity Area has been identified as an area suitable for significant growth in homes and employment.

5.2 An extra 10,000 jobs and 1,500 homes within Park Royal will require upgrades to existing transport infrastructure and supporting policies to ensure the resultant growth in travel demand does not adversely affect the local area.

5.3 The Park Royal Transport Strategy has defined and presented a range of potential interventions to meet the Park Royal transport vision of providing networks that enhance the communities they serve and help local businesses to operate and grow, both now and in the future.

5.4 These interventions have been assessed and prioritised in accordance with how well they meet the defined objectives for the area. The OPDC and TfL are seeking views on the proposed transport interventions and the priority they have been given as part of the Local Plan consultation process.

Local Plan Consultation

5.5 The programme for OPDC's Local Plan is set out below and is contained within OPDC's Local Development Scheme, which was published in August 2015.

Document:	OPDC Local Plan
Role and Content:	Sets out the vision, objectives and core policies for the area
Coverage:	Entire OPDC Area
Preparation:	July-December 2015
Consultation (Regulation 18):	February 2016 – March 2016
Consultation (Regulation 19):	Summer 2016
Submission:	Autumn 2016
Adoption:	Spring 2017

Next Steps in the Development of the Strategy

5.6 This document supports the Regulation 18 consultation. Following receipt of submissions a preferred package of transport intervention measures will be presented as part of the Regulation 19 consultation process.

5.7 Following consideration of the Regulation 18 consultation submissions received on the transport intervention packages, a short-list of interventions will be produced along with a final, preferred package. This preferred set of interventions will form the basis of the Regulation 19 consultation in the summer of 2016.

A Interventions Long List

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Park Royal Transport Strategy

Intervention Options Long List

For Consultation

OPDC and Transport for London

27 January 2016

PL DM HI PT

Park Royal Transport Strategy – focus of interventions

Planning (PL)

Area-wide overarching planning controls for new developments and enforcement for existing developments to limit and discourage the use of the car as a main mode of transport and support sustainable travel choices

Demand Management (DM)

Multi – stakeholder/framework agreements and programmes to reduce car dependency, improve efficiency, reduce costs and lower emissions

Highway Improvements (HI)

Physical interventions to the highway, junctions and walking and cycling infrastructure to increase total transport capacity and interoperability

Public Transport Improvements (PT)

Physical interventions to improve the connectivity, accessibility and inclusivity of the public transport network

1. Respond to the challenges and opportunities of the existing and future strategic transport network and the Old Oak Common site
2. Deliver against the objectives and help accomplish the vision set for Park Royal
3. Create opportunities for long lasting physical improvements and behavioural change

Long list of options

PT1	Modified bus services in the Park Royal area
PT2	Shuttle bus services
PT3	Improved station facilities

HI1	Abbey Road junction improvements
HI2	Park Royal Rd / Coronation Rd junction improvements
HI2a	Basic intervention
HI2b	Intermediate intervention
HI2c	Extensive intervention
HI3	Acton Lane/North Acton junction improvements
HI4	Cycle improvements
HI5	Pedestrian improvements
HI6	Road resurfacing/repairs
HI7	Decluttering of streets
HI8	New strategic road connections

DM1	Development control strategy
DM2	Travel plans
DM3	Delivery and service plans
DM4	Freight consolidation
DM5	Parking and loading controls
DM6	Waterborne freight movements
DM7	Mode share targets
DM8	Rail freight

PL1	Transport Panel
PL2	Smart management of the transport network
PL3	Improved workplace cycle facilities
PL4	Greening of corridors and placemaking
PL5	Enhance personal security to encourage walking
PL6	HGV corridors
PL7	Low emissions zone
PL8	Incentives for electric vehicles
PL9	Car club/car sharing strategy

Agreed assessment matrix

RTF FUNCTIONS =>		Moving		Functioning		Unlocking		Living	Sustaining	Protecting		Deliverability	
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Very Low	Very Low	Short Term
PL2	0	✓✓	✓✓	✓✓	✓✓	✓	✓	0	✓✓	✓	Low	Medium	Medium Term
PL3	✓	✓	✓	✓	0	✓✓	✓✓	✓	✓✓	0	Very Low	Low	Short Term
PL4	✓✓	✓	✓	✓✓	0	✓	✓	✓✓✓	✓✓	✓✓	Low	Medium	Medium Term
PL5	✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓✓	Very Low	Low	Short Term
PL6	✓	✓✓	✓	✓✓	✓	0	✓✓	0	0	✓	Medium	Medium	Medium Term
PL7	0	✓✓	0	0	✓✓	✓	0	✓✓	✓✓	0	Medium	High	Medium Term
PL8	0	✓	0	✓	✓✓✓	✓	0	✓	✓✓	0	High	Medium	Medium Term
PL9	0	✓✓	0	✓	✓✓	✓	✓	✓	✓✓	0	Very Low	Low	Medium Term
DM1	✓✓	✓✓	0	✓✓	0	✓✓	✓✓	✓	✓	✓	Low	Very Low	Short Term
DM2	✓	✓✓	✓	✓	✓	✓	✓	0	✓✓	✓	Very Low	Low	Short Term
DM3	✓	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Very Low	Low	Short Term
DM4	0	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Medium	Medium	Short Term
DM5	0	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓✓	✓	Very Low	Medium	Short Term
DM6	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓	0	✓✓	Medium	High	Long Term
DM7	✓	✓✓✓	✓✓	0	✓	✓	✓	✓	✓✓	✓	Very Low	Medium	Long Term
DM8	✓✓	✓✓	✓	✓✓	0	✓	✓✓	✓	0	✓	Medium	Medium	Long Term
HI1	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓	✓✓	Low	Low	Medium Term
HI2a	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term
HI2b	✓✓	✓	✓✓	✓✓	0	✓	✓	✓	✓	✓	Low	Low	Medium Term
HI2c	✓✓	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓	✓✓	High	High	Long Term
HI3	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term
HI4	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓✓	✓	Low	Medium	Short Term
HI5	✓✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓	Low	Low	Short Term
HI6	✓	✓	✓✓✓	✓✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term
HI7	✓✓	✓	✓	✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term
HI8	✓✓✓	✓✓	✓	✓✓	0	✓✓	✓✓	0	0	0	Very High	Very High	Long Term
PT1	✓✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	0	✓✓	0	Low	Medium	Medium Term
PT2	✓✓	✓	✓	0	✓	✓	✓	0	✓✓	0	Low	Medium	Medium Term
PT3	✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	✓	✓	✓	High	Medium	Long Term

KEY

0	Does not meet objective
✓	Partially meets objective
✓✓	Meets objective
✓✓✓	Meets objective across multiple criteria

1. Provides direct linkage between the objectives and the assessment framework
2. Retains links to TfL's Roads Task Force (RTF) street functions
3. Considers separately the deliverability of each option in terms of cost, difficulty and timescale

Note: Further details in the main report under the Intervention Assessment section.

Highway improvement options – long list for consultation

HI1 Abbey Road junction improvements

HI2 Park Royal Rd / Coronation Rd junction improvements

- **HI2a** Basic intervention
- **HI2b** Intermediate intervention
- **HI2c** Extensive intervention

HI3 Acton Lane/North Acton junction improvements

HI4 Cycle improvements

HI5 Pedestrian improvements

HI6 Road resurfacing/repairs

HI7 Decluttering of streets

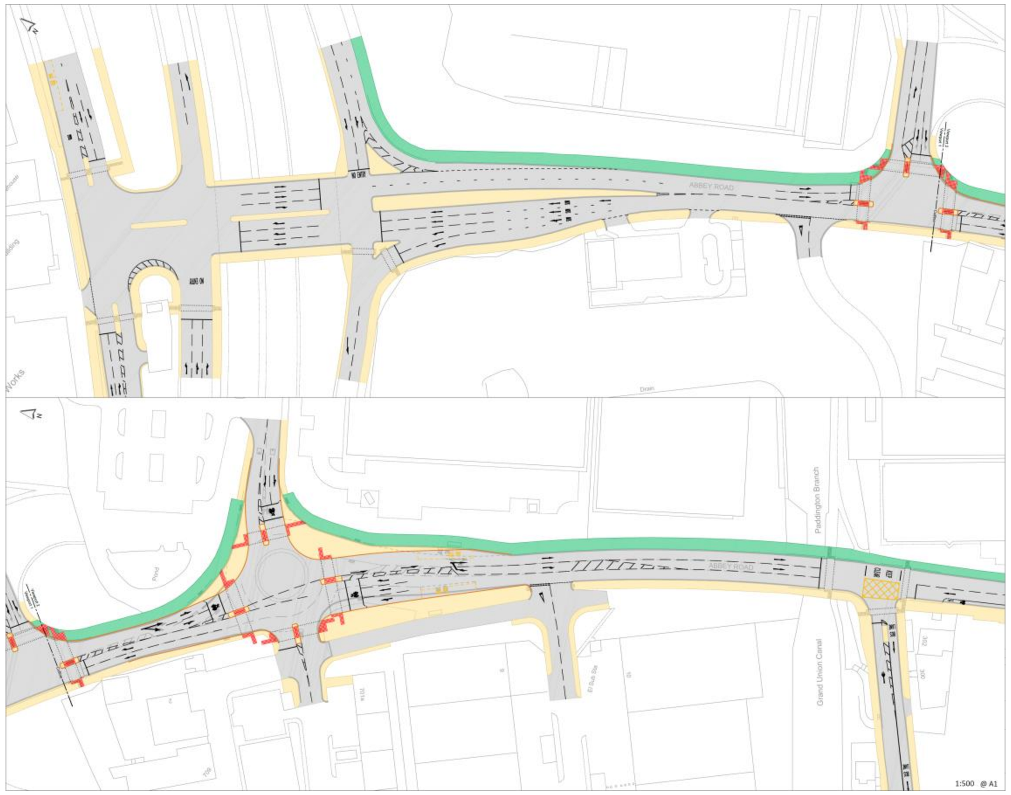
HI8 New strategic road connections

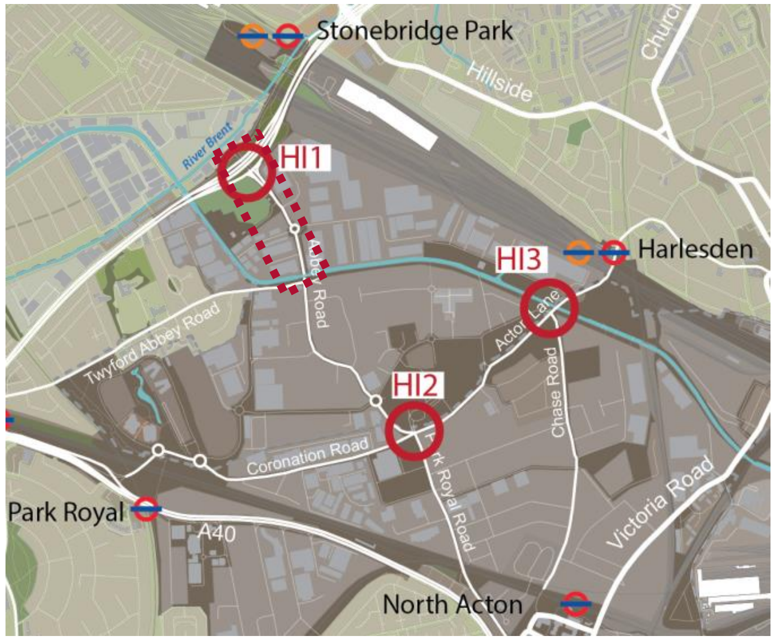
HI1: Abbey Road junction improvements – Description

Abbey Road (North Circular to Twyford Abbey Road)

1. Identified as a key bottleneck in the Park Royal road network during site visits with stakeholders
2. Issues associated with high volumes of traffic gaining access to and from the North Circular
3. Capacity issues at Hanger Lane are a major contributor, but the following localised junction improvements would potentially provide benefit:
   a) Conversion of roundabout to signals and coordination of traffic signal timings along Abbey Road. Existing signals do not operate under Urban Traffic Control (UTC) which means they cannot be timed to provide progression in response to variable traffic flows. The existing roundabout also results in queues blocking through the junctions which could be better managed if replaced by signals.
   b) Reallocation of lanes to provide additional right turn capacity onto the North Circular eastbound. Demand for this movement is approximately 50% higher than the ahead movement but this traffic can only use 1 of 3 existing available lanes.
4. Junction modelling is needed to quantify potential benefits and optimise designs

HI1. Abbey Road





HI1: Abbey Road junction improvements – Assessment

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI1	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓	✓✓	Low	Low	Medium Term

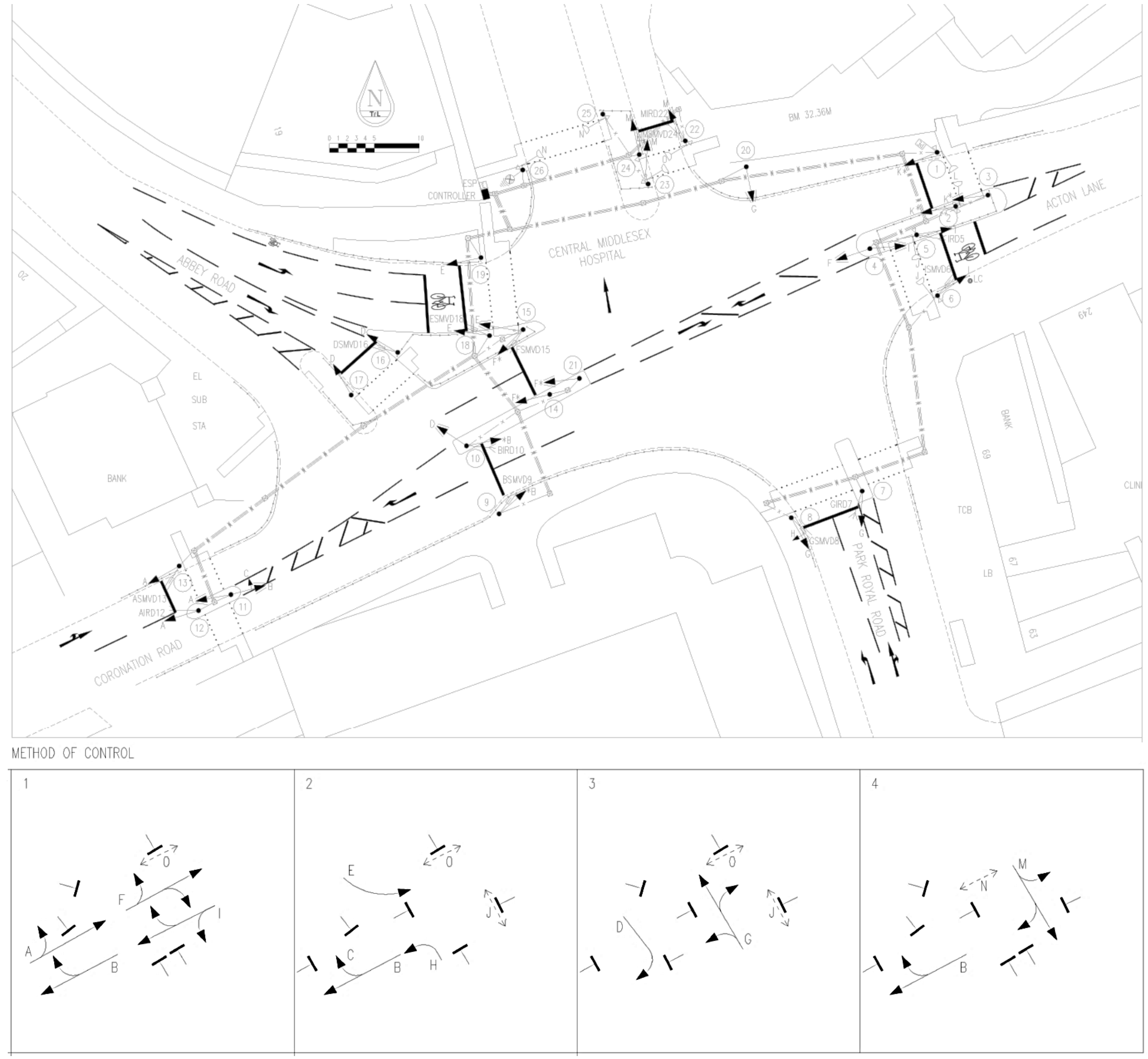
1. Reduction in congestion would benefit general traffic, freight movements and buses
2. Cyclist safety would benefit from reduced level of traffic congestion on key corridor and removal of an existing roundabout
3. Replacement of roundabout with signals provides new pedestrian and cycle crossing facilities
4. Upgrades do not deliver a step change in capacity or improve urban realm outcomes
5. Some small benefit to servicing and access due to improved traffic flows
6. Some small benefit to air quality resulting from reduced congestion, although does not improve major arterial roads which are major generators of emissions
7. Junction improvements would support growth in travel on internal roads, but without additional capacity at Hanger Lane there will be limited benefit to journeys to and from the strategic road network
8. Cost and risk relatively low and would fall under “business as usual” type junction upgrades

HI2(a) Park Royal Road/Coronation Road Junction improvements (Basic intervention) – Description

HI2a

Option A Low Cost Junction improvement

1. Existing staggered crossroads arrangement means that current signal operation is inefficient and a source of significant delay to all modes
2. Lowest cost and timescale option would be to review and optimise existing signal timings. It is possible that a review of the signal staging and timings could identify a more efficient operation that better meets current demand, with no change to existing geometry
3. Junction modelling is needed to quantify potential benefits and optimise designs



Source: TfL

HI2(a) Park Royal Road/Coronation Road junction improvements (Basic intervention) – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI2a	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term

Option A Low Cost Junction improvement

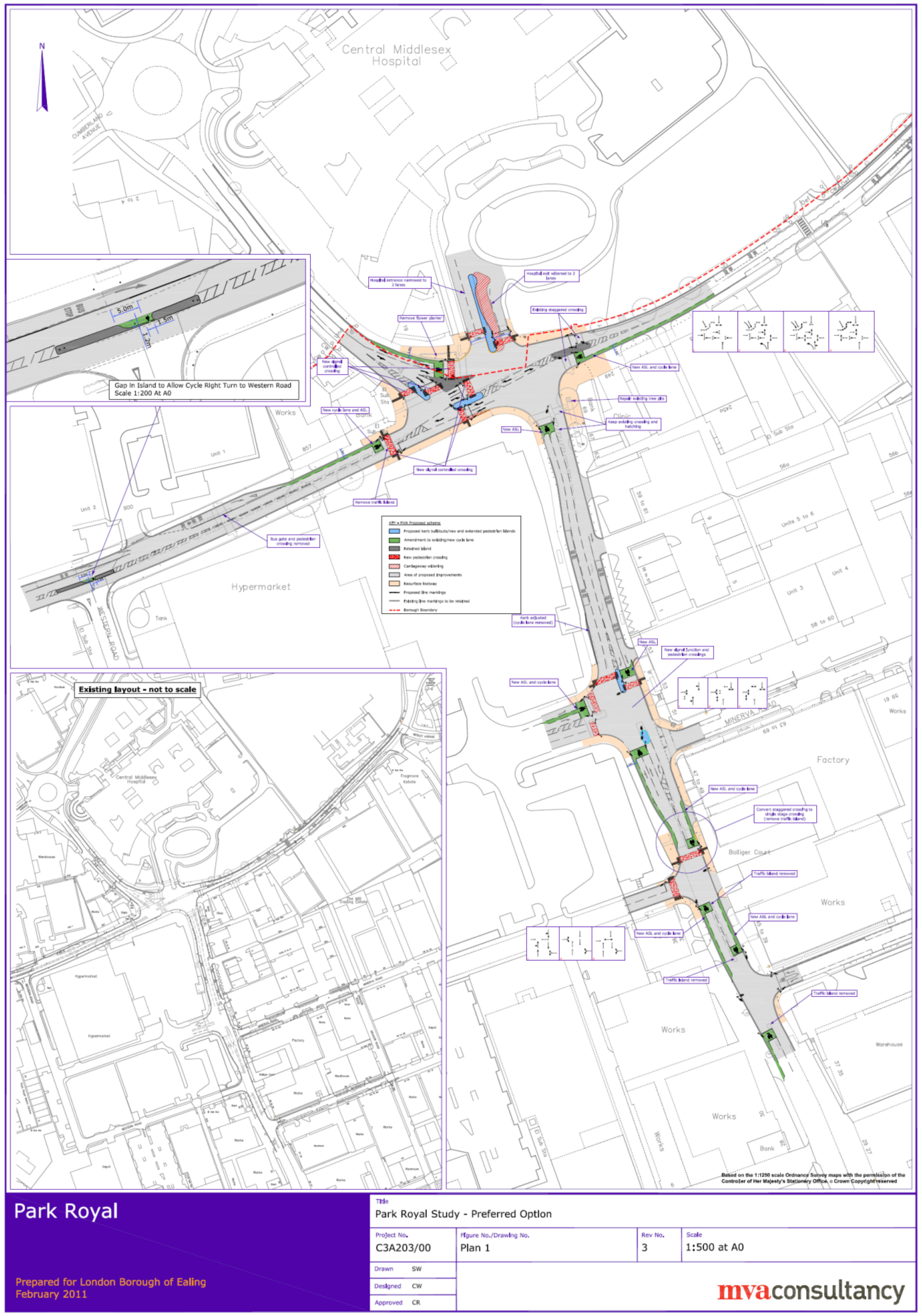
1. Reduction in congestion would benefit general traffic, freight movements and buses
2. Cyclists would benefit from reduced level of traffic congestion on key cycle corridors
3. Traffic signal timing changes do not deliver a step change in capacity or improve urban realm outcomes
4. Some small benefit to servicing and access due to improved traffic flows
5. Some small benefit to air quality resulting from reduced congestion
6. Does not address existing issue of pedestrian crossing facilities only being on limited arms and not meeting desire lines
7. Cost and risk very low and could be undertaken as part of TfL's Timing Review programme
8. Any timing review would also need to consider operation and signal timings at signalised junctions to the south (the ASDA access junction and Standard Road)

HI2(b) Park Royal Road/Coronation Road junction improvements (Intermediate intervention) – Description

HI2b

Option B Medium Cost Junction Improvement

1. Existing staggered crossroads arrangement means that current signal operation is inefficient and a source of significant delay to all modes
2. Medium cost and timescale option would be to adopt the preferred design option identified by MVA in 2011 as part of a study commissioned by LB Ealing
3. This option aims to limit changes to junction geometry so as not to require costly utilities diversions
4. This option provides additional pedestrian crossing facilities on desire lines
5. Includes some short sections of new cycle lanes
6. Includes improvements to the signalised junctions to the south, including installation of SCOOT control at the junctions to provide coordination
7. This option was identified after consultation with various stakeholder groups and assessment of four alternatives
8. Design needs reviewing to ensure pedestrian refuge islands are of sufficient width and to confirm impact to kerb lines



HI2(b) Park Royal Road/Coronation Road junction improvements (Intermediate intervention) – Description

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI2b	✓✓	✓	✓✓	✓✓	0	✓	✓	✓	✓	✓	Low	Low	Medium Term

1. This design was found by MVA to reduce delays and congestion in the area with the average travel time for each vehicle in the network being reduced by 17% (AM peak)and 9% (PM peak). Average speed per vehicle also improves with a 9% increase in the AM peak and 5% in the PM peak
2. Cyclists would benefit from reduced level of traffic congestion on key cycle corridors and short sections of cycle lane on approach to the junctions
3. Some small benefit to servicing and access due to improved traffic flows
4. Some small benefit to air quality resulting from reduced congestion
5. Upgrades do not deliver a step change in capacity or improve urban realm outcomes
6. Junction improvements would support growth in travel on internal roads, but do not address arterial journey times
7. Additional crossing facilities and simplified traffic movements at junctions would benefit pedestrians encouraging further walking and cycling
8. Cost and risk could be relatively low and would fall under “business as usual” type junction improvement works – although a design review is required to confirm if there is a costly impact to utilities

HI2(c) Park Royal Road/Coronation Road junction improvements (Extensive intervention) – Description

Option C High Cost Junction improvement

1. Existing staggered crossroads arrangement means that current signal operation is inefficient and a source of significant delay to all modes
2. High Cost Option would be to realign Park Royal Road at the Abbey Road / Coronation Road junction to remove stagger. This would allow for more efficient junction operation and simplify junction movements for all users
3. This also presents an opportunity to create a "Heart of Park Royal" with the potential for new public space on the south eastern corner of the junction
4. This option would require significant land acquisition from the existing ASDA car park and most likely replacement of lost parking in the form of a multi-storey parking structure
5. Earlier studies by LB Ealing identified significant amounts of utilities under footways, relocation of which would be required, further increasing costs
6. Junction modelling is needed to quantify potential benefits and optimise designs

HI2c. Abbey Rd / Coronation Rd

Source: Old Oak and Park Royal Opportunity Area Planning Framework (GLA, 2015)

HI2c

HI2(c) Park Royal Road/Coronation Road junction improvements (Extensive intervention) – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI2c	✓✓	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓	✓✓	High	High	Long Term

1. Reduction in congestion would benefit general traffic, freight movements and buses
2. Cyclists would benefit from reduced level of traffic congestion on key cycle corridors and new cycle facilities could be provided
3. Potential step change in junction capacity
4. Potential to improve urban realm outcomes with new public space
5. Could help support wider objectives of mode shift to sustainable modes by facilitating a retail/leisure " Heart of Park Royal"
6. Some small benefit to servicing and access due to improved traffic flows
7. Some small benefit to air quality resulting from reduced congestion, although does not improve major arterial roads which are major generators of emissions
8. Additional crossing facilities and simplified traffic movements at junctions would benefit vulnerable road users (VRUs)

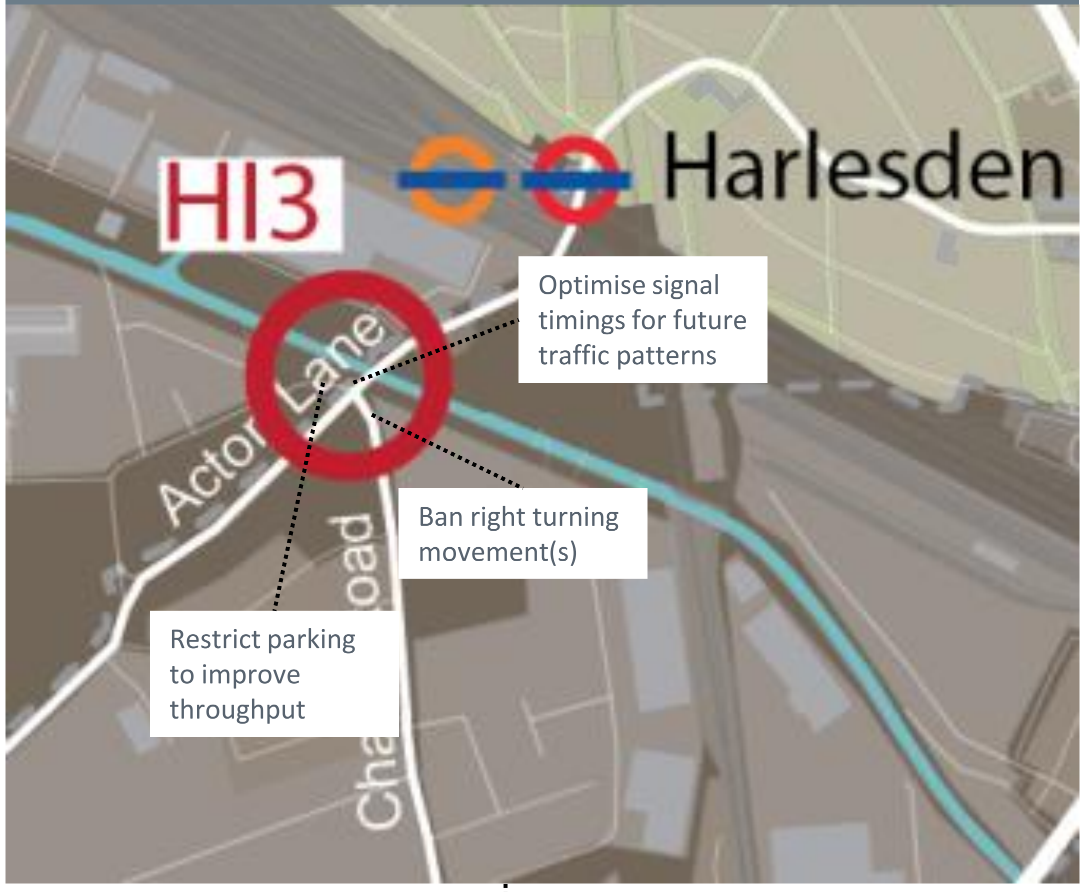
HI3

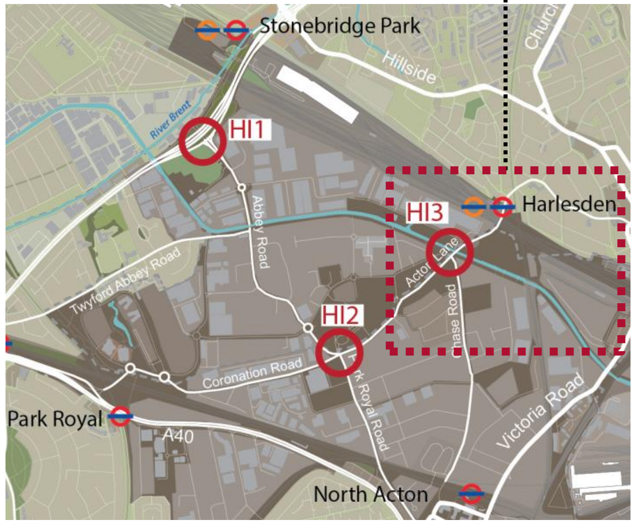
HI3: Acton Lane/North Acton Road junction improvements - Description

Acton Lane / North Acton Road Junction

1. This junction experiences high demand as an alternative route between the A40, the North Circular and destinations to the north-east of Park Royal
2. It is unlikely any significant changes to junction geometry could be made due to local constraints such as the canal bridge and alignment of Barretts Green Road
3. Possible measures would be:
   a) Review and optimisation of traffic signals.
   b) Extend parking restrictions along Barretts Green Road to provide wider effective lane widths and increase capacity.
   c) Review right turning movements with view to banning some to increase junction capacity. This would be subject to alternative routes being available, particularly for HGVs.
4. Junction modelling is needed to quantify potential benefits and optimise designs

HI3 Acton Lane / North Acton Road





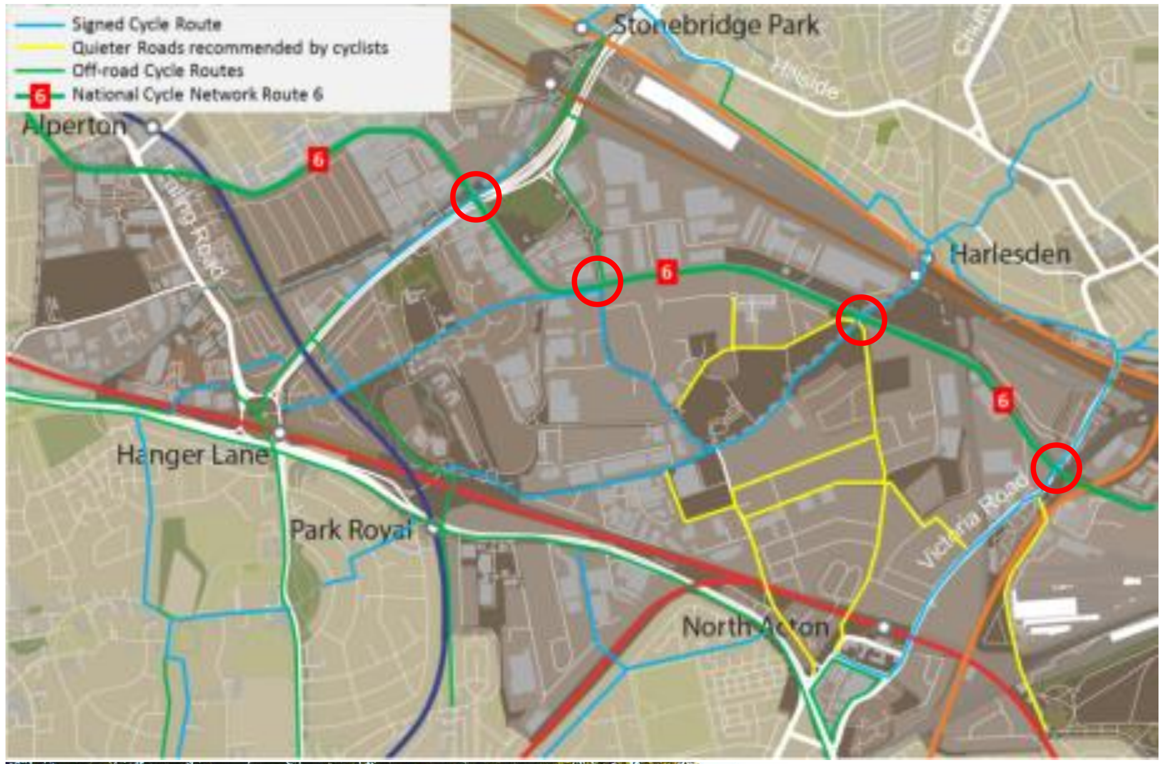
HI3:Acton Lane/North Acton Road junction improvements - Assessment

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI3	✓	✓	✓✓	✓	0	✓	✓	0	0	✓	Very Low	Very Low	Short Term

1. Reduction in congestion would benefit general traffic, freight movements and buses
2. Cyclists would benefit from reduced level of traffic congestion on key cycle corridors
3. Upgrades do not deliver a step change in capacity or improve urban realm outcomes
4. Some small benefit to servicing and access due to improved traffic flows
5. Some small benefit to air quality resulting from reduced congestion, although does not improve major arterial roads which are major generators of emissions
6. Junction improvements would support growth in travel on internal roads, but do not address arterial journey times
7. Potential to investigate introduction of pedestrian crossing facilities that are currently omitted from the junction
8. Cost and risk relatively low and would fall under “business as usual” type works

HI4: Cycle improvements – Description

1. Cycle infrastructure improvements to encourage increased cycle use – focused on existing signed routes and connections to the west and based on OPDC design guide and strategy
2. Analysis of Journey to Work Data shows vast majority of employees live within 8km of Park Royal with a significant concentration within 5km or nearer i.e. well within typical cycling distances in London
3. Segregation likely to be challenging due to parking and narrow carriageway widths. Improvements to focus around:
    1. Improved connections to National Cycle Route 6 (following the Grand Union Canal) which could act as key arterial cycle route into Park Royal. There are currently only four points at which cycle friendly routes connect with the 2.6km of NCR 6 that runs through Park Royal.
    2. Improved connections to rail stations with introduction of cycle hire facilities, such as Brompton Cycle Hire, to allow rail travellers to complete their journeys by cycle.
    3. Improved wayfinding.
    4. Enhanced cycle crossing facilities where required.
4. Area-wide improvements should also be supported by investments in “end-of-journey” cycle facilities in the form of cycle parking, lockers, showers etc. More details of these are described in intervention PL3



HI4: Cycle improvements – Assessment

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI4	✓✓	✓✓	✓✓	✓	0	✓	✓	✓	✓✓	✓	Low	Medium	Short Term

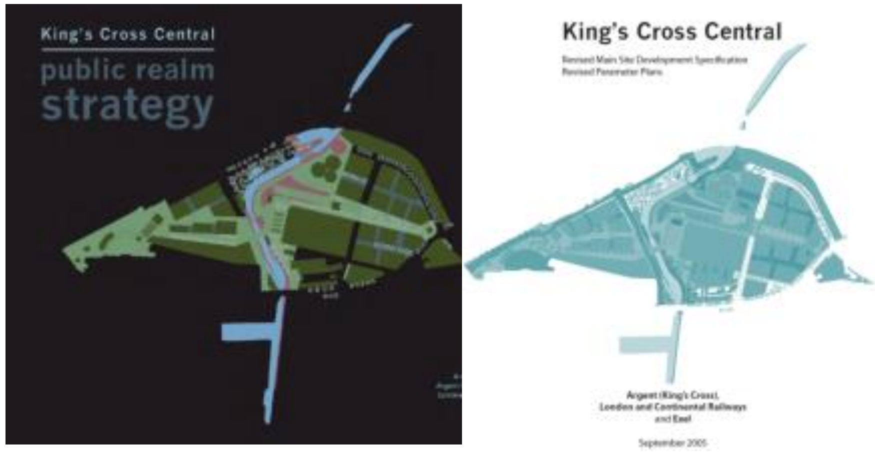
1. Increased cycle usage will reduce congestion, benefiting general traffic, freight movements and buses
2. Cyclists would benefit from enhanced infrastructure and improved wayfinding
3. Pedestrians potentially benefit from lower traffic volumes and ability to utilise new cycle connections
4. Upgrades do not deliver a step change in capacity or improve urban realm outcomes
5. New connections help reduce severance effects within Park Royal – consideration needs to be given to improving connections to National Cycle Route 6
6. Some small benefit to air quality resulting from increased cycle usage, although does not improve major arterial roads which are major generators of emissions
7. Increased cycle usage would improve health of new cyclists and promote more active lifestyles
8. Would support growth in travel on internal roads, by encouraging mode shift to a sustainable mode
9. Additional crossing facilities and raising driver awareness of cyclists through road markings would improve safety
10. Cost and risk relatively low although potentially challenging to identify appropriate measures/connections

HI5: Pedestrian improvements – Description

1. A design guide and strategy will be developed for the Old Oak and Park Royal area to ensure consistent, high-quality urban realm that increases the attractiveness of walking as a mode. Local Borough guidance such as the Brent Placemaking Guide, Ealing Urban Realm Strategy or Hammersmith and Fulham StreetSmart streetscape design guide would be used as a basis for the guide
2. Expand on existing Legible London signage and wayfinding that is currently restricted to the Grand Union Canal. Likely to require tailoring to suit the locations of interest within Park Royal
3. Effective use of surface treatments, materials and lighting together with environmental interventions such as public art combining to create pathways, landmarks and destinations. Other measures could include removal of graffiti and introduction of new pedestrian links
4. Prioritised upgrades to pedestrian connections from the Park Royal estate to stations
5. Improved crossing facilities to reduce severance effect of road traffic
6. Improved footways in terms of quality of surface and removal of clutter
7. Improved connections focusing on facilitating direct and safe walking and cycling routes from the stations to places of work

Legible London sign along the Grand Union Canal

Pedestrian connection to North Acton Station



Kings Cross Urban realm Strategy and localised parameter plans ensured a consistent high quality urban environment

HI5: Pedestrian improvements – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI5	✓✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓	Low	Low	Short Term

1. Benefits of reduced dependency on car travel likely to be offset by reduction in traffic capacity to provide an improved pedestrian environment
2. Improved connections to stations likely to encourage wider use of rail as a mode of transport
3. Cyclists would also benefit from shared pedestrian/cycle connections and upgrades to urban realm
4. New connections could help reduce severance and increase the permeability especially to/from residential areas to the proposed retail core
5. Some small benefits to air quality are expected from increased walking/public transport usage
6. Increased walking would improve health and promote more active lifestyles
7. Additional crossing facilities especially at junctions and along the main corridors such as Park Royal Road and Coronation Road would improve safety
8. Cost and risk of interventions is relatively low although they are dependent upon the extent of urban realm upgrades and land ownership
9. Rail and underground passengers would benefit from improved station environment and onward connections
10. Servicing and freight movements could occur more freely due to fewer cars on the local road network
11. Should be delivered in the shorter term, but with focus on connections to areas of increased development

HI6: Road resurfacing/repairs – Description

1. Road surface and footway quality varies quite significantly throughout Park Royal, with some sections showing need of repair
2. The area would benefit from a conditions assessment to identify and prioritise areas for maintenance
3. Measures could include surface dressing, resurfacing, pot hole repair, road markings, etc
4. The DfT sponsored Highways Maintenance Efficiency Programme (HMEP) identified that intervening at the right time reduces the amount of potholes forming and prevents bigger problems later
5. Making repairs improves safety and reduces running costs for vehicles that use the roads regularly
6. Boroughs would need to work together and develop a coordinated approach to asset management – best achieved by setting up of a Transport Working Group (see PL1)

On-site evidence of poor condition of the road surface near Harlesden Station

HI6: Road resurfacing/repairs – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI6	✓	✓	✓✓✓	✓✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term

1. Improved road surface will create more comfortable journeys for road users
2. Pot holes and other road surface defects are a hazard to cyclists and lead to slow journeys
3. Improved carriageway surfaces /treatments will provide an improvement to the look and feel of the area
4. Servicing trips and freight movements will benefit from reduced wear and tear to fleet vehicles and less risk of damage to goods being transported
5. Road safety benefits for all road users from well maintained and clearly marked road surfaces
6. Numerous types and levels of maintenance can be undertaken at relatively low cost and allow a tailored solution to be delivered in stages
7. “Business as usual” operation with only minor risk of short-term delays/road closures during works

HI7: Decluttering of streets – Description

1. Unnecessary street clutter reduces the attractiveness of an area and can cause obstructions to pedestrian movement
2. Street clutter can be of particular concern for vulnerable pedestrians such as older people, disabled people and parents with pushchairs
3. Decluttering can reduce associated maintenance costs
4. Key elements that could be improved:
    1. Removal of unnecessary signs or combining use with signal poles at junctions.
    2. Removal of unused phone boxes.
    3. Guardrail - *is unsightly and detracts from local character and visual amenity and there is evidence that it can increase traffic speeds and present an increased risk to cyclists who can be crushed against it by vehicles (Source: DfT Manual for Streets).*
5. A good level of guidance already exists and should be applied through the proposed design guide for Old Oak and Park Royal
6. Decluttering can have a positive impact on pedestrian safety due to improved visibility and lower speeds:
    1. Decluttering Kensington and Chelsea's High Street saw a 40% reduction in road traffic accidents and a 60% reduction in pedestrian accidents *(Source: Department for Communities and Local Government).*

HI7: Decluttering of streets – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI7	✓✓	✓	✓	✓	0	✓	✓	✓✓	✓	✓	Very Low	Very Low	Short Term

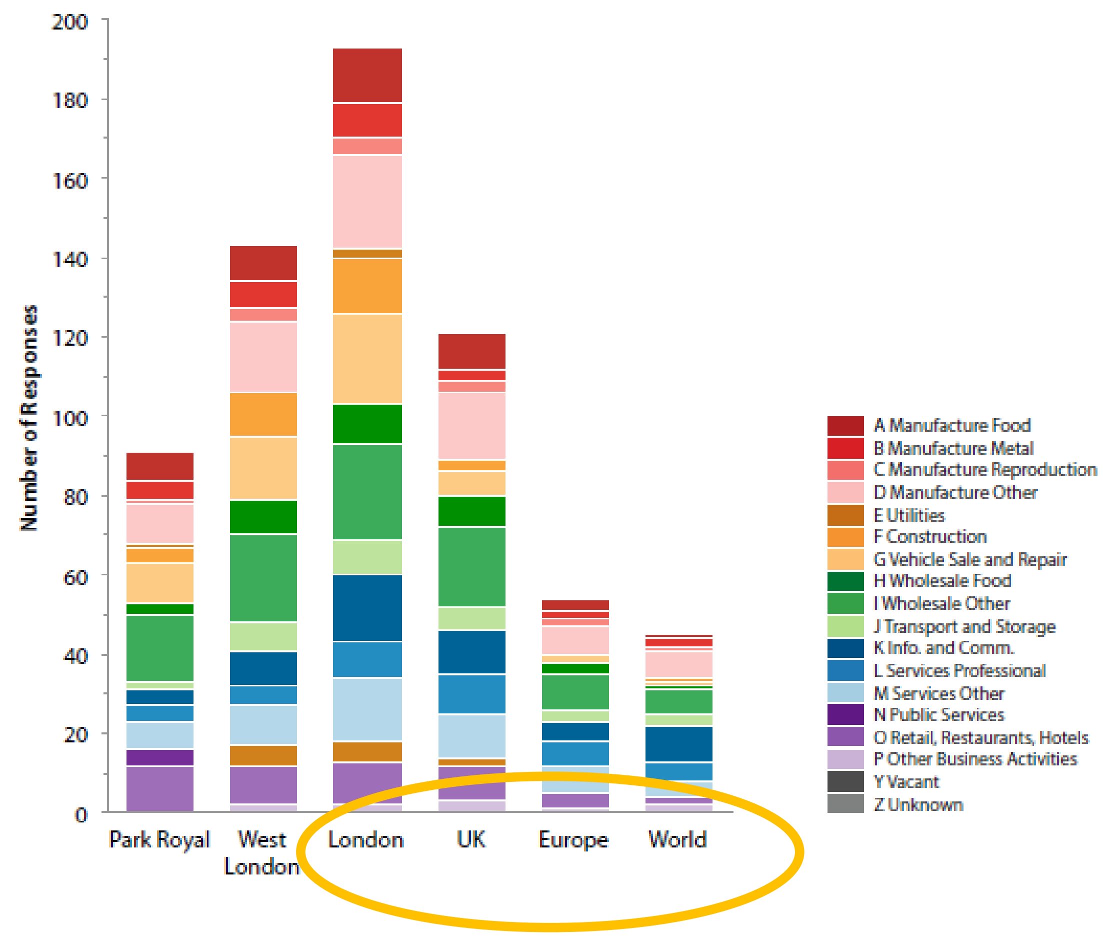
1. Improved street environment for pedestrians with more space for use on the footways
2. Removal of guard railing, particularly around junctions would improve the environment and reduce the feeling of constraint for cyclists
3. Decluttered street environment with fewer barriers to movement along pedestrian desire lines
4. Evidence that decluttering can improve safety through improved visibility and reduced vehicle speeds owing to perceived segregation
5. Low cost and will reduce long-term maintenance costs
6. Can be delivered in short timeframe under "business as usual" activities

HI8: New strategic road connections

Improved strategic road connections could include:

1. Improved access to the A40
    a) The A40 is the main arterial route for Park Royal into central London and out to the M40. With a large proportion of Park Royal business customers being located outside west London (see chart) a significant proportion of trips use the corridor.
    b) TfL is in the process of commissioning a targeted study looking at potential improvements for this section of the A40. Any options for improved connections to the corridor will therefore fall under this project.
2. New connections through Park Royal
    a) New links through the site and to the strategic network will be needed to open up potential development sites and improve connections for existing users.
    b) Both east-west and north-south connectivity should be encouraged and aim to accommodate all modes safely.

fig. 53 Customer Locations
Interviewed workplaces only (14%)



Source: The Park Royal Atlas (May, 2014)

HI8: New strategic road connections – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
HI8	✓✓✓	✓✓	✓	✓✓	0	✓✓	✓✓	0	0	0	Very High	Very High	Long Term

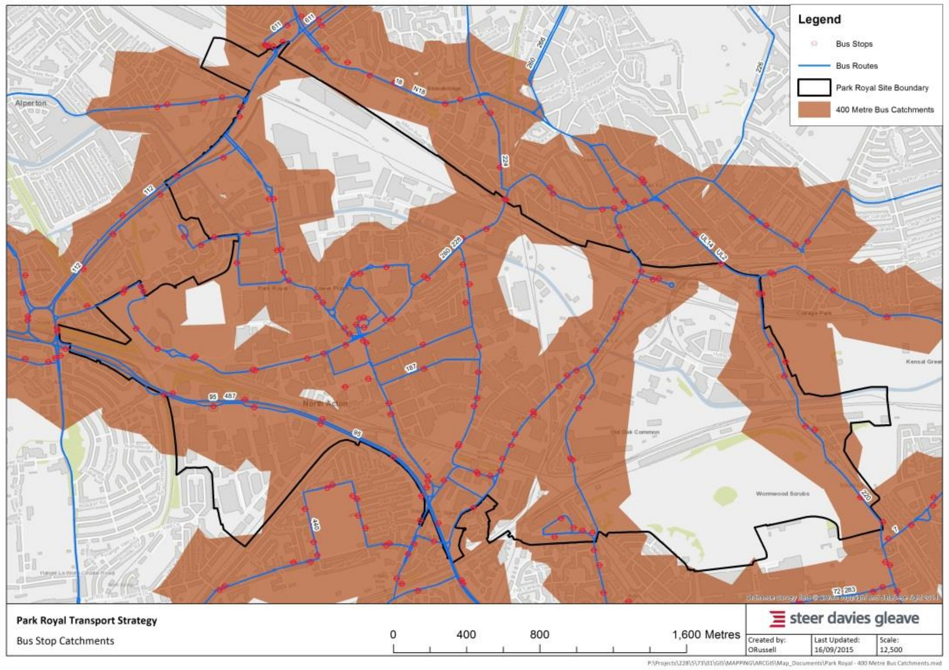
1. Major new road connections would provide additional highway capacity through Park Royal to support growth in travel demand
2. New links also likely to induce traffic demand and so may require usage restrictions to prevent congestion returning to exist levels e.g. bus, HGV and high occupancy vehicle lanes
3. Highly expensive requiring land acquisition and loss of space for employment or residential use unless built in tunnels which would further increase costs
4. At-grade roads would present further severance challenges for walking and cycling
5. Previous schemes have been considered and will be bought forward for consideration by TfL

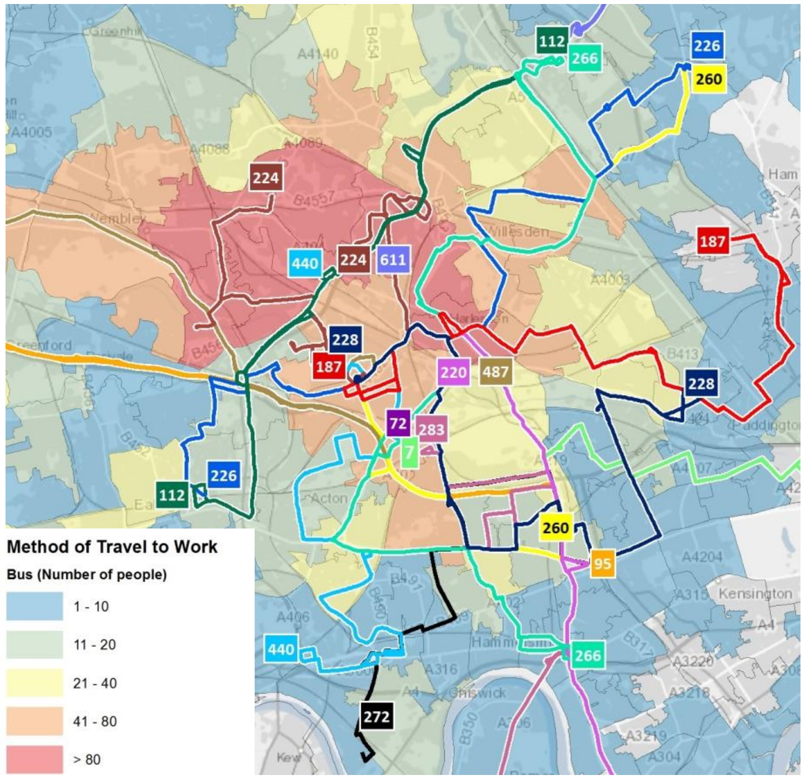
Public transport improvements options – long list for consultation

PT1	Modified bus services in the Park Royal area
PT2	Shuttle bus services
PT3	Improved station facilities

PT1: Modified bus services in the Park Royal area – Description

1. Bus travel currently accounts for 14% of journey-to-work trips in the Park Royal area
2. Route and stop coverage within Park Royal is quite good although extending services into all areas is not feasible due to road widths
3. Bus service improvements would need to focus on providing improved service to residential areas with high car mode share for journey-to-work trips to Park Royal, provided changes are financially viable
4. Connections to Old Oak also need to be given priority to take advantage of new Crossrail services, provided changes are financially viable
5. Potential to improve bus services to provide larger vehicles and / or increased frequencies. New routes and physical bus priority measures are also possible (although some of these may require parking to better managed to release road space – see DM5)
6. Bus priority on key corridors could be reviewed should DM5 (Parking Controls) identify an oversupply of on-street parking
7. Bus stop locations should be reviewed to improve catchment areas and to improve junction operations





PT1: Modified bus services in the Park Royal area – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PT1	✓✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	0	✓✓	0	Low	Medium	Medium Term

1. Bus passengers would benefit from improved connections to and from Park Royal
2. Rail and underground passengers would benefit from improved onward connections
3. Increased bus mode share would reduce congestion levels, although an increase in bus numbers may offset this slightly
4. Servicing and freight movements could occur more freely due to fewer cars on the local road network
5. Fewer cars on the road network would lower levels of air pollution
6. Continued improvement and modernisation of the bus fleet will reduce pollution over the next few years
7. Increased bus mode share would free up road capacity to permit growth
8. Potential to link new communities/suburbs to Park Royal would help create a more diverse workforce and customer base
9. Implementation is likely to be of medium cost with minimal additional infrastructure requirements (although dependent upon number of additional services and their frequency)
10. No significant risks to delivery, but risks associated with potential poor take up of new services and ongoing fleet maintenance costs
11. Should be delivered as and when employment growth in Park Royal or Old Oak occurs

PT2: Shuttle bus services – Description

1. Shuttle buses to operate between stations and centres of work within Park Royal
2. Funded by local businesses / transport group
3. Provide regular and secure connections to the stations to encourage greater rail mode share
4. Could reduce the need for additional TfL services (PT1)
5. Would require provision of sufficient bus stopping capacity in vicinity of stations
6. Could be targeted at stations that have highest footfall and rolled out further should they prove popular
7. Study required to identify final destinations for passengers within Park Royal to ensure shuttle services are routed appropriately
8. *Note: TfL used to run shuttle buses in Park Royal (PR and PR2) but services with more links proved more popular and the shuttles were withdrawn in 2007 and 2011*

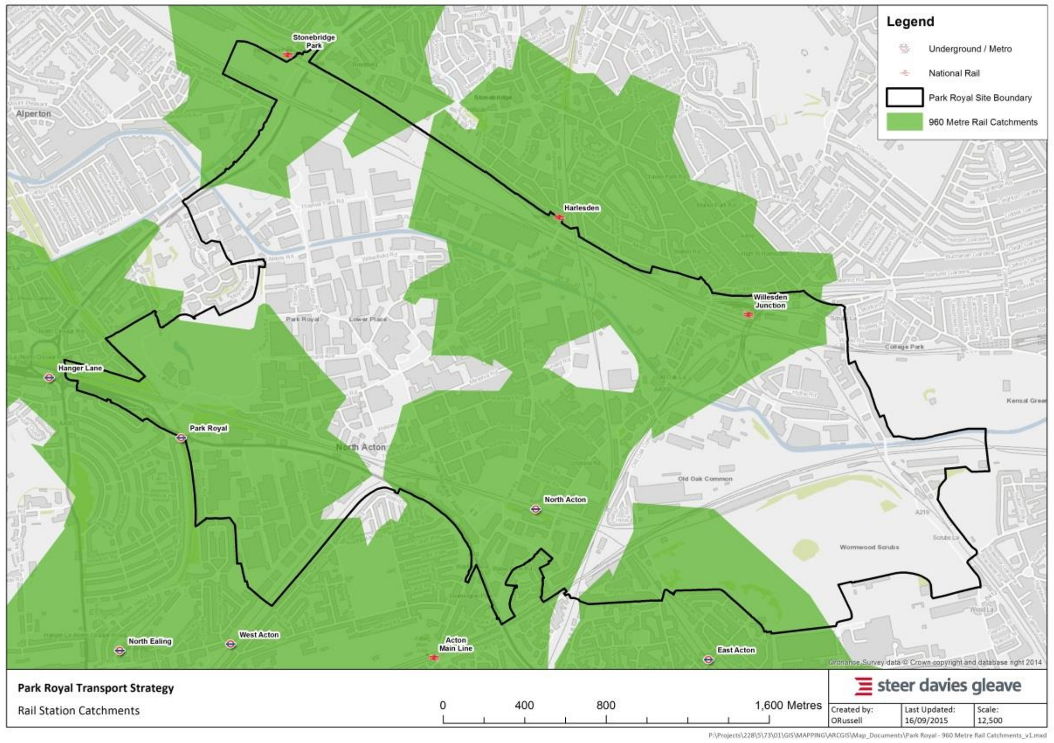
PT2: Shuttle bus services – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PT2	✓✓	✓	✓	0	✓	✓	✓	0	✓✓	0	Low	Medium	Medium Term

1. Shuttle services could complement TfL bus services and reduce the need for TfL to provide additional capacity
2. Rail and underground passengers would benefit from improved onward connections
3. Increased bus mode share would reduce congestion levels
4. Servicing and freight movements could occur more freely due to fewer cars on the local road network
5. Increased bus mode share would free up road capacity to permit growth
6. Potential to provide an innovative on-demand type service similar to Uber
7. Service could be offered as an employee benefit that would make the area more attractive to workers – particularly vulnerable/mobility impaired groups
8. Implementation is likely to be of medium cost with minimal additional infrastructure requirements, although dependent upon number of additional services and their frequency
9. No significant risks to delivery, but would require coordination of multiple businesses to fund services
10. Workforce would be given a safe and dedicated service
11. Should be delivered as and when employment growth in Park Royal or Old Oak occurs although study to understand employee needs could be implemented sooner

PT3: Improved station facilities – Description

1. Rail and Underground travel currently accounts for 25% of journey-to-work trips in Park Royal
2. Existing station facilities are of a poor standard with lack of step-free access
3. Increased rail mode share could be achieved by improving the station environment and linking these with enhanced onward connections into the heart of Park Royal (see also PT1, PT2, PT6)
4. Improved urban realm around the stations would act as an enhanced gateway to Park Royal and also create an environment more conducive to sustainable travel modes
5. Opportunities to focus investment on one or two key gateway stations may provide greatest benefit



PT3: Improved station facilities – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PT3	✓✓	✓✓	✓✓	✓	0	✓✓	✓✓	✓	✓	✓	**High**	**Medium**	**Long Term**

1. Rail and underground passengers would benefit from improved station environment and access for mobility impaired passengers
2. Increased rail mode share would reduce traffic congestion levels
3. Servicing and freight movements could occur more freely due to fewer cars on the local road network
4. Reduced cars on the road network would lower levels of air pollution
5. Increased rail mode share would free up road capacity to support growth
6. Improvement of the urban realm around stations could act as a catalyst for further growth and development
7. Likely to be of high cost with none of the stations in the vicinity of Park Royal on TfL's station improvements programme
8. No significant risks to delivery, but risks associated with short-term issues of maintaining access and capacity during construction
9. Should be delivered as and when employment growth in Park Royal or Old Oak occurs

Planning options – long list for consultation

PL1	Transport Panel
PL2	Smart management of the transport network
PL3	Improved workplace cycle facilities
PL4	Greening of corridors and placemaking
PL5	Enhance personal security to encourage walking
PL6	HGV corridors
PL7	Low emissions zone
PL8	Incentives for electric vehicles
PL9	Car club/car sharing strategy

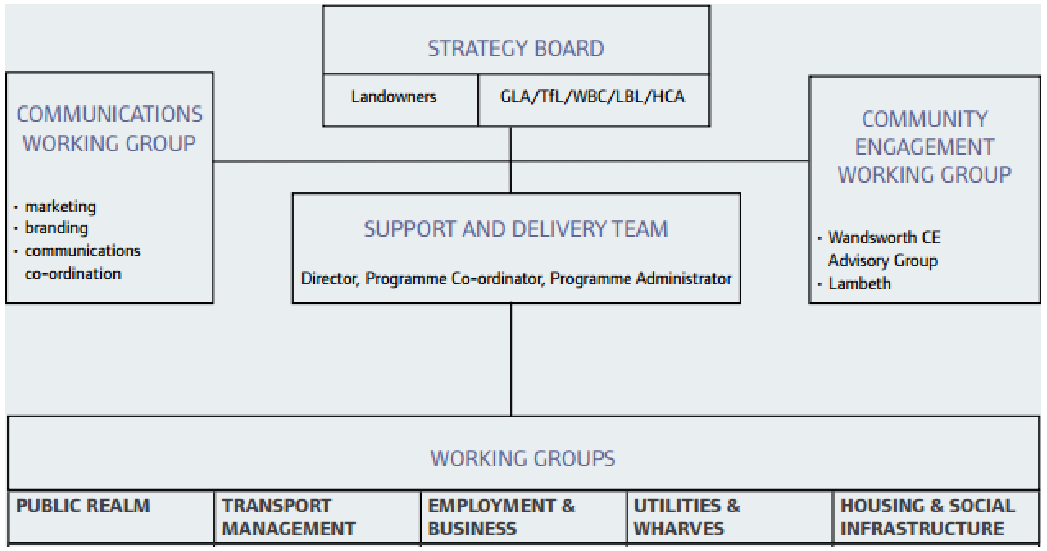
PL1: Transport Panel – Description

1. Setting up a governance structure for the delivery of the Opportunity Area Planning Framework (OAPF) has been implemented successfully in other areas such as the Vauxhall Nine Elms Battersea (VNEB) Opportunity Area (OA)
2. The governance structure should include specific working groups and panels with the role of ensuring the implementation of the main objectives and interventions
3. In the case of Park Royal it is important that a specific Transport Panel is implemented
4. A Transport Panel for Park Royal should be coordinated by the OPDC and should include the London Boroughs of Brent, Ealing and Hammersmith and Fulham, Business and Local Community Groups, TfL, GLA, LUL, Network Rail and London Overground

Case Study:

VNEB Governance Structure

- The Strategy Board has been set up to provide strategic leadership for the implementation of the framework.
- The Board is alternately chaired by the Leaders of Lambeth and Wandsworth Councils and is attended by officers of the public authorities and major landowners.
- The governance structure comprises the Strategy Board and a series of subject-specific working groups and subgroups.



Example of VNEB governance structure

PL1: Transport Panel – Assessment

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Very Low	Very Low	Short Term

1. The implementation of a Transport Panel would be a cost-effective management structure fundamental to the joined-up delivery of transport improvements throughout Park Royal
2. The existence of the Transport Panel and a framework agreement between the main stakeholders and planning authorities is also likely to give more confidence and credibility to potential funders of schemes
3. The panel could be set up in a relatively short period of time and Terms of Reference have recently been circulated between potential members
4. The Transport Panel should work towards the aims and objectives set out in the Park Royal Transport Strategy and ensure decisions and measures are swiftly implemented to facilitate growth
5. The panel would facilitate delivery of all transport measures
6. Without this group cross-borough interventions would be challenging to deliver

PL2: Smart management of the transport network– Description

1. Smart management of the transport network to maximise the efficiency of its use. Transport networks servicing Park Royal should adopt existing and future technologies that result in:
   a) Fewer servicing and freight trips;
   b) A growth in the mode share of sustainable modes;
   c) Effective management and distribution of demand across the available transport modes;
   d) A behavioural change in travellers;
   e) Improved protection for vulnerable road users;
   f) Prioritisation of high-value trips.
2. Smart management could be implemented by taking advantage of already available tools and case studies such as the FORS scheme developed by TfL (see Case Study). Also could engage local businesses and stakeholders in adopting or developing specific tools with replication and scaling potential
3. Potential to design for Automated Vehicles to streamline their integration and take advantage of capacity and efficiency benefits they provide
4. Potential to become a test bed for emerging technologies to ensure they are implemented at the earliest opportunity – for example as part of TfL's Surface Intelligent Transport System (SITS) programme

Case Study:

- The Fleet Operator Recognition Scheme (FORS) is an industry-led accreditation scheme
- Participants are expected to demonstrate they have the mechanisms to monitor and collect data and initiate actions to minimize the impacts of:
  - Fuel Use
  - Penalty Charge Notices
  - Vehicle Incidents
  - Other Infringements

PL2: Smart management of the transport network – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL2	0	✓✓	✓✓	✓✓	✓✓	✓	✓	0	✓✓	✓	Low	Medium	Medium Term

1. Collection and dissemination of data on the main modes of transport and how users travel across the area can help distribute demand across the available capacity
2. Awareness of conditions on the network at any given time can improve resilience and mitigate any planned or unplanned incidents on the network
3. This approach can foster innovation and create value if developed solutions are scalable and marketable outside of the study area
4. Planning now for future technologies will ensure they can be implemented when available
5. More advanced elements can be challenging to implement on a Park Royal scale due to cost and need to link in with London-wide systems
6. As some of the technologies available are relatively new and their capabilities are less known it might become difficult to prove their benefit

PL3: Improved workplace cycle facilities – Description

1. The provision of end-of-journey cycle facilities such as bike stands, lockers, showers as well as training and maintenance support and assistance encourage cycling uptake
2. This can be achieved through planning and development control in the case of new developments and can be encouraged through demand management strategies such as travel plans
3. These facilities would be easier to provide for larger employers and are likely to have a wider impact if associated with events and internal promotion
4. A strategy for smaller employers for providing shared facilities is also important due to the great diversity of small-size employers in Park Royal
5. Greater London Authority (GLA) research has shown that the quality of cycle parking provision and fear of cycle theft both play a significant part in a person's decision whether or not to cycle. Around 40 per cent of respondents said they would cycle more regularly if better parking was available
6. Current journey to work cycle mode share is 3%. Mayor's cycle vision aims for a 5-6% mode share consistent with potential targets for Park Royal

Case study:

- GlaxoSmithKline (GSK) chose to reduce the car parking at its worldwide headquarters in Brentford which was supplied at an annual cost of £2,000 per space and redirected the funding to improve cycle facilities for a cost of £400 a year.
- The number of staff cycling to work has increased from 50 to 450 (out of 3,600).

PL3: Improved workplace cycle facilities – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL3	✓	✓	✓	✓	0	✓✓	✓✓	✓	✓✓	0	Very Low	Low	Short Term

1. Cater for short work trips and more sustainable end of trip alternatives
2. Have a positive contribution to the environment and physical health of employees
3. Relatively low implementation costs
4. For new developments they can be implemented through PL1 and will support cycling and mode shift targets set through DM2 and DM7
5. Reductions in off-site car parking could bring down overheads and reductions in on-site car parking can free up space for more profitable uses
6. Help deliver carbon emissions targets for organisations

PL4: Greening of corridors and placemaking – Description

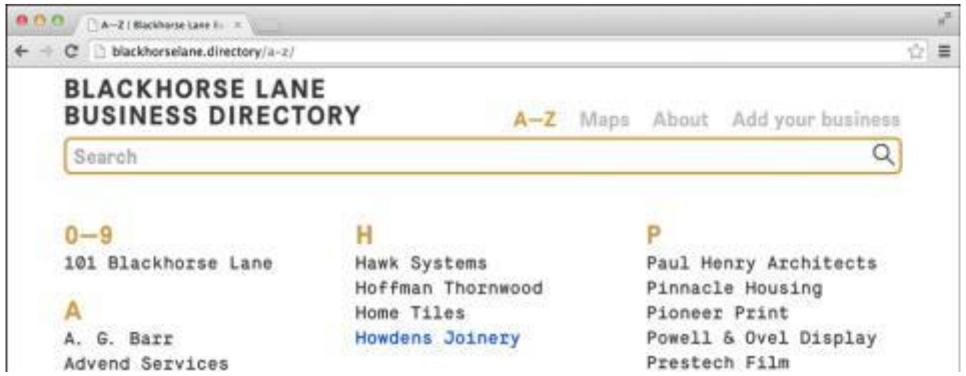
1. The creation of green routes and corridors across the study area would provide more opportunities for walking and cycling
2. The implementation of green corridors can help to:
   a) Make it easier for people to access work opportunities and other facilities and services
   b) Enhance the quality of life by providing access for people of all ages and abilities to green and open space
   c) Provide safe and secure walking and cycling routes, bringing 'dead' areas back to life
   d) Shifting some short trips from motorised modes to walking and cycling, offering alternative transport networks
   e) Provide vital links that are quiet, safe and accessible for those making local journeys
3. Use art or landmark features to ease navigation around area

Blackhorse Lane Industrial Estates Wayfinding

Blackhorse Lane Upgraded Shop fronts

Case Study:

- Blackhorse Lane in Waltham Forest
- The area is receiving £1.1m from the Outer London Fund, matched by £321,000 from the Council to support the rich local economy of manufacturing industries and high street businesses.
- Two important interventions are :
  - Upgrade of signage and frontages along Blackhorse Lane's industrial estates to develop an area-wide graphic identity to consolidate its local character
  - Create a directory of local businesses and designers and makers in the Blackhorse Lane area



PL4: Greening of corridors and placemaking – Assessment

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL4	✓✓	✓	✓	✓✓	0	✓	✓	✓✓✓	✓✓	✓✓	Low	Medium	Medium Term

1. The implementation of a series of green corridors across the area Park Royal is expected to provide more opportunities for walking and cycling as well as a better access to public transport services
2. Servicing and freight movements could be improved through improved wayfinding and reduced number of car users
3. It is expected that the quality of the environment will increase
4. Additional activity on the street and in public spaces is likely to have a positive impact on people's perception of personal security and through better design improve road safety for vulnerable users
5. Green corridors will also offer the opportunity to better integrate the Grand Union Canal with the Park Royal area and connect it to public transport stops

PL5: Enhance personal security to encourage walking – Description

1. Due to the nature of the development in the area footpaths are not generally overlooked and very few have active frontages to provide passive surveillance for pedestrians
2. Perceived personal security is further degraded by the poorly maintained urban environment and low quality connections
3. Measures to encourage personal security could be focused on physical interventions and specific design measures such as:
    1. Enhancement of lighting across the sites
    2. Additional security
    3. CCTV installation at locations of particular concern
4. Other measures that could contribute to increasing personal security and encouraging walking are related to other planning and demand management options such as PL3 and DM1

PL5: Enhance personal security to encourage walking – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL5	✓	✓	✓✓	✓	0	✓	✓	✓✓	✓✓	✓✓✓	Very Low	Low	Short Term

1. Quick and relatively inexpensive to implement
2. Contributes to improving the perception of walking and supports the implementation of other planning and demand management measures such as PL3 and DM1
3. Relatively low risk measure with wider benefits that can include reduced levels of crime and anti-social behaviour, improving the perception of the area and subsequently increasing its attractiveness and potential for growth
4. Would benefit from a collaborative approach across major businesses

PL6: HGV corridors - Description

1. Identifying a HGV corridor helps to focus movements on specific routes and free up important road space on the remaining part of the network
2. The identified corridors can be later targeted for specific safety and design improvements
3. Freight can also be prioritised on specific corridors through design interventions or traffic signals
4. Likely to be challenging to implement in Park Royal in isolation. Likely to require sub-regional coverage as a minimum
5. Opportunity to provide priority lanes (bus and HGV) during times of the day could be considered, but only with parking and loading controls (DM5) to free up carriageway space

Case Studies

A. A priority HGV and bus lane has been implemented in the VNEB OA to provide access to developments along Nine Elms Lane. It is under 100m long and is provided in the southbound direction only.

B. Another scheme has been implemented in Leeds on Pontefract Lane. This is combined with a high-occupancy vehicle lane and bus lane and it links the M1 with Leeds town centre.

PL6: HGV corridors – Assessment

RTF FUNCTIONS =>	Moving			Functioning		Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL6	✓	✓✓	✓	✓✓	✓	0	✓✓	0	0	✓	Medium	Medium	Medium Term

1. Dedicated corridors for HGV traffic could contribute to reducing congestion across the area and support the implementation of other measures such as DM2, DM3, PL6
2. Offers an opportunity for standardisation of the area-wide signage, markings and information along the identified corridors
3. Frees up road space on the remaining part of the network, opening up opportunities for improving walking, cycling and public transport
4. The approach can also have a positive impact on freight movements and servicing as traffic can be monitored more closely and schedules managed better

PL7: Low emissions zone – Description

1. The Low Emission Zone (LEZ) operates to encourage the most polluting heavy diesel vehicles driving in London to become cleaner
2. The LEZ covers most of Greater London and is in operation 24 hours a day, 365 days of the year
3. The Transport for London Road Network inside the Park Royal area are subject to LEZ charges but the remaining local roads are the responsibility of each council and they would need to agree the implementation of a LEZ in Park Royal
4. Especially for fleets and businesses operating large numbers of vehicles, such a measure will encourages fleet reorganisation to bring vehicles up to the required standards
5. The Ultra Low Emission Zone (ULEZ) in central London will encourage further improvements to HGV fleets by placing an additional charge on the more polluting vehicles – see [TfL's Ultra Low Emission Vehicle Delivery Plan on the TfL website]
6. Park Royal may indirectly benefit from the ULEZ through better air quality, as many products produced are shipped into the ULEZ
7. Potential issues with cost of compliance for smaller businesses that could not afford to upgrade their vehicles

Modelled annual mean NO2 air pollution, based on measurements made during *2010*.

Source: London Air Quality Network, Annual Pollution Maps, 2010

PL7: Low emissions zone – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL7	0	✓✓	0	0	✓✓	✓	0	✓✓	✓✓	0	Medium	High	Medium Term

1. The introduction and enforcement of low emission zone(s) would especially benefit the residential areas and would support the implementation of other measures such as PL8, PL3, DM2 and DM3
2. Would be a quick and relatively inexpensive measure to implement
3. Could impact businesses through increased operating costs
4. Would require the implementation of coordinated signage and road markings across the study area
5. Would encourage an area-wide commitment to reducing emissions and improving the quality of the environment

PL8: Incentives for electric vehicles – Description

1. Owners of electric vehicles benefit from much lower fuel costs compared to conventional vehicles
2. The UK Government offers a Plug-in Car Grant of 25% off the cost of a car (up to £5,000) and a Plug-in Van Grant of up to 20% off the cost of a van (up to £8,000)
3. Currently there is no VED (vehicle tax) to pay on electric vehicles. There is a range of tax incentives for business users
4. Electric vehicles and plug-in hybrid electric vehicles (PHEVs) which meet the criteria are eligible for a 100% discount on the Congestion Charge
5. Some London boroughs offer free or reduced-charge parking for electric vehicles

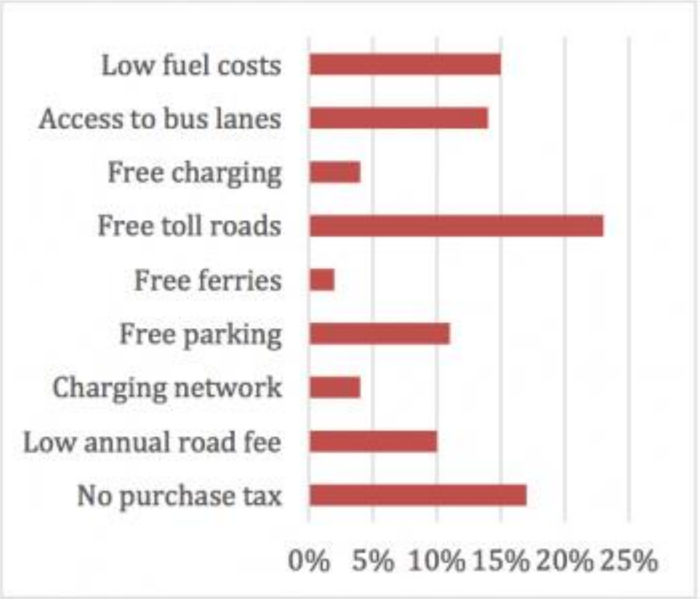


Fig 13. What are the three most important EV incentives?

Source: Clean Technica

PL8: Incentives for electric vehicles – Assessment

RTF FUNCTIONS =>	Moving		Functioning			Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL8	0	✓	0	✓	✓✓✓	✓	0	✓	✓✓	0	High	Medium	Medium Term

1. Electric vehicles have a positive impact on the local environment and are a relatively low-risk option
2. Reduced dependency on petrol-driven vehicles would protect against future increases in fuel costs
3. Where fleets can be upgraded they can also facilitate growth and innovation
4. Free or discounted parking could be provided in Park Royal for electric vehicles

PL9: Car club/car sharing strategy – Description

Car Clubs

1. Provide access to a car, without the need to own a car
2. Cars are available to the public and businesses, booked by the hour online and accessed using a smartcard or mobile phone app
3. Cars are provided by private companies, and are typically parked in dedicated bays
4. Costs to the Local Authority/developer are limited to providing on-street bays and signage
5. Currently 155,000 Londoners use car clubs
6. 50% of Londoners now live within a five minute walk of a car club car
7. The 2015 car club strategy (developed by a car club coalition in partnership with TfL) sets out targets to grow the membership of car clubs to 1,000,000 members by 2020

Car Sharing

1. Provides efficient use of cars for specific trips, such as commuting
2. Individuals share their journeys with others, often facilitated by their employer
3. Car sharing would be encouraged by employers by providing preferred parking provision or similar

PL9: Car club/car sharing strategy – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
PL9	0	✓✓	0	✓	✓✓	✓	✓	✓	✓✓	0	Very Low	Low	Medium Term

Through the Transport Working Group a combination of car clubs and car sharing schemes would be developed to increase uptake and harness the potential of both Car Club and Car Sharing schemes.

Car Clubs

1. Car club members use public transport more than average, as use of a car club vehicle encourages mode choice on a trip-by-trip basis
2. Benefits to the local neighbourhood include:
    1. Lower levels of car ownership and associated parking issues. Only 20% of long-term members now own a car, compared to almost half owning a car before joining a car club
    2. Lower levels of local road congestion. Car club members on average drive less after joining a car club
    3. Lower levels of air pollution. Car club cars are cleaner and have lower emissions than the national fleet
    4. Car club cars are used by more people with an average occupancy of 2.3 people compared to 1.6 people for private cars

Car Sharing

3. Car sharing car reduce levels of congestion and vehicle emissions, particular during peak commuting hours
4. Car sharing can reduce levels of parking required at workplaces and can be incentivised through priority parking bays

Demand management options – long list for consultation

DM1	Development control strategy
DM2	Travel plans
DM3	Delivery and service plans
DM4	Freight consolidation
DM5	Parking and loading controls
DM6	Waterborne freight movements
DM7	Mode share targets
DM8	Rail freight

DM1: Development control strategy – Description

1. Development control is an efficient way to manage travel demand for future developments
2. It includes measures such as:
   a) parking standards
   b) servicing and delivery requirements
   c) provision for cycle and walking including investment in good connections with the public transport network
3. Due to the various development policies across the area there is the opportunity to integrate the planning and development control strategy under the umbrella of the OPDC, with the local authorities as major stakeholders and enforcement authorities
4. The OAPF provides this integrated strategy to allow area-wide development to occur more swiftly and ensure clear policies and standards are applied across the area
5. The OAPF was adopted by the Mayor of London on 4 November 2015

DM1: Development control strategy – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM1	✓✓	✓✓	0	✓✓	0	✓✓	✓✓	✓	✓	✓	Low	Very Low	Short Term

1. Strategic document ensuring the prioritisation and investment in infrastructure to support sustainable modes of transport
2. Delivers change through influencing or incentivising third parties to undertake specific activities rather than delivering infrastructure directly
3. Promotes investment and provision of public realm improvements
4. Requires consideration of servicing needs from the onset and (depending on the size and type of development) requires demand management measures to be binding commitments through the planning process
5. Through the promotion of environmental and human-scale design, strategies can provide for improvements to the environment and indirectly support healthier travel and lifestyle choices
6. Safety and personal security can also be promoted at the planning stage by encouraging designs and uses that activate the streets, provide natural surveillance and traffic calming
7. The costs and timescale of adopting an overarching development control strategy are medium considering that the local authorities already have a planning framework
8. The risks are relatively low whilst a dedicated development control strategy for the area would bring substantial benefits and further facilitate development

DM2: Travel plans – Description

1. Characteristics of travel plans:
   a) Long-term management strategy to encourage sustainable travel for new and existing developments
   b) Normally funded by employer, with surveys and update required every 2-3 years
   c) Sets out transport impacts, establishes targets and identifies a package of measures to encourage sustainable travel.
   d) Requires ownership, monitoring and enforcement together with selected/self-appointed champions
   e) Tools such as iTRACE (development and monitoring) and ATTrBuTE (assessment) are available online and support implementation
   f) Can be developed individually or as a framework for an entire estate or area
2. Benefits of travel planning:
   a) Less congestion and therefore improved safety on local roads by promoting alternatives to the car
   b) Reduced highway capacity problems by promoting sustainable travel choices
   c) Local environmental improvements from reduced congestion, carbon emissions, pollution and noise
   d) Make the site more attractive to potential occupiers/users
   e) Increased opportunities for active healthy travel, such as walking and cycling
   f) Reduced demand for parking spaces enabling land to be put to more cost-effective or commercially beneficial use and freeing space for active travel initiatives
   g) Increased opportunities for employers to feed into corporate social responsibility or sustainability initiatives

Case Study:

- Golden Mile Transport Group (GMTG)
- Initiatives developed and promoted under the GMTG umbrella:
  - Golden Mile Transport Forum
  - Golden Mile Website
  - Real-time travel map
  - Business Engagement
  - Awareness Events
  - Golden Mile Pool Bike Scheme

DM2: Travel plans – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM2	✓	✓✓	✓	✓	✓	✓	✓	0	✓✓	✓	Very Low	Low	Short Term

1. Travel Plans:
   a) Are a cost-effective tool to encourage and deliver change in mode share and travel behaviour
   b) Represent a tool for enhancing stakeholder collaboration
   c) Distribute and enhance ownership of travel demand management for an area
   d) Champion small-scale initiatives and allow for scaling up
   e) Increase the exchange of information, ideas and good practice reducing costs and improving business efficiency
   f) Achieve greater economies of scale by integrating services and pooling resources
   g) Enable smaller organisations to benefit from the support and expertise of larger ones

DM3: Delivery and service plans – Description

1. A Delivery and Servicing Plan (DSP) establishes a framework for the effective management of freight vehicle activity and is usually agreed by groups of businesses rather than being imposed by local authorities
2. It includes measures such as:
   a) Implementing a delivery booking system
   b) Moving deliveries outside of peak, or normal working hours
   c) Reducing the time spent on-site by suppliers
   d) Reducing delivery, servicing and collection frequencies
   e) Establishing a centralised ordering system
   f) Reducing or consolidate the number of suppliers
3. As well as benefiting participating organisations, a DSP has advantages for suppliers and the local community by:
   a) Saving time and money by reducing the number of illegal and unsafe loading and unloading activities
   b) Reducing the environmental impact
   c) Improving the safety of delivery and servicing activity
   d) Cutting congestion in the local area
   e) Ensuring business continuity in case of disruptions or planned events
   f) Reducing trips, particularly during peak hours,
   g) Improving customer service and delivery times,
   h) Adhering to best practices (Fleet Operator Recognition Scheme (FORS))

Case Study:

- Inmidtown Business Improvement District (BID)
- More than 220 companies located in the Holborn area are using a free waste collection service operated by inmidtown BID. This has led to one electric vehicle replacing 85 waste collection vehicles

DM3

DM3: Delivery and service plans – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM3	✓	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Very Low	Low	Short Term

1. DSPs are a cost-effective tool to manage servicing and delivery with real potential for trip reduction especially during peak hours
2. A DSP can:
   a) contribute to reducing CO2 emissions, congestion and collisions
   b) Save time and money for both local businesses and their customers
   c) Reduce the environmental impact of the organisations involved
   d) Improve the safety of delivery and servicing activity across the site by adhering to standards and schemes such as FORS

DM4: Freight consolidation – Description

1. There are various forms of freight consolidation usually agreed by groups of businesses rather than being imposed by local authorities:
   a) Use of one or more satellite consolidation sites to provide a central point for deliveries for a single business or group of businesses in a given area. The number of trips to the site itself is reduced, as deliveries are consolidated and made by one or two vehicles throughout the day.
   b) Use of a supplier that offers a consolidated service means that servicing trips required for a business can be reduced if a supplier can pick-up multiple types of waste and recycling items from a single business / businesses at the same time.
   c) Consolidation of deliveries to a single business through better management of vehicle capacity (ensuring vehicles are fully loaded) or use of larger vehicles.
2. Benefits of freight consolidation include:
   a) A reduction in freight / delivery and servicing vehicle trips, particularly during peak hours
   b) A reduction in CO_2 emissions and improvement in local air quality
   c) A reduction in congestion and collisions
   d) More cost effective operations through:
      i. use of off-site storage capacity (allows more productive use of on-site space)
      ii. time and money savings associated with managing a single supplier (e.g. if a supplier offering a consolidation service is used)
      iii. potential cost savings if a consolidation service is negotiated by an area-wide partnership instead of on a business-by-business basis.

Case Study(s):

- Regent Street – Consolidation and collaboration
- Inmidtown (central London Business Improvement District)
  - daily essentials consolidation (pilot)
  - waste and recycling consolidation.


Transport for London

Regent Street –
Consolidation and collaboration

DM4

DM4: Freight consolidation – Assessment

RTF FUNCTIONS =>	Moving		Functioning			Unlocking		Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM4	0	✓✓	✓	✓✓	✓	✓	✓✓	0	0	✓	Medium	Medium	Short Term

1. The implementation of a freight consolidation strategy would have direct positive impacts servicing and freight movements across the area
2. Consolidation is also expected to have a positive impact on reducing congestion by reducing the number of servicing and delivery vehicles on the road network
3. Fewer freight movements are also expected to have a positive impact on the quality of the environment
4. The costs and risk of implementation are considered relatively low although, due to the diversity of businesses and their specific requirements, consolidation might be achievable only for limited services
5. The diversity of business uses also offers an opportunity for innovative methods to be tested
6. Will require identification of a suitable holding area for vehicles

DM5: Parking and loading controls – Description

1. Parking and Loading controls are usually managed and enforced by local councils
2. Differences between neighbouring authorities in the area can result in confusion and enforcement issues along the boundary
3. Unmanaged loading and delivery activity can create congestion, harm road network performance and reduce the effectiveness of traffic engineering schemes (e.g. bus priority measures)
4. Integrated, cross-borough signage, parking and loading restrictions and Controlled Parking Zones (CPZ) can reduce confusion and facilitate enforcement
5. Facilitating kerbside loading smooths traffic flows and benefits the local economy by reducing the need for informal activities in inappropriate locations
6. Managing parking and loading/unloading activities can also improve walking and cycling routes by clearing important kerbside and road space and limiting user conflict
7. A detailed parking assessment needs to be undertaken across the area to record the levels of usage and needs of businesses

On-site evidence of parking limiting footway space and dominating the street environment

DM5

DM5: Parking and loading controls – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM5	0	✓✓	✓✓	✓✓	0	✓	✓	✓✓	✓✓	✓	Very Low	Medium	Short Term

1. In the case of Park Royal there are three London Borough boundaries meeting in the area and, as a consequence, the parking and loading controls tend to be more difficult to enforce
2. Improved formalised parking and loading could be designed to better protect cyclists
3. There is already controlled parking in the LB Ealing's area but no permits are required and there is only a fixed daily charge
4. The road capacity is often reduced by delivery vehicles and parked cars
5. Site visit and interviews with local businesses reveal the need for more parking and loading controls and enforcement to ensure efficient functioning of the area
6. This may impact some businesses e.g. car repair garages, that park vehicles on the highway requiring close consultation during the development of a scheme

DM6: Waterborne freight movements – Description

1. Movement of freight by water can be more efficient and environmentally sustainable than road freight
2. Major development sites across London have used the River Thames and other waterways to transport materials and waste e.g. Northern Line Extension
3. According to the Port of London Authority over five million tonnes of freight were transported on the Thames in 2013 which reduced road traffic in the city by 265,000 lorry movements a year
4. TfL included in its post-Games strategy the aim of developing a water freight planning tool to help increase understanding of London’s waterways as a viable mode for freight
5. The Grand Union Canal runs through the area on a straight alignment with few locks. This provides potential for a waterborne freight route. Powerday have an operational freight wharf facility nearby.


On-site evidence of low utilisation of the canal.

Increased freight activity could create opportunities for wider improvements on the canal and support investments in walking and cycling

Case Study:

- Grand Union Canal - Aggregates
- A case study by the Commercial Boat Operators Association (CBOA) shows how 450,000 tonnes of aggregate was moved via the Grand Union Canal from a gravel pit to a canalside concrete-making plant near West Drayton.
- The use of the canal has avoided approximately 6,000 road lorry movements each year.

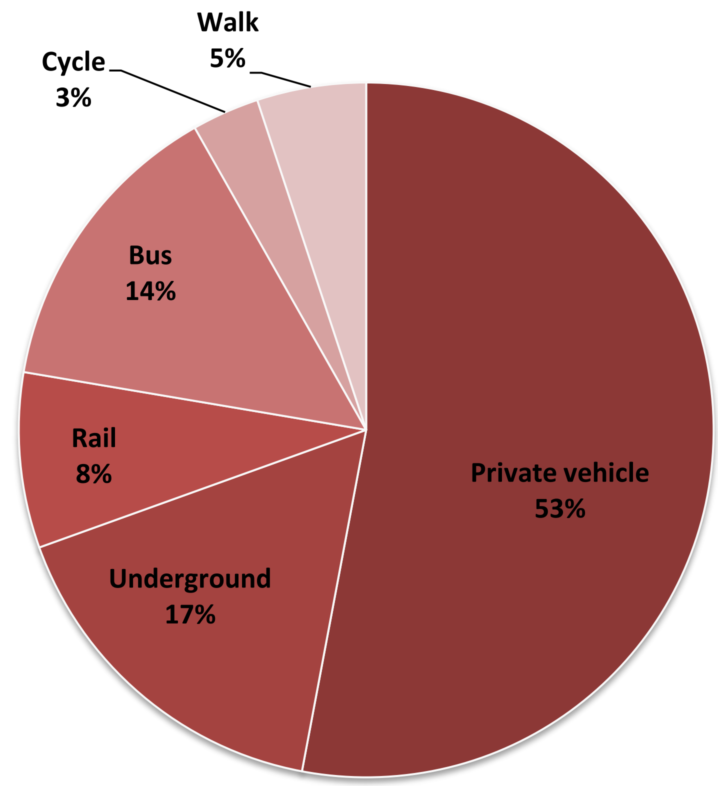
DM6: Waterborne freight movements – Assessment

	Moving		Functioning			Unlocking		Living	Sustaining	Protecting	Deliverability		
RTF FUNCTIONS =>													
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM6	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓	0	✓✓	Medium	High	Long Term

1. The Grand Union Canal cuts right through the middle of Park Royal and it is a generally on underutilised piece of infrastructure
2. The canal has great potential to reduce freight movements by road and associated externalities such as road congestion, pollution and limited road capacity, especially as part of a wider delivery and servicing strategy for the area
3. The canal has the potential to provide links to other sites along the Grand Union Canal, such as to regeneration areas and transport hubs in central and east London - opening up new connections for the businesses that operate within this geographic area
4. This is in line with strategic aspirations to further utilise the waterways for transportation and movement in London
5. Requires investment in wharf facilities, appropriate vessels and recruitment/training of operators and represents a long-term solution that will need to follow the London-wide/national lead
6. Challenges are associated with constructing sufficient wharf facilities with adequate onward connections, whilst keeping costs of transport comparable to road/rail

DM7: Mode share targets – Description

1. The current mode share of journeys to work is heavily dominated by private vehicle (53%)
2. Although accessible by three Underground stations and also Overground services, only 25% of the trips are made by Underground and rail
3. This low public transport mode share is also a consequence of the poor walking and cycling conditions across the area and the limited enforcement of parking restrictions
4. With the expected future growth in both employment and residential uses it will be important to manage travel demand in order to achieve a reduction in the car mode split
5. The mode share targets can be delivered through framework agreements and strategies agreed between employers and the planning authority (e.g. travel plans)
6. Potential targets are provided and the level of change will depend on the package of interventions that is implemented. The suggested 8% reduction in the mode split for private vehicles is consistent with maintaining the same approximate total number of car trips into the Park Royal area even with the predicted growth in employment and population i.e. the reduction in car trips due to existing employees moving to more sustainable modes is balanced by new employees, some of whom will travel by car.



Existing Travel to Work Mode Split

Source: Census 2011

Mode	Existing	Target	Expected Change
Private Vehicle	53%	45%	-8%
Walk	5%	6%	1%
Underground	17%	19%	2%
Rail	8%	9%	1%
Bus	14%	16%	2%
Cycle	3%	5%	2%
TOTAL	**100%**	**100%**	**0%**

DM7: Mode share targets – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM7	✓	✓✓✓	✓✓	0	✓	✓	✓	✓	✓✓	✓	Very Low	Medium	Long Term

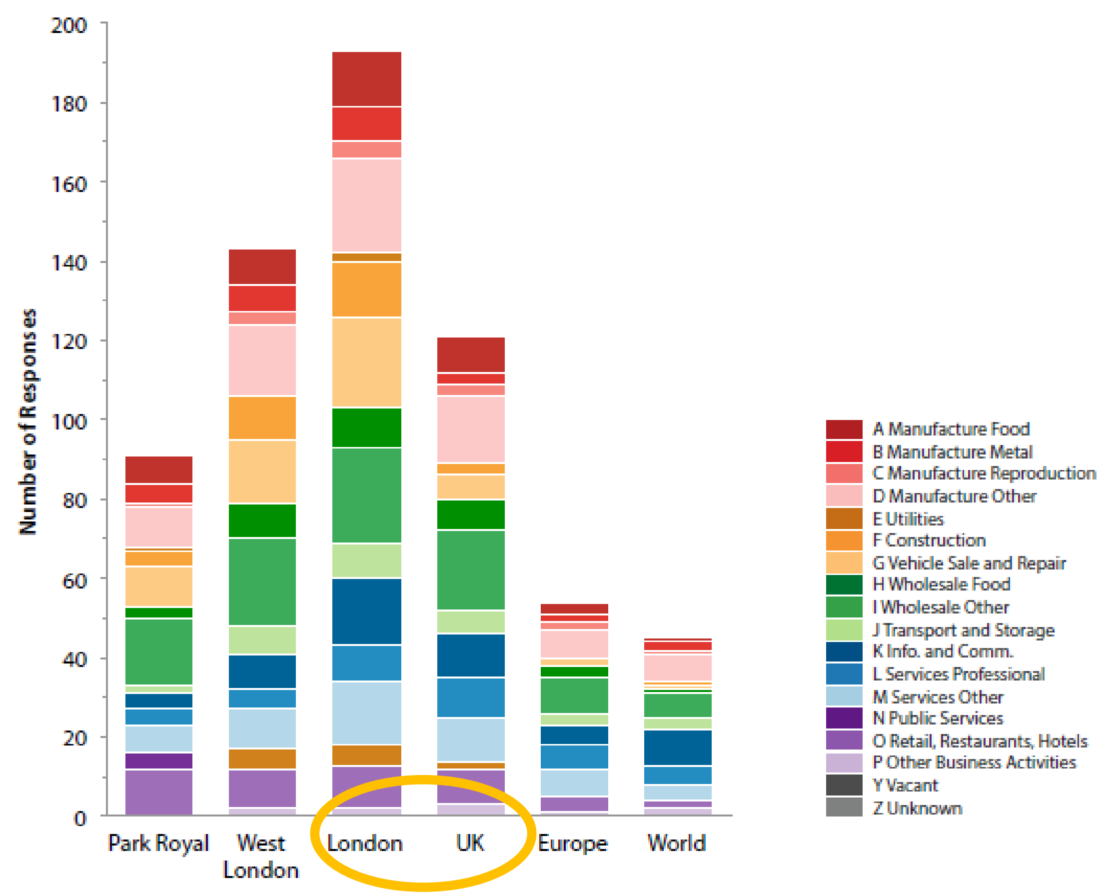
1. With the local road junctions already congested at peak times, the future employment and residential developments in Park Royal will put additional pressure on the road network
2. The current mode share for private car use is unsustainable and a reduction in vehicle traffic is required
3. The targets will ensure all stakeholders engage towards achieving the same goals and look for common solutions of addressing the problems
4. Demand management, enforcement and also improvements to the walking and cycling infrastructure are all feasible measures that could contribute to achieving a more balanced and sustainable mode share
5. The current mode share also shows that the existing public transport connections are not being used to their full potential

DM8: Rail freight – Description

1. The latest London Freight Data Update (TfL, 2014) shows that in 2012 rail was the third most used mode for freight after road and water, carrying 6.7 million tonnes of freight within London
2. The greatest inward flows to London in 2012 by weight came from the South West and East Midlands (together accounting for 68 % of goods transported by rail and unloaded at terminals in London)
3. For goods loaded onto rail in London, approximately 40% was moved to the South East and a further 35% was intra-London traffic
4. Park Royal is located in close proximity to the North and West London Lines and Dudding Hill Line with established freight facilities at Willesden Junction. The proposed future investments will create opportunities for more capacity and freight links to be created at the Old Oak Common site
5. Further assessment of the impact on rail capacity is required

fig. 53 Customer Locations

Interviewed workplaces only (14%)



Source: The Park Royal Atlas (May, 2014)

DM8: Rail freight – Assessment

RTF FUNCTIONS =>	Moving		Functioning		Unlocking			Living	Sustaining	Protecting	Deliverability		
PRTS OBJECTIVES =>	CONNECTING	MITIGATING	OPTIMISING	SUPPORTING	INNOVATING	FACILITATING (HOMES)	FACILITATING (EMPLOYMENT)	ENHANCING	SUSTAINING	PROTECTING	COST	DIFFICULTY	TIMESCALE
DM8	✓✓	✓✓	✓	✓✓	0	✓	✓✓	✓	0	✓	Medium	Medium	Long Term

1. With a high proportion of their customers located in London and the UK, improved freight rail connections to and from Park Royal could help businesses reach their customers within the wider London and UK markets
2. Rail freight connections have great potential to reduce road freight movements and associated externalities such as road congestion and pollution, especially as part of a wider delivery and servicing strategy for the area
3. Rail freight has the potential to provide links to other sites such as regeneration areas and transport hubs in central and east London - opening up new connections for the businesses that operate within this geographic area
4. Requires investment in rail connection and facilities but could fall under the umbrella of the already proposed connections at Old Oak

steer davies gleave

Park Royal Transport Strategy - Modelling Report

Report
January 2016

Transport for London / OPDC

Our ref: 22857301
Client ref: Task 15

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1 Introduction

1.1 This report forms part of the Park Royal Transport Strategy (PRTS), which in turn forms a supporting consultation document to the Old Oak and Park Royal Development Corporation (OPDC) draft Local Plan for the Old Oak and Park Royal Opportunity Area (OA). This report covers the detail of the highway modelling exercise conducted to understand the level of increase in demand and its impact on the highway network.

1.2 The SATURN West London Highway Assignment Model (WeLHAM) developed by TfL has been used to assess these impacts . The model provided covers the West London area in detail which includes the study area and therefore provides an appropriate basis for the strategic assessment of traffic interventions and the operational effects.

1.3 The purpose of this Highway Modelling Report is to provide an overview of the model development. This includes the recalibration process that has been undertaken in the Park Royal area to ensure that the model reflects the existing traffic levels and congestion. The development of the future year model is also discussed, which has been used to understand the operation of the highway network during construction and operation of High Speed 2 (HS2) and the associated completion of developments in the Opportunity Area.

1.4 TfL provided Steer Davies Gleave with a 2012 base year WeLHAM model that had been further developed as part of the HS2 study to improve the local calibration. This is an interim WeLHAM (p3) model as model validation work is still being undertaken by TfL, with the AM peak more advanced than PM peak. The approach to the model development has been to improve the model in the study area while maintaining the wider calibration model standards. The model development undertaken to produce this is the "HS2 WeLHAM OOC Baseline Model Performance Report" produced by Mott Macdonald on behalf of HS2 Ltd[1].

1.5 In addition future AM and PM peak scenario models were provided by TfL for the following years:

- 2021 (HS2 Construction Scenario)
- 2026 (HS2 year of opening)
- 2041 (Full OA build out)

[1] HS2 WeLHAM OOC Baseline Model Performance Report, Mott MacDonald, 2013

Project Study Area

1.6 The main project study area is represented by the OA as shown in Figure 1.1. Within this area a detailed review of the network and demand was undertaken, and a local calibration undertaken focused on improving the models representation of the observed data within this area.

Report Structure

1.7 The report is Structured as follows:

- Chapter 2– Initial Model Review: Describes our review of the existing model (Interim P3 WeLHAM Model)
- Chapter 3 – Revised Base Model Development: Describes the improvements made to the model and the final calibration statistics.
- Chapter 4 – Forecast Year Model Development

1.8 The model has been developed in line with TfL's "Sub-regional Highway Assignment Model Guidance on Model Use Version 1.1" and using TfL's "Planning Strategic Analysis Sub-Regional Highway Assignment Model Application Model Auditing Process (HAM-MAP)". The completed HAM-MAP can be found in Appendix A of this report.

Figure 1.1: Project Area

2 Initial Model Review

2.1 This chapter describes the review of the existing model and is separated into two sections

- Base Year Adequacy Assessment – this is largely focused on auditing and updating the network coding in the local area, but also includes some sense checks of the traffic assignment.
- Local Model Validation Checks – Assessing the model against observed data, particularly focused on the Park Royal area.

Base Year Adequacy Assessment

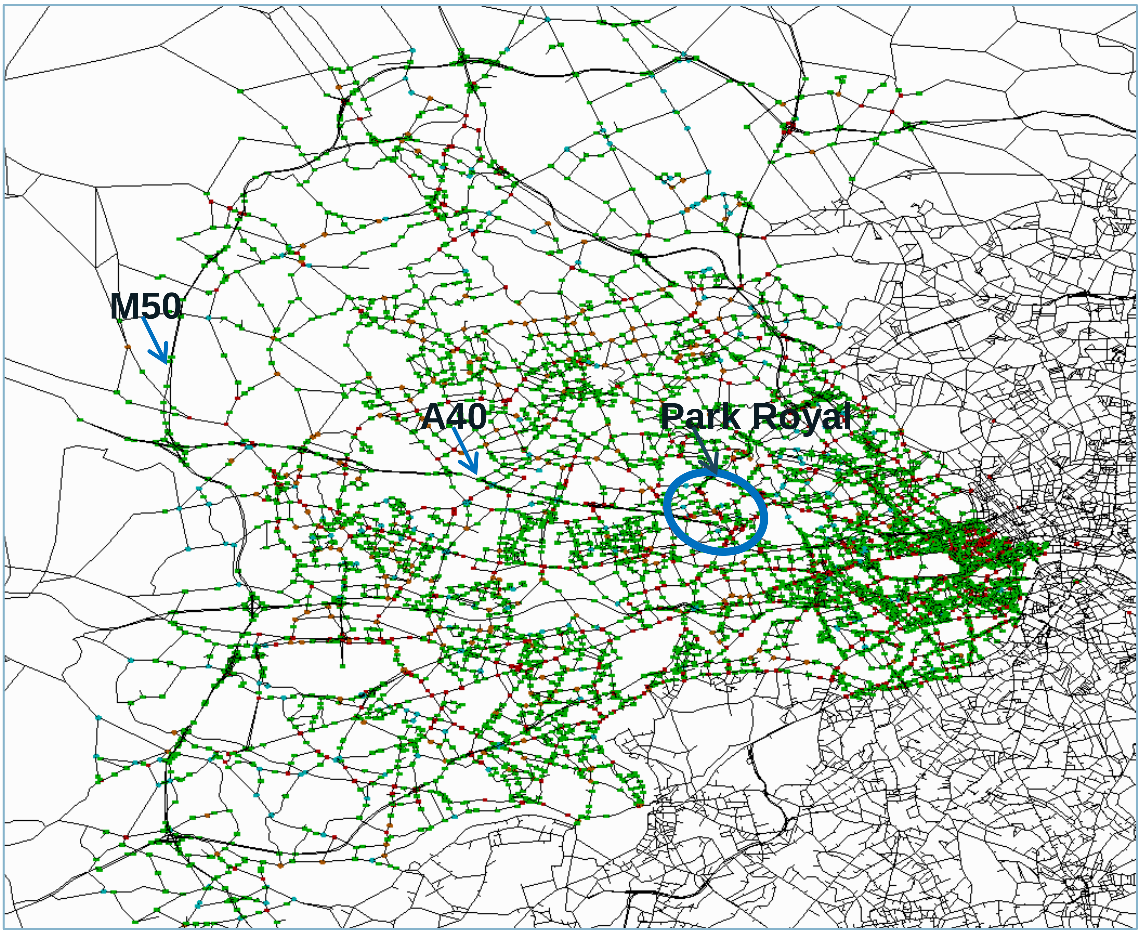
Network Review

2.2 This section details the network review undertaken of the model provided for the study. The model was an interim version of the 2012 WeLHAM P3 model which had been developed as part of the Old Oak Common HS2 study. The model has been updated for the AM and PM peak periods.

Model Network Coverage

2.3 The WeLHAM network covers the whole of London in detail, with a skeleton network extending to cover the UK. It has a detailed modelled area covering West London (Figure 2.1 showing the extent of this coverage), with nodes coloured other than grey forming the WeLHAM simulation network where junctions are modelled in detail. The study area network (which was reviewed and updated as part of this study) is highlighted in blue, with the study area located well within the “core” WeLHAM area.

Figure 2.1: WeLHAM Simulation Area



Local Network Review

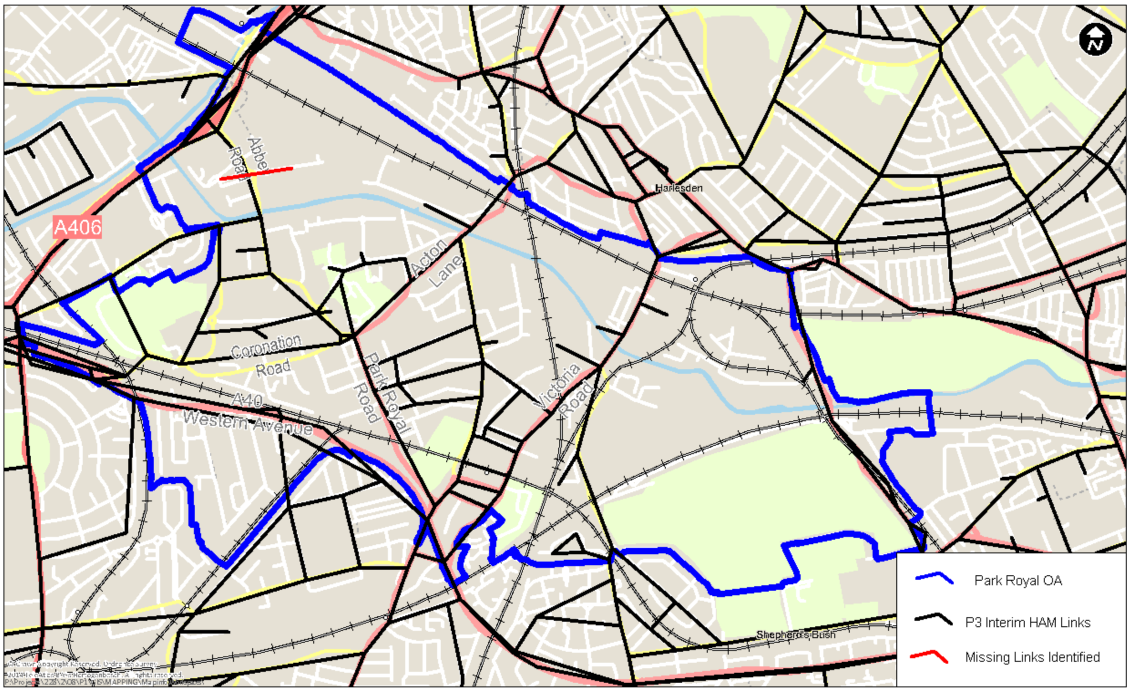
2.4 Having verified that the Park Royal study area is well within the WeLHAM detailed modelled area we then focused on reviewing the network in the Park Royal study area. The project study area is represented by the OA as shown in **Error! Reference source not found.** Within this area a detailed review of the network and demand was undertaken.

Figure 2.2: Project Area

Network Coverage

2.5 The network within the study area was reviewed to confirm the inclusion of all significant roads and junctions. Figure 2.2 below shows the WeLHAM network in the Park Royal Area with the black lines representing the model links. All key links in the Park Royal Area are included as well as a number of access points to load the traffic onto the network from the zone connectors.

Figure 2.3: HAM Network Links in the Study Area



2.6 The only new links added into the model are to represent Premier Park Road highlighted in red in Figure 2.3 above. The Roundabout connecting Abbey Road and Premier Park Road was not coded into model. This junction is important in the context of the study as queues often build up at this junction during the peak hours. New links were therefore added into the model to represent Premier Park Road and new centroid connectors to the surrounding zones so that the roundabout could be correctly represented.

Updates to Existing Junction Coding

2.7 A detailed check of all junctions on the key roads within the study area was undertaken. This was to verify that the junction types and lane allocations were correct. Spot checks of saturation flows and signal setting were done to ensure that these were plausible. The roads where the detailed junction checks were undertaken are:

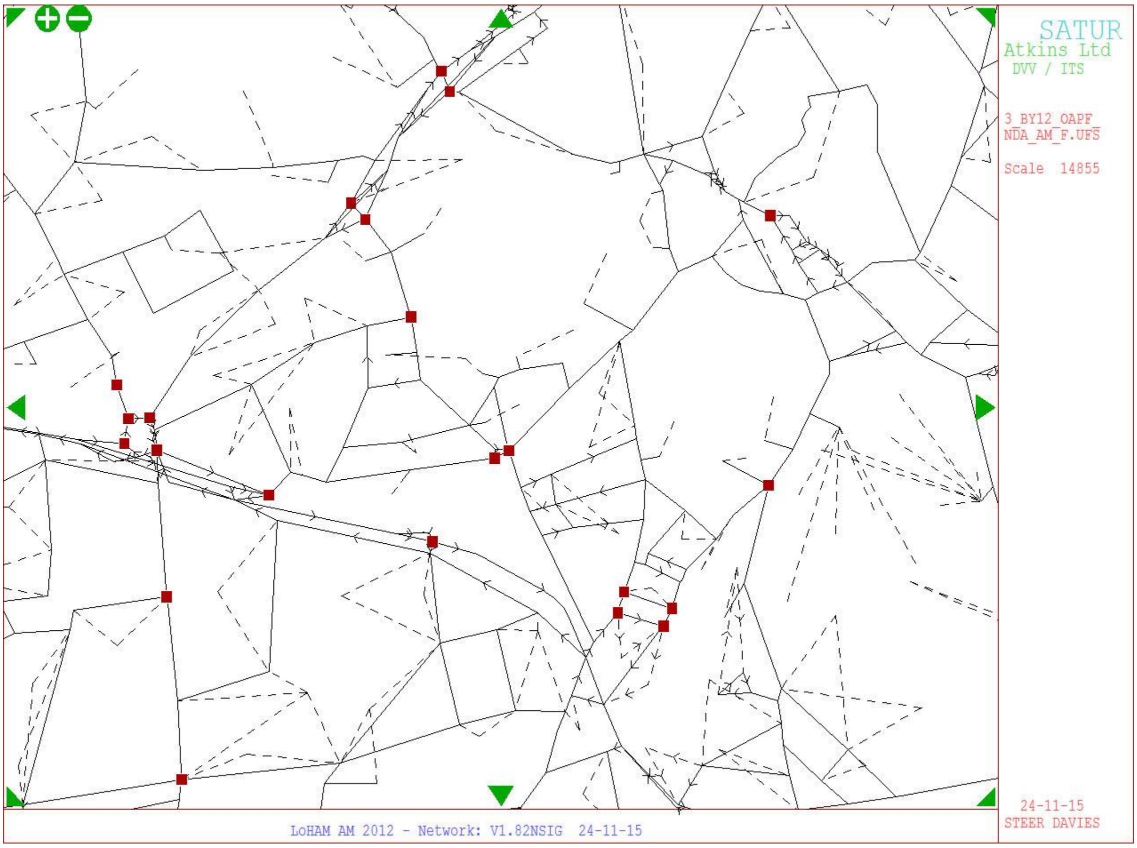
- Abbey Road
- Acton Lane
- Chase Road
- Coronation Road
- Park Royal Road
- Twyford Abbey Road
- Victoria Road
- A406 North Circular

- A40

Signal Junctions

2.8 TfL's Planning Team provided 2012 observed signal information recently collated as part of the London wide Highway Assignment Model (LoHAM) refresh. Using this data the signal phases and timings in the study area were updated. Figure 2.4 below displays all the junctions that were updated as a result of this process.

Figure 2.4: Junctions with Updated Signal Timings and Phasing



Incorporation of Missing Signalised Nodes

2.9 The observed signal data was also used to identify missing signal junctions in the network. This identified a number of pelican crossings in and around the study area. Figure 2.5 and Table 2.1 shows the new junctions coded into the model. The initial model's journey time was quicker than the observed data and incorporating these pelican crossings improved this comparison.

Figure 2.5: New Pelican Crossings and Signalised Junctions

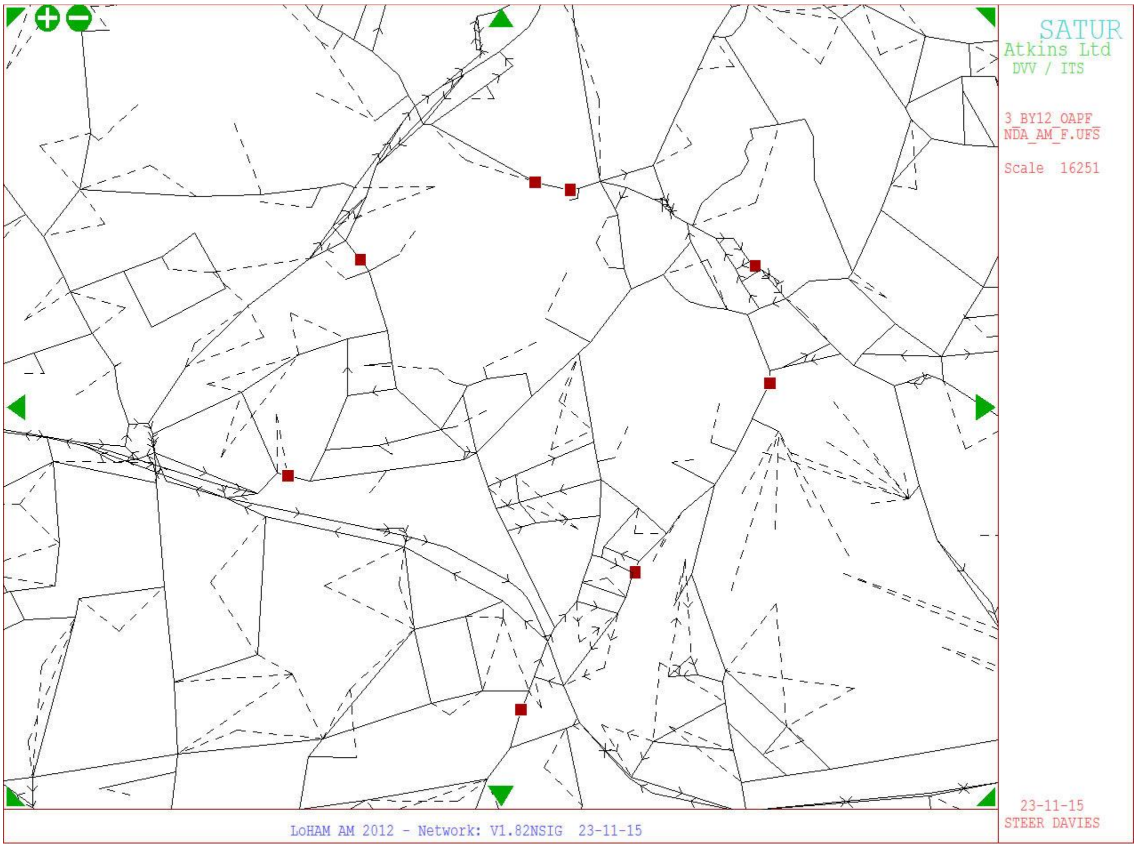


Table 2.1: New Nodes Included to Represent Pelican Crossings or Signalised Junctions

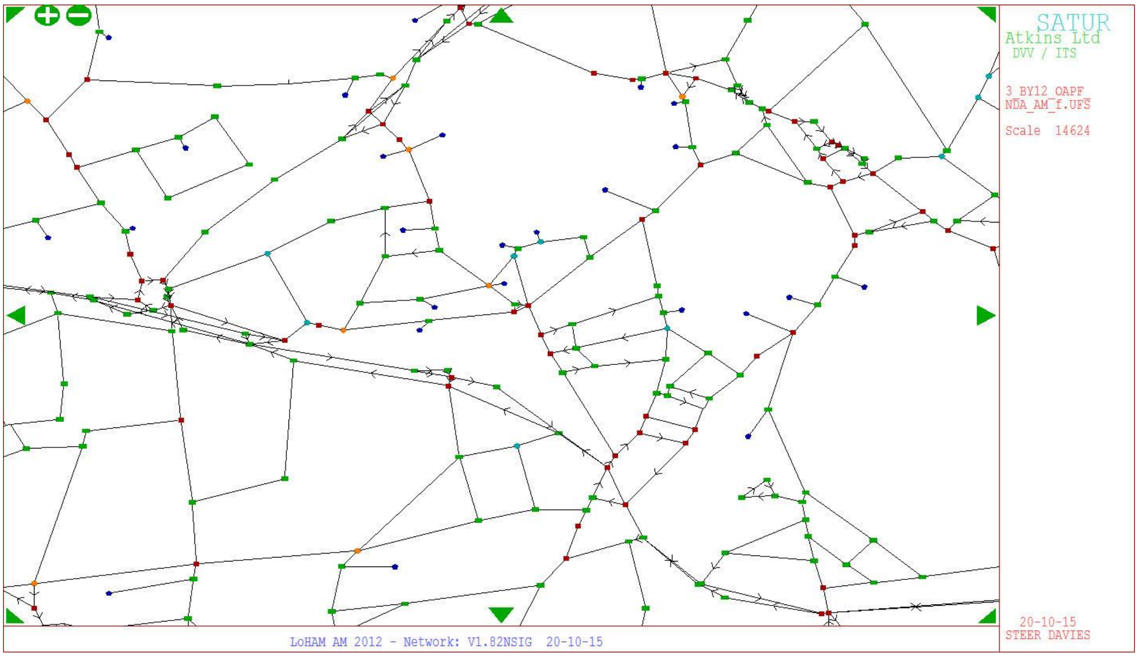
New node	Description
64685	Pelican crossing on Victoria Road near Bethune Road
64695	Pelican crossing on Horn Lane near Noel Road
66579	Pelican crossing on Hillside near Wesley Road
66580	Pelican crossing on Hillside near Hilltop Avenue
66587	Pelican crossing on Old Oak Lane near Station Approach
66588	Pelican crossing on Manor Park Road near Tavistock Road
66613	Pelican crossing on Coronation Road near Lakeside Drive
66666	Abbey Road and Bestway access signalised junction

Updated Modelled Network

2.10 The final modelled network following completion of these changes is shown below with the following colours representing different node types:

Node Colour	Junction Type
Green	Priority controlled junction
Light blue	Roundabout (no U-Turns)
Yellow	Roundabout (U-turns permitted)
Red	Traffic Signals
Dark Blue	External node/zone connection

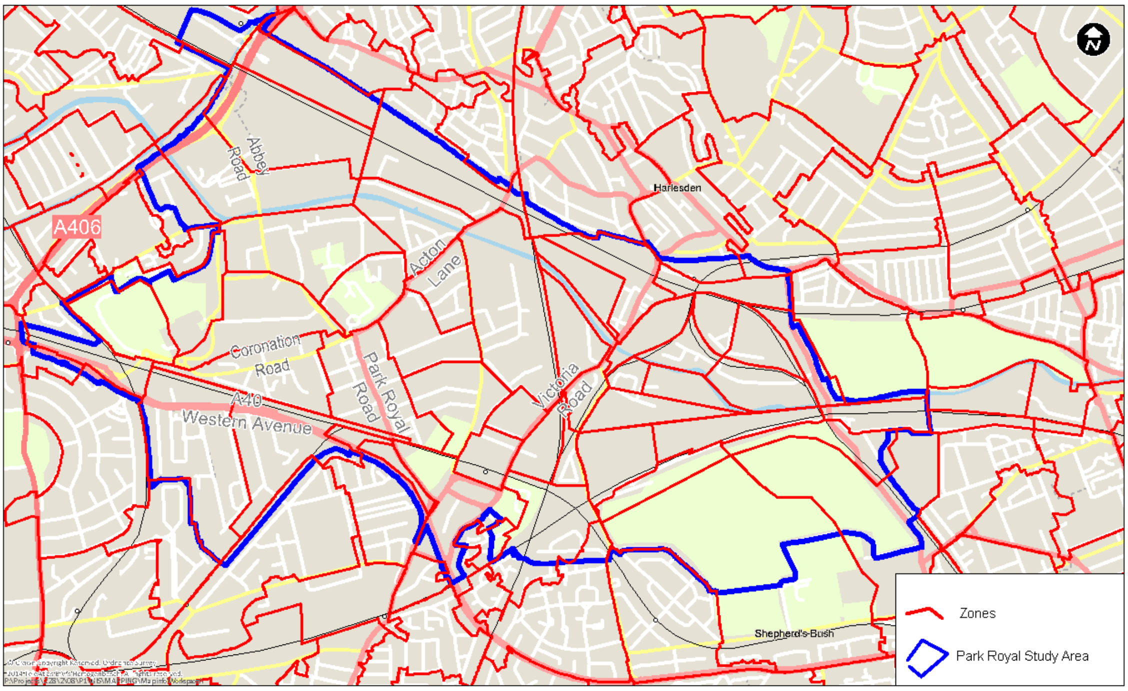
Figure 2.6: Final Network



Local Area Zoning Checks

2.11 The zones sizes, their limits and connectors were checked to confirm that the zones in the base year appropriately represented key trip generators and attractors. The zones were found to be appropriate and no changes were made.

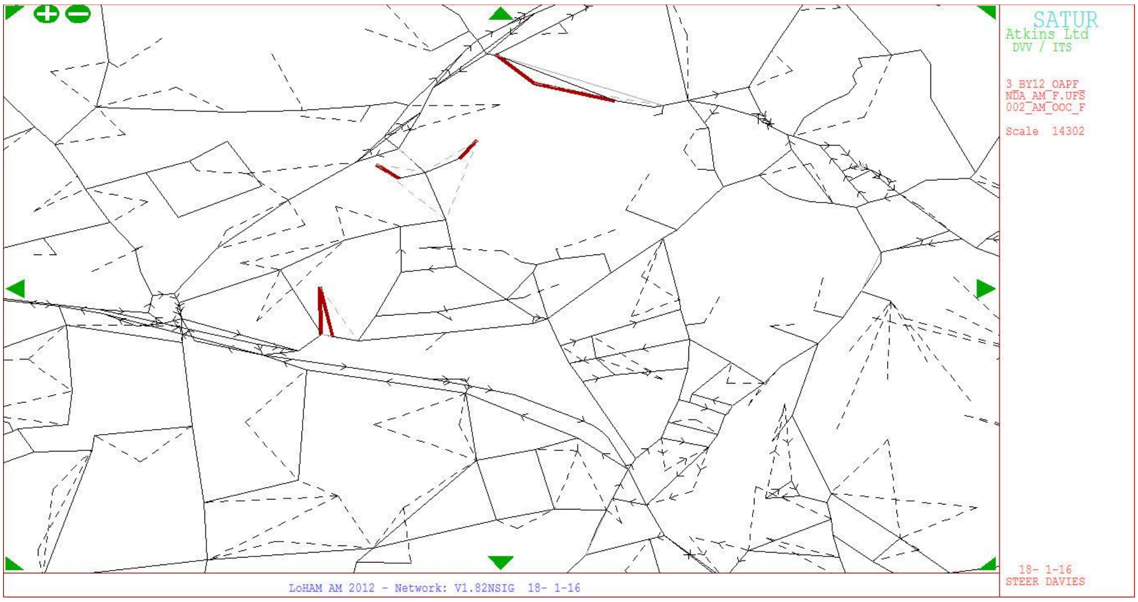
Figure 2.7: Model Zones



Zone Connectors

2.12 In tandem with the review of the zonal detail, the zone connectors were also checked within the Park Royal area. The zones were mostly connected in sensible places so these were not changed. The main update was connecting the two zones to the North West of Park Royal into the new “spigot” links representing Premier Park Rd, so that the roundabout with Abbey Road could be modelled correctly. Two other zones needed to be edited as links were split to include missing pelican crossing, but this does not materially change the location of where traffic is loaded. Figure 2.8 shows the new centroid connector coding.

Figure 2.8: Zone Centroid Connectors



Routing

Check Between Key Origin-Destination Pairs for Car and HGV User Classes

2.13 Select link analyses were done on the seven key roads that allow traffic to go in and out of the study area. These roads are:

- Abbey Road
- Acton Lane
- Chase Road
- Coronation Road
- Park Royal Road
- Twyford Abbey Road
- Victoria Road

2.14 The select links were checked and analysis undertaken to confirm sensible route choices were made in the model. The Select link analysis plots can be found in Appendix B.

Convergence

2.15 The convergence criteria adopted for the HAM model is based on the GAP criteria alone, with a value of 0.02 required for 4 consecutive iterations. Both peaks meet this criteria in both the initial and final models following calibration. None of the 10 worst converged nodes as reported by SATURN for various categories are within the Park Royal Study area.

Congestion Analysis

2.16 The general levels of congestion in the model were plausible with no major areas of concern in and around the modelled area. Plots of demand weighted delays can be found in Appendix C for the initial and final models.

2012 Interim WeLHAM (p3) Model Validation

2.17 Validation checks were made for the existing WeLHAM (p3) model provided by TfL. These checks and their conclusions are presented in this section.

Traffic Data

2.18 The model pack provided for this study included a significant number of traffic surveys undertaken in 2012 (between June and July, and in October) across London. The validation spreadsheets included 1,526 counts, arranged in 50 screenlines and 810 mini screenlines and 64 journey time routes. This information generally provided very good coverage of the study area, but there were some specific roads, such as Abbey Road that were missing count data and Park Royal Road which had no journey time information.

New Count Information

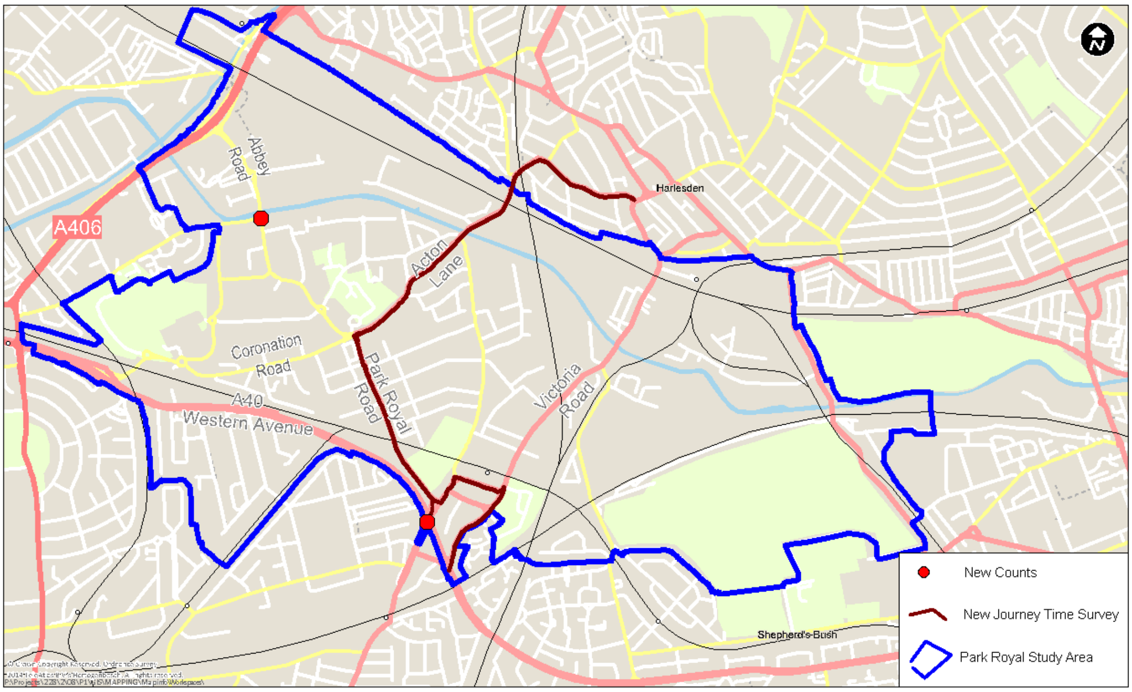
2.19 TfL provided additional survey data, not used in the existing model's calibration, which enabled the identified gaps to be filled. The new information used was for:

- Western Avenue - Horn Lane - Victoria Road
- Abbey Rd-Twyford Abbey Rd-Wellings Bridge

New Journey Times

2.20 A new journey time route was also extracted from the Trafficmaster database by TfL at our request covering Acton Lane and Park Royal Road. There were also a number of bespoke journey time surveys created for the HS2 study in the area which were used to further improve the local calibration (these are described further in the chapter).

Figure 2.9: New Survey Data Included in Park Royal Calibration



Calibration criteria

Counts

2.21 The Design Manual for Roads and Bridges (DMRB, Volume 2 Section 2) states that there are two principal statistics to determine the difference between model and observed traffic flows:

- GEH statistic
- The absolute and percentage differences between modelled flows and counts (DMRB criteria)

2.22 The GEH statistic is a measure to determine the goodness of fit between modelled and observed flows. It is a form of Chi-squared statistic that incorporates both relative and absolute errors between the two sets of data and is based on the following equation:

$$GEH = \sqrt{\frac{(M-C)^2}{\frac{(M+C)}{2}}}$$

GEH	GEH statistic
M	Modelled Flow
C	Observed Flow

2.23 A GEH value of less than 5 is deemed to be acceptable by the DMRB. This is equivalent of a 95% confidence level.

2.24 The DMRB criteria applies a different criteria depending on the number of vehicles counted in the modelled hour, banding them into 3 different categories (see Table 2.2 below). The guidance also states this criteria should be met for 85% of cases.

2.25 It should be noted that the DMRB acknowledges that models which fall short of meeting these criteria may still be acceptable as long as the links with the largest discrepancies are located outside the immediate area of interest.

Table 2.2: Calibration and Validation Criteria

Observed Flows (vehicles per hour)	Criteria
<700	Individual flows within 100 vph
700 to 2700	Individual flows within 15%
>2700	Individual flows within 400 vph
All flows	GEH Statistics <5

Screenline

2.26 While the model is calibrated at individual count locations as described above, counts are also grouped into screenlines or cordons, in order to validate that the overall movement of traffic between different areas is accurate. In many ways the screenline calibration is more important than the individual link calibration in a strategic model because it provides a validation of the trip matrix and it is more statistically significant reducing the impact of day to day variations or errors in counts at particular sites.

2.27 The WebTAG screenline calibration criteria is that the model flows across the screenline should be within 5% of the observed flows for 85% of the screenlines.

Journey Time

2.28 The journey time validation and acceptability criteria is shown in Table 2.3 below.

Table 2.3: Journey Time Validation and Acceptability Criteria

Criteria	Acceptability Guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	within 15% of surveyed times (or 1 minute,

Model Wide Calibration

2.29 The first assessment is of the overall P3 model, to confirm that the model is calibrating to an acceptable level for the study. These statistics are also identified in order to ensure that any changes made to improve the local area calibration does not produce a deterioration in the wider model calibration.

2.30 Figure 2.10 below shows the headline model statistics for the P3 model. While the individual counts and journey times are not ideal, the screenlines are very good with the AM peak passing for 86% of screenlines and the PM peak 84%.

Figure 2.10: Wider Model Statistics

Criteria	AM	PM
Links - GEH <5	70%	72%
Links - GEH <7.5	80%	82%
Links - DMRB Flow Criteria	74%	76%
Screenline - Flow Difference <5%	86%	84%
Journey Time Calibration <15%	64%	64%

2.31 While there are some weaknesses.32 in the wider model (given that it is the interim version of the model), we believe (following discussions with TfL) that the general calibration levels are of a reasonable standard, but with further checks required in the Park Royal area.

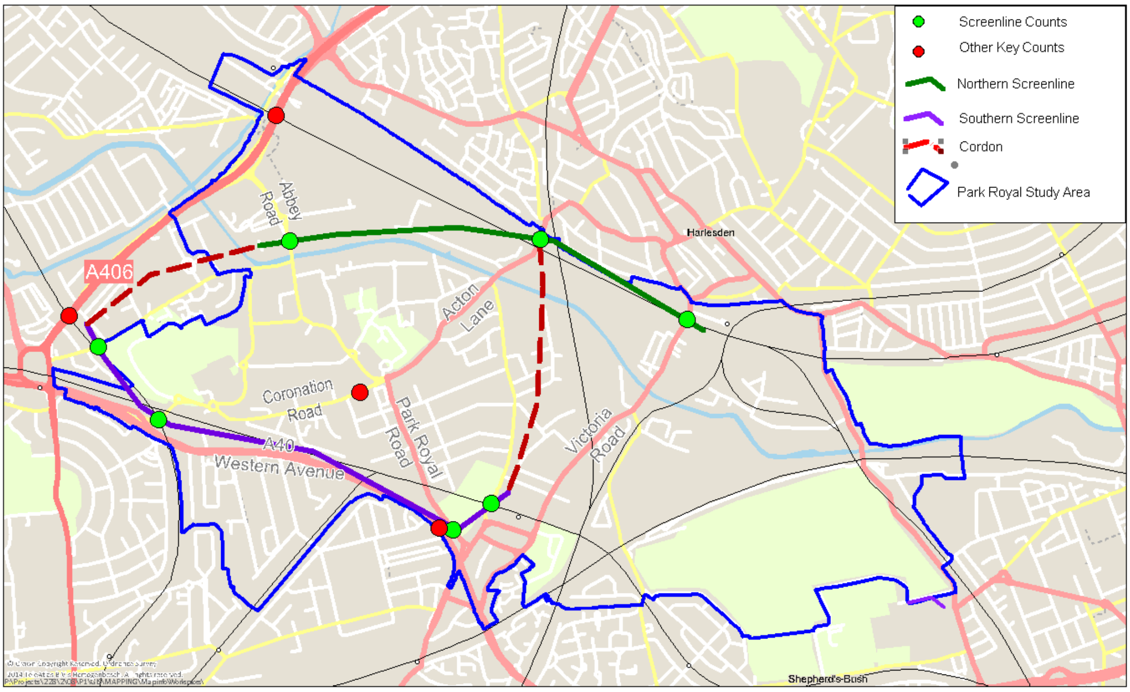
Local Area Calibration

2.32 In order to assess the calibration in the study area counts and journey times in and around Park Royal were assessed in more detail. This included assessing some key link counts, creating a new cordon for the study and assessing a new set of journey time routes.

Count Calibration

2.33 The local area count assessment was focused on 13 key count locations (in both directions) making up 26 counts in total distributed through the Park Royal Area and on key strategic links passing close by. In addition two screenlines were created from a number of these counts in order to assess the overall demand levels in the study area. This was complemented by the cordon analysis assessing the total inbound and outbound flows into the core Park Royal Area. Figure 2.11 below shows the key count locations and the screnlines/ cordon.

Figure 2.11: Key Count Locations and Screenlines



AM Peak

2.34 At the individual count level the AM Peak study area counts calibrate to a good level with the GEH criteria being met in almost 82% of cases and the DMRB for 86% of cases. The main concern is at Abbey Road where the model underestimates traffic significantly with the model 400 vehicles lower than the observed in the inbound direction and 250 in the outbound direction. To some extent this is unsurprising as the count at Abbey Road was not available in the P3 calibration. Table 2.5 below shows the individual count calibration for all vehicle types.

2.35 The model is weaker at the screenline/ cordon level with 3 of the 4 cordons being well at least 15% lower than the observed. While the inbound cordon has a good match the outbound is 18% under the counts. These results suggested that there is an underestimation of demand within Park Royal. Table 2.4 below shows the screenline and cordon results.

PM Peak

2.36 The PM peak results are weaker than the AM Peak, but still relatively good at the individual count level, with 77% of counts meeting the GEH and DMRB criteria. Abbey Road again fails in both directions, but there are also errors at Action Lane and Park Royal Lane that were not present in the AM peak. Table 2.7 below shows the individual count calibration for all vehicle types.

2.37 There are similar results at the screenline and cordon level as in the AM peak, with 3 out of 4 screenlines too low and the outbound cordon also failing. Table 2.6 below shows the screenline and cordon results.

Table 2.4: AM Peak (08:00-09:00) 2012 WeLHAM (Interim P3) Old Oak Screenlines – All Vehicles

Cordon/ Screenline	No. of sites	Observed	Model	Difference	% Difference	GEH
Inbound cordon	6	2734	2718	-384	-1%	0.3
Outbound cordon	6	2424	1990	-535	-18%	9.2
North Screenline – Inbound	3	2149	1774	-375	-17%	8.5
North Screenline - Outbound	3	1790	1525	-266	-15%	6.5
South Screenline – Inbound	4	1572	1563	-9	-1%	0.2
South Screenline - Outbound	4	1128	859	-270	-24%	8.6

Table 2.5: AM 2012 (08:00-09:00) WeLHAM (Interim P3) Old Oak Key Counts – All Vehicles

Site	Direction	Observed	Model	Difference	% Difference	GEH	DMRB
Abbey Rd	SB	1242	808	-434	-35%	13.5	Fail
Acton Ln	SB	332	368	36	11%	1.9	Pass
Victoria Rd	SB	575	598	23	4%	0.9	Pass
Abbey Rd	NB	629	370	-259	-41%	11.6	Fail
Acton Ln	NB	802	782	-21	-3%	0.7	Pass
Victoria Rd	NB	359	373	14	4%	0.7	Pass
Chase Rd	NB	318	282	-36	-11%	2.1	Pass
Western Ave Link Rd	EB	730	763	32	4%	1.2	Pass
Park Royal Rd	NB	378	369	-9	-2%	0.5	Pass
Twyford Abbey Rd	EB	146	150	4	3%	0.3	Pass
Chase Rd	SB	275	92	-182	-66%	13.5	Fail
Western Ave Link Rd	WB	203	218	14	7%	1.0	Pass
Park Royal Rd	SB	427	335	-92	-22%	4.7	Pass
Twyford Abbey Rd	WB	224	214	-10	-4%	0.7	Pass
Coronation Rd	EB	259	184	-75	-29%	5.0	Pass
Coronation Rd	WB	146	137	-9	-6%	0.7	Pass
A406 (North of Abbey Rd)	EB	2937	3070	134	5%	2.4	Pass
A406 (North of Abbey Rd)	WB	2946	2990	44	1%	0.8	Pass
A406 (North of Hanger La)	EB	3687	3705	18	0%	0.3	Pass
A406 (North of Hanger La)	WB	3099	3253	153	5%	2.7	Pass
A40	EW	2352	2278	-73	-3%	1.5	Pass
A40	WE	2797	2718	-80	-3%	1.5	Pass

Table 2.6: PM Peak (17:00-18:00) 2012 WeLHAM (Interim P3) Old Oak Screenlines – All Vehicles

Cordon	No. of sites	Observed	Model	Difference	% Difference	GEH
Inbound cordon	6	2078	2047	-307	-1%	0.7
Outbound cordon	6	3167	2682	-603	-15%	9.0
North Screenline – Inbound	3	1745	1475	-270	-15%	6.7
North Screenline - Outbound	3	2225	1847	-379	-17%	8.4
Sourth Screenline – Inbound	4	1069	1032	-37	-3%	1.2
South Screenline - Outbound	4	1611	1386	-225	-14%	5.8

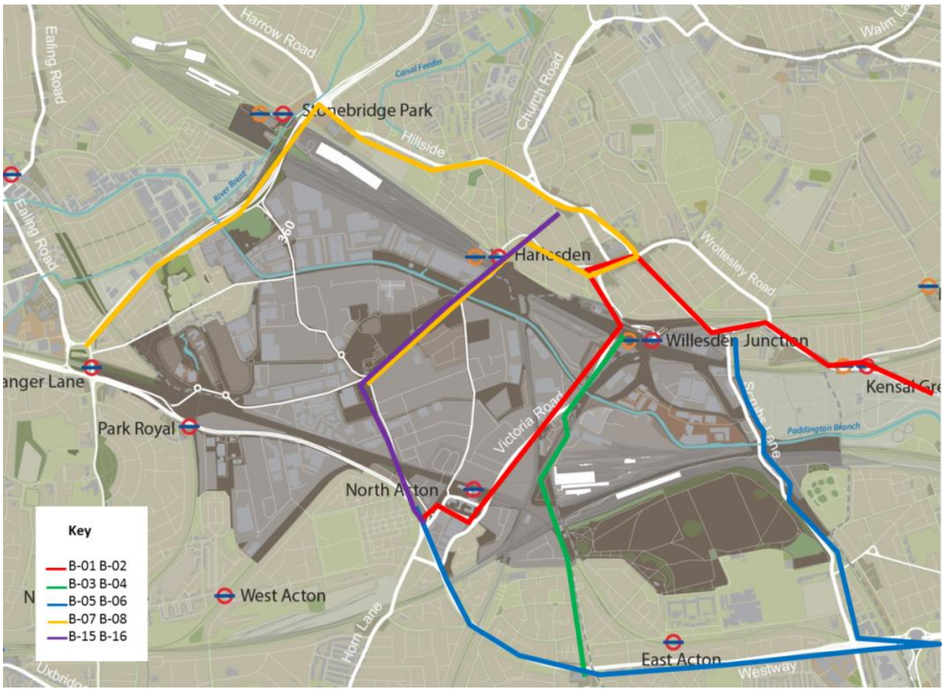
Table 2.7: PM 2012 (17:00-18:00) WeLHAM (Interim P3) Old Oak Key Counts – All Vehicles

Site	Direction	Observed	Model	Difference	% Difference	GEH	DMRB
Abbey Rd	SB	588	451	-137	-23%	6.0	Fail
Acton Ln	SB	759	587	-172	-23%	6.6	Fail
Victoria Rd	SB	399	437	38	10%	1.9	Pass
Abbey Rd	NB	1217	832	-385	-32%	12.0	Fail
Acton Ln	NB	460	465	5	1%	0.3	Pass
Victoria Rd	NB	548	549	1	0%	0.0	Pass
Chase Rd	NB	246	215	-31	-12%	2.0	Pass
Western Ave Link Rd	EB	215	199	-16	-7%	1.1	Pass
Park Royal Rd	NB	535	541	6	1%	0.3	Pass
Twyford Abbey Rd	EB	74	77	3	4%	0.4	Pass
Chase Rd	SB	394	286	-108	-27%	5.8	Fail
Western Ave Link Rd	WB	561	542	-20	-4%	0.8	Pass
Park Royal Rd	SB	401	285	-116	-29%	6.3	Fail
Twyford Abbey Rd	WB	255	274	19	7%	1.2	Pass
North Circular Rd	WB	2759	2799	40	1%	0.8	Pass
North Circular Rd	EB	3344	3366	22	1%	0.4	Pass
A406 (North of Abbey Rd)	EB	3344	3366	22	1%	0.4	Pass
A406 (North of Abbey Rd)	WB	2759	2799	40	1%	0.8	Pass
A406 (North of Hanger La)	EB	3412	3419	7	0%	0.1	Pass
A406 (North of Hanger La)	WB	3981	4045	64	2%	1.0	Pass
A40	EW	3417	3409	-8	0%	0.1	Pass
A40	WE	2455	2479	24	1%	0.5	Pass

Local Journey Time Calibration

2.38 Ten journey time routes (five in both direction) were analysed to assess to what extent the model replicates the network conditions in and around Park Royal. Figure 2.12 shows the routes used in the local calibration.

Figure 2.12: Journey times route location



2.39 The journey time comparison in the AM peak is good with only one route out of range. However in the PM peak, more than half of the routes do not pass the validation criteria. Table 2.8 below contains the comparison for each route and period.

Table 2.8: 2012 WeLHAM (p3) interim validation relevant journey times

Period	RouteID	Obs_Time	Model_Time	Difference	DMRB_Pass
AM	B-01	1066	931	-13%	Pass
	B-02	1405	1121	-20%	Fail
	B-03	636	587	-8%	Pass
	B-04	429	473	10%	Pass
	B-05	802	913	14%	Pass
	B-06	726	764	5%	Pass
	B-07	1048	1114	6%	Pass
	B-08	1187	1036	-13%	Pass
	B-015	462	481	4%	Pass
	B-016	495	456	-8%	Pass
PM	B-01	1482	1103	-26%	Fail
	B-02	1663	1323	-20%	Fail
	B-03	744	512	-31%	Fail
	B-04	588	622	6%	Pass
	B-05	1436	1035	-28%	Fail
	B-06	754	730	-3%	Pass
	B-07	1995	1064	-47%	Fail
	B-08	1319	1169	-11%	Pass
	B-015	563	416	-26%	Fail

	B-016	511	466	-9%	Pass

2012 Interim WeLHAM (p3) Model Conclusion

2.40 The WeLHAM P3 interim model is a good starting point for the Park Royal study, with the following features:

- The network review showed that the coding and zonal representation was to a good standard in the study area;
- The model wide calibration showed good levels of screenline validation (although individual counts and journey times were weaker); and
- Good levels of calibration within the Park Royal Area, especially at the individual count level

2.41 There review of the interim model identified the need for some improvements in the Park Royal area including:

- Improving the modelling of Abbey Road;
- Adding in observed 2012 signal timings and missing pelican crossings;
- A need to improve the flows at the screenline/ cordon level so that traffic entering/ leaving the study area is at the correct level.
- Improving PM peak journey times

3 Revised Base Model Development

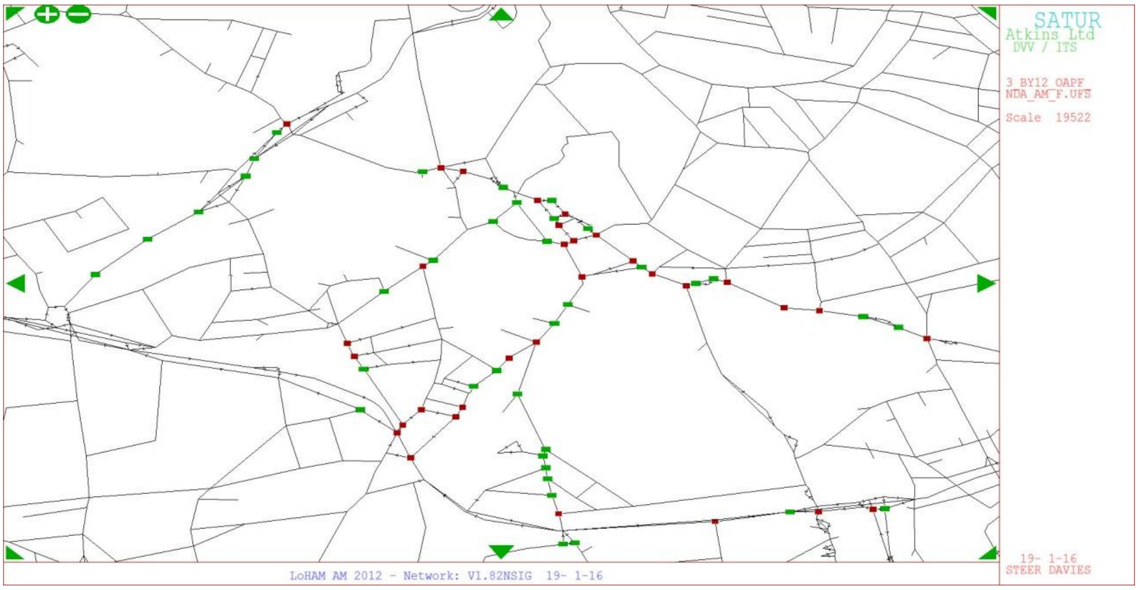
Model Calibration

3.1 After incorporating the changes identified in the model audit, there was a need to further improve the model further to address the areas of the model where the count and journey time comparisons were weaker. This involved using the journey time surveys and link counts in the Park Royal area to identify and where appropriate improve the model. In addition matrix estimation was undertaken to ensure that final matrix reflected any changes in the local network and the new observed count data.

Network Calibration

3.2 As mentioned above a detailed network calibration was undertaken. This involved identifying areas of the model that were performing poorly against the observed data, and improving the coding. Any changes to the network coding was done in line with HAM guidance so that changes to the junctions improved the reality of the junction changes rather than arbitrary changes to “fix” the model. In addition the same approach was taken between the AM and PM peaks with common saturation flows between the two models. In total 124 junctions were adjusted during the calibration as shown in Figure 3.1 below.

Figure 3.1: Changes to Junction Coding During the Model Calibration



Matrix Estimation

3.3 Demand matrices were also re-estimated using matrix estimation to improve the accuracy of the model. TfL provided us with the a number of files to ensure the approach undertaken was consistent with approach in developing the P3 model. These included TfL's standard batch files and the counts and control files (with mini screenlines) used in developing the model. In addition the prior matrix was provided so that the estimation was undertaken using this matrix rather than the P3 estimated matrix.

3.4 The only change to the matrix estimation files, was in adding in the two new link counts into the matrix estimation files that had been made available for the study (as described in Chapter 2) at:

- A40 West of Victoria Road; and
- Abbey Road south of Premier Park Road.

Revalidated 2012 WeLHAM (p3) Model – Count Data Comparison

Global Results

3.5 The global validation results were then checked to ensure that the changes introduced in the network did not worsen the overall calibration at the network-wide level. For both time periods, the global results showed only very small changes following the new level of local calibration.

Table 3.1: Global and study area comparison general results

Global	AM		PM	
	Original P3	Updated	Original P3	Updated
Links - GEH <5	70%	71%	72%	72%
Links - GEH <7.5	80%	80%	82%	81%
Links - DMRB Flow Criteria	74%	75%	76%	76%
Screenline - Flow Difference <5%	86%	86%	84%	86%
Journey Time	64%	64%	64%	64%

Local Flow Validation

3.6 Following the recalibration process statistics for the local area showed an improved level of calibration for both time periods.

In the AM peak (results can be seen in

3.7 Table 3.2 and Table 3.3 on the next page):

- at the individual count level 95% of counts pass the GEH and DMRB criteria (all but one count).
- Both cordons are within 5% of the observed.
- 3 out 4 screenlines pass, the only failure is the South Screenline outbound, but the absolute difference is fairly small (less than 200).

3.8 In the PM peak (results can be seen in Table 3.4 and Table 3.5 on the next page):

- at the individual count level 95% of counts pass the GEH and DMRB criteria (all but one count).
- Both cordons are within 5% of the observed
- While only 1 screenline passes the 5% criteria, there has been considerable improvement from the original model, with GEH values of less than 3.

Table 3.2: AM Peak (08:00-09:00) 2012 WeLHAM (Final Park Royal Model) Screenlines – All Vehicles

Cordon/ Screenline	No. of sites	Observed	Model	Difference	% Difference	GEH
Inbound cordon	**6**	**3364**	**3362**	**-2**	**0%**	**0.0**
Outbound cordon	**6**	**1225**	**1272**	**47**	**4%**	**1.3**
North Screenline – Inbound	3	2149	2185	37	2%	0.8
North Screenline - Outbound	3	1790	1795	5	0%	0.1
South Screenline – Inbound	4	1572	1548	-24	-2%	0.6
South Screenline - Outbound	4	1128	970	-159	-14%	4.9

Table 3.3: AM Peak (08:00-09:00) 2012 WeLHAM (Final Park Royal Model) Key Counts – All Vehicles

Site	Direction	Observed	Model	Difference	% Difference	GEH	DMRB
Abbey Rd	SB	1242	1196	-46	-4%	1.3	Pass
Acton Ln	SB	332	371	40	12%	2.1	Pass
Victoria Rd	SB	575	618	43	7%	1.8	Pass
Abbey Rd	NB	629	615	-14	-2%	0.5	Pass
Acton Ln	NB	802	799	-3	0%	0.1	Pass
Victoria Rd	NB	359	381	21	6%	1.1	Pass
Chase Rd	NB	318	283	-36	-11%	2.1	Pass
Western Ave Link Rd	EB	730	748	18	2%	0.7	Pass
Park Royal Rd	NB	378	367	-11	-3%	0.6	Pass
Twyford Abbey Rd	EB	146	150	5	3%	0.4	Pass
Chase Rd	SB	275	274	0	0%	0.0	Pass
Western Ave Link Rd	WB	203	224	20	10%	1.4	Pass
Park Royal Rd	SB	427	243	-184	-43%	10.1	Fail
Twyford Abbey Rd	WB	224	230	6	2%	0.4	Pass
Coronation Rd	EB	259	200	-59	-23%	3.9	Pass
Coronation Rd	WB	146	131	-15	-10%	1.3	Pass
North Circular Rd	WB	259	200	-59	-23%	3.9	Pass
North Circular Rd	EB	146	131	-15	-10%	1.3	Pass
A406 (North of Abbey Rd)	EB	2937	3060	124	4%	2.3	Pass
A406 (North of Abbey Rd)	WB	2946	2949	3	0%	0.0	Pass
A406 (North of Hanger La)	EB	3687	3668	-19	-1%	0.3	Pass
A406 (North of Hanger La)	WB	3099	3211	112	4%	2.0	Pass
Western Ave A40	EW	2352	2304	-48	-2%	1.0	Pass
Western Ave A40	WE	2797	2708	-90	-3%	1.7	Pass

Table 3.4: PM Peak (17:00-18:00) 2012 WeLHAM (Interim P3) Old Oak Screenlines – All Vehicles

Cordon	No. of sites	Observed	Model	Difference	% Difference	GEH
Inbound cordon	6	3572	3400	-172	-5%	2.9
Outbound cordon	6	1403	1335	-68	-5%	1.8
North Screenline – Inbound	3	1745	1647	-99	-6%	2.4
North Screenline - Outbound	3	2225	2169	-56	-3%	1.2
Sourth Screenline – Inbound	4	1069	1002	-67	-6%	2.1
South Screenline - Outbound	4	1611	1501	-110	-7%	2.8

Table 3.5: PM 2012 (17:00-18:00) WeLHAM (Interim P3) Old Oak Key Counts – All Vehicles

Site	Direction	Observed	Model	Difference	% Difference	GEH	DMRB
Abbey Rd	SB	588	517	-70	-12%	3.0	Pass
Acton Ln	SB	759	714	-45	-6%	1.7	Pass
Victoria Rd	SB	399	415	17	4%	0.8	Pass
Abbey Rd	NB	1217	1154	-63	-5%	1.8	Pass
Acton Ln	NB	460	500	41	9%	1.9	Pass
Victoria Rd	NB	548	514	-34	-6%	1.5	Pass
Chase Rd	NB	246	206	-40	-16%	2.6	Pass
Western Ave Link Rd	EB	215	237	22	10%	1.5	Pass
Park Royal Rd	NB	535	486	-49	-9%	2.2	Pass
Twyford Abbey Rd	EB	74	74	0	0%	0.0	Pass
Chase Rd	SB	394	394	1	0%	0.0	Pass
Western Ave Link Rd	WB	561	540	-21	-4%	0.9	Pass
Park Royal Rd	SB	401	262	-139	-35%	7.6	Fail
Twyford Abbey Rd	WB	255	304	49	19%	2.9	Pass
North Circular Rd	WB	222	221	-2	-1%	0.1	Pass
North Circular Rd	EB	182	172	-10	-5%	0.7	Pass
Coronation Rd	EB	3412	3445	33	1%	0.6	Pass
Coronation Rd	WB	3981	4037	55	1%	0.9	Pass
A406 (North of Abbey Rd)	EB	3417	3184	-232	-7%	4.0	Pass
A406 (North of Abbey Rd)	WB	2455	2502	47	2%	0.9	Pass
A406 (North of Hanger La)	EB	588	517	-70	-12%	3.0	Pass
A406 (North of Hanger La)	WB	759	714	-45	-6%	1.7	Pass
Western Ave A40	EW	399	415	17	4%	0.8	Pass
Western Ave A40	WE	1217	1154	-63	-5%	1.8	Pass

Revalidated 2012 WeLHAM (p3) Model – Journey Time Data Comparison

3.9 The journey time statistics improved after the revalidation, especially for the PM, with only one route failing to pass the criteria. For both periods, the sum of all the route differences is less than 3% in the final model.

Table 3.6: Post matrix estimation validation relevant journey times

Period	RouteID	Obs_Time	Model_Time	Difference	DMRB_Pass
AM	B-01	1066	1089	2%	Pass
	B-02	1405	1290	-8%	Pass
	B-03	636	588	-8%	Pass
	B-04	429	519	21%	Fail
	B-05	802	910	14%	Pass
	B-06	726	734	1%	Pass
	B-07	1048	1146	9%	Pass
	B-08	1187	1286	8%	Pass
	B-015	462	473	2%	Pass
	B-016	495	455	-8%	Pass
PM	B-01	1482	1549	5%	Pass
	B-02	1663	1697	2%	Pass
	B-03	744	845	13%	Pass
	B-04	588	610	4%	Pass
	B-05	1436	1580	10%	Pass
	B-06	754	729	-3%	Pass
	B-07	1995	1544	-23%	Fail
	B-08	1319	1238	-6%	Pass
	B-015	563	492	-13%	Pass
	B-016	511	544	6%	Pass

Revalidated 2012 WeLHAM (p3) Model – Conclusion

3.10 As a result of the implementation of the changes discussed in this report to recalibrate the model focusing on the Park Royal local area, the final base year model provides a robust starting point for forecasting the increased demand levels in Park Royal.

3.11 A thorough audit of the network coding and zonal representation in the area has been undertaken. This resulted in the implementation of a number of changes to improve the modelled network, including:

- Replacing the signal settings with observed data; and
- Improving network and zonal detail on Abbey Road.

3.12 A detailed calibration exercise was then undertaken to improve the accuracy of the model in the study area. The final model's local calibration shows:

- All but one of the counts sites passing the WeBTAG criteria;
- Screenline and cordon level showing a good match against the count data, indicating overall levels of traffic in the study area is accurate.
- All but one journey time route matching the observed data

3.13 These excellent levels of local calibration has been achieved without compromising the global calibration results.

4 Future Scenario Model Development

Overview

4.1 This section describes the updates made to the model to create the future year scenarios. Three future year scenarios were created for the study to feed into the Park Royal Transport Study:

- 2021 (HS2 Construction Scenario)
- 2026 (HS2 year of opening)
- 2041 (Full OA build out)

4.2 The models were built from existing scenarios which were based on the models TfL provided in the WeLHAM Interim P3 model pack which had been used in the HS2 Old Oak Common study.

4.3 A key assumption is that the reference case models provided account for TfL's current assumptions on changes to the transport network and demand growth in London. Therefore no adjustments were made to the overall growth in the model. The network includes TfL's view on committed schemes in the future. There has not been any testing of different network interventions or mitigation measures, rather the model has been used to provide inputs into the wider study to feed into planning to address any network pinch point/ problems identified.

Demand Adjustments

4.4 As mentioned above the total growth in trips in the model was not adjusted, but there was redistribution of trips to the correct development zones in and around Park Royal. Checks were made at the LTS level in the Park Royal area to ensure this growth had been incorporated and a visual check in the Old Oak Common area to ensure traffic growth was forecasted in this OAPF area. However given that no new LTS run were undertaken for the study no additional checks were made on London wide growth.

4.5 The future year matrices used in these future scenarios required updating to reflect the following effects:

- Any zone splitting required in the study area
- Changes made to the base year matrices, due to the matrix estimation process.
- Revised trip generation and attraction rates based on revised planning assumptions and recent Transport Applications for major local developments
- Redistribution of trips to zones where development is now most likely to occur.

4.6 These were included through a Furnessing process to adjust the matrices to new row/column totals. The new row/column totals were calculated following these steps:

1. Zone Splitting
2. Add Base Calibration Changes
3. Remove Demolition
4. Alperton Housing Zone Adjustments
5. Add in Developments
6. Trip balancing

4.7 Each step is described in more detail in the following sections.

Step 1: Zone Splitting

4.8 There are five zones that for the purpose of the study were split because new developments only occur in a part of the zone and the connections to the network need to be updated to reflect the location of trips going to/from the development. The following figure and table show where these zones are located and how the new zones have been split from the old zones. These zones were not split in the base year.

Figure 4.1: Zones Splitting Location

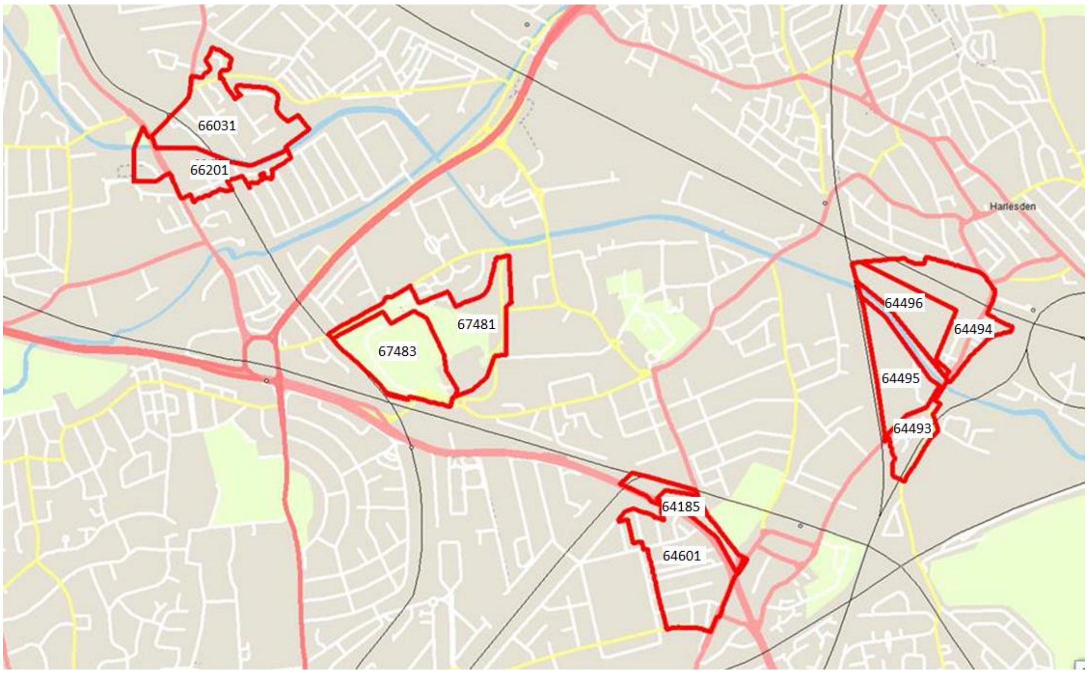


Table 4.1: Zone Splitting Percentages

Original Zone Name	New Zone Name	AM Origin	AM Destination	PM Origin	PM Destination
64185	64185	10%	10%	10%	10%
	64601	90%	90%	90%	90%
64493	64493	80%	20%	20%	80%
	64495	20%	80%	80%	20%
64494	64494	80%	20%	20%	80%
	64496	20%	80%	80%	20%
66031	66031	60%	60%	60%	60%
	66201	40%	40%	40%	40%
67481	67481	100%	100%	100%	100%

Step 2: Add Base Calibration Changes

4.9 The absolute base year changes were included by adding the difference between the new base year matrix and the WeLHAM Interim P3 2012 matrix.

Step 3: Removal of Trips Due to Demolition

4.10 The new developments in the study area imply that there are some parts were significant demolition will take place to facilitate new developments. To include this effect a percentage of the base demand was taken from the base demand in the zones that are going to be affected by demolition. The next table shows the zones and the percentage of base demand that is removed.

Table 4.2: Zones and percentages of base demand withdraw for demolish

Area	New Zone Name	2021 Demolition Factor	2026 Demolition Factor	2041 Demolition Factor
First Central - Park Royal Residential	67483	100%	100%	100%
Alperton Developments	66201	60%	60%	60%
Alperton Developments	66031	60%	60%	60%
Alperton Developments	66054	50%	50%	50%
HS2 Construction Site 2	64495	0%	0%	100%
HS2 Construction Site 1	64496	0%	0%	100%
Origin Business Park	67481	100%	100%	100%

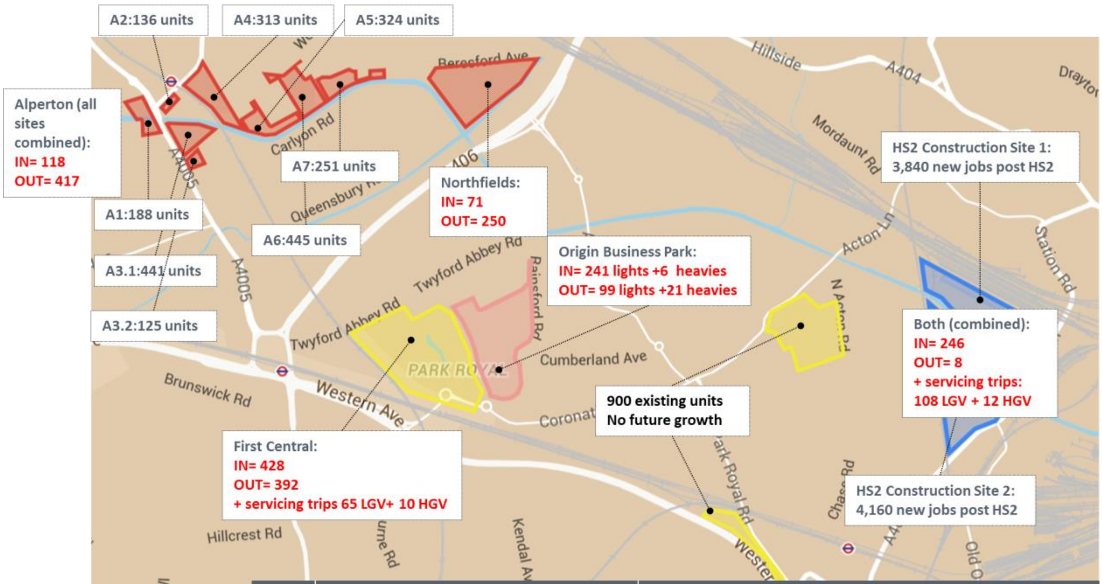
Step 4: Alperton Housing Zone Adjustments

4.11 Given the proximity of the Alperton Housing Zone to the study area and the fact that more detailed information regarding the quantum of development is now available, trips relating to these developments were adjusted. This was done by adjusting the zonal trips for Alperton based on the information relating to location and number of housing units as shown below in Figure 4.2 and Figure 4.3. To maintain consistency with the LTS Borough-wide growth forecasts for the London Borough of Brent, the total number of trips within the Borough were maintained by applying factors to other zones outside the Alperton Housing Zone.

Step 5: Add in Developments

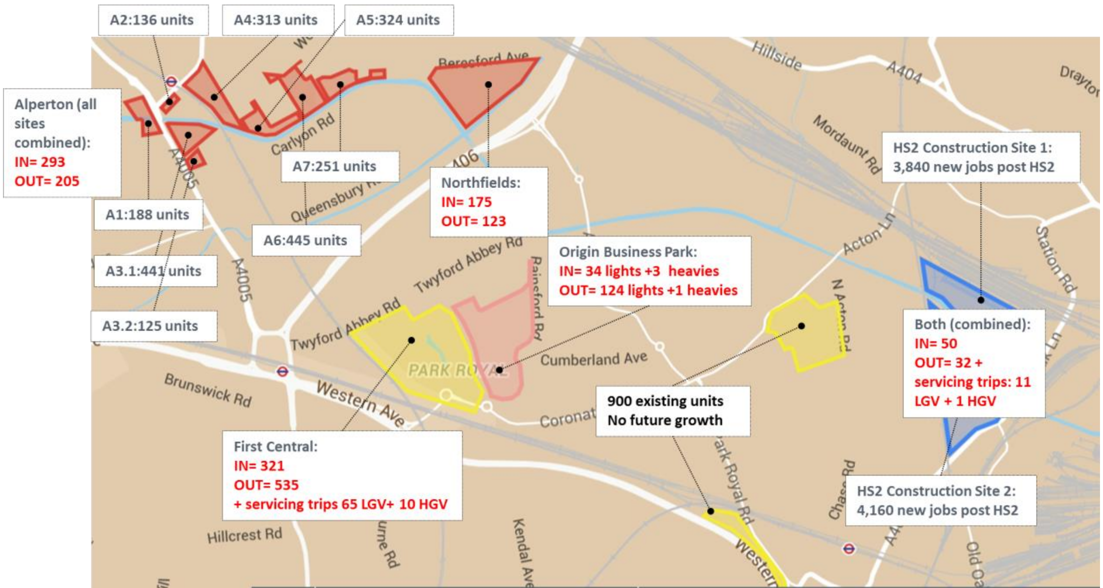
4.12 The new developments within the OA and the Alperton Housing Zone include residential units and new jobs. The assumptions about the distribution of new trips coming in and out these new developments for each modelled period are presented in the following figures.

Figure 4.2: AM Peak Hour trip generation and attractions distributions



	Residential Development			Employment Sites			
Scenario Year	Alperton Housing Zone	Northfields	First Central	Origin Business Park	First Central Site	HS2 Shield Site (1)	HS2 Shield Site (2)
2021	✓	✓ (50%)	✓ (30%)	✓	✓		
2026	✓	✓ (100%)	✓ (100%)	✓	✓		
2041	✓	✓ (100%)	✓ (100%)	✓	✓	✓ (100%)	✓ (100%)

Figure 4.3: PM Peak Hour trip generation and attractions distributions



	Residential Development			Employment Sites			
Scenario Year	Alperton Housing Zone	Northfields	First Central	Origin Business Park	First Central Site	HS2 Shield Site (1)	HS2 Shield Site (2)
2021	✓	✓ (50%)	✓ (30%)	✓	✓		
2026	✓	✓ (100%)	✓ (100%)	✓	✓		
2041	✓	✓ (100%)	✓ (100%)	✓	✓	✓ (100%)	✓ (100%)

4.13 The new trips were added to the total row and column trips for each affected zone. This involved adjusting the 2021, 2026 and 2031 matrices separately as the developments come on line at different years (See appendix D for the demand totals added to the matrix).

Step 6: Trip Balancing

4.14 The total trips in the matrices should remain the same as those in the Interim WeLHAM model provided by TfL. To ensure this, all the zones outside the study area were multiplied by a balancing factor. This factor is calculated as the total trips in the matrix with calibration changes included (Step 2) minus the forecasted trips in the study area, all divided by the total trips outside the study area in the matrix with calibration changes.

4.15 The resulting total trips in PCUs are shown in the table below for the whole model.

Table 4.3: Final matrices total trips for AM and PM

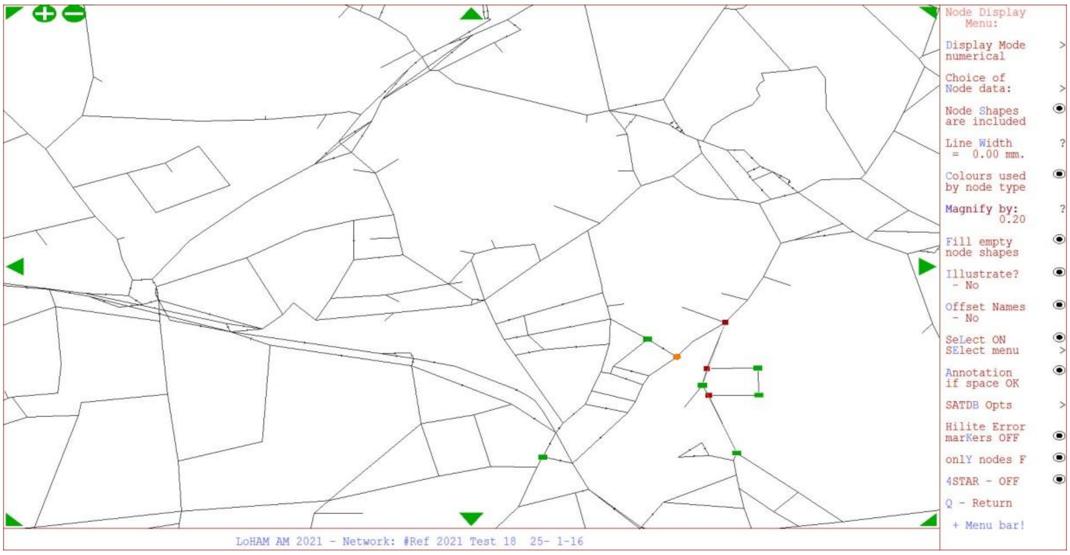
Period	Level	2021	2026	2041
AM	Car Non Work	769,585	755,776	779,617
	Car in Work	24,159	24,552	25,496
	LGVs	166,167	177,124	210,285
	HGVs	123,586	124,745	129,734
PM	Car Non Work	791,260	781,676	813,055
	Car in Work	37,956	38,478	39,825
	LGVs	148,639	158,421	188,159
	HGVs	78,711	79,633	83,678

Network Update Process

4.16 The network changes that were made in the revalidated 2012 Base Models needed to be copied into the future scenario models to retain the improved calibration measures. All the changes from the Base model calibration were included, with the exception of the changes that occurred between the Base and Future scenario as a result of future infrastructure changes e.g. the new road layout and junctions at the new Old Oak Common Station (junctions with changes in coding are highlighted in Figure 4.4).

4.17 For this process the HAM_Network_Extract_Tool_v5.5 developed by TfL was used.

Figure 4.4: Junction Coding – Changed between 2012 Base to 2041



Results

Convergence

4.18 The three future year assignments were then run for AM and PM Peaks. The convergence criteria adopted for the HAM model is based on the GAP criteria, with a value of 0.02 required for 4 consecutive iterations. The model converges for all time periods and years.

Overall Forecast Traffic Growth

4.19 TfL's WeLHAM traffic model has been used to determine forecast traffic volumes for three key future years:

- 2021 – during HS2 construction
- 2026 – Opening of HS2
- 2041 – Full build out of the OA

4.20 In and around the Park Royal Study area, traffic flows on the key roads are forecast to increase by about 5% by 2021 which is when construction of HS2 will be at its peak. This growth will consist of background traffic growth and additional construction traffic.

4.21 Between 2021 and 2026 when HS2 construction is complete and in operation, very little additional growth in overall traffic levels is forecast.

4.22 By 2041 however, traffic is expected to have increased by approximately 7-9% from current levels as a result of further background growth and full build out of the Old Oak and Park Royal OA.

4.23 The relatively modest increase in traffic volumes on the roads surrounding Park Royal is due to existing capacity constraints that prevent any further increases.

Changes in Traffic Flow on Key Roads

4.24 Traffic volumes on the key roads through the study area have been determined using TfL's HAM modelling which has been updated to provide greater detail in the Park Royal area as part of this study.

AM Peak Traffic Flow Changes

4.25 Table 4.4 summarises the key traffic flow changes on the network in the AM peak. All values quoted have been rounded in recognition of the level of confidence that can be attributed to this level of strategic road modelling.

4.26 The most significant flow changes in 2021 are:

- A total of 136 two-way heavy vehicle movements per hour associated with HS2 construction.
- A 35%-45% increase on Coronation Road is likely as a result of First Central and Origin Business Park developments being operational.
- A 10-15% increase in traffic entering Park Royal via Park Royal Road, Acton Lane and Abbey Road.
- A 15% increase in traffic exiting the estate via Abbey Road.

4.27 Flow changes in 2026 on the strategic road network are comparable to the 2021 scenario indicating that the capacity previously utilised by construction vehicles on these roads is taken up by an induced through traffic demand and that HS2 does nothing to reduce local traffic volumes. However some key entry/exit routes to Park Royal see further increases:

- Coronation Road flows increase further to levels 40-70% higher than existing due to the full build out of the First Central Development which is assumed to accommodate all of the 1,500 additional homes in the estate.
- Traffic exiting the estate by Abbey Road is forecast to increase further with a 35% increase from existing levels. This is attributable to the trips from First Central heading to destinations in the north via the North Circular and to a lesser degree general employment growth across Park Royal.

4.28 The most significant flow changes in 2041, driven by the increased development demand are:

- A 10% increase on traffic accessing the Park Royal Estate via Park Royal Road.
- A 40%-75% increase on Coronation Road.
- A 45% increase in traffic exiting the estate via Abbey Road.

Table 4.4: AM Peak Hour Traffic Flow Changes on Key Roads

Road and Direction of Travel	Existing Flow (pcu/hr)	2021		2026		2041	
		Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing
A40 Eastbound (west of Hanger Lane)	4780	4760	0%	4820	1%	4890	2%
A40 Westbound (west of Hanger Lane)	3310	3480	5%	3430	4%	3590	8%
North Circular Northbound	3230	3260	1%	3300	2%	3310	2%
North Circular Southbound	3180	3330	5%	3350	5%	3410	7%
Park Royal Road Northbound	400	430	8%	410	2%	440	10%
Park Royal Road Southbound	270	290	7%	300	11%	290	7%
Victoria Road Northbound	430	440	2%	460	7%	450	5%
Victoria Road Southbound	680	660	-3%	630	-7%	600	-12%
Acton Lane Southbound	440	520	18%	520	18%	560	27%
Acton Lane Northbound	870	880	1%	890	2%	900	3%
Twyford Abbey Road Eastbound	160	170	6%	150	-6%	160	0%
Twyford Abbey Road Westbound	240	250	4%	250	4%	240	0%
Chase Road Northbound	240	240	0%	240	0%	220	-8%
Chase Road Southbound	190	170	-11%	180	-5%	200	5%
Coronation Road Eastbound	780	1060	36%	1070	37%	1090	40%
Coronation Road Westbound	270	390	44%	450	67%	470	74%
Abbey Road Southbound	770	900	17%	890	16%	910	18%
Abbey Road Northbound	640	740	16%	860	34%	940	47%
Total	**20800**	**21890**	**5%**	**22150**	**6%**	**22590**	**9%**

PM Peak Traffic Flow Changes

4.29 Table 4.5 summarises the key traffic flow changes on the network in the PM peak. All volumes have been rounded in recognition of the level of confidence that can be attributed to this level of strategic road modelling.

4.30 The most significant flow changes in 2021 are:

- A 30% increase in traffic accessing Park Royal via Coronation Road, likely as a result of First Central and Origin Business Park developments being operational.
- A 25% increase in traffic on Victoria Road northbound in part due to the HS2 construction traffic.
- A 30% increase in southbound traffic on Chase Road, although this is from a low base so is not a significant increase in total numbers.
- A 15% increase in traffic exiting the estate via Abbey Road.
- A 20% increase in traffic exiting the estate via Park Royal Road.

4.31 As with the AM peak, flow changes in the 2026 PM peak are comparable to the 2021 scenario, indicating that the capacity previously utilised by construction vehicles on these roads is taken up by an induced through traffic demand and that HS2 does nothing to reduce local traffic volumes. The one exception to this is Coronation Road eastbound which sees further flow increases, to levels 50% higher than existing due to the full build out of the First Central Development which is assumed to accommodate all of the 1,500 additional homes in the estate.

4.32 The most significant flow changes in 2041, driven by the increased development demand, are:

- A 35% increase on traffic exiting the Park Royal Estate via Park Royal Road.
- A 20% increase in traffic on Victoria Road northbound, which represents a slightly lower increase when compared to the HS2 construction scenario.
- Further increases on Coronation Road resulting in 60% higher eastbound volumes than existing.
- Further increases on Chase Road southbound resulting in 70% higher volumes than existing.

4.33 Appendix E has a number of plots showing network flows and conditions (delays, queues etc.) for further information.

Table 4.5: PM Peak hour Traffic Flow Changes on Key Roads

Road and Direction of Travel	Existing Flow (pcu/hr)	2021		2026		2041	
		Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing	Flow (pcu/hr)	Change from Existing
A40 Eastbound (west of Hanger Lane)	4340	4520	4%	4500	4%	4570	5%
A40 Westbound (west of Hanger Lane)	4260	4310	1%	4330	2%	4330	2%
North Circular Northbound	3440	3470	1%	3480	1%	3580	4%
North Circular Southbound	3080	3290	7%	3240	5%	3400	10%
Park Royal Road Northbound	450	450	0%	450	0%	440	-2%
Park Royal Road Southbound	290	350	21%	320	10%	390	34%
Victoria Road Northbound	510	650	27%	610	20%	610	20%
Victoria Road Southbound	470	460	-2%	460	-2%	480	2%
Acton Lane Southbound	770	690	-10%	700	-9%	710	-8%
Acton Lane Northbound	550	580	5%	570	4%	620	13%
Twyford Abbey Road Eastbound	90	100	11%	100	11%	100	11%
Twyford Abbey Road Westbound	320	300	-6%	300	-6%	280	-13%
Chase Road Northbound	170	140	-18%	150	-12%	160	-6%
Chase Road Southbound	70	90	29%	90	29%	120	71%
Coronation Road Eastbound	260	340	31%	390	50%	420	62%
Coronation Road Westbound	650	680	5%	710	9%	690	6%
Abbey Road Southbound	440	410	-7%	470	7%	510	16%
Abbey Road Northbound	920	1060	15%	1050	14%	1120	22%
Total	**20990**	**21810**	**4%**	**21860**	**4%**	**22450**	**7%**

Conclusions

4.34 The above flow increases of up to 75% on some key internal roads to Park Royal have the potential to significantly increase congestion and journey times to and from the estate. These increases require targeted measures at existing key pinch points in the network to address these potential future issues. The key pinch points are:

- Abbey Road between the North Circular and Twyford Abbey Road
- Junction of Park Royal Road / Coronation Road / Abbey Road
- Junction of Acton Lane / North Acton Road

4.35 In addition to the growth on the local road network, strategic roads and associated junctions such as the A40, North Circular, Hanger Lane and Gypsy Corner will also see demand increases. These strategic connections are vital to the operation of Park Royal businesses and residents.

4.36 To address the future challenges of these strategic connections, TfL is currently undertaking a detailed study into the A40 and its associated junctions in the vicinity of Park Royal.

A HAM MAP

B Select Link Analysis

C Network Congestion Base Year

D Growth

E Network Plots

CONTROL INFORMATION

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SDG project/proposal number	Client contract/project number
22857301	Task 15

Author/originator	Reviewer/approver
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Other contributors	Distribution
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Version control/issue number	Date
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OPDC
OLD OAK AND PARK ROYAL DEVELOPMENT CORPORATION

Park Royal Transport Strategy

Appendices

2017

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HAM MAP.xlsx

Stage1a

Transport for London Planning Strategic Analysis - Sub-Regional Highway Assignment Model Application Model Auditing Process (HAM-MAP) - Stage 1a: Initial Model Review Project Name - Park Royal Transport Study HAM Used - WelHAMp3_HS2OOC	Consultant Responsible - Steer Davies Gleave
Model Base Year - 2012	Model Future Year - 2021, 2026, 2041
Periods Modelled: AM, PM	Periods Modelled: AM, PM

Base Year Model Review: Local Network Audit

Technical Note: Park Royal Transport Strategy - Modelling Report (Chapter 2)

Base Year Adequacy Assessment	**Satisfactory**	**Checking Engineer/ Planner**	**Checking Engineer/ Planner**	**Report Reference**
Local Network Density Checked Y/N	N	NDA	TSC	Paragraph 2.3 - 2.6
Check on Junction/ Link Coding Undertaken	N	NDA	TSC	Paragraph 2.7 - 2.9
Inspection for Convergence Issues	Y	NDA	TSC	Paragrpah 2.15
Realism Checks Made	Y	NDA	TSC	Chapter 2
Routing check between key OD pairs for Car/ HGV	Y	NDA	TSC	Appendix B

Network Improvements Identified	**Satisfactory**	**Checking Engineer/ Planner**	**Checking Engineer/ Planner**	**Report Reference**
Plot of Additional Links Provided	Y	NDA	TSC	Figure 2.3
Check on Coding Undertaken	Y	NDA	TSC	Paragraph 2.7 - 2.9
Local Area Zoning Checked	Y	NDA	TSC	Paragraph 2.11
Plot of Additional Zones Provided	N/A	NDA	TSC	N/A
Centroid Connectors Checked and Plotted	Y	NDA	TSC	Paragraph 2.12

Future Year Adequacy Assessment Satisfactory	**Satisfactory**	**Checking Engineer/ Planner**	**Checking Engineer/ Planner**	**Report Reference**
Local Area Network Adequacy	N/A	N/A	N/A	N/A
Local Area Zoning Adequacy	N/A	N/A	N/A	N/A

Local Model Validation Checks	**Satisfactory**	**Checking Engineer/ Planner**	**Checking Engineer/ Planner**	**Report Reference**
Local Area Flow Validation Checks Undertaken	N	NDA	TSC	Paragraph 2.32 - 2.37
Screenline and Cordon Performance Reported	N	NDA	TSC	Tables 2.4 and 2.6
Additional Local Counts Identified/ Collected	Y	NDA	TSC	Paragraph 2.19
Performance Against Local Counts Reported	N	NDA	TSC	Table 2.5 and 2.7
Local Journey Times Assessed	N	NDA	TSC	Table 2.8
Plots of Local Congestion Provided	Y	NDA	TSC	Appendix C
Requirement for Model Re-validation	Y	NDA	TSC	Paragraph 2.40

Acceptance: TfL make no warranties, express or implied, that acceptance of this model adheres to best practise nor is confirmation that the contractor has fully met their statutory requirements.		CE/P to confirm that this model conforms to HAM Guidance Stage 1a and the main areas above have been checked and are correct.	MAE/P to confirm that this model conforms to HAM Guidance Stage 1a and the main areas above have Guidance Stage 1a and the main areas above have been checked and are correct.
		Natalia Duran	Tom Caulfield
	Signed	Natalia C. Duran A.	T Caulfield
	Date	27/01/2015	27/01/2015

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HAM MAP.xlsx

Stage 1b

Transport for London Planning Strategic Analysis - Sub-Regional Highway Assignment Model Application Model Auditing Process (HAM-MAP) - Stage 1a: Initial Model Review Project Name - Park Royal Transport Study HAM Used - WelHAMp3_HS2OOC	Consultant Responsible - Steer Davies Gleave
Model Base Year - 2012	Model Future Year - 2021, 2026, 2041
Periods Modelled AM PM	Periods Modelled AM PM

Base Year Model Review: Local Model Re-validation

Model Validation Report Received: Park Royal Transport Strategy - Modelling Report

Network Improvements Identified	**Satisfactory**	**Checking Engineer/ Planner**	**Model Audit Engineer/ Planner**	**Report Reference**
Plot of Additional Links Provided	Y	NDA	TSC	Figure 2.3
Check on Coding Undertaken	Y	NDA	TSC	Paragraph 2.7 - 2.9
Local Area Zoning Checked	Y	NDA	TSC	Paragraph 2.11
Plot of Additional Zones Provided	N/A	NDA	TSC	N/A
Centroid Connectors Checked and Plotted	Y	NDA	TSC	Paragraph 2.12

Model Calibration/ Matrix Estimation	**Satisfactory**	**Checking Engineer/ Planner**	**Model Audit Engineer/ Planner**	**Report Reference**
Estimation from Prior Matrices	Y	NDA	TSC	Paragraph 3.3-3.4
Additional Local Counts Identified/ Collected	Y	NDA	TSC	Paragraph 2.19
Counts used as Mini-screenlines	Y	NDA	TSC	Paragraph 3.3
Plot of Additional Counts Provided	Y	NDA	TSC	Figure 2.9
Screenline and Cordon Calibration Reported	Y	NDA	TSC	Table 3.1

Local Model Validation Checks	**Satisfactory**	**Checking Engineer/ Planner**	**Model Audit Engineer/ Planner**	**Report Reference**
Screenline and Cordon Calibration Reported	Y	NDA	TSC	Table 3.2 and 3.4
Performance Against Local Counts Reported	Y	NDA	TSC	Table 3.3 and 3.5
Local Screenline Comparisons WebTAG Compliant	Y	NDA	TSC	Paragraph 3.6 - 3.8
Local Individual Counts WebTAG Compliant	Y	NDA	TSC	Paragraph 3.6 - 3.8
Local Journey Times to 15%	Y	NDA	TSC	Table 3.6
Comparison of Journey Times for HAM JT Routes	Y	NDA	TSC	Table 3.1
Plots of Local Congestion Provided	Y	NDA	TSC	Appendix C
Routing check between key OD pairs for Car/ HGV Y/N	Y	NDA	TSC	Appendix B
Model Convergence Gap to WebTAG Standards	Y	NDA	TSC	Paragrpah 2.15

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		Natalia Duran	Tom Caulfield
	Signed	Natalia C. Duran A.	T Caulfield
	Date	27/01/2015	27/01/2015

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HAM MAP.xlsx

Stage 2b

Transport for London Planning Strategic Analysis - Sub-Regional Highway Assignment Model Application Model Auditing Process (HAM-MAP) - Stage 1a: Initial Model Review Project Name - Park Royal Transport Study HAM Used - WelHAMp3_HS2OOC	Consultant Responsible - Steer Davies Gleave
Model Base Year - 2012	Model Future Year - 2021, 2026, 2041
Periods Modelled AM PM	Periods Modelled AM PM

Future Year Model Review: With Development Report				
Forecast Year Report Received				
Trip Generation and Distribution	**Satisfactory**	**Checking Engineer/ Planner**	**Model Audit Engineer/ Planner**	**Report Reference**
LTS Development Zone Trip-ends adjusted Y/N	Y	NDA	TSC	Paragraph 4.10 - 4.15
GIS Plot of Trip-end changes BY Minus/ Devt Y/N	Y	NDA	TSC	Appendix D
Car Trips vs Parking Check Y/N	N/A			
Development Zone Select Link Plots - B Minus/ Devt	N/A			
Comparison of LTS vs TRAVL/TRICS Y/N	Y	NDA	TSC	Appendix D
Sense Check of Trip Distribution and allocate development demand to the correct zones	Y	NDA	TSC	Appendix D
HAM Runs for with Development	**Satisfactory**	**Checking Engineer/ Planner**	**Model Audit Engineer/ Planner**	**Report Reference**
GIS Plot of OD changes BaseYear Minus vs Dev	Y	NDA	TSC	Appendix D
Plot of Junctions with Changed Coding	Y	NDA	TSC	Figure 4.4
Model Convergence Gap to WebTAG Standards Y/N	Y	NDA	TSC	Paragraph 4.18
Locations of Local Signal Optimization	N/A			
Impact of Local Signal Optimization (comparison)	N/A			
Plots of Local Congestion Hotspots	Y	NDA	TSC	Appendix E
Demand Flow Plots	Y	NDA	TSC	Appendix E
Actual Flow Plots	Y	NDA	TSC	Appendix E
Queue Length Plots	Y	NDA	TSC	Appendix E
GIS V/C (Red/amber/green) Plots	Y	NDA	TSC	Appendix E
Junction Impact Statistics	Y	NDA	TSC	Appendix E
Comparison against Base Journey Times	N/A			
Area Based Statistics	N/A			
Development Zone Select Link Plots - Devt	N/A			
Development Zone Select Link Plots - B Minus	N/A			
Gross Development Impact & Displacement Plots	N/A			
Matrix Cordon Based Analysis - Devt Demand	N/A			
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		Natalia Duran	Tom Caulfield	
	Signed	Natalia C. Duran A.	T Caulfield	
	Date	27/01/2015	27/01/2015	

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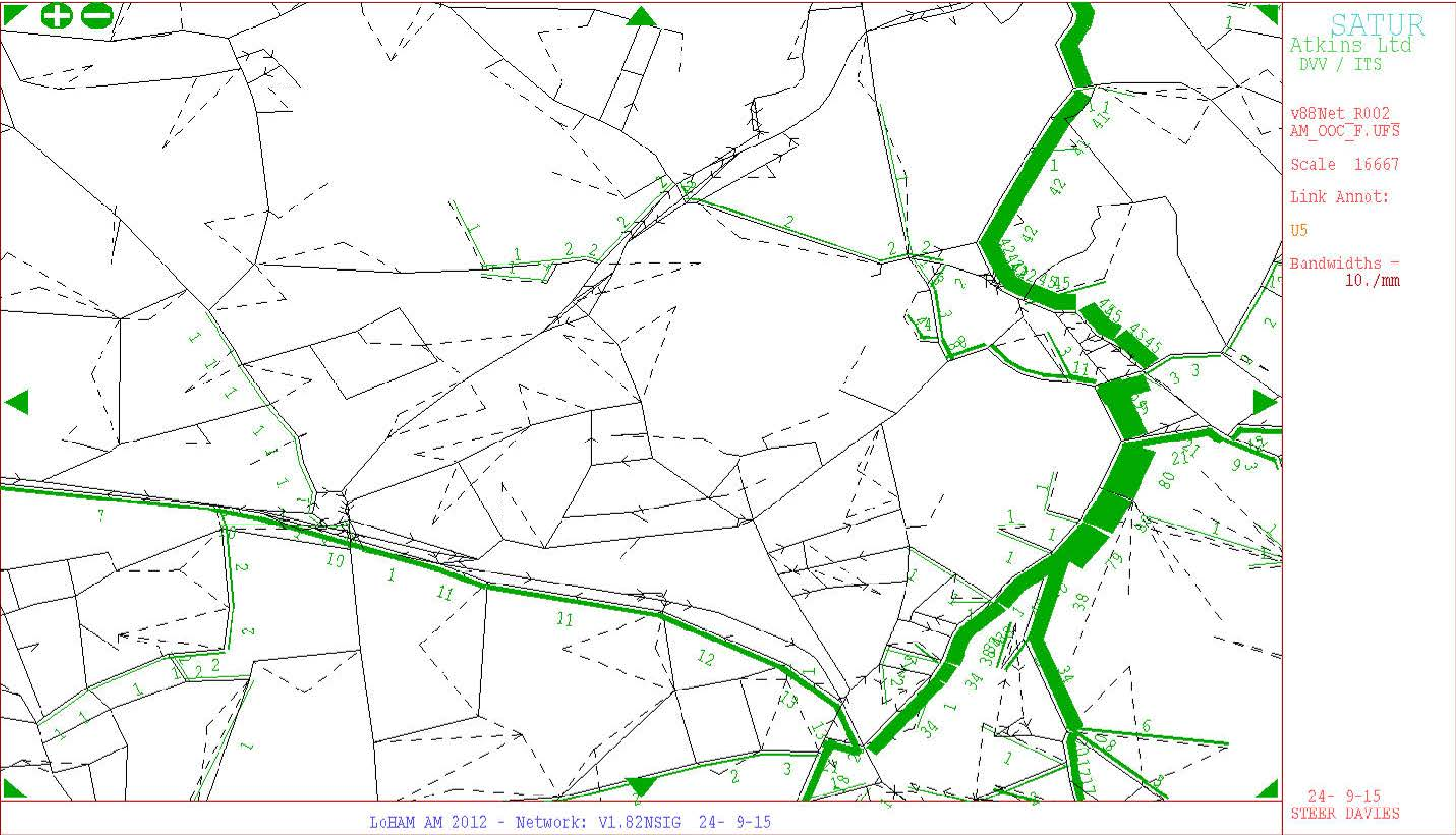
Park Royal Transport Strategy

Modelling Report

Appendix B – Select Link Analysis



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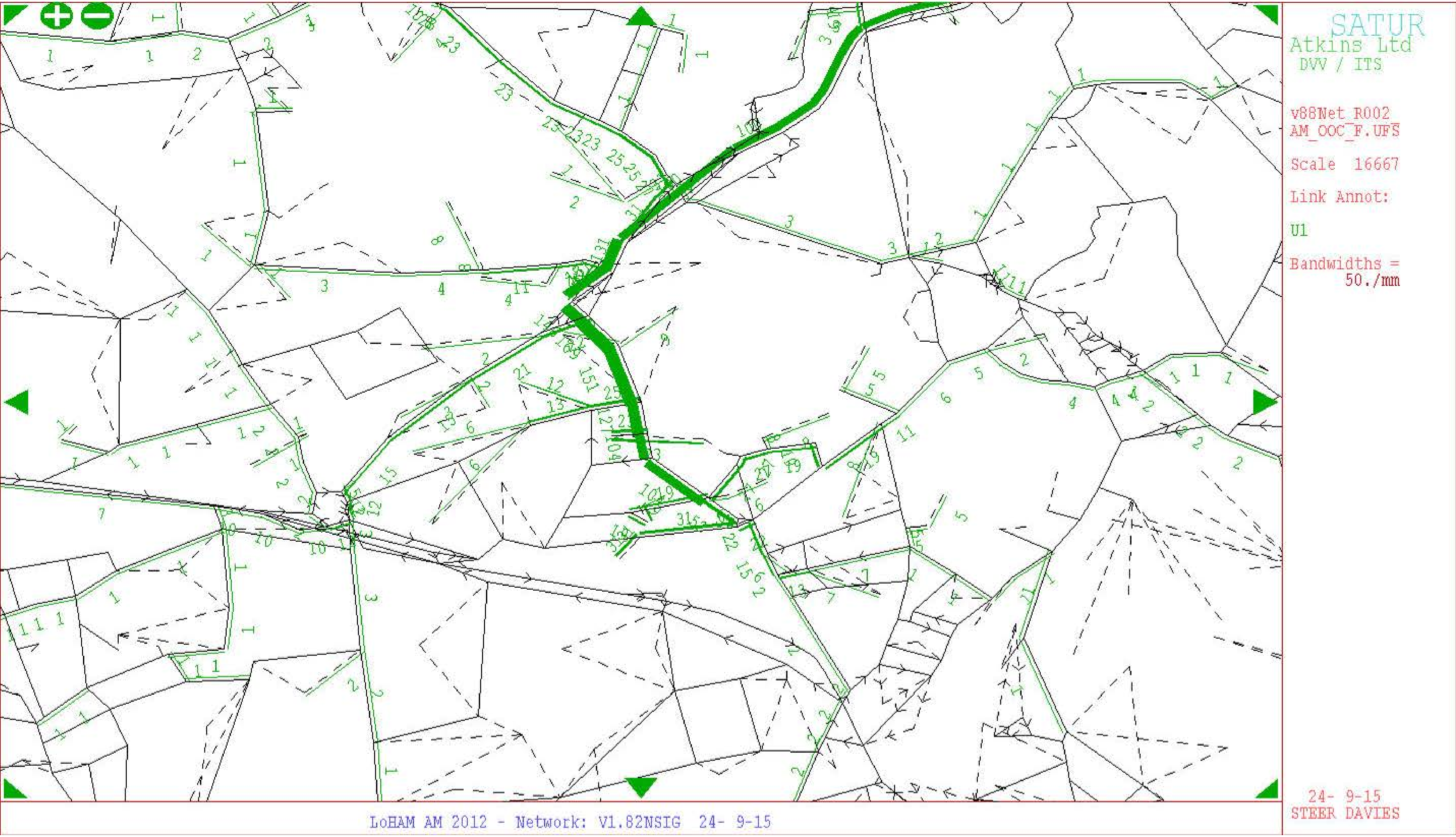
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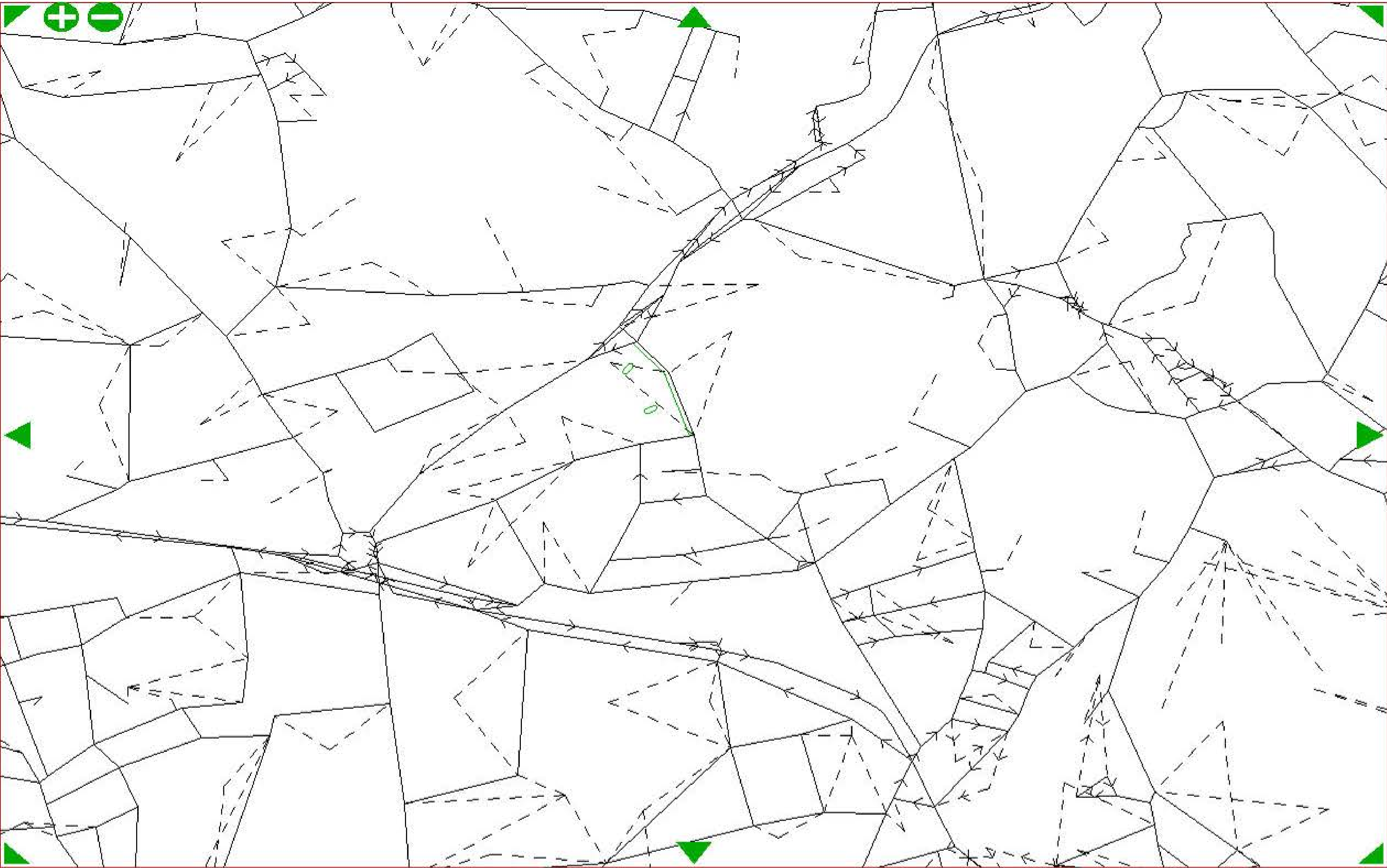

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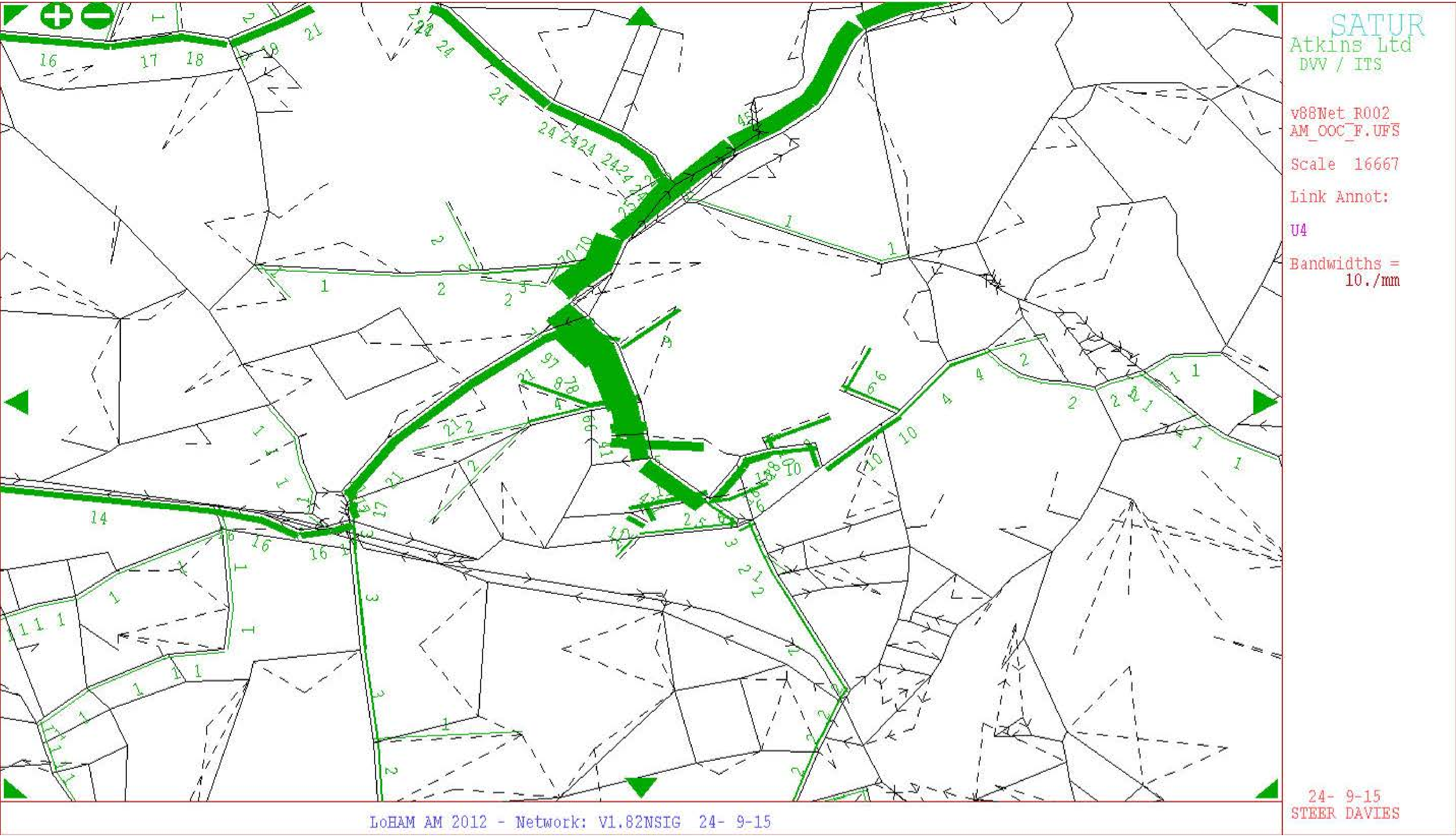

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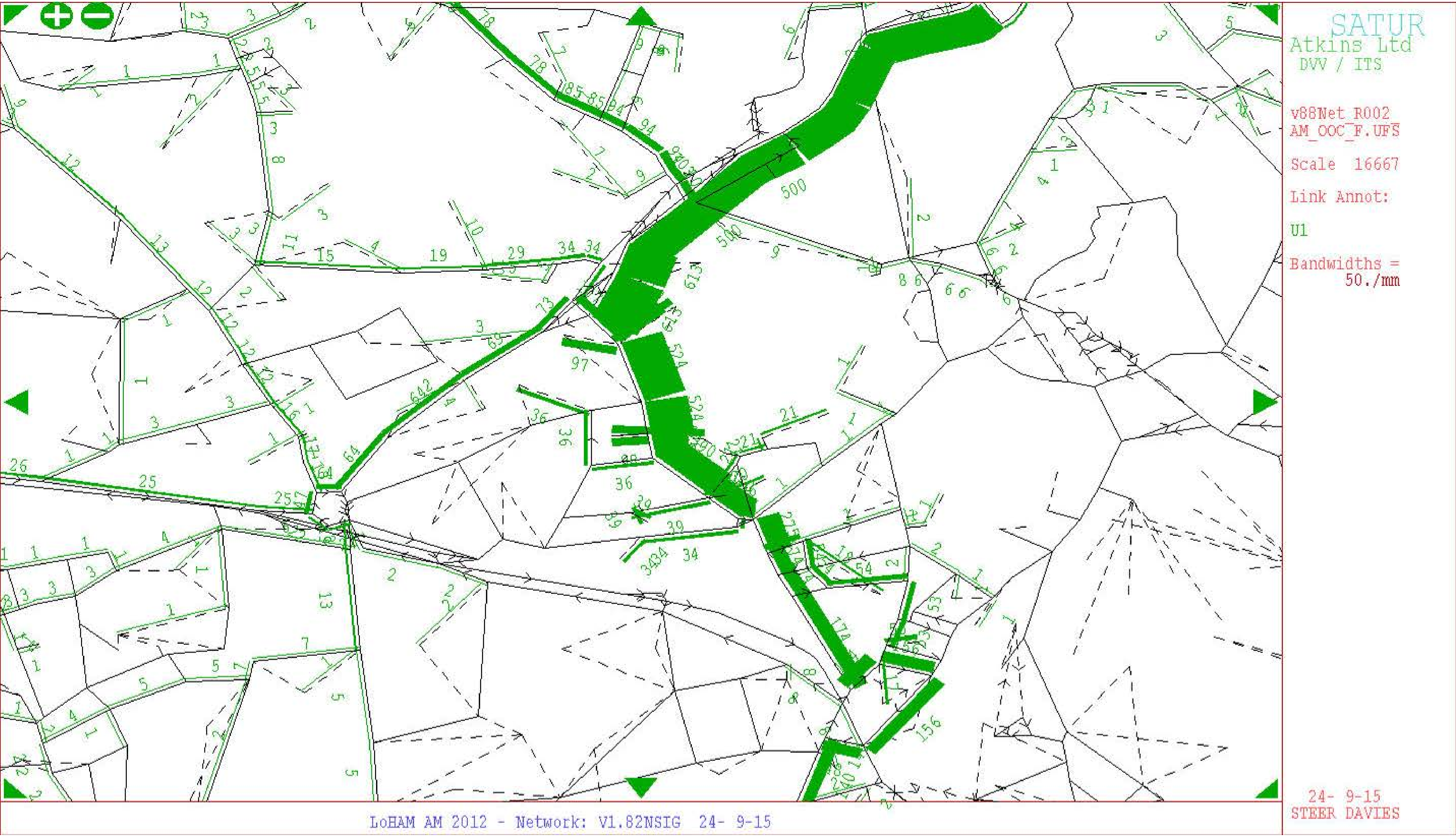

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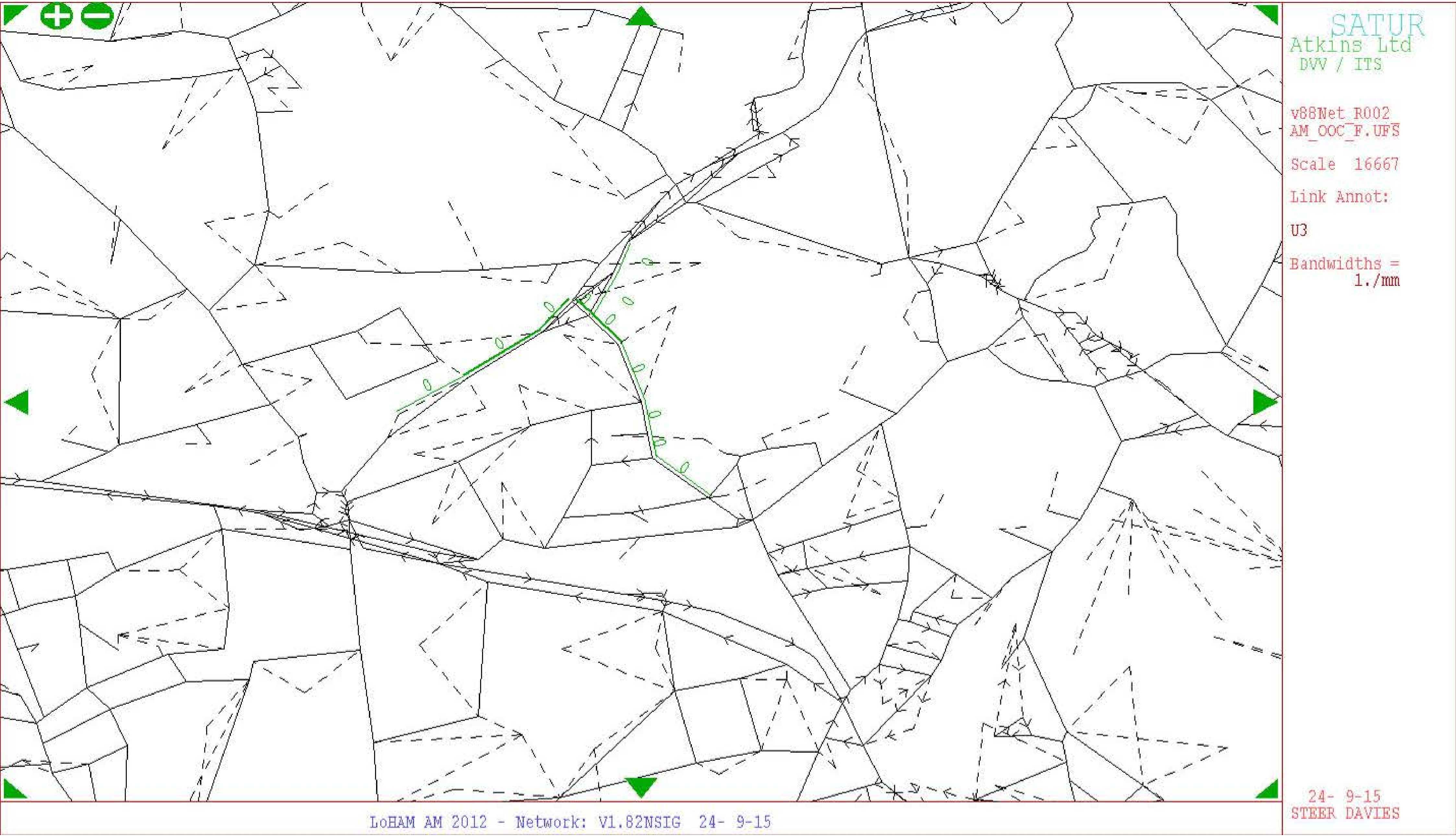

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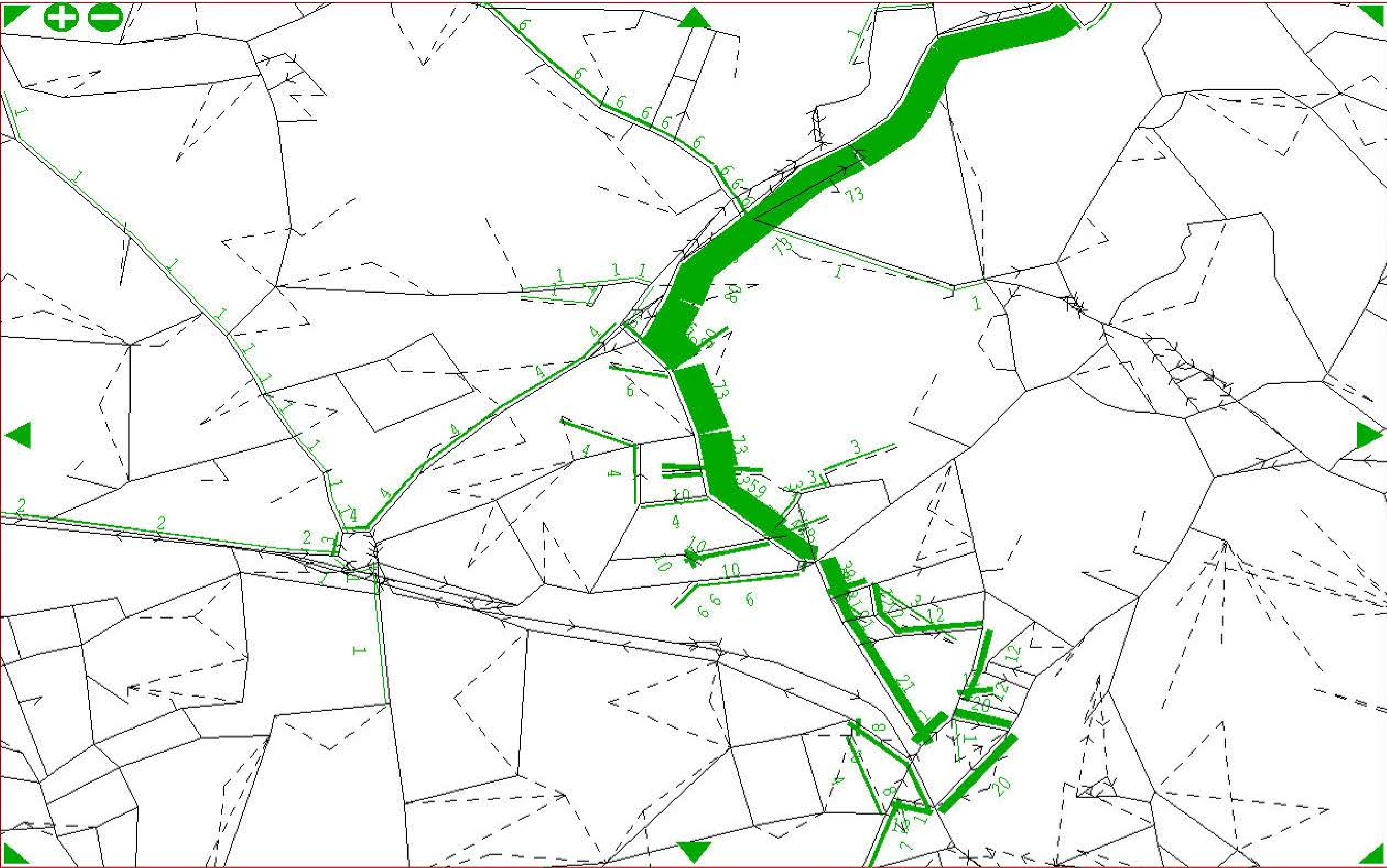
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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Bandwidths =
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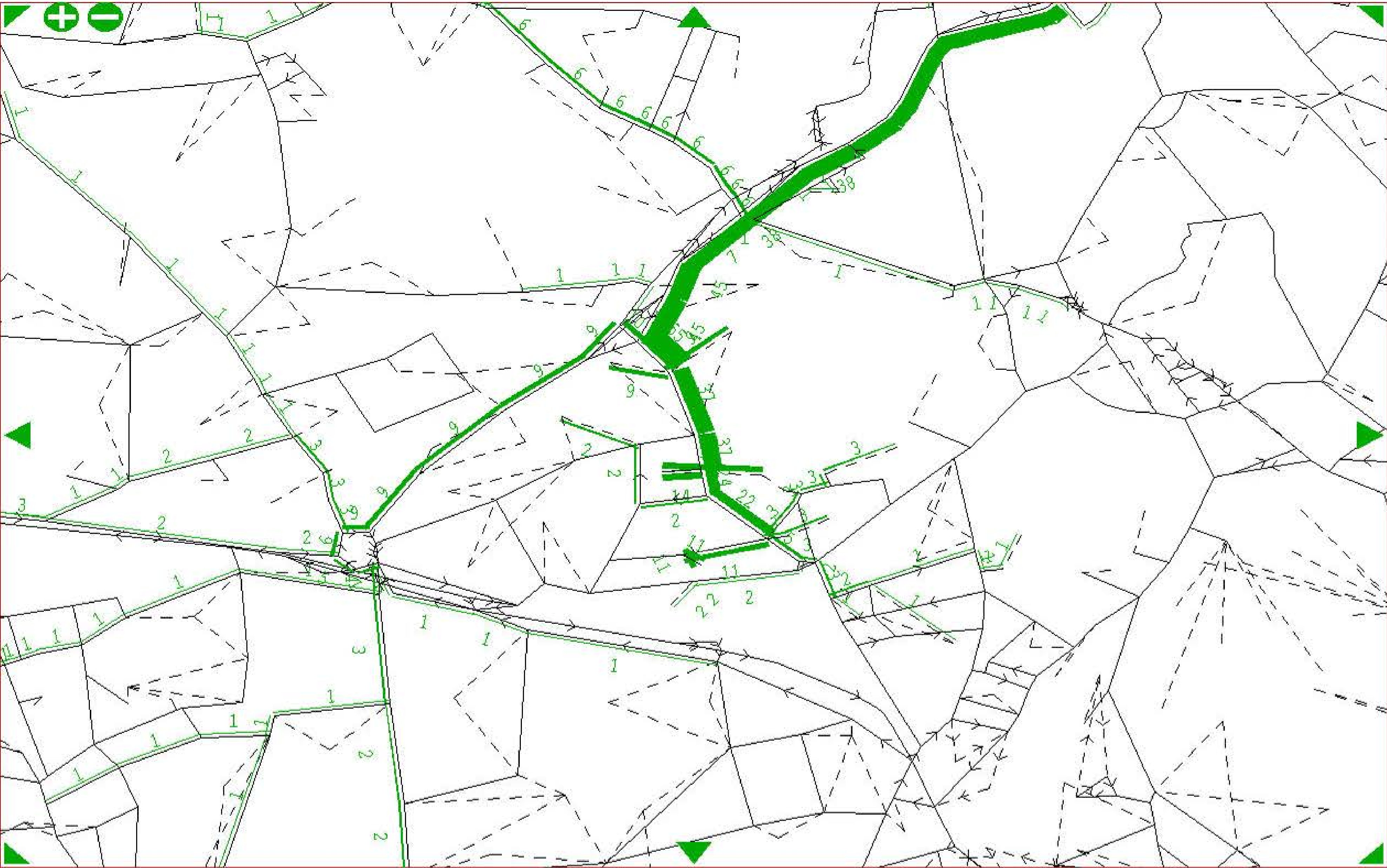
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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Atkins Ltd
DVV / ITS

v88Net_R002_
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Link Annot:

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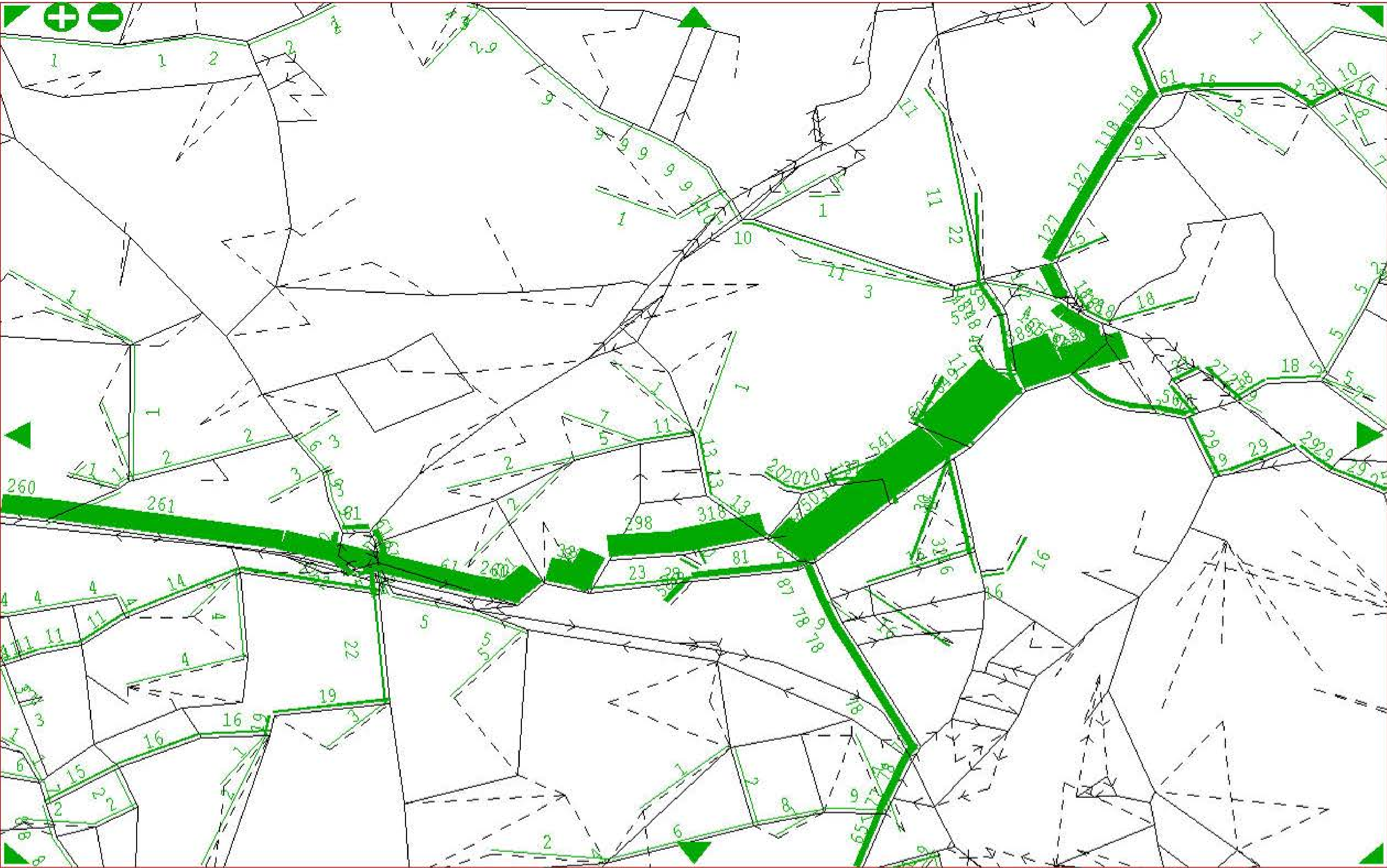
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

Scale 16667

Link Annot:

U1

Bandwidths =
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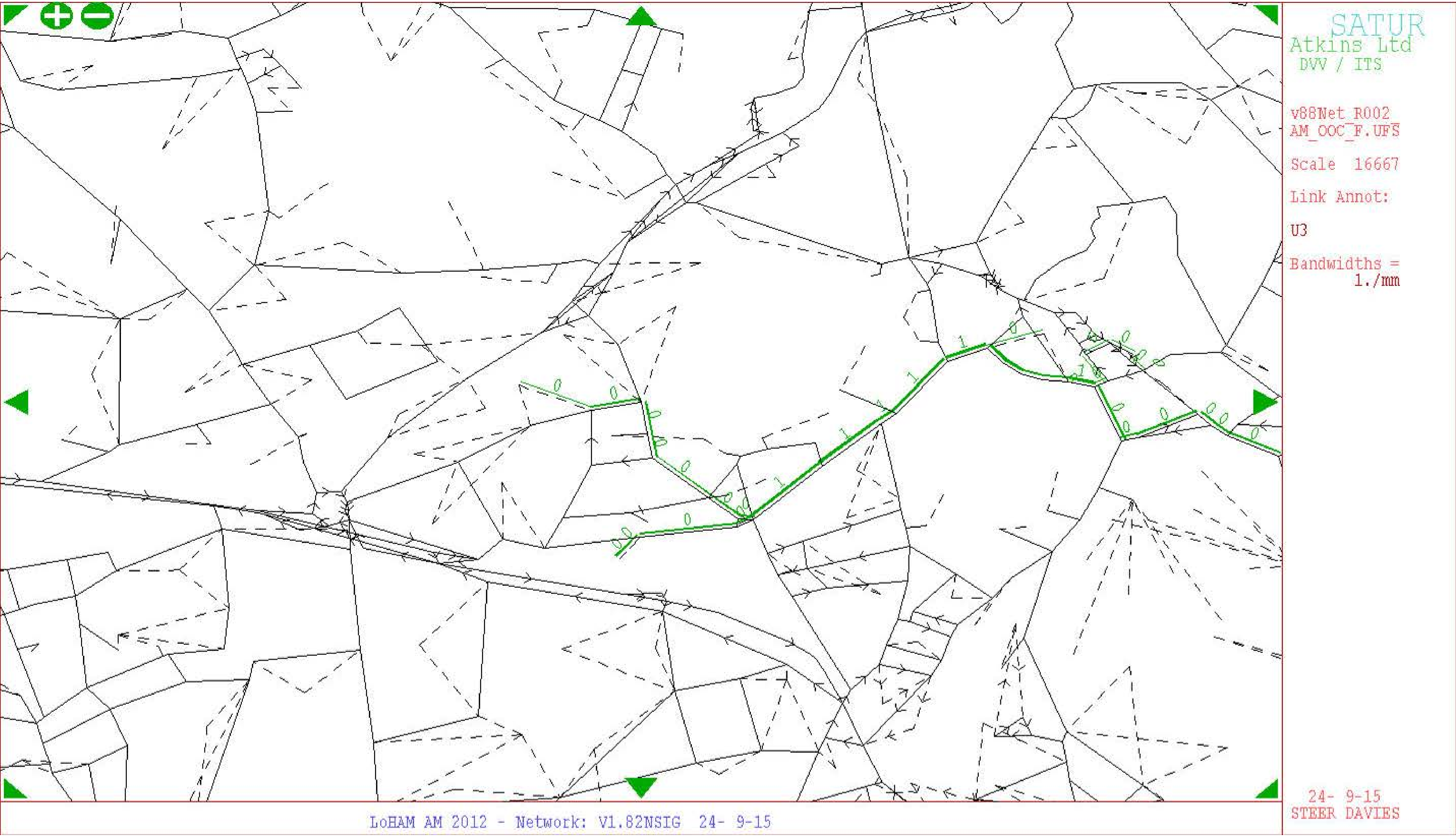
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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Atkins Ltd
DVV / ITS
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AM_OOC_F.UFS
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Bandwidths =
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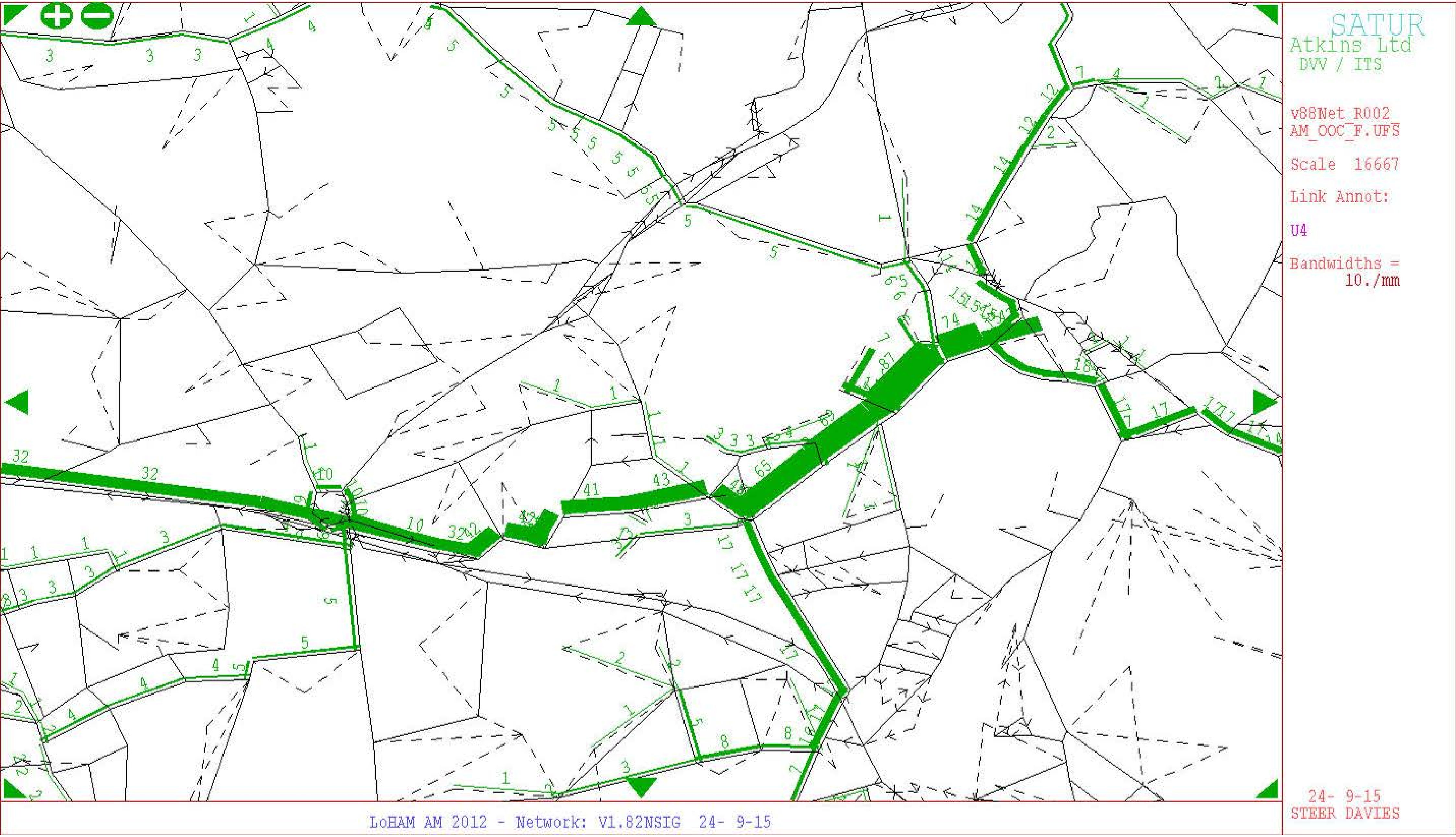
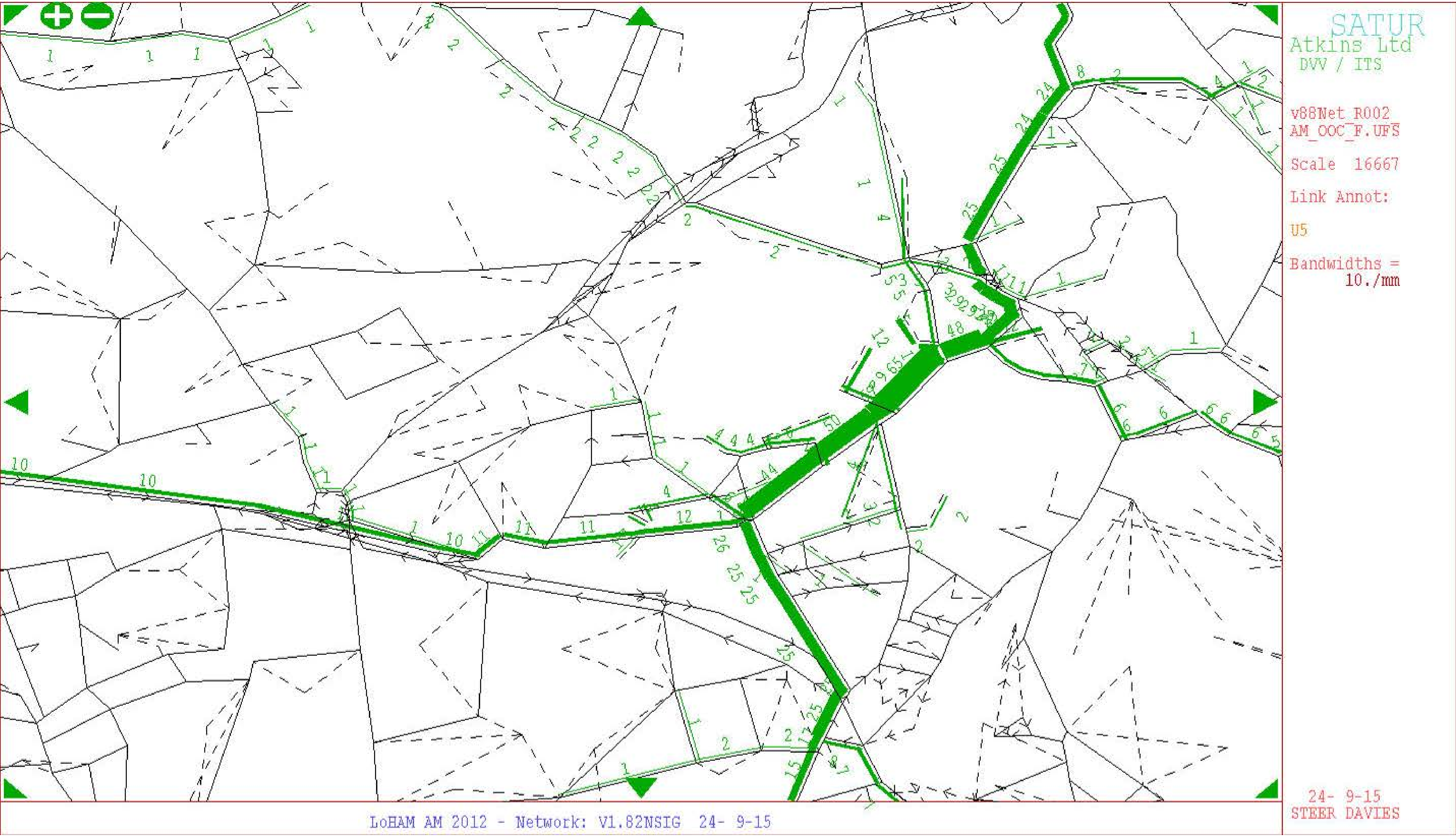
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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DVV / ITS
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AM_OOC_F.UFS
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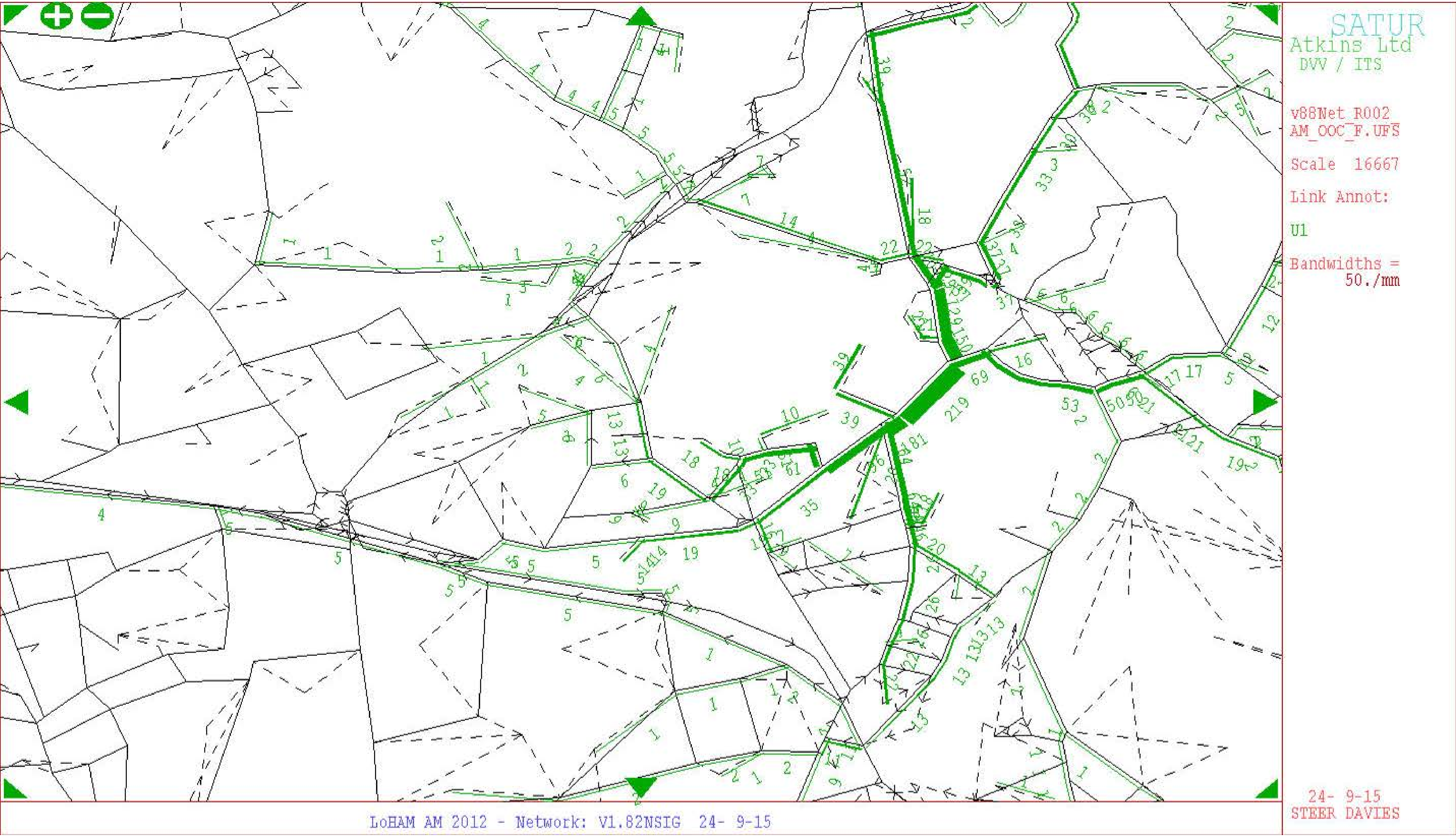
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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AM_OOC_F.UFS
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24- 9-15
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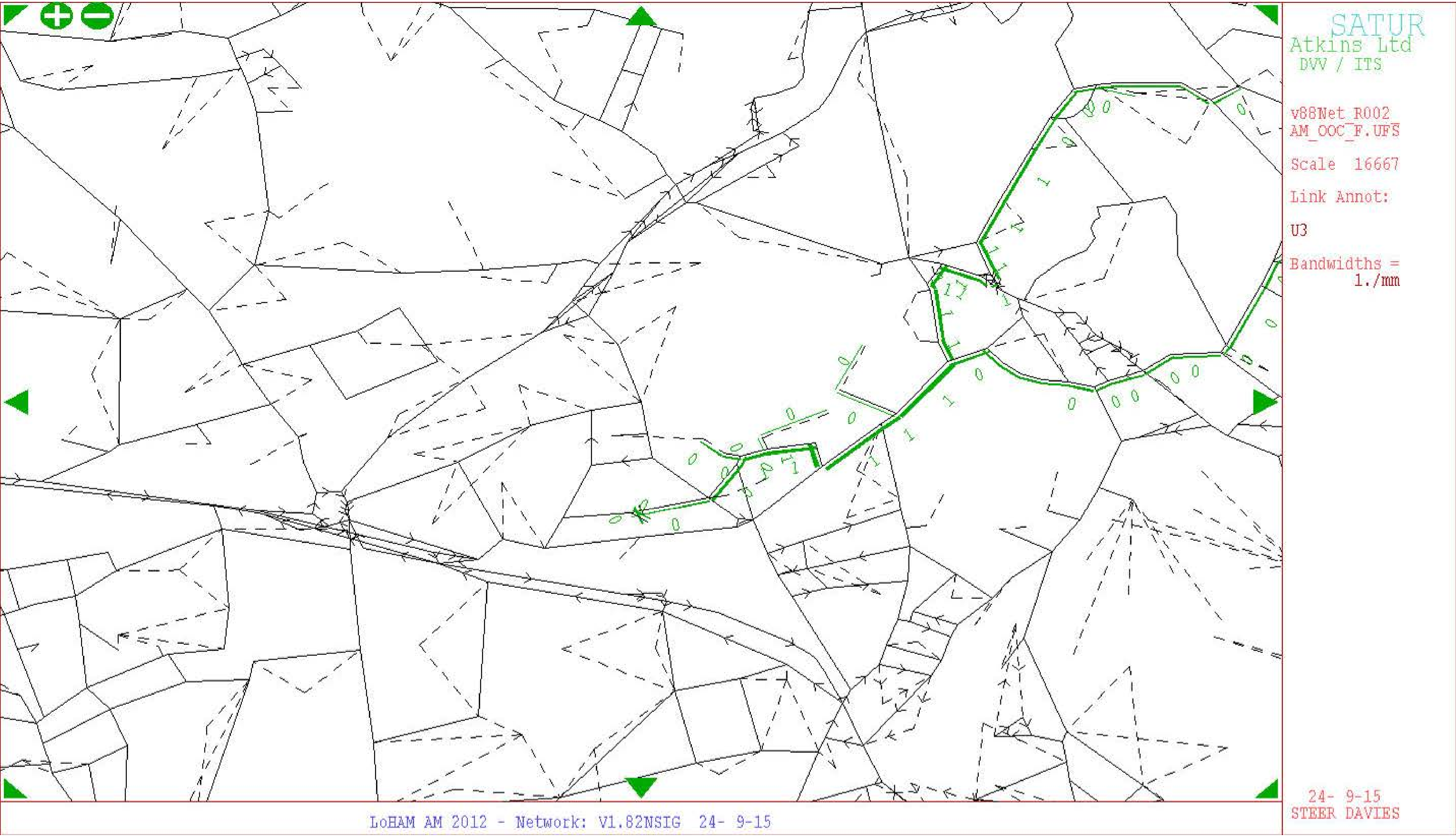
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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DVV / ITS
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AM_OOC_F.UFS
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24- 9-15
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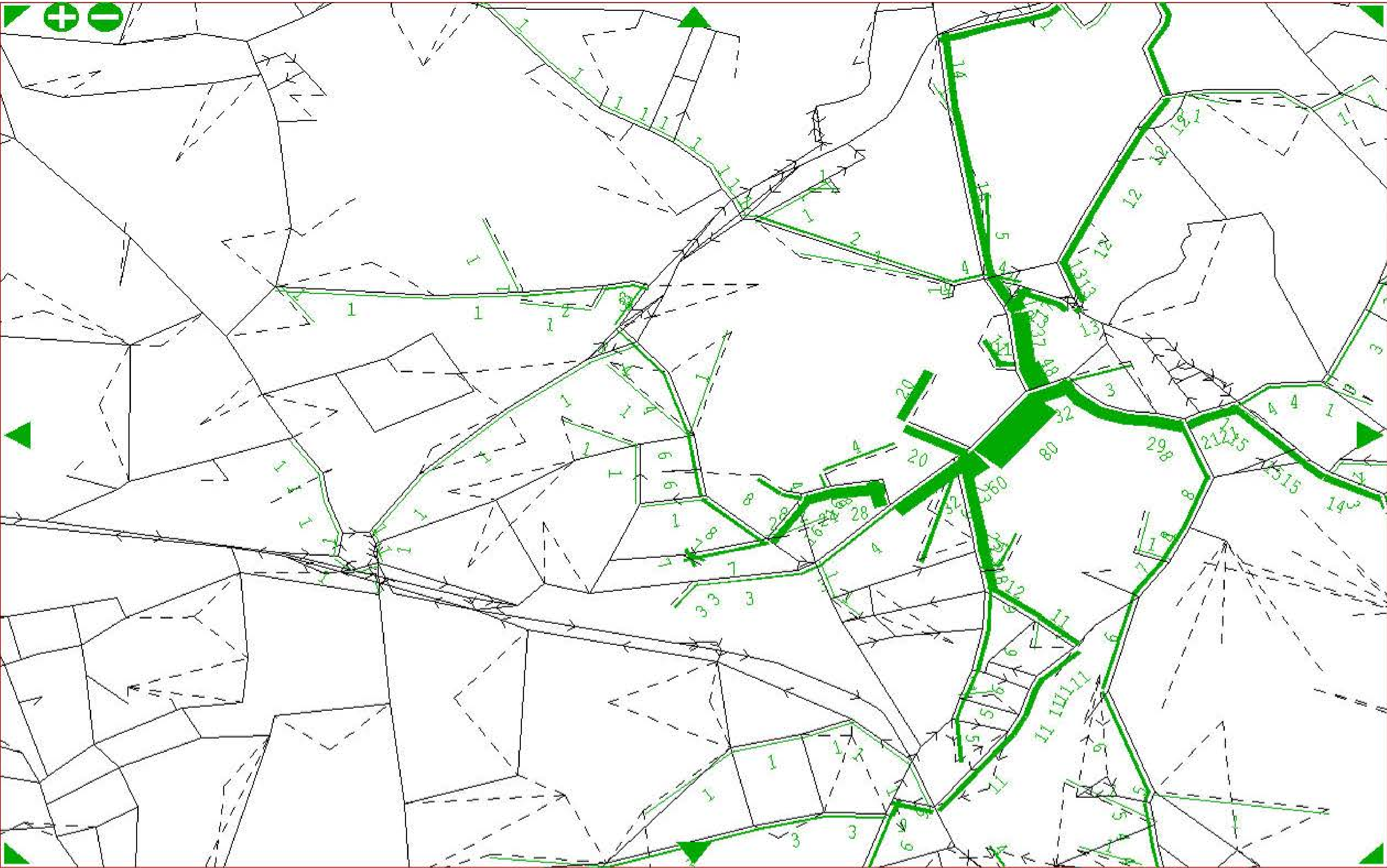

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Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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Bandwidths =
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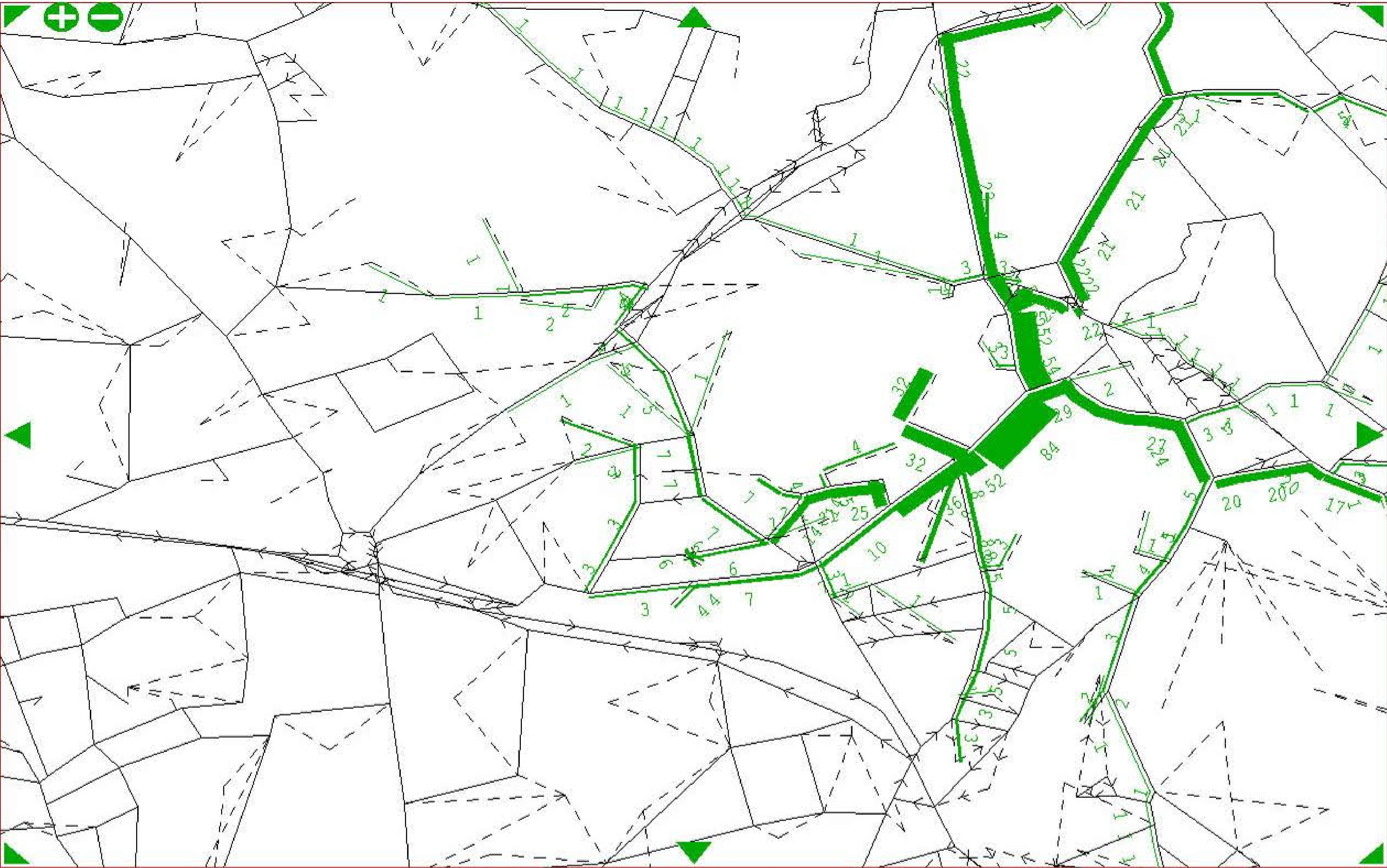
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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Bandwidths =
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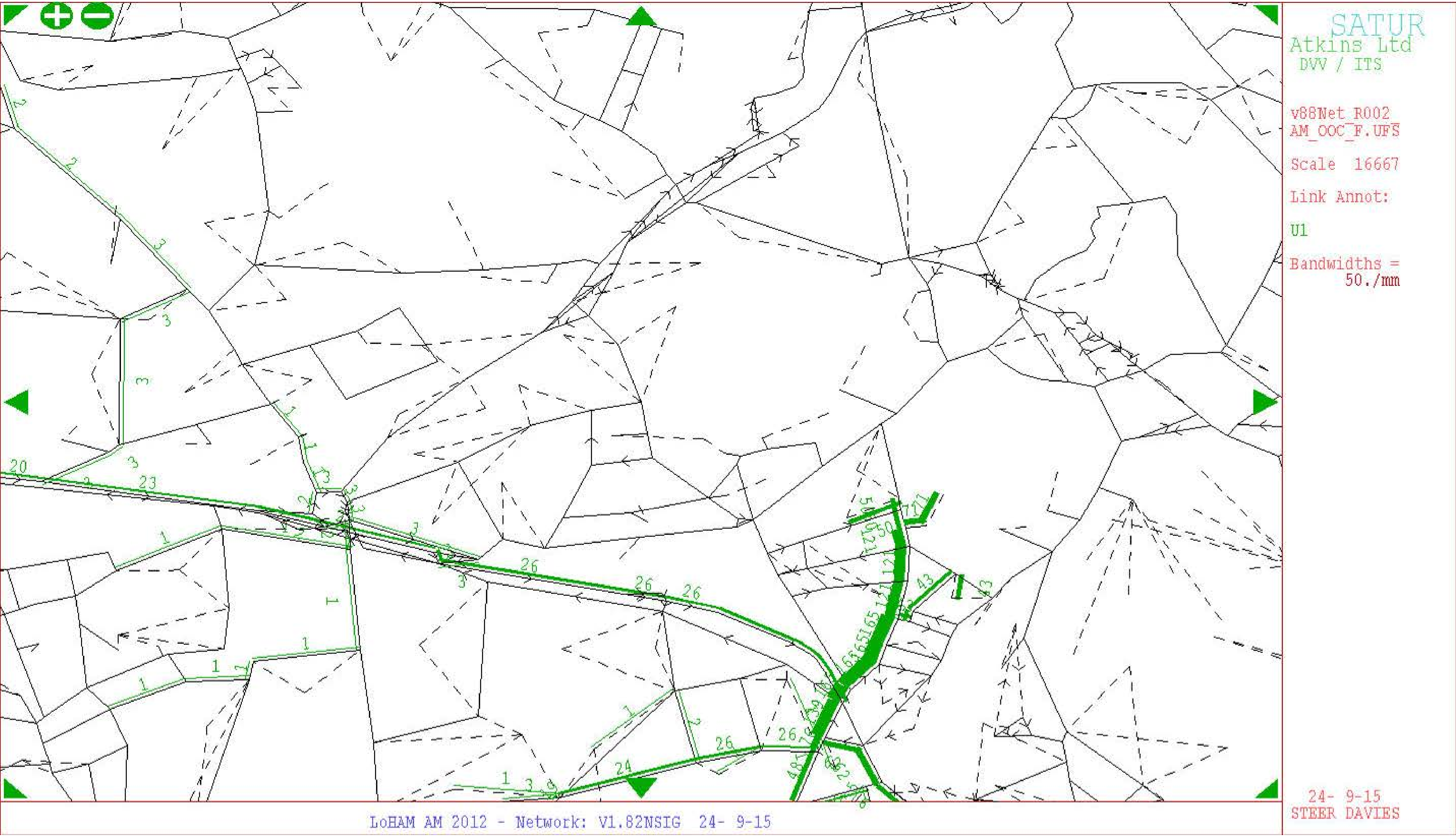
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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DVV / ITS
v88Net_R002_
AM_OOC_F.UFS
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24- 9-15
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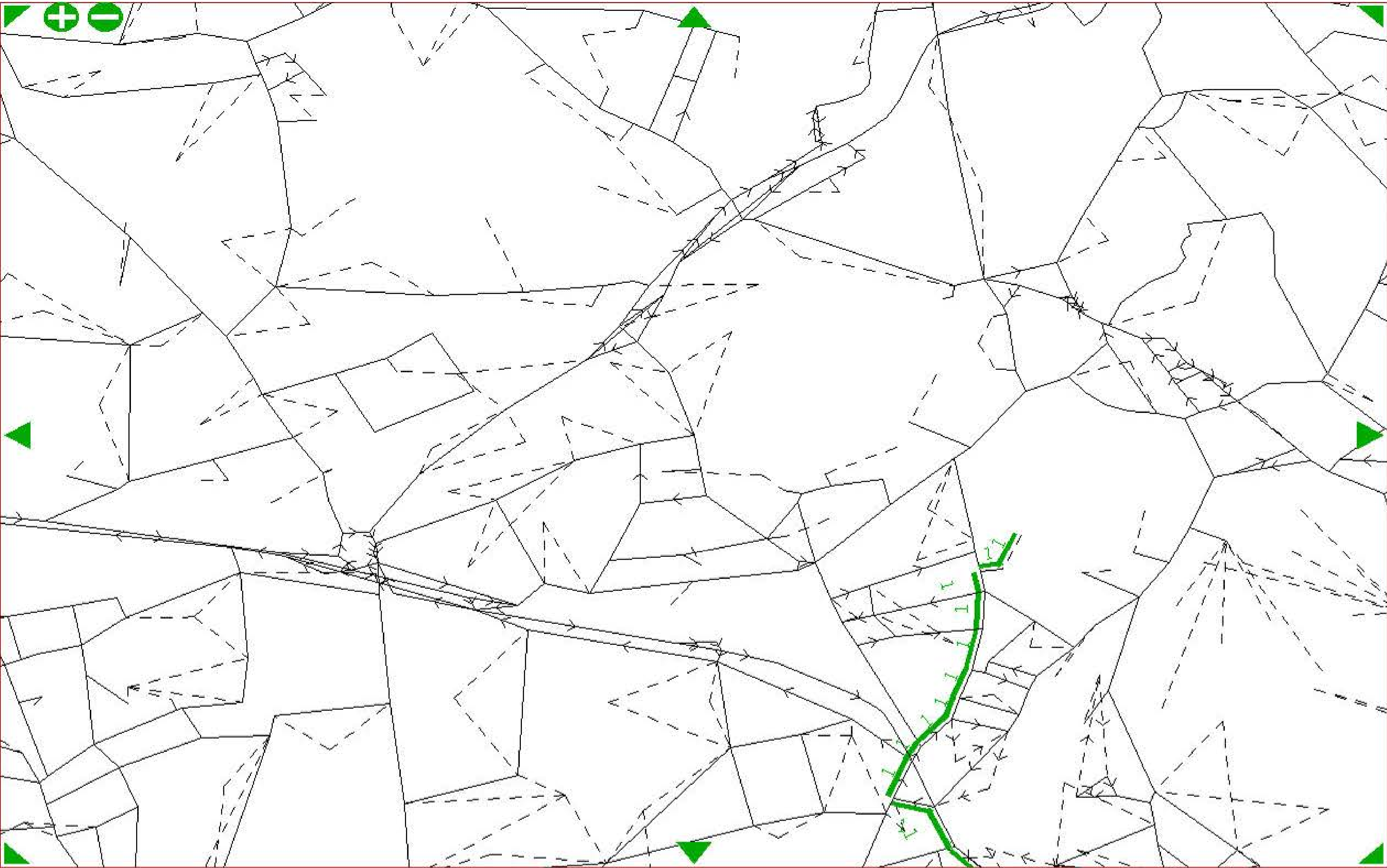
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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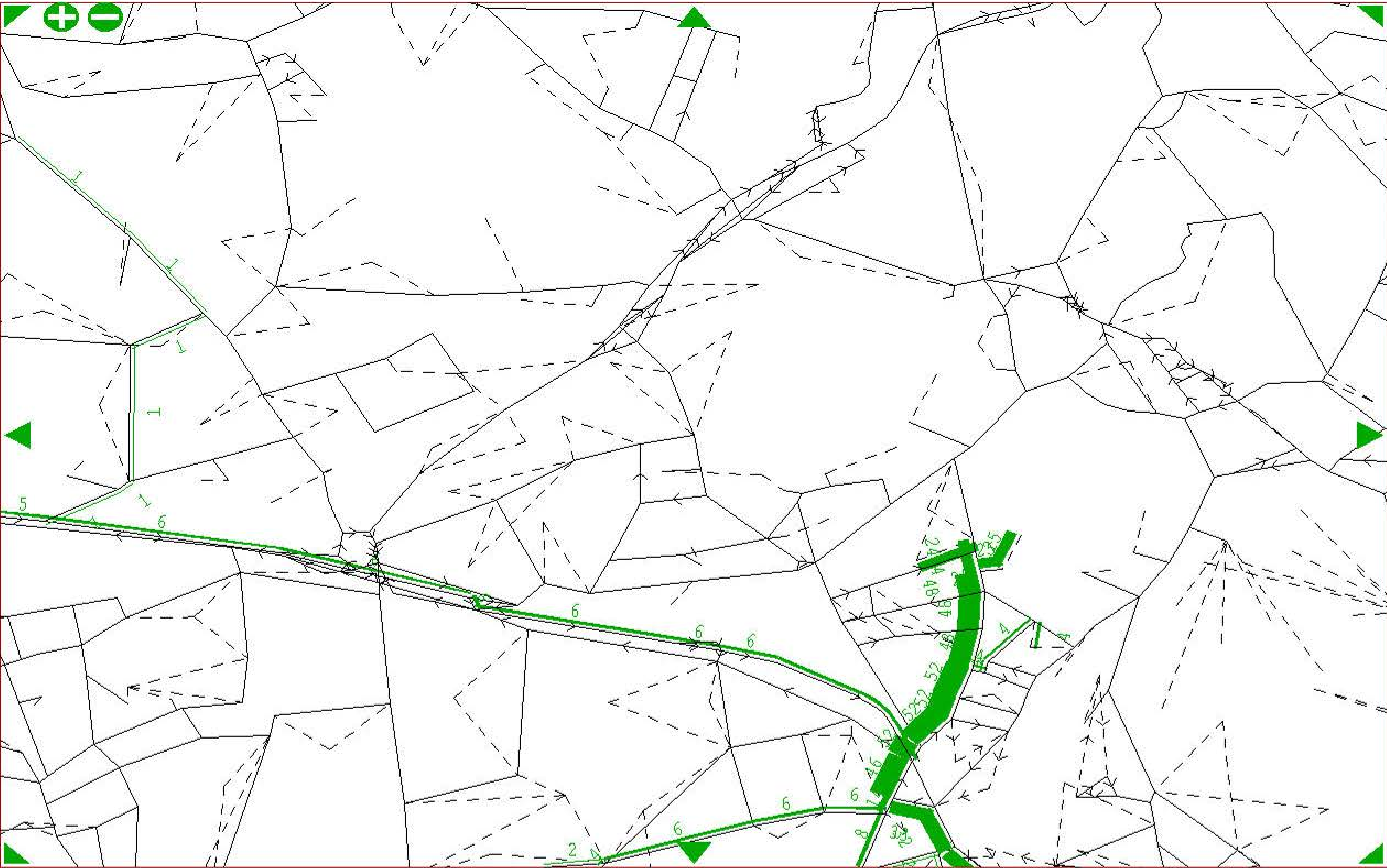
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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24- 9-15
STEER DAVIES

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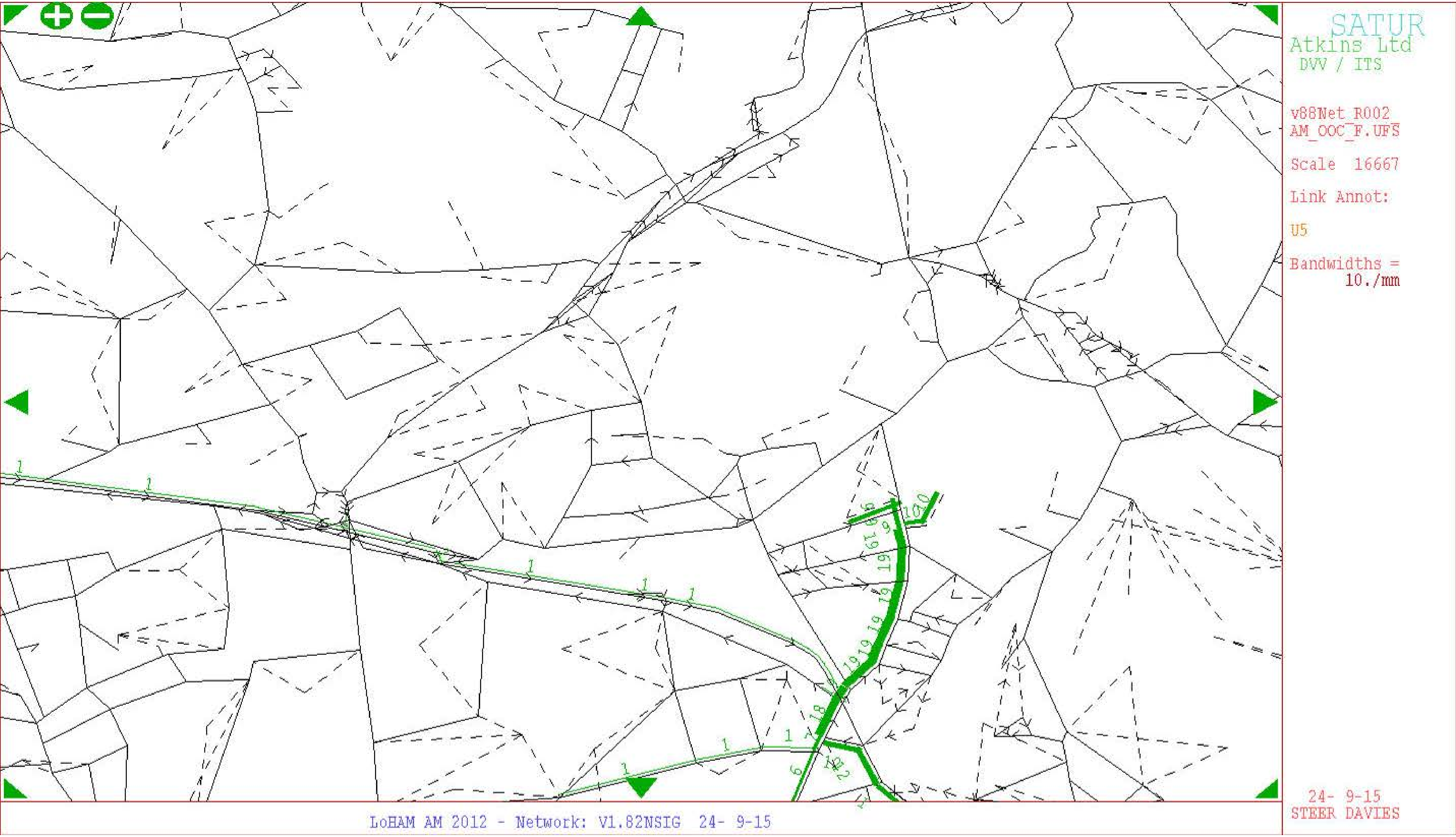
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Atkins Ltd
DVV / ITS
v88Net_R002_
AM_OOC_F.UFS
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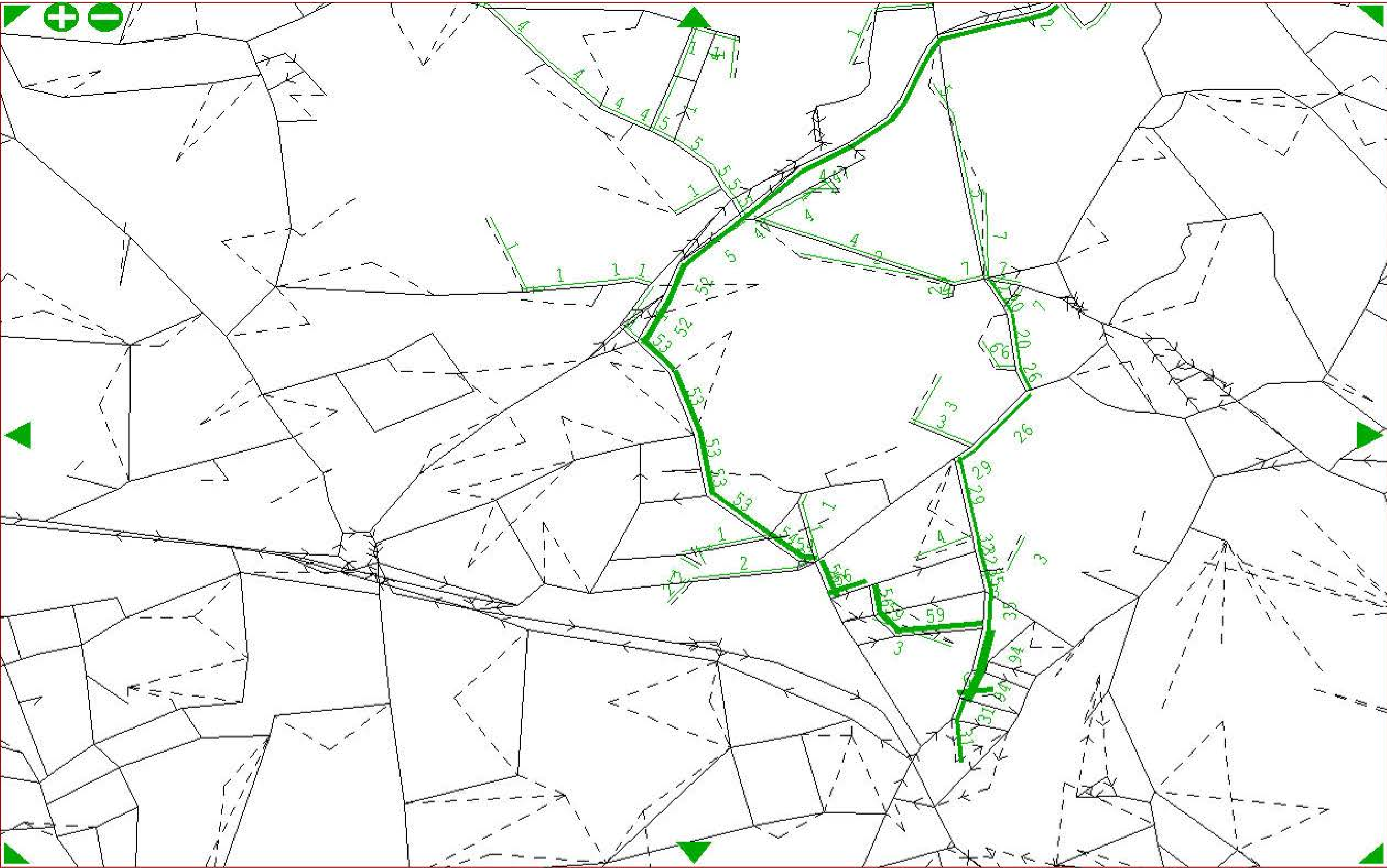
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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Bandwidths =
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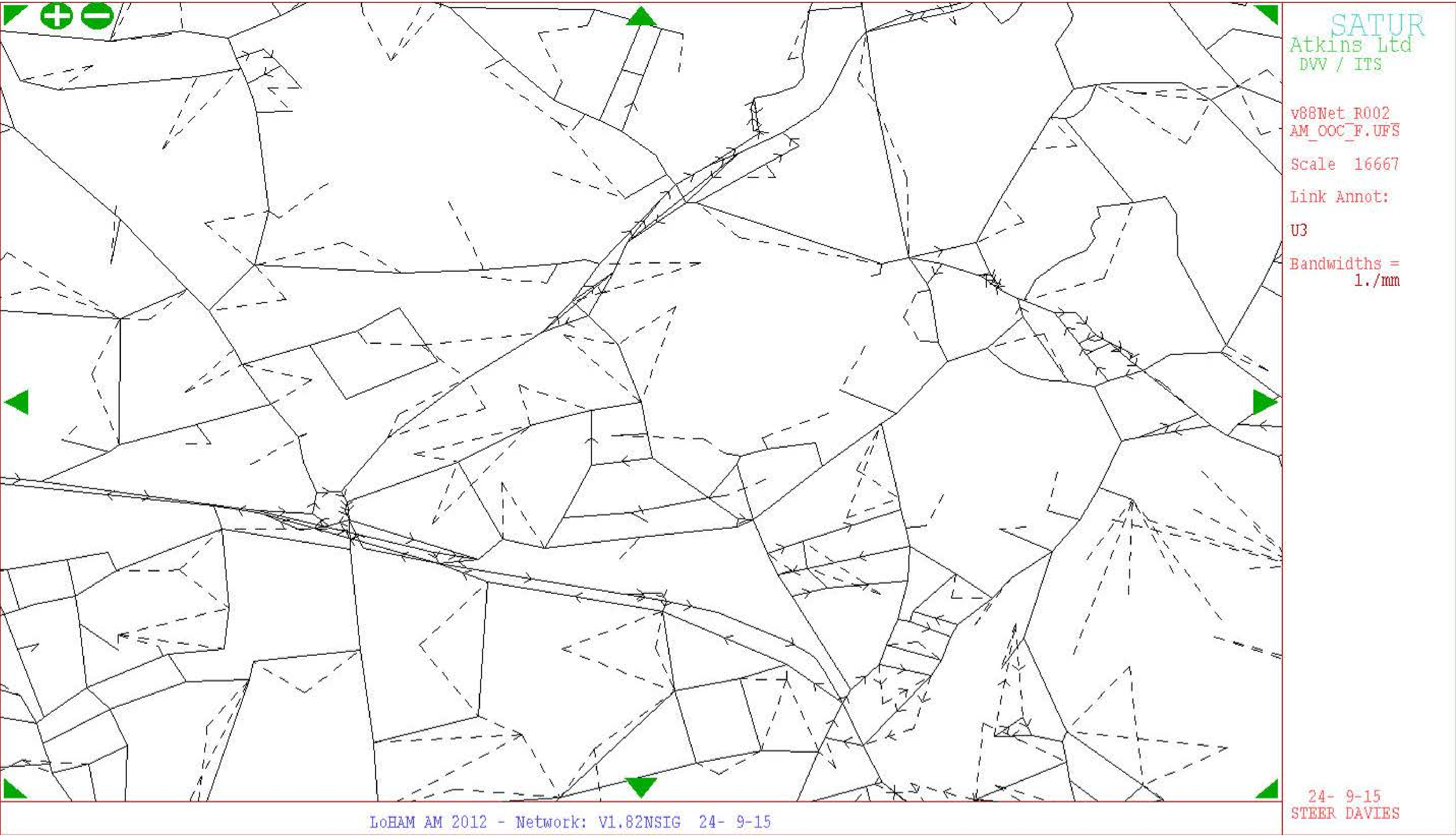
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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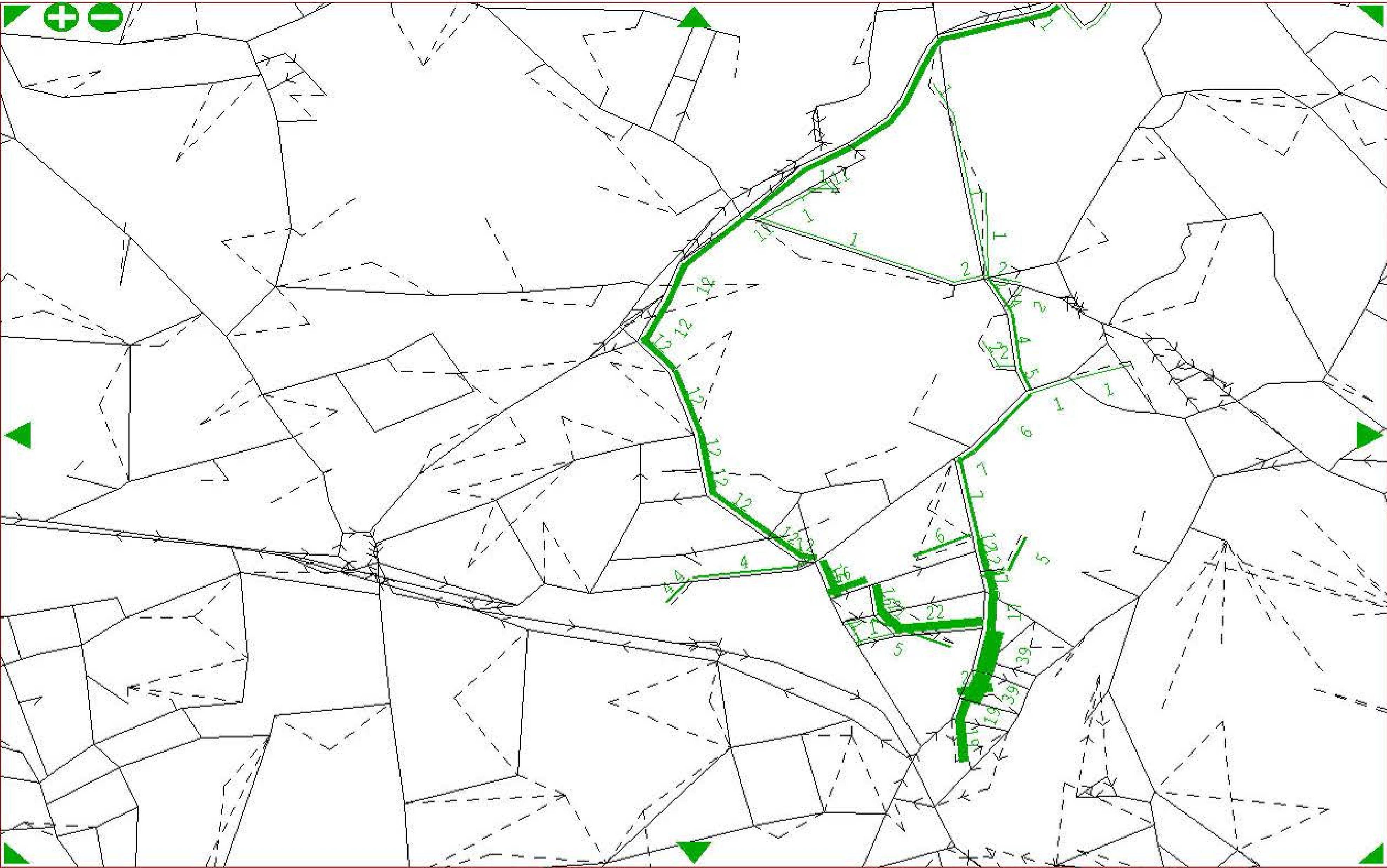

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Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

Scale 16667

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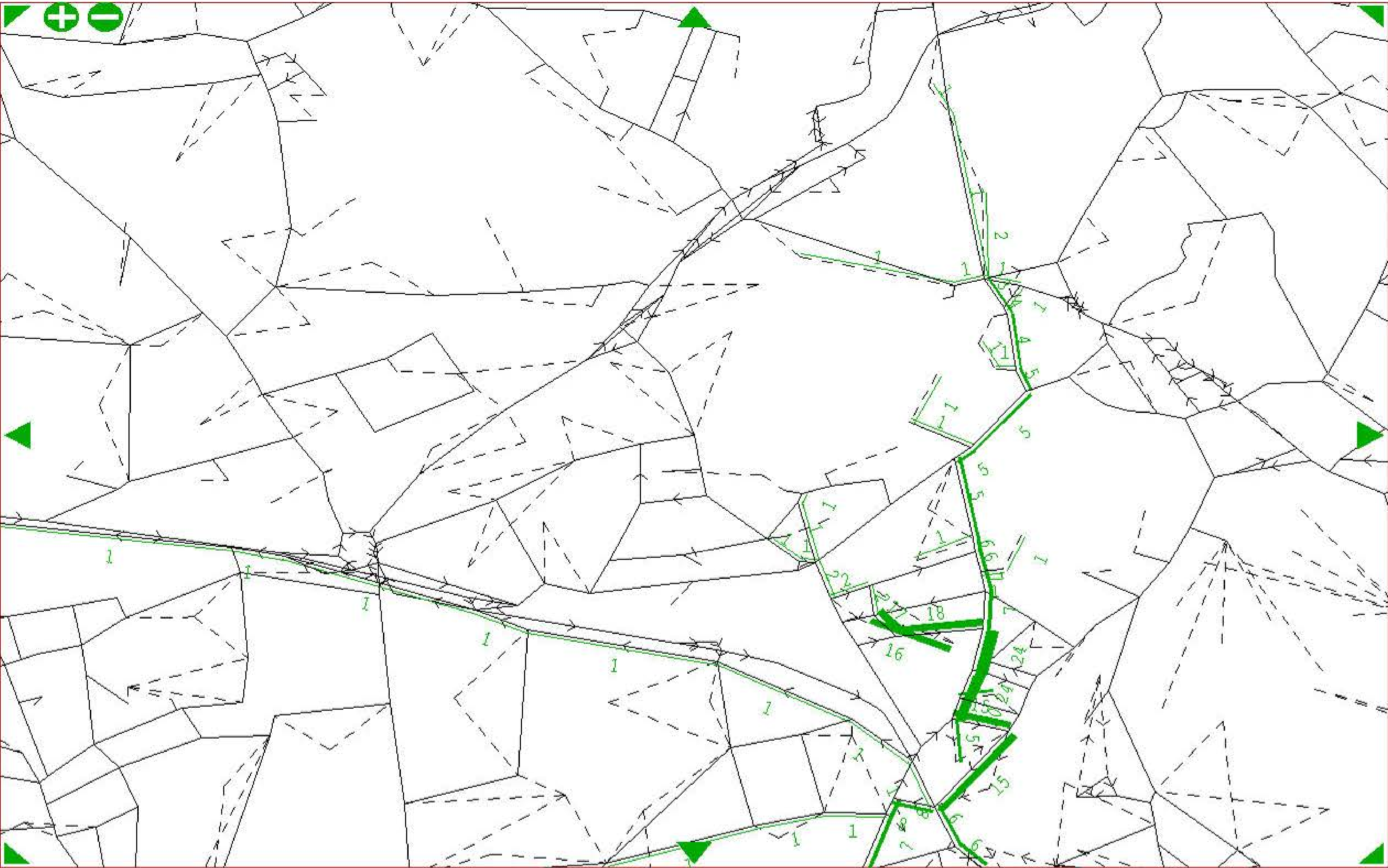
U4

Bandwidths =
10./mm

24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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DVV / ITS

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24- 9-15
STEER DAVIES

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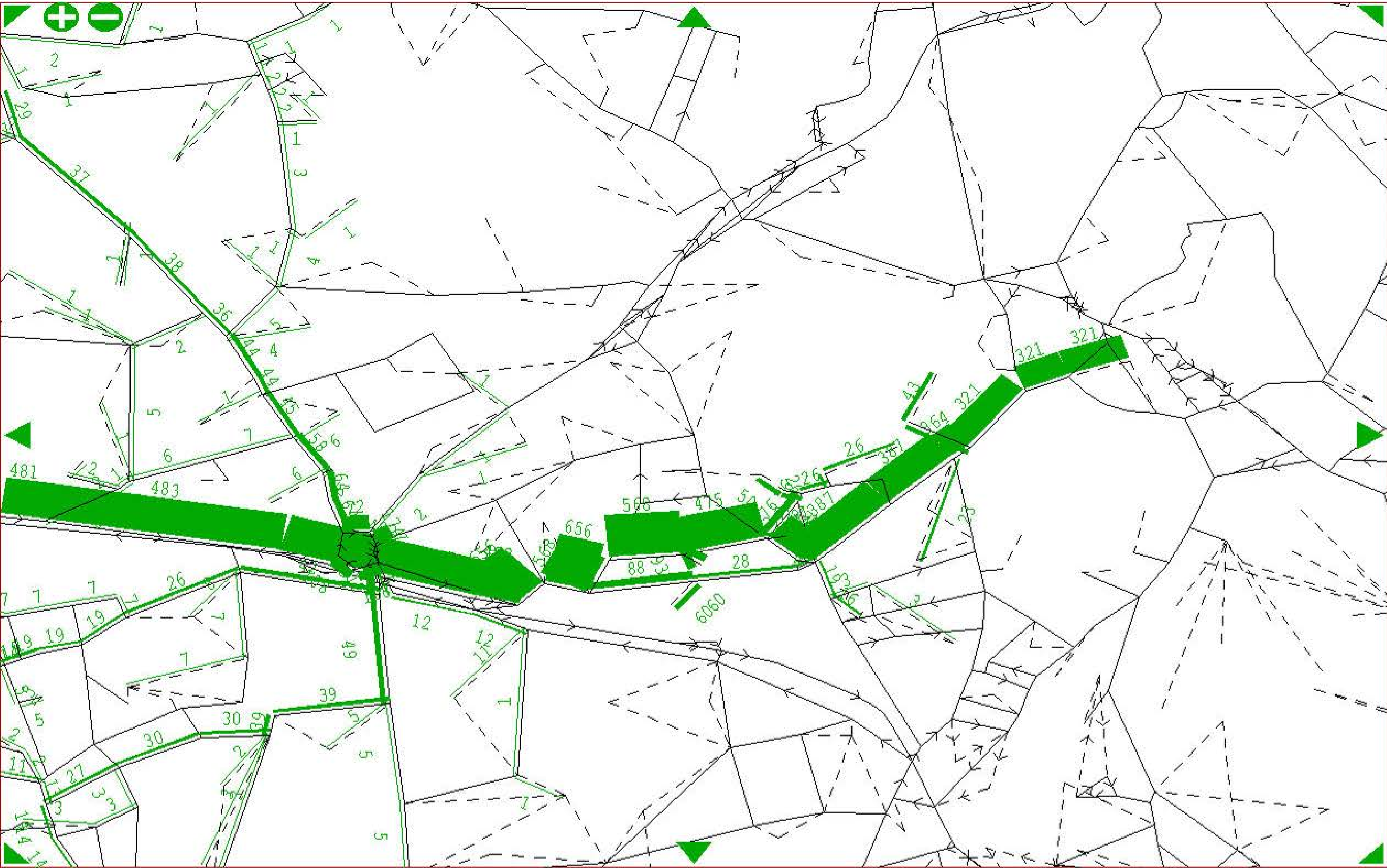

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Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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U1

Bandwidths =
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24- 9-15
STEER DAVIES

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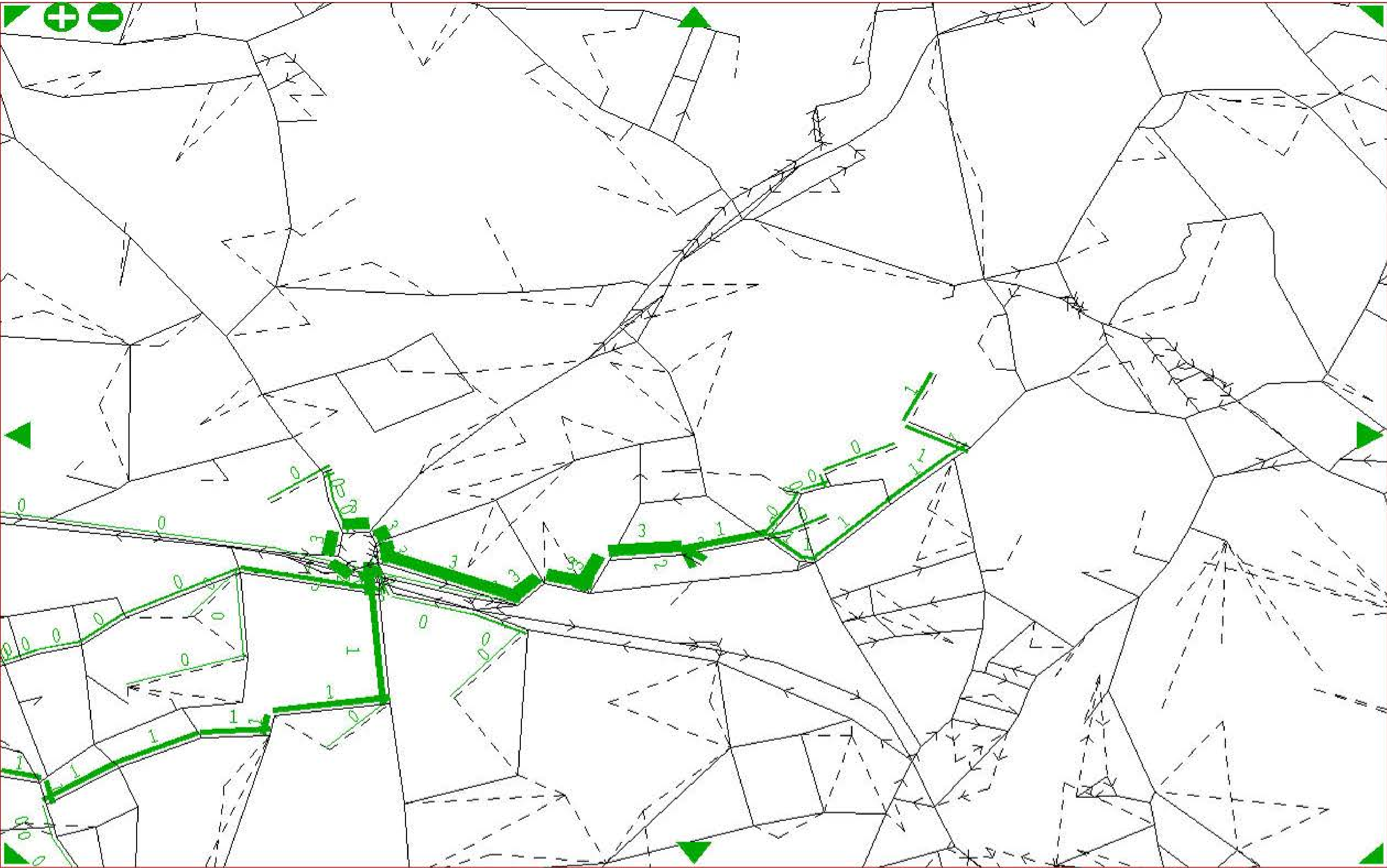

SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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U3

Bandwidths =
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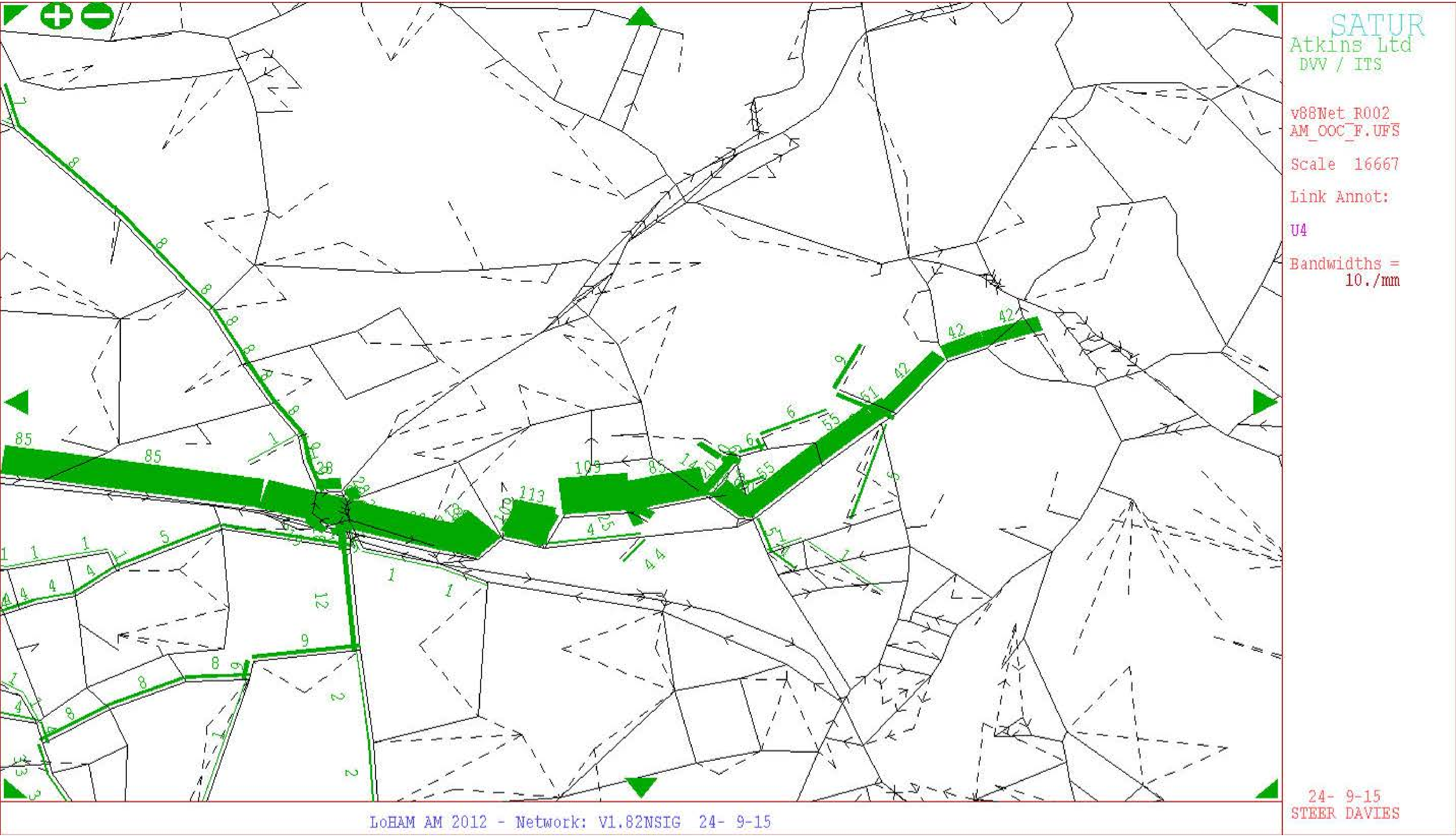
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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Atkins Ltd
DVV / ITS
v88Net_R002_
AM_OOC_F.UFS
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Bandwidths =
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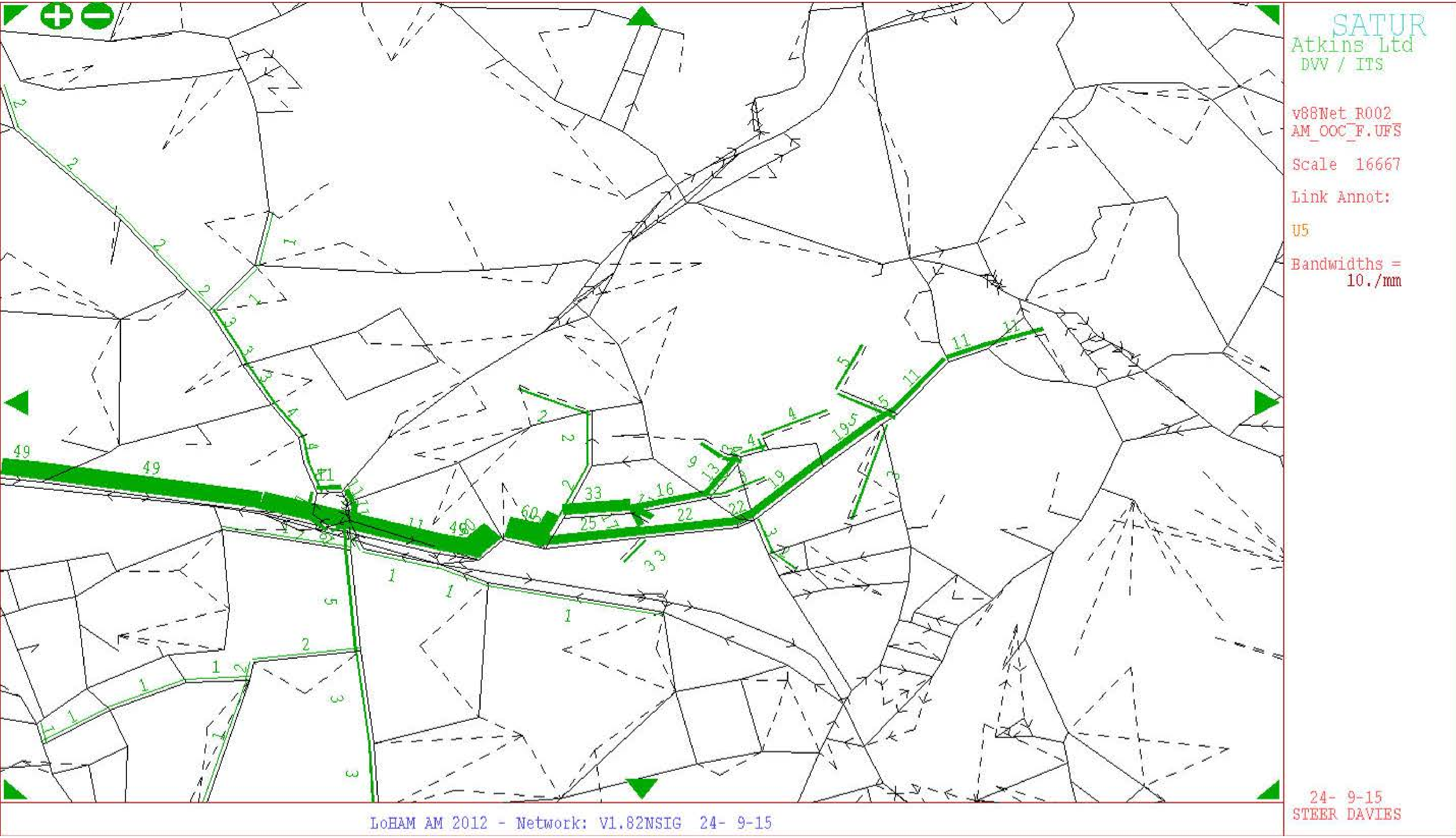
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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24- 9-15
STEER DAVIES
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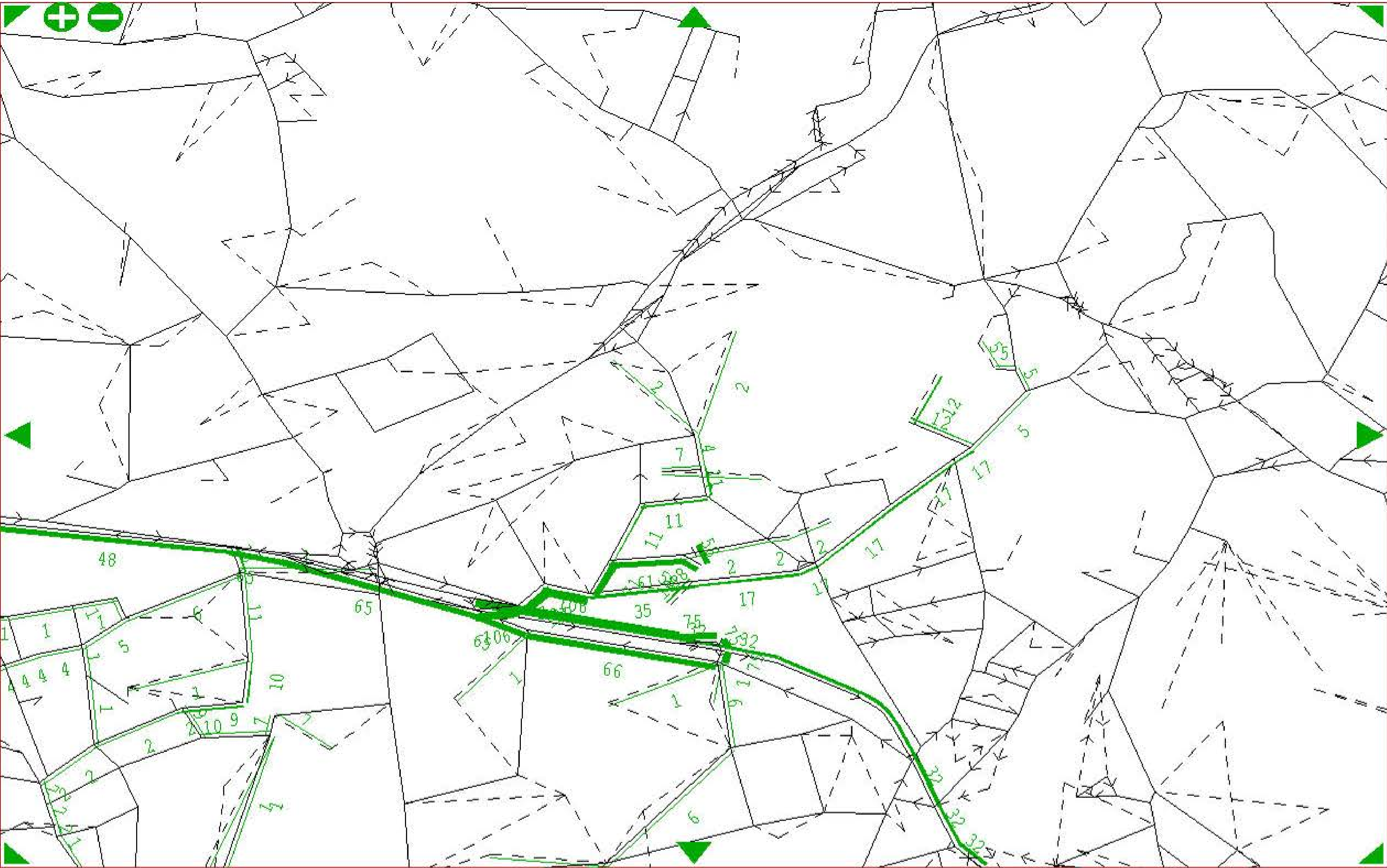

SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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24- 9-15
STEER DAVIES

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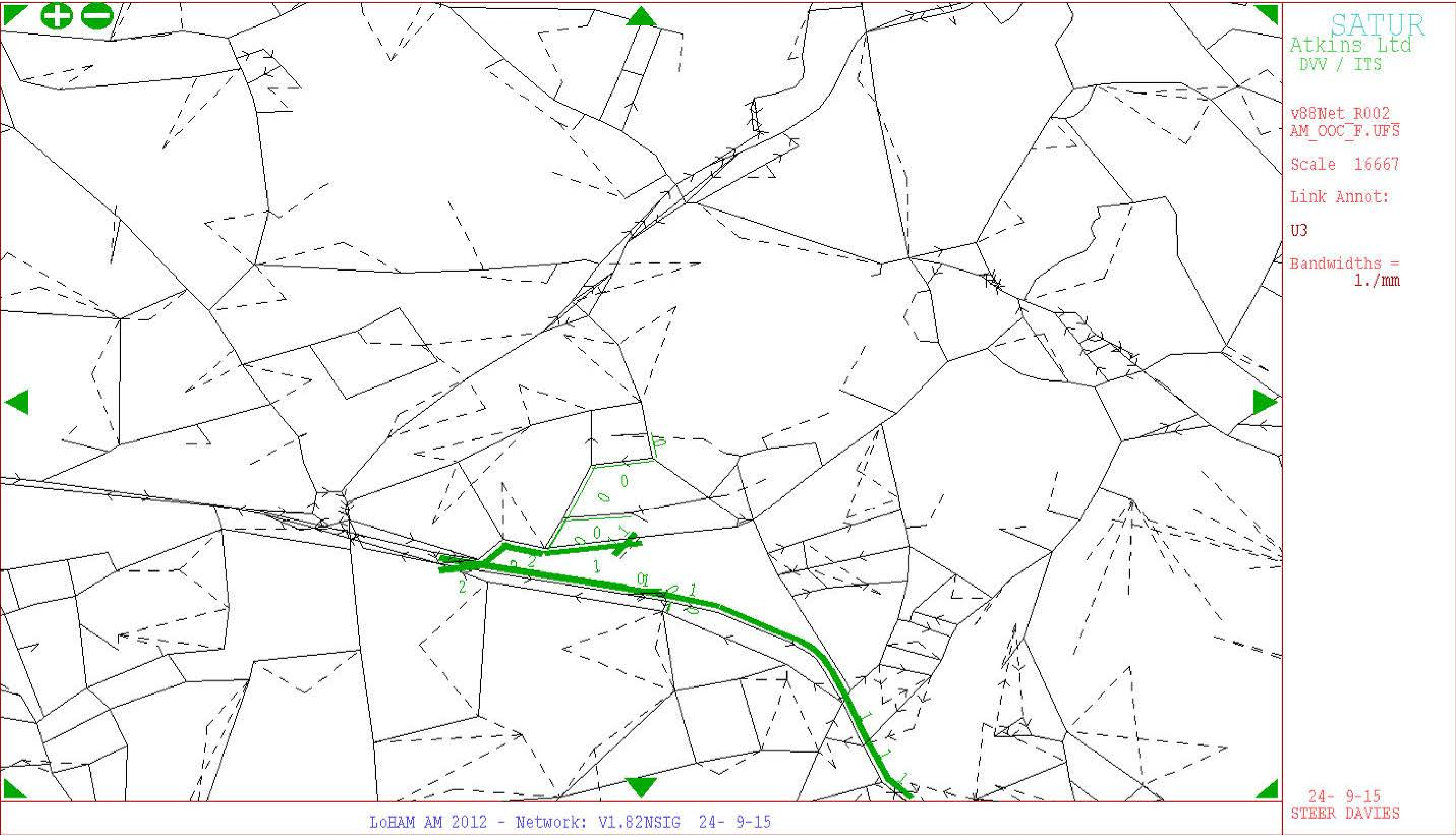
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AM_OOC_F.UFS
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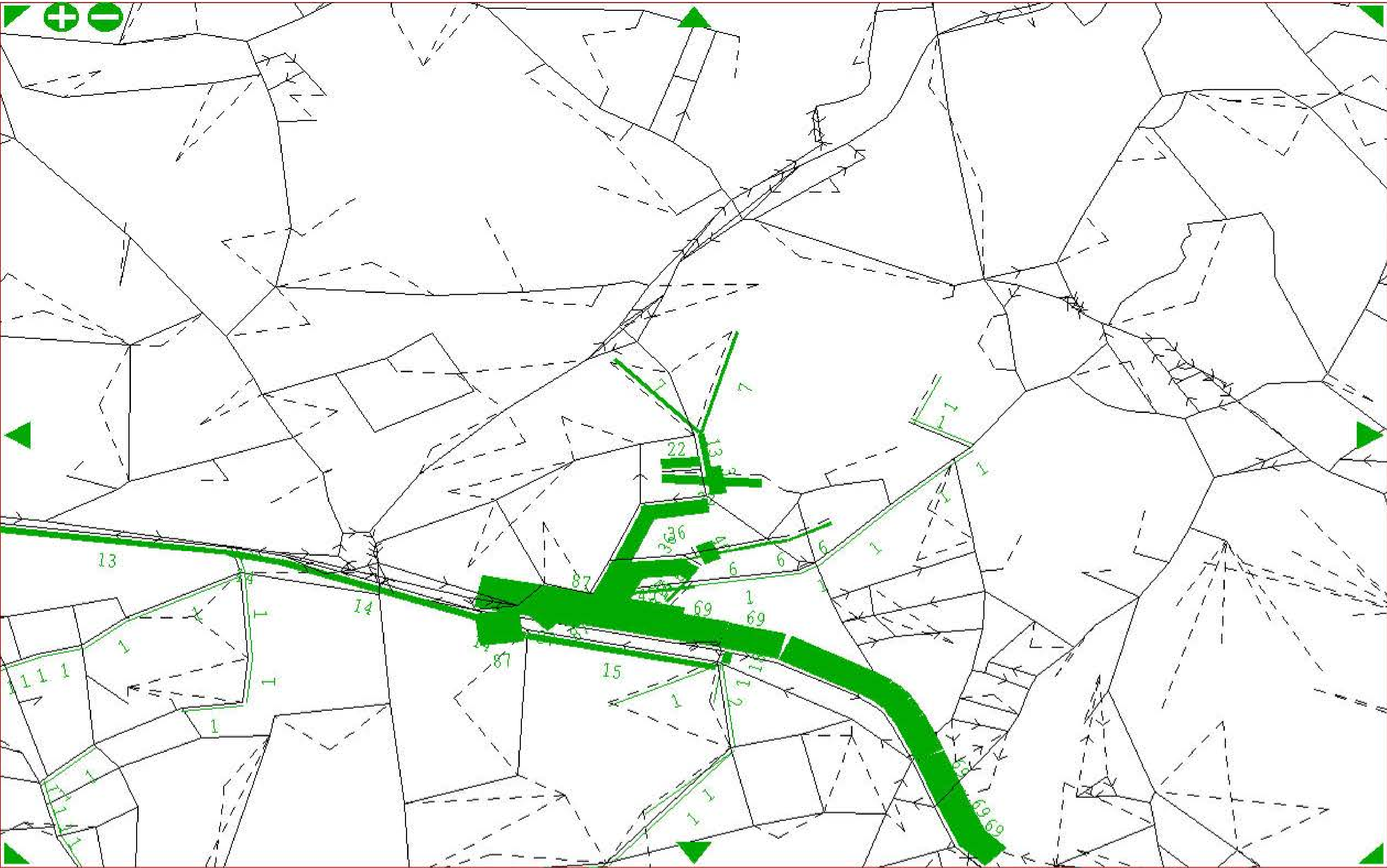

SATUR
Atkins Ltd
DVV / ITS

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AM_OOC_F.UFS

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Bandwidths =
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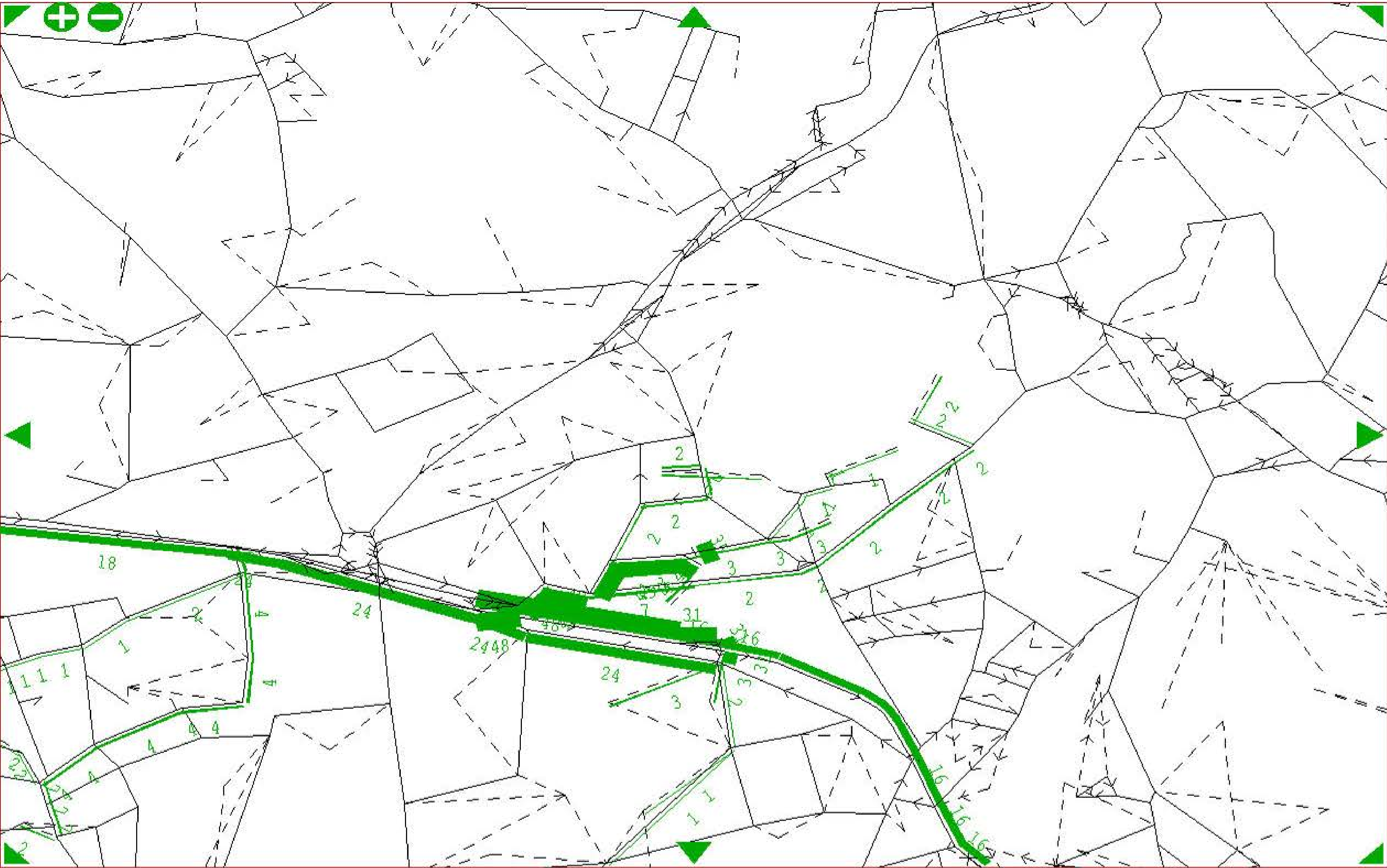
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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DVV / ITS

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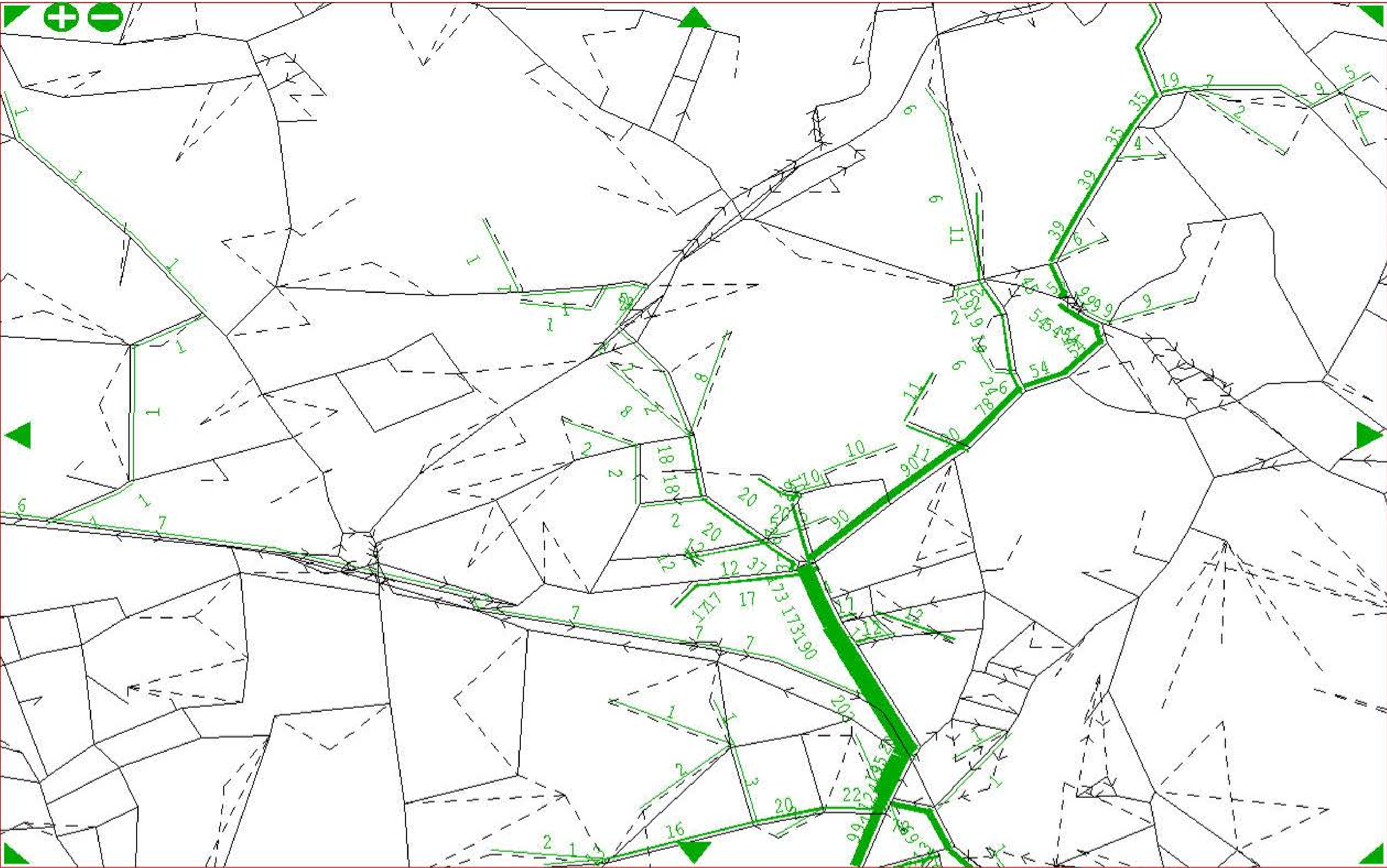
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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Atkins Ltd
DVV / ITS

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AM_OOC_F.UFS

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STEER DAVIES

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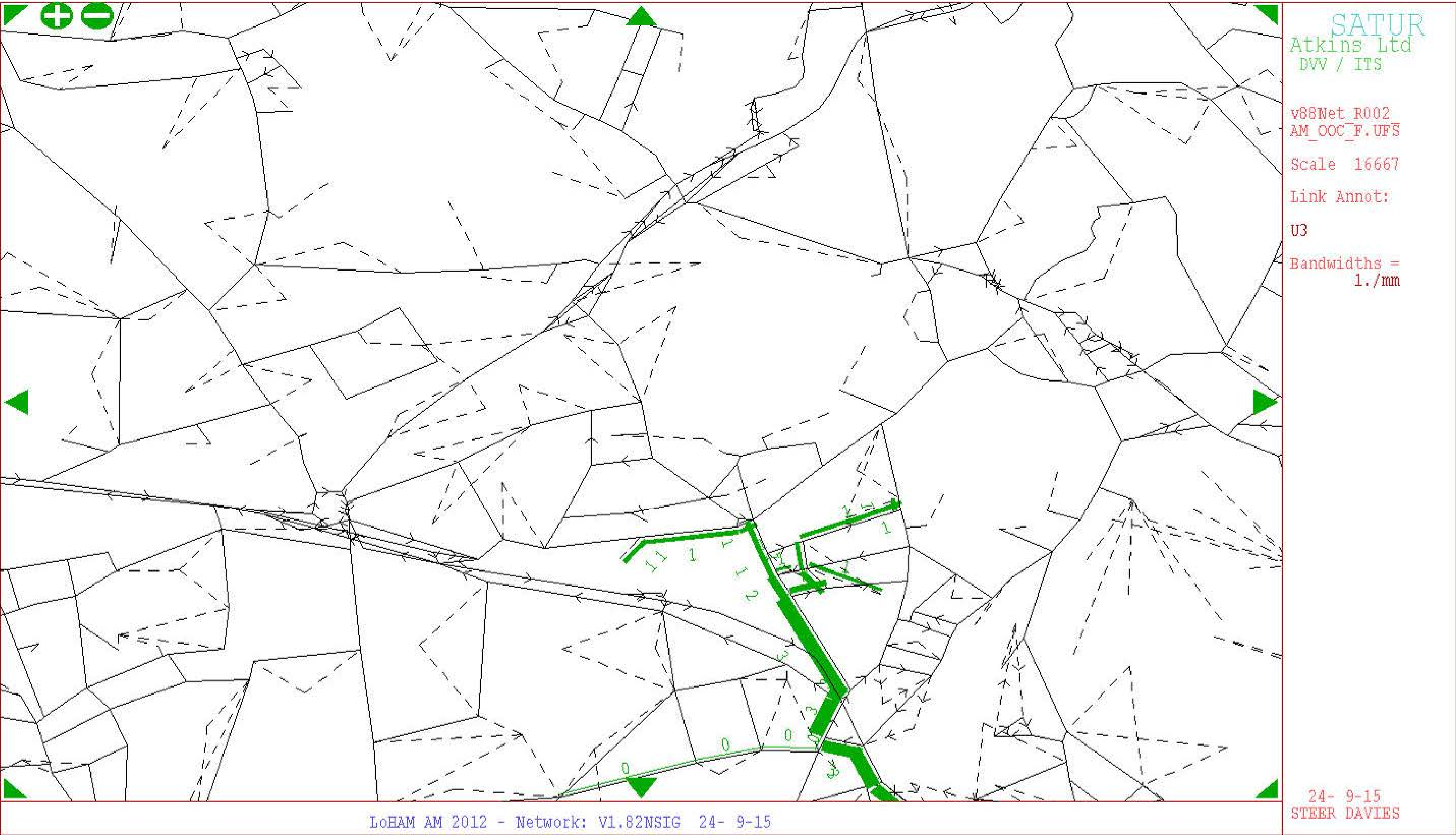
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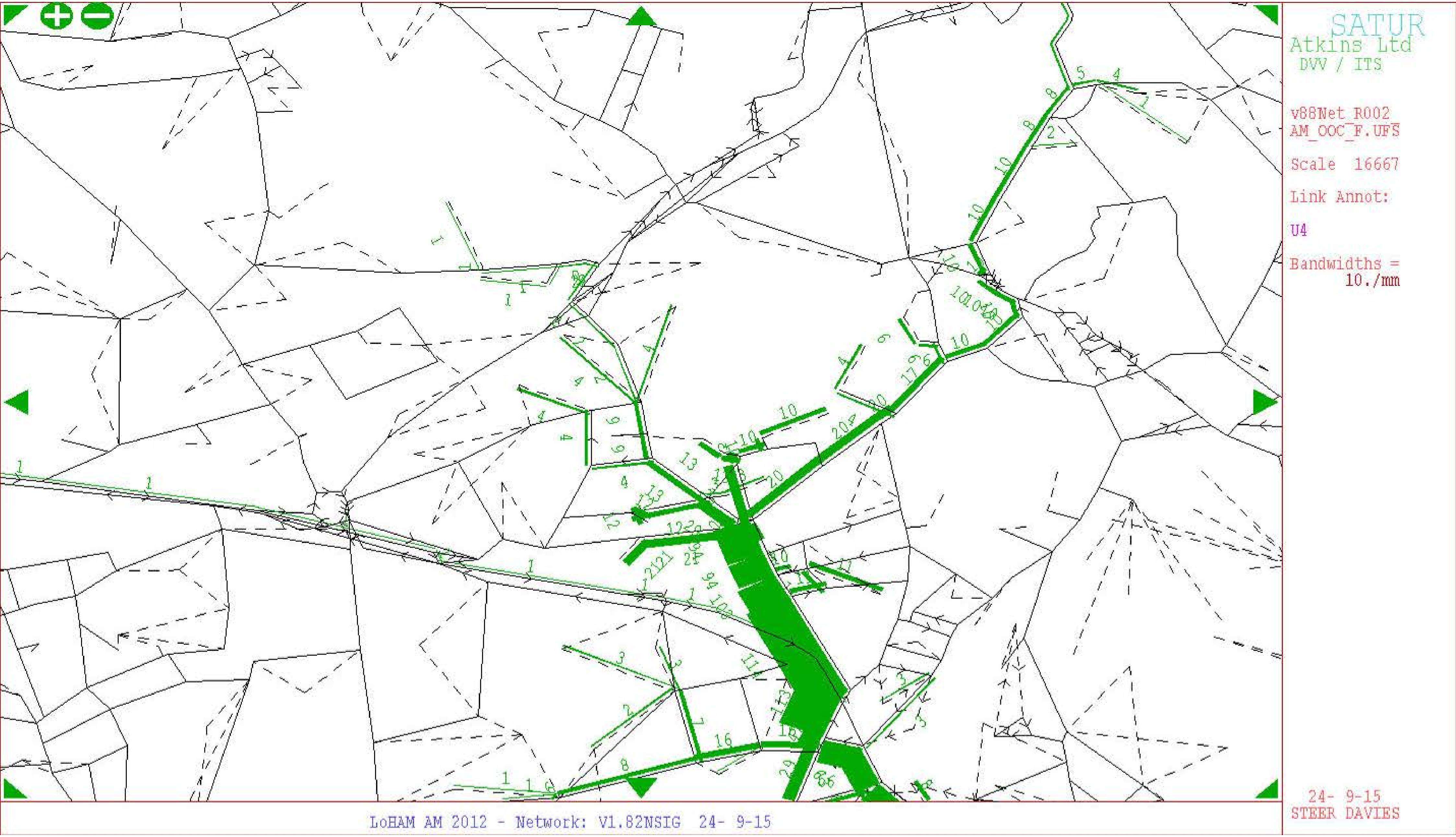
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24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15

SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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STEER DAVIES

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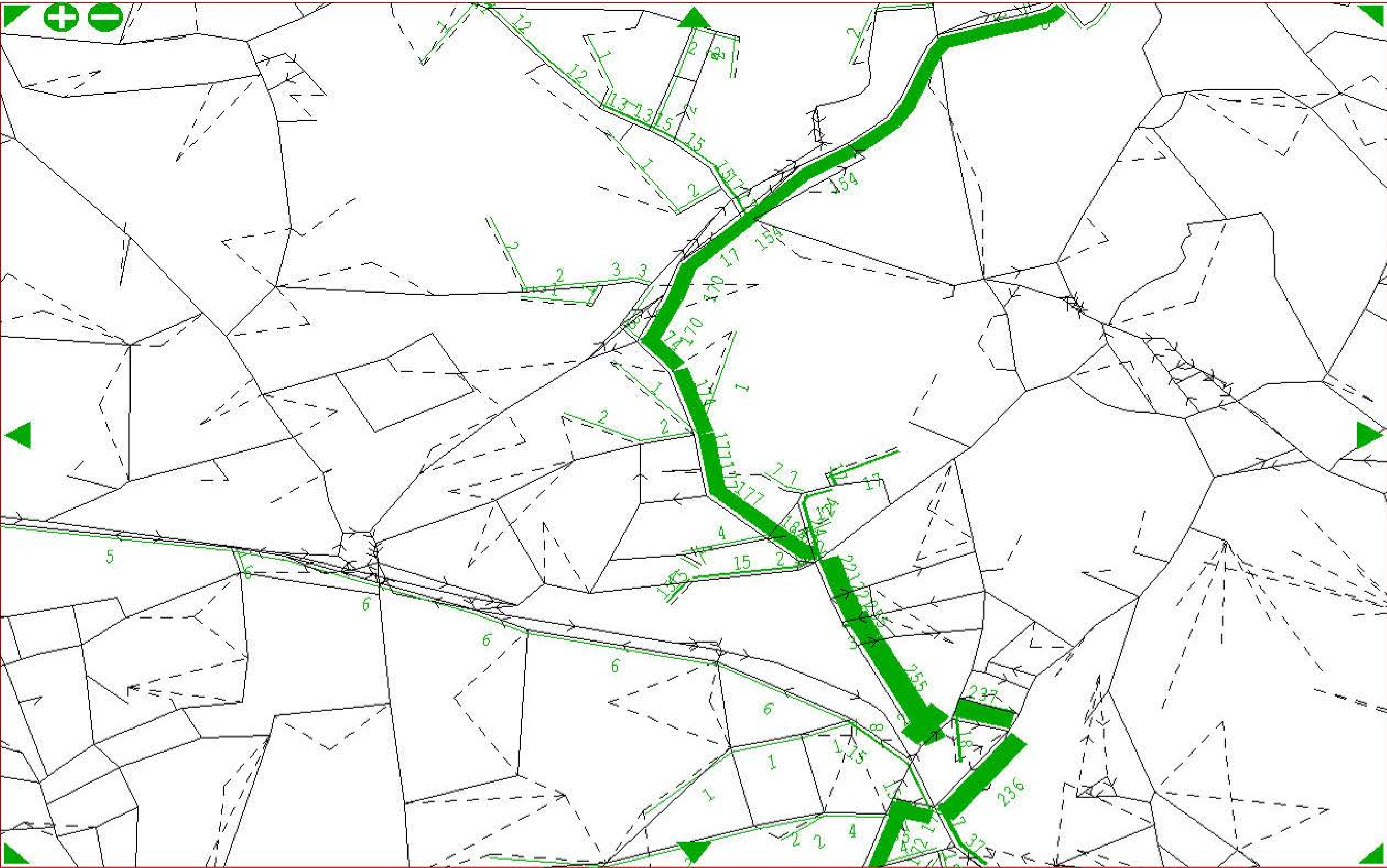

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Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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STEER DAVIES

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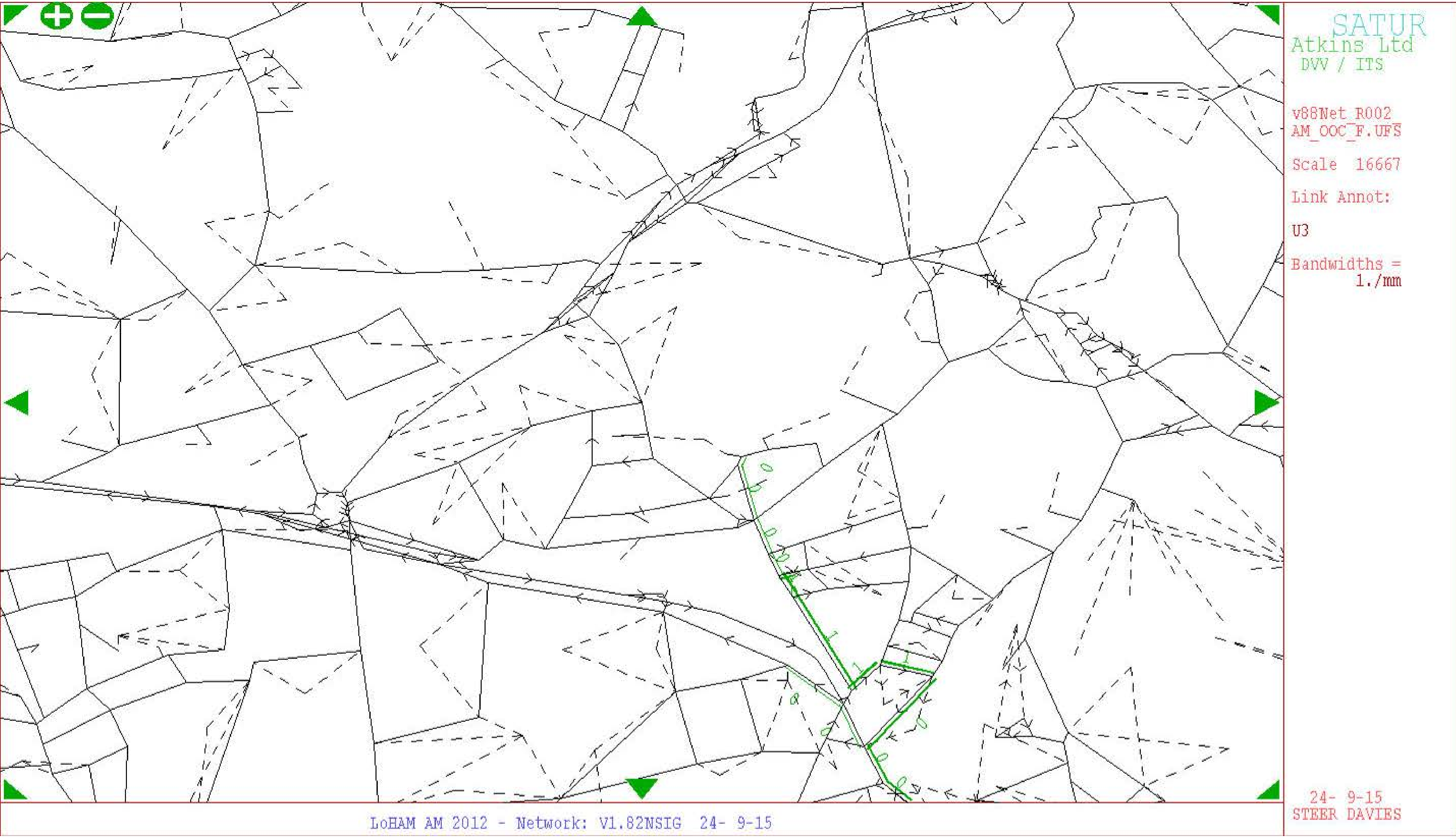
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DVV / ITS
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AM_OOC_F.UFS
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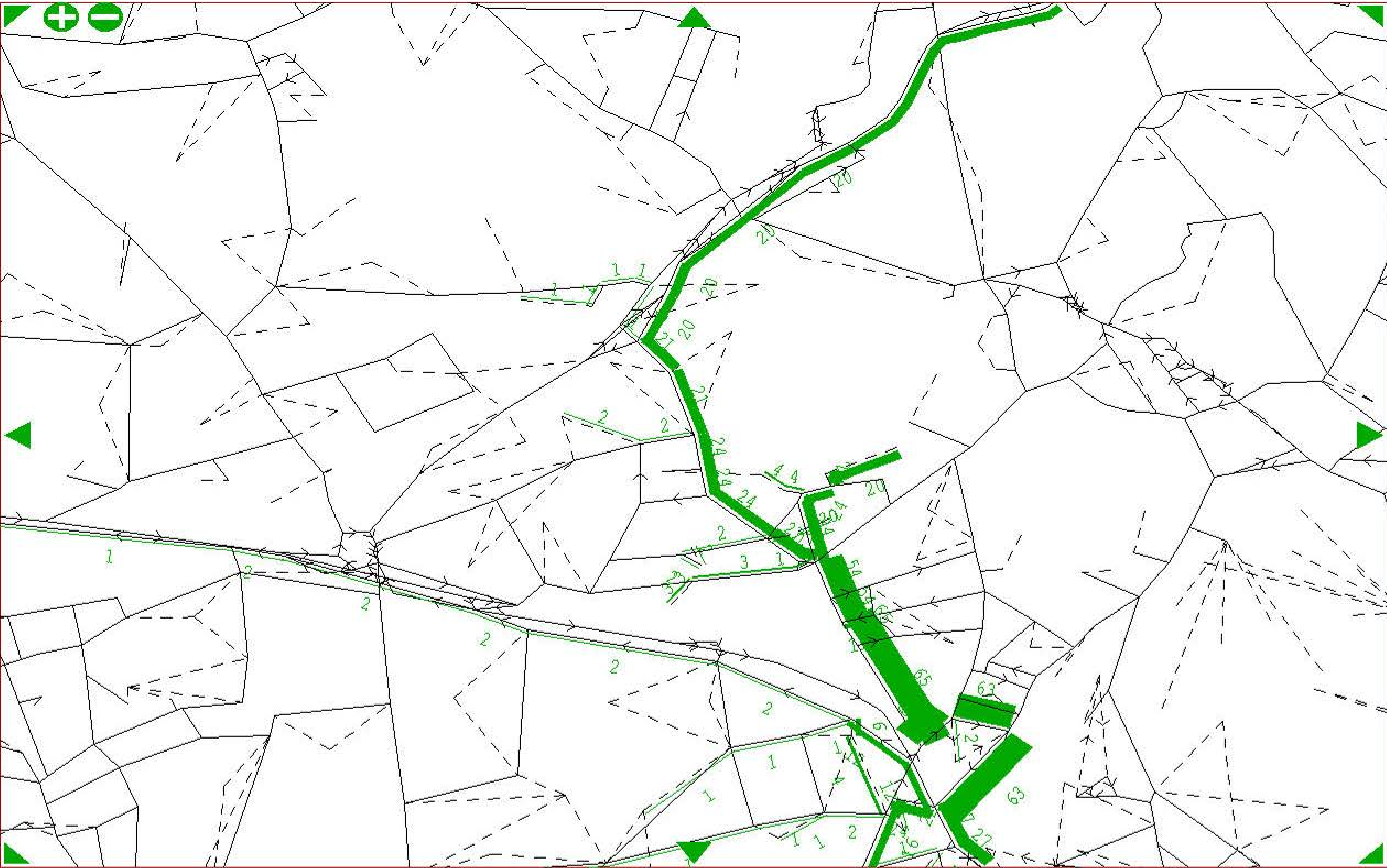
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

Scale 16667

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Bandwidths =
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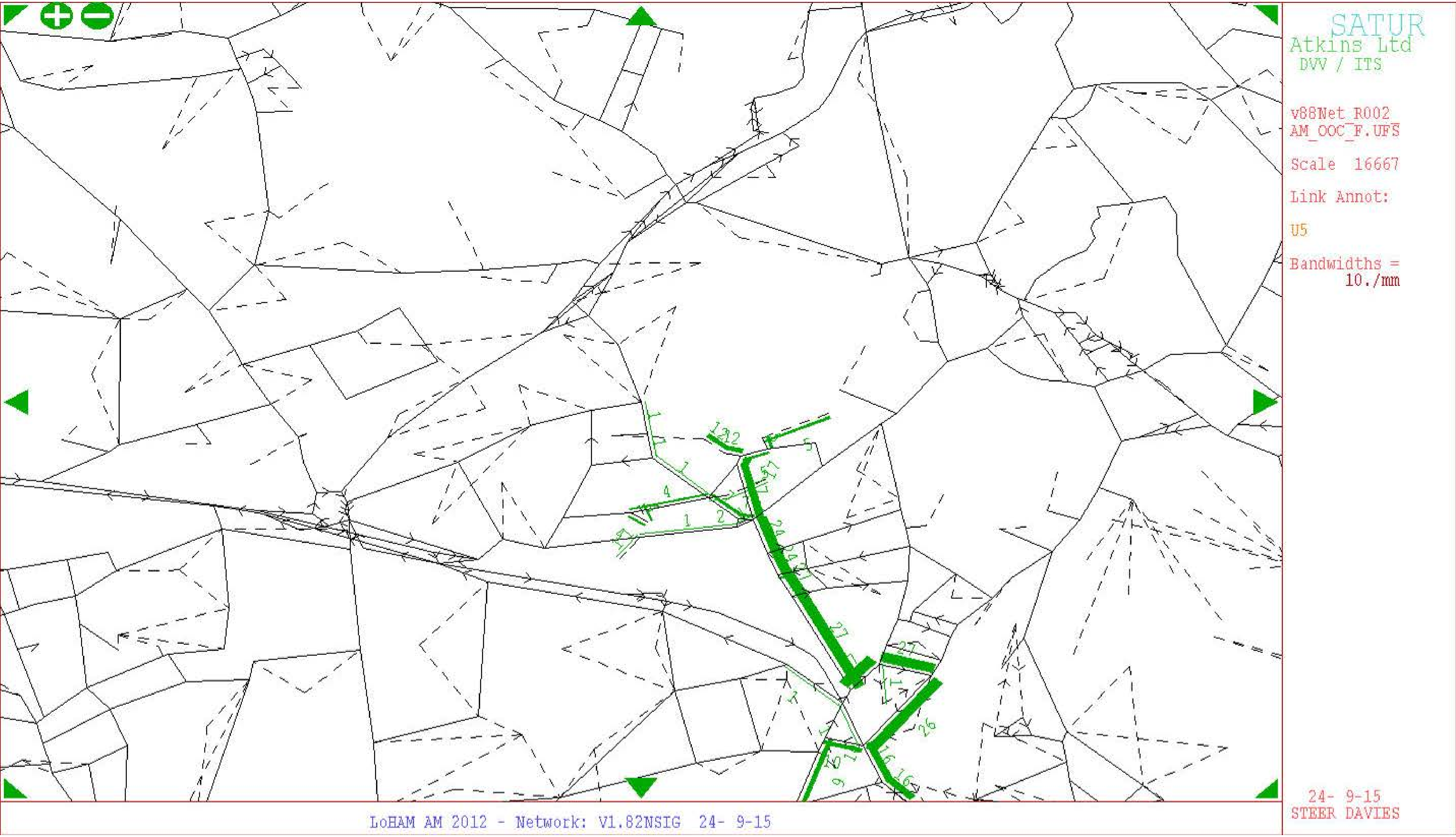
24- 9-15
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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DVV / ITS
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AM_OOC_F.UFS
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24- 9-15
STEER DAVIES
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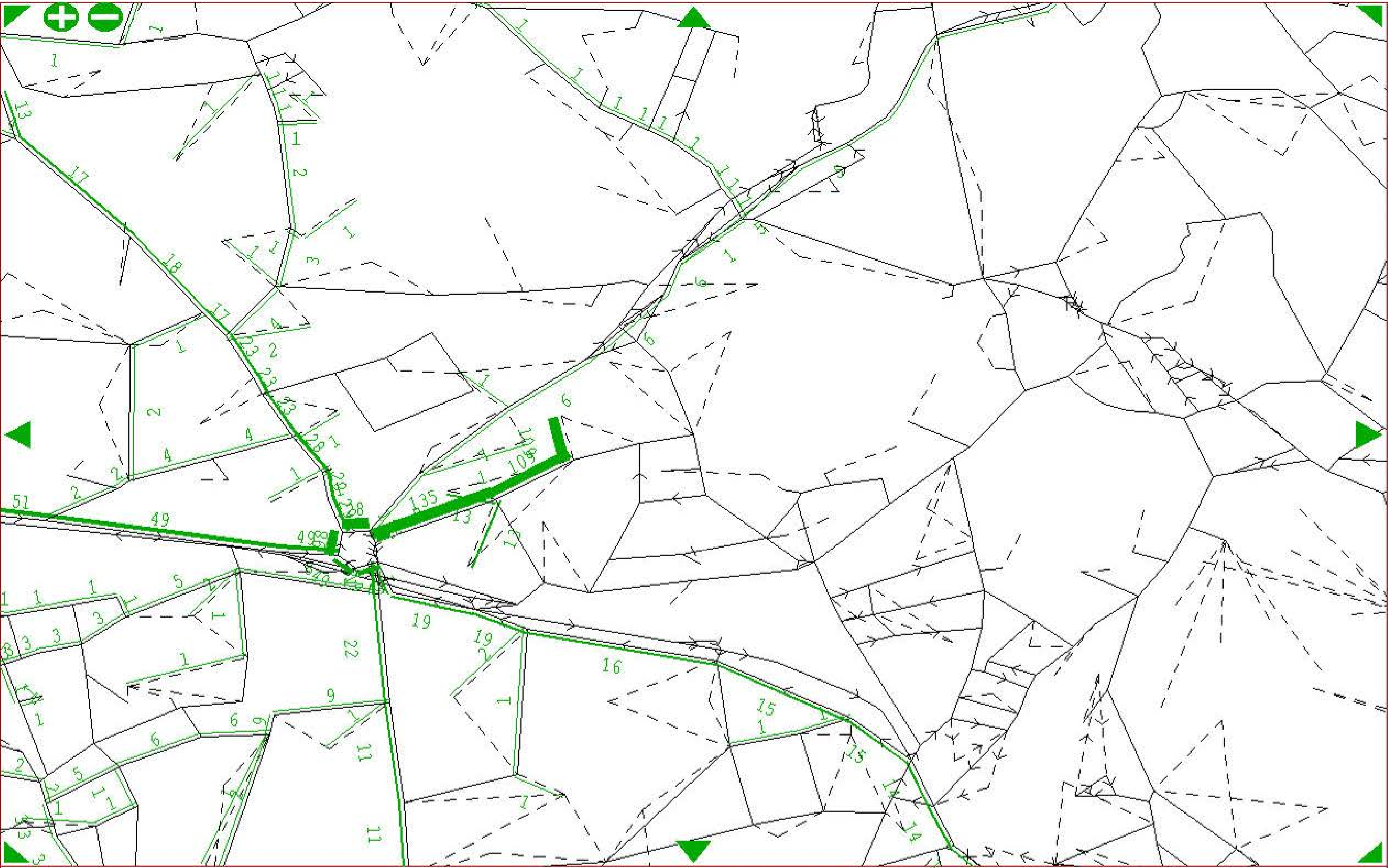

SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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24- 9-15
STEER DAVIES

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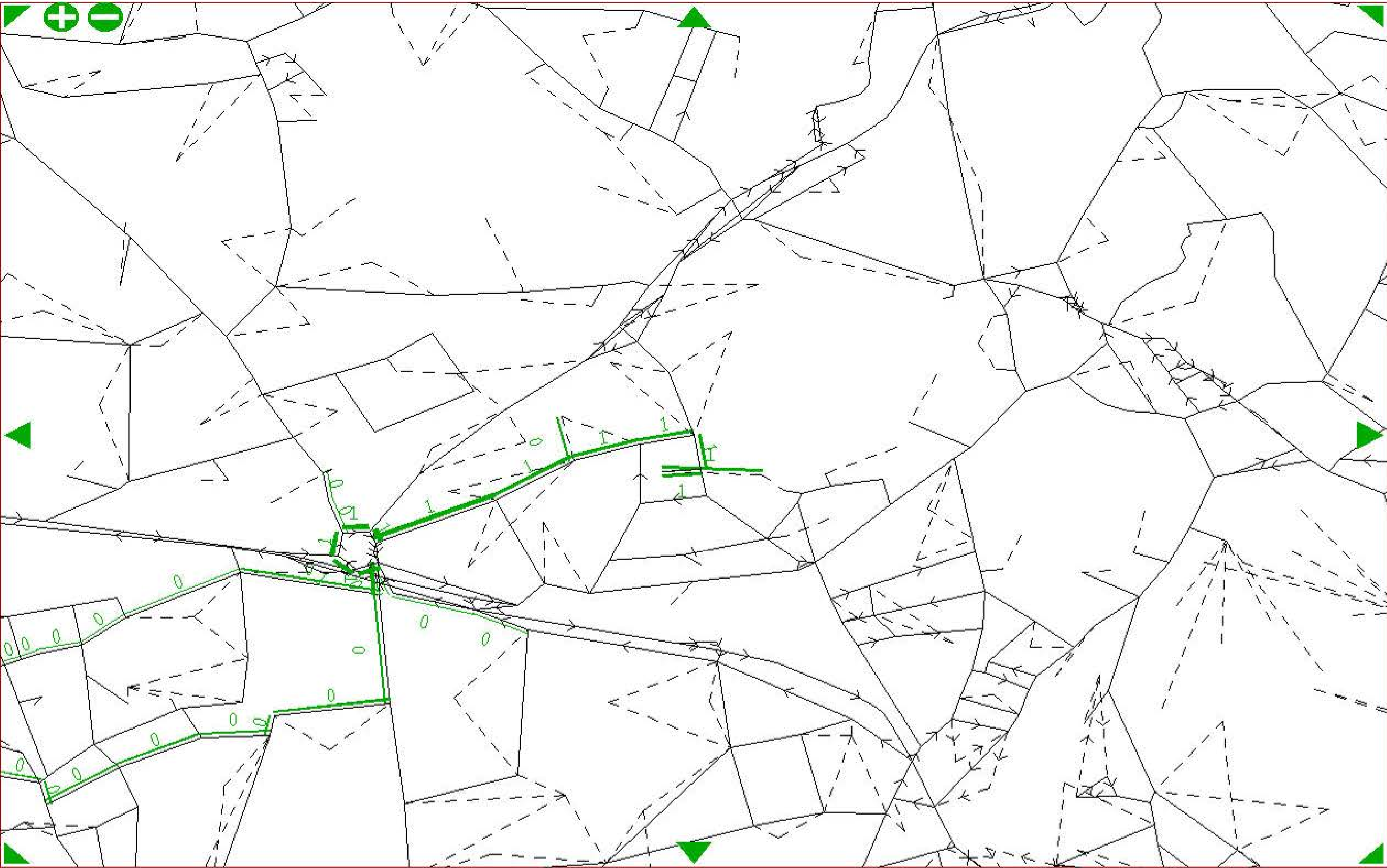

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Atkins Ltd
DVV / ITS

v88Net_R002_
AM_OOC_F.UFS

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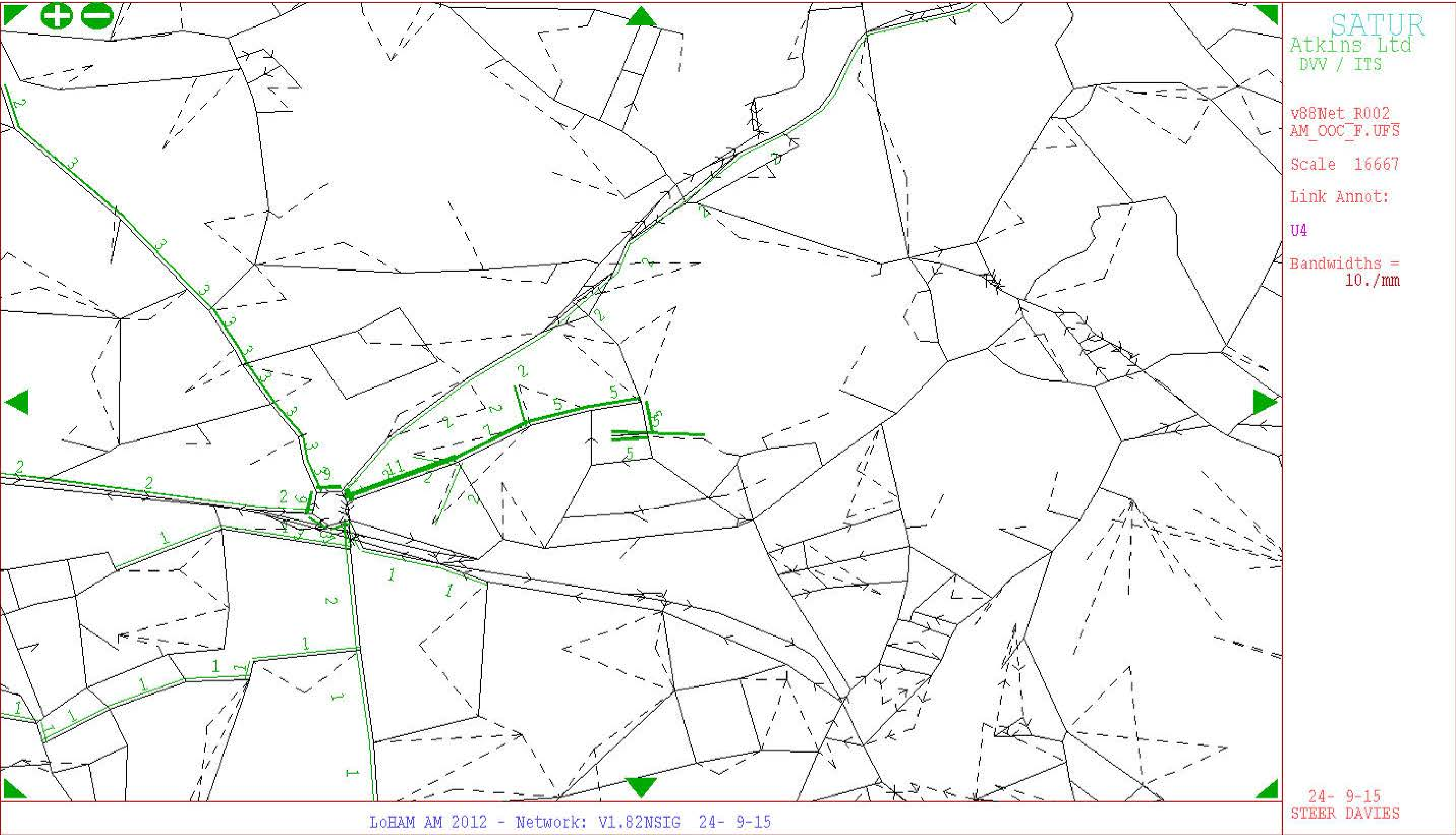
STEER DAVIES

LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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AM_OOC_F.UFS
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24- 9-15
STEER DAVIES
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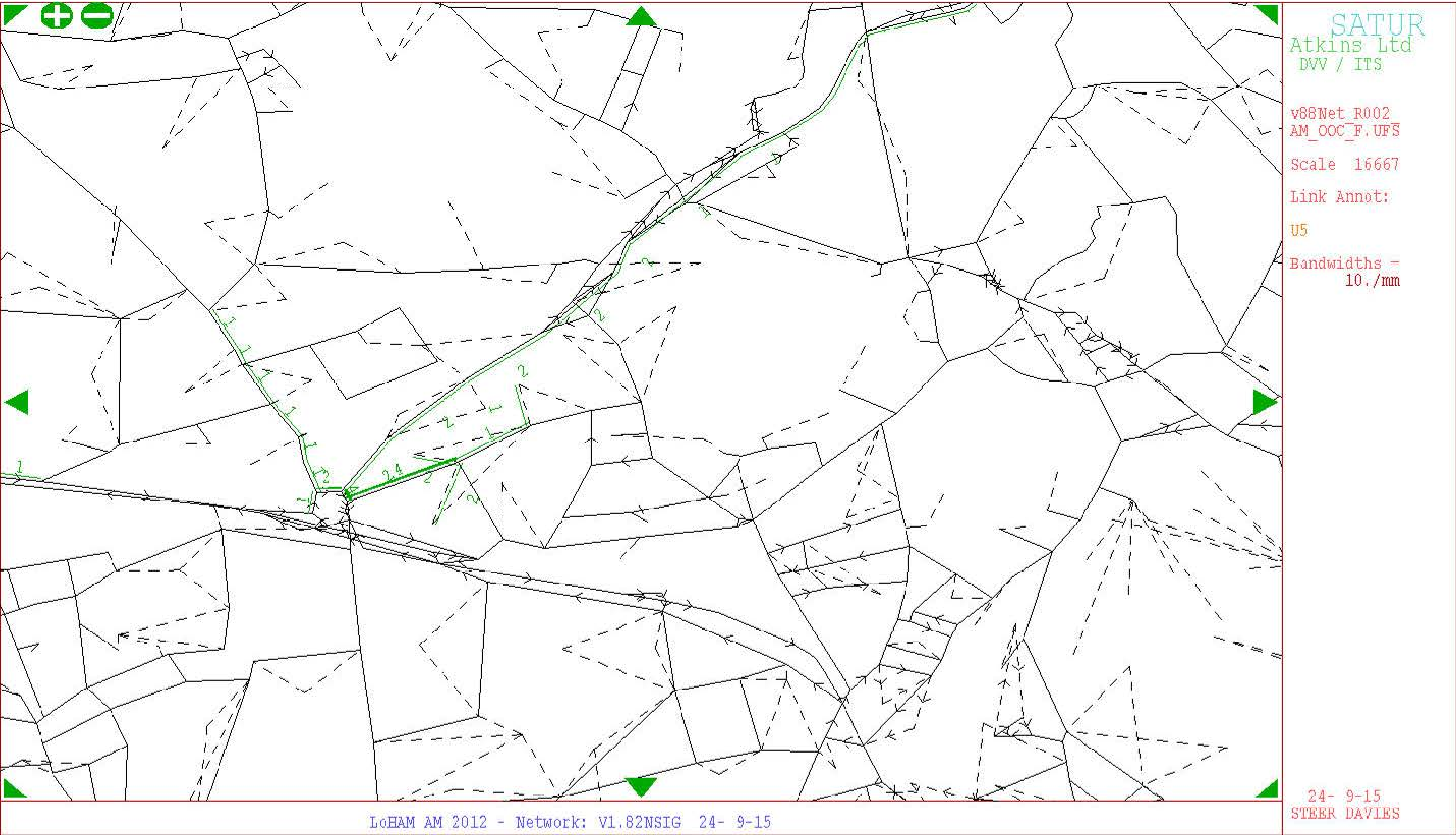
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AM_OOC_F.UFS
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24- 9-15
STEER DAVIES
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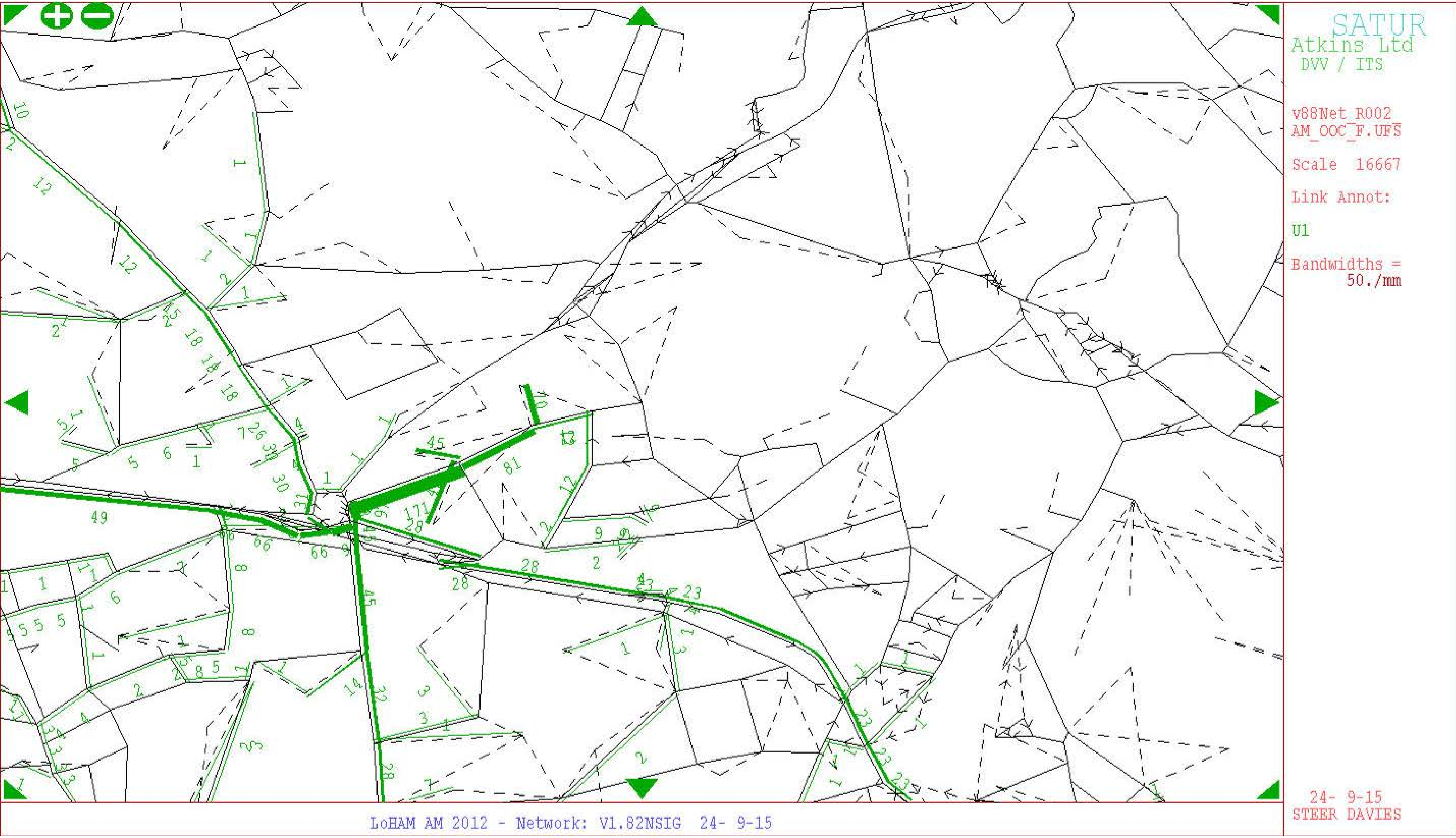
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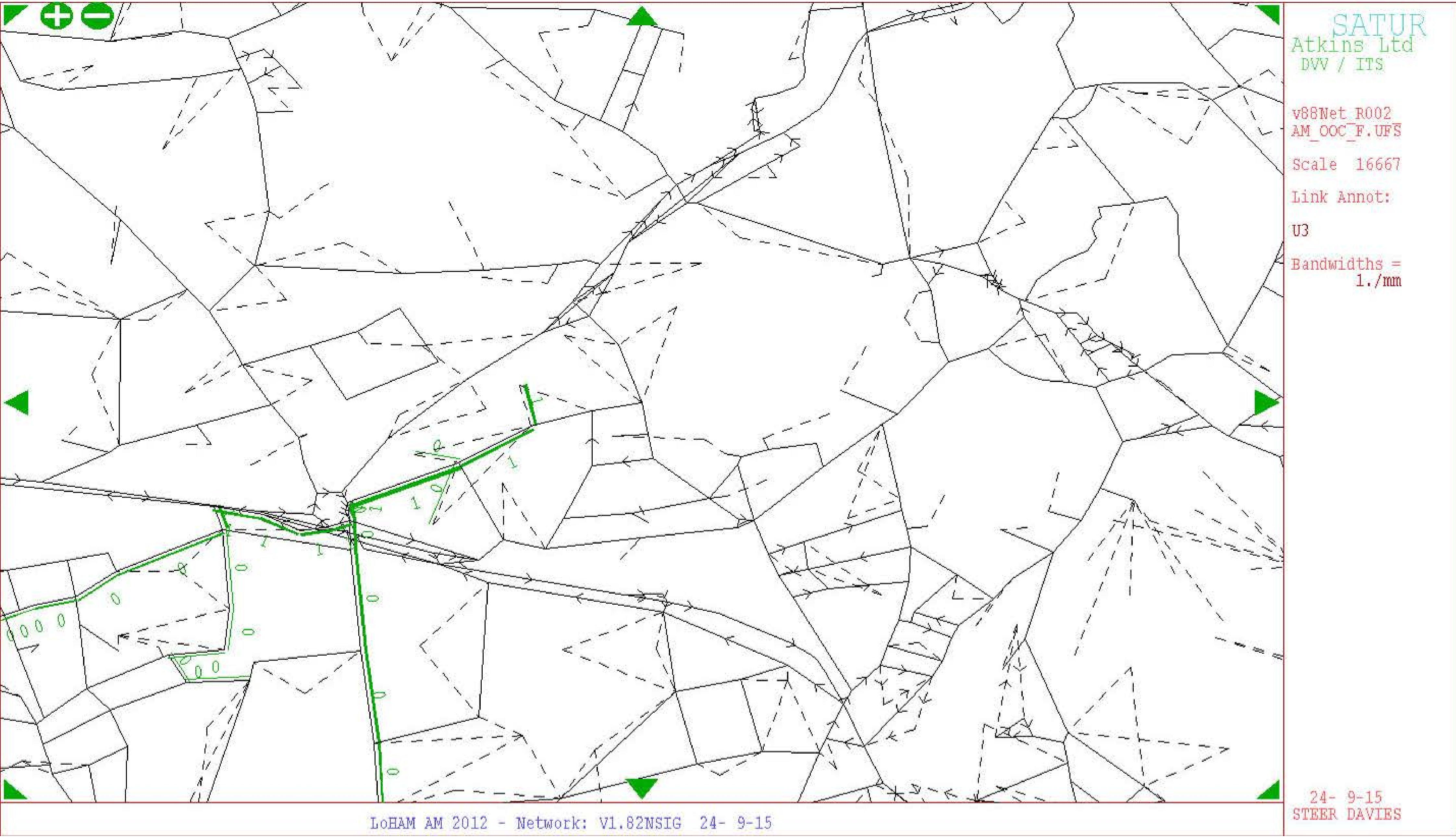

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Atkins Ltd
DVV / ITS
v88Net_R002_
AM_OOC_F.UFS
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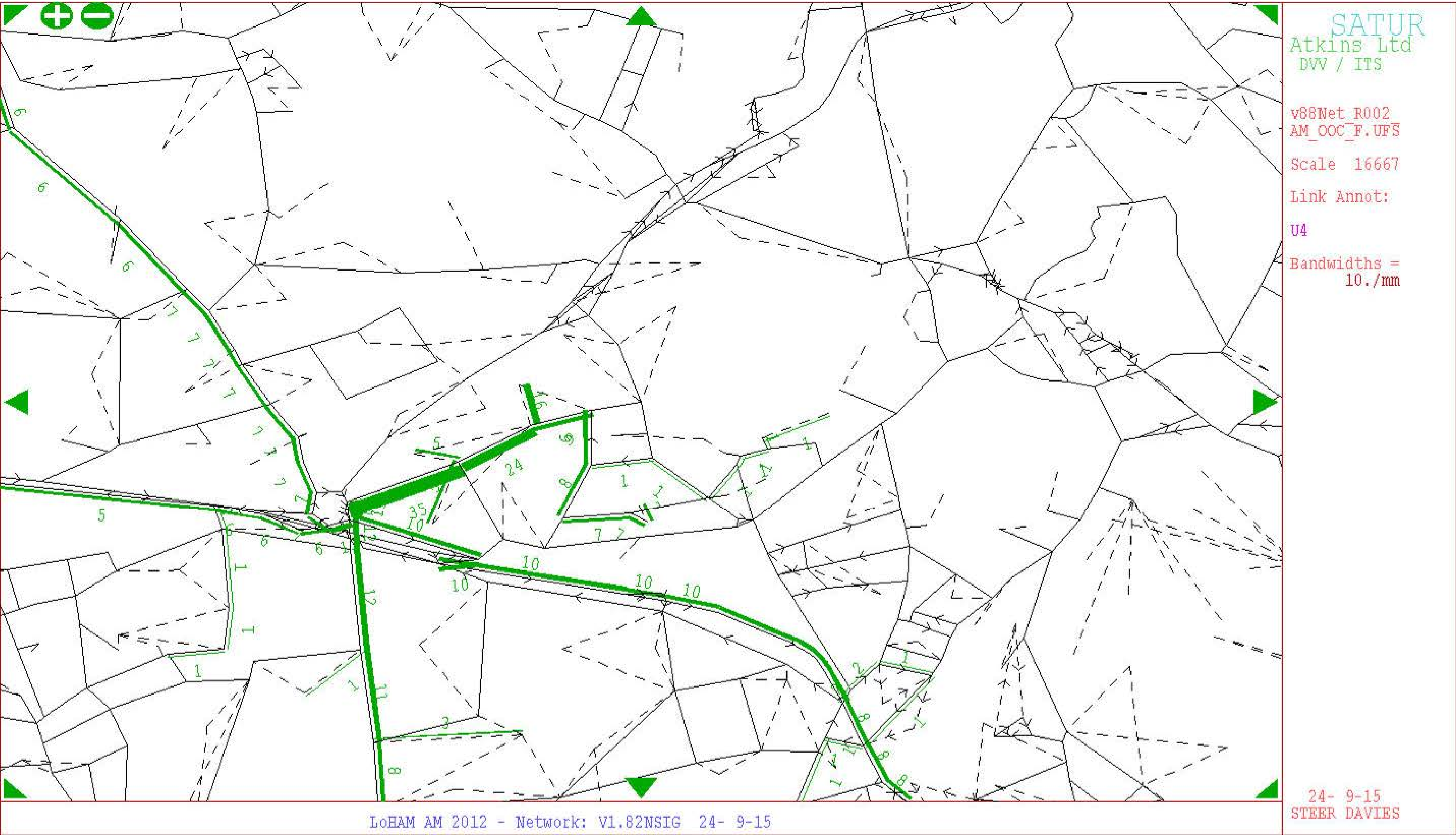
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15



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Atkins Ltd
DVV / ITS
v88Net_R002_
AM_OOC_F.UFS
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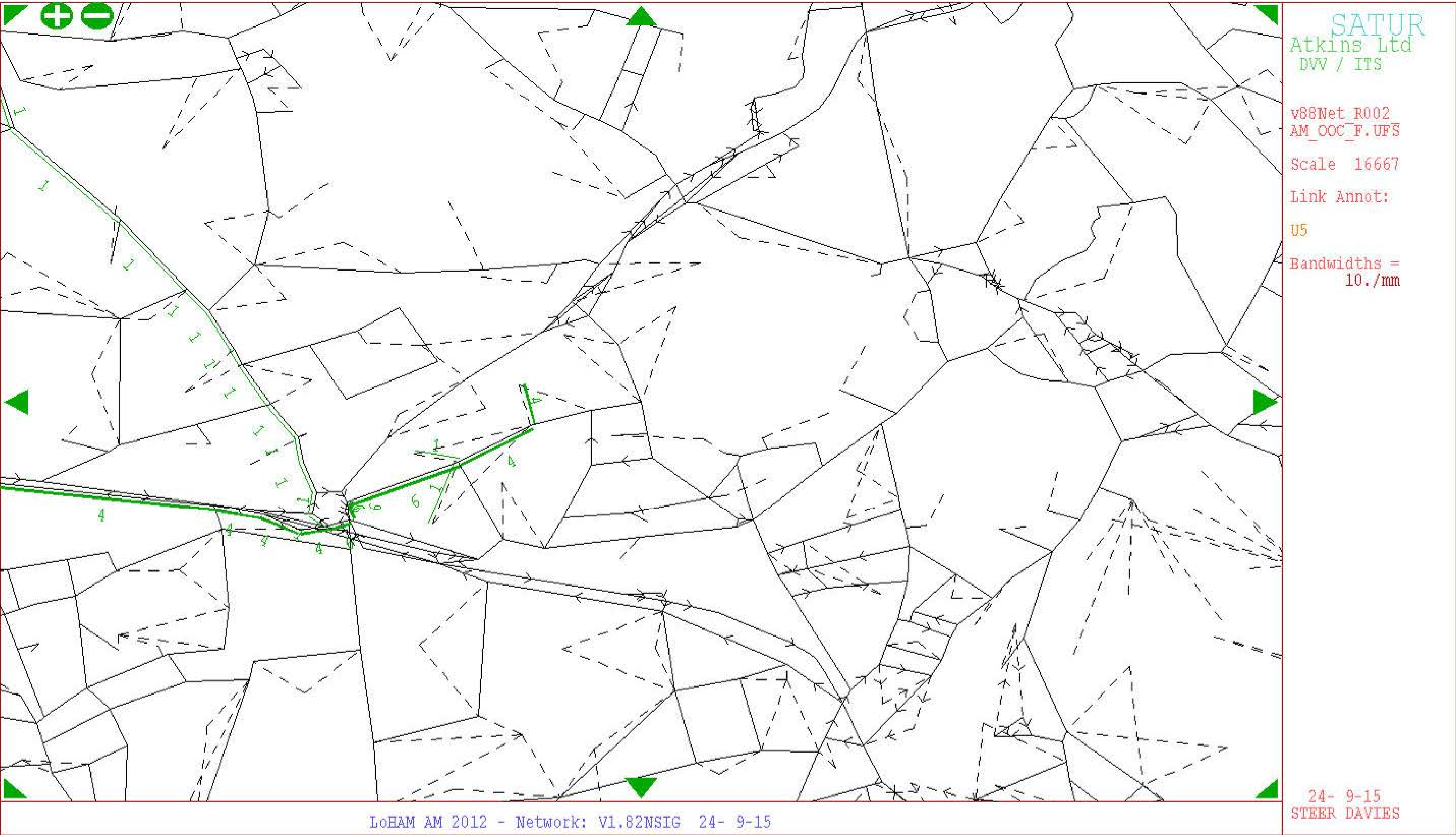
24- 9-15
STEER DAVIES
LoHAM AM 2012 - Network: V1.82NSIG 24- 9-15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AM_OOC_F.UFS
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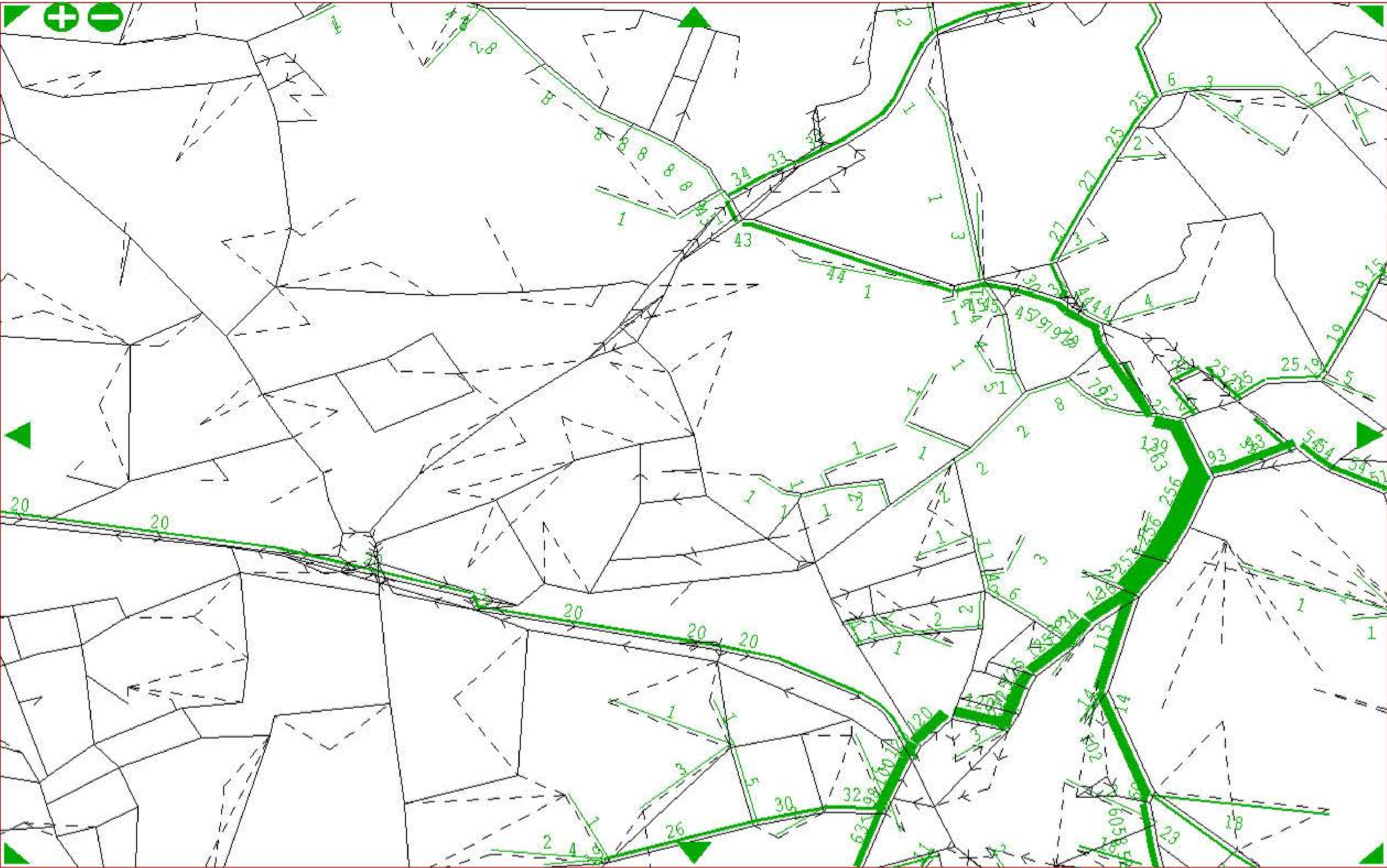

SATUR
Atkins Ltd
DVV / ITS

v88Net_R002_AM_OOC_F.UFS

Scale 16667

Link Annot:

U1

Bandwidths = 50./mm

24- 9-15
STEER DAVIES

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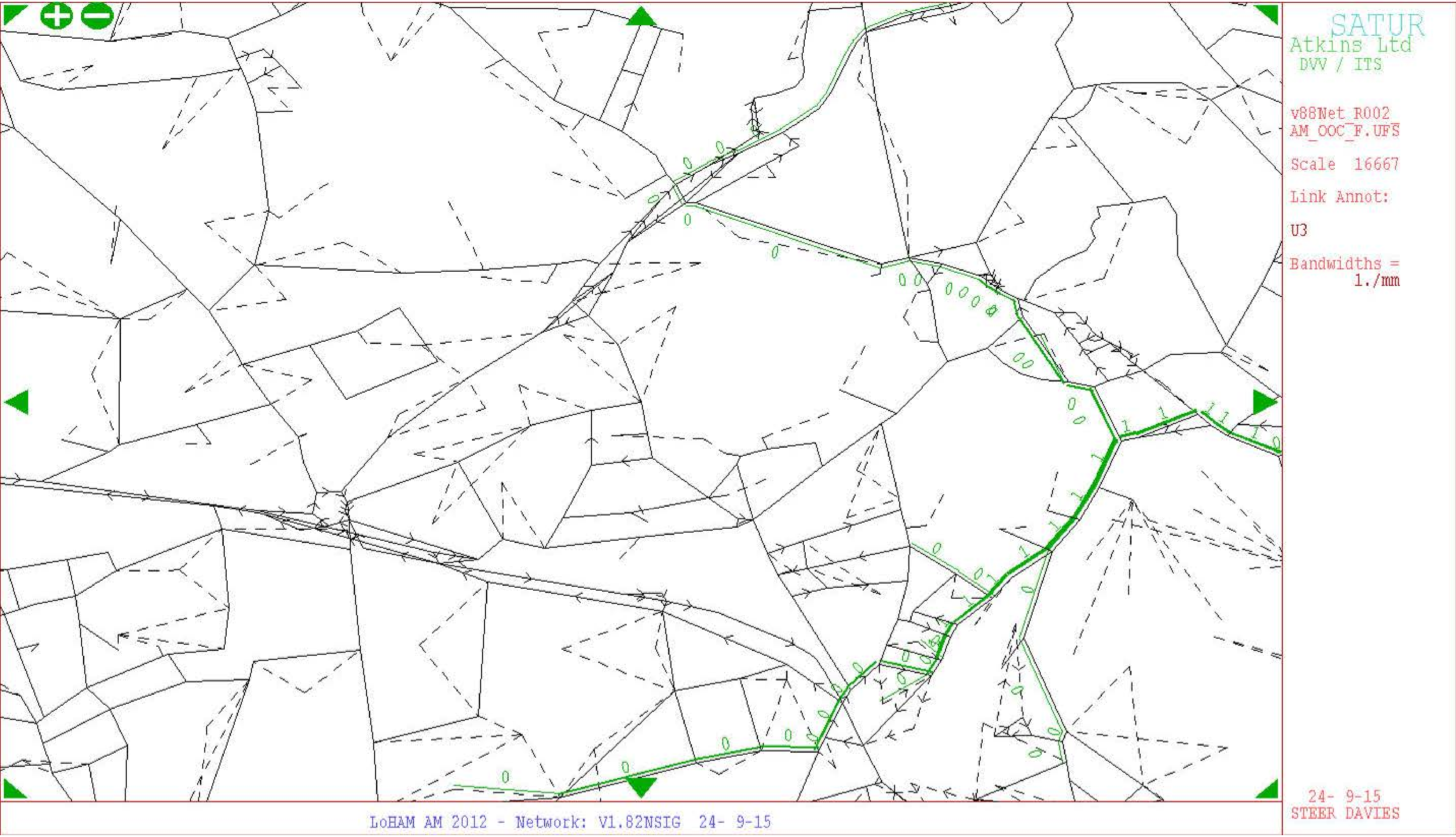
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24- 9-15
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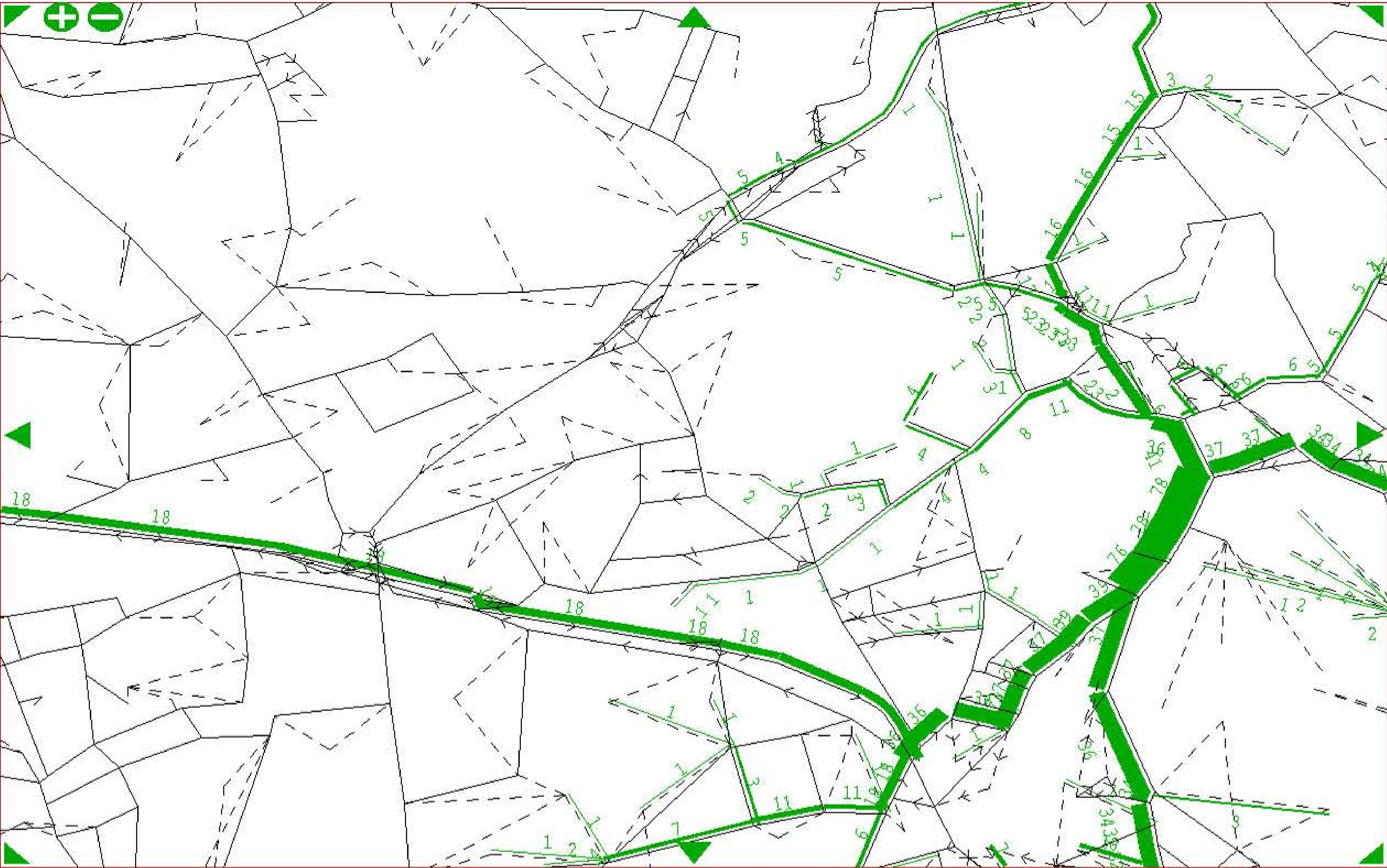

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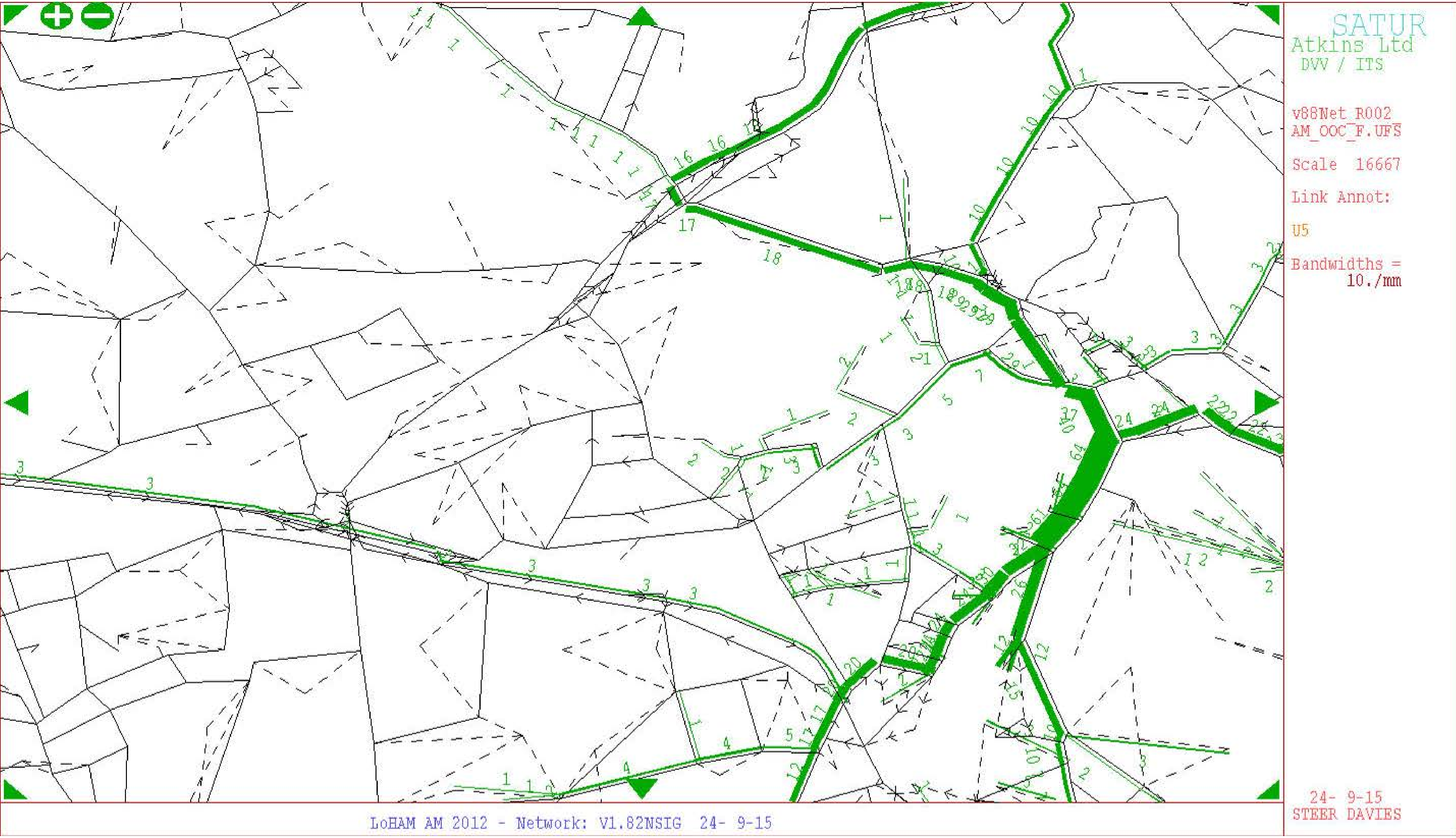
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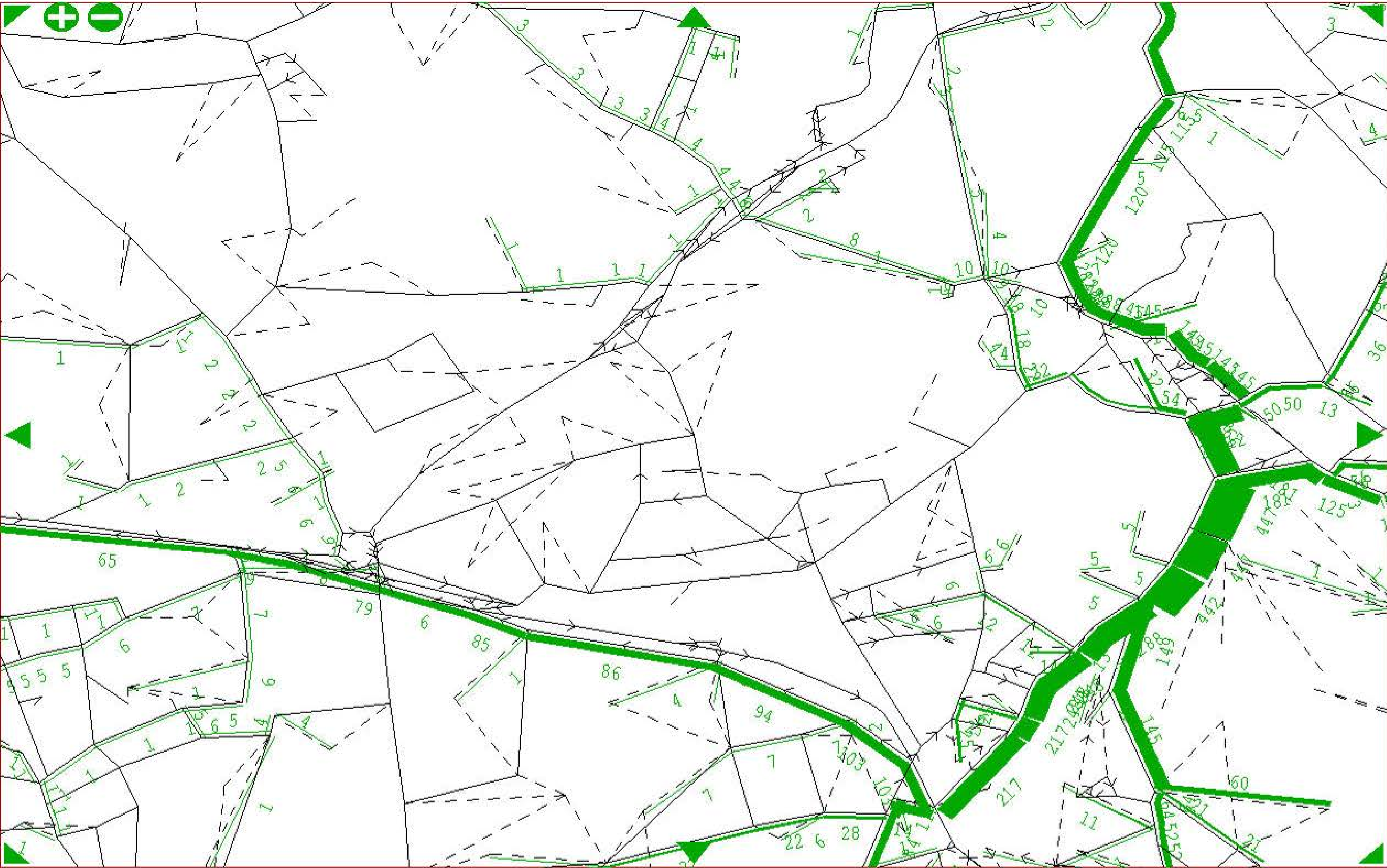

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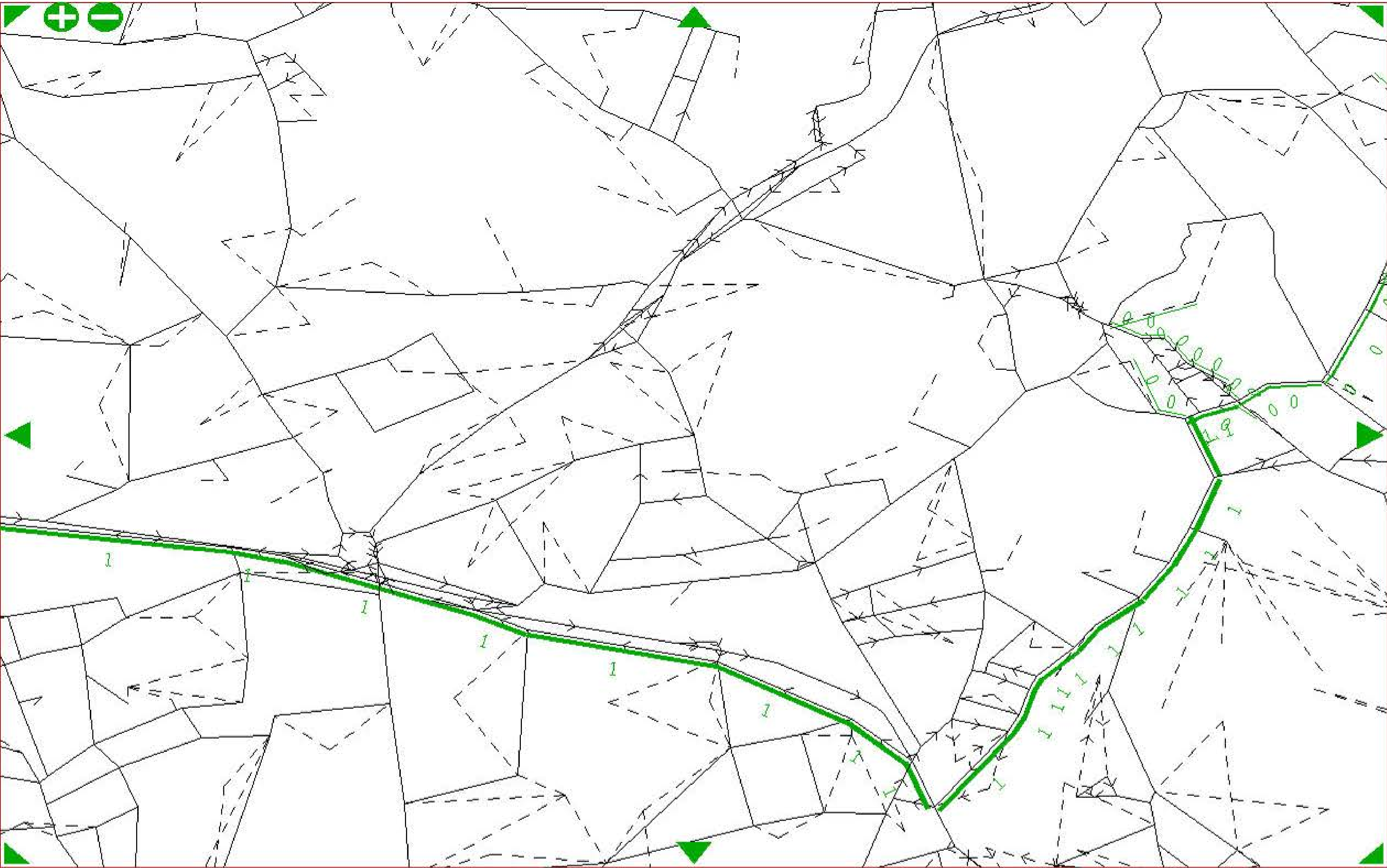

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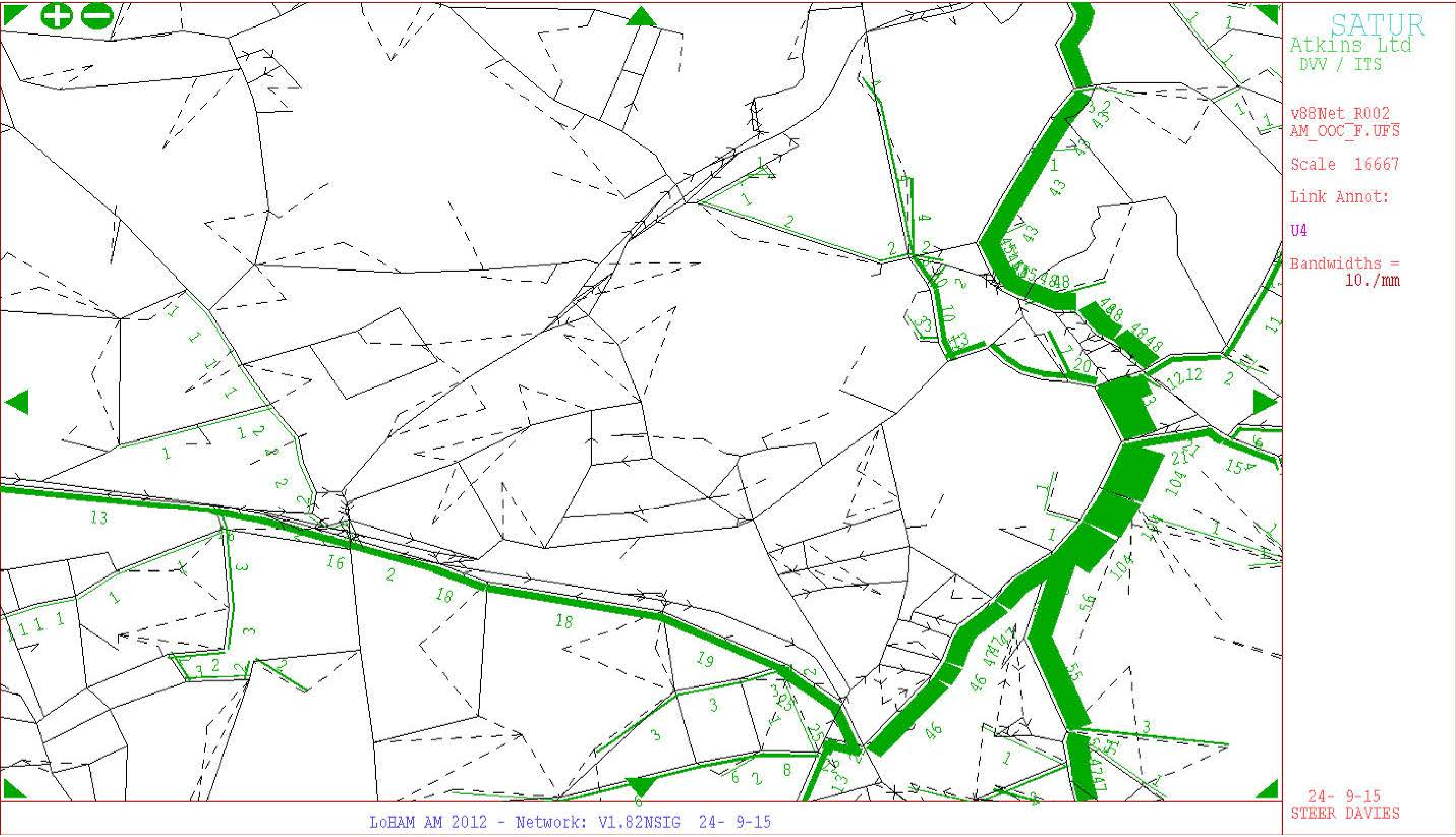
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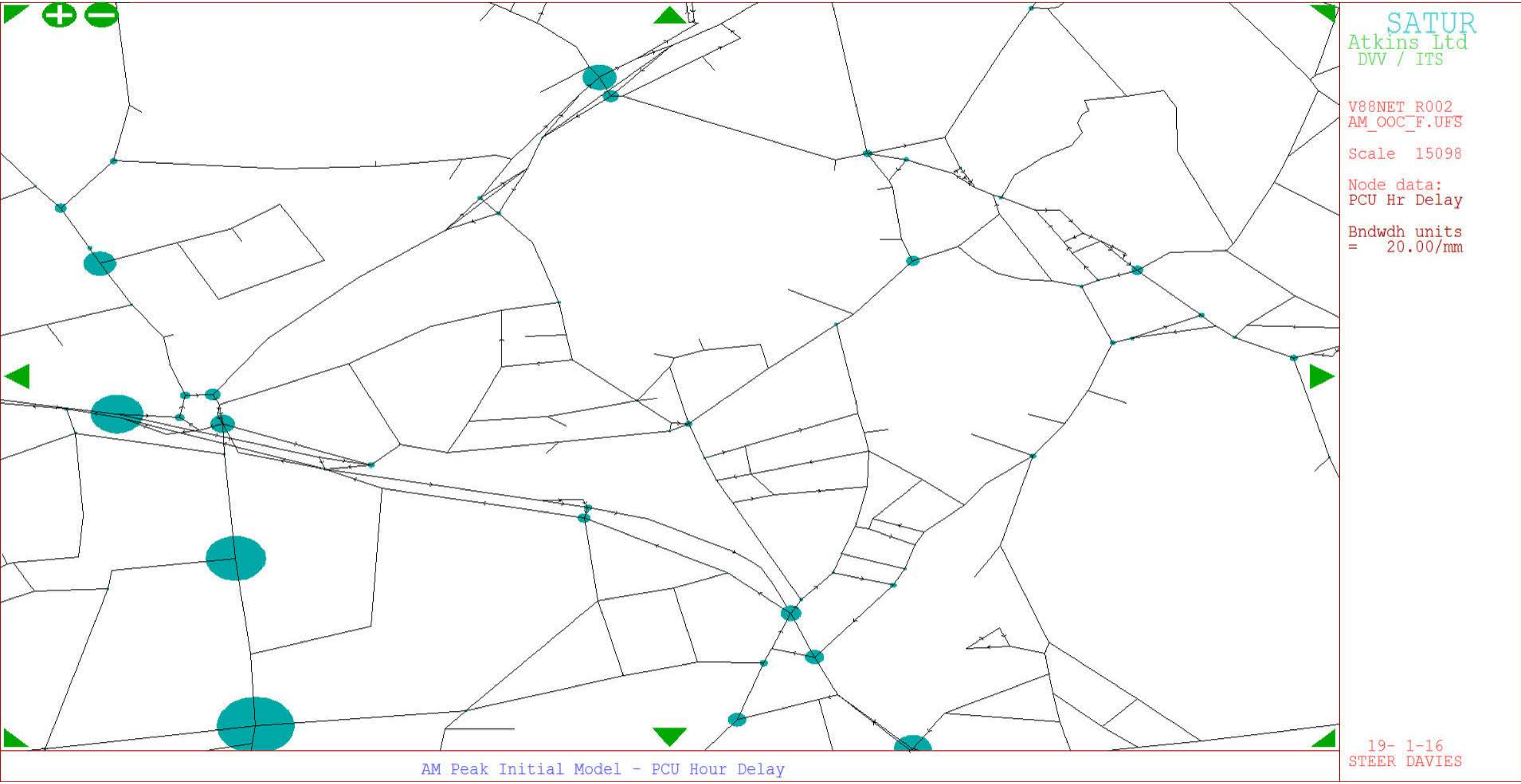
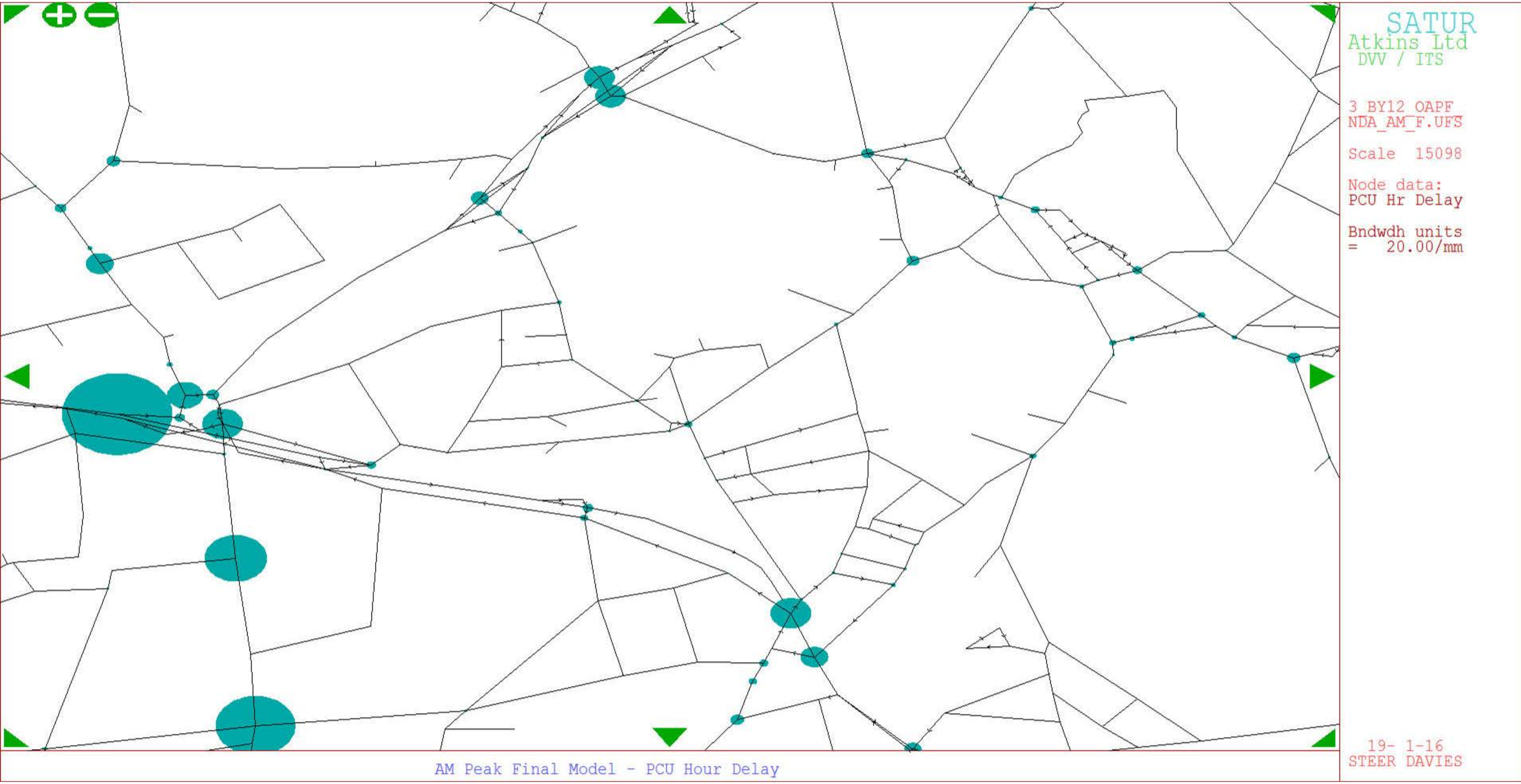
Park Royal Transport Strategy

Modelling Report

Appendix C – Base Modelling Junction Delay



AM Peak Initial Model - PCU Hour Delay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Bndwdh units
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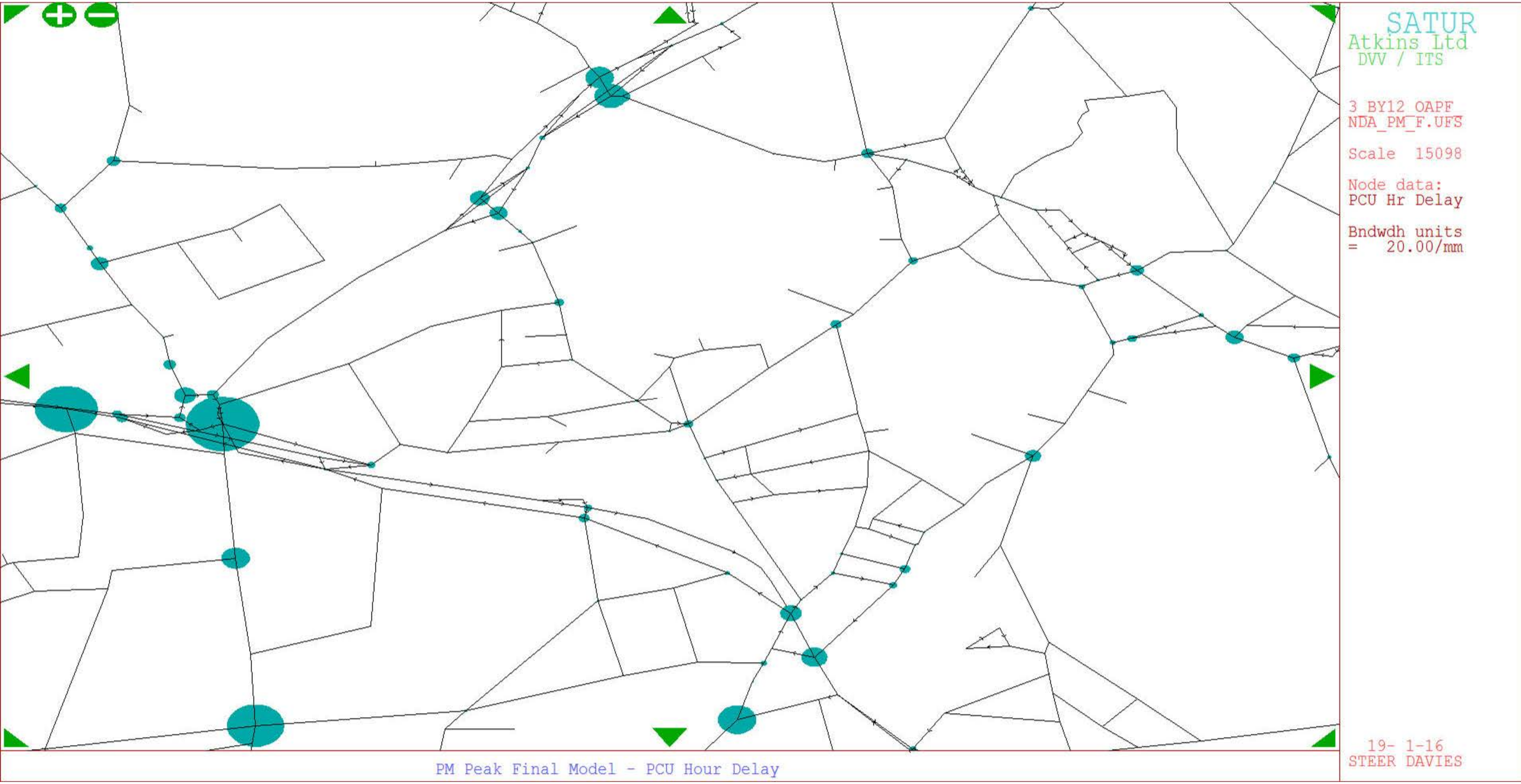
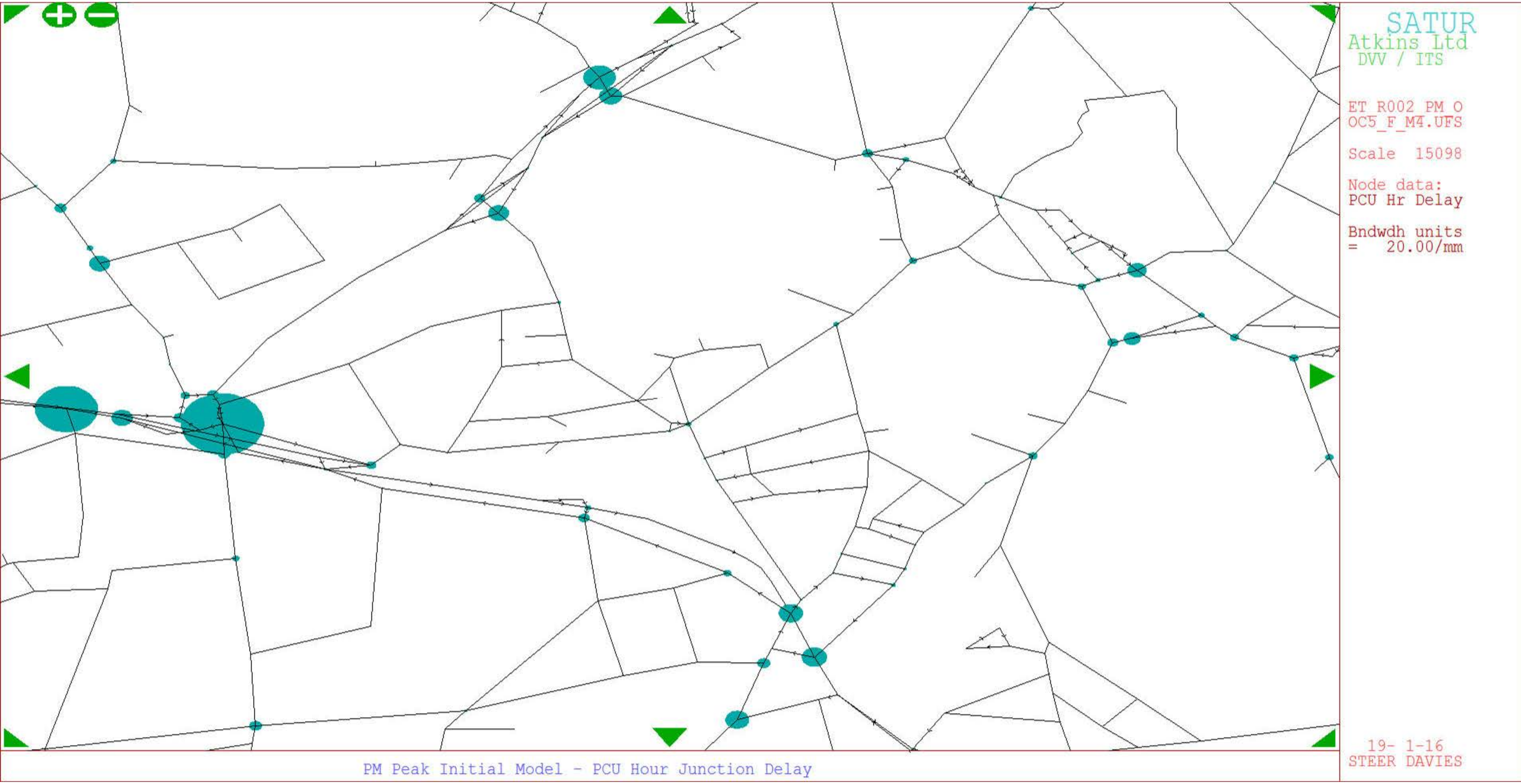
STEER DAVIES
AM Peak Final Model - PCU Hour Delay



PM Peak Final Model - PCU Hour Delay



PM Peak Initial Model - PCU Hour Junction Delay

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Park Royal Transport Strategy

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Appendix D – Demand Growth

Figure D1: AM Peak Development Growth Numbers

					AM Trips						2021 AM Peak								2026 AM Peak								2041 AM Peak							
					IN Destination			OUT Origin			IN Destination				Out Origin				IN Destination				Out Origin				IN Destination				Out Origin			
	HAM Zones	PRTS Name	Total Units	New Jobs	Car	LGV (Servicing)	HGV (servicing)	Car	LGV (Servicing)	HGV (servicing)	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV
First Central	67483	First Central	N/A		428	129	19	392	129	19	428		65	10	118		65	10	428		65	10	392		65	10	428		65	10	392		65	10
Alperton Housing Zone	66201	255 Ealing Road (A3.2)	125		118			417			7				23				7				23				7				23			
	66201	243 Ealing Road (A3.1)	441		118			417			23				83				23				83				23				83			
	66031	Minavil House (A2)	136		118			417			7				26				7				26				7				26			
	66201	Alperton House (A1)	188		118			417			10				35				10				35				10				35			
	66031	Atlip (A4)	313		118			417			17				59				17				59				17				59			
	66031	Sunleigh Road (A5)	324		118			417			17				61				17				61				17				61			
	66031	Woodside Avenue (A6)	445		118			417			24				83				24				83				24				83			
	66054	Mount Pleasant (A7)	251		118			417			13				47				13				47				13				47			
Northfields	66054	Northfields	N/A		71			250			36				125				71				250				71				250			
HS2 Shield Site 2	64495	HS2 Shield Site 2		4160	246	216	24	8	216	24																	128		56	6	4		56	6
HS2 Shield Site 1	64496	HS2 Shield Site 1		3840	246	216	24	8	216	24																	118		52	6	4		52	6
Origin Bus Park	67481	Origin Bus Park	N/A	N/A	268	268	23	99	99	9	241		27	12	89		10	5	241		27	12	89		10	5	241		27	12	89		10	5

Figure D2: PM Peak Development Growth Numbers

					PM Trips						PM								PM								PM							
					IN Destination			OUT Origin			IN				Out				IN				Out				IN Destination				Out Origin			
	New Zone Name	PRTS Name	Total Units	New Jobs	Car	(Servicing)	HGV (servicing)	Car	(Servicing)	HGV (servicing)	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV	Car	Taxi	LGV	HGV
First Central	67483	First Central			321	129	19	535	129	19	96		65	10	535		16	2	321		65	10	535		16	2	321		65	10	535		65	10
Alperton Housing Zone	66201	255 Ealing Road (A3.2)	125		293			205			16				12				16				12				16				12			
	66201	243 Ealing Road (A3.1)	441		293			205			58				41				58				41				58				41			
	66031	Minavil House (A2)	136		293			205			18				13				18				13				18				13			
	66201	Alperton House (A1)	188		293			205			25				17				25				17				25				17			
	66031	Atlip (A4)	313		293			205			41				29				41				29				41				29			
	66031	Sunleigh Road (A5)	324		293			205			43				30				43				30				43				30			
	66031	Woodside Avenue (A6)	445		293			205			59				41				59				41				59				41			
	66054	Mount Pleasant (A7)	251		293			205			33				23				33				23				33				23			
Northfields	66054	Northfields			175			123			88				62				175				123				175				123			
HS2 Shield Site 2	64495	HS2 Shield Site 2		4160	50			32	22	2																	26				17		6	0
HS2 Shield Site 1	64496	HS2 Shield Site 1		3840	50			32	22	2																	24				15		5	0
Origin Bus Park	67481	Origin Bus Park				67	6		248	21			34	3			31	3			34	3			31	3			34	3			124	11

Figure 1: AM 2021 Traffic Growth (PCUs) – Including Development Trips for Park Royal Study

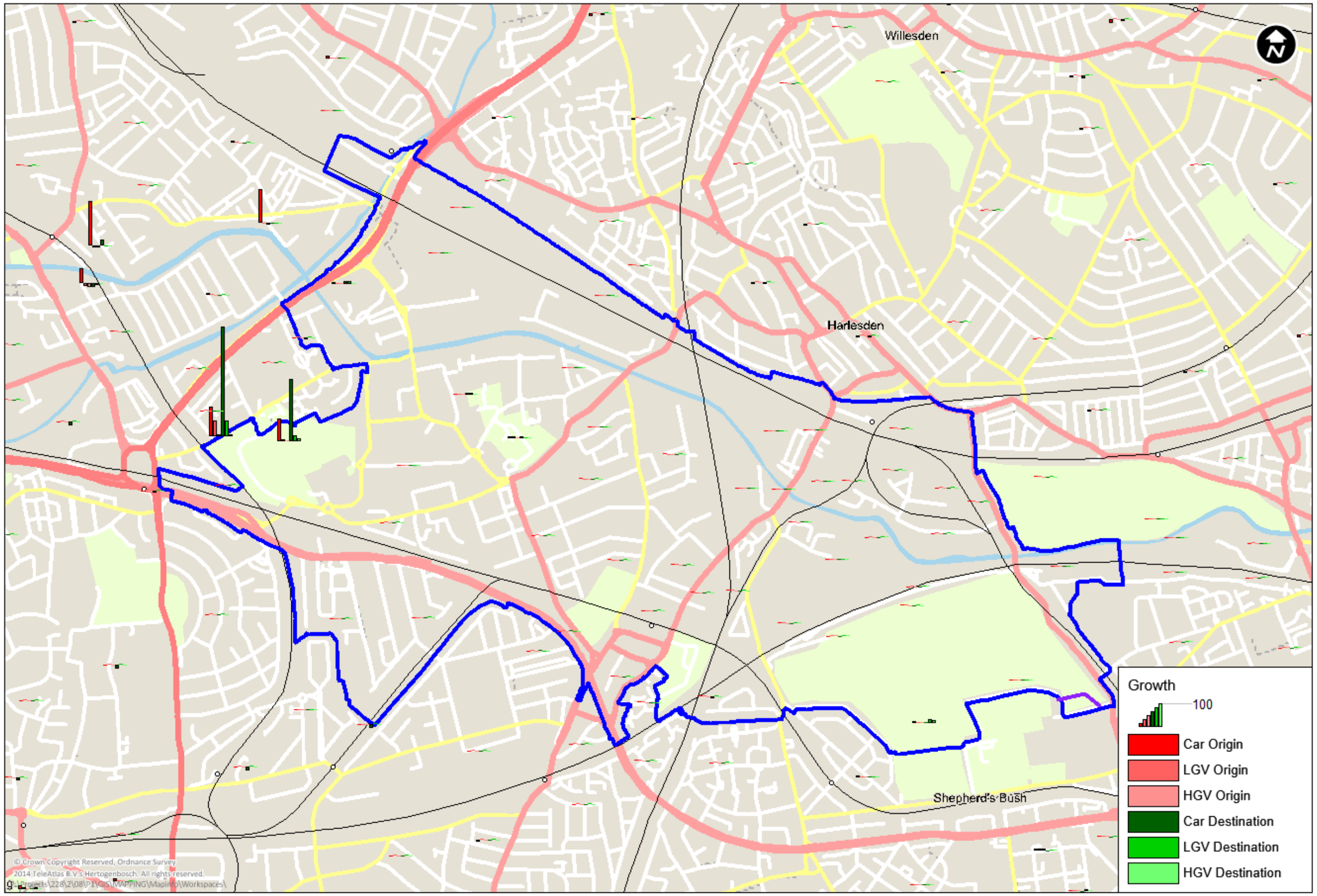

Figure 2: AM 2026 Traffic Growth (PCUs) – Including Development Trips for Park Royal Study

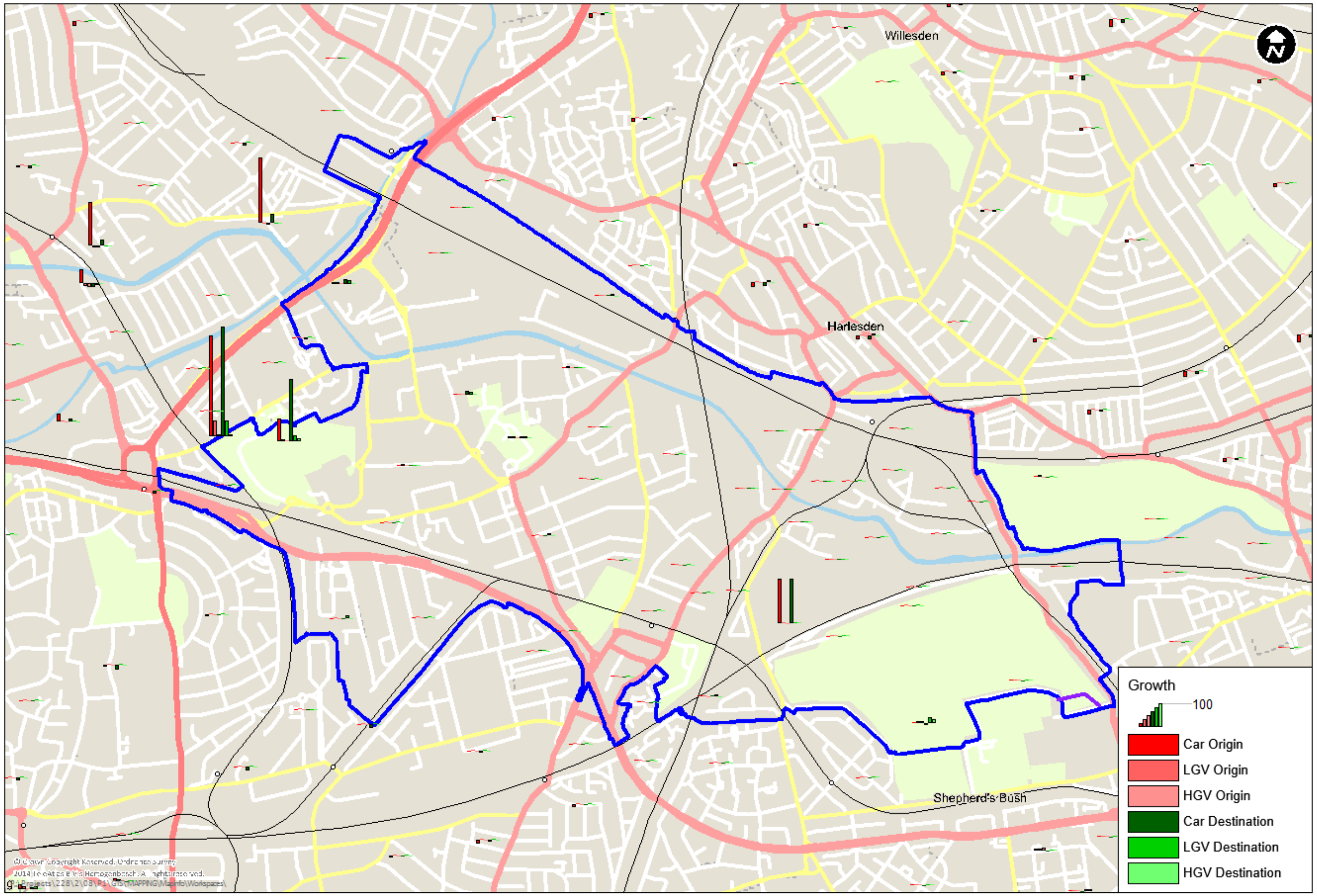

Figure 3: AM 2041 Traffic Growth (PCUs) – Including Development Trips for Park Royal Study

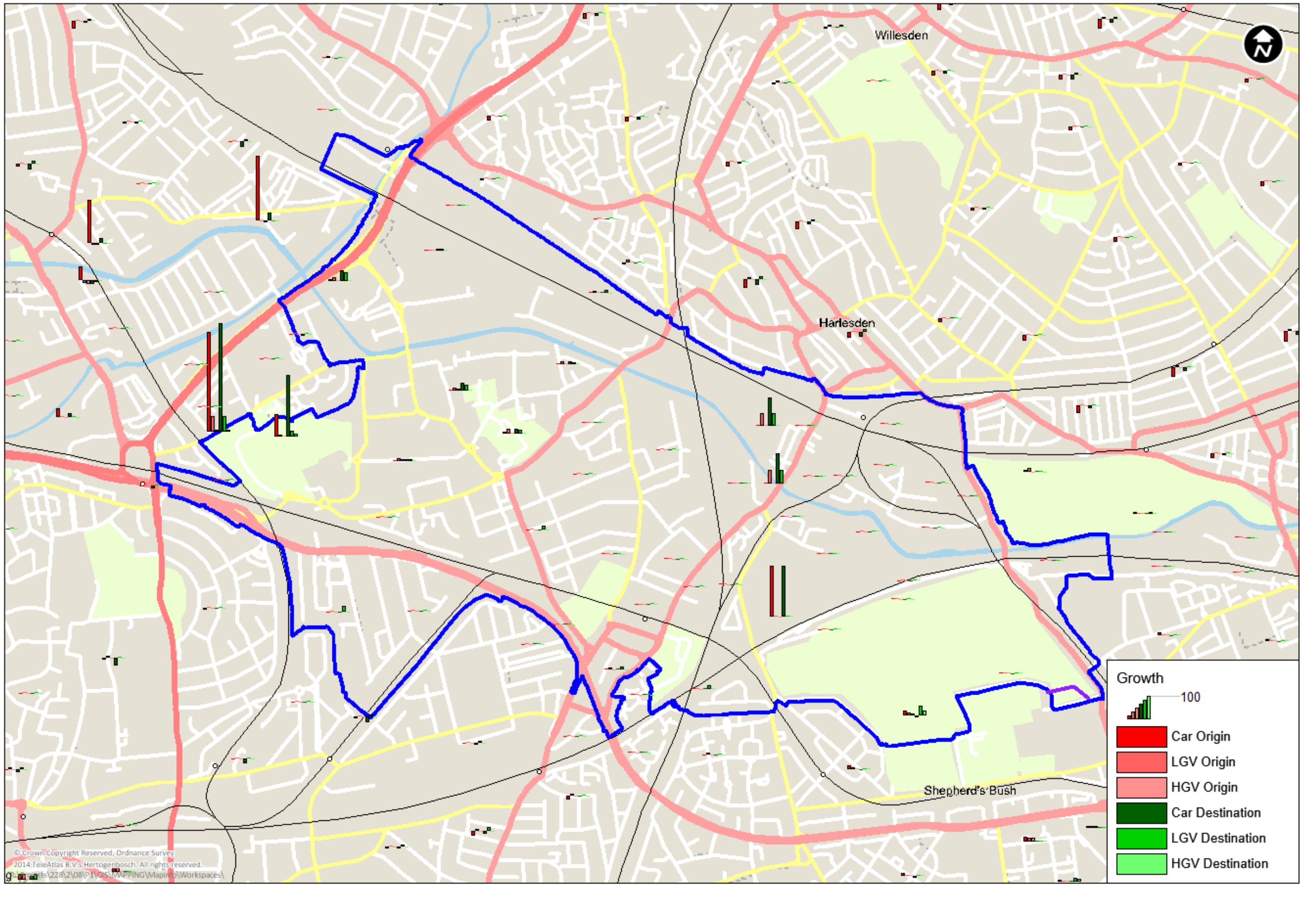

Figure 4: PM 2021 Traffic Growth (PCUs) – Including Development Trips for Park Royal Study

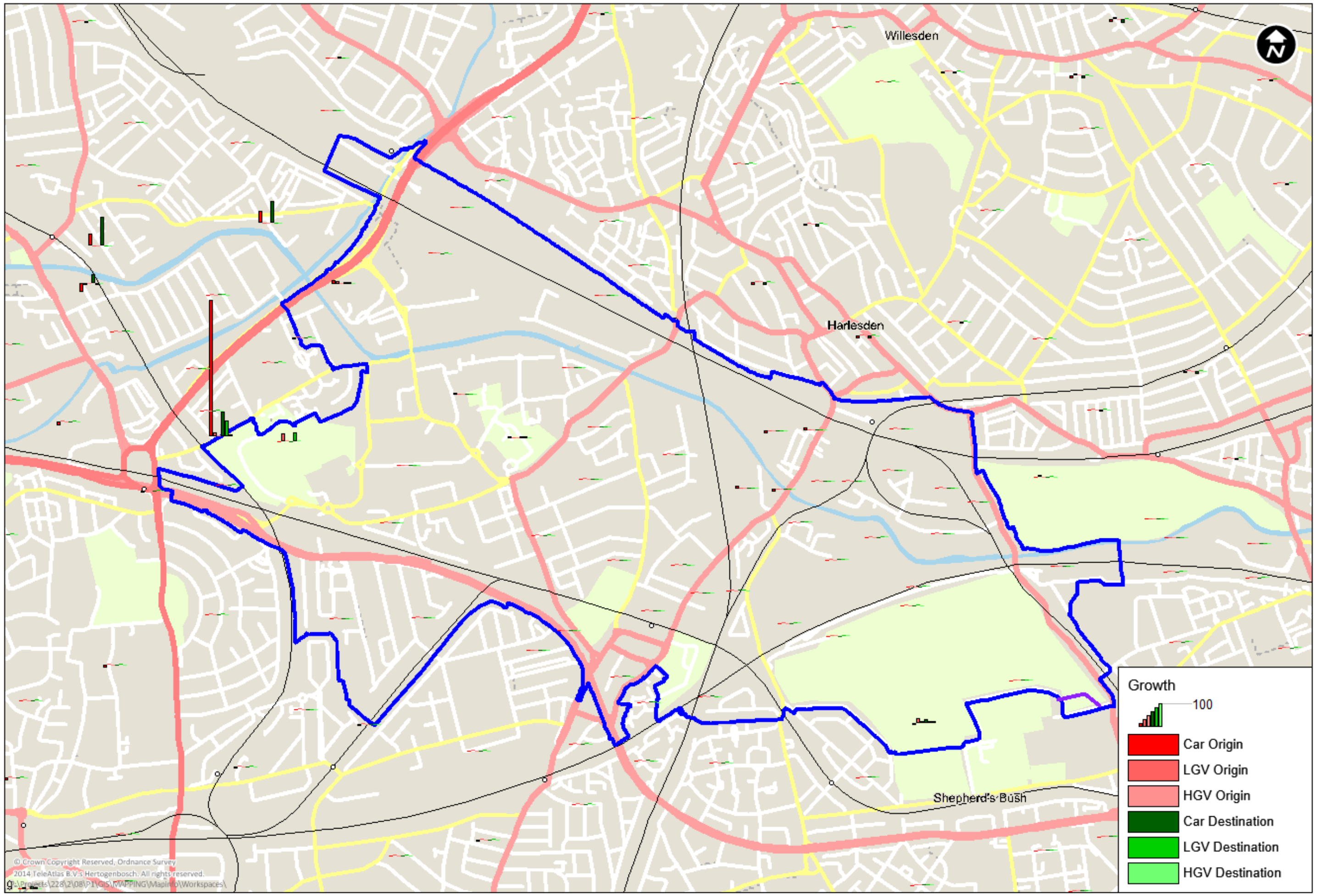

Figure 5: PM 2026 Traffic Growth (PCUs) – Including Development Trips for Park Royal Study

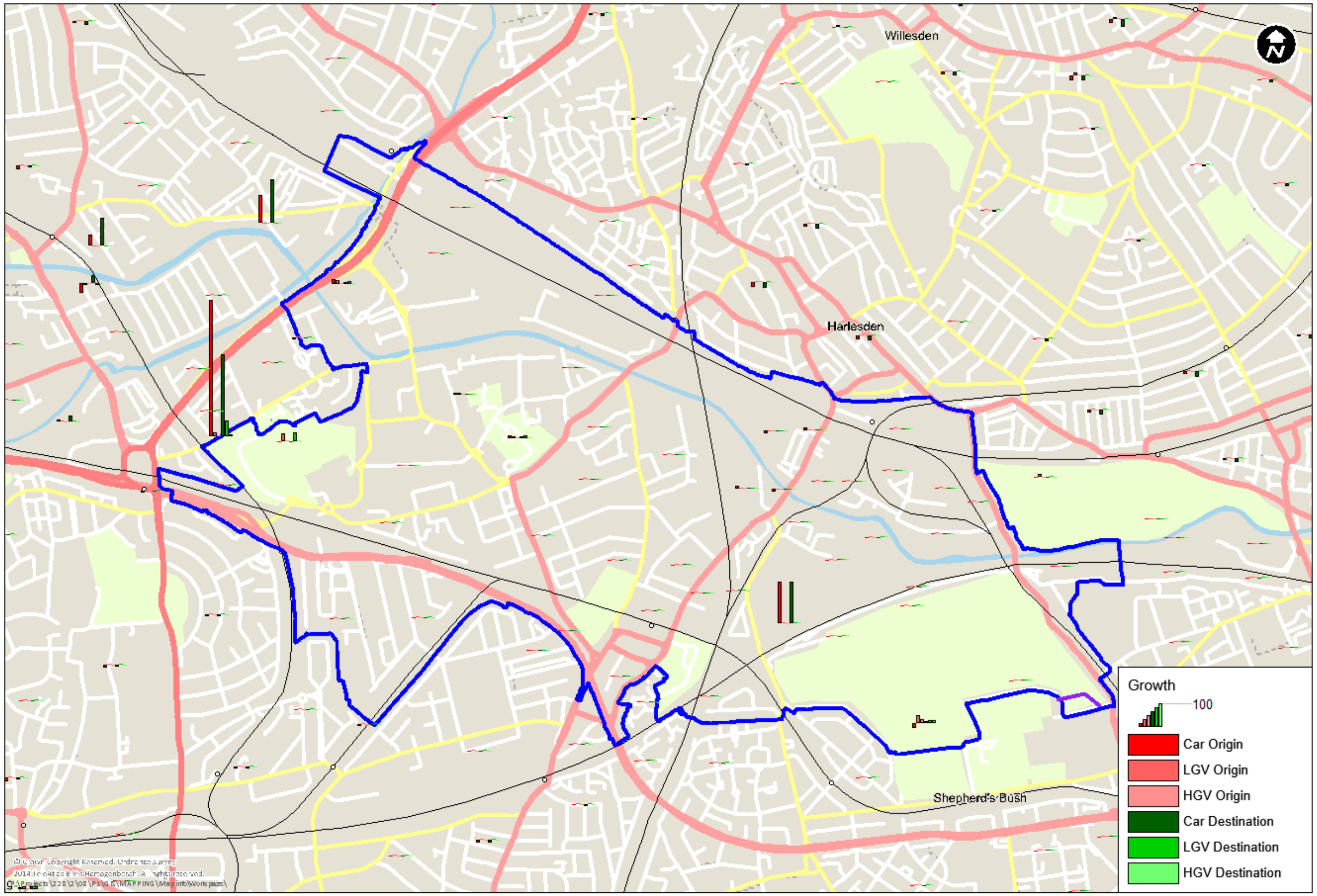

Figure 6: PM 2041 Traffic Growth (PCUs) – Including Development Trips for Park Royal Study

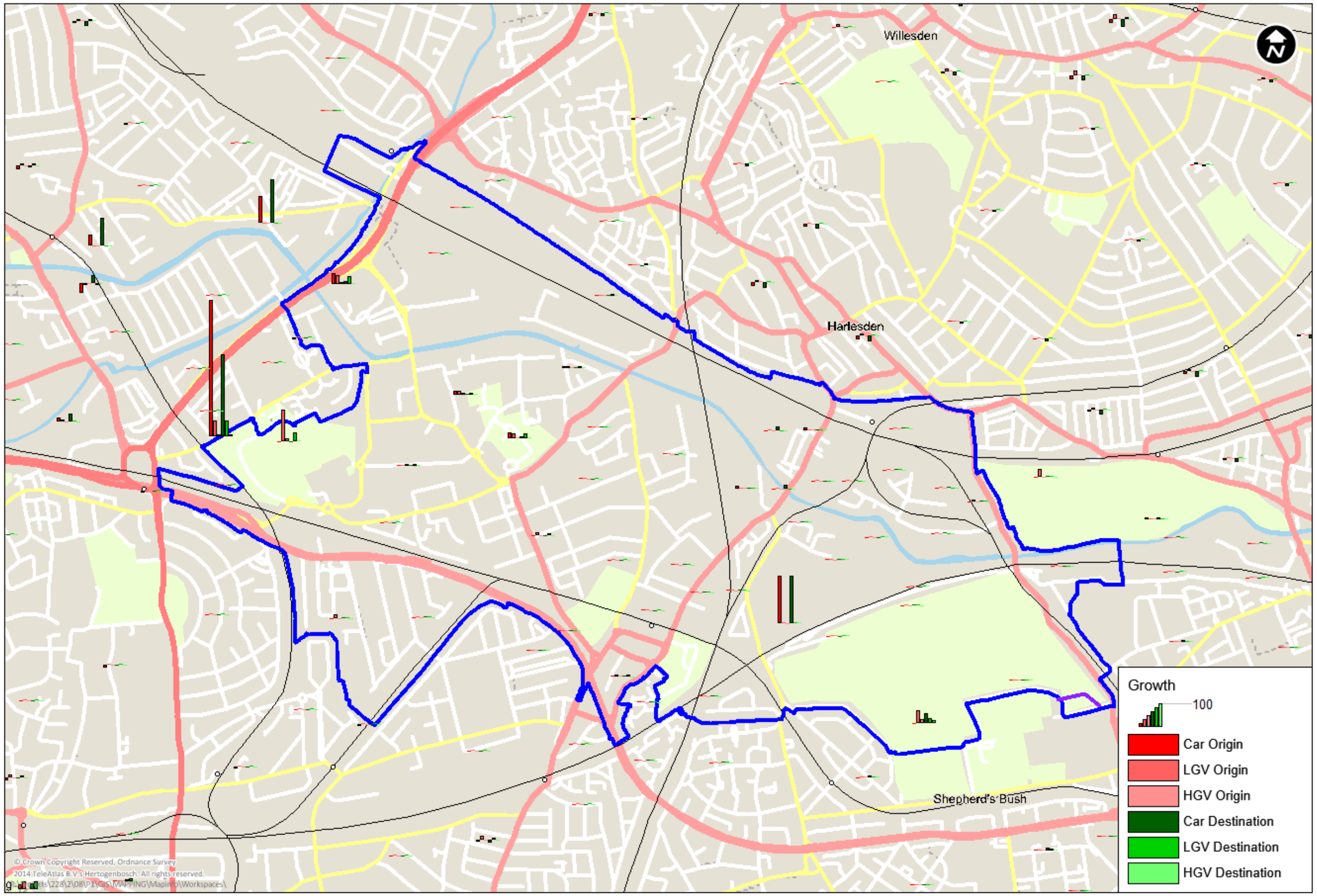

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Figure E.1: AM Peak 2012 Base Year Demand Flows in PCUs

Figure E.2: AM Peak 2012 Base Year Actual Flows in PCUs

Figure E.3: AM Peak 2012 Base Year Average Queue in PCUs

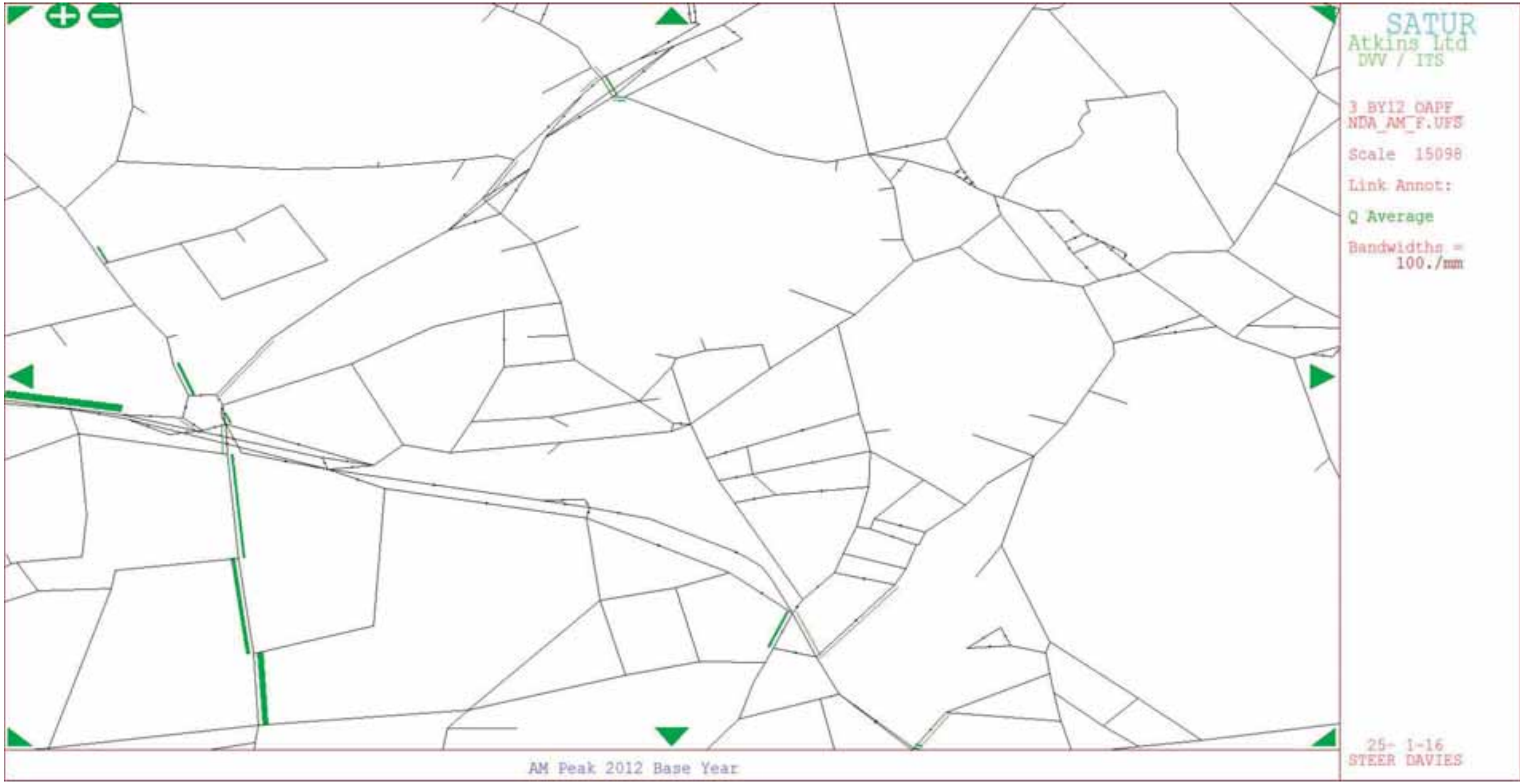


Figure E.4: AM Peak 2012 Base Year Average Delay in Seconds

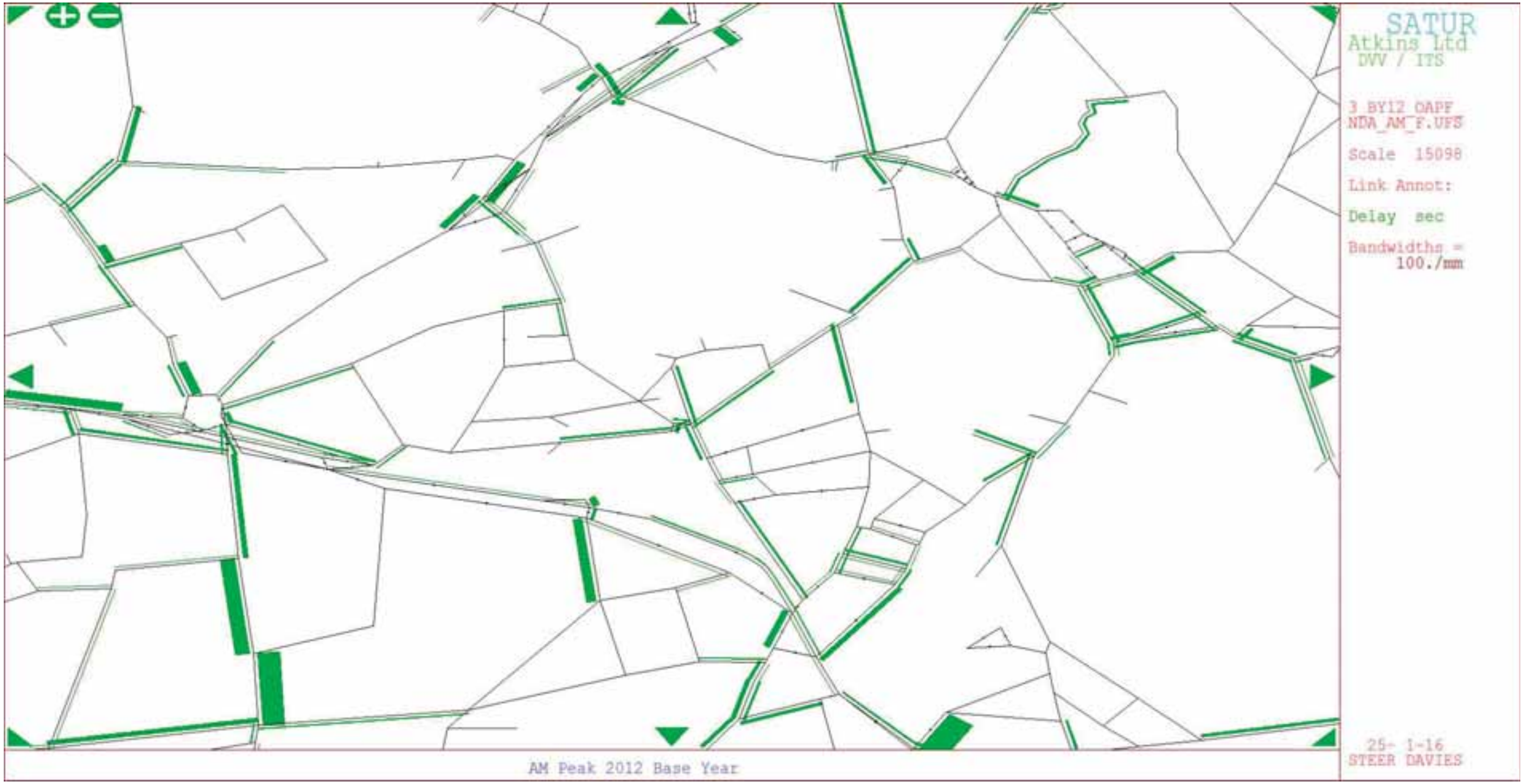


Figure E.5: AM Peak 2012 Base Year Volume Over Capacity %

Figure E.6: PM Peak 2012 Base Year Demand Flows in PCUs

Figure E.7: PM Peak 2012 Base Year Actual Flows in PCUs

Figure E.8: PM Peak 2012 Base Year Average Queues in PCUs

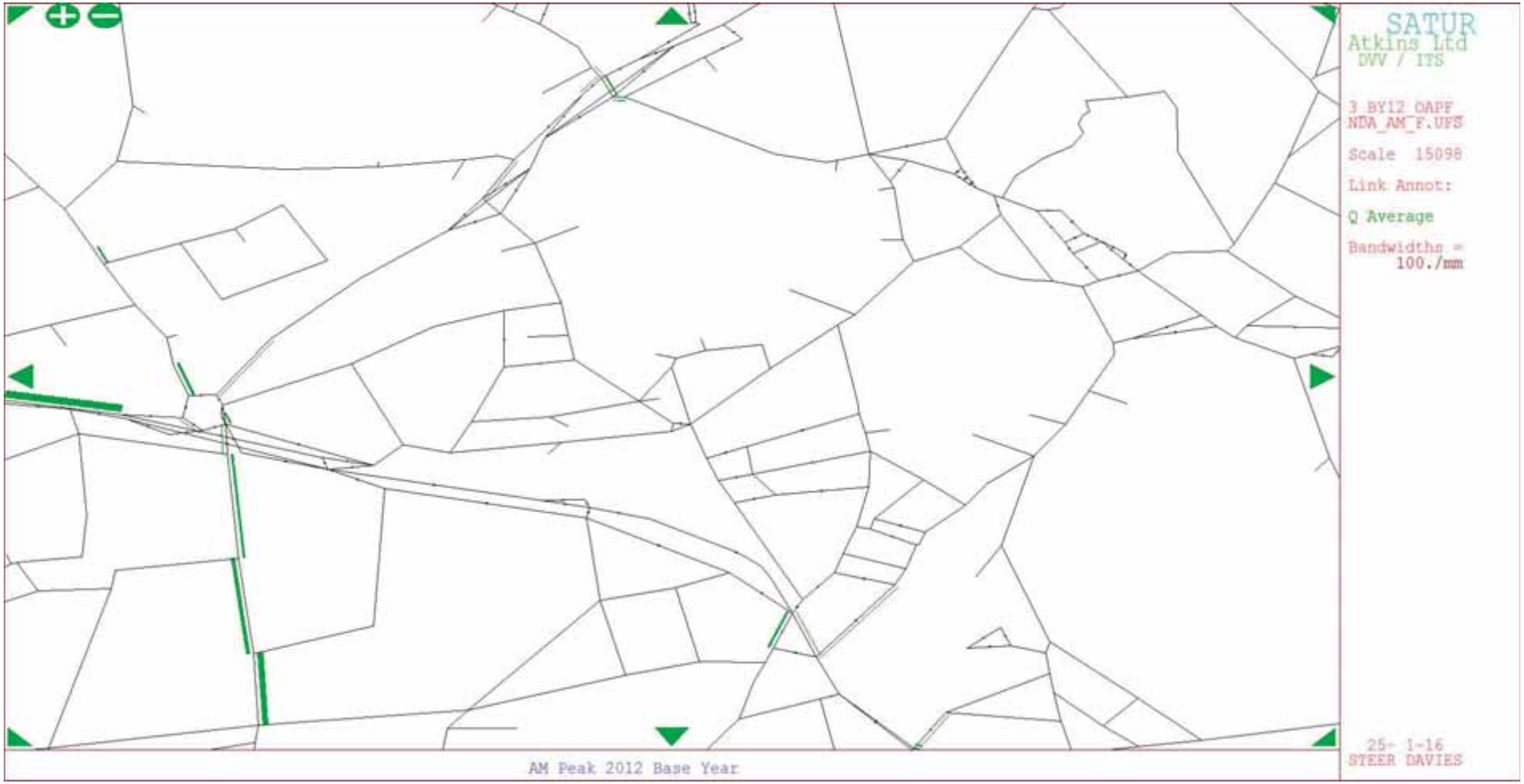


Figure E.9: PM Peak 2012 Base Year Average Delay in Seconds

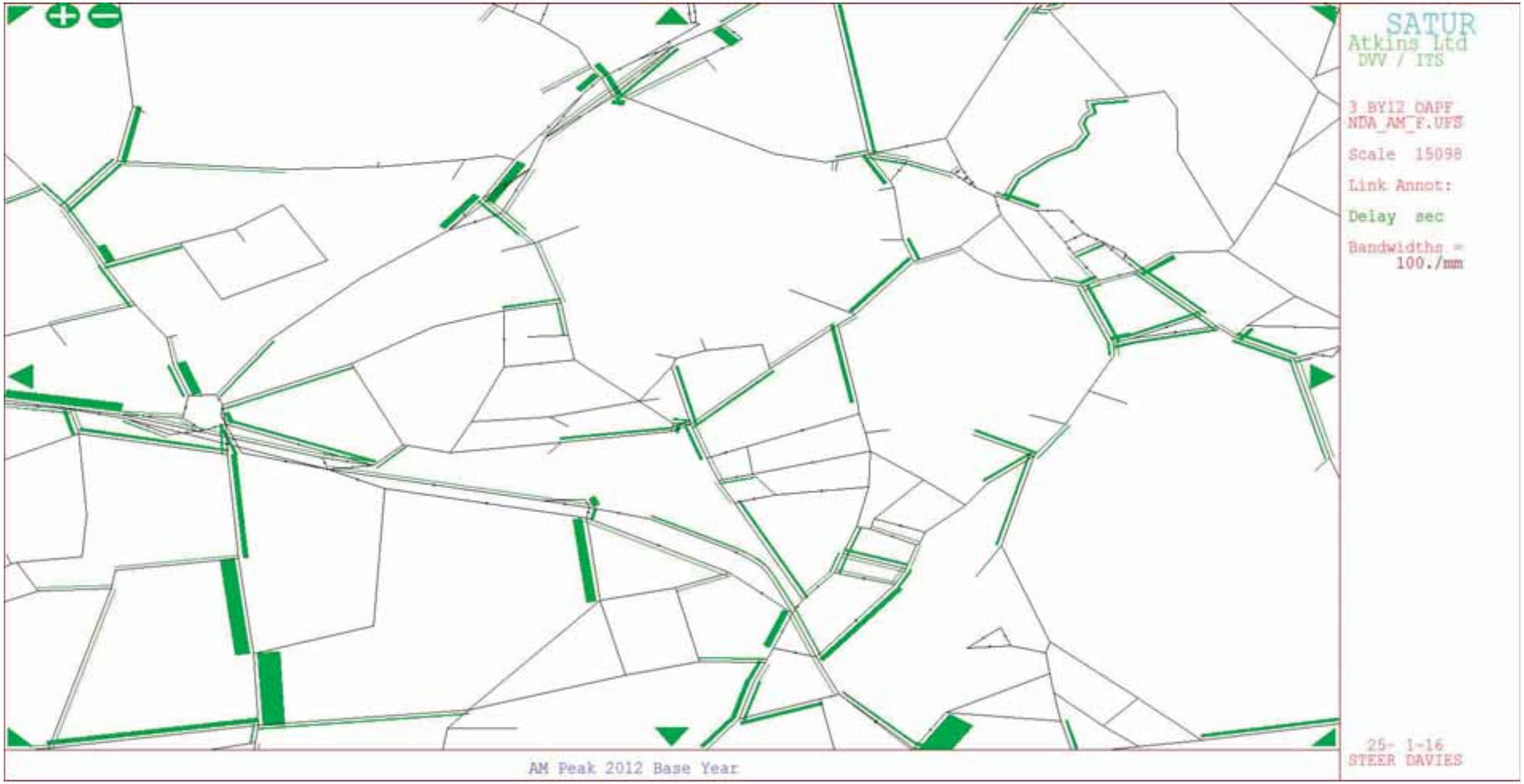


Figure E.10: AM Peak 2012 Base Year Volume Over Capacity %

Figure E.11: AM Peak 2021 Park Royal Demand Flows in PCUs

Figure E.12: AM Peak 2021 Park Royal Actual Flows in PCUs

Figure E.13: AM Peak 2021 Park Royal Average Queue in PCUs

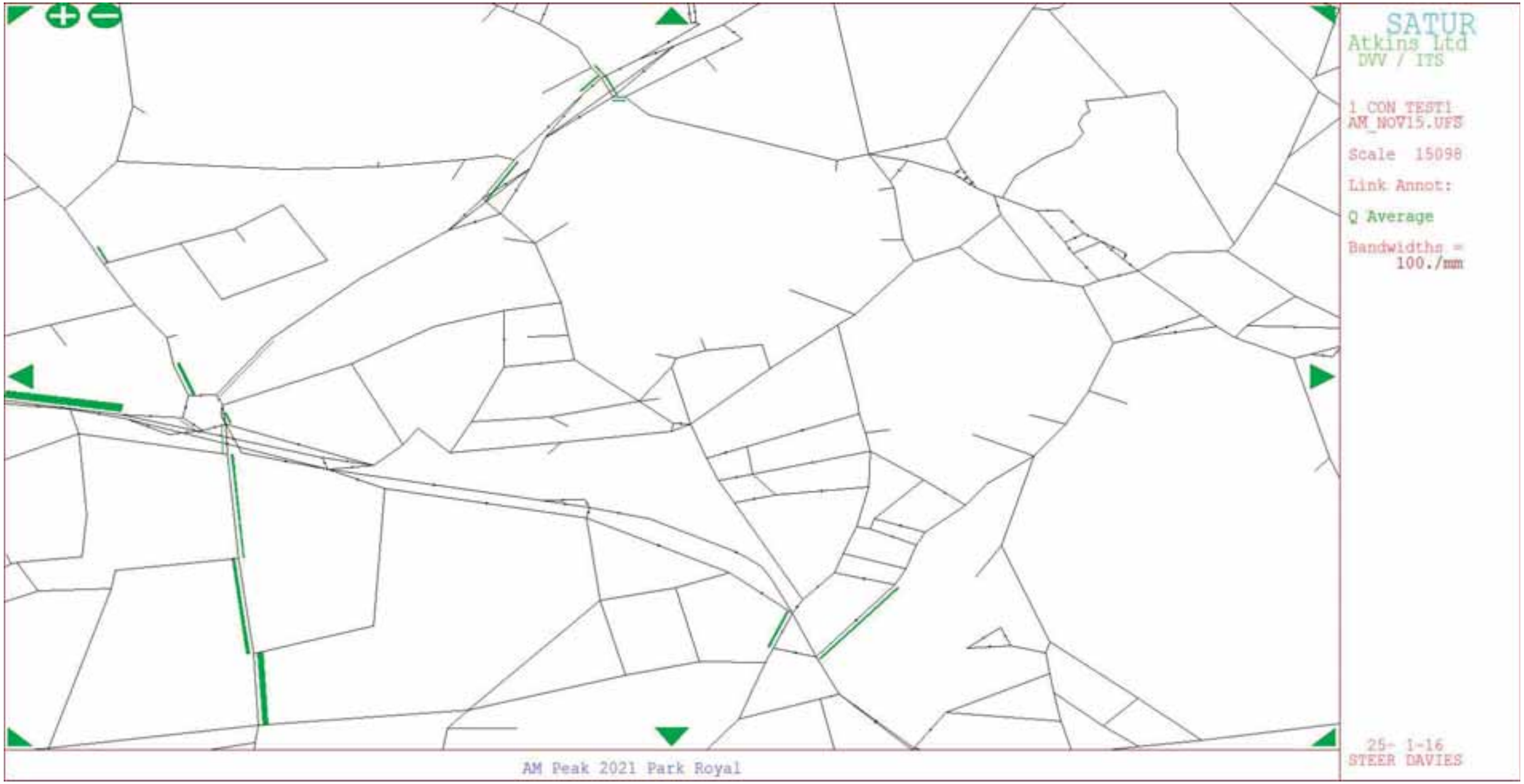


Figure E.14: AM Peak 2021 Park Royal Average Delay in Seconds

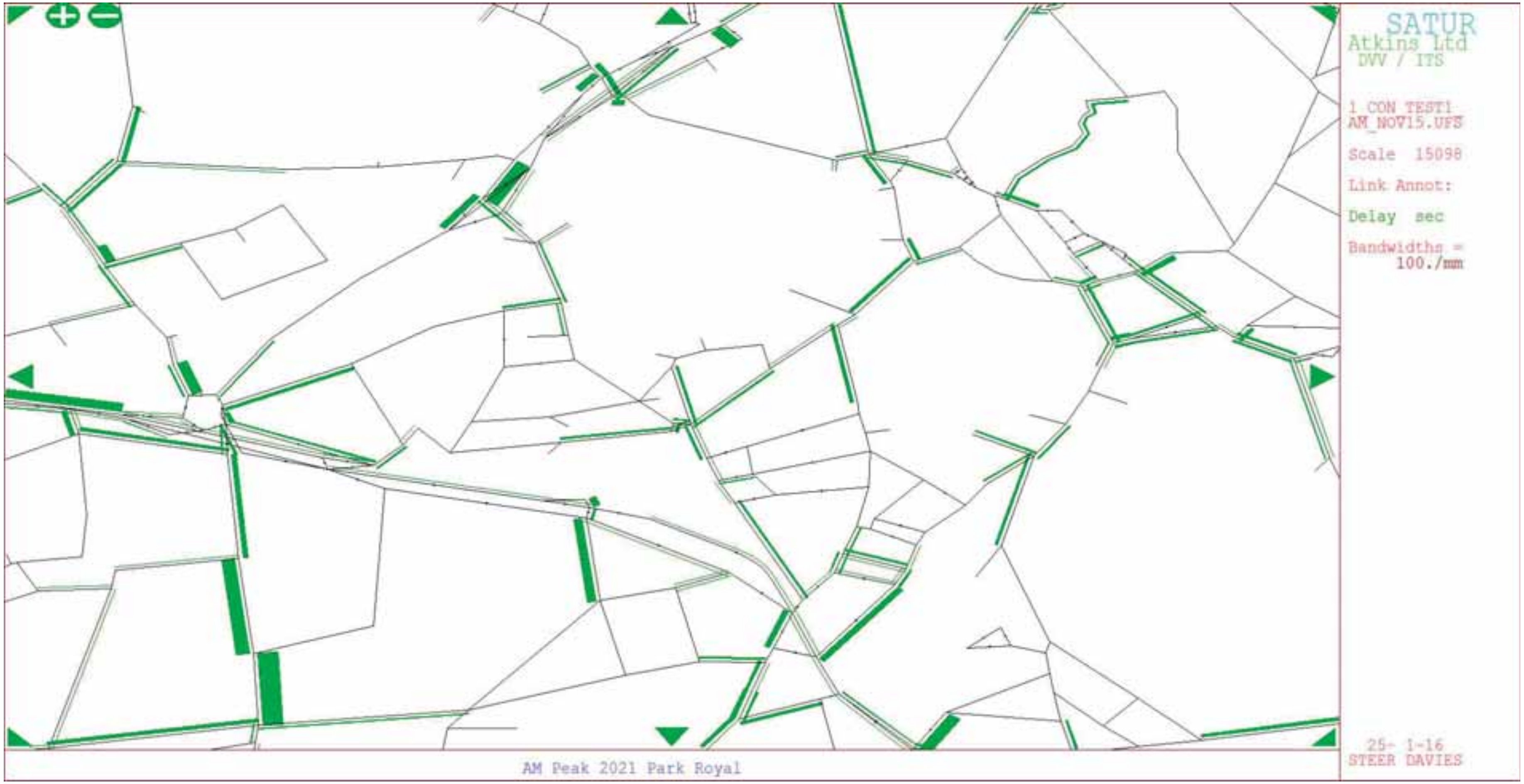


Figure E.15: AM Peak 2021 Park Royal Volume Over Capacity %

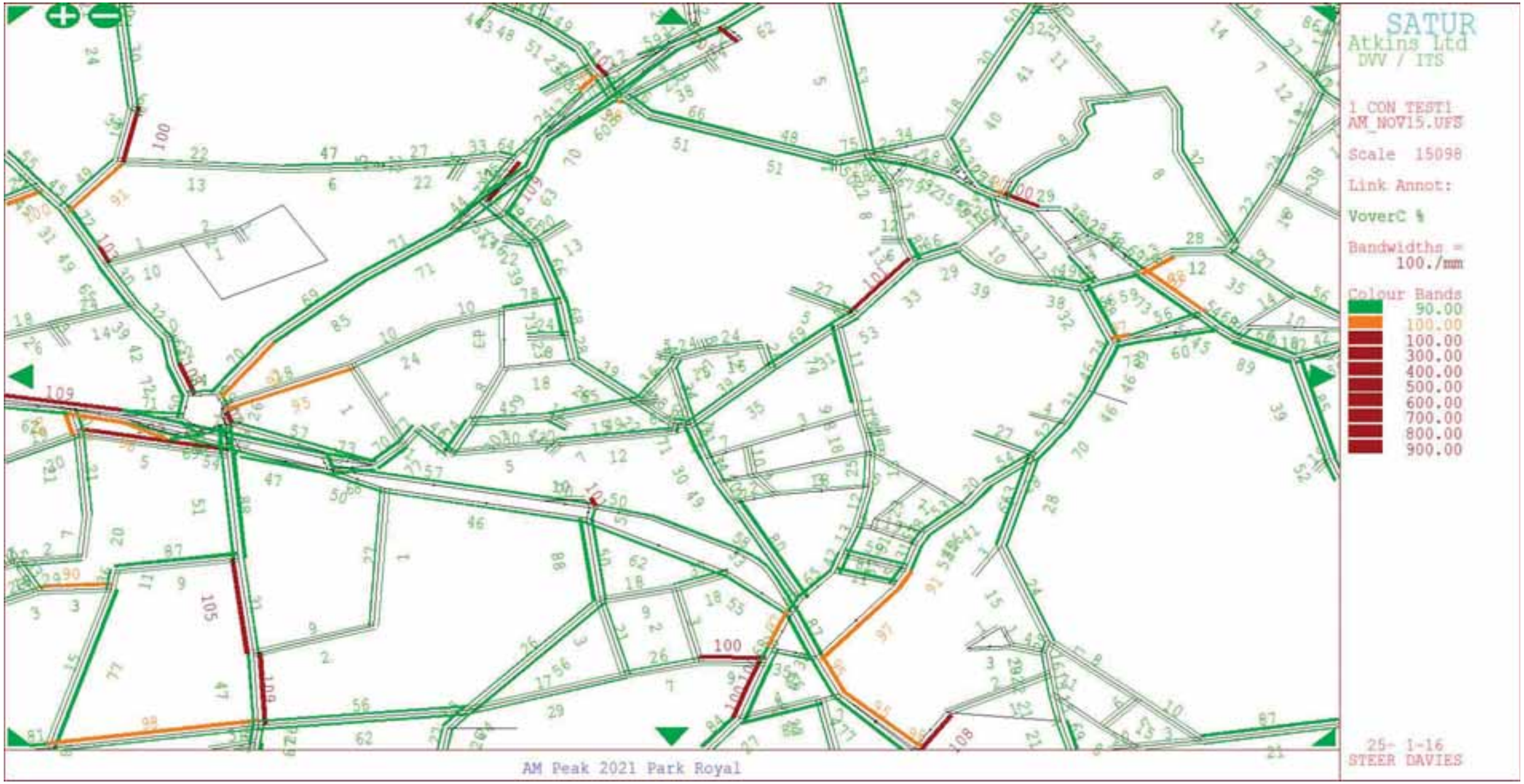


Figure E.16: AM Peak 2021 Park Royal PCU Hour Junction Delays

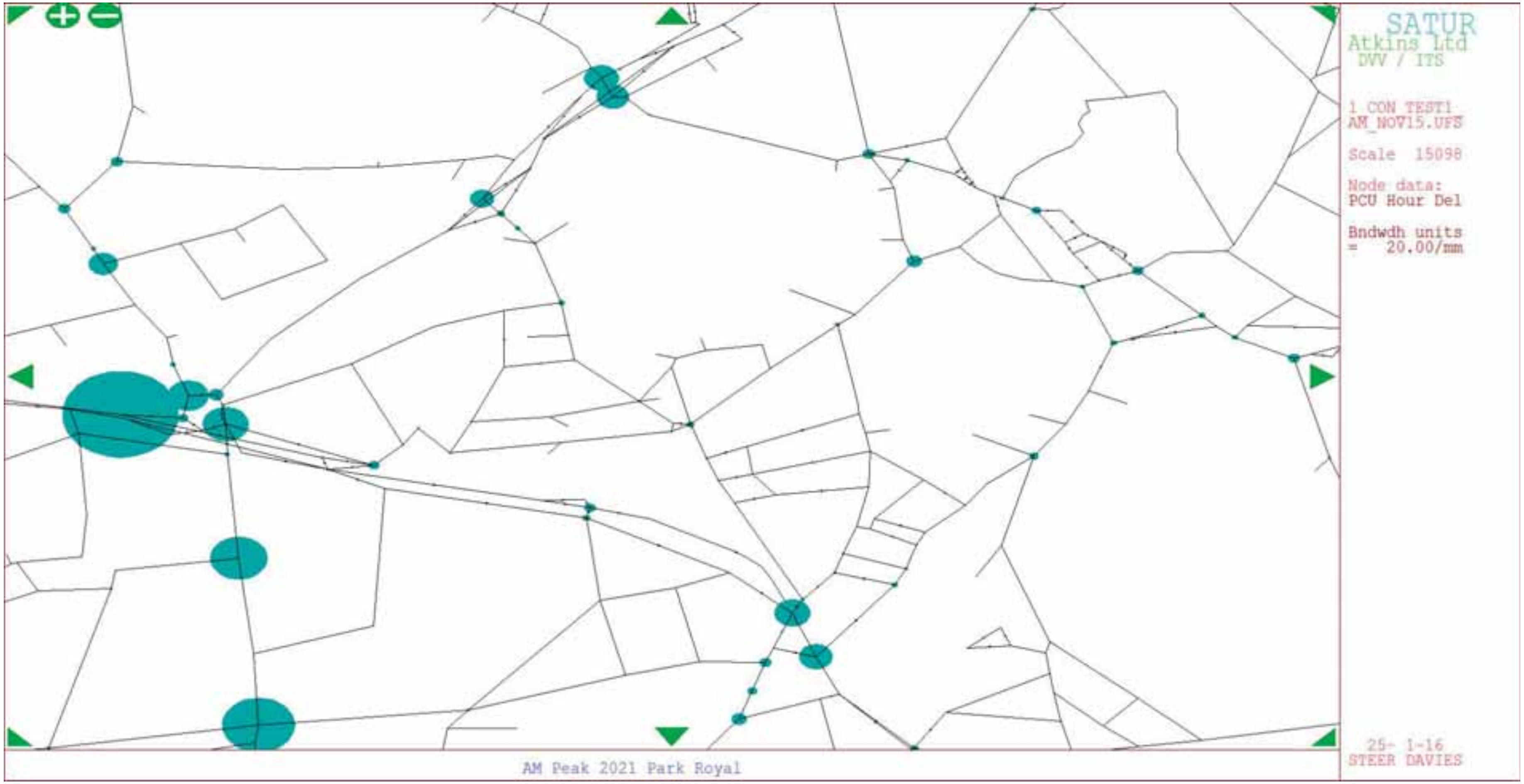


Figure E.17: AM Peak (Park Royal 2021- BY 2012) Demand Flow Differences in PCUs

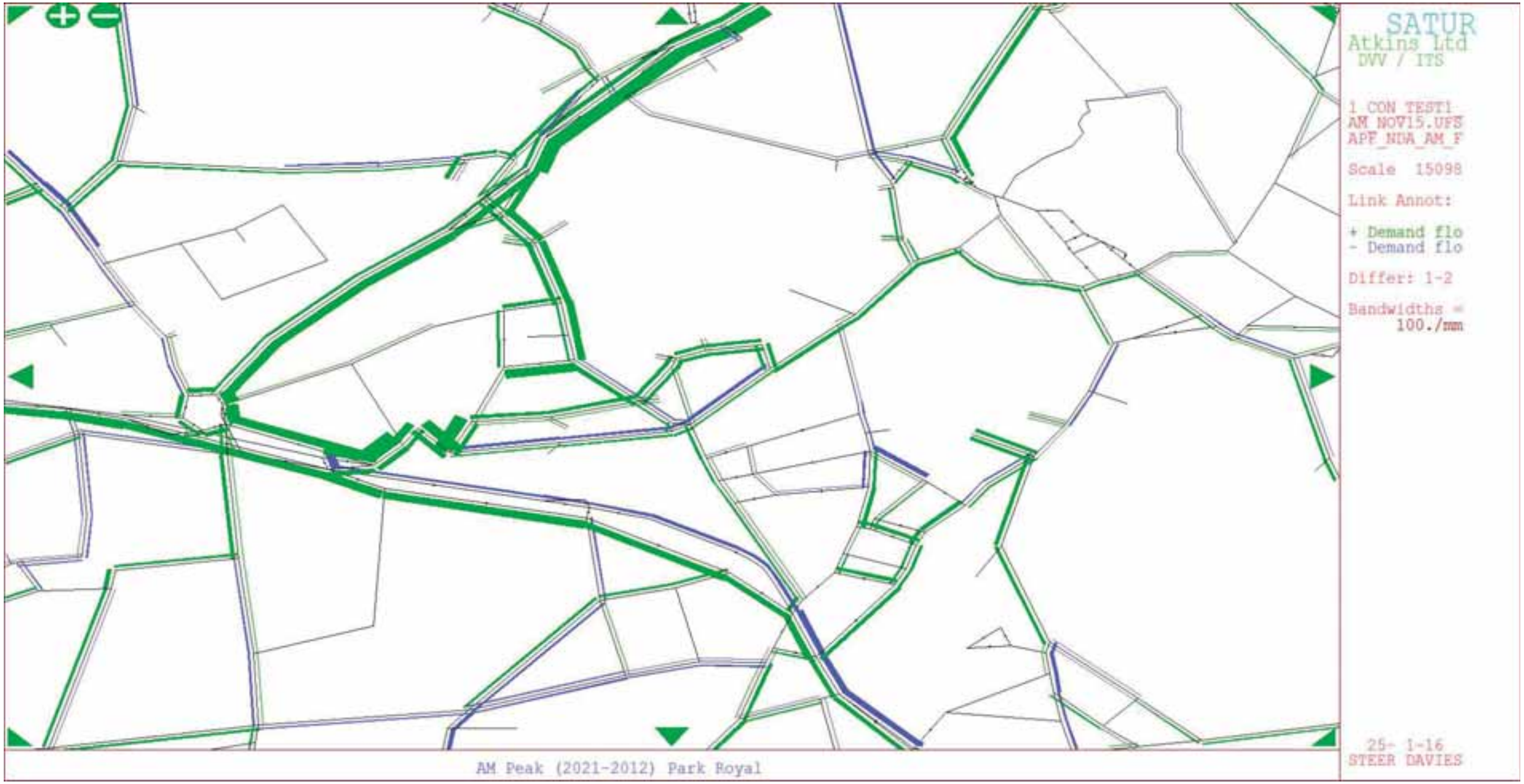


Figure E.18: AM Peak (Park Royal 2021- BY 2012) Actual Flow Differences in PCUs

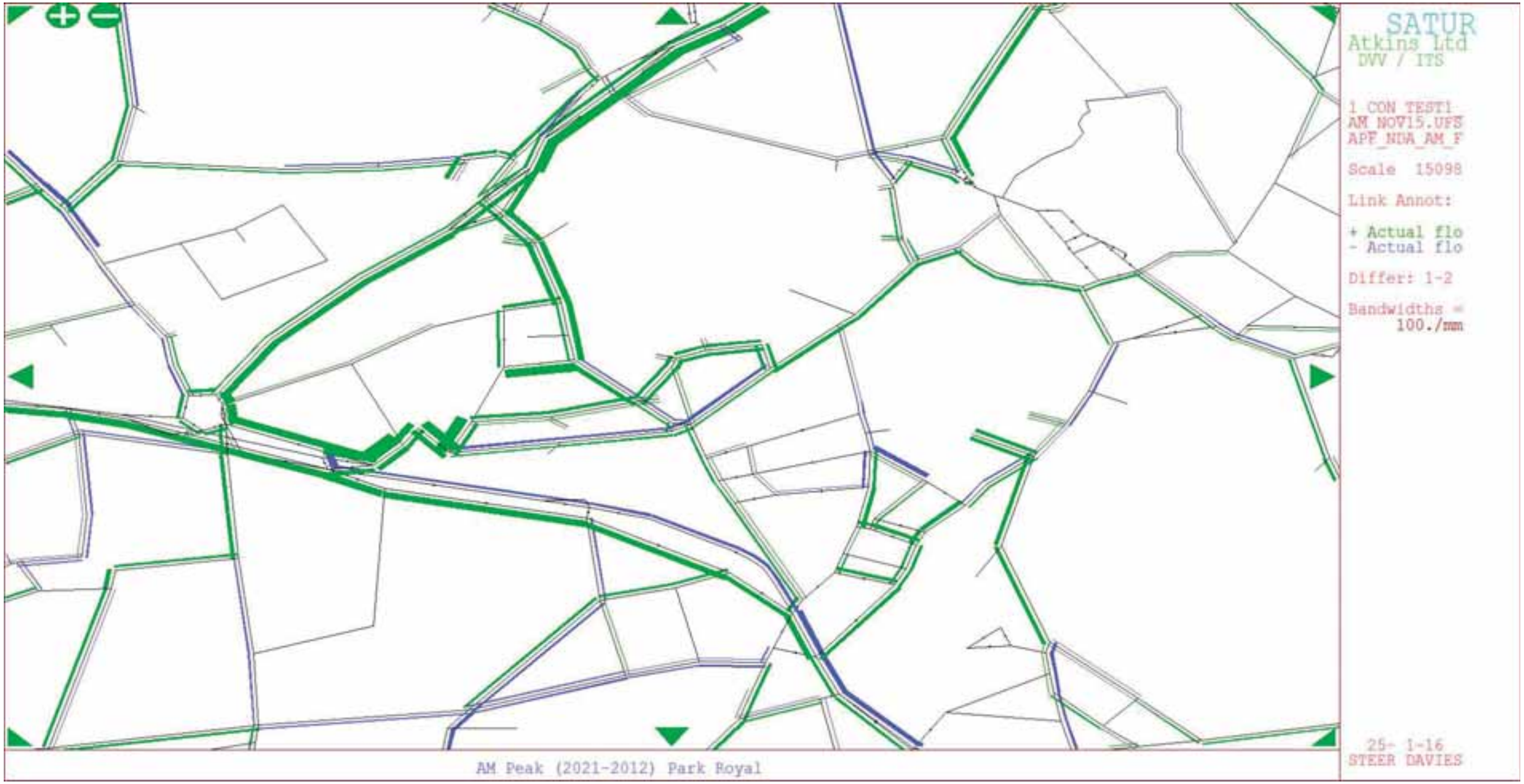


Figure E.19: AM Peak (Park Royal 2021- BY 2012) Average Queue Differences in PCUs

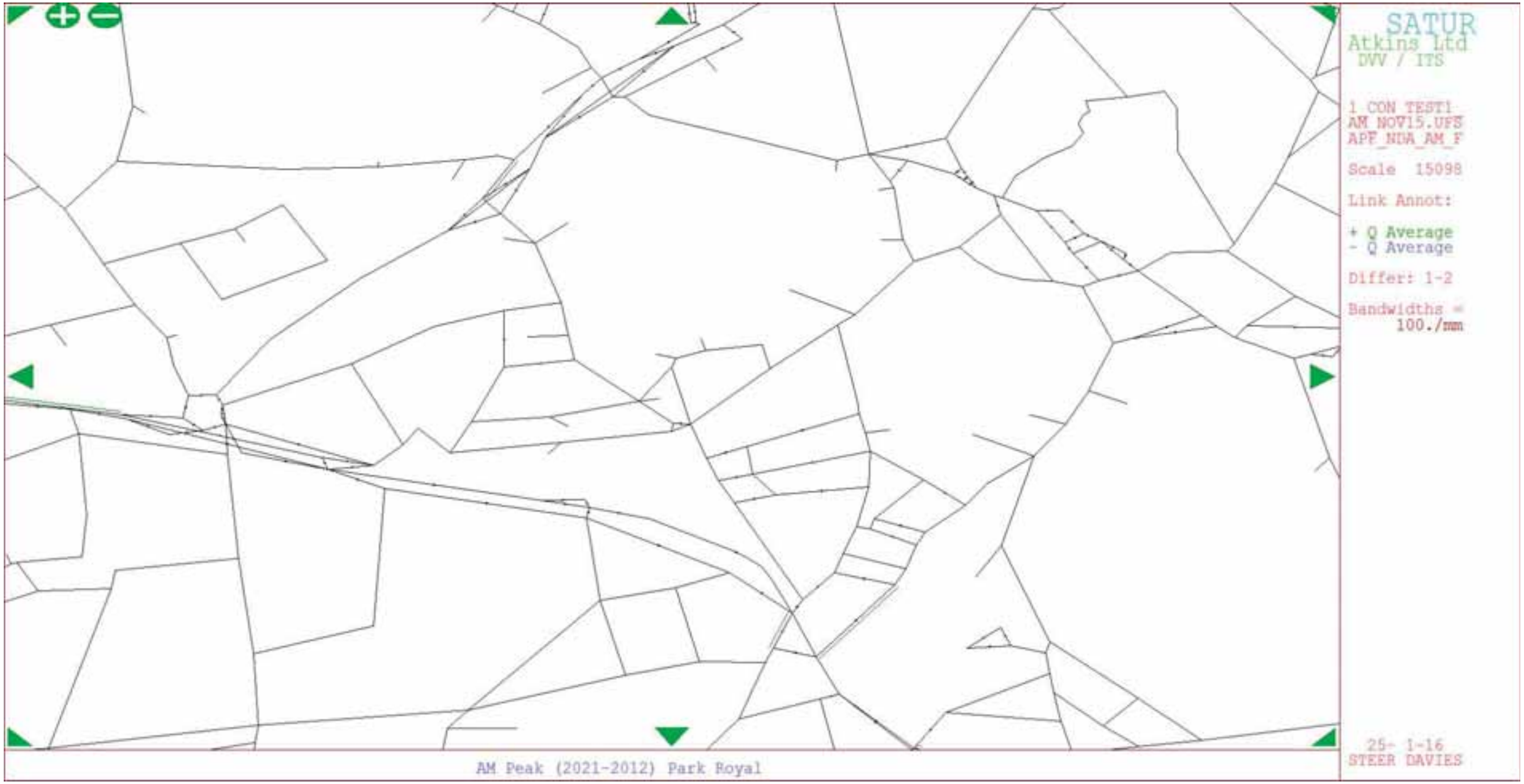


Figure E.20: AM Peak (Park Royal 2021 - BY 2012) Average Delay Differences in Seconds

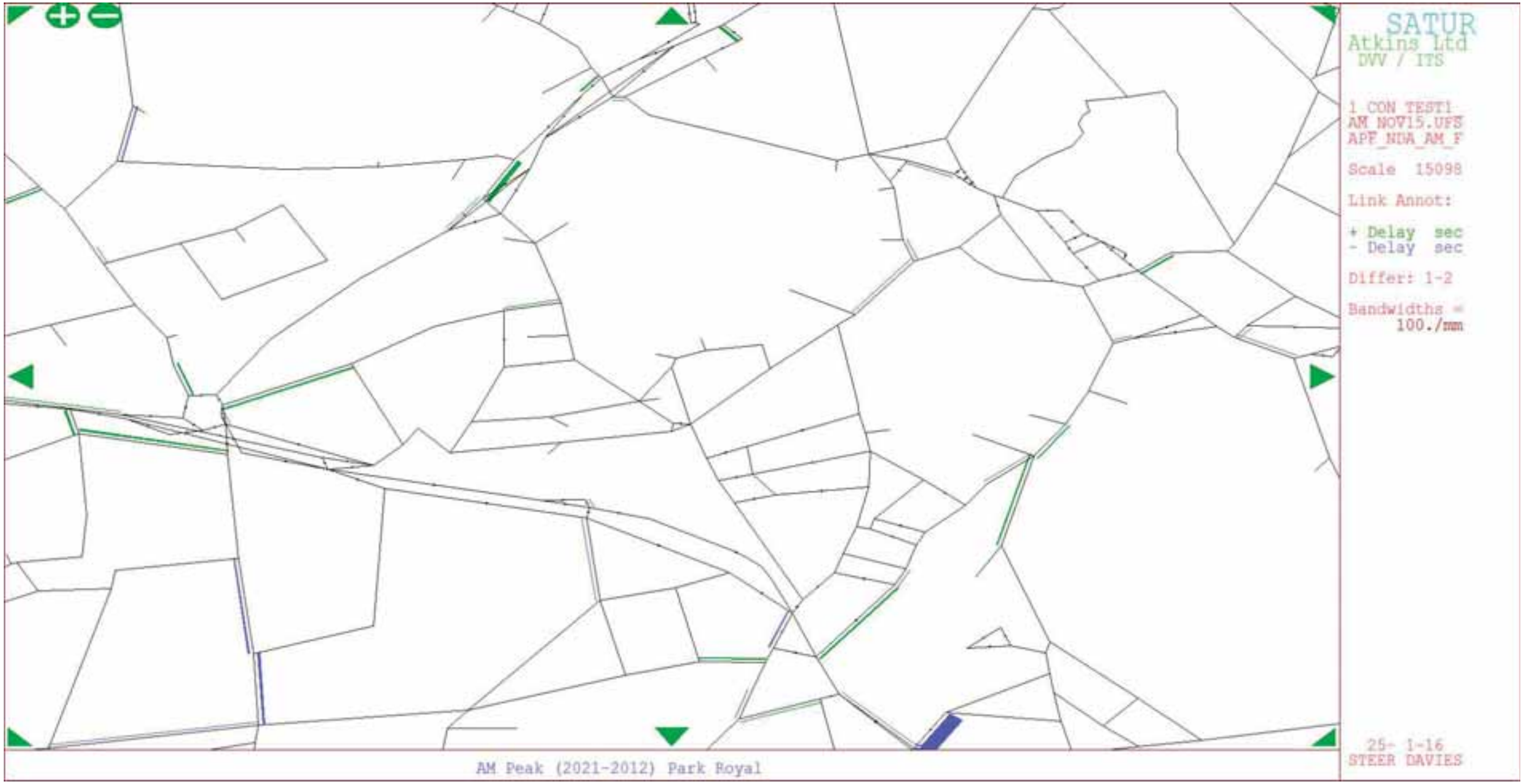


Figure E.21: AM Peak (Park Royal 2021- BY 2012) PCU Hour Junction Delay Differences

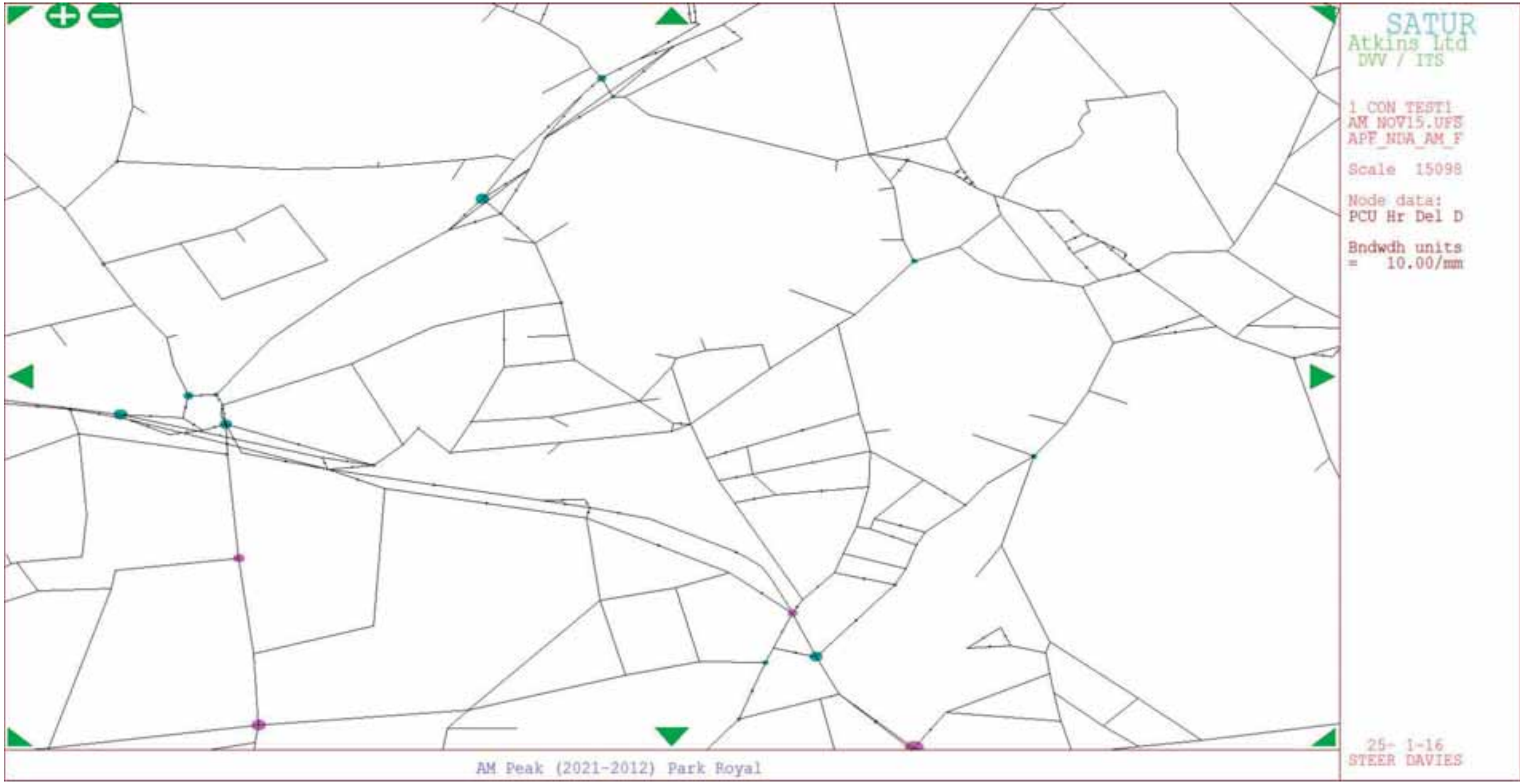


Figure E.22: PM Peak Park Royal 2021 Demand Flow in PCUs

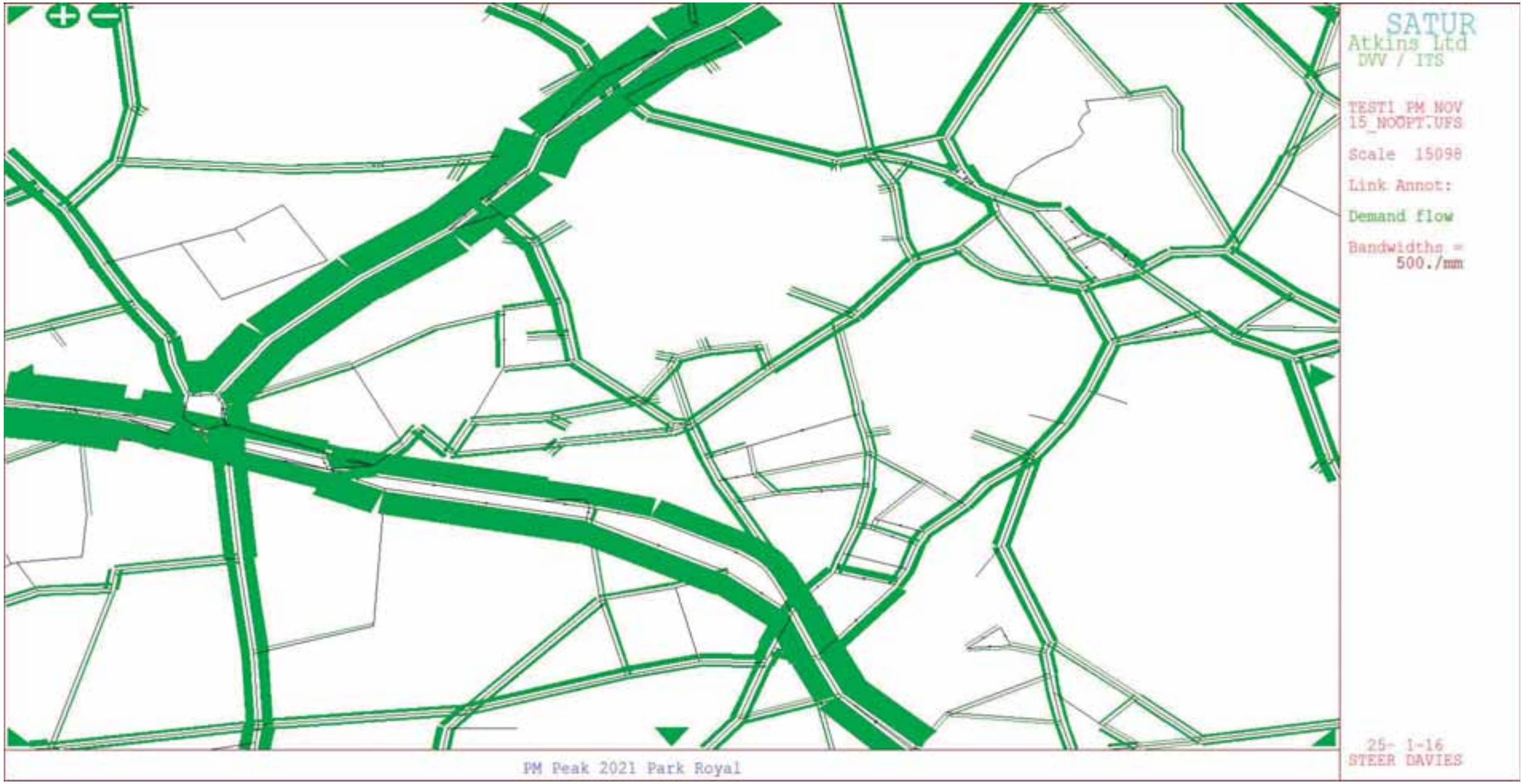


Figure E.23: PM Peak Park Royal 2021 Actual Flow in PCUs

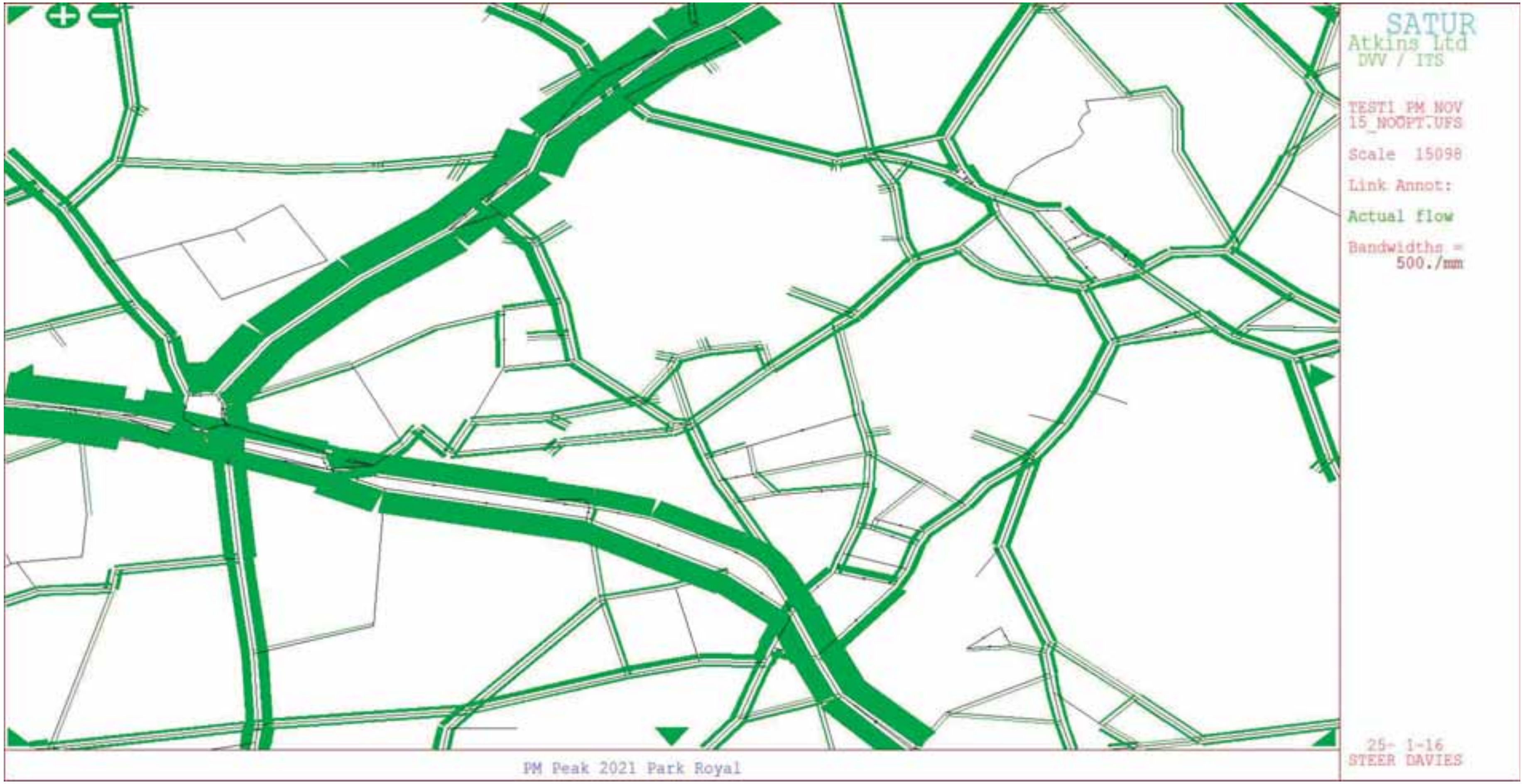


Figure E.24: PM Peak Park Royal 2021 Average Queue in PCUs

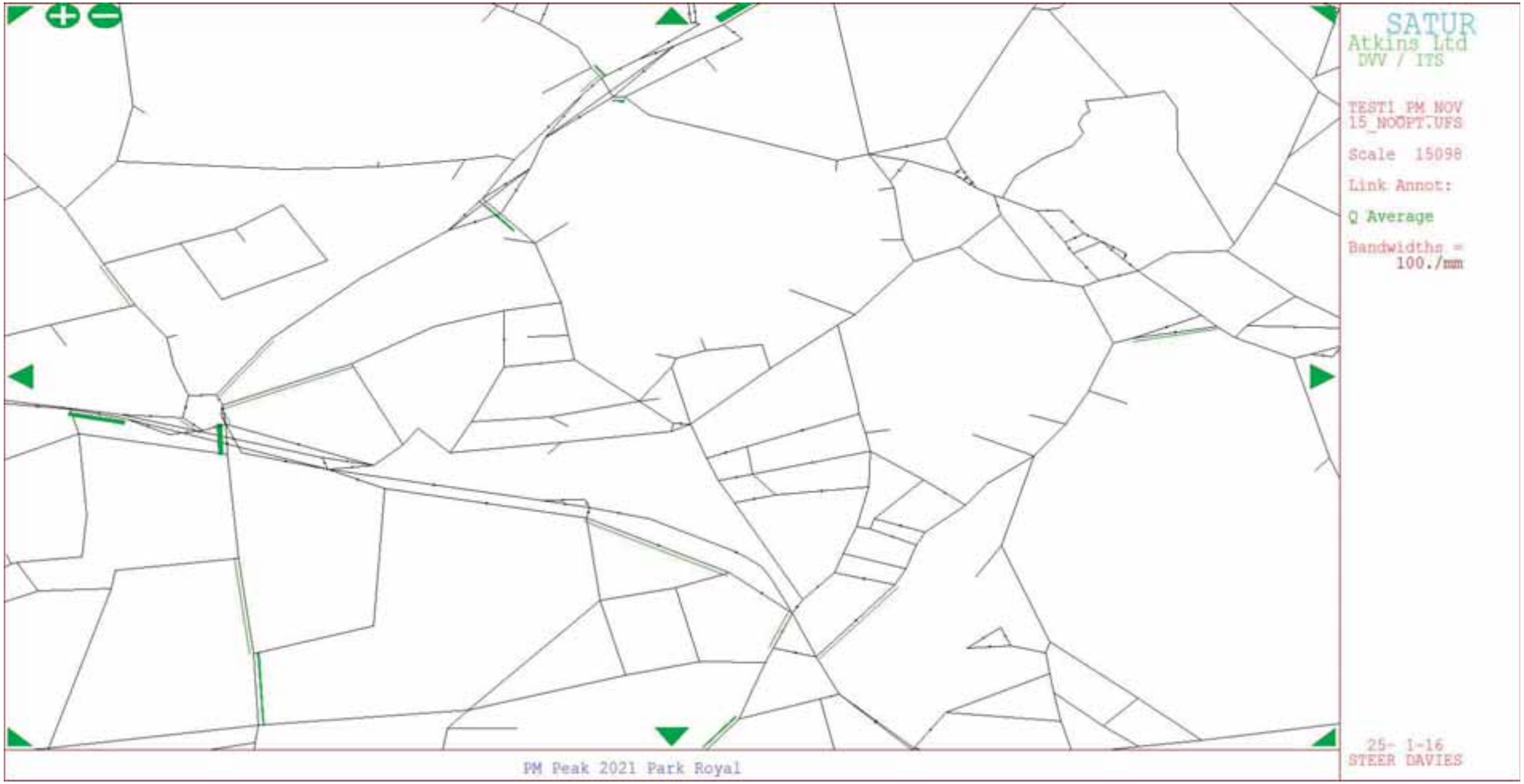


Figure E.25: PM Peak Park Royal 2021 Average Delay in Seconds

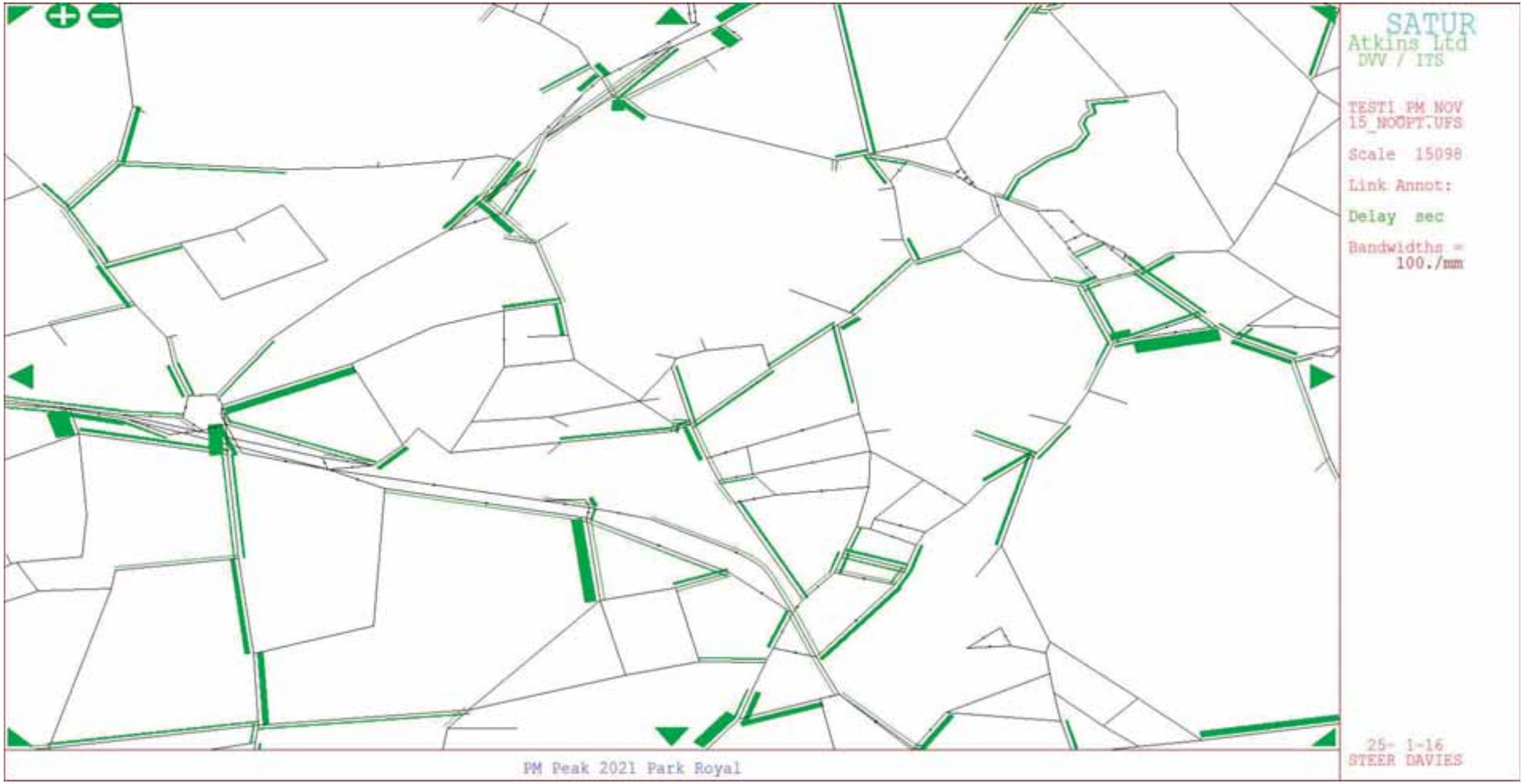


Figure E.26: PM Peak Park Royal 2021 Volume Over Capacity %

Figure E.27: PM Peak Park Royal 2021 Junction PCU Hour Junction Delay

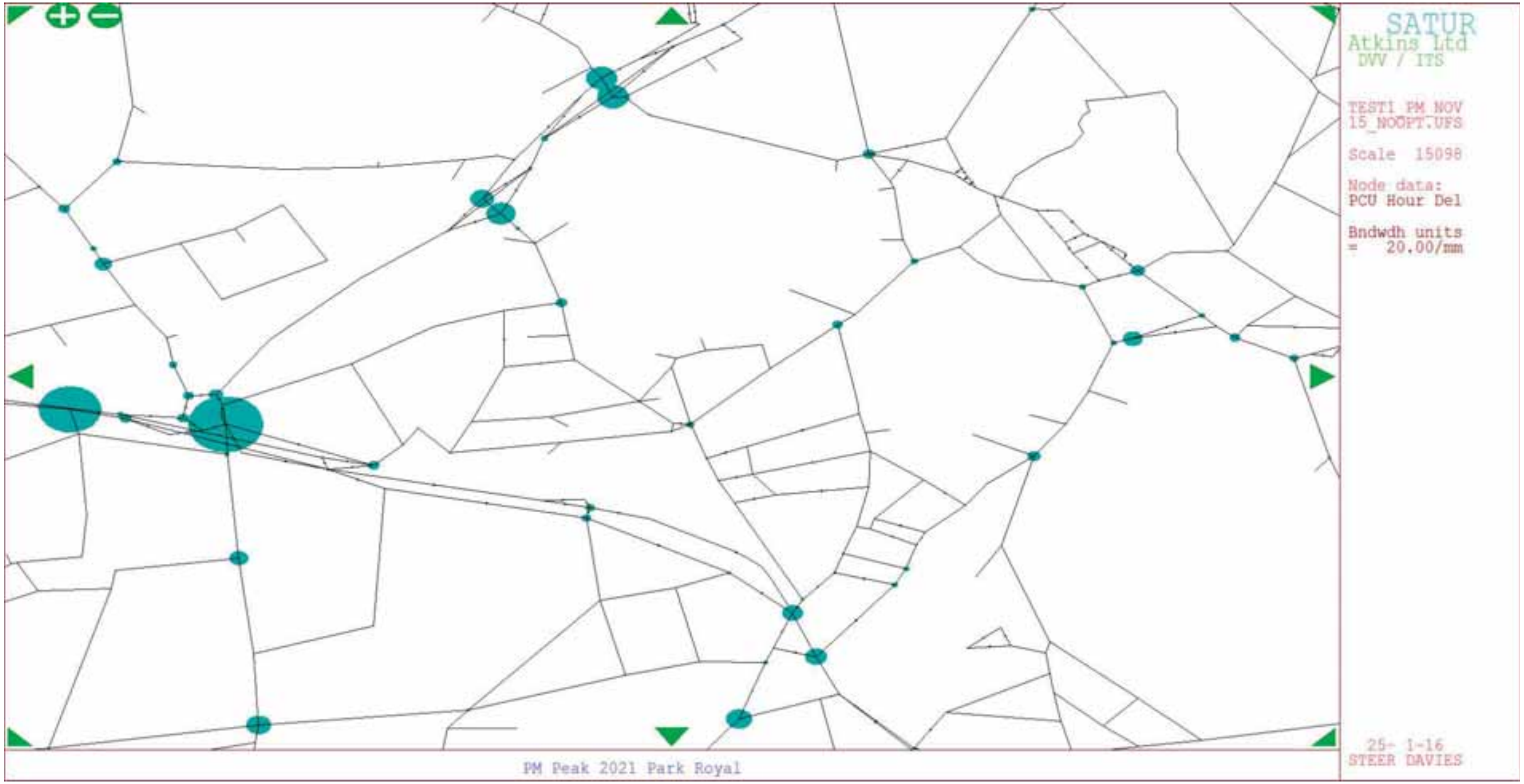


Figure E.28: PM Peak (Park Royal 2021 – BY 2012) Demand Flow Differences in PCUs

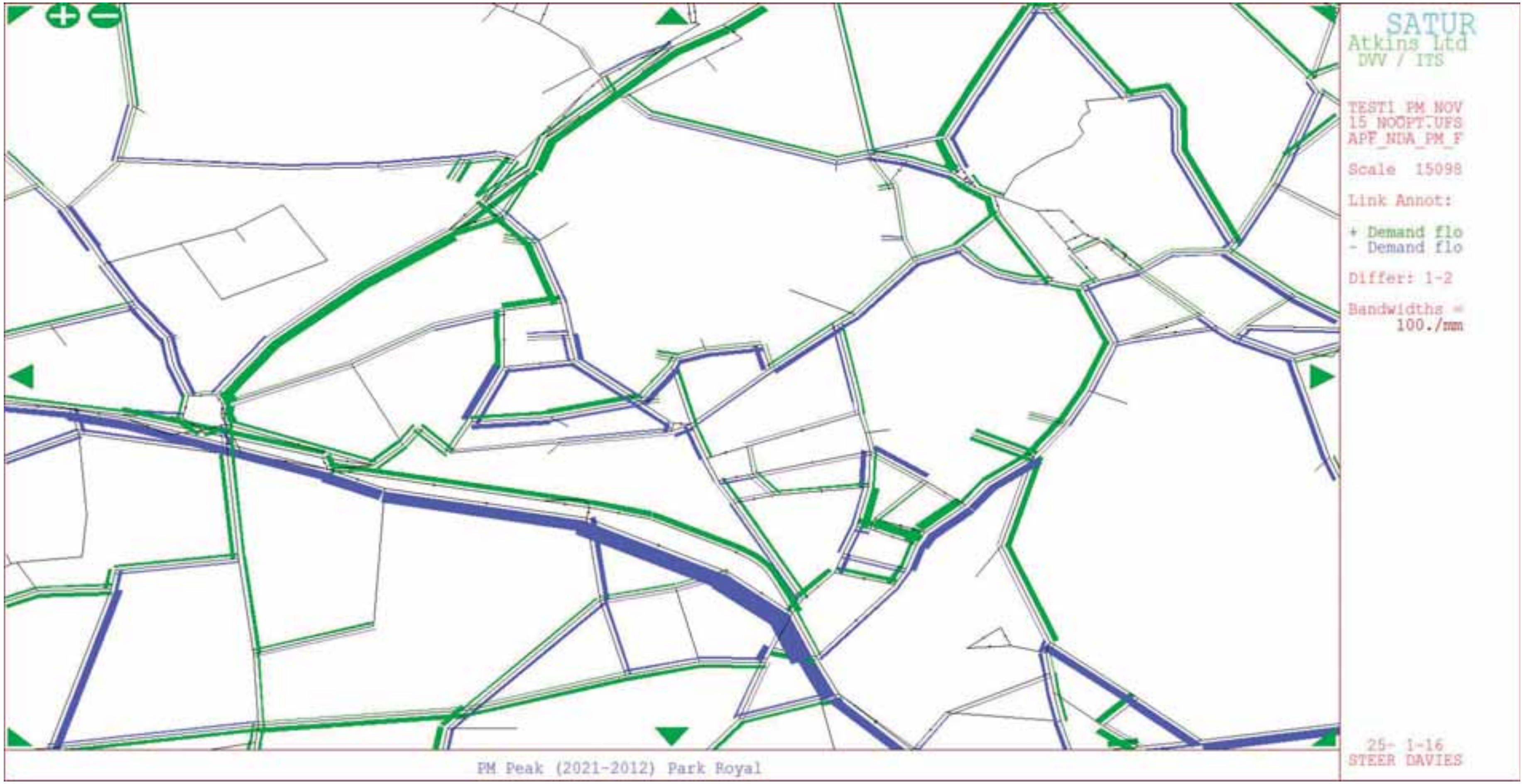


Figure E.29: PM Peak (Park Royal 2021 – BY 2012) Actual Flow Differences in PCUs

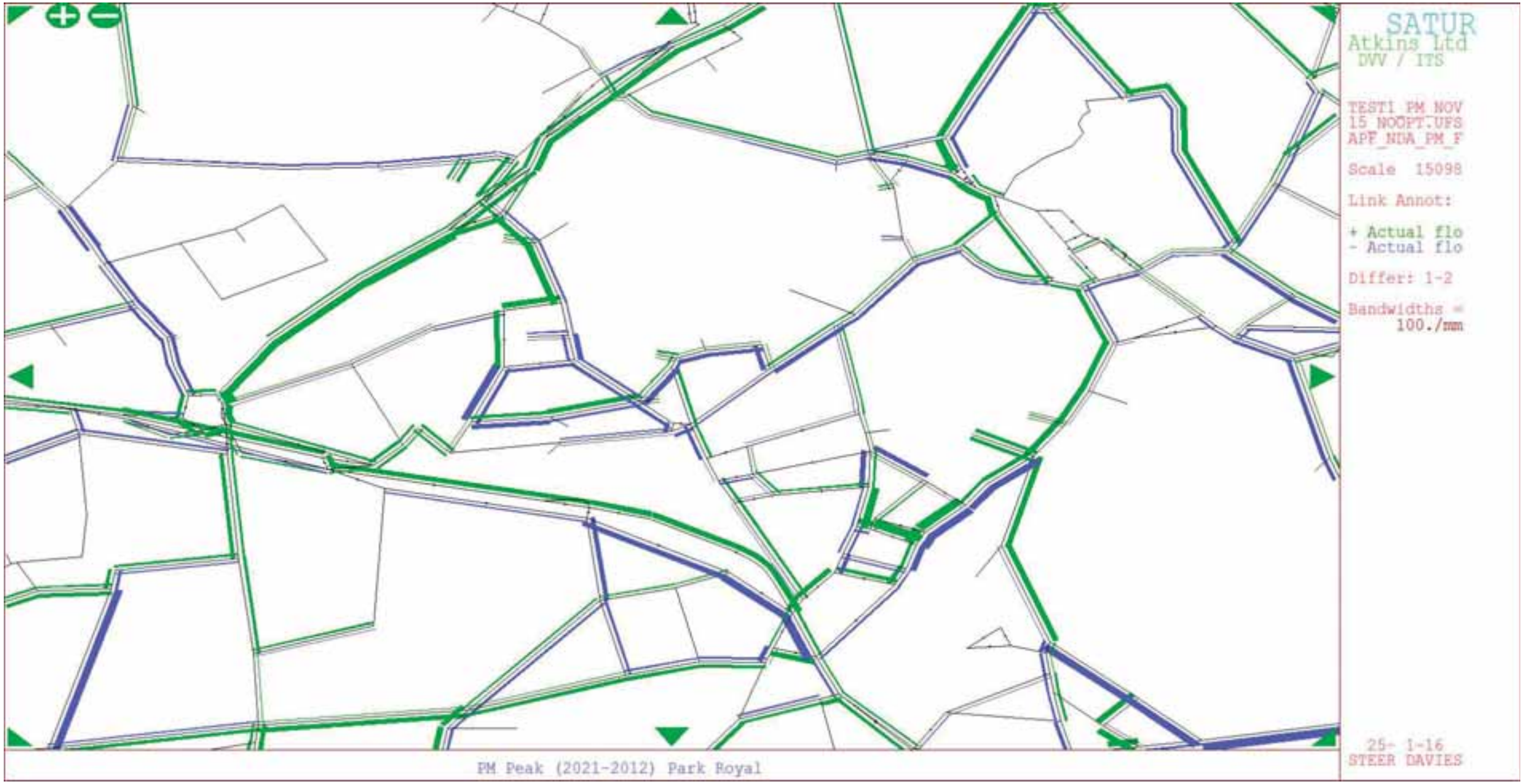


Figure E.30: PM Peak (Park Royal 2021 – BY 2012) Average Queue Differences in PCUs

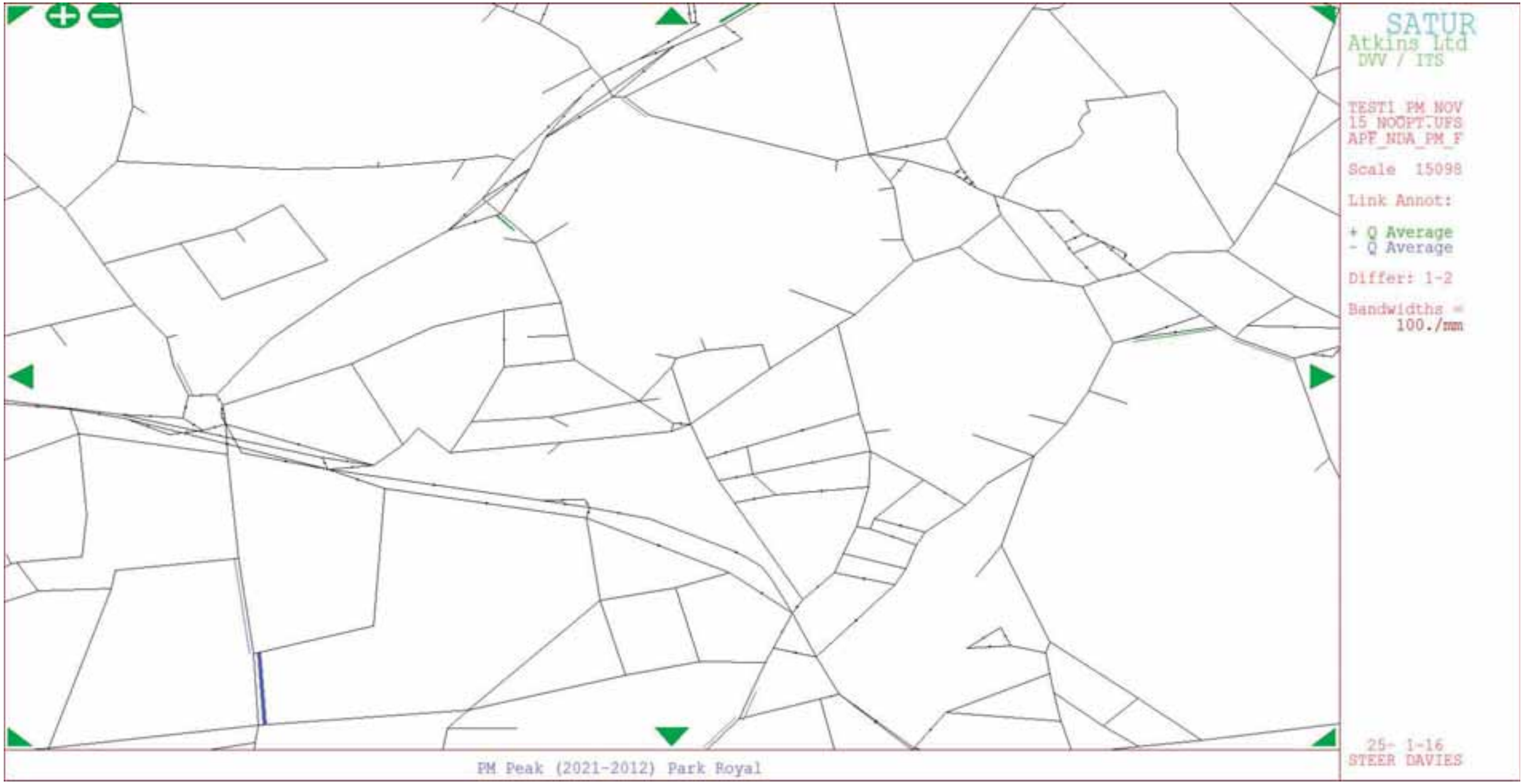


Figure E.31: PM Peak (Park Royal 2021 – BY 2012) Average Delay Differences in Seconds

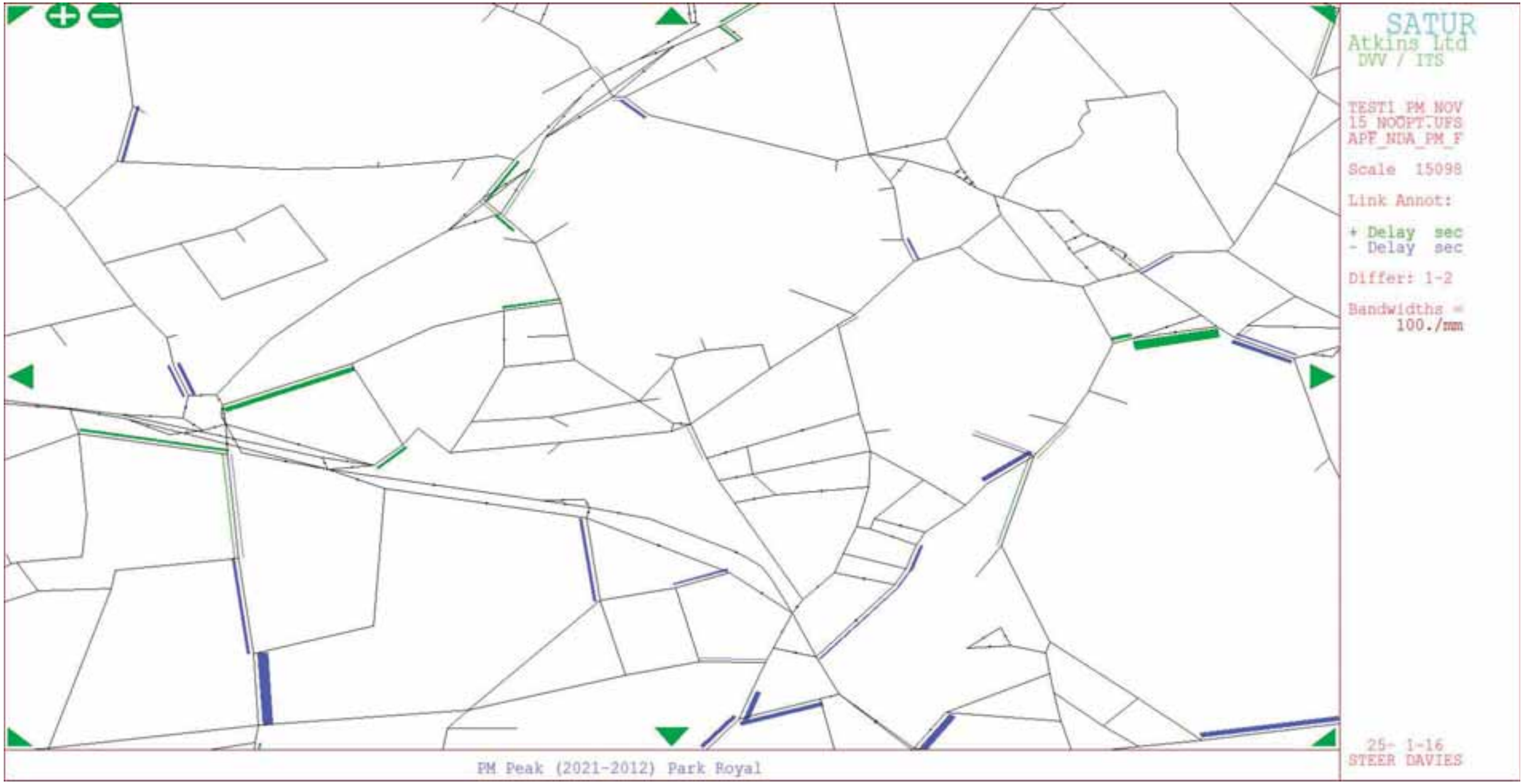


Figure E.32: PM Peak (Park Royal 2021 – BY 2012) PCU Hour Junction Delay Differences

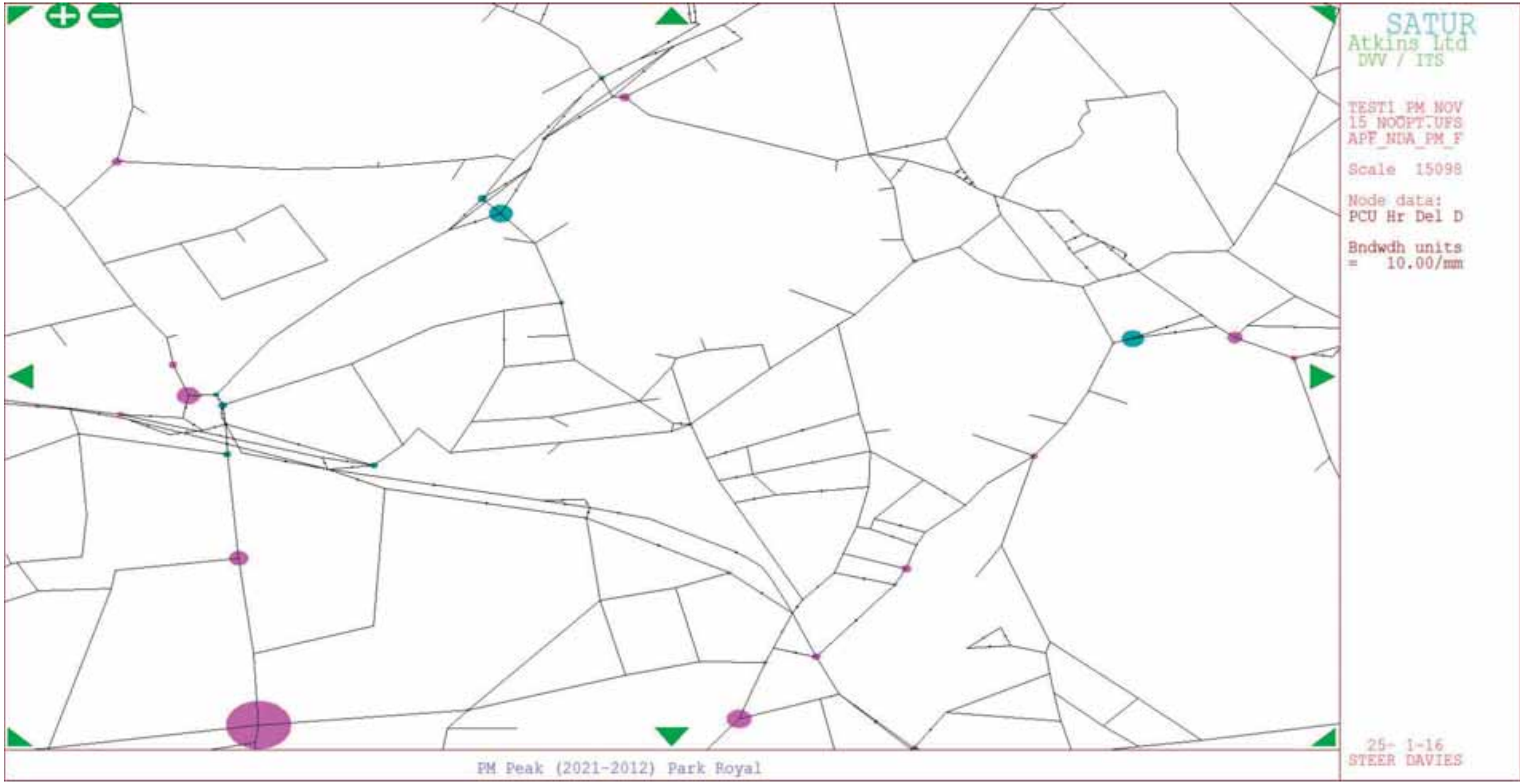


Figure E.33: AM Peak 2026 Park Royal Demand Flows in PCUs

Figure E.34: AM Peak 2026 Park Royal Actual Flows in PCUs

Figure E.35: AM Peak 2026 Park Royal Average Queue in PCUs

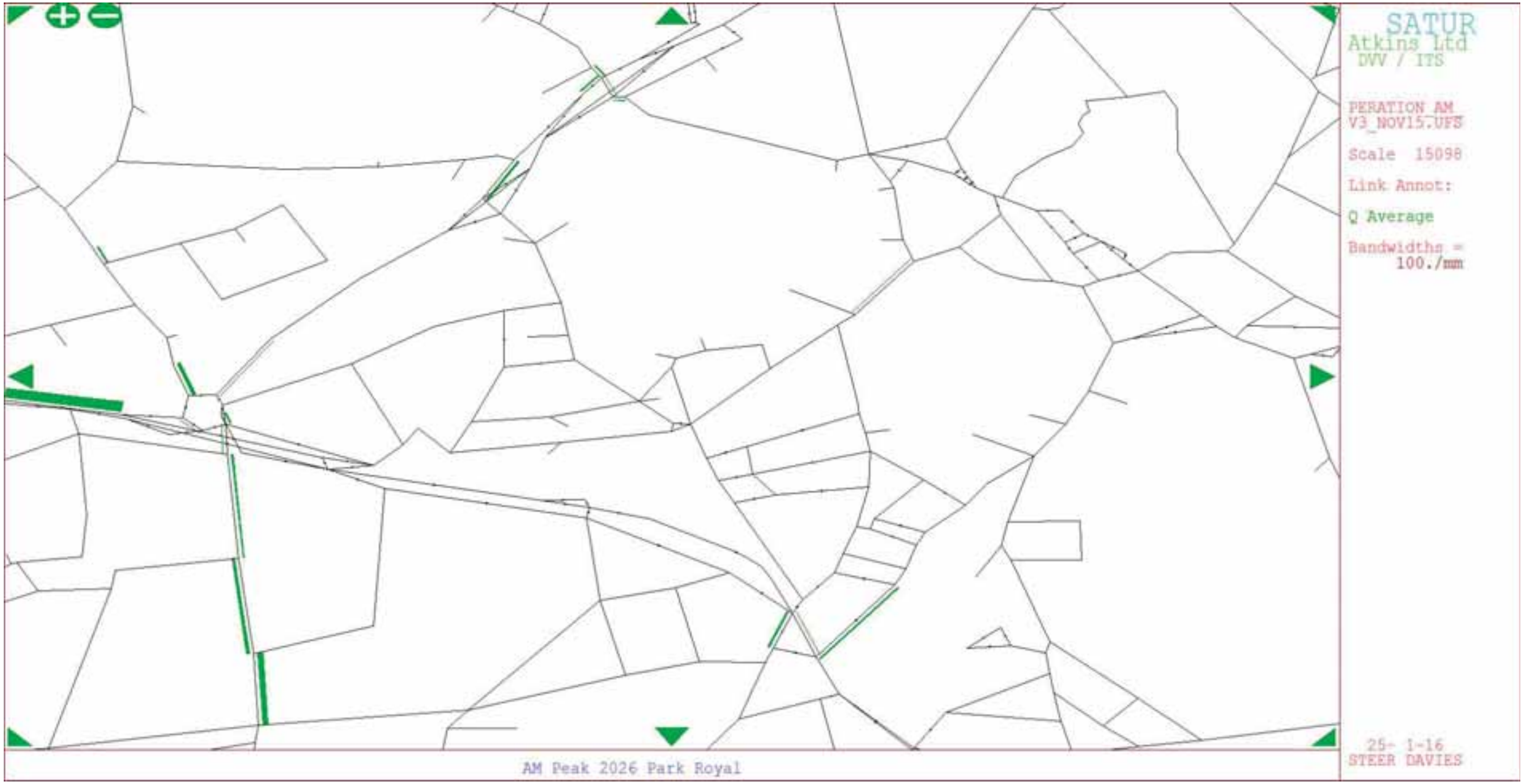


Figure E.36: AM Peak 2026 Park Royal Average Delay in Seconds

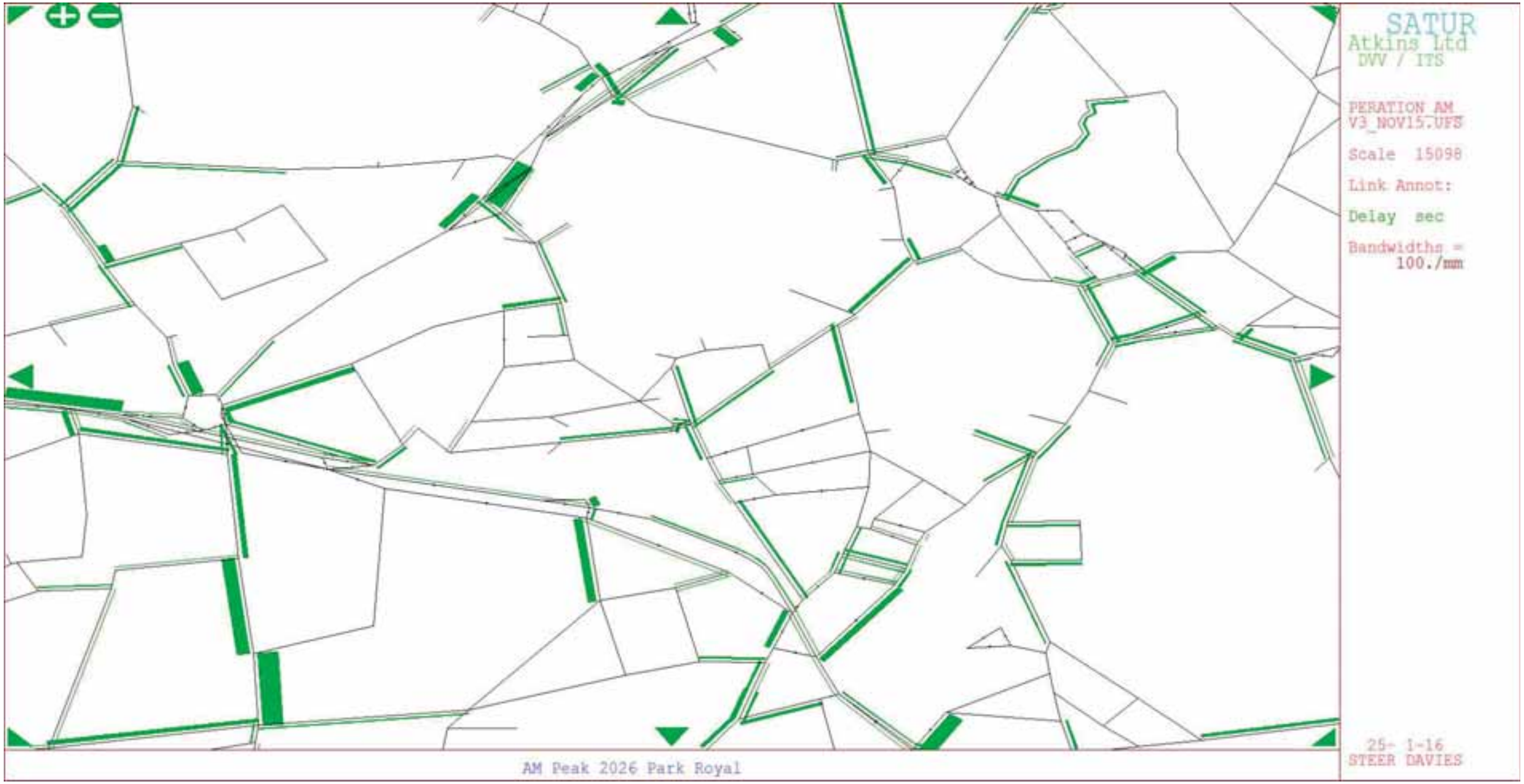


Figure E.37: AM Peak 2026 Park Royal Volume Over Capacity %

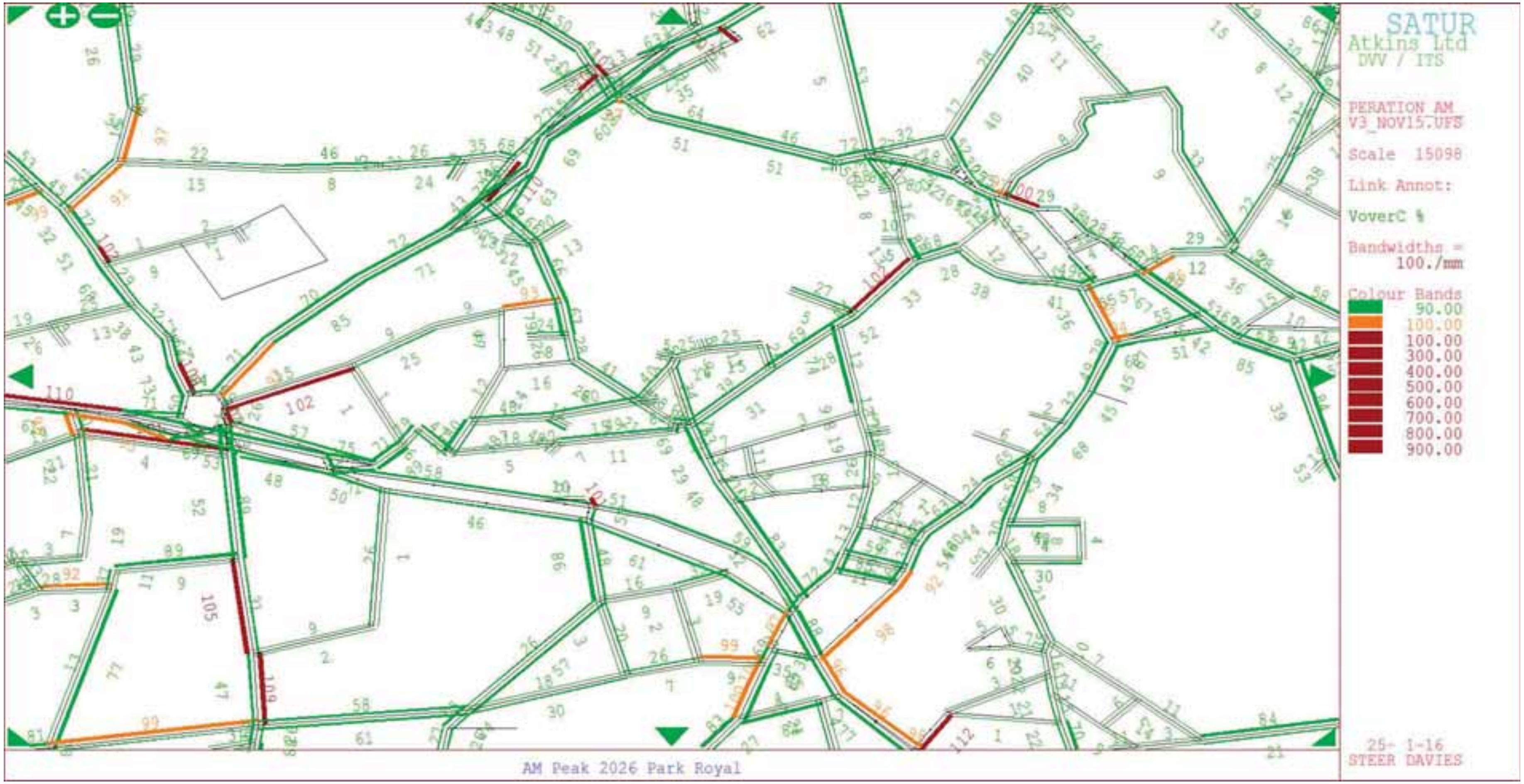


Figure E.38: AM Peak 2026 Park Royal PCU Hour Junction Delay

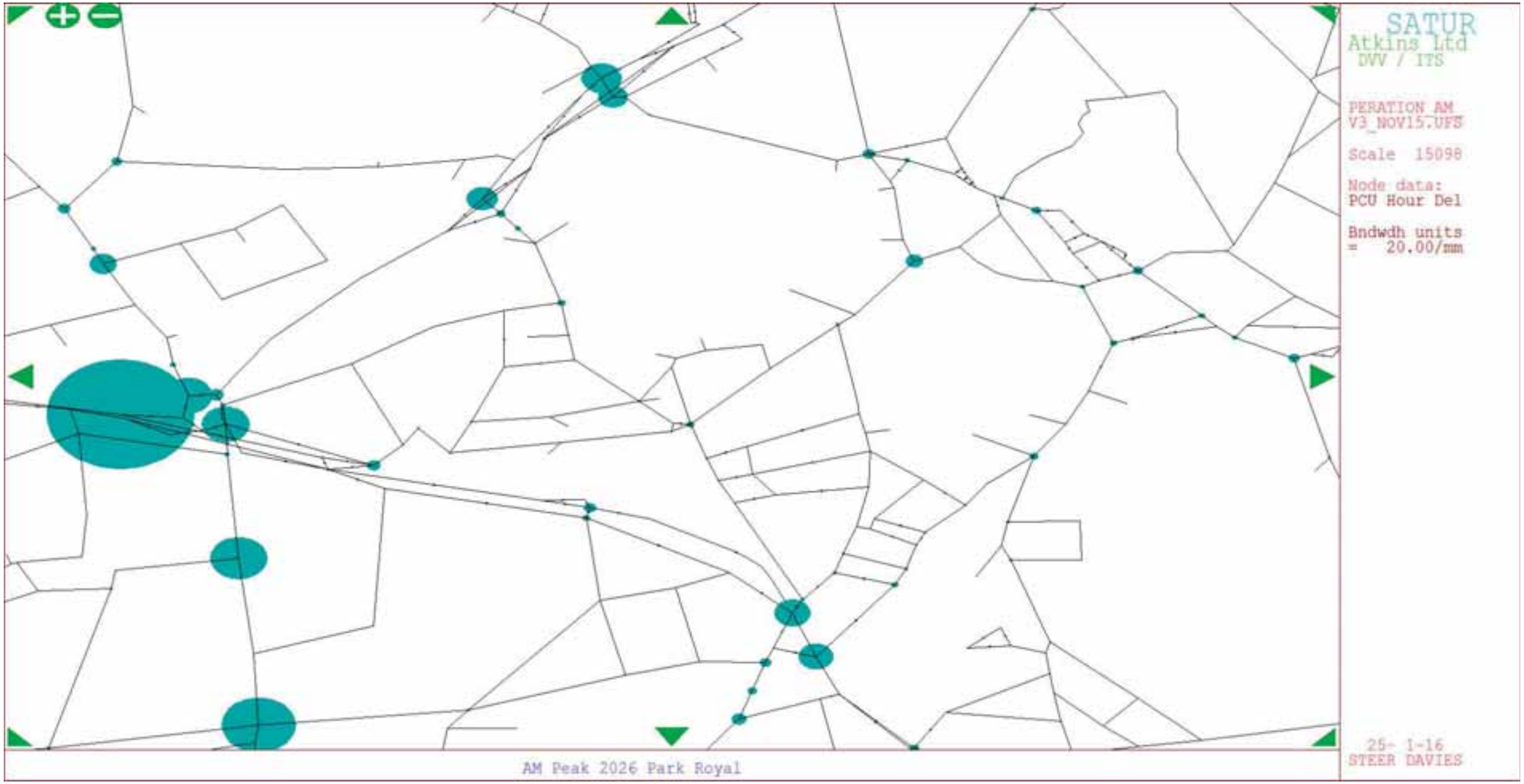


Figure E.39: AM Peak (Park Royal 2026 – BY 2012) Demand Flow Differences in PCUs

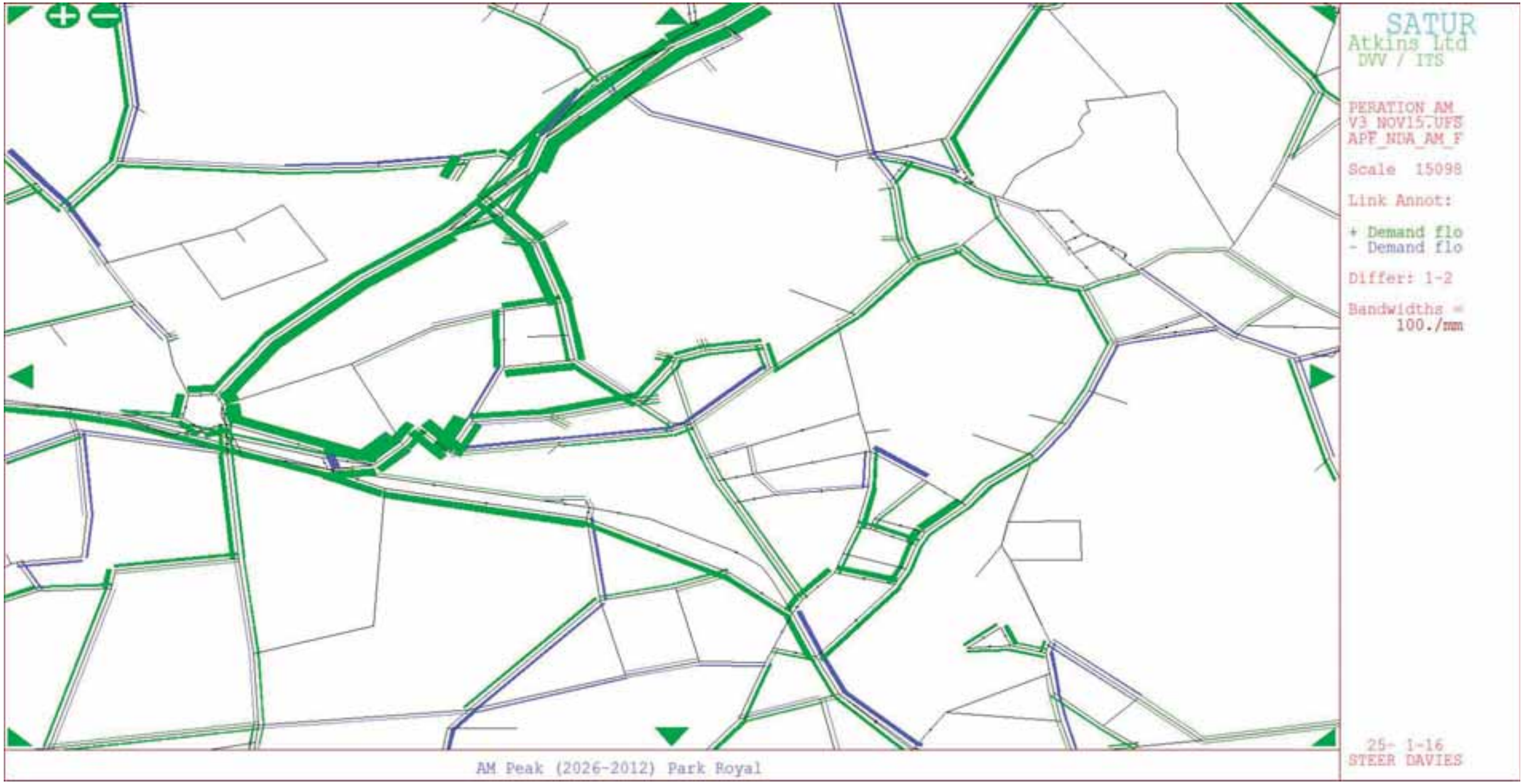


Figure E.40: AM Peak (Park Royal 2026 – BY 2012) Actual Flow Differences in PCUs

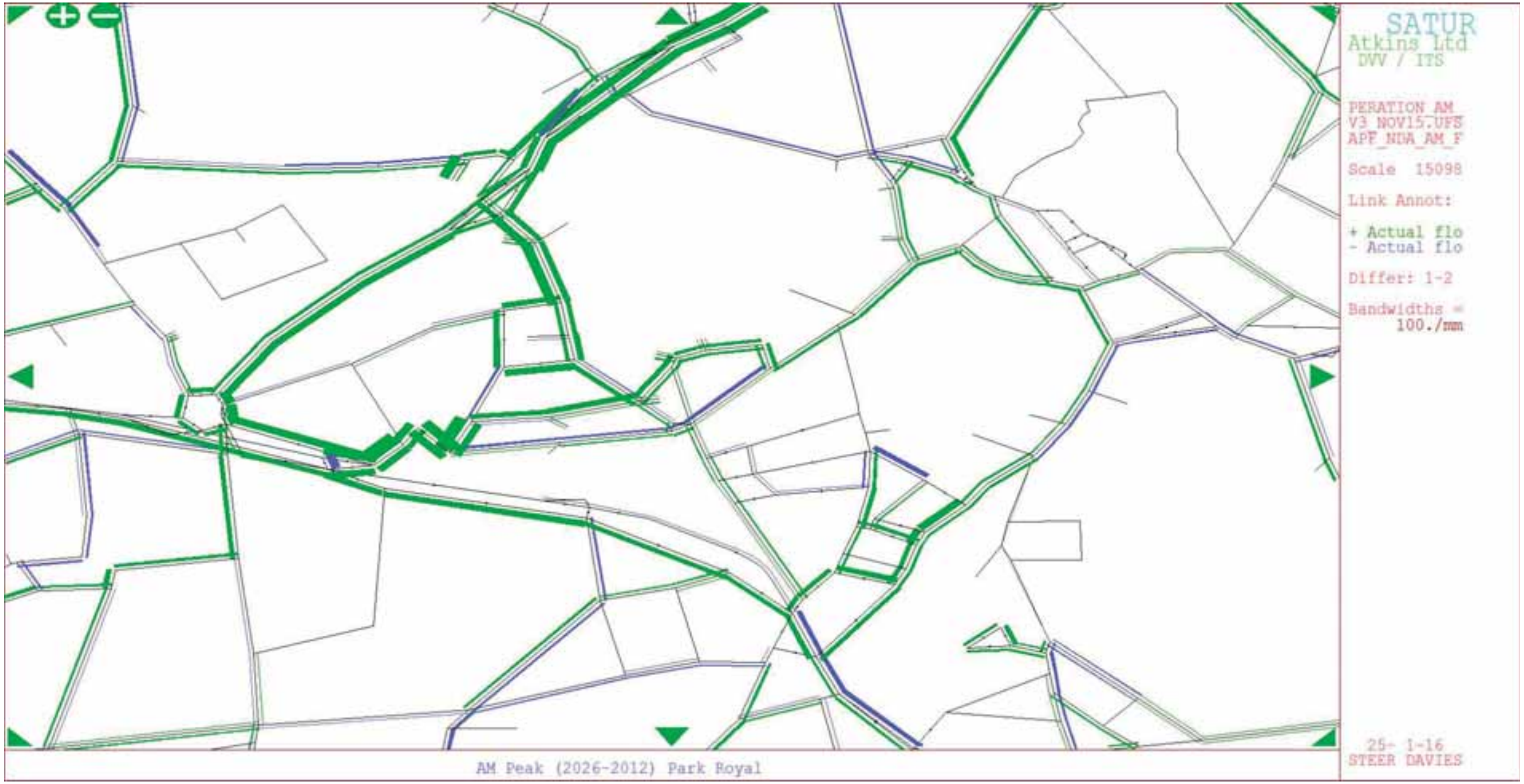


Figure E.41: AM Peak (Park Royal 2026 – BY 2012) Average Queue Differences in PCUs

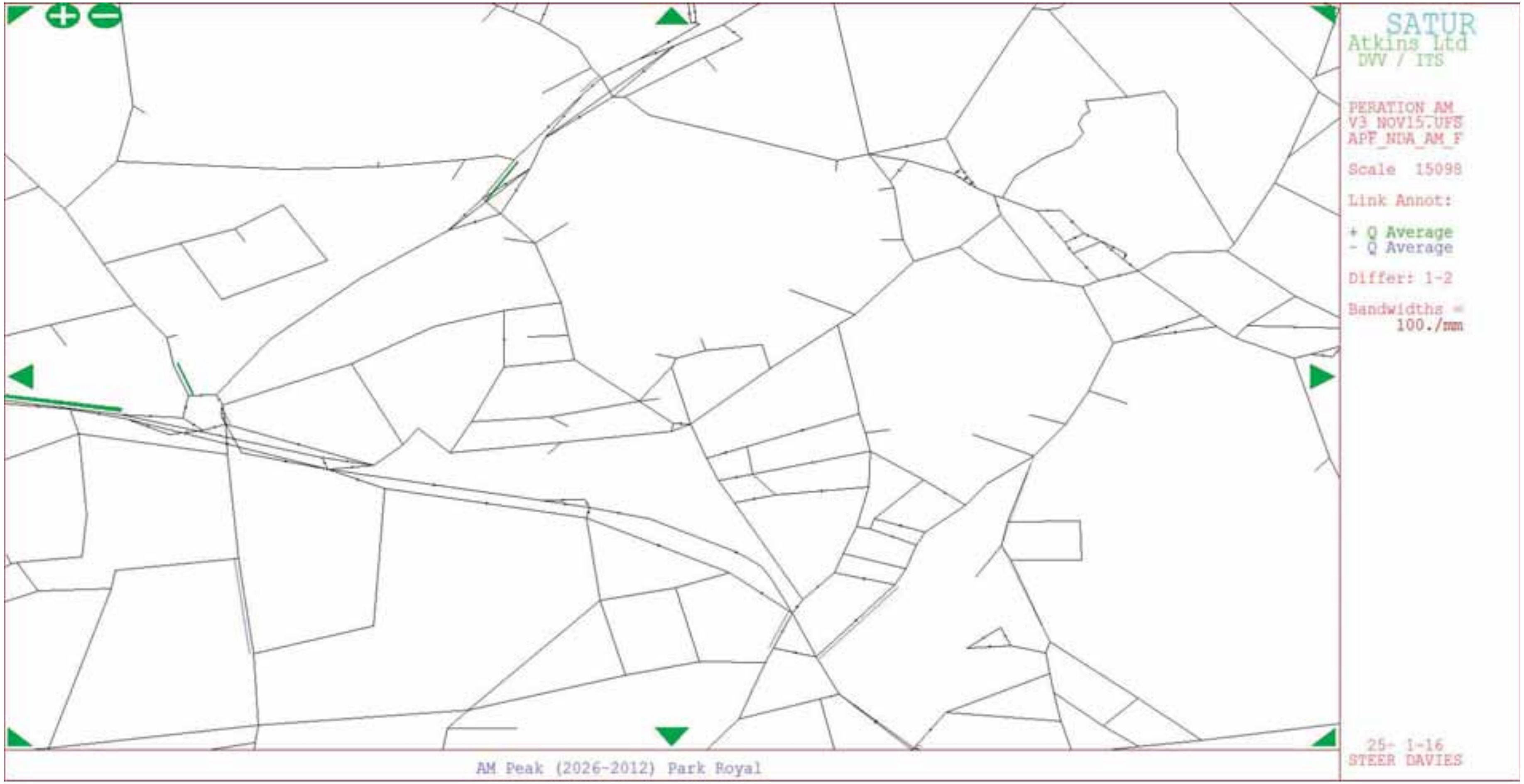


Figure E.42: AM Peak (Park Royal 2026 – BY 2012) Average Delay Differences in PCUs

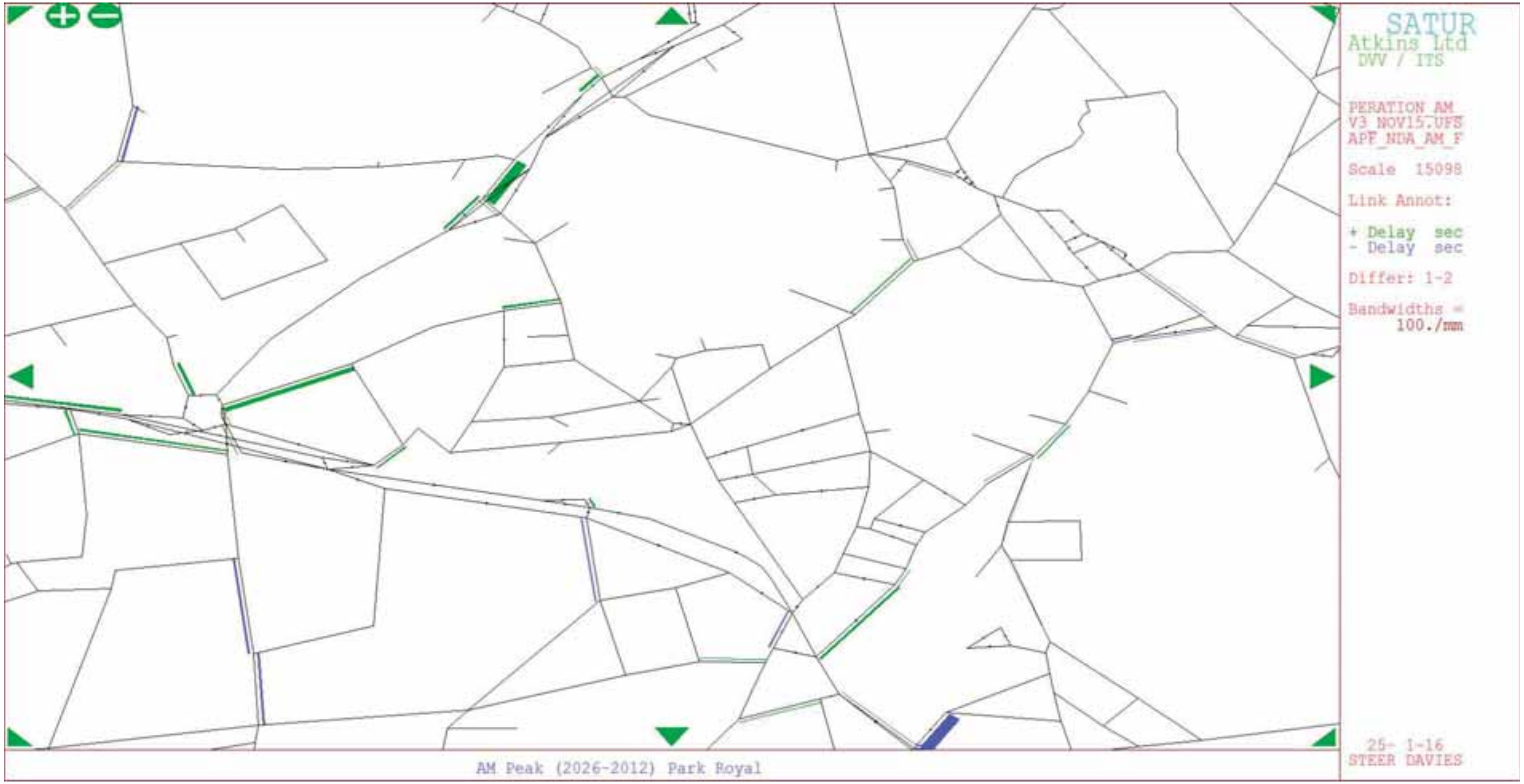


Figure E.43: AM Peak (Park Royal 2026 – BY 2012) PCU Hour Junction Delay Differences

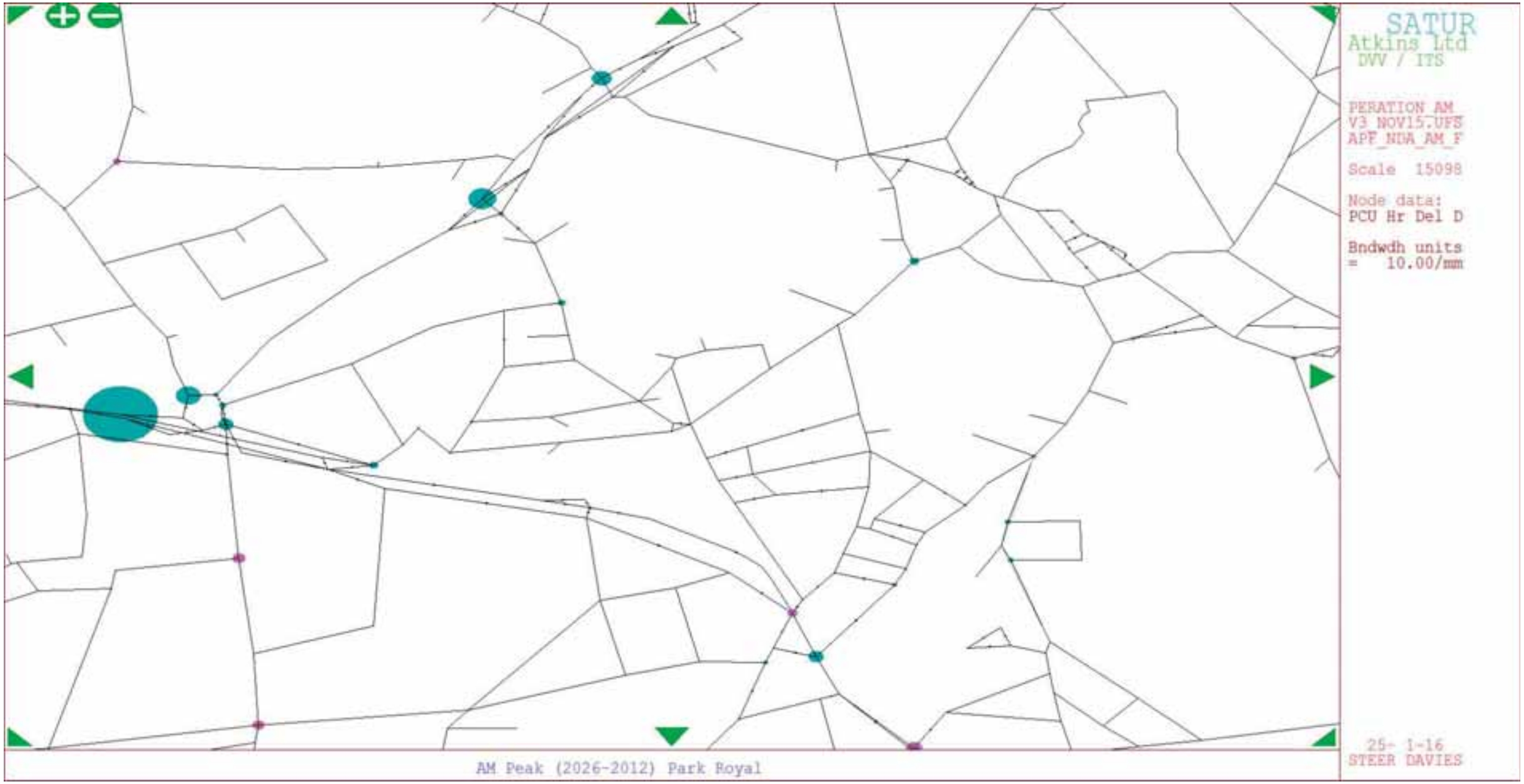


Figure E.44: PM Peak 2026 Park Royal Demand Flows in PCUs

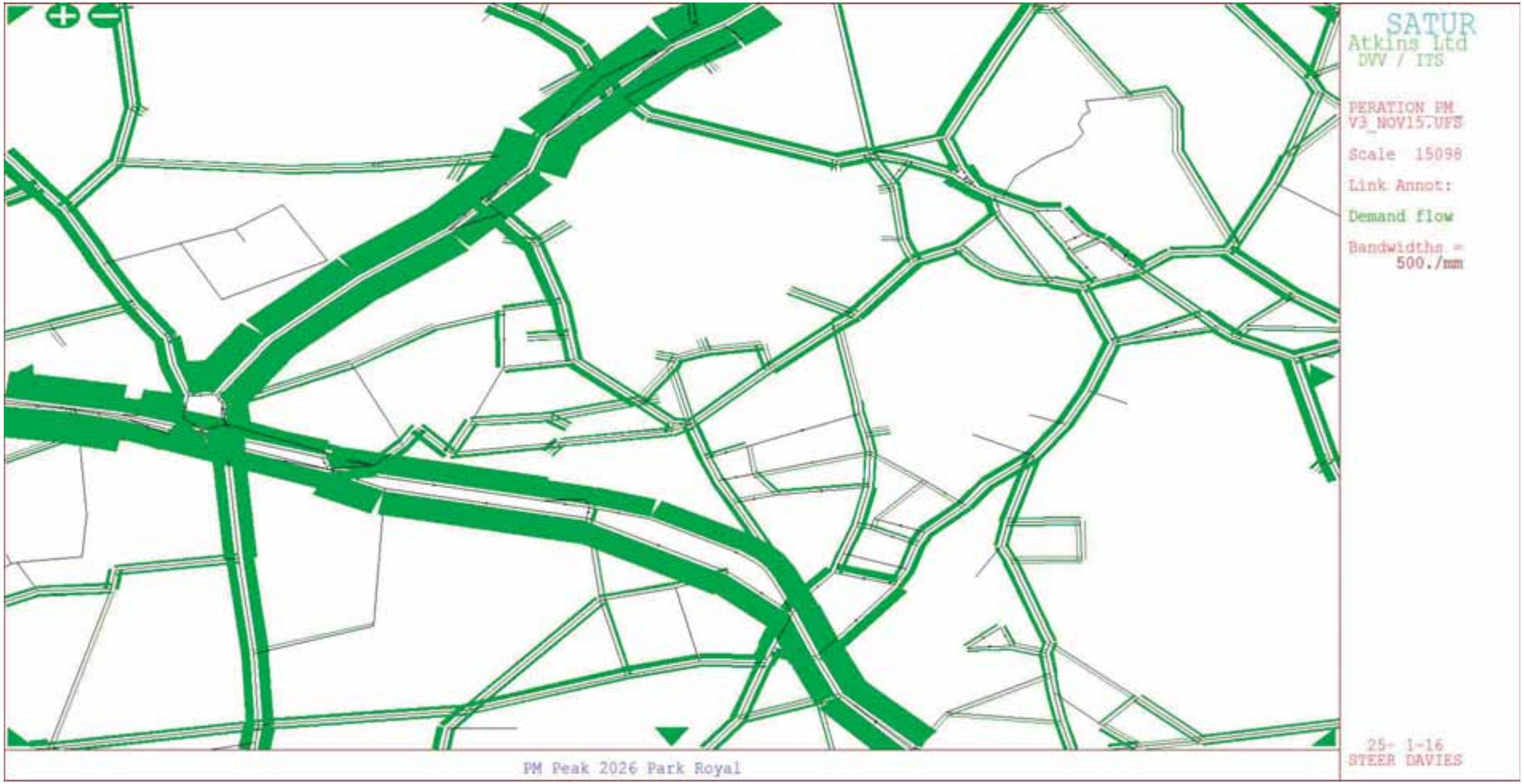


Figure E.45: PM Peak 2026 Park Royal Actual Flows in PCUs

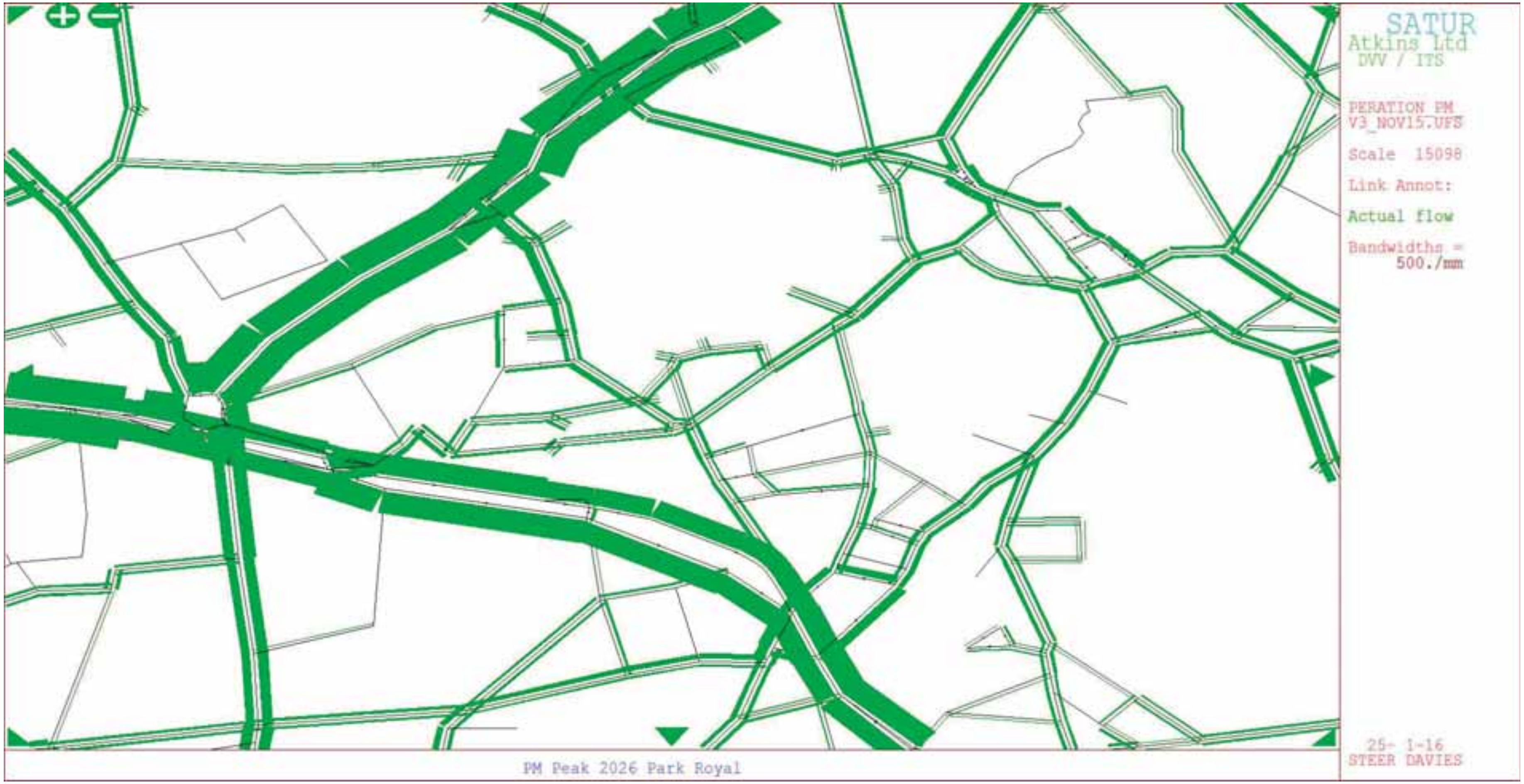


Figure E.46: PM Peak 2026 Park Royal Average Queue in PCUs

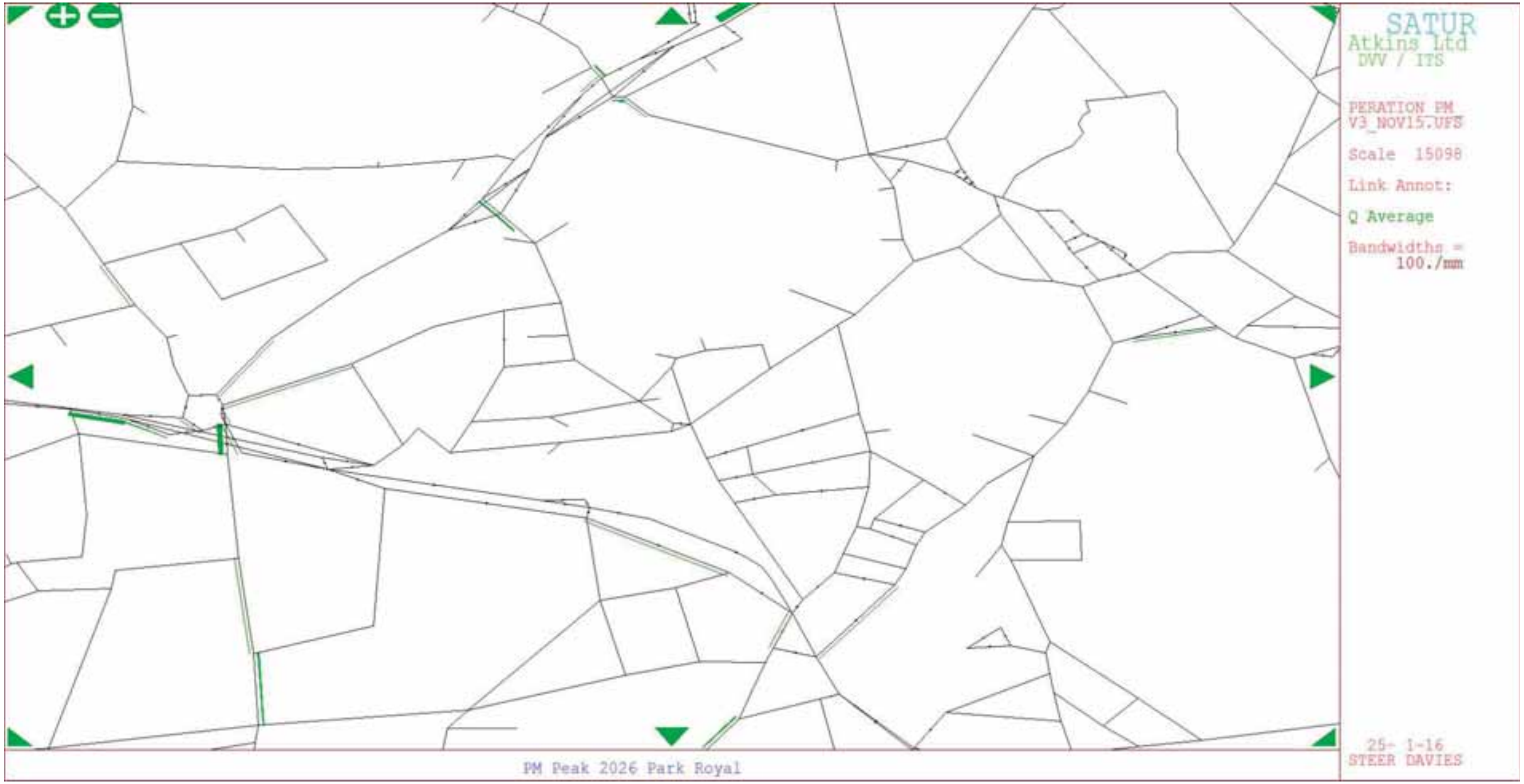


Figure E.47: PM Peak 2026 Park Royal Average Delay in Seconds

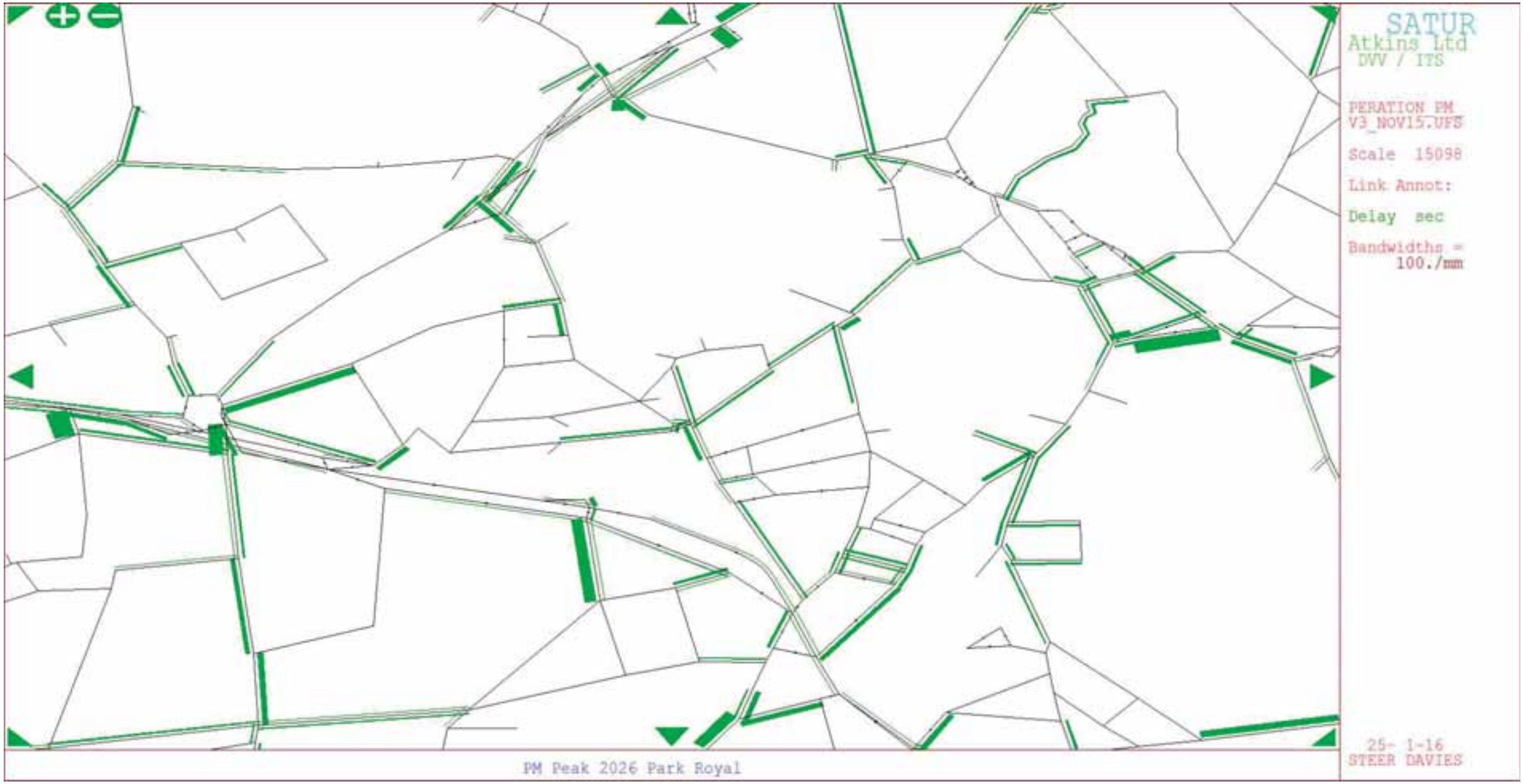


Figure E.48: PM Peak 2026 Park Royal Volume Over Capacity %

Figure E.49: PM Peak 2026 Park Royal PCU Hour Junction Delay

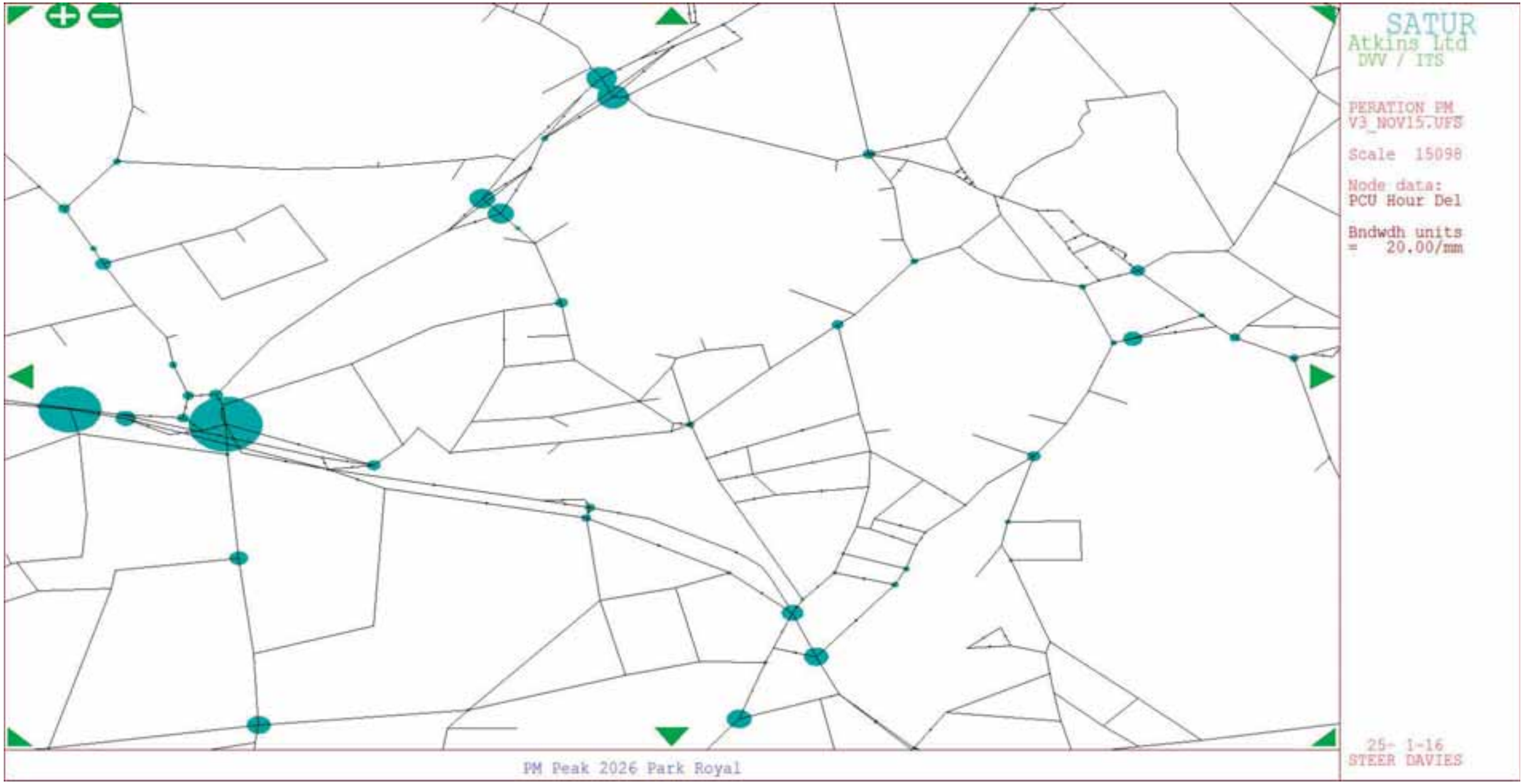


Figure E.50: PM Peak (Park Royal 2026 – BY 2012) Demand Flow Differences in PCUs

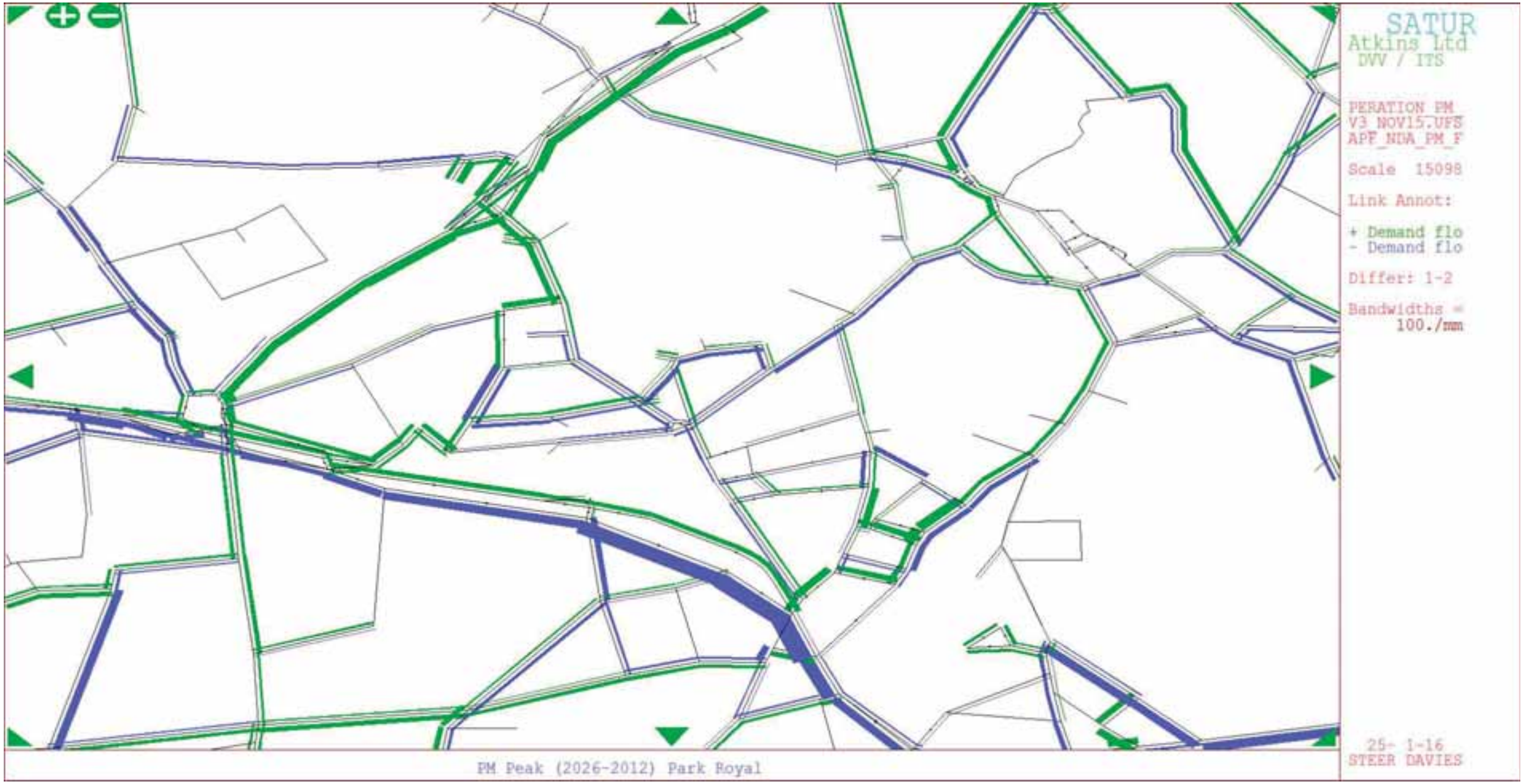


Figure E.51: PM Peak (Park Royal 2026 – BY 2012) Actual Flow Differences in PCUs

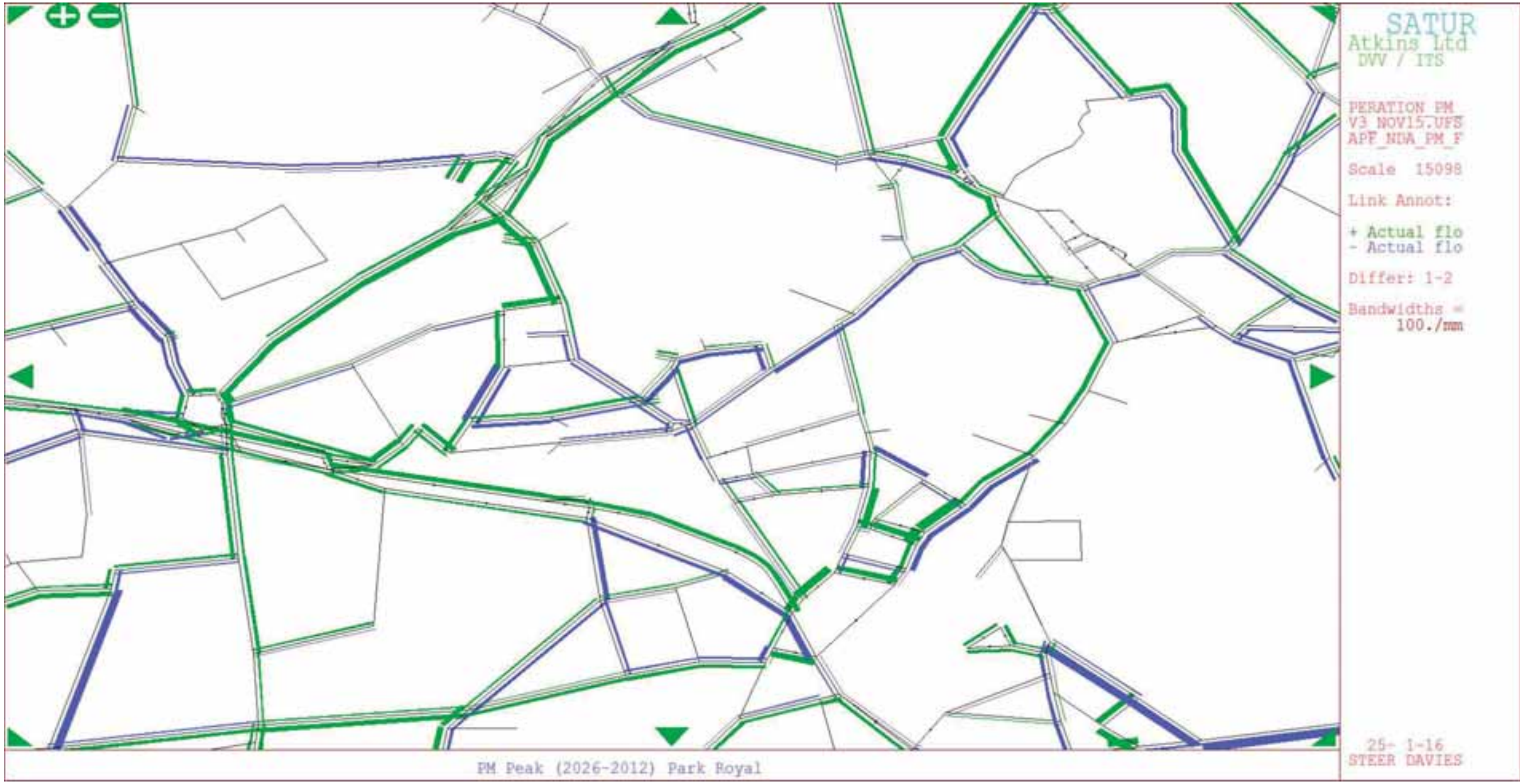


Figure E.52: PM Peak (Park Royal 2026 – BY 2012) Average Queue Differences in PCUs

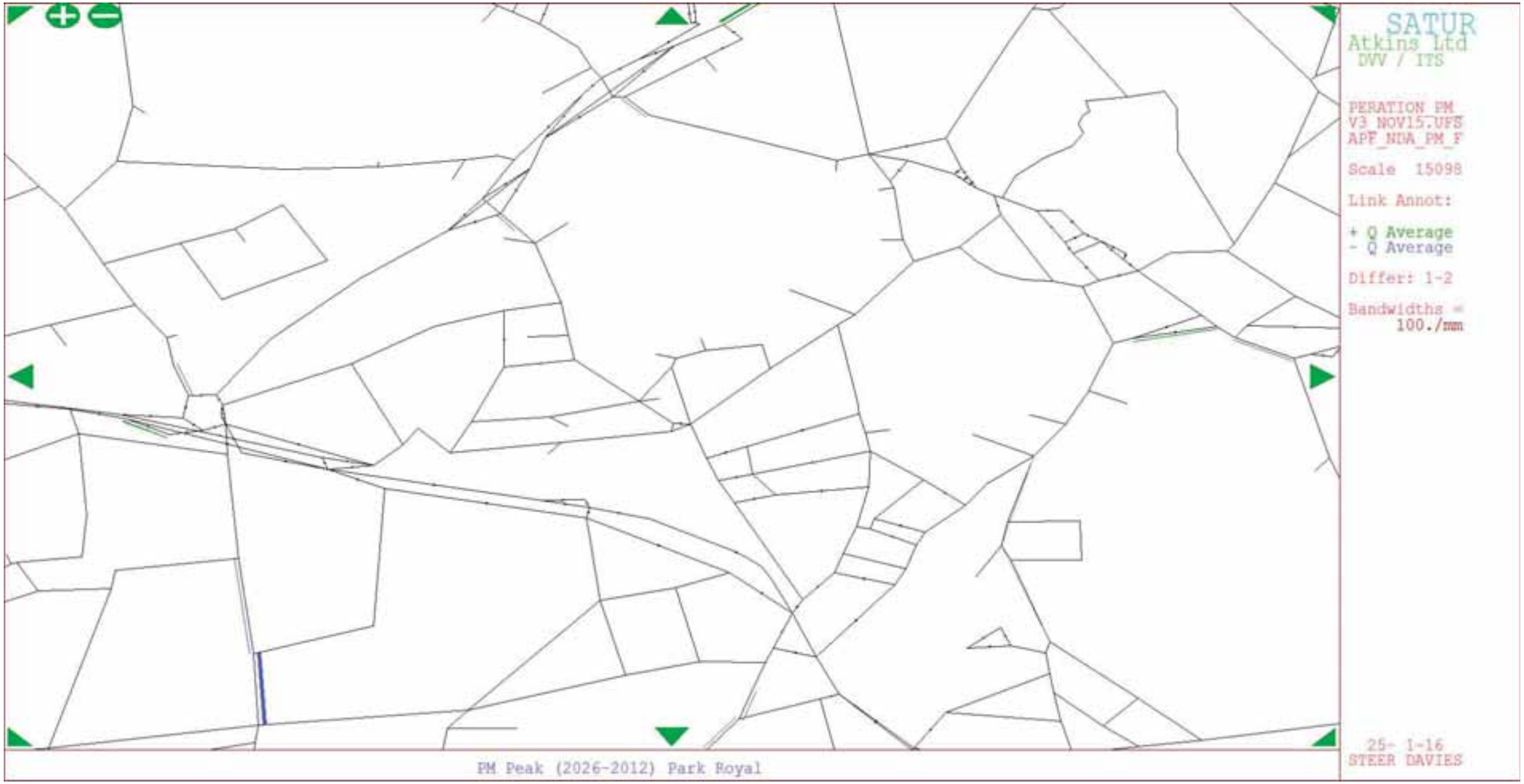


Figure E.53: PM Peak (Park Royal 2026 – BY 2012) Average Delay Differences in PCUs

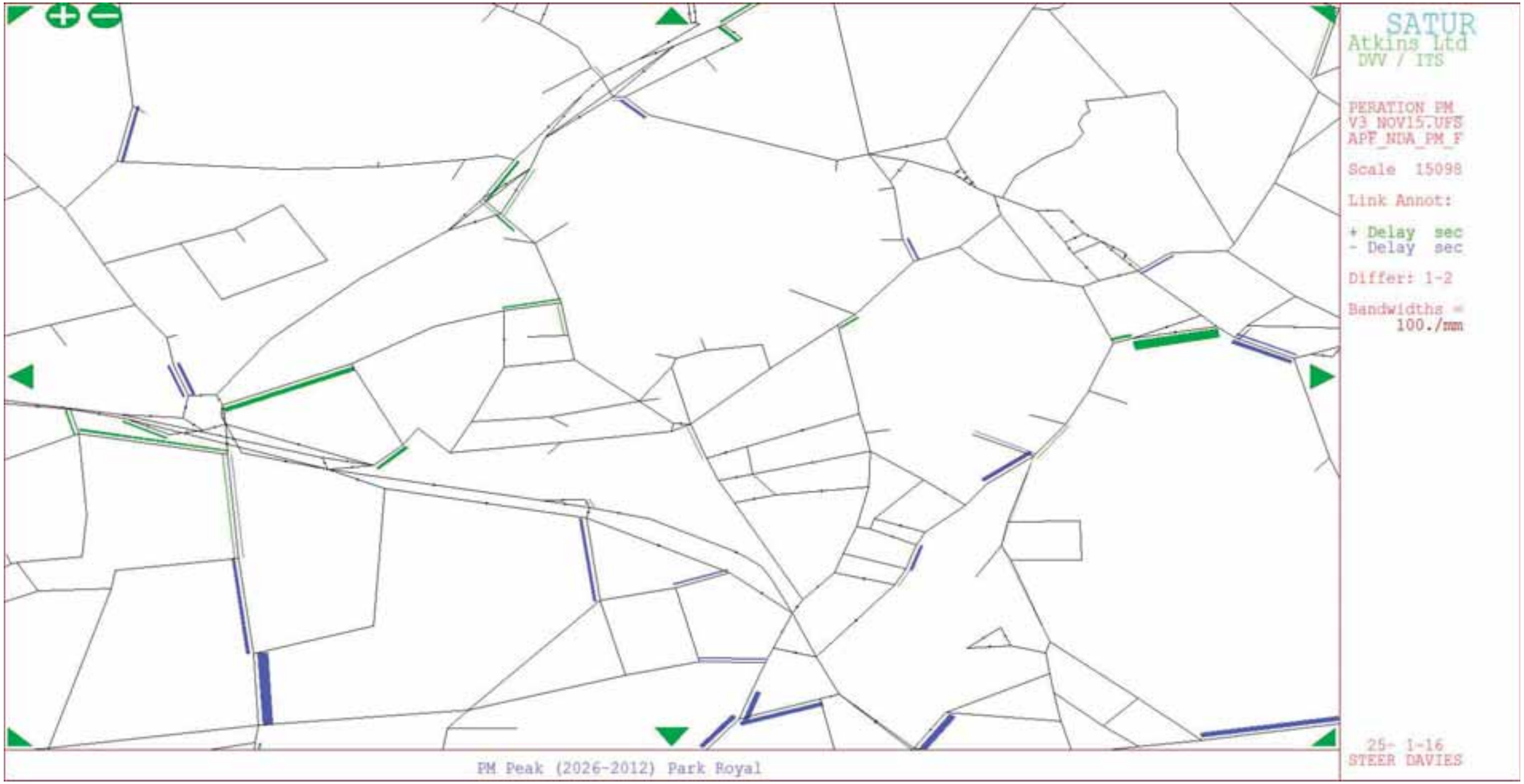


Figure E.54: PM Peak (Park Royal 2026 – BY 2012) PCU Hour Junction Delay Differences

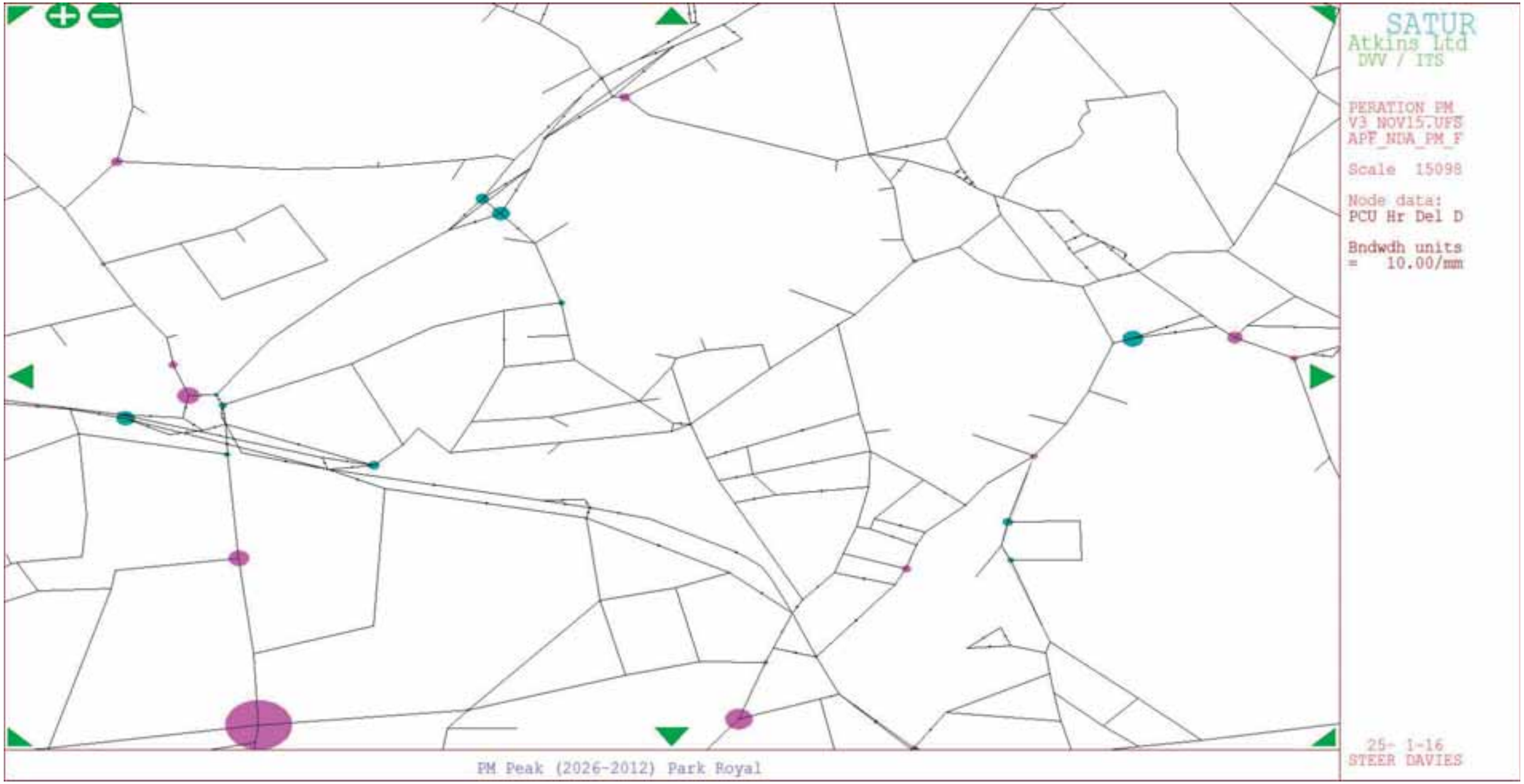


Figure E.55: AM Peak 2041 Park Royal Demand Flows in PCUs

Figure E.56: AM Peak 2041 Park Royal Actual Flows in PCUs

Figure E.57: AM Peak 2041 Park Royal Average Queue in PCUs

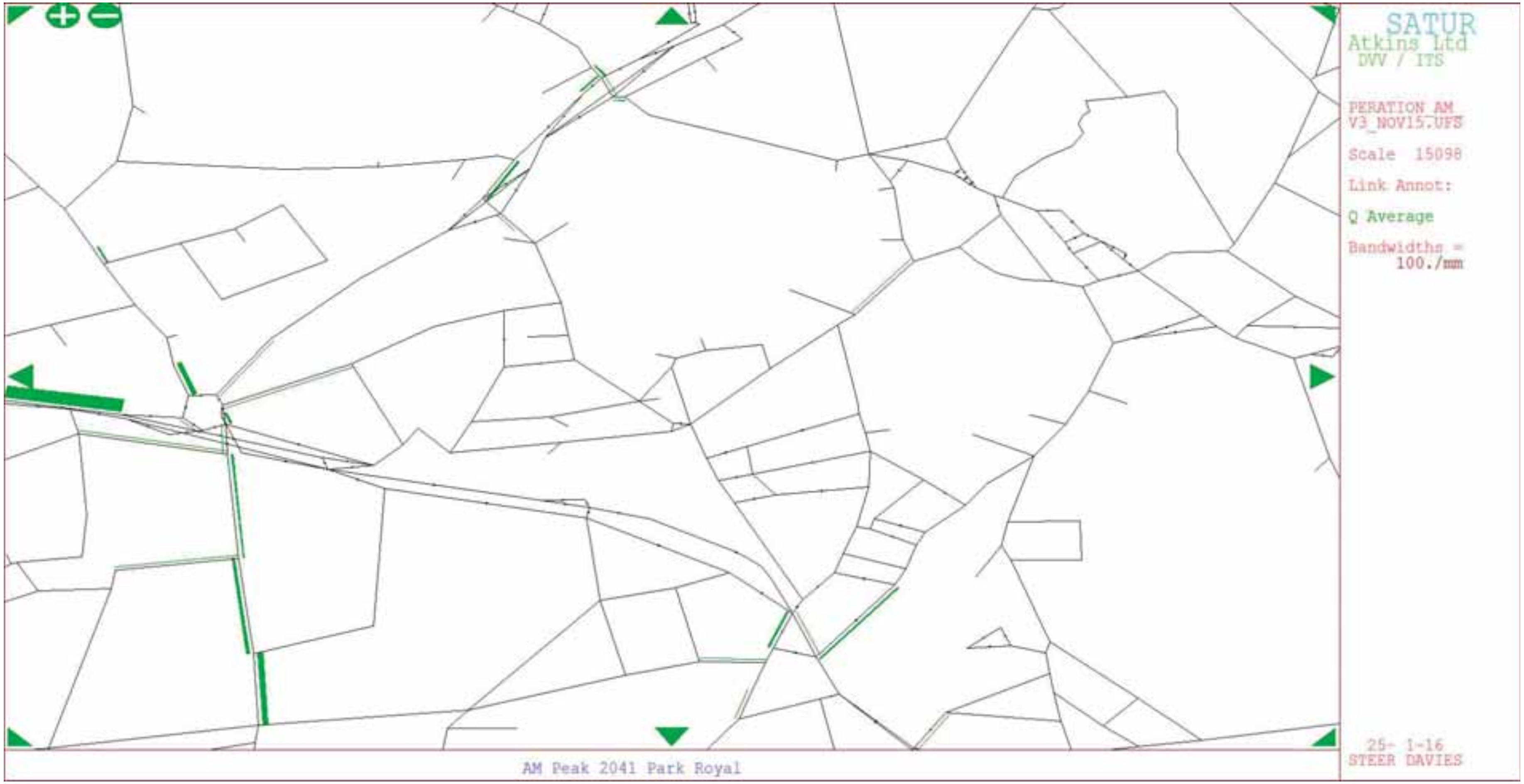


Figure E.58: AM Peak 2041 Park Royal Average Delay in Seconds

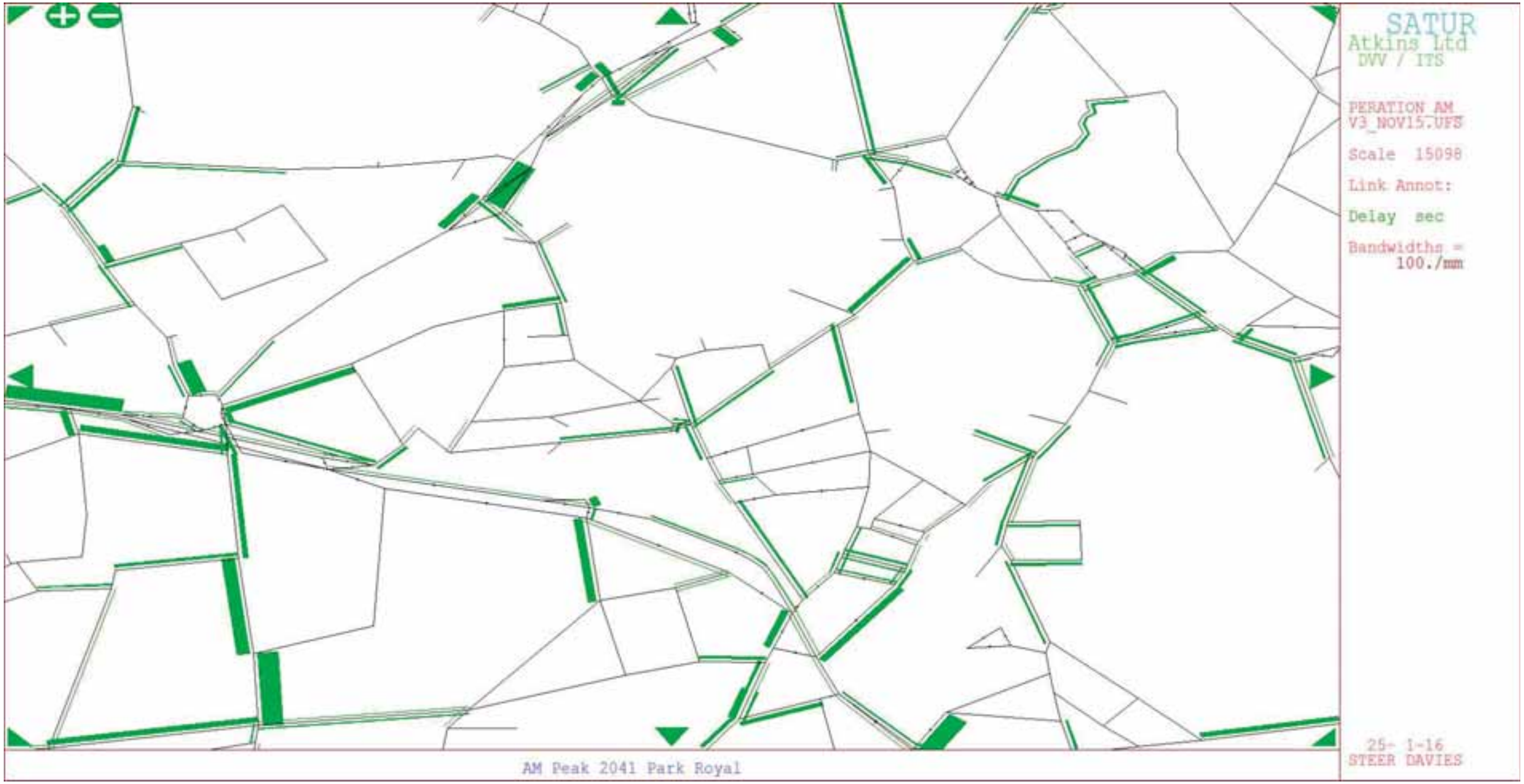


Figure E.59: AM Peak 2041 Park Royal Volume Over Capacity %

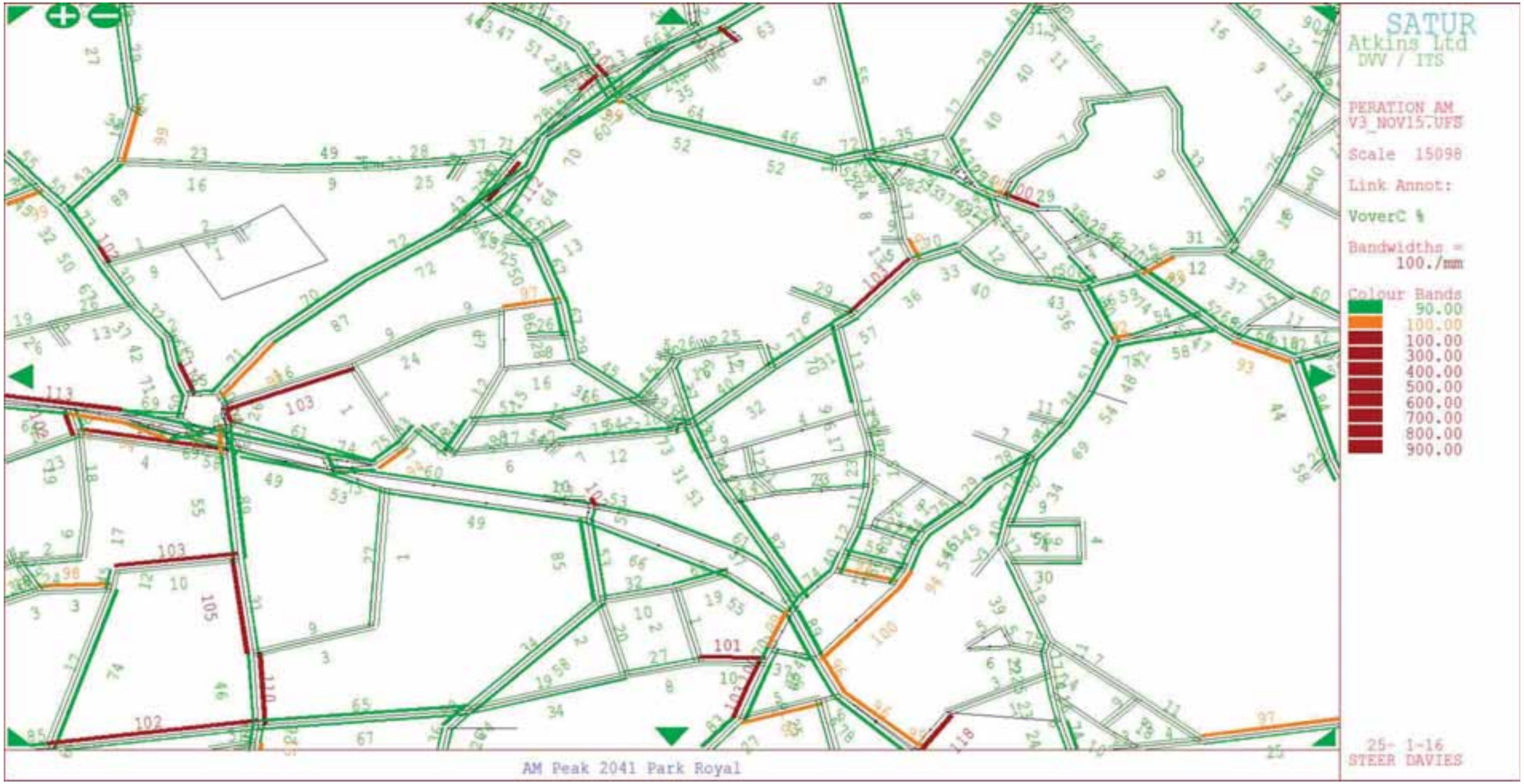


Figure E.60: AM Peak 2041 Park Royal PCU Hour Junction Delay

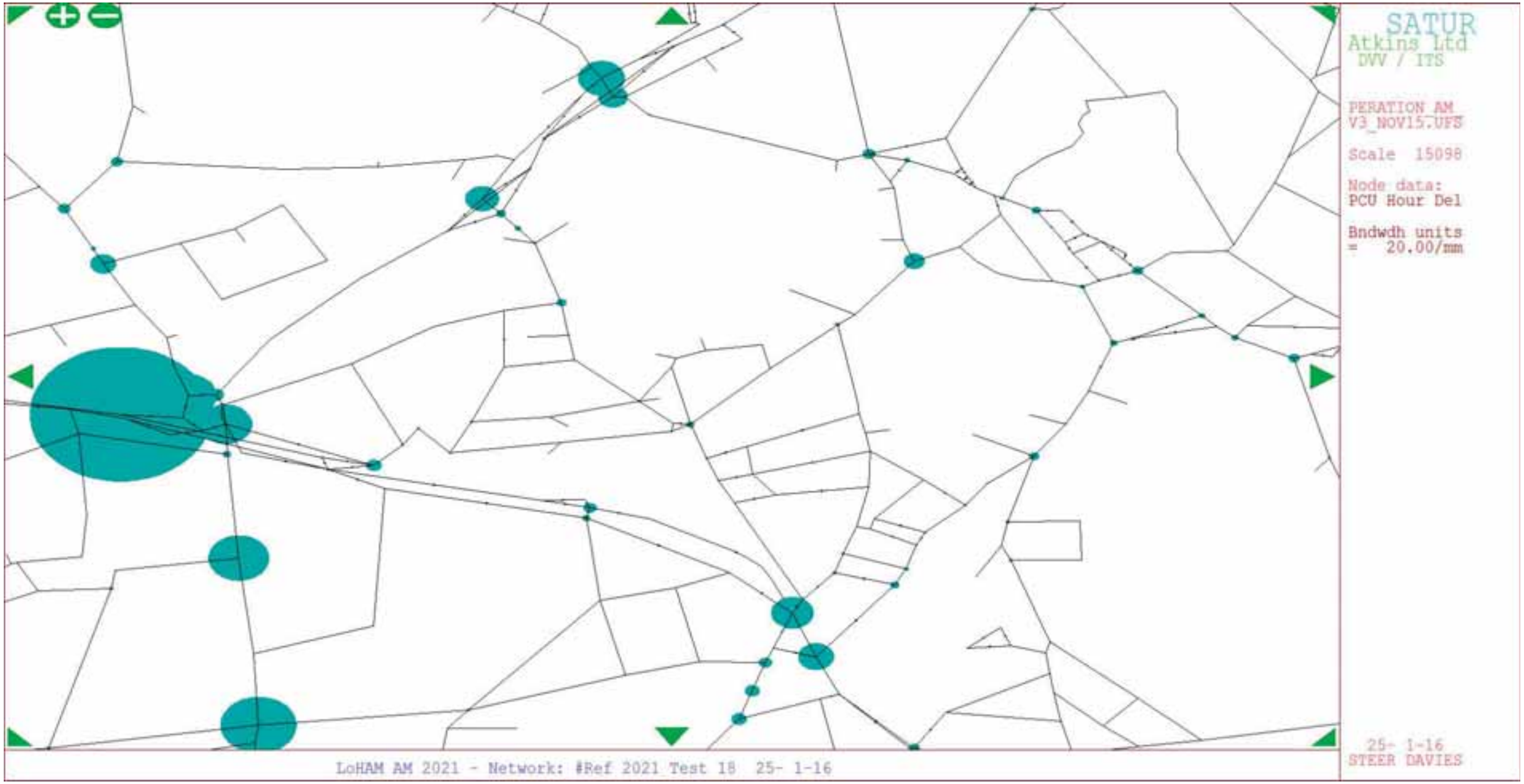


Figure E.61: AM Peak (Park Royal 2041 – BY 2012) Demand Flow Differences in PCUs

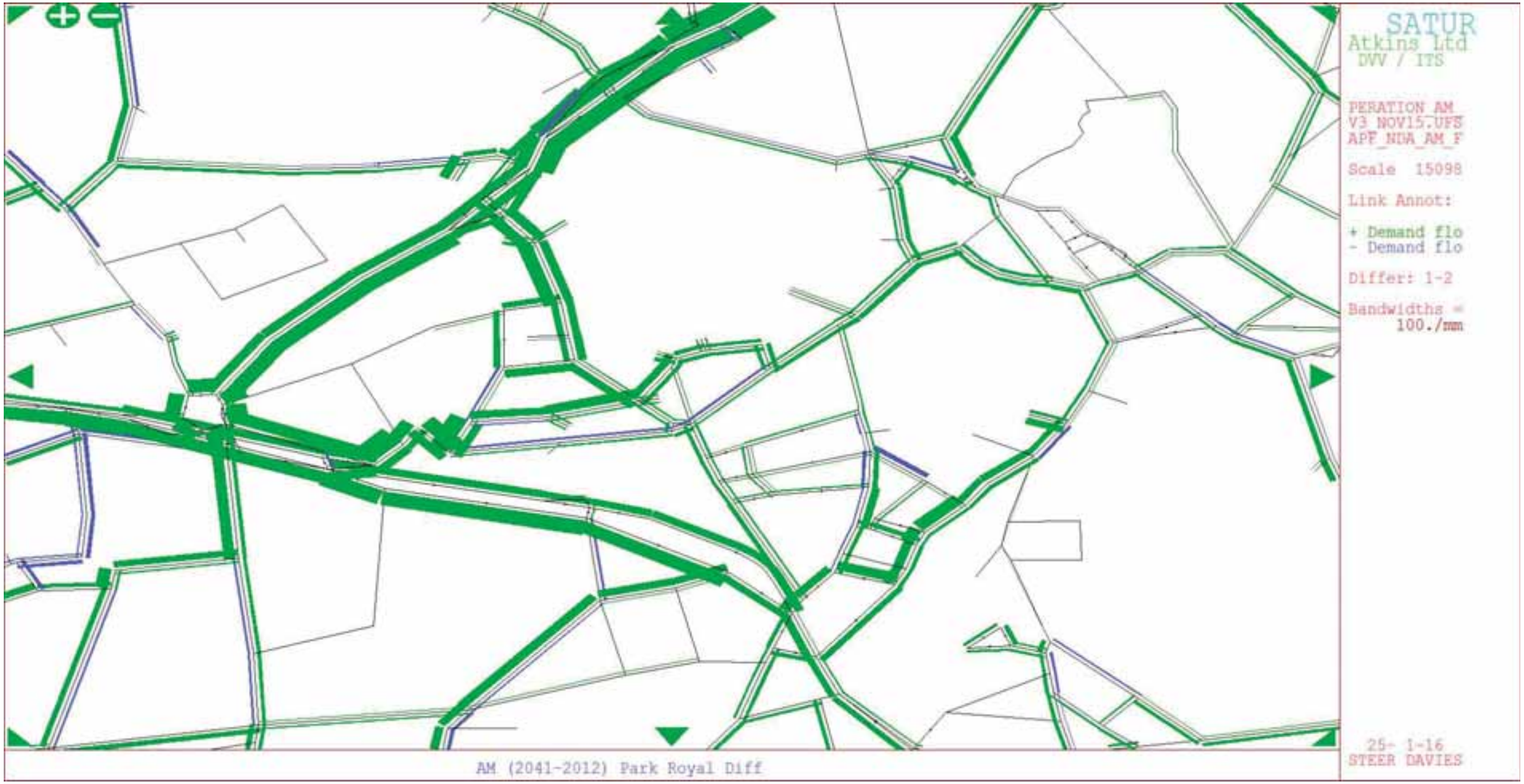


Figure E.62: AM Peak (Park Royal 2041 – BY 2012) Actual Flow Differences in PCUs

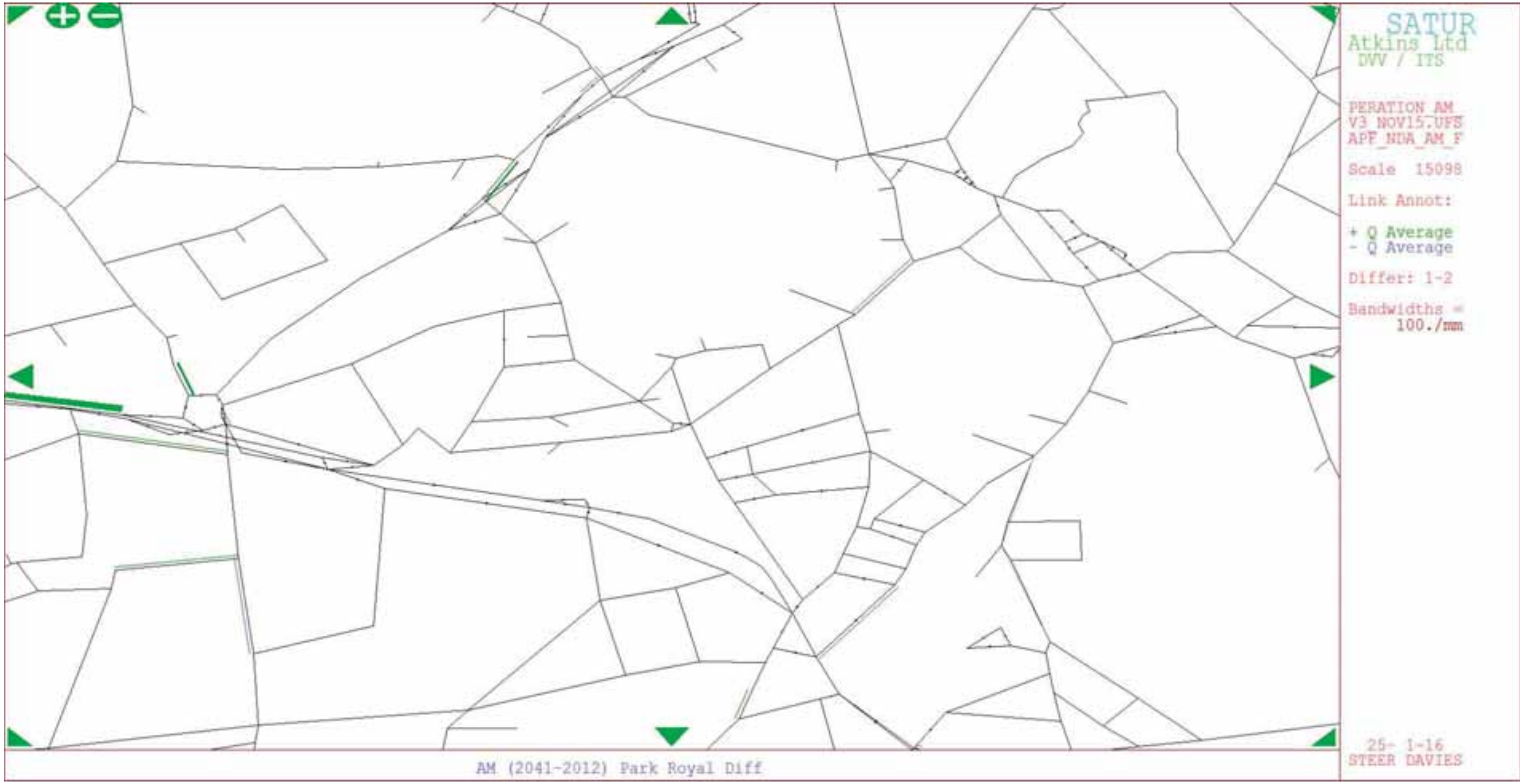


Figure E.63: AM Peak (Park Royal 2041 – BY 2012) Average Queue Differences in PCUs

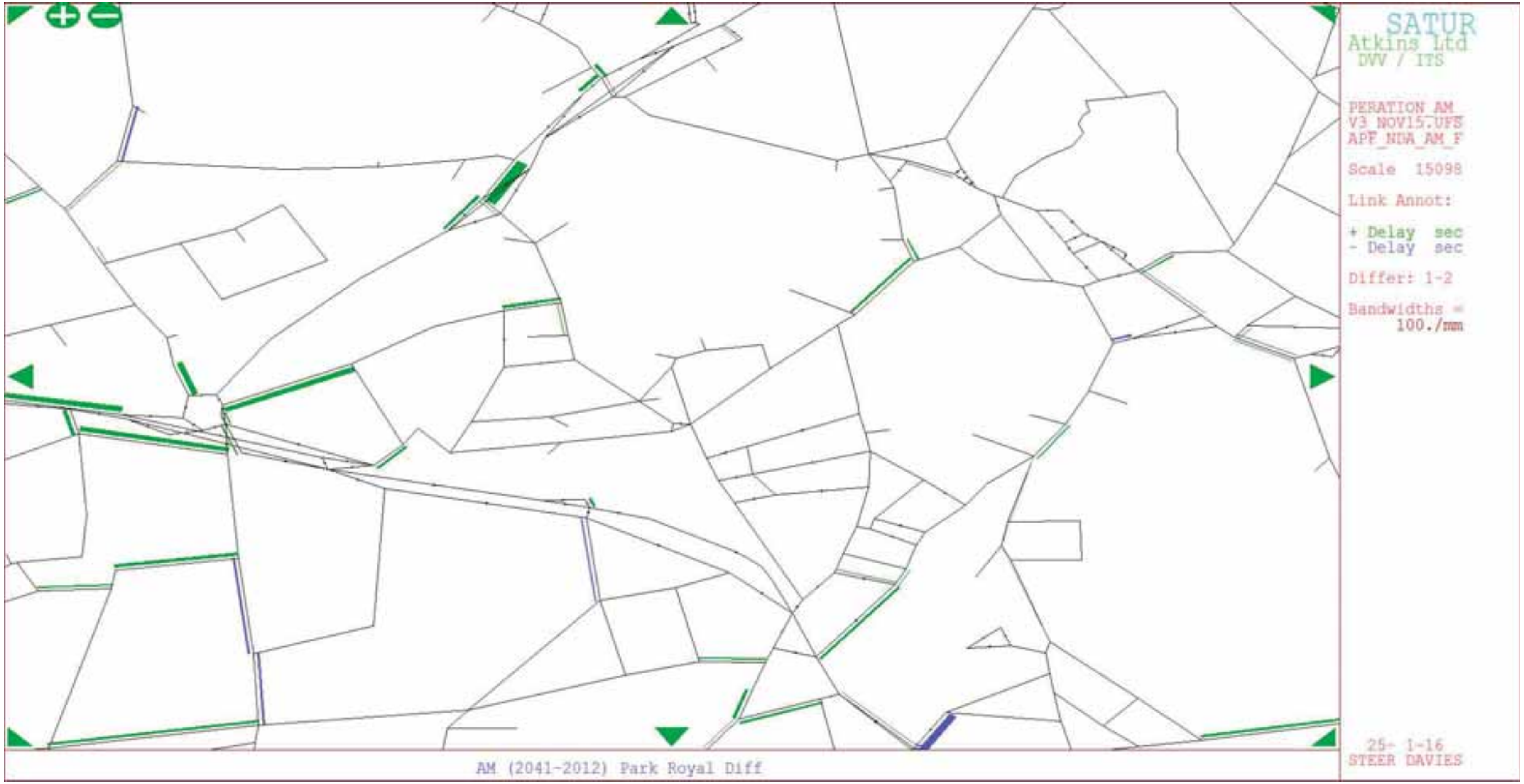


Figure E.64: AM Peak (Park Royal 2041 – BY 2012) Average Delay Differences in PCUs

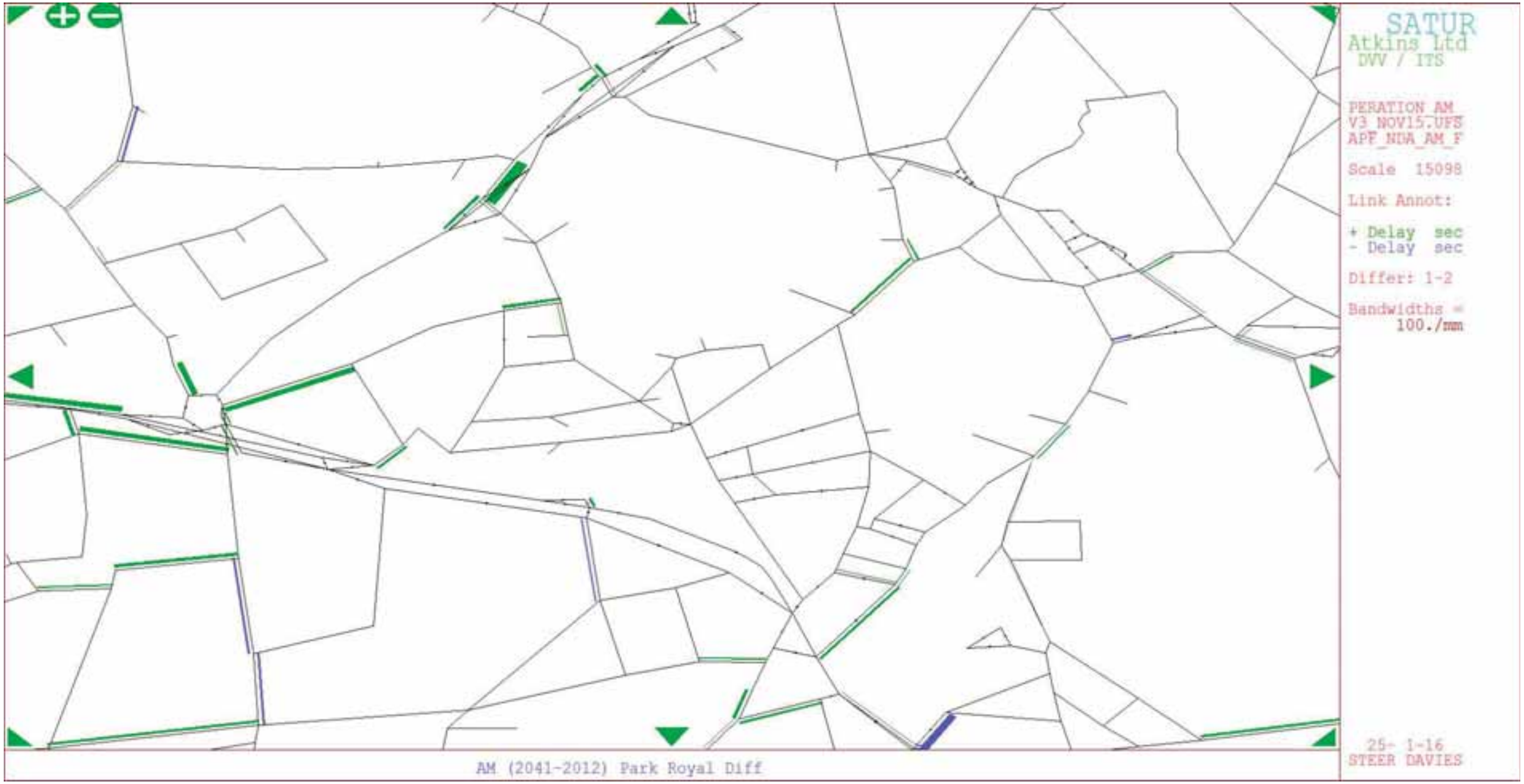


Figure E.65: AM Peak (Park Royal 2041 – BY 2012) PCU Hour Junction Delay Differences

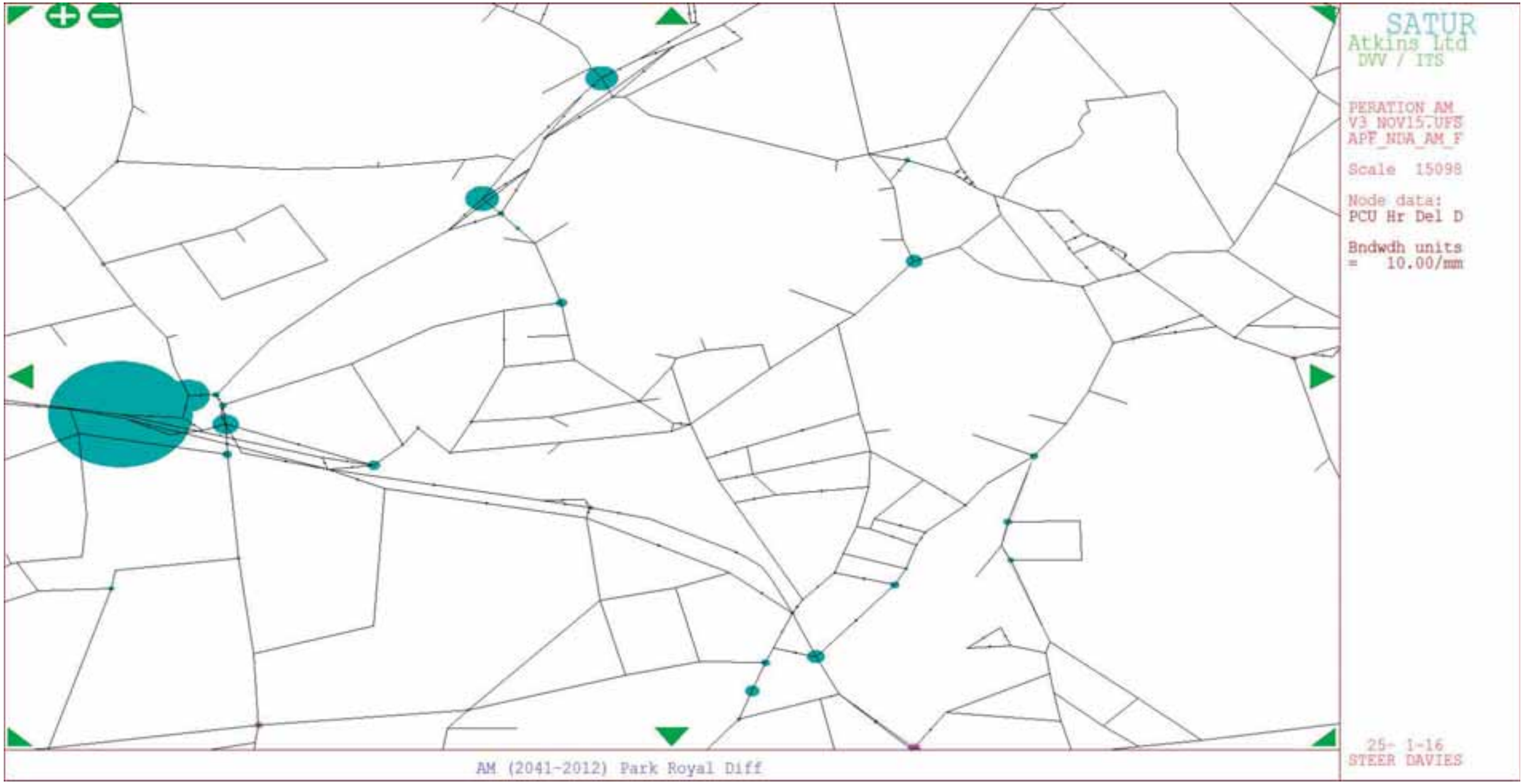


Figure E.66: PM Peak 2041 Park Royal Demand Flows in PCUs

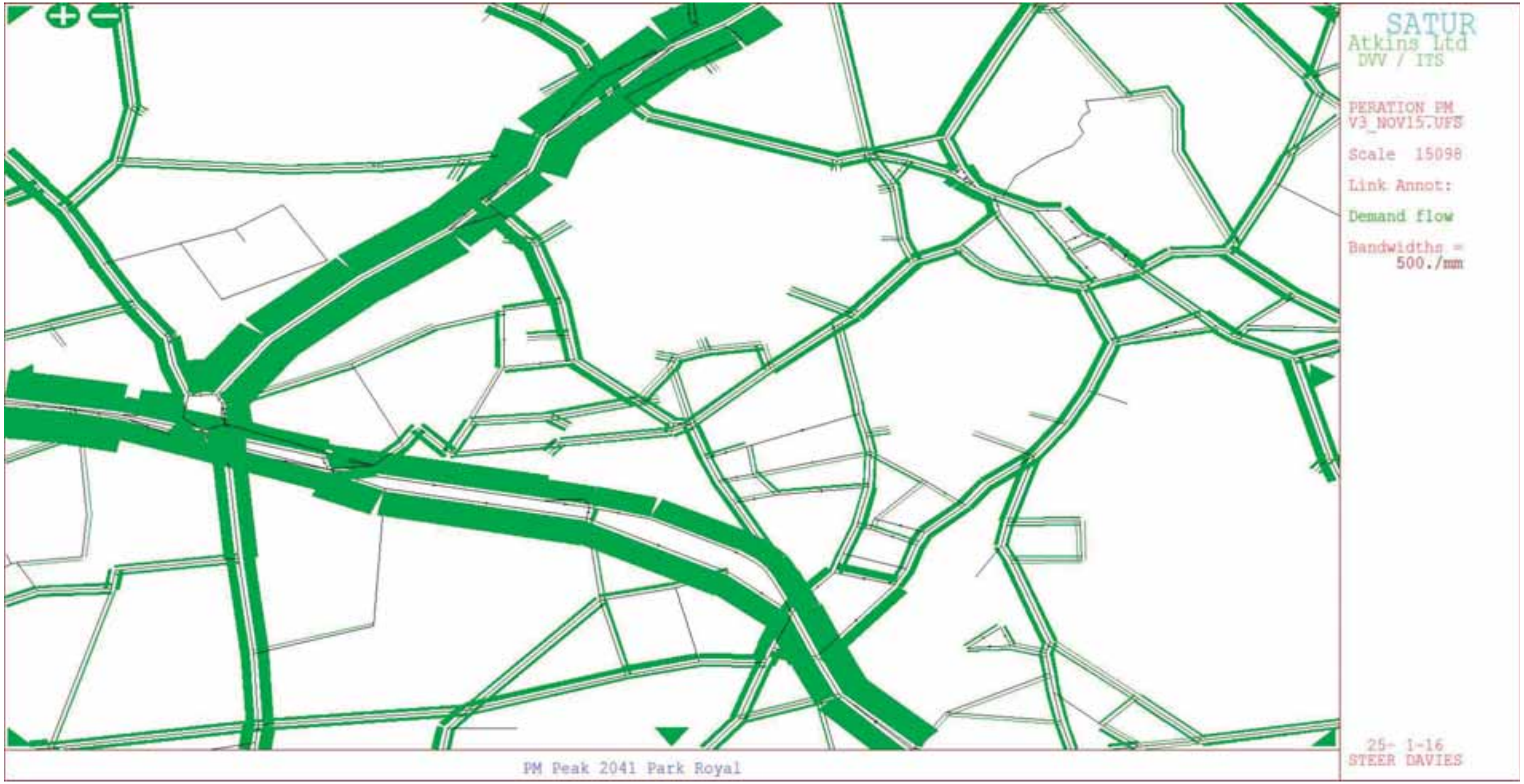


Figure E.67: PM Peak 2041 Park Royal Actual Flows in PCUs

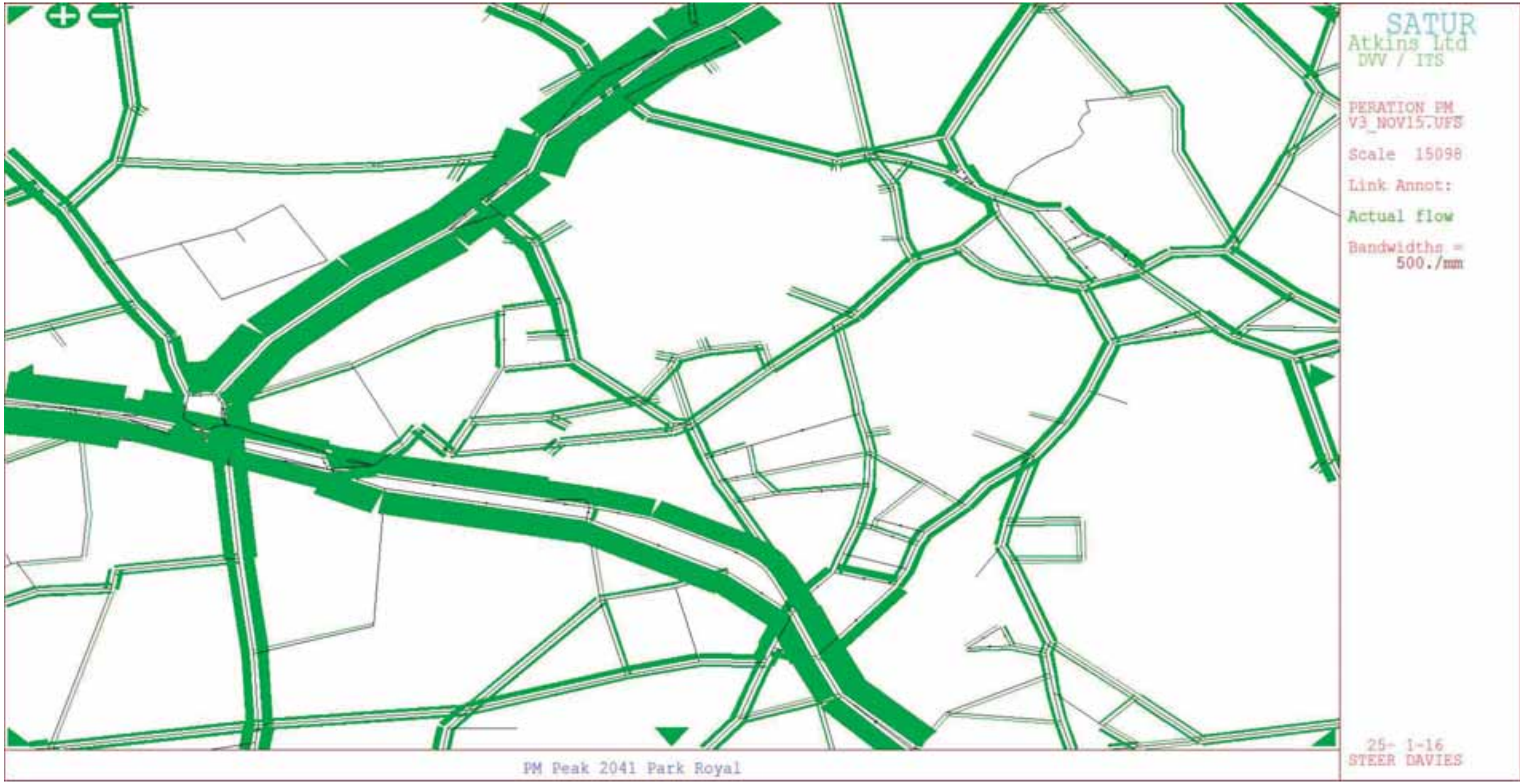


Figure E.68: PM Peak 2041 Park Royal Average Queue in PCUs

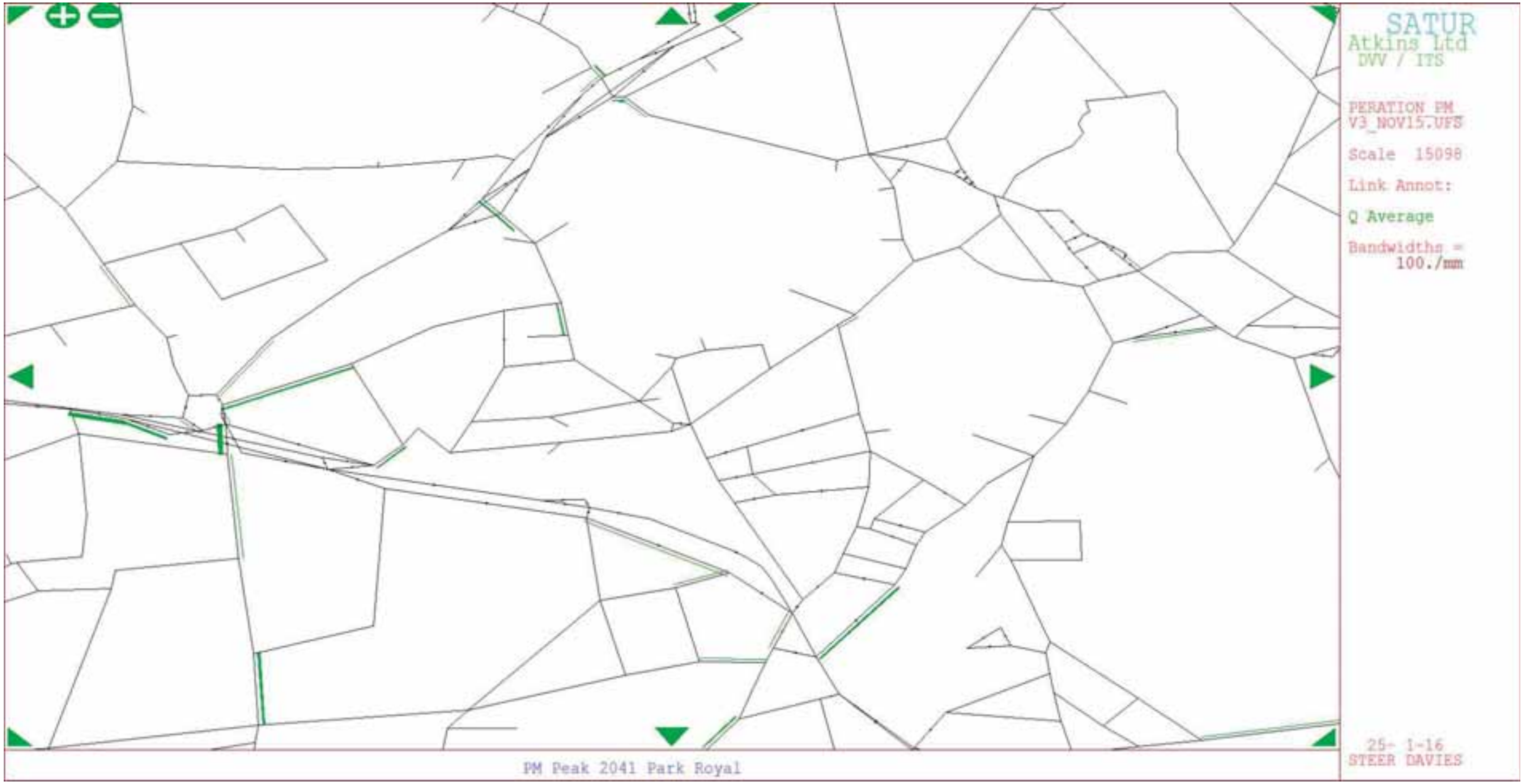


Figure E.69: PM Peak 2041 Park Royal Average Delay in Seconds

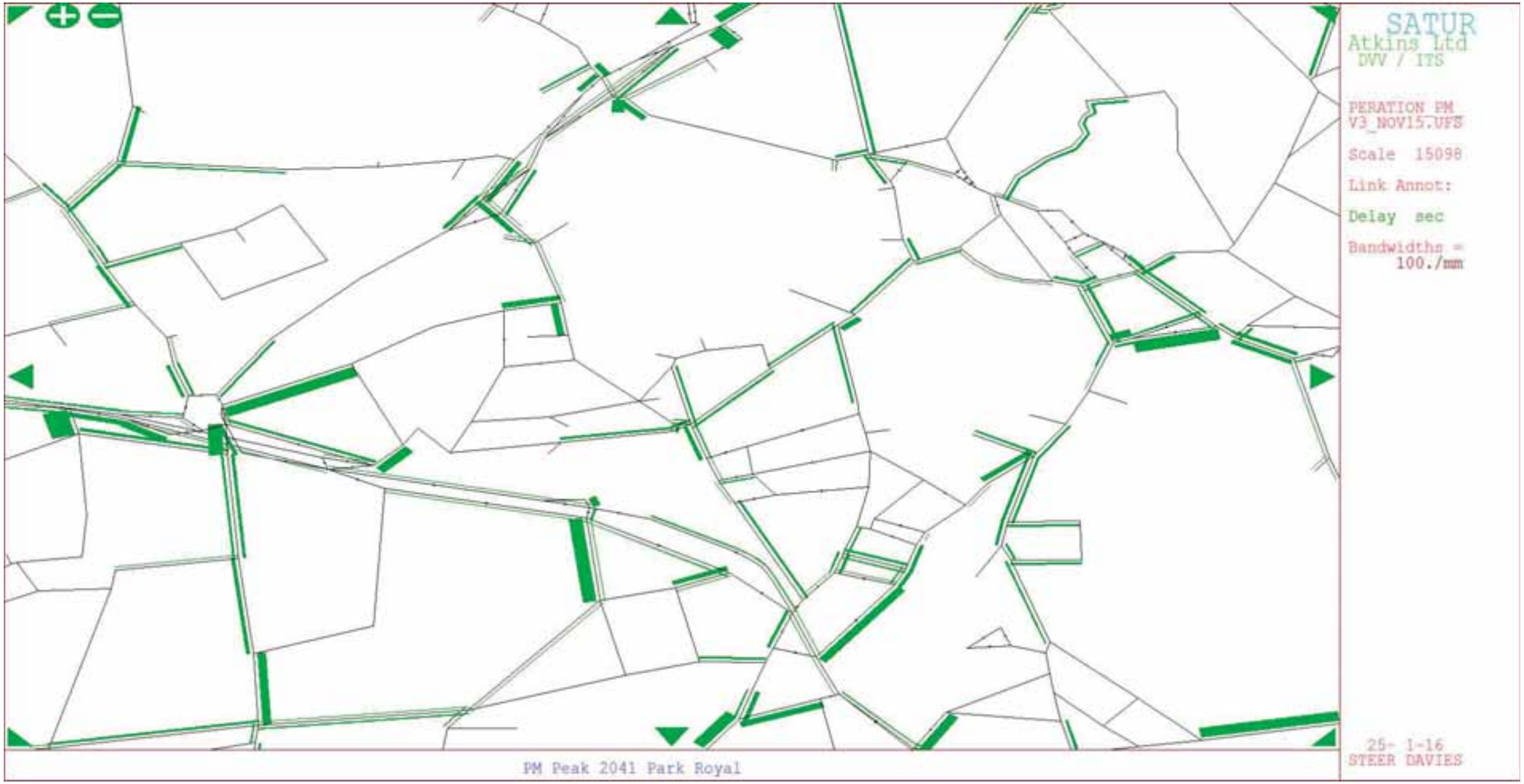


Figure E.70: PM Peak 2041 Park Royal Volume Over Capacity %

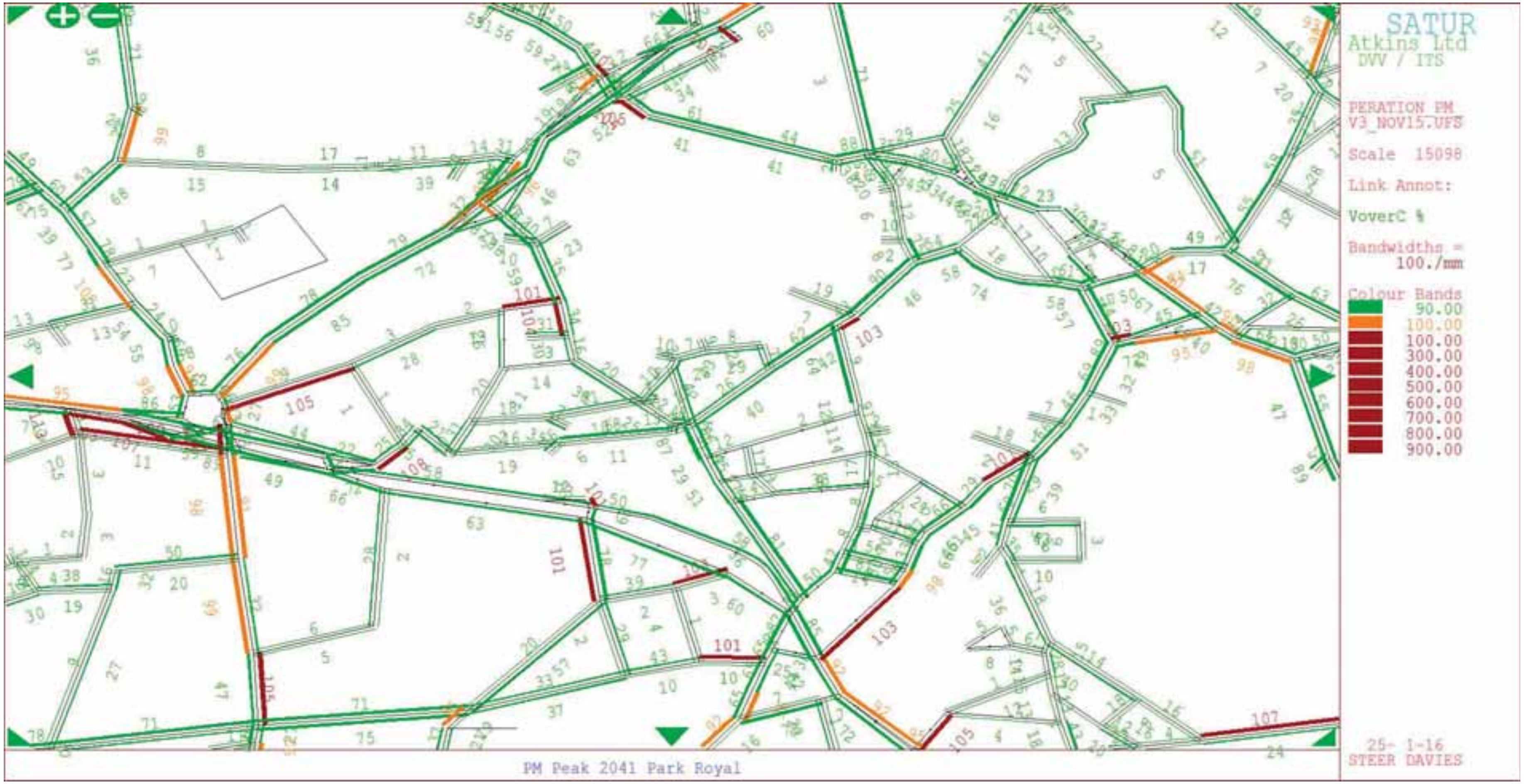


Figure E.71: PM Peak 2041 Park Royal PCU Hour Junction Delay

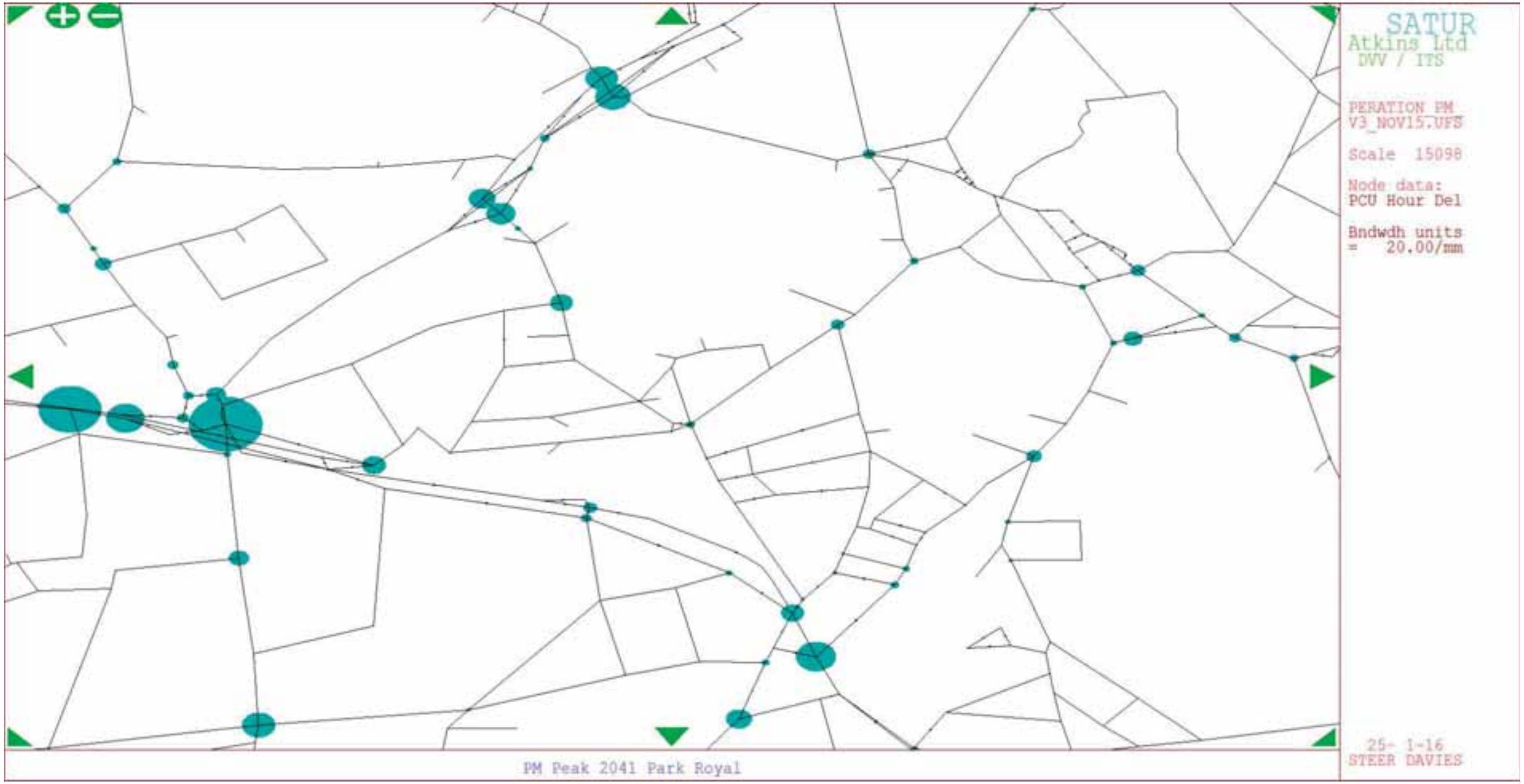


Figure E.72: PM Peak (Park Royal 2041 – BY 2012) Demand Flow Differences in PCUs

Figure E.73: PM Peak (Park Royal 2041 – BY 2012) Actual Flow Differences in PCUs

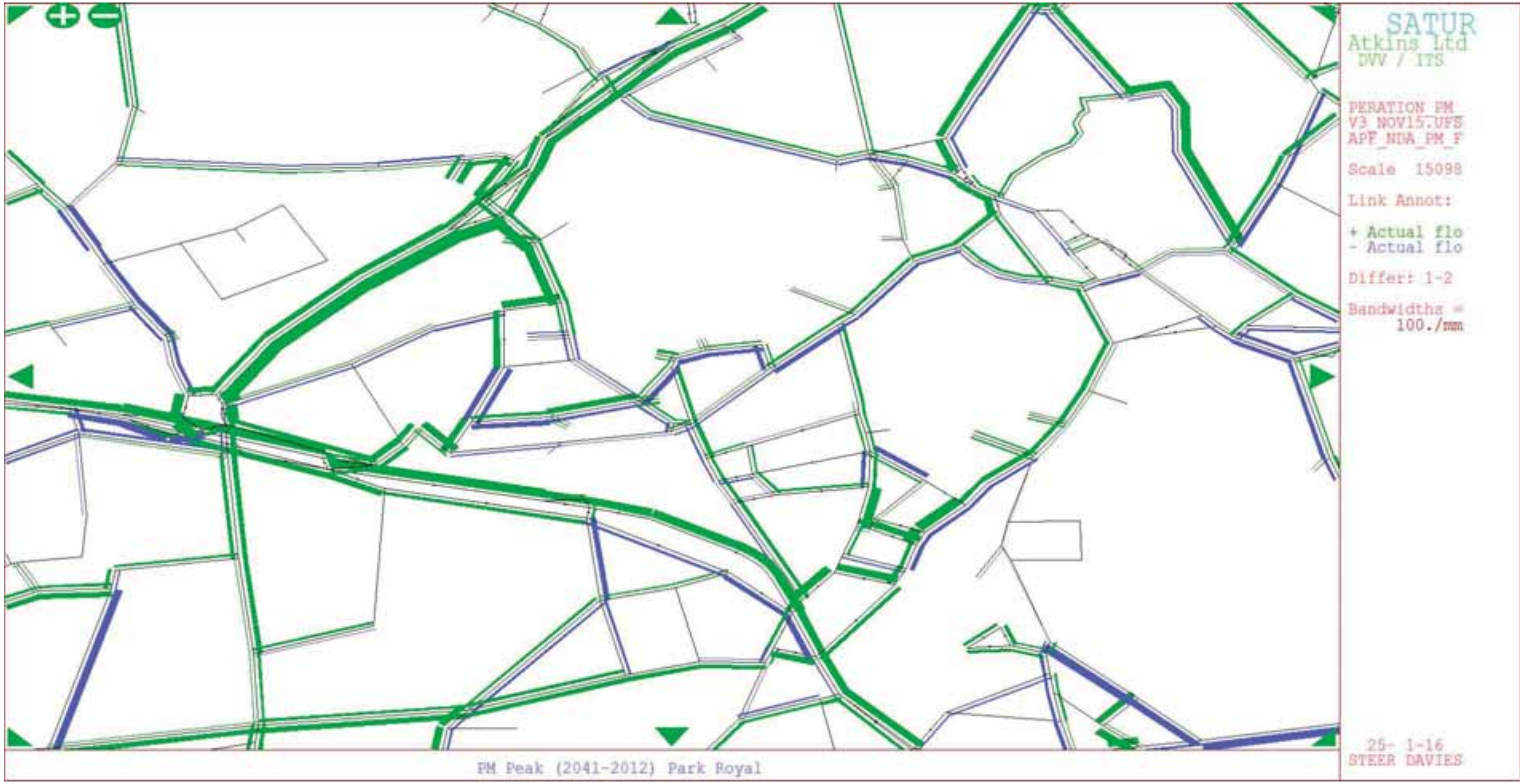


Figure E.74: PM Peak (Park Royal 2041 – BY 2012) Average Queue Differences in PCUs

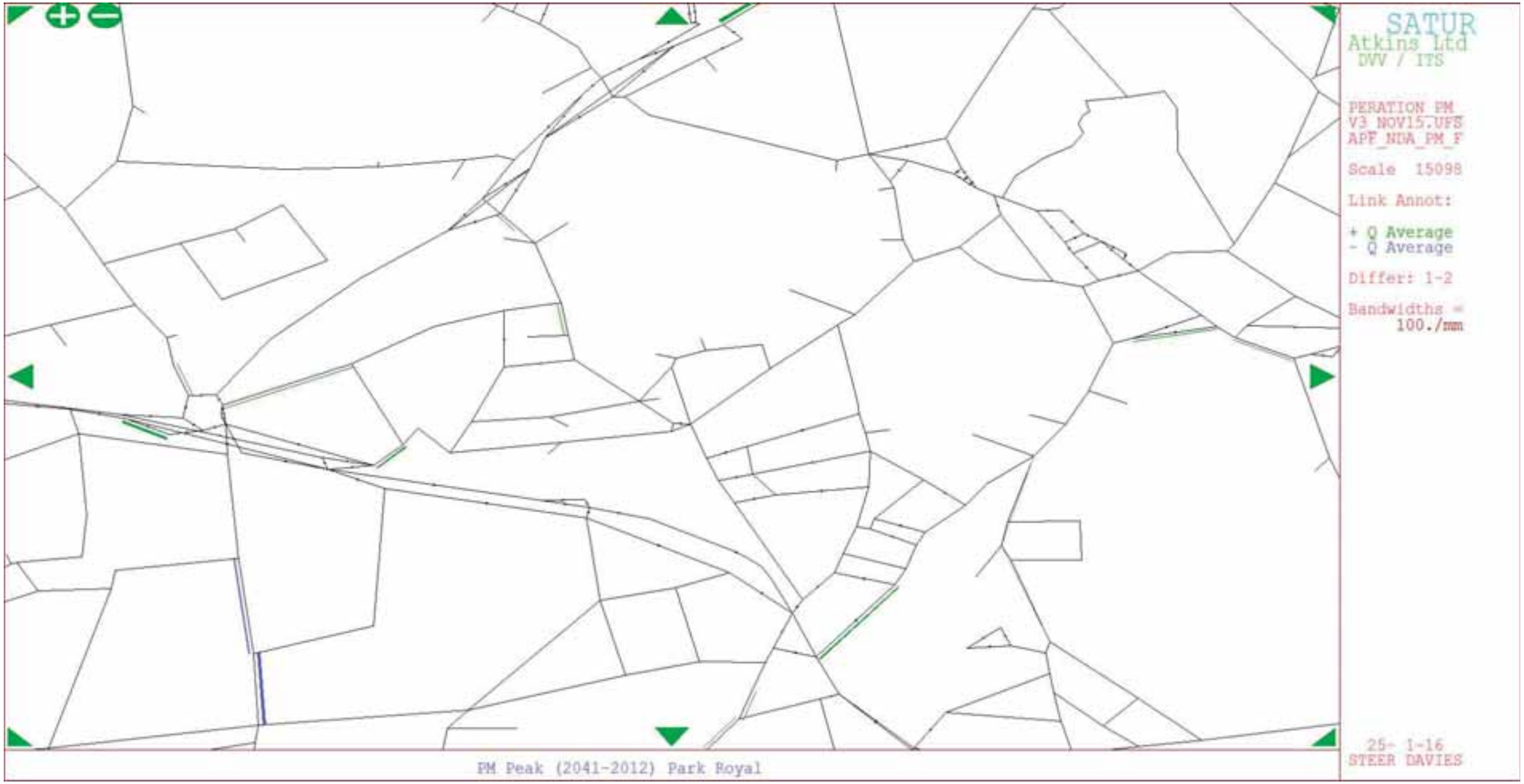


Figure E.75: PM Peak (Park Royal 2041 – BY 2012) Average Delay Differences in PCUs

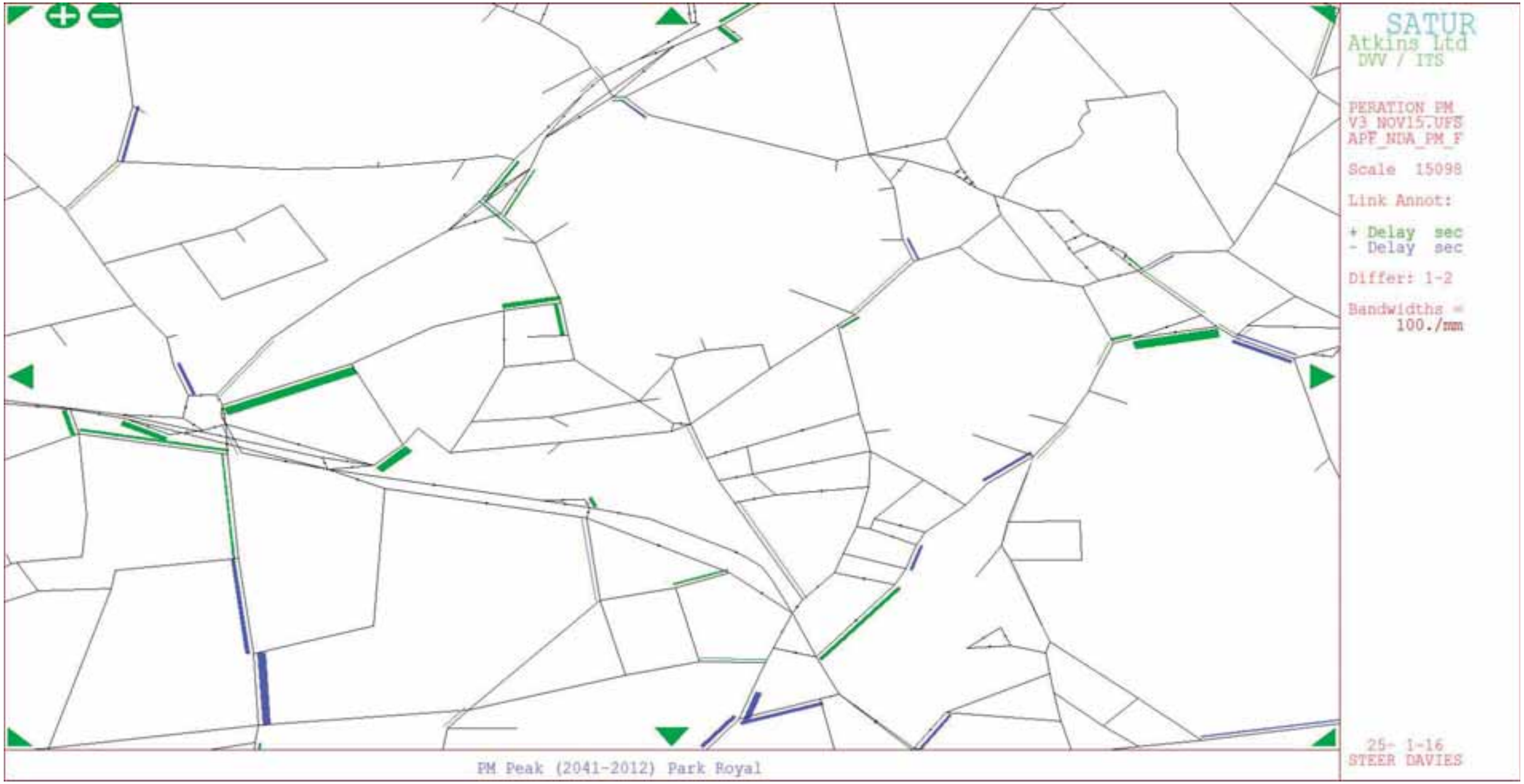
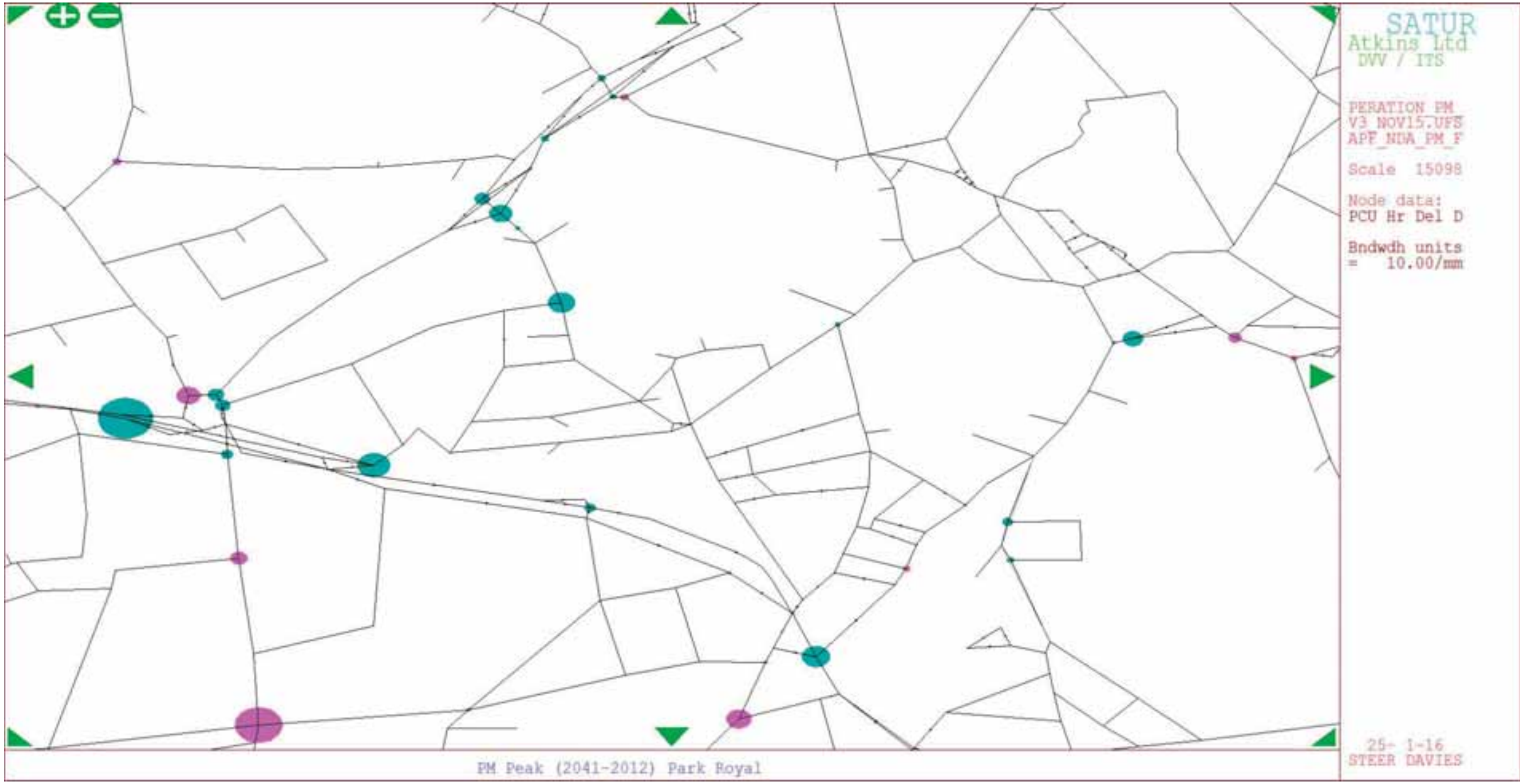


Figure E.76: PM Peak (Park Royal 2041 – BY 2012) PCU Hour Junction Delay Differences



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