

FARNLEY ESTATES LIMITED

FARNLEY COUNTRY PARK

SUBMISSIONS TO DRAFT KIRKLEES LOCAL PLAN

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1. INTRODUCTION

1.01 This statement sets out the representations of Farnley Estates Limited (FEL) to the Kirklees Draft Local Plan, in relation to the proposed Farnley Country Park. The representations relate specifically to:

- The Council's Vision for Kirklees
- The Strategic Objectives of the Kirklees Local Plan
- Policy DLP 10: Supporting the Rural Economy
- Policy DLP 34: Strategic Green Infrastructure
- Site No. SGI 2115: Farnley Country Park
- Policy DLP 55: Green Belt
- 'Rejected' Housing Allocations
 - Site H188
 - Site H189
 - Site H256
 - Site H257
 - Site H254
 - Site H252
- Mixed Use Allocations

1.02 Separate representations have been made on other sites not directly related to the Park.

1.03 The Report is set out in the following way:

Section 2 provides a summary of FEL's interest and its vision for the Farnley Country Park;

Section 3 summarises the need for the Country Park;

Section 4 sets out the benefits of the Country Park;

Section 5 sets out how the Country Park can be delivered;

Section 6 requests a mixed use allocation on land at Penistone Road to act as a gateway to the Country Park;

Section 7 requests a number of housing allocations in order to deliver the Park and summarises the technical information submitted to support the allocation of this housing land;

Section 8 summarises the requested changes to the draft Local Plan and concludes.

1.04 A number of Appendices are attached to this statement:

Appendix 1 shows a concept plan of the Country Park;

Appendix 2 provides a summary of the 2015 Farnley Country Park consultation exercise;

Appendix 3 contains a masterplan and flood risk assessment for Rejected Housing Site H189 (land to the north and south of Woodsome Road, Fenay Bridge);

Appendix 4 contains a masterplan and flood risk assessment for Rejected Housing Site H256 (land north of Woodsome Road, Fenay Bridge);

Appendix 5 contains a masterplan and flood risk assessment for Rejected Housing Site H257 (land west of Penistone Road, Fenay Bridge);

Appendix 6 contains a masterplan for Rejected Housing Site H252 (land west of Farnley Road, Farnley Tyas) ;

Appendix 7 contains a masterplan for Rejected Housing Site H254 (land east of Thurstonland Road, Farnley Tyas);

Appendix 8 contains a transport assessment of the likely traffic generation and suggested improvements to the local highway network.

Appendix 9 contains a flood risk assessment for Rejected Site SGI2109/H188 (The Gateway, land west of Penistone Road, Fenay Bridge)

2. FARNLEY ESTATES LIMITED AND THE FARNLEY COUNTRY PARK VISION

- 2.01 Farnley Estates Limited (FEL) owns and manages around 1,500 acres (607 hectares) of farmland, parkland and woodland in and around the village of Farnley Tyas, to the south of Huddersfield. FEL's land holdings stretch from Brockholes in the Holme Valley in the west, to Lepton in the east and include land on the urban fringe of Huddersfield.
- 2.02 In 1968, when the current owners of FEL (the Sykes family) bought Farnley Estates from the Dartmouth Estate, there were 32 farms. Today, there are only three working farms. FEL is working hard to manage its agricultural land and in December 2012 was awarded 'Higher Level Stewardship' by Natural England. Specific projects have included planting more than 70,000 trees since 2000, re-establishing and maintaining boundary walls and hedges and clearing permissive footpaths. However, as farming continues to change, the commercial future of these remaining farms is uncertain and in order for the Estate to survive and maintain its high level of stewardship, it must evolve.
- 2.03 As part of Natural England's Higher Level Stewardship status, FEL has considered how it can provide greater access to the land for outdoor recreation, while still allowing for agriculture and protecting the natural environment. The Estate is located on the edge of one of England's largest towns, only a few miles from Huddersfield town centre and is a valuable but underused resource to the local community for outdoor recreation. FEL has therefore consulted over the last two years with more than 450 organisations, including: local charities, schools, sports clubs and businesses, regarding the future of the Estate and how they would like to be involved.
- 2.04 The clear message from this consultation exercise was that people want better access to the countryside for outdoor recreation and it is from this that the vision of a new 'Country Park' has evolved.
- 2.05 Natural England defines and accredits Country Parks as '*areas for people to visit and enjoy recreation in a countryside environment*', meeting the following ten essential criteria and at least 10 of the following desirable criteria:

Essential criteria:

- *At least 10 ha in size*
- *Defined by a clear boundary – marked on a map, whether it's open or fenced in*
- *Accessible – less than 10 miles from a residential area*
- *Free to enter*
- *Inclusive and accessible – meeting equality and disability needed and provision for various groups*
- *Predominantly natural or semi-natural landscape, eg woodland, grassland, wetland, heathland or parkland, with no more than 5% of the area built upon (excluding car parks)*
- *Signposted and easy to navigate – visitors should be shown where they can go and what they can do and directed along footpaths, bridleways and cycle routes*
- *Visibly staffed, eg litter collection and maintenance*
- *Available for public or educational events*
- *Near public toilets – either onsite or a 2 minute walk away*
- *Informed by the local community – the public should have some influence over the management and development of the site*

Desirable criteria:

- *A visitor centre*
- *Play facilities*
- *Catering*
- *Bike and horse trails*
- *Art and sculpture*
- *Permanent staff presence during the day*
- *Detailed information available to visitors*
- *Brown and white directional signs and shown on an OS map*
- *Outdoor activities*
- *Achieved or working towards Green Flag Award status*
- *A green transport policy*
- *Facilities for less able visitors, eg easy trials, seats and information available in accessible formats*
- *Plans for the management of biodiversity, geodiversity and preservation of historical environment*

- *Opportunities for practical community involvement, eg volunteering*
- *Promotion of the health benefits of walking*
- *An outreach programme to the less represented sectors of the community*
- *A programme of events and guided walks, promoting healthy living and environmental awareness*

2.06 It is considered that the Farnley Country Park would be able to meet all of the essential criteria and most if not all of the desired criteria, so a wider public consultation exercise was then carried out by FEL in 2015 to ask whether people would support the establishment of a Country Park on not just FEL land but a wider area of around 6,200 acres (approximately 2,540 ha) bounded by the A629, A635, A616 and Almondbury, as other landowners would be able to participate in the Park, if they wished to do so.

2.07 A plan showing the potential extent of the Country Park with locations for access points and activities is attached at **Appendix 1**. This plan was used in a consultation exercise by FEL (see www.farnleycountrypark.co.uk and www.peopleforthepark.co.uk). 10,375 votes were recorded and 85% expressed support for the Country Park. A summary of the results can be found at **Appendix 2** of this statement.

2.08 The 2015 consultation exercise also proposed a funding source for the Country Park, which would come from releasing some land on the edge of the Park and on the edge of Farnley Tyas for housing development, which are currently in the Green Belt. A number of FEL sites were submitted to Kirklees Council in 2014 for potential housing development in its 'Call for Sites' as part of its Strategic Housing Land Availability Assessment, published in 2015. The delivery of the Park and the proposed housing allocations are considered in more detail in Sections 6 and 7 of this statement.

2.09 The draft Kirklees Local Plan (November 2015) has identified Farnley Country Park as a 'Strategic Green Infrastructure Proposal', with the following draft policy DLP34:

"The Council recognises the potential benefits of the establishment of the Farnley Country Park including enhancing access to natural green space, increasing opportunities for local recreation, wildlife conservation, tourism and economic benefits.

The aims of the Farnley Country Park are to:

- *Conserve and enhance the countryside, recognising and respecting its biodiversity, historic environment, landscape and other special qualities;*
- *Promote opportunities for greater enjoyment of an access to the countryside by the public for education, health, leisure, recreation, sport and tourism;*
- *Encourage rural diversification that will secure the future of the countryside; and*
- *Improve the image of Kirklees as place to invest, live, work and visit.*

Proposals to establish the country park will therefore be supported where these do not conflict with national planning policies or policies in the Local Plan.”

2.10 FEL supports this draft policy and this statement seeks to provide further evidence on the need for the Country Park and its benefits.

2.11 However, the draft Local Plan does not currently propose to allocate land off Penistone Road required for a gateway into the park and also does not propose to allocate land for housing development that would fund the delivery of the park. This statement therefore also sets out FEL's planning case for allocating additional land to create a mixed use gateway on Penistone Road and for allocating additional land for housing that will fund the delivery of the park.

3. THE NEED FOR THE COUNTRY PARK

Need for Access and New Facilities for Outdoor Recreation and Better Health

- 3.01 The consultation exercise carried out by FEL over the last 2 years has identified a need for improved access to the countryside for recreation.
- 3.02 While there are some existing public rights of way in the area of the Country Park, they are limited and do not allow easy and safe routes for residents in Almondbury and Lepton. There is an opportunity to provide new and improved routes into and through the Park, with new facilities to encourage use by as wide a section of the community as possible, for cyclists, horse riders and walkers.
- 3.03 The draft Local Plan, the Kirklees Joint Health and Wellbeing Strategy and the National Planning Policy Framework all recognise the importance of promoting healthy communities and the role that the planning system can play in creating healthy communities, by providing for increased opportunities for outdoor recreation.
- 3.04 In addition, the Country Park would provide a major new facility close to the urban population of Huddersfield and within easy access, reducing the propensity for residents to travel outside the area for visits to other recreational areas, such as the Peak District National Park or the South Pennine Moors.

Need for Educational Opportunities

- 3.05 Local schools have identified a need for improved access to local countryside for field visits, but appropriate facilities are required for them to be able to safely access the countryside. An education centre with on-site parking, classrooms and outdoor/indoor picnic areas would allow local schools to use the countryside.

Need for Tourism Opportunities

- 3.06 In 2013, the tourism economy supported 3.1m jobs in the UK (9.6% of all jobs) and accounted for £126.9bn (9.0%) of the UK's economic activity (Source: Tourism: Jobs and Growth – the economic distribution of the tourism economy in the UK, Deloitte and Oxford Economics, November 2013). The sector is forecast to increase by 3.8% pa, with increased demand from both international visitors, but also by domestic

demand. It is estimated that there is the potential for 630,000 new jobs in the sector by 2025.

- 3.07 Tourism in Yorkshire makes a significant contribution to the regional economy, with an estimated 216 million visits in 2011, valued at £7bn (Source: Welcome to Yorkshire, ONS, 2011). However, Kirklees and Calderdale only attract 3.3% of this lucrative tourist market, despite being strategically located between Leeds and Manchester, on the edge of the Peak District National Park and with many attractions of its own, including the attractive countryside and historic towns and villages. There is clearly potential for Kirklees to capture more tourist spend through better marketing and developing new attractions and facilities.
- 3.08 This has been recognised in the Kirklees Economic Strategy 2014, which recognises that one of the District's economic weaknesses is that there is a '*lack of a major tourism attraction in to draw in footfall and spend*' (p.10) but that one of the District's strengths is its '*attractive built and natural environment*'. The Economic Strategy identifies '*leisure tourism*' as a key priority for the District. However, the draft Local Plan does not explicitly recognise the strategic potential of the tourism economy to create economic growth, new jobs and to help diversify the local economy, which has historically been heavily dependent on manufacturing. It is considered that the Local Plan's strategic objective for the local economy should refer to tourism as a key growth sector.
- 3.09 The Country Park would create a well-managed and well-marketed facility that would not only benefit local people but also encourage new visitors to the area by the provision of appropriate activities and facilities, such as hotels, camp sites, restaurants, cycle routes, walking paths and horse trails

Need for Rural Diversification and Economic Opportunities

- 3.10 The draft Local Plan recognises the need to support the rural economy in Kirklees and includes Policy DLP10, which states that:

“ Proposals to support the rural economy including tourism related development, farm diversification schemes, farm shops, ancillary cafés and tea rooms and other appropriate businesses including live/work units will be supported where:

- a) *The enterprise is provided through the conversion or re-use of an existing building;*
and
- b) *The proposal would not adversely affect the management and viability of any farm holding.*

Where new buildings are proposed in the green belt the development propose must be considered to be acceptable having regard to green belt policy. In all cases where development is proposed in the green belt regard must be had to the relevant policies in this plan.”

3.11 The supporting text to this policy notes that the Green Belt is a *‘living and working environment supporting innumerable businesses including farms, garden centres and nurseries, riding stables and liveries, industry and offices and a host of other enterprises’* and that *‘changing agricultural practices also mean the farms are seeking new ways to maintain their viability and this will often lead to proposals for diversification schemes and tourist related enterprises that have a genuine need for a green belt location’*. FEL supports these comments and as outlined in Section 2 of this statement, FEL needs to continue to diversify its land holdings, in order to maintain a viable and sustainable business. There are now only three working farms on the Estate, compared to 32 back in 1968.

3.12 FEL’s consultation exercise has identified a significant level of interest in developing new business opportunities within the Country Park, from outdoor recreation providers (astronomy, camping, cycling, climbing, equestrian, fishing, orienteering, walking and others), from accommodation providers (holiday lodges, hotels) and food/drink facilities (tea rooms, restaurants, pubs). This indicates the level of interest that exists in developing new businesses in the rural Green Belt of Kirklees, which will create jobs, diversify the local economy and strengthen existing settlements by providing new economic activity.

Need for Strategic Green Infrastructure

3.13 Kirklees produced a Technical Paper on Environmental Designations in November 2015, which has informed the draft Local Plan’s policies on green infrastructure and other environmental designations. The Paper reports on an exercise by Natural England in identifying strategic green infrastructure networks in Kirklees. The Fenay Beck Corridor was identified as one of the District’s strategic green infrastructure

networks. The Country Park would help to protect and strengthen this environmental network.

4. THE CONTENT OF THE PARK AND ITS BENEFITS

4.01 The Country Park can meet all of the above needs by becoming a destination for education, health, leisure, recreation, sport, tourism and rural business, while continuing with farming and conversation work.

4.02 The Country Park concept is for an area of land larger than just FEL's interests, as the larger the Country Park, the wider its benefits will spread across the District and the more other landowners will be able to participate, if they so wish.

4.03 The Plan in **Appendix 1** shows the concept of the Country Park, which includes the following:

- A number of 'gateways' into the Country Park:
 - 1) The main gateway at Penistone Road (a regular bus route to Huddersfield), with a new access and some built development to provide car parking and visitor/information facilities;
 - 2) A 'heritage' gateway at Castle Hill, with no new built development, to link into the existing car park at Castle Hill and network of public footpaths ;
and
 - 3) A series of 'rail based' gateways with no new built development at Honley station, Brockholes station and Shepley station, where signage will guide rail users to the footpath networks within the Country Park
- An all-weather 'circuit' around the perimeter of the Country Park providing access for all, in order to link the 'gateways' and the existing footpath network – this will be delivered in stages and could be as long as 23 km ;
- New permissive access routes and other improvements to existing public rights of way to create increased access for walkers;
- Nature trails and heritage trails in the Country Park;
- Opportunities for camping/glamping;
- Opportunities for horse riding;
- Opportunities for adventure activities, such as aerial adventure, climbing, orienteering; and
- Other opportunities across the Country Park for rural diversification.

- 4.05 It is important to recognise that with the exception of the Penistone Road Gateway (where some built development is required), the Country Park will remain in the Green Belt and will still be protected from built development by Green Belt policy.
- 4.06 The Country Park would develop over time, but the core infrastructure of the main gateway and the circuit would be the first stages to be funded by the sale of FEL land for housing.
- 4.07 The Country Park would be governed by a Board, consisting of representatives from FEL, Kirklees Council, other landowners and the existing Park Foundation, which consists of potential users and other interested parties.
- 4.08 The benefits of the Country Park are:
- Greater access to the countryside for all local people and improved facilities for outdoor recreation (cycling, horse riding and walking) with associated health and well-being benefits;
 - Greater understanding and appreciation of the natural environment and the countryside through education;
 - A well-managed and marketed destination for outdoor recreation and tourism, which will improve the image of Huddersfield and help to diversify the local economy, bringing in new visitors and capturing more of the growing tourism sector;
 - New economic opportunities for rural diversification to maintain the viability of farming in rural Kirklees;
 - Greater protection for the management of the countryside and continued stewardship; and
 - Significant job creation.

5. THE DELIVERY OF THE COUNTRY PARK

- 5.01 In order to establish the Country Park, FEL require funding to implement and maintain the Penistone Road Gateway and the Circuit, which would be the first stages of the Country Park.
- 5.02 A number of potential housing sites on the edge of the Country Park along Penistone Road have been identified as suitable for development, as well as two linked sites on the edge of Farnley Tyas. Details of each of these sites and a planning justification as to why they can be developed for housing is set out in Section 7.
- 5.03 FEL would enter into a legal obligation with Kirklees that these sites can only be developed for housing if they enable the establishment of the Country Park. This requirement could be written into the Local Plan, with the detail of the legal agreement to be agreed at planning application stage.

6. THE GATEWAY

- 6.01 As outlined in Section 2, Natural England sets out a number of essential criteria and a number of desired criteria for its Country Park accreditation scheme.
- 6.02 The key criterion is that people can access the park and to this end, a number of 'gateways' into the park are proposed, some of which will be based on railway stations on the Penistone Line with no new built development, but the largest of the gateways would be west of Penistone Road, in the area of the park closest to the large population centre of Huddersfield and on a busy public transport corridor.
- 6.03 This gateway on Penistone Road would include some built development, such as: a visitor centre, cycle hire shop, car park and other related facilities to support the Park. The gateway would be the main entrance into the Park's 'circuit', providing access for cyclists and walkers into and around the Park.
- 6.04 At this stage, it is proposed to access the site from a new roundabout on Penistone Road, which has been designed to accommodate the likely traffic from the gateway, as set out in the transport statement that can found in **Appendix 8**.
- 6.05 It is therefore requested that the 12.82 ha of land rejected in the draft Local Plan as Site ref. SGI2109/H188 is removed from the Green Belt and allocated for a mix of uses compatible with the aims and objectives of the Country Park, as set out in Policy DLP34 of the draft Local Plan.
- 6.06 It is recognised that the land is currently Green Belt, but for the reasons advanced more fully in Section 7, it is considered that the creation of a Country Park that will improve access to greater outdoor recreation opportunities in the Green Belt comprise exceptional circumstances that justify amending the Green Belt boundaries to allow for some built development on this site.
- 6.07 The site is bounded by the Fenay Beck and is partly within an area at risk from flooding, but there is sufficient land within the site to accommodate flood attenuation measures. This is considered in more detail in the Flood Risk Assessment, contained in **Appendix 9**.

7. GREEN BELT POLICY AND HOUSING ALLOCATIONS*Strategic Housing Land Availability Assessment*

7.01 In 2014, FEL submitted to Kirklees Council a number of potential development sites along Penistone Road and on the edge of Farnley Tyas, in response to a 'Call for Sites'. The call for sites was then used to inform the preparation of a 'Strategic Housing Land Availability Assessment' (SHLAA), which identifies potential housing land.

7.02 The SHLAA concluded that with the exception of the gateway site (see Section 6 above), which the Council considered unsuitable for development due to flood risk issues (which we have addressed above in Section 6), all other FEL sites are potentially suitable for housing development. The only constraint to their development is their current Green Belt status, which is not an environmental or physical constraint, but just a planning policy designation.

Green Belt Policy and Exceptional Circumstances

7.03 The draft Local Plan notes that Kirklees has an extensive area of land designated as Green Belt, representing about 70% of land in the District. Areas in Kirklees to which Green Belt policies apply were first defined in the 1960s, with the general extent of the Green Belt confirmed in the 1980s through the West Yorkshire Structure Plan. Subsequent local plans identified detailed boundaries, which were largely carried through into the Kirklees Unitary Development Plan, adopted in 1999.

7.04 Para. 79 of national planning practice guidance states that the '*fundamental aim*' of Green Belt policy is to prevent urban sprawl by keeping land permanently open. Para. 80 sets out the five purposes of Green Belt land:

- *To check the unrestricted sprawl of large built up areas;*
- *To prevent neighbouring towns merging into one another;*
- *To assist in safeguarding the countryside from encroachment;*
- *To preserve the setting and special character of historic towns; and*
- *To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.*

7.05 Once Green Belt boundaries have been defined, para. 81 advises that:

“ ... Local planning authorities should plan positively to enhance the beneficial use of the Green Belt, such as looking for opportunities to provide access; to provide access or outdoor sport and recreation; to retain and enhance landscapes, visual amenity and biodiversity; or to improve damaged and derelict land.”

7.06 The proposed Farnley Country Park is entirely within the Green Belt, so the park will greatly enhance the beneficial use of the Green Belt, by providing new access opportunities and facilities for outdoor sport and recreation. This is a perfect fit with national policy on how Green Belt land should be used, but the Park can only be delivered by releasing some land from the Green Belt on the edge of the Park, in close proximity to the existing settlements of Lepton and Farnley Tyas.

7.07 The draft Local Plan represents a unique opportunity to review the Green Belt boundaries, which is allowed for in national planning guidance, which states at para. 83 that:

“Local planning authorities with Green Belts in their area should establish Green Belt boundaries in their Local Plans which set the framework for Green Belt and settlement policy. Once established, Green Belt boundaries should only be altered in exceptional circumstances, through the preparation or review of the Local Plan. At that time, authorities should consider the Green Belt boundaries, having regard to their intended permanence in the long term, so that they should be capable of enduring beyond the plan period.”

7.08 Kirklees Council is therefore able to alter Green Belt boundaries through the Local Plan process, if it is able to demonstrate exceptional circumstances. There is no explicit national planning guidance on what may constitute exceptional circumstances, but these could include a need for housing and the creation of a new Country Park with wide benefits, as set out in Section 4 above.

7.09 Kirklees has demonstrated in its draft Local Plan that as a District, it needs to plan for 29,340 new homes over the Plan period 2013-2031, i.e. 1,630 new homes per annum. However, Kirklees has only been building an average of 908 homes per annum since 1999/2000. The draft Local Plan proposes to allocate a number of housing allocations, in the following order of priority (as set out in the draft Local Plan's spatial development strategy):

- a) *Previously developed land and buildings within settlements;*
- b) *Suitable greenfield sites within settlements (unless essential for urban green space/local green space or other over-riding constraints);*
- c) *Sustainable extensions to settlements where exceptional circumstances can be demonstrated;*
- d) *Detached green belt sites (where these are previously developed or where exceptional circumstances can be demonstrated).*

7.10 The draft Local Plan allocates a number of sites within settlements, but is unable to meet all of the District's housing need without proposing housing allocations outside settlement boundaries, including some Green Belt release. This demonstrates that some Green Belt release is required for Kirklees to meet its housing need.

7.11 Para. 84 provides further guidance to local authorities on reviewing Green Belt boundaries and states that:

“When drawing up or reviewing Green Belt boundaries local planning authorities should take account of the need to promote sustainable patterns of development. They should consider the consequences for sustainable development of channelling development towards urban areas inside the Green Belt boundary, towards towns and villages inset within the Green Belt or towards locations beyond the outer Green Belt boundary.”

7.12 As recognised in the draft Local Plan's spatial development strategy, sustainable patterns of development can include 'urban extensions', i.e. new areas of development on the edge of existing areas that benefit from good access to employment opportunities and services, i.e. education, health, public transport and shops. It is considered that the location of FEL land on the edge of Lepton, with good access from the A629 Penistone Road and in close proximity to services in Lepton and in nearby Huddersfield, represents a sustainable location for new development. Similar considerations apply to sites on the edge of the village of Farnley Tyas, which has a number of services (primary school, pub and regular bus services) and good access to nearby Huddersfield.

7.13 Para. 85 of the national planning guidance states that:

“When defining boundaries, local planning authorities should:

- *Ensure consistency with the Local Plan strategy for meeting identified requirements for sustainable development;*
- *Not include land which it is unnecessary keep permanently open;*
- *Where necessary, identify in their plans areas of 'safeguarded land' between the urban area and the Green Belt, in order to meet longer-term development needs stretching well beyond the plan period;*
- *Make clear that safeguarded land is not allocated for development at the present time. Planning permission for the permanent development of safeguarded land should only be granted following a Local Plan review which proposes the development;*
- *Satisfy themselves that Green Belt boundaries will not need to be altered at the end of the development plan period; and*
- *Define boundaries clearly, using physical features that are readily recognisable and likely to be permanent."*

7.14 It is considered that each of the five sites proposed by FEL to be released from the Green Belt represents a sustainable location for new development, is not necessary to be kept as permanently open and can be clearly defined by existing physical boundaries. Further information on each of the sites is set out below.

Rejected Housing Allocations

7.15 FEL therefore wishes to promote the following rejected housing allocations for inclusion in the Local Plan, so that they can fund the delivery of the Country Park:

- Site H189 – 0.56 ha of land to the north and south of Woodsome Road, Fenay Bridge
- A reduced Site H256 – 13.3 ha of land north of Woodsome Road, Fenay Bridge (this site has been reduced in size from the 25 ha shown in the Rejected Options document)
- Site H257 – 21 ha of land west of Penistone Road, Fenay Bridge
- Site H252 – 1.2 ha of land west of Farnley Road, Farnley Tyas
- Site H254 – 3.4 ha of land east of Thurstonland Road, Farnley Tyas

7.16 Each site is considered in detail in **Appendices 3 to 7**, which include:

- A masterplan by DLA Architects showing the constraints and opportunities of each site, in terms of access, flood risk and landscape; and
- A note on the flood risk of each site if relevant, prepared by Sanderson Associates.

7.17 In addition, a report (**see Appendix 8**) has been prepared by Sanderson Associates on the traffic implications of all of the sites on Penistone Road, resulting in a potential comprehensive traffic solution that includes two new roundabouts on Penistone Road: one to enter the gateway to the park and another at the junction of Woodsome Road and a new link road to Rowley Lane. A drawing showing this potential new arrangement can be found in the traffic assessment.

7.18 This information shows that all of the sites are physically capable of delivering new homes and it is considered that these housing sites should be included in the Local Plan for the following reasons:

- 1) they are considered to represent sustainable locations for new housing development, thereby helping to meet the District's housing needs which cannot be met on non-Green Belt sites;
- 2) they are not required to be kept permanently open as part of the Green Belt as their development will not result in the coalescence of settlements;
- 3) the site boundaries are clearly defined by existing physical features and new Green Belt boundaries are capable of being 'defended' in the future;
- 4) the development of the sites will fund the delivery of the Farnley Country Park, which will see beneficial use of the Green Belt, as advocated by national policy for Green Belt land.; and
- 5) it is considered that the above factors constitute exceptional circumstances that justify their release from the Green Belt

8. SUMMARY AND CONCLUSIONS

8.01 Farnley Estates Limited is proposing to establish a Country Park to the south of Huddersfield, which will meet an identified need for greater access to the countryside for outdoor recreation.

8.02 The Country Park concept is for an area of land larger than just FEL's interests, as the larger the Country Park, the wider its benefits will spread across the District and the more other landowners will be able to participate, if they so wish.

8.03 The Country Park would include the following:

- A number of 'gateways':
 - 1) The main gateway at Penistone Road (a regular bus route to Huddersfield), with a new access and some built development to provide car parking and visitor/information facilities;
 - 2) A 'heritage' gateway at Castle Hill, with no new built development, to link into the existing car park at Castle Hill and network of public footpaths ;
and
 - 3) A series of 'rail based' gateways with no new built development at Honley station, Brockholes station and Shepley station, where signage will guide rail users to the footpath networks within the Country Park
- An all-weather 'circuit' around the perimeter of the Country Park providing access for all, in order to link the 'gateways' and the existing footpath network – this will be delivered in stages and could be as long as 23 km ;
- New permissive access routes and other improvements to existing public rights of way to create increased access for walkers;
- Nature trails and heritage trails in the Country Park;
- Opportunities for camping/glamping;
- Opportunities for horse riding;
- Opportunities for adventure activities, such as aerial adventure, climbing, orienteering; and
- Other opportunities across the Country Park for rural diversification.

8.04 The benefits of the Country Park would include:

- Greater access to the countryside for all local people and improved facilities for outdoor recreation (cycling, horse riding and walking) with associated health and well-being benefits;
- Greater understanding and appreciation of the natural environment and the countryside through education;
- A well-managed and marketed destination for outdoor recreation and tourism, which will improve the image of Huddersfield and help to diversify the local economy, bringing in new visitors and capturing more of the growing tourism sector;
- New economic opportunities for rural diversification to maintain the viability of farming in rural Kirklees;
- Greater protection for the management of the countryside and continued stewardship; and
- Significant job creation.

8.05 It is important to recognise that with the exception of the Penistone Road Gateway (where some built development is required), the Country Park will remain in the Green Belt and will still be protected from built development by Green Belt policy.

8.06 FEL therefore supports the inclusion of the Country Park in the draft Local Plan, as set out in Policy DLP34.

8.07 It is also requested that the Council's Vision for Kirklees and the Strategic Objectives of the Kirklees Local Plan explicitly recognise the potential that tourism and the leisure economy have to diversify and strengthen the local economy, in line with Policy DLP 10: Supporting the Rural Economy.

8.08 The Country Park would develop over time, but the core infrastructure of the main gateway and the circuit would be the first stages to be funded by the sale of some FEL land for housing.

8.09 In addition, it is requested that the 12.82 ha of land rejected in the draft Local Plan as Site ref. SGI2109/H188 is removed from the Green Belt and allocated for a mix of uses to act as a 'gateway' into the Country Park, compatible with the aims and objectives of the Country Park, as set out in Policy DLP34 of the draft Local Plan.

8.10 FEL therefore wishes to promote the following rejected housing allocations for inclusion in the Local Plan, so that they can fund the delivery of the Country Park:

- Site H189 – 0.56 ha of land to the north and south of Woodsome Road, Fenay Bridge
- A reduced Site H256 – 13.3 ha of land north of Woodsome Road, Fenay Bridge (this site has been reduced in size from the 25 ha shown in the Rejected Options document)
- Site H257 – 21 ha of land west of Penistone Road, Fenay Bridge
- Site H252 – 1.2 ha of land west of Farnley Road, Farnley Tyas
- Site H254 – 3.4 ha of land east of Thurstonland Road, Farnley Tyas

8.11 The information referred to in Section 7 of this statement shows that all of the above sites are physically capable of delivering new homes and it is considered that these housing sites should be included in the Local Plan for the following reasons:

- they are considered to represent sustainable locations for new housing development, thereby helping to meet the District's housing needs which cannot be met on non-Green Belt sites;
- they are not required to be kept permanently open as part of the Green Belt as their development will not result in the coalescence of settlements;
- the site boundaries are clearly defined by existing physical features and new Green Belt boundaries are capable of being 'defended' in the future;
- the development of the sites will fund the delivery of the Farnley Country Park, which will see beneficial use of the Green Belt, as advocated by national policy for Green Belt land.; and
- it is considered that the above factors constitute exceptional circumstances that justify their release from the Green Belt.

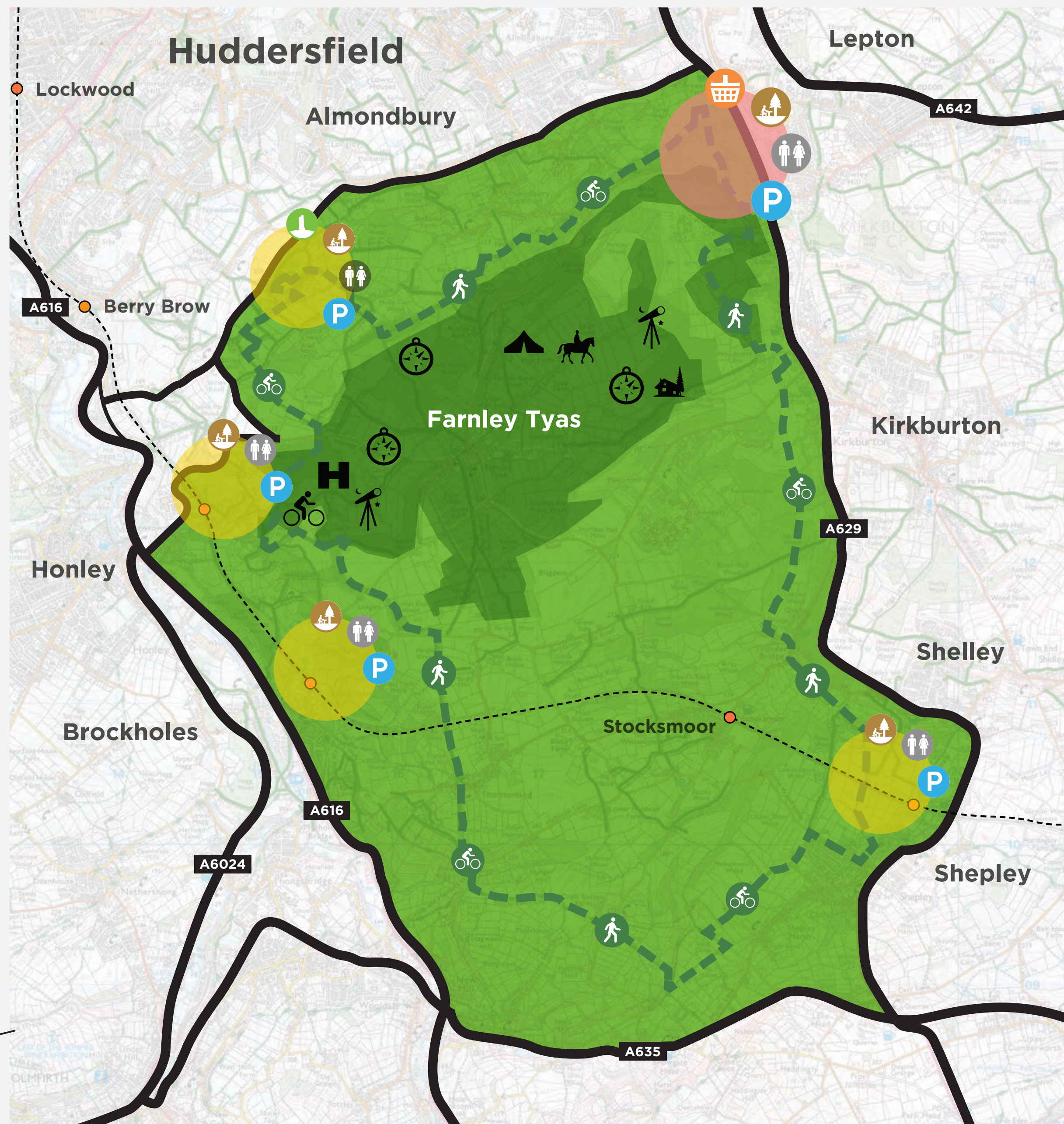
APPENDIX 1

SHOWS A CONCEPT PLAN OF THE COUNTRY PARK

Proposed map & facilities

-  Shopping
-  Picnic area
-  Toilets
-  Castle Hill
-  Parking
-  Main facility area
-  Additional facility area
-  Proposed park area
-  Land owned by Farnley Estates
-  Proposed 17-mile cycle & walk route (many connecting routes tbc)
-  Camping
-  Glamping
-  Horse riding
-  Orienteering
-  Astronomy
-  Rail Station
-  A-road routes
-  Mountain biking
-  High wire adventures

farnley
country
park



APPENDIX 2

PROVIDES A SUMMARY OF THE 2015 FARNLEY COUNTRY PARK
CONSULTATION EXERCISE

farnley country park

Public Consultation Report 31st July 2015





The Process

- 18-month consultation with more than 400 groups
- More than 50 suggested uses for the land
- Formal consultation with Kirklees Council since March 2012

May 2015: People for the Park campaign launched



Overall Voting Results

Vote start date: Tuesday 12th May 2015

Vote results captured: 09:30 Saturday 1st Aug 2015



10,375 Votes



8,839 responses

85.2%



1,452 responses

14%



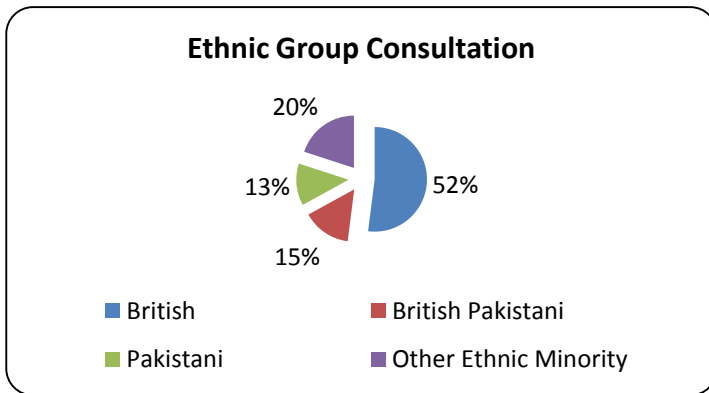
84 responses

0.8%

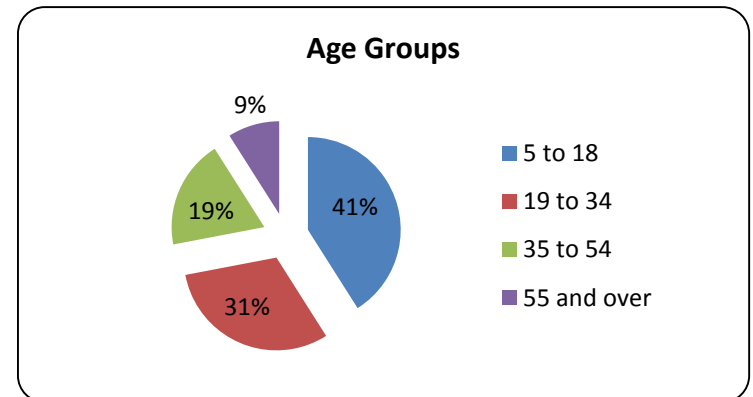


Minority Group Consultation

- Kirklees TV commissioned to conduct consultation with minority groups
- Members of Pakistani, Sikh and Afro-Caribbean communities within Kirklees consulted
- Additional research conducted with college students across Kirklees



Sample size: 817 Source:KLTV



Source:KLTV

817 Responses



745 in favour

91.2%



Link to report [here](#)



Results by Postcode

Following the *Yes / No / No preference* vote respondents were invited to register their details and comment on the reason(s) for their vote.



2,914 voters registered their details

Only people
who registered
their details



Yes voters also had the opportunity to identify their area(s) of interest from a list or add a specific interest.

The following pages detail these results.



Votes By Area

Registered details

Only people
who registered
their details



2,914 responses



2,704 households
representing
7,241* individuals
voted yes



in favour

91.1%

* Not included in the overall results



HD1

Only people who registered their details



Huddersfield Town Centre, Hill House, Lockwood, Marsh, Paddock



-  152 People
-  141 People
-  138 People
-  130 People
-  103 People

Top 5 interests - representing HD1 household totals

91 Responses



in favour

98.9%

HD2

Birkby, Brackenhall, Bradley, Deighton, Fartown, Fixby, Sheepbridge

Only people
who registered
their details



169 People



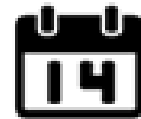
149 People



147 People



143 People



117 People

Top 5 interests -
representing
HD2 household
totals

105 Responses



in favour

95.2%

HD3

Paddock, Salendine Nook, Scammonden, Longwood

Only people
who registered
their details



346 People



319 People



309 People



263 People



238 People

Top 5 interests -
representing
HD3 household
totals

191 Responses



in favour

96.3%

HD4

Berry Brow, Crosland Moor, Farnley Tyas, Netherton, Newsome, Lowerhouses, Stocksmoor, Cowersley

Only people who registered their details



476 People



422 People



412 People



360 People



359 People

Top 5 interests - representing HD4 household totals

301 Responses



in favour

88.4%

HD5

Almondbury, Dalton, Kirkheaton, Moldgreen, Waterloo, Lockwood

Only people
who registered
their details



489 People



426 People



420 People



366 People



355 People



Top 5 interests -
representing
HD5 household
totals

293 Responses



in favour

91.1%

HD6

Bailiff Bridge, Brighouse, Rastrick, Clifton

Only people
who registered
their details



79 People



61 People



59 People



58 People



53 People

Top 5 interests -
representing
HD6 household
totals

45 Responses



in favour

97.8%

HD7

Golcar, Linthwaite, Marsden, Scapegoat Hill, Slaithwaite

Only people
who registered
their details



252 People



235 People



212 People



186 People



167 People

Top 5 interests -
representing
HD7 household
totals

140 Responses



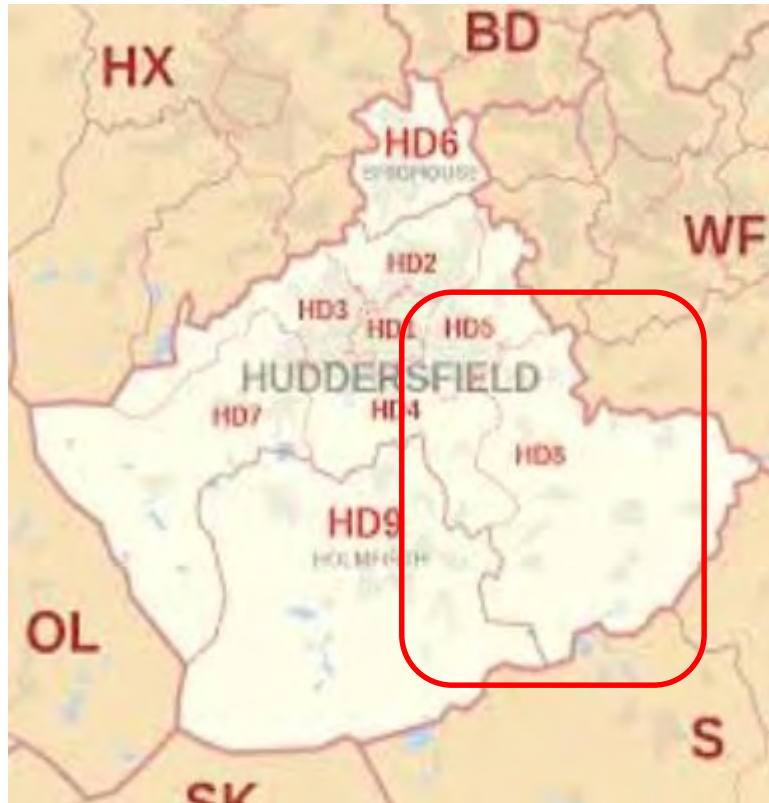
in favour

92.9%

HD8

Clayton West, Denby Dale, Emley, Fenay Bridge, Kirkburton, Lepton, Scissett, Shelley, Shepley, Skelmanthorpe

Only people who registered their details



772 People



725 People



638 People



606 People



551 People

Top 5 interests - representing HD8 household totals

486 Responses



in favour

89.1%

HD9

Birdsedge, Brockholes, Hepworth, Holme, Holmfirth, Honley, Meltham, Scholes, Upperthong, Wooldale

Only people who registered their details



835 People



742 People



729 People



670 People



648 People

Top 5 interests - representing HD9 household totals

498 Responses



in favour

89.4%

BD Postcodes

Only people who registered their details



Includes; **BD12** - Low Moor, Oakenshaw, Wyke, Lower Wyke, Delph Hill
BD19 - Cleckheaton, Gomersal, Scholes



- 78 People
- 75 People
- 65 People
- 60 People
- 55 People

Top 5 interests - representing BD household totals

54 Responses



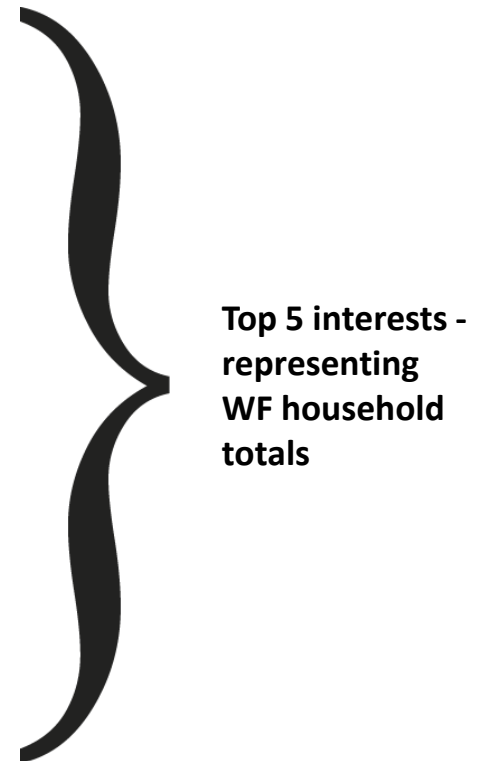
in favour

100%

WF Postcodes

Includes Kirkless Wards; WF4, WF5, WF12-17

Only people who registered their details



198 Responses



in favour

94.4%

Only people
who registered
their details



Surrounding Conurbations

- The surrounding urban conurbations of Greater Manchester, Leeds and Sheffield are home to approximately 4m residents.

Source: www.ons.gov.uk

- Over 8m people live within one-hour drive of the proposed park location.

Source: Regeneris EDC

- Nearest comparable facility is Tatton Park. When the recent RHS Flower Show was held at Tatton Park, only 7% of attendees came from Yorkshire, perhaps indicating the need for facilities closer to home.

Source: RHS Statistics, Bournemouth University

201 Responses



in favour

96.5%



Other Areas

Only people
who registered
their details



311 Responses



in favour

96.9%



Representing
household
interests from
other areas



A scenic view of rolling green hills under a clear blue sky. In the foreground, a stone wall runs across the frame, with the words "FARNLEY ESTATES" engraved on it. The middle ground is filled with lush green fields and scattered trees. In the distance, a tall, thin tower stands on a hilltop. The overall atmosphere is bright and peaceful.

Comments and Feedback

People for the Park FAQ's

Campaign comments and questions created our [FAQ page](#)

farnley
country
park

Your VOTE About the Park **FAQs** Park Foundation Contact

Frequently asked questions.

What is a country park?
Officially, in the UK, a 'country park' is an area of land designated under the Countryside Act 1968, this used to mean that they received support and funding from the Countryside Commission. In the case of Farnley Country Park, we want to provide a green rural area where local people and those from further afield can benefit from easy access to the stunning countryside on our doorstep.

To make it easy and more enjoyable for people to visit, we plan to have designated trails, facilities, car parking and rural activities, that will give people a reason to visit and to stay in the area.

Where will Farnley Country Park be?
Farnley Estates is willing to give permissive access to its 1,500 acres of land, which stretches approximately from Brockholes and Honley up and around Farnley Tyas village and down to Penistone Road in Lepton. Ideally we'd like adjoining landowners to partner with us. If Kirklees add their land to the mix, the Park will reach as far as Castle Hill.

How will the Park be financed?
Country parks such as Epping Forest, Dalby Forest and Tatton Park cost millions to develop, grow and maintain. Rather than Farnley Country Park becoming a drain on local resources, we want to make sure the Park not only pays for itself but also benefits the local economy.

We've identified areas of land that can be released for housing, without affecting the proposed Farnley Country Park. This will solve three issues:

- Contribute towards Kirklees' housing provision.
- Provide capital to create Farnley Country Park.
- Allow for a 'sinking fund' to pay for the ongoing maintenance and development of Farnley Country Park.

What is a sinking fund?
A 'sinking fund' is a pot of money or 'capital' that will be invested into a fund. The interest earned on the investment will be used to pay for the upkeep and ongoing maintenance of the Park. It's anticipated that at today's interest rates between



Community Interaction

Paul Sykes and Sammy Travis have attended numerous community meetings over the last 18 months, and received large amounts of feedback, both positive and negative. Communications and minutes of key meetings before and during the People for the Park Campaign are displayed below: (click on calendar)



Farnley Tyas Community
29th October 2014 / 3rd November 2014
7th January 2015



Castle Hill Civic Association
3rd June 2015



Lepton Community
2nd June 2014 / 3rd June 2015



Shelley Community
14th October 2014



Community Interaction

Continued from previous page...



Farnley Forum- Estate lead meeting
7th May 2014 / 22nd September 2014
11th May 2015



Shepley Village Association
21st October 2014



Kirkburton Parish Council
3rd July 2014 / next meeting
3rd September 2015



Thurstonland Community
6th October 2014

We have also been invited to present at the following meetings:

Brockholes Village Trust 11th August 2015

Friends of Storthes Hall Woods 14th September 2015

Holmfirth Community Forum 14th October 2015

Huddersfield and Halifax Geographical Association 24th November 2015



Ongoing Dialogue

Farnley Country Park will belong to the people, and provide a legacy for generations of Huddersfield residents to come.

With this in mind, the Farnley Country Park Foundation was created to act as a bridge between the park users and the park's board.

<http://peopleforthepark.co.uk/Park-foundation.php>

Chaired by John Hirst and Joanne Stanley, the Foundation now has over 50 active members and the capacity to grow as our number of users grow.

The Foundation will enable the park's users to define how the park serves the people of Huddersfield and Yorkshire

More details about the meetings and members are available via the link to the right



Join the Farnley
Country Park
Foundation



Key Arguments



- Employment opportunities
- Facilities for local youth / disabled residents
- Increased commercial income to area
- Land use needs to be rethought due to changes in modern farming



- Increased traffic
- Loss of Green belt land
- Impact on residents
- Loss of animal habitats
- Increased infrastructure demands



Support and Benefits



Local Organisations

Educational Benefits

Many local organisations have detailed how children can benefit from access to a dedicated outdoor learning environment.

Some of these benefits are detailed [in summary](#) & [in full](#).

Health & Wellbeing

With increased pressure on national and local health services, health and wellbeing is key to any new community facility.

Some of these benefits are detailed [in summary](#) & [in full](#)

The following links highlight some of the support offered by local companies and organisations showing support for the park:



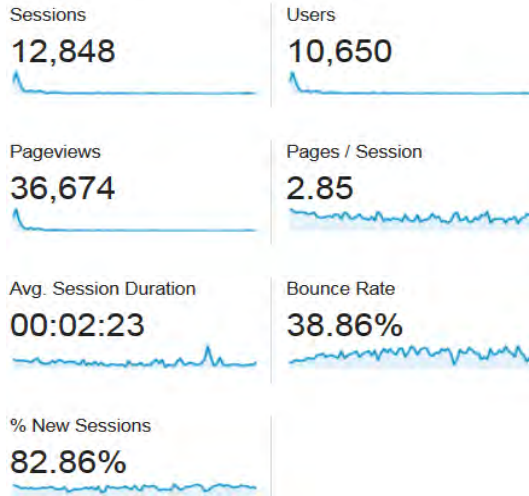
HEAD - Holmfirth Enterprise and Development
Suites 3 & 5 Victoria Court, 91 Huddersfield Road, Holmfirth, United Kingdom

People for the Park

Multi-media

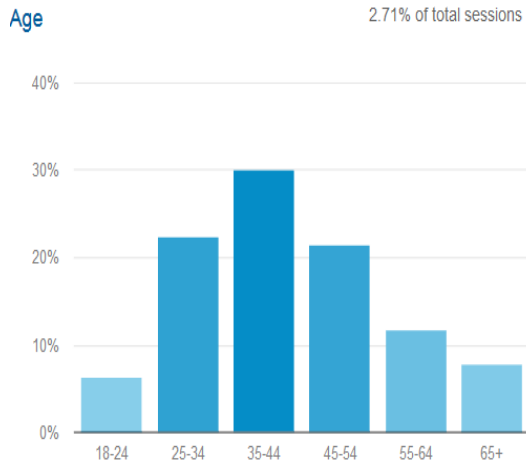


Web Traffic



www.peopleforthepark.co.uk

- Session data shows over 36,000 page views since launch
- Over 10,000 unique IP addresses logged
- 67% of views over 60 seconds demonstrating interest
- Broad spectrum of age ranges represented



Session Duration Page Depth

Sessions
12,848
% of Total: 100.00% (12,848)

Pageviews
36,674
% of Total: 100.00% (36,674)

Session Duration	Sessions	Pageviews
0-10 seconds	5,660	6,290
11-30 seconds	1,030	2,567
31-60 seconds	1,130	3,423
61-180 seconds	2,678	10,833
181-600 seconds	1,553	7,997
601-1800 seconds	687	4,480
1801+ seconds	110	1,084

Local Press



Local press
launch 18:00
12 May 2015

Click [here](#) for story

Plan revealed for massive outdoor-activity park on the edge of Huddersfield

18:00, 12 MAY 2015 BY NICK LAVIGUEUR

The ambitious proposal for 6,000 acres of land around Farnley Tyas could create 450 jobs and include walking, mountain-biking and horse-riding tracks

Receive news like this by e-mail

99 Shares [f](#) Share [t](#) Tweet [g+](#) +1 [in](#) LinkedIn

Proposed map & facilities

VIEW GALLERY

- Shooting
- Picnic area
- Toilets
- Castle Hill
- Parking
- Main facility area
- Additional facilities
- Proposed park area
- Land owned by Farnley Estates
- Proposed 12-mile cycle & walk route (City of Huddersfield)
- Camping
- Stargazing
- Horse riding
- Orienteering
- Mountain biking
- High wire adventures

Map labels: Lockwood, Huddersfield, Almondbury, Lepton, Kirkburton, Shelley, Shepley, Brockholes, Stockbromley, Farnley Tyas, Berry Brook.

Think recruitment, think people, think...

STARFLEX

10 YEAR ANNIVERSARY

We provide qualified, skilled, semi skilled and unskilled personnel for:

Schools • Office • Industry

The Region's Experts in Temporary & Permanent Recruitment

[FIND OUT MORE](#)

Recommended in News

- GREENHEAD PARK**
12-year-old boy robbed in Greenhead Park »
- KIRKLEES COUNCIL**
Business set to run Huddersfield's newest school »
- LEEDS CROWN COURT**
Jailed in July: ...



- The Examiner has provided a balanced view and we have built a good working relationship – evidenced in the following articles:
 - [Article 1](#) [Article 2](#) [Article 3](#)
- During the launch phase, we captured feedback, which can be viewed on the following link: [here](#)
- Examiner Facebook responses have been collated [here](#)



BBC Look North

- **BBC Look North** Correspondent Danni Hewson interviewed Paul and John Sykes for BBC Look North on [Wednesday 20th May 2015](#)



BBC
LOOK **NORTH**



BBC Radio Leeds

Friday 22nd May - On Air...

Paul Sykes took part in the Breakfast Show to promote the park along with William Armitage, a local business man, who was also interviewed about how this would benefit local people and businesses.

BBC
RADIO LEEDS



Social media coverage [19th of May 2015](#) and [21st May 2015](#)



Farnley Country Park Vision

We commissioned a local business www.visualharmony.co.uk to produce a video about the Estate's vision and our findings from previous consultations, [take a peek](#):



Poster Campaign

A4 and A3 posters and leaflets distributed by the Foundation members

Want to join in?

A map of the potential park area, outlined in white on a green background. The map is divided into several colored circles, each representing a different activity or location. The locations are labeled around the map: Almondbury, Lepton, Berry Brow, Kirkburton, Honley, Shelley, Brockholes, Shepley, and New Mill. The activities are: x-country running, fine dining, glamping, cycle hire, aerial adventure, xtreme cycling, segways, free open space, local produce, 17-mile cycle track, nature trails, history trail, horse riding, food festivals, and archery. A small box in the bottom left corner says 'Potential park area' and 'Above map shows our vision for Farnley Country Park'.

Potential park area
Above map shows our vision for Farnley Country Park

farnley
country
park

Vote YES for a country park for Huddersfield by visiting peopleforthepark.co.uk

SCAN THIS TO VOTE INSTANTLY!

Want this?

A list of activities and a call to action. The text is arranged in a list format, with each item in a different color. The activities are: Free open space, xtreme cycling, mountain bike trails, flower shows, glamping, aerial adventure, nature trails, afternoon tea, local produce, bushcraft, fine dining, segways, horse riding, cross country running, archery, forest school, food festivals, interactive art, cycle hire, a place to visit, live, work and play?

Free open space, **xtreme cycling**, **mountain bike trails**, **flower shows**, **glamping**, aerial adventure, **nature trails**, **afternoon tea**, **local produce**, **bushcraft**, **fine dining**, **segways**, **horse riding**, **cross country running**, **archery**, **forest school**, **food festivals**, **interactive art**, **cycle hire**, a place to **visit**, **live**, **work** and **play**?

Vote YES for a country park for Huddersfield by visiting peopleforthepark.co.uk

farnley
country
park

SCAN THIS TO VOTE INSTANTLY!



People for the Park



Social Media Campaign

Launched 12th May 2015



Want this?

Free open space, **xtreme cycling, mountain bike trails, flower shows, glamping, aerial adventure, nature trails, afternoon tea, local produce, bushcraft, fine dining, segways, horse riding, cross country running, archery, forest school, food festivals, interactive art, cycle hire, a place to visit, live, work and play?**

Want to join in?



Potential park area
Above map shows our vision for Farnley Country Park

- x-country running
- glamping
- fine dining
- aerial adventure
- cycle hire
- xtreme cycling
- 17-mile cycle track
- free open space
- segways
- local produce
- history trail
- horse riding
- nature trails
- food festivals
- archery



Facebook Insights



- Launched 12th May 2015
- Peak of interest 10k views

Farnley Estates
12 May · 🌐

VOTE NOW; <http://peopleforthepark.co.uk/>

Farnley Country Park
A vast, green open space in Huddersfield for people to visit, learn, work and play

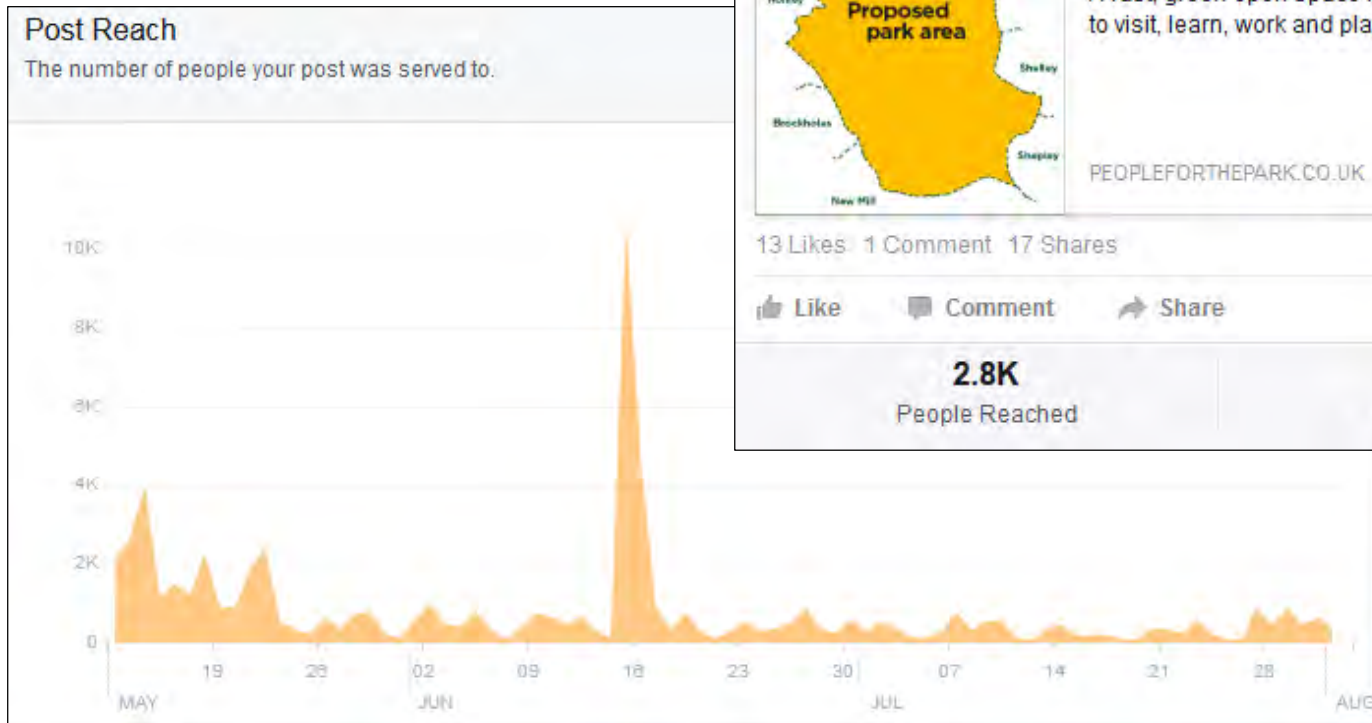
PEOPLEFORTHEPARK.CO.UK

13 Likes · 1 Comment · 17 Shares

Like Comment Share

2.8K
People Reached

228
Post Clicks



Facebook Posts

Posts To Page



Dave Parker ▶ People for the Park

May 13 · 🌐

This is one of the best ideas / proposals I've seen for a while. Especially like the idea of the multipurpose circuit, creating walking / cycling routes around the park, as my daughter is learning to ride, and this would be an ideal, local amenity that we would definitely use.

I hope as many people as possible support it, so it can get co-operation from KMC and businesses / groups, as well as the community. I've emailed the Almondbury councillors to ask for their support - do likewise if you agree 😊

3 Likes

👍 Like 💬 Comment ➦ Share



Irene Walsh ▶ People for the Park

May 13 · Wanaka, New Zealand · 🌐

I am visiting Yorkshire in August and can't wait to visit Farnley.... I am living in NZ where there's plenty on offer for scenery and outdoors. Can't wait to get back to Yorkshire where the locals make you feel so welcome ❤️

Source; People for the Park Facebook

Screen grabs click [here](#)



Farnley Estates

16 June · 🌐

The Country Park could open a world of opportunities for all. Can you imagine miles, upon miles, of off road routes for horse riding for instance? www.peopleforthepark.co.uk



Farnley Country Park

A vast, green open space in Huddersfield for people to visit, learn, work and play

PEOPLEFORTHEPARK.CO.UK

32 Likes 1 Comment 1 Share

👍 Like 💬 Comment ➦ Share

1.5K
People Reached

112
Post Clicks



Twitter Analytics



May 2015

181 Tweets
31.2k Users reached
1,902 Profile visits
326 Mentions
185 New followers

June 2015

187 Tweets
42.6k Users reached
968 Profile visits
112 Mentions
175 New followers

July 2015

182 Tweets
45.9k Users reached
791 Profile visits
30 Mentions
64 New followers

Screen Grab click [here](#)

TWEET HIGHLIGHTS

Top Tweet earned 4,555 impressions

#peopleforthepark VOTE NOW for a
Country Park for **#Huddersfield**
peopleforthepark.co.uk **@huddersfieldSU**
@Huddersfield4U

↩ 1 ↻ 7 ★ 2



Sporting Celebrity Endorsement



Eorl Crabtree

- England Rugby International player
- Huddersfield Giants player

↻ Eorl Crabtree retweeted



Farnley Estates @FarnleyEstate - Jul 31

@BigEorl Thank you for all your support. Today is the last chance to make a difference peopleforthepark.co.uk #4all

Free open space, xtreme cycling, mountain bike trails, flower shows, glamping, aerial adventure, nature trails, afternoon tea, local produce, bushcraft, fine dining, segways, horse riding, cross country running, archery, forest school, food festivals, interactive art, cycle hire, a place to visit, live, work and play?

Want to join in?

Potential park area
Allow us to show you what the Farnley Country Park

Activities on map:
- knowledge hunting
- fine dining
- cycle hire
- free open space
- history trail
- horse riding
- archery
- food festivals
- nature trails
- local produce
- segways
- xtreme cycling
- glamping
- aerial adventure



The Future of Farnley Estates

Farnley Country Park - a legacy

The overall aim is to create a legacy for the people of Huddersfield. One that has the potential to create jobs, increase tourism and economic development, and improve the health and wellbeing of local people by providing easy access to green space.

Next steps

We are keen to keep the message of the Park alive and will now be promoting our vision using the **Farnley Country Park** identity. This will still give people the opportunity to vote and comment about the Park.

The Foundation will also play a key role over the next 6 months, assisting Farnley Estates by reaching out to more people and gaining more support and ideas for the future of the Estate.

www.farnleycountrypark.co.uk



Conclusions



A significant number of people support the proposal for Farnley Country Park:

- **10,375 Votes**
- **85.2% in favour**



This result is replicated across Kirklees, including those postcodes that border the proposed Park:

- **HD4 – 301 registered comments, 88.4% in favour**
- **HD5 – 293 registered comments, 91.1% in favour**
- **HD8 – 486 registered comments, 89.1% in favour**
- **HD9 – 498 registered comments, 89.4% in favour**



Conclusions



There is a real desire from those in more urban areas to access green open space:

- **HD1 – 98.9% in favour**

Top five activities that voters want from the park, in order of preference:

1. Walking
2. Spend time with family
3. Adventure activities
4. Cycling
5. Events



Farnley Estates - Team



Paul Sykes - Director

For me, this is a legacy project for the family, for the Estate and for the Town which will take at least 25 years to fulfil. It really is a once-in-a-lifetime opportunity to provide an area for Outdoor Educational Excellence, for health and for leisure and one that can be enjoyed for generations to come.



John Sykes - Director

The Farnley Country Park's creation will be a singular turning point in the history of our area; it will complement our well-deserved historical reputation as one of the UK's leading centres of manufacturing excellence. Companies, national and international, will see that, not only is Huddersfield 'the place to make it', but it is also 'the place to live it.'



Jeanette Dyson & Sammy Travis

Jeanette
Communications Manager

Sammy
Project Development Manager



APPENDIX 3

CONTAINS A MASTERPLAN AND FLOOD RISK ASSESSMENT FOR REJECTED
HOUSING SITE H189 (LAND TO THE NORTH AND SOUTH OF
WOODSOME ROAD, FENAY BRIDGE)

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 05 - Land to the north and south of Woodsome Road, Lepton

Site Area: 0.56Ha

Existing Site Description:

The site consists of two parcels of land to either side of Woodsome Road, at its junction with Penistone Road. The northern part of the site is bounded to the east by Penistone Road and to the south by Woodsome Road. A residential property sits to the west screened by mature vegetation, with open countryside to the north along the Fenay valley. The site has an existing access from Woodsome Road and is mainly covered by gravel hard-standing and scrub vegetation. The southern part of the site is larger in size, bounded to the east by Penistone Road, to the north by Woodsome Road. The southern boundary consists of an established hedgerow with a mature trees and a commercial unit beyond. The southern boundary sits at the edge of the open countryside and land surrounding Woodsome Beck.



Site photograph looking to the south-west from Penistone Road at the northern edge of Site 05

- visually enclosed along the bottoms of the valleys
- Rolling topography generally sloping to towards Fenay Beck.

Planning Context:

The site is located within Green Belt, however, it is being actively promoted by Farnley Estates as part of the ongoing green belt review.

There is a 1no. individual TPO within the northern part of the site.

The site is located within the Fenay Beck Green Infrastructure Corridor, and borders park of the Kirklees Wildlife Habitat Network to the south-west, as identified within the Draft Local Plan.

Part of the southern section of the site sits within EA Flood Zone 2, as identified in the Draft Local Plan.

Landscape Character Area:

The site is located within National Character Area (NCA) 37: Yorkshire Southern Pennine Fringe and the Kirklees District Landscape Character Assessment: G9: Fenay Beck Valley & Tributaries. A site visit was also undertaken to carry out a localised character assessment.

The landscape character of the site and surrounding area can be summarised as:

- made up of the main valley of the Fenay Beck River
- broadleaved woodland cover
- regular fields of medium scale, with smaller fields found around the edges of settlements. Land is predominantly pastoral with occasional arable use.
- Field boundaries are commonly hedgerows or stone walls

Existing landscape features and assets:

Topography: Flat: very gradual slope to the west.

Vegetation Cover: Generally open with boundary vegetation to the north-western and southern boundaries. Single mature TPO tree with northern part of site

Public Rights of Way: None within the site

Ecological Features: Boundary vegetation and hedgerow, Fenay Beck Green Infrastructure Corridor / Kirklees Wildlife Habitat Network

Water features and Flood Zones: Woodsome Beck lies to the south-west of the site. Part of the southern area of the site lies within flood risk EA Flood Risk Zones 2, as identified in the Draft Local Plan.

Visual Analysis:

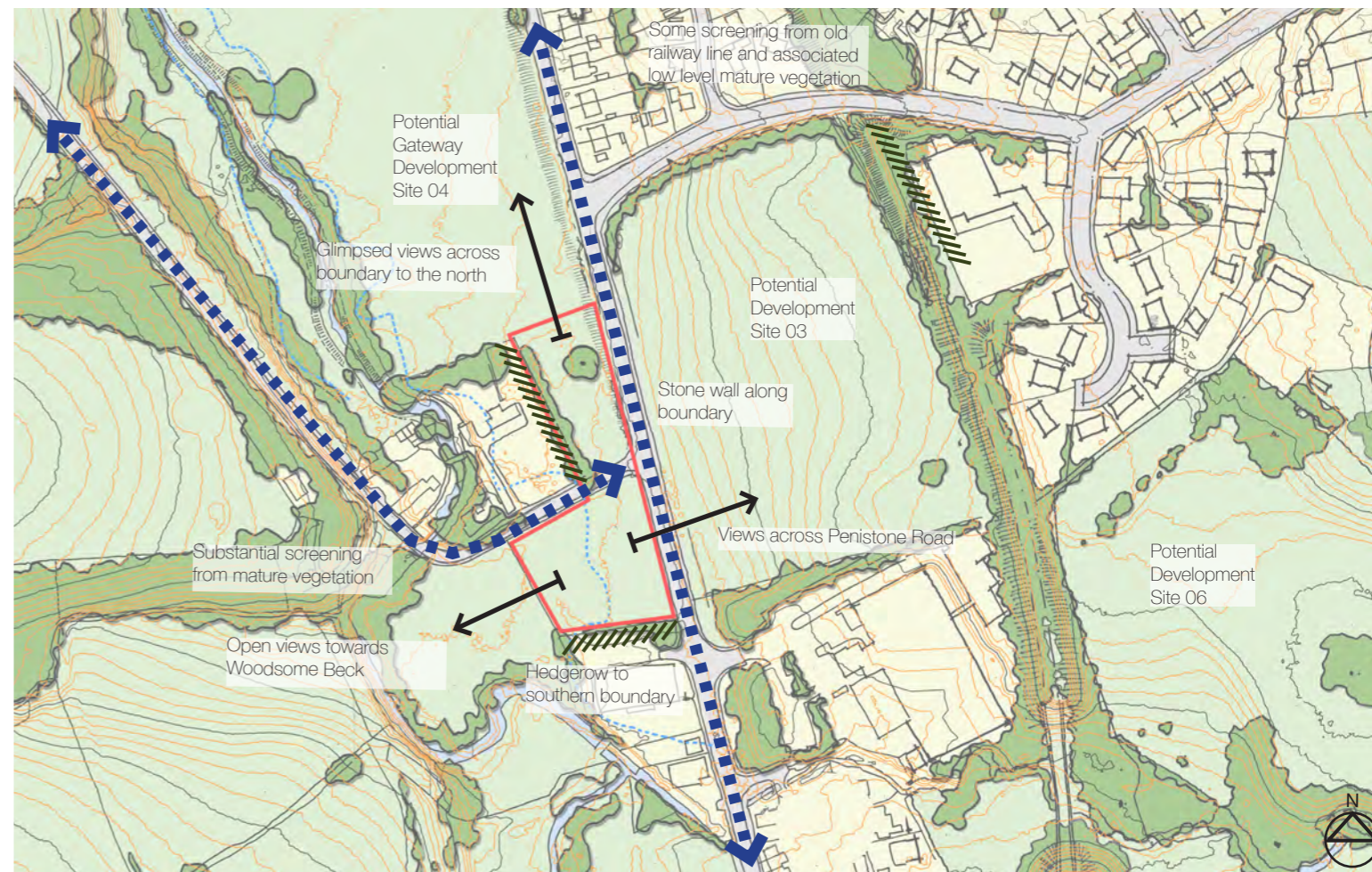
A site visit was undertaken to carry out a visual appraisal of key views into and out of the site. Due to the site being in the valley bottom views consist of glimpsed views along the Fenay Valley and surrounding hills, but are often screened by surrounding vegetation.

Aims for Landscape and Masterplan Strategy:

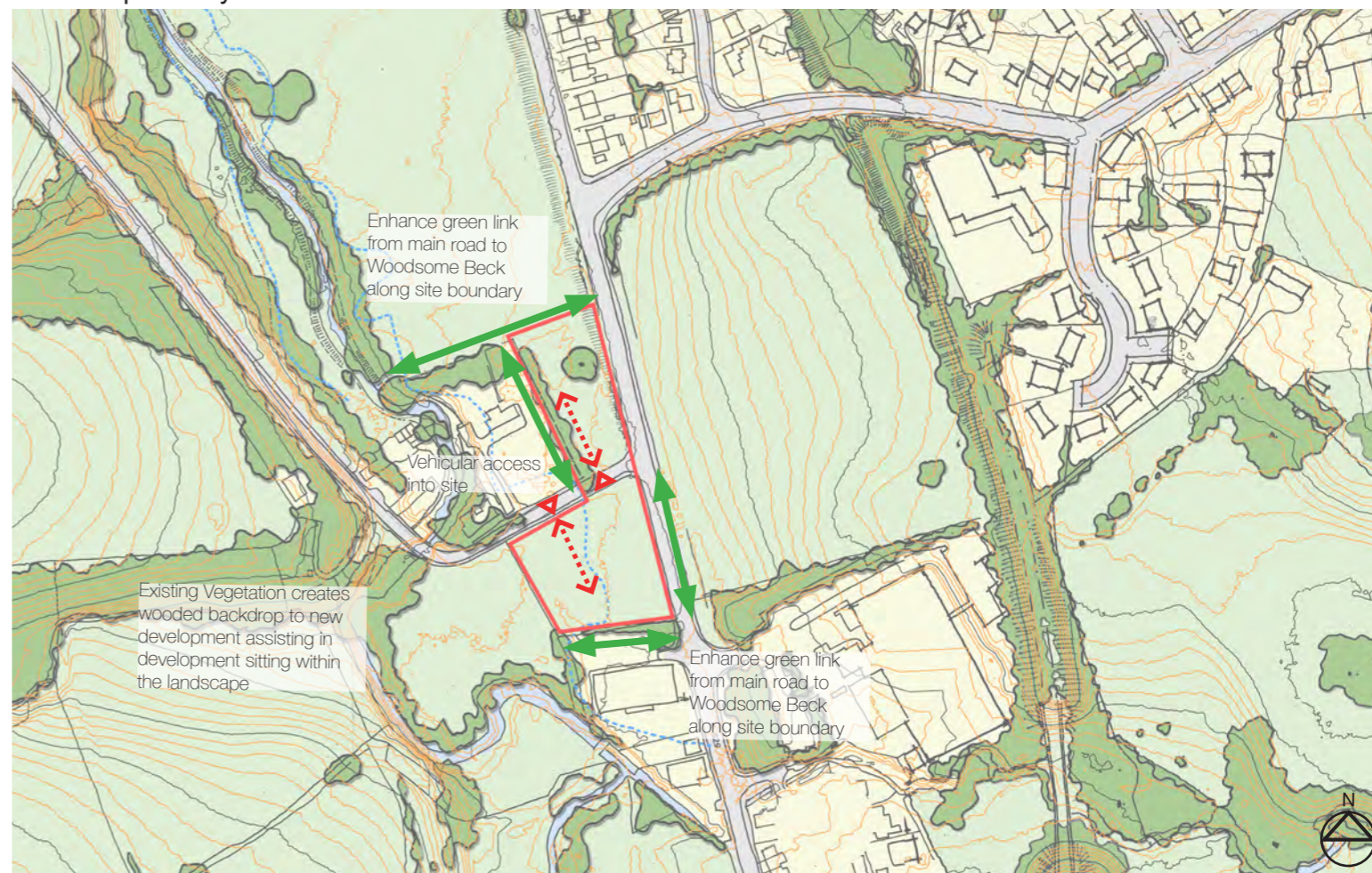
- Respond to the site and its context; and
- Develop a robust landscape structure.

Landscape and Masterplan Opportunities:

- Provide links to existing wildlife habitats;
- Provide space for recreational and amenity use;
- Integrate the development into the local landscape
- Consider views across the landscape.
- Integrating the development proposals into the local landscape; and where necessary
- Providing screening



Landscape Analysis Plan. NTS@A3

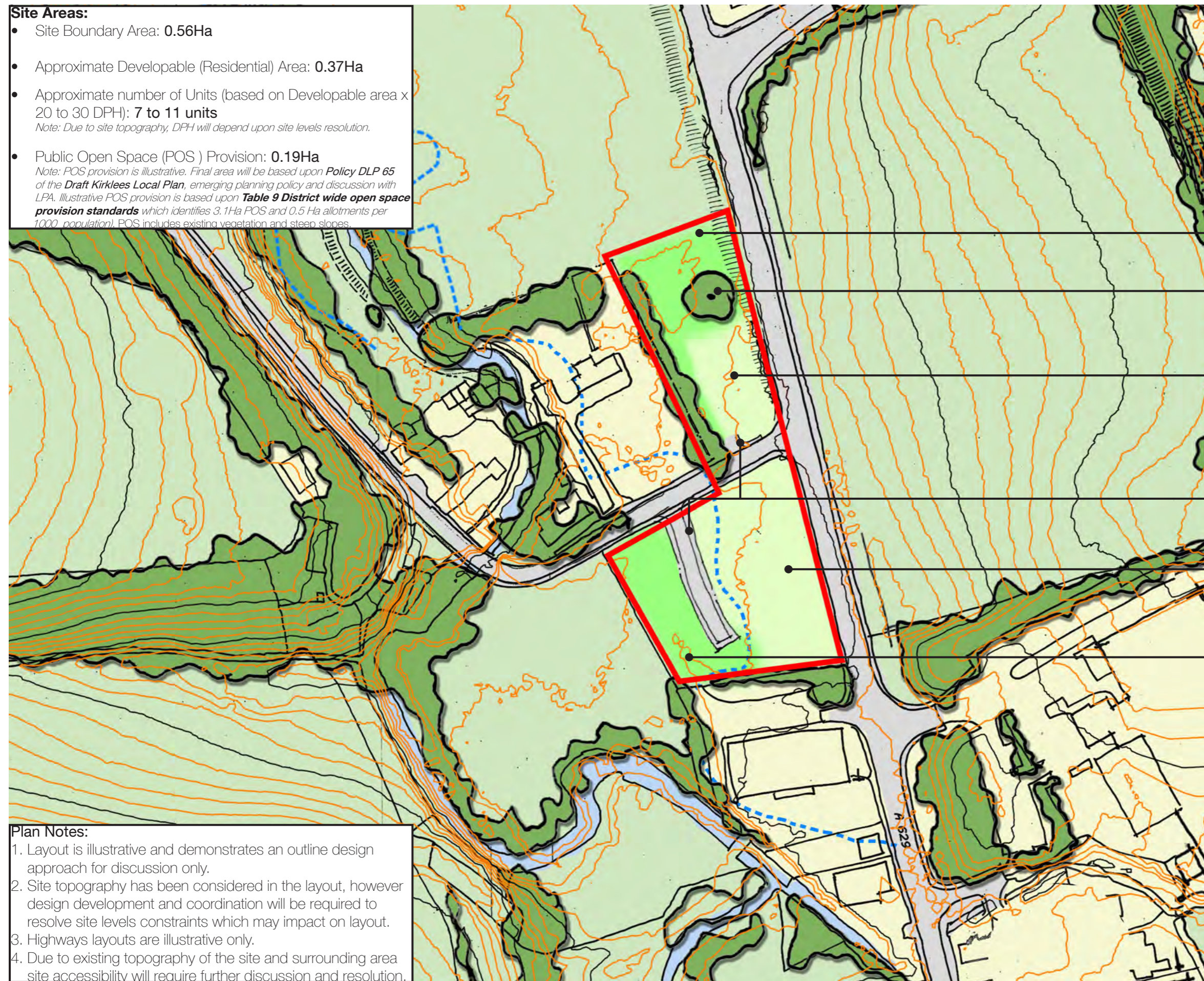


Landscape Opportunities and Structure Plan. NTS@A3

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES
Site 05 - Land to the north and south of Woodsome Road, Lepton

Site Areas:

- Site Boundary Area: **0.56Ha**
- Approximate Developable (Residential) Area: **0.37Ha**
- Approximate number of Units (based on Developable area x 20 to 30 DPH): **7 to 11 units**
Note: Due to site topography, DPH will depend upon site levels resolution.
- Public Open Space (POS) Provision: **0.19Ha**
Note: POS provision is illustrative. Final area will be based upon Policy DLP 65 of the Draft Kirklees Local Plan, emerging planning policy and discussion with LPA. Illustrative POS provision is based upon Table 9 District wide open space provision standards which identifies 3.1Ha POS and 0.5 Ha allotments per 1000 population. POS includes existing vegetation and steep slopes.



- Reinforced green link from main road through development to connect landscape with Woodsome Beck.
- TPO tree retained and protected
- Northern area shown as housing for layout purposes. Subject to LPA requirements area may be utilised as POS and/or allotments.
- Vehicular Access from Woodsome Road
- Housing development outside flood risk area with views towards Woodsome Beck. Potential for additional planting along Penistone Road frontage to help screen development from main road.
- POS / green space located within flood risk area. Potential to incorporate SuDs features.

Plan Notes:

1. Layout is illustrative and demonstrates an outline design approach for discussion only.
2. Site topography has been considered in the layout, however design development and coordination will be required to resolve site levels constraints which may impact on layout.
3. Highways layouts are illustrative only.
4. Due to existing topography of the site and surrounding area site accessibility will require further discussion and resolution.

Note: Plan is illustrative only.
Final design and layout subject to detail design, site surveys and coordination with other consultants and LPA.



Prepared on behalf of

Farnley Estates Ltd

FLOOD RISK ASSESSMENT

**Proposed Development
Farnley Tyas, Huddersfield
Allocation 05**

Flood Risk Overview

Acknowledgements:

Environment Agency

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

Any information provided by third parties and referred to herein has not been checked or verified by Sanderson Associates (Consulting Engineers) Ltd, unless otherwise expressly stated within this report.

This report was checked and approved on the 19 January 2016 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

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Report Ref:	9069/DH/004/01	January 2016	
Author:	Darren Hawkyard		
Checked & Approved:	Thomas Walker	Date:	19 January 2016

Contents

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1	Introduction.....	5
2	Existing Situation	6
3	Consultations.....	7
4	Flood Risk.....	8
5	Drainage Constraints	9
6	Conclusion.....	11

Appendices

Appendix A - Drawings

Site Location: 9069/001

Flood Extent Plan: 9069/401

Appendix B - Consultations

Environment Agency

APPENDIX C – Calculations

Existing Greenfield Run Off Estimate

1 Introduction

- 1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Overview for possible development sites Farnley Tyas, Huddersfield. The aim of this assessment is to discuss the present and future flood risk to the site and to assess possible uses and mitigation measures required. The location of the site is shown on drawing 9069/001 contained in Appendix A.
- 1.2 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF) March 2012 and the associated Planning Practice Guidance, 2014.
- 1.3 Consultation with Environment Agency (EA) has taken place. The consultation response is discussed in Section 3 and contained within Appendix B.
- 1.4 Each site allocation will be separated into individual reports and assessed on their own merits. A site Location plan showing each of the site allocations is located in Appendix A.

2 Existing Situation

2.1 Existing Site Description

2.1.1 The site is currently open fields and located to the north and south of Woodsome Road, Huddersfield. Drawing 9069/001 included in Appendix A shows the site limits and location.

2.1.2 Access is currently gained from Woodsome Road via gated accesses.

2.1.3 The site is split into two with one half located to the north of Woodsome Road and the other half to the south. The site is bound to the north by adjoining fields with Penistone Road bounding the site to the east. A private development bounds the site to the south with adjoining fields and a residential property to the west.

2.1.4 The closest main river is the Fenay Beck which is located 90m to the west of the site.

2.2 Existing Site Analysis

2.2.1 The site area is 7,672m² (0.76Ha) taken from information provided by the client is considered to be permeable (not positively drained). Therefore the site is considered to be 0% impermeable and 100% permeable.

2.2.2 The estimated Greenfield runoff rate from the site has been assessed using WinDES Source Control software. The run off rate has been calculated at 1.67l/s or 2.19l/s/Ha for a 1 in 1 year return period (IH124 Method requires calculations based on 50Ha reduced to the site area). The WinDES output files are contained within Appendix C.

2.2.3 The topography of the site generally grades from south to north. Levels range from approximately 85.0m AOD at the eastern boundary of the site to 83.00m AOD upon the north western corner of the site.

3 Consultations

- 3.1 As part of this assessment, the Environment Agency (EA) information has been reviewed in relation to flood zones and groundwater. All responses are contained in Appendix B.
- 3.2 The response from the Environment Agency confirms that the site falls within Flood Zones 1 and 2 with the worst case scenario of a between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%).
- 3.3 The Environment Agency provided modelled flood levels for the Fenay Beck in the vicinity of the site. These include levels for the 1 in 100 + climate change and 1 in 1000 year events. There are no flood defences in close proximity to the site.
- 3.4 The Environment Agency have provided historic flooding maps and shows that the site was not subject to historic flooding.
- 3.5 The Environment Agency website show that the site is not within a Groundwater Source Protection Zone.

4 Flood Risk

- 4.1 The main risk of flooding to the site comes from the Fenay Beck which is located 90m to the site. No flood defences are located within close proximity to the site.
- 4.2 The Environment Agency confirms that the site falls within Zones 1 and 2 with the worst case scenario of a between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%).
- 4.3 Drawing 9069-401 contained within Appendix A shows the flood extents of a 1 in 100 year + climate change and 1 in 1000 year flood event this site local levels are based on a Lidar spot levels and modelled flood levels supplied by the Environment Agency. The flood extent plan shows the site to lie within Flood Zone 1 and assessed as having a less than 1 in 1,000 annual probability of river flooding. This will have to be confirmed as part of the full flood risk assessment with the flood extent plan based on a site specific topographical survey.
- 4.4 There are no constraints to the type of proposal on this allocation assuming that building structures are located wholly within Flood Zone 1.
- 4.5 The Environment Agency online surface water mapping shows areas of modelled surface water flooding within the boundary of the site, the probability of this occurring is given less than 1 in 1000 (0.1%) annual probability of occurring in any given year and is deemed to have a very low risk of occurring.
- 4.6 Mitigation measures can be implemented within the Full Flood Risk Assessment to ensure surface water localised to, and conveyed within the sites road network would not affect any of the proposed development.

5 Drainage Constraints

5.1 The current building regulations, Part H3, detail the favoured hierarchy of surface water disposal being in order of preference, to ground by infiltration, to watercourse and then to sewer.

1. Infiltration

2. Watercourse

3. Sewer

1. Infiltration Drainage

5.2 Infiltration methods of drainage such as soakaways and filter drains percolate surface water runoff allowing it to permeate into the subsoil at its natural rate mimicking the natural process of drainage and as such are subject to the local ground conditions.

5.3 The Local Authority will request that a site investigation is carried out to deem whether infiltration methods are viable within the site.

2. Discharge to Watercourse

5.4 If the above is not deemed viable the Local Authority will accept discharge to watercourse. The closest main watercourse to the site is the Fenay Beck which is located 90m to the south of the site.

5.5 The Environment Agency and internal drainage board would have to be consulted in regards to agreeing an acceptable discharge rate into the Fenay Beck. A rate no greater than 1.4l/s/ha for discharge into local watercourse is normally requested.

3. Discharge to Sewer

- 5.6 If neither of the above are deemed viable Yorkshire Water should be consulted in order to agree possible surface water outfall. In addition Yorkshire Water will have to be consulted to agree a point of foul connection.

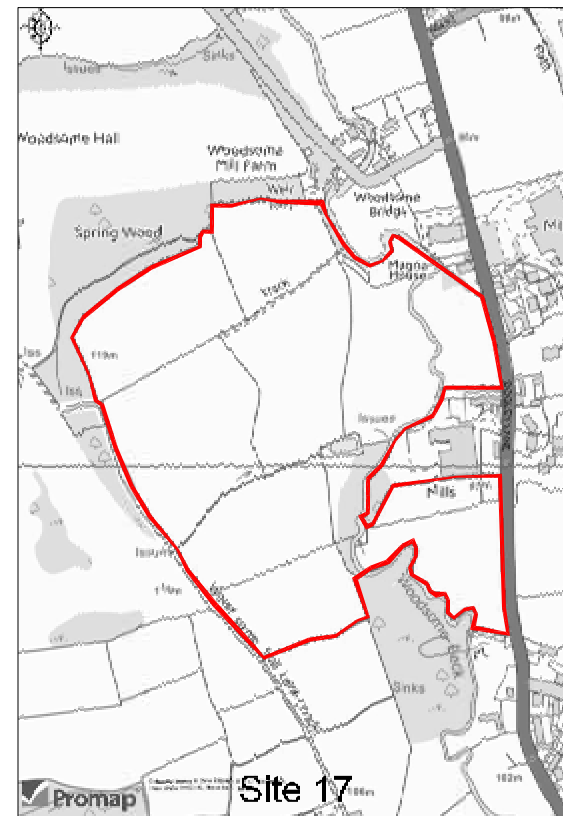
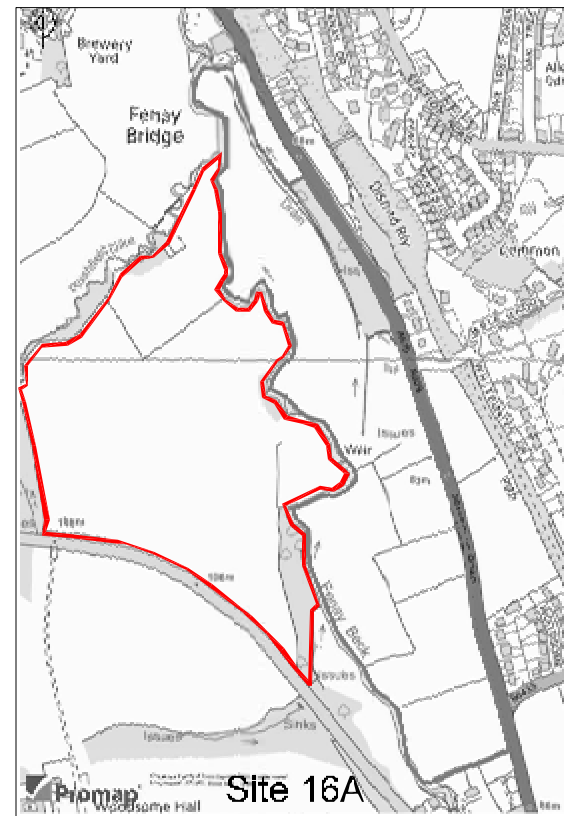
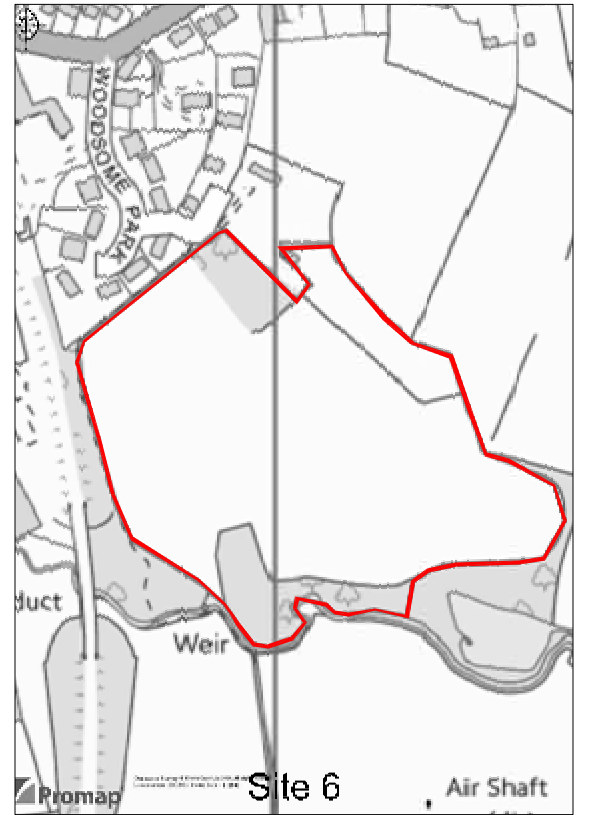
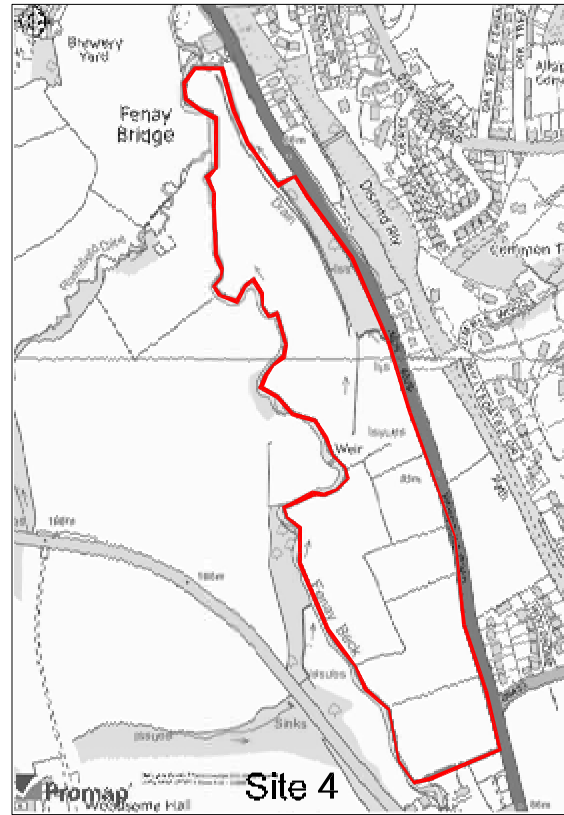
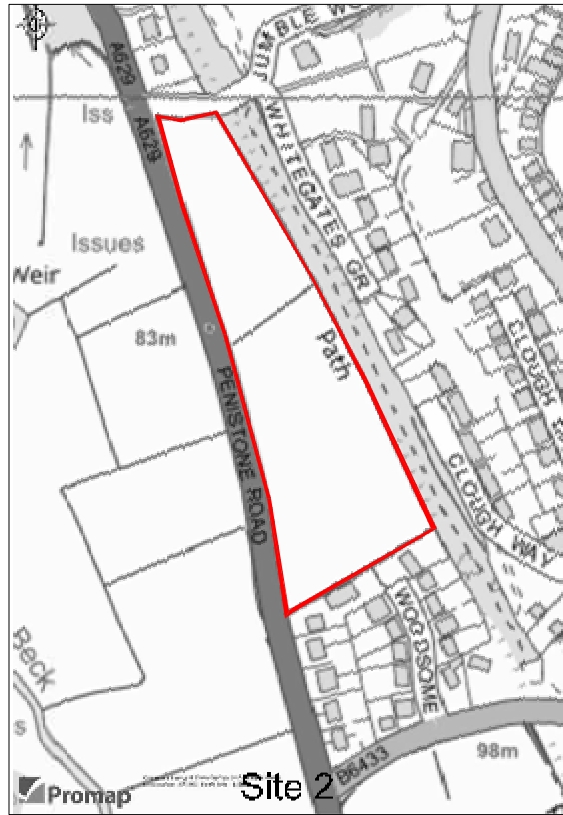
6 Conclusion

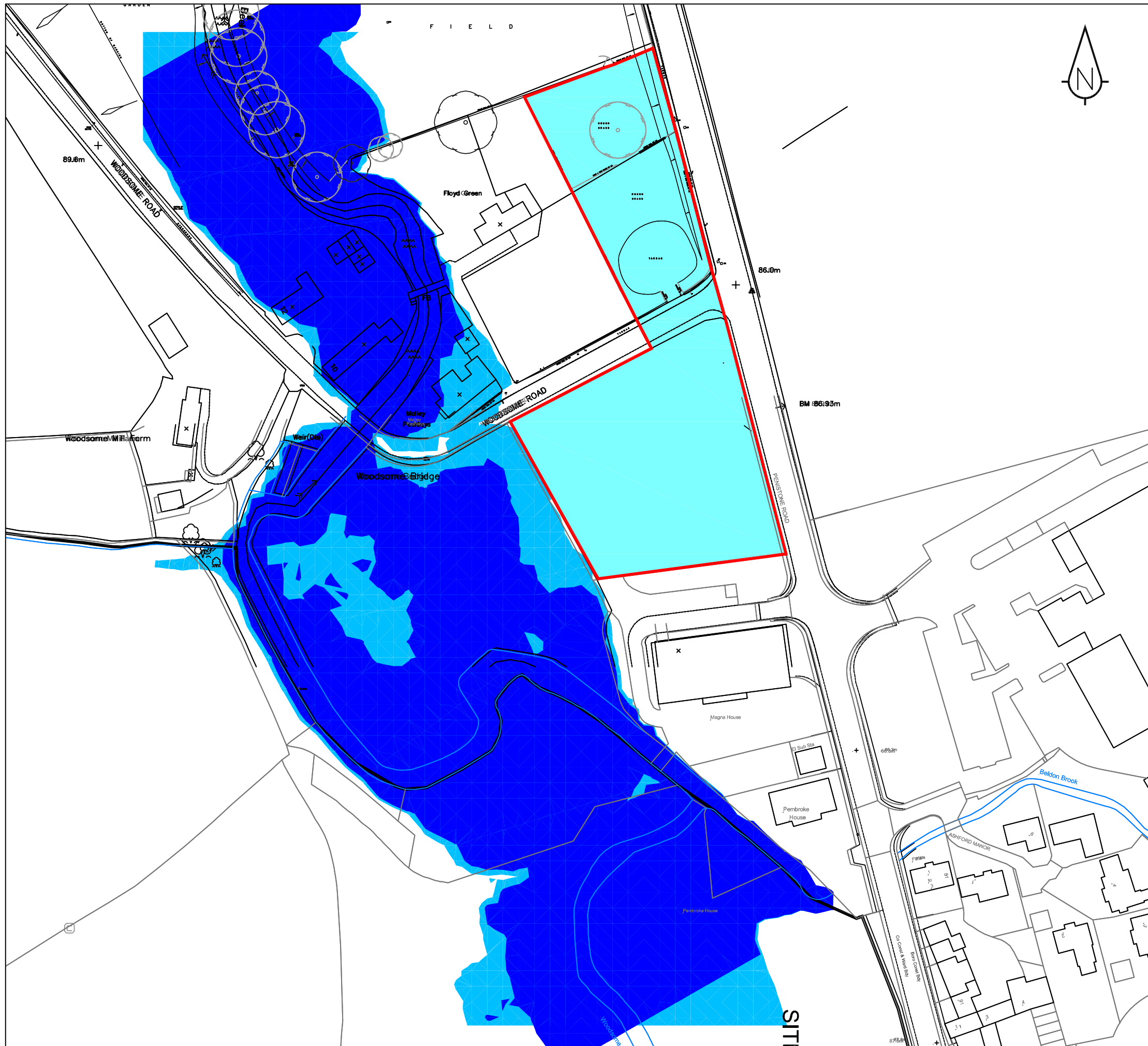
- 6.1 This flood risk overview serves to review and assess the sources of potential flooding to the site
- 6.2 As concluded in section 3 the site is considered to lie within Flood Zone 1 and assessed as having a less than a 1 in 1,000 annual probability of river flooding.
- 6.3 As this site is located wholly within Flood Zone 1 there are no restrictions on development types or location. Yorkshire Water should be consulted at the time of a full flood risk assessment being written to determine the exact location of any existing sewers.
- 6.4 A full flood risk assessment and surface water management strategy would have to be written and submitted to the Local Authority in order to gain planning permission. This document serves as an overview to inform the client of possible risk and constraints that could arise at the site.

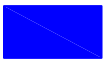


Appendix A - Drawings

Site Location: 9069/001


Flood Extent Plan: 9069/401





	- Flood Zone 3
	- Flood Zone 2
	- Flood Zone 1 (Developable Land)

Rev	Amendment	Drawn	Date	Checked




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Project Name
**Proposed Development
Farnley Tyas, Huddersfield
Allocation 05**

Drawing Title
Flood Extent Plan

Scale	1:1250	Drawn By	DH
Drawing Size	A3	Checked By	IE
Date	Jan 16	Approved By	IE

	Drawing Number	Rev
	9069-401	

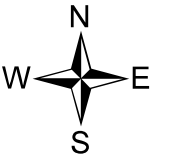
Appendix B - Consultations
Environment Agency

Flood Map Woodsome Road/ Penistone Road, Kirklees - Date Created: 21/06/2013 Ref: 26205



www.environment-agency.gov.uk





Scale: 1:10,000

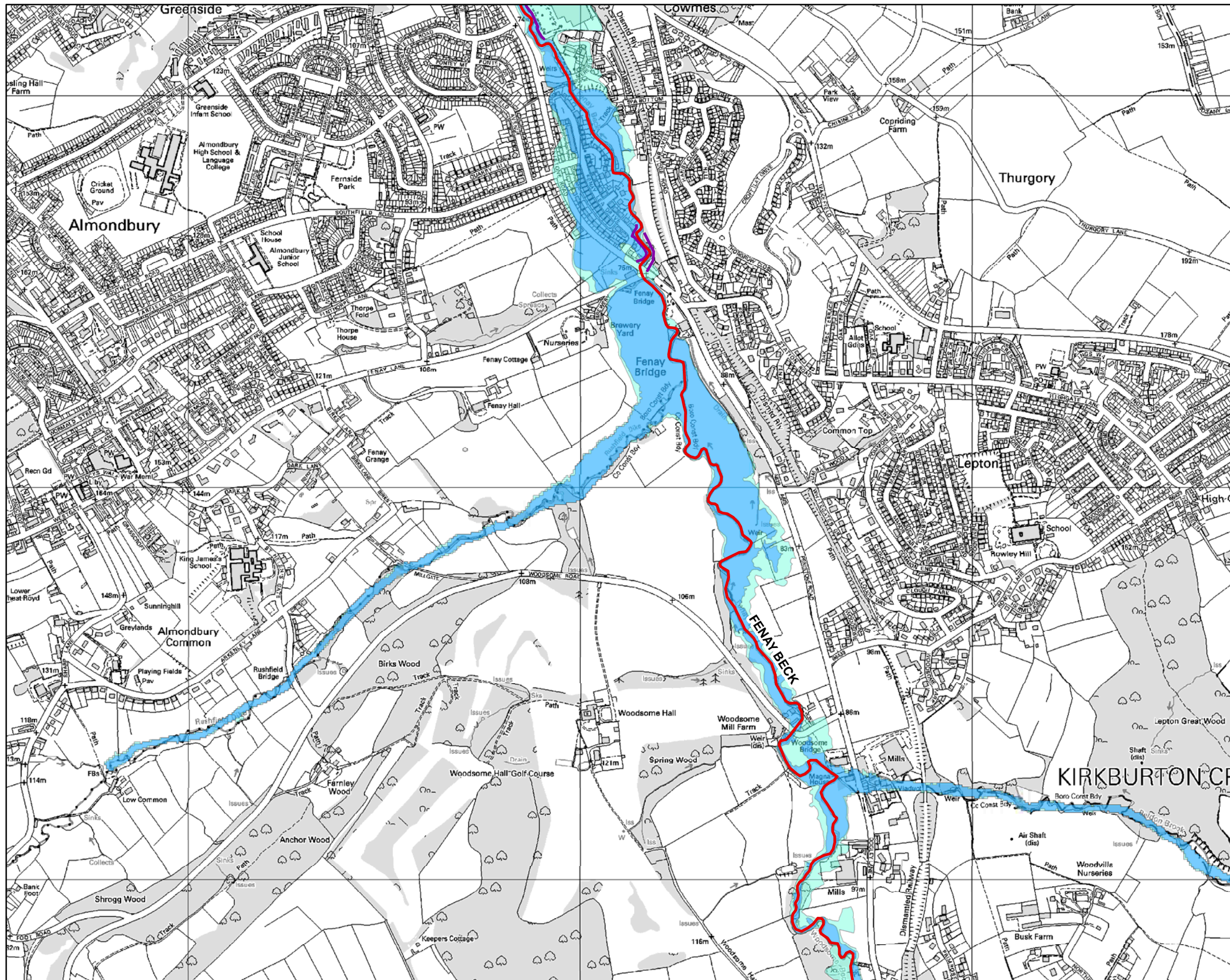


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LEGEND

-  Main River
-  Flood Map Flood Defences
-  Flood Zone 3 (FZ3)
-  Flood Zone 2 (FZ2)



Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3758

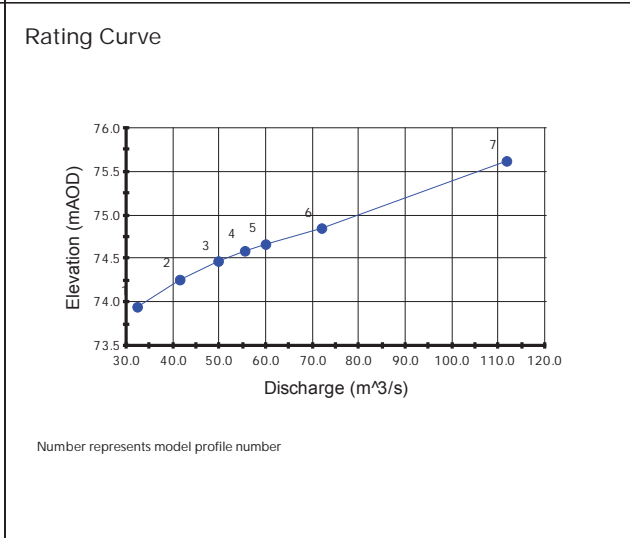
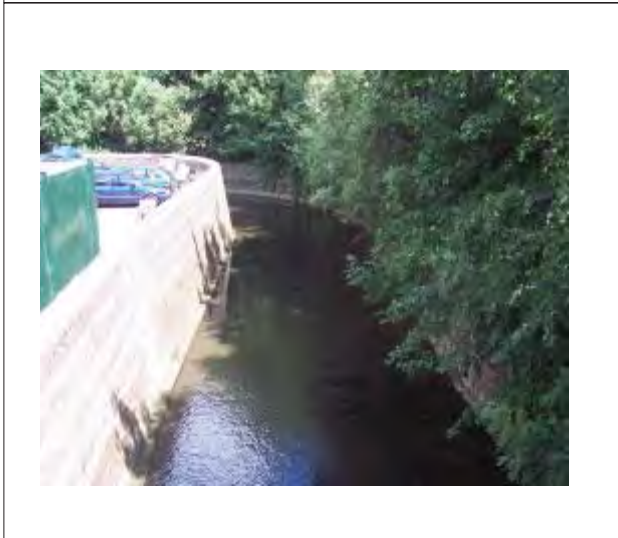
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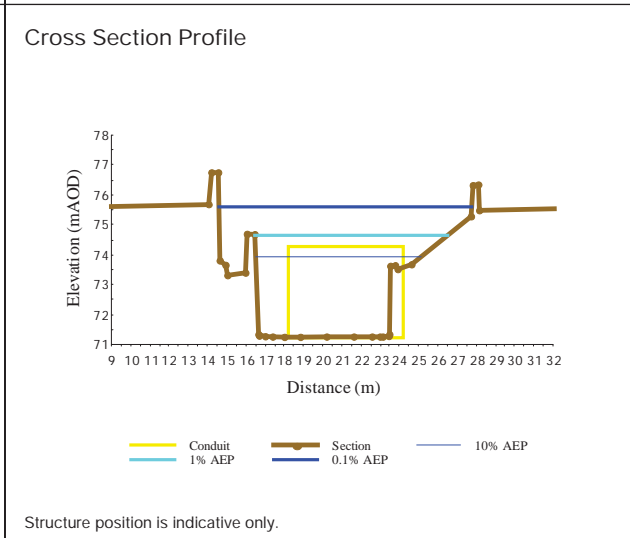
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 Section u/s: 3801



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	73.954	1.66
2	4.0	41.5	74.263	1.83
3	2.0	49.8	74.477	1.99
4	1.3	55.5	74.593	2.11
5	1.0	59.9	74.669	2.21
6	1.0	71.9	74.852	2.45
7	0.1	111.5	75.619	2.70

Level of Left Bank 76.758 mAOD
 Level of Right Bank 76.330 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3758

Location Plan

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Cross Section References

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Section Type: CONDUIT, SECTION, SPILL

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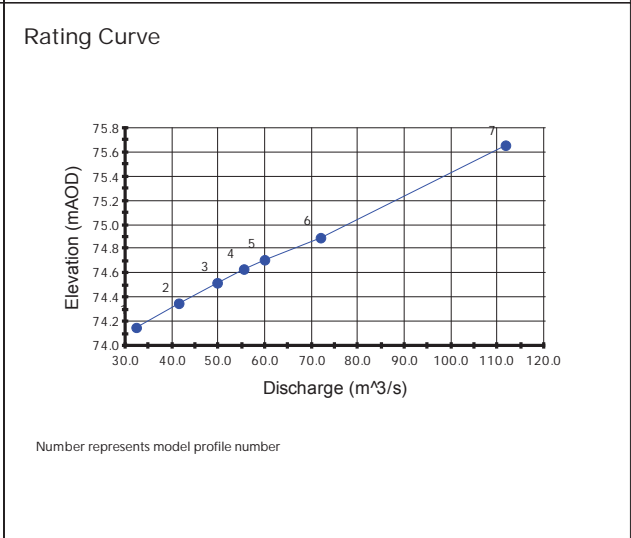
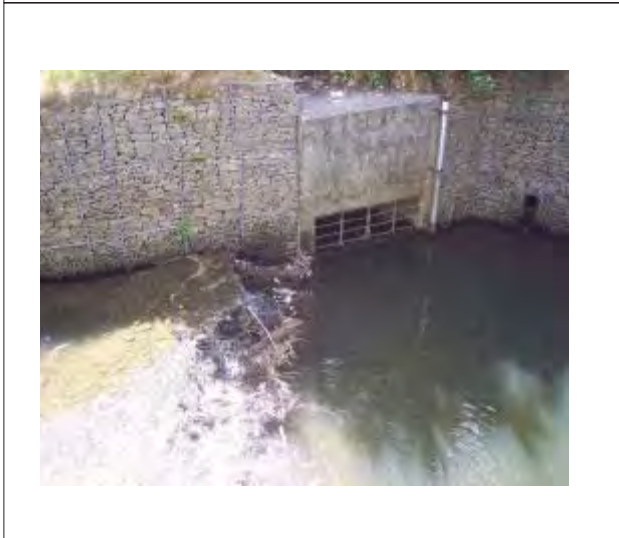
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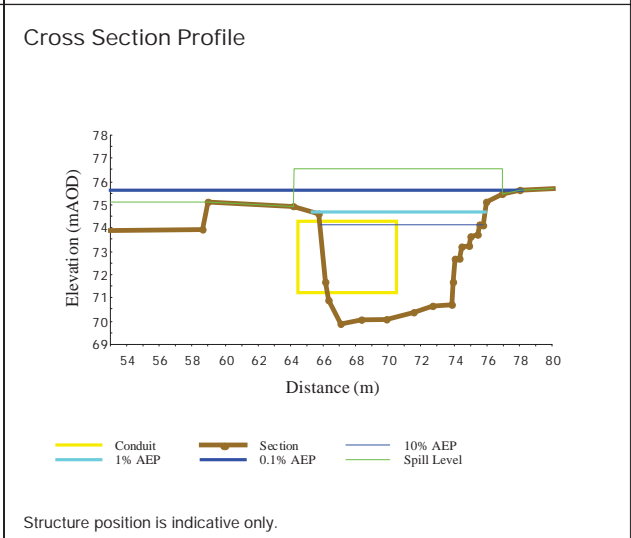
Section u/s: 3811d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.156	0.76
2	4.0	41.5	74.355	0.73
3	2.0	49.8	74.524	0.72
4	1.3	55.5	74.637	0.72
5	1.0	59.9	74.713	0.72
6	1.0	71.9	74.896	0.74
7	0.1	111.5	75.654	0.68

Level of Left Bank 75.149 mAOD
 Level of Right Bank 75.145 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3801

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3811

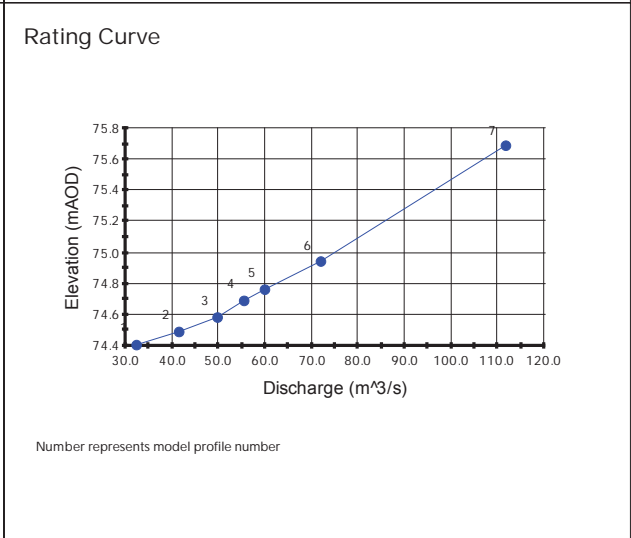
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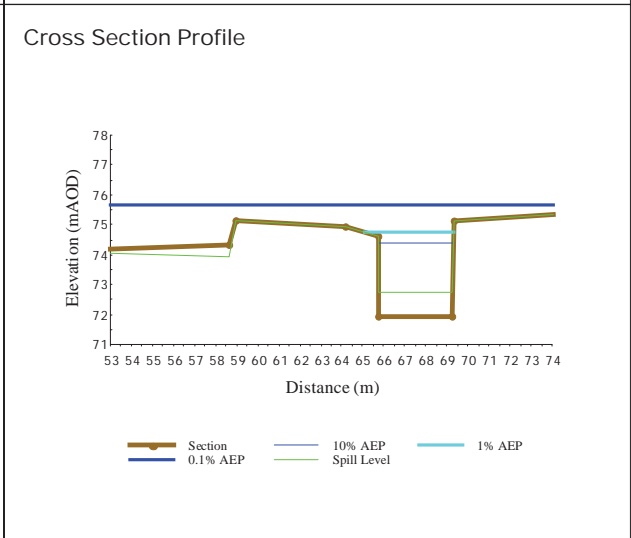
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 Section u/s: 3941



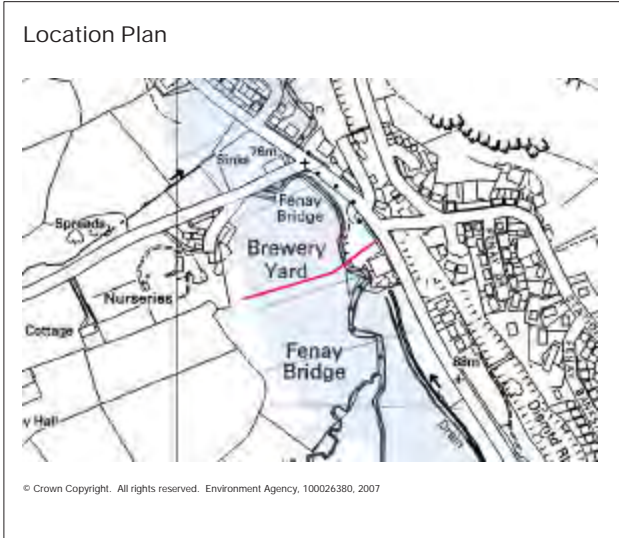
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.411	0.93
2	4.0	41.5	74.494	0.97
3	2.0	49.8	74.589	0.97
4	1.3	55.5	74.694	0.90
5	1.0	59.9	74.767	0.86
6	1.0	71.9	74.947	0.81
7	0.1	111.5	75.688	0.63

Level of Left Bank 75.149 mAOD
 Level of Right Bank 75.145 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



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Cross Section References

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Chainage: 3941

Section Type: SECTION

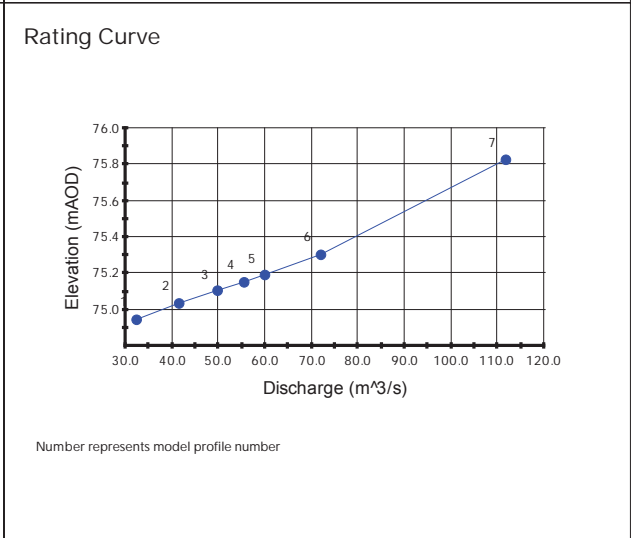
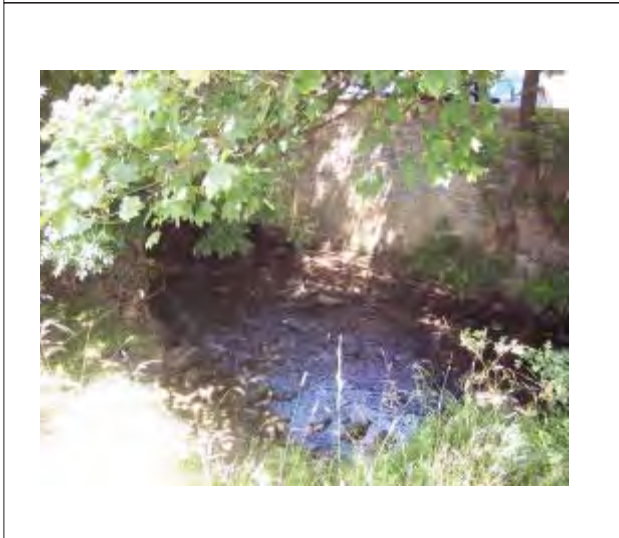
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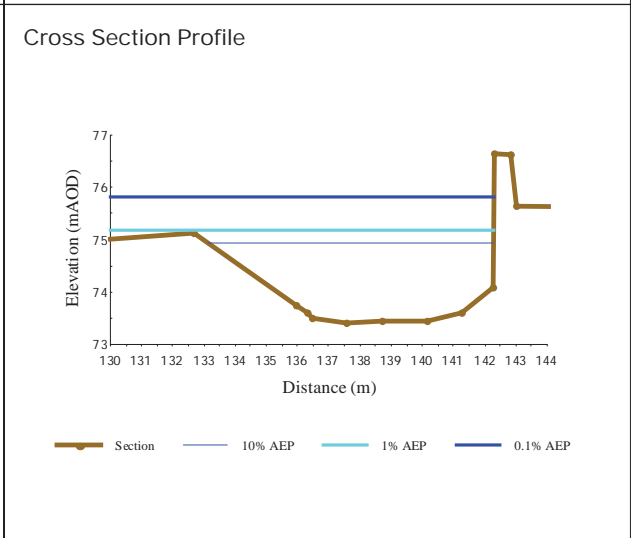
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Summary of Results


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1	10.0	32.4	74.949	0.91
2	4.0	41.5	75.038	0.91
3	2.0	49.8	75.108	0.92
4	1.3	55.5	75.154	0.93
5	1.0	59.9	75.194	0.92
6	1.0	71.9	75.306	0.90
7	0.1	111.5	75.827	0.73

Level of Left Bank 75.138 mAOD
 Level of Right Bank 76.650 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3941

Location Plan



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Cross Section References

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Reach: 1

Chainage: 3981

Section Type: BRIDGE, SECTION, SPILL

OS NGR: Unknown


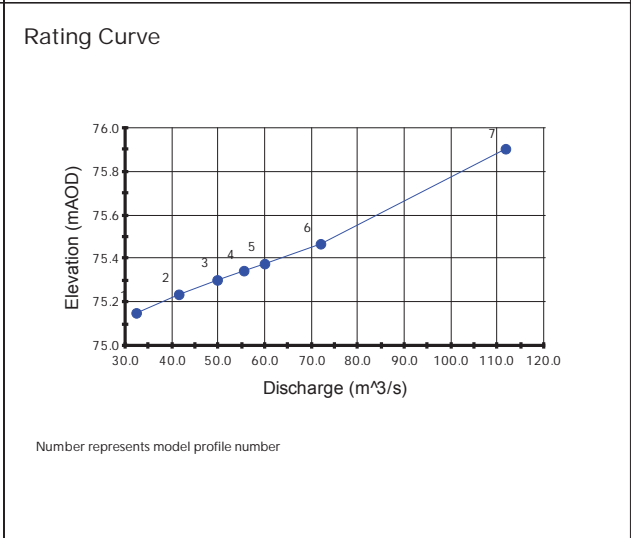
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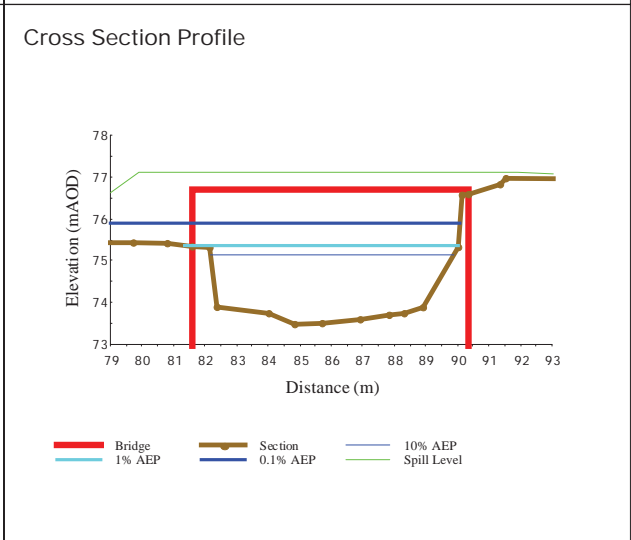
Summary of Results

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2	4.0	41.5	75.238	0.49
3	2.0	49.8	75.304	0.52
4	1.3	55.5	75.346	0.53
5	1.0	59.9	75.378	0.54
6	1.0	71.9	75.469	0.55
7	0.1	111.5	75.904	0.49

Level of Left Bank 75.333 mAOD

Level of Right Bank 76.977 mAOD

AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3981u

Location Plan

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Cross Section References

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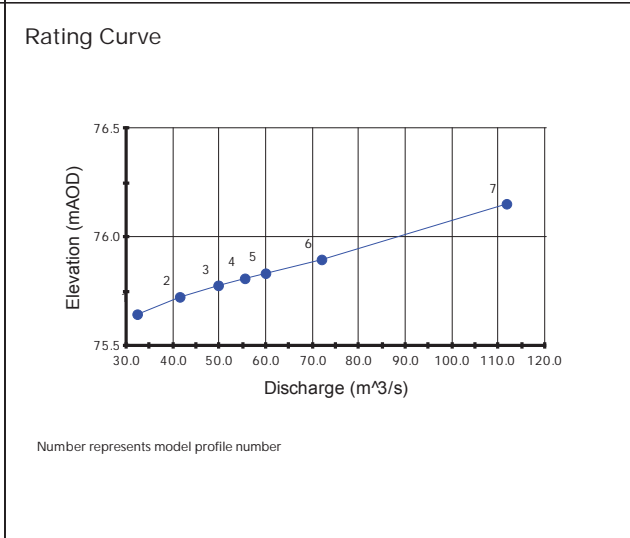
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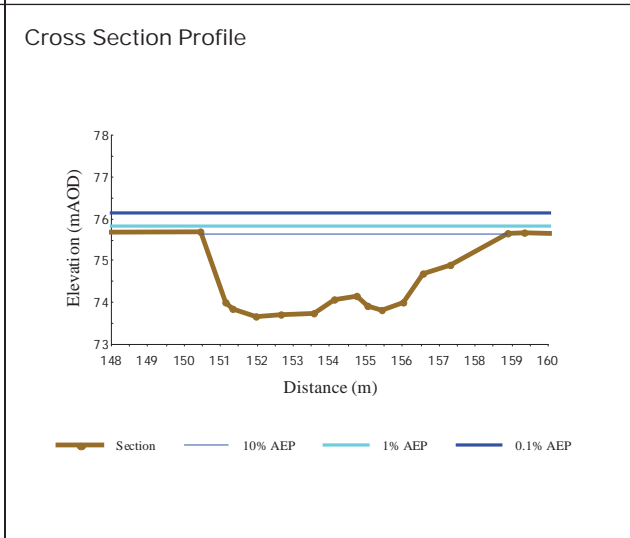
Next
 Section d/s: 3981u
 Section u/s: 4184d



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	75.647	0.89
2	4.0	41.5	75.727	0.86
3	2.0	49.8	75.779	0.89
4	1.3	55.5	75.811	0.91
5	1.0	59.9	75.835	0.92
6	1.0	71.9	75.897	0.96
7	0.1	111.5	76.152	0.97

Level of Left Bank 75.704 mAOD
 Level of Right Bank 75.661 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4095

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4184

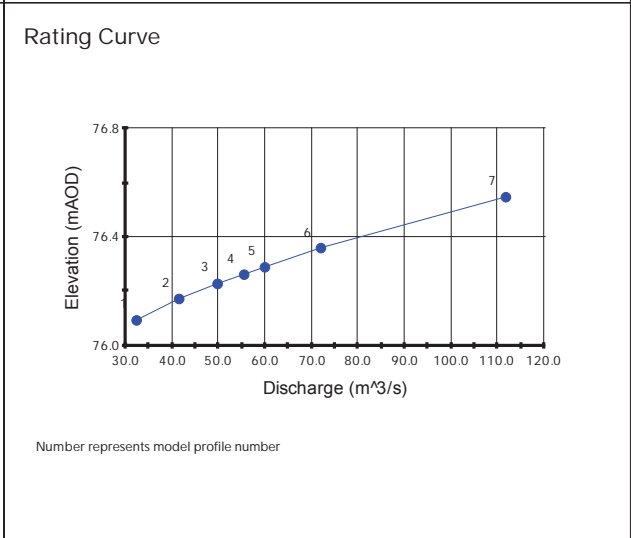
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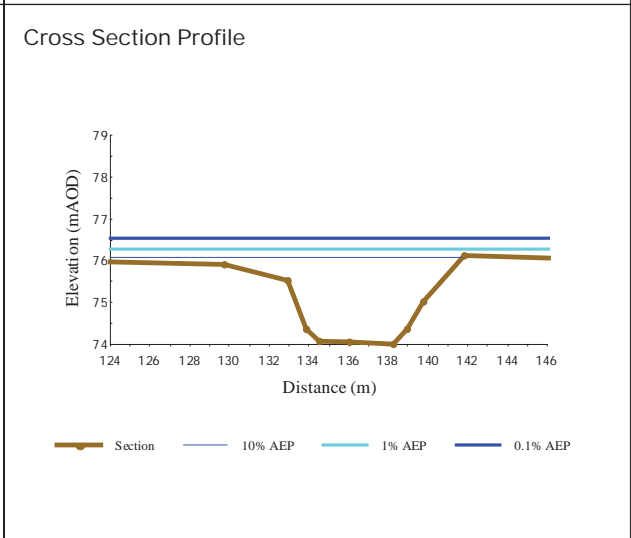
Next
 Section d/s: 4095
 Section u/s: 4184u



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	76.097	0.75
2	4.0	41.5	76.175	0.75
3	2.0	49.8	76.230	0.76
4	1.3	55.5	76.264	0.77
5	1.0	59.9	76.291	0.78
6	1.0	71.9	76.361	0.81
7	0.1	111.5	76.547	0.89

Level of Left Bank 75.926 mAOD
 Level of Right Bank 76.140 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4184d

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4336

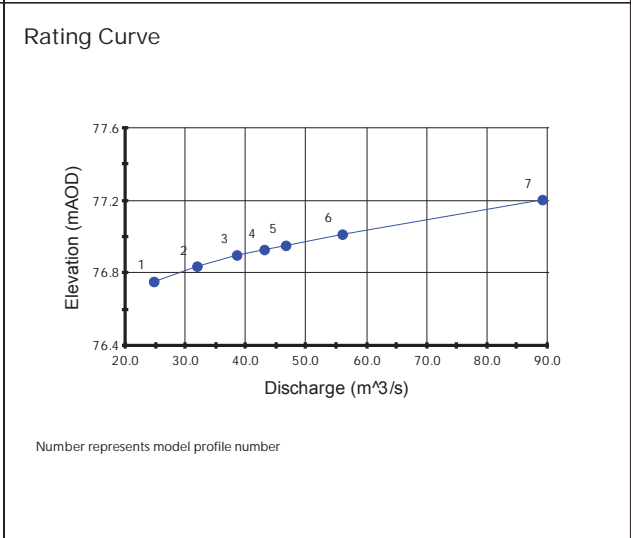
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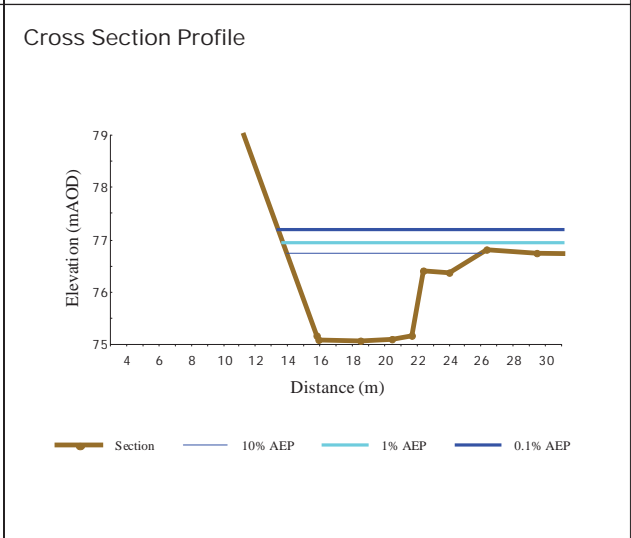
Next
 Section d/s: 4184u
 Section u/s: 4436



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	76.757	0.83
2	4.0	31.9	76.841	0.78
3	2.0	38.5	76.901	0.78
4	1.3	43.0	76.932	0.80
5	1.0	46.6	76.954	0.81
6	1.0	55.9	77.016	0.84
7	0.1	89.0	77.205	0.94

Level of Left Bank 81.165 mAOD
 Level of Right Bank 76.819 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4336

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4436

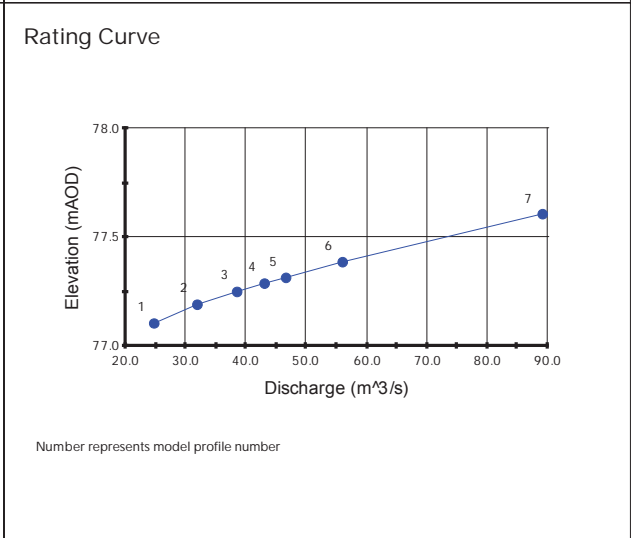
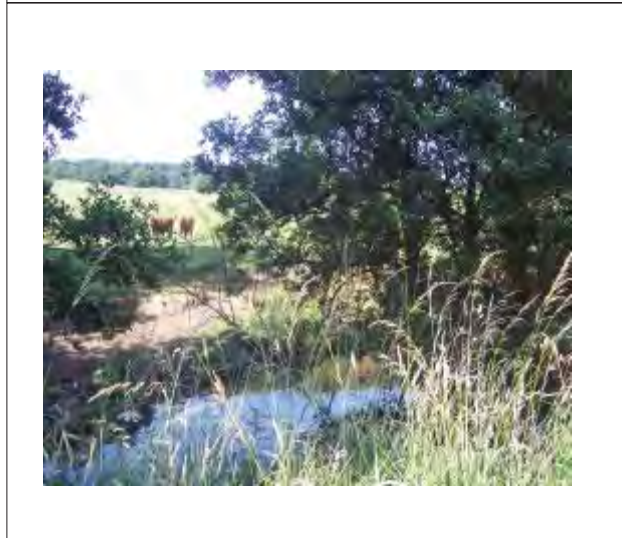
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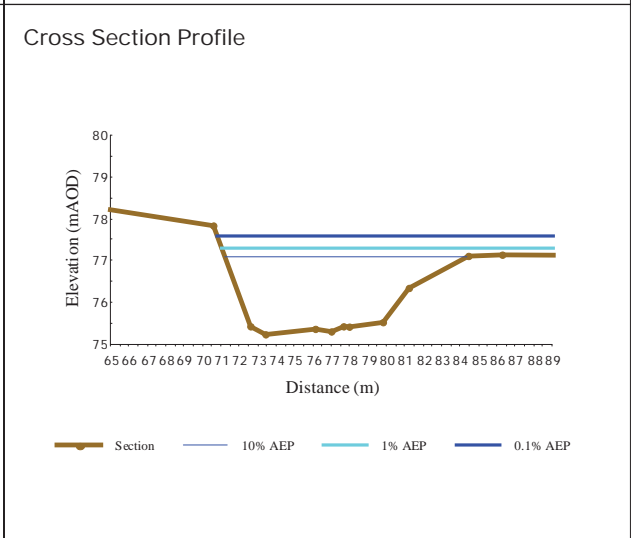
Next
 Section d/s: 4336
 Section u/s: 4565



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	77.106	0.64
2	4.0	31.9	77.193	0.67
3	2.0	38.5	77.252	0.72
4	1.3	43.0	77.289	0.75
5	1.0	46.6	77.316	0.77
6	1.0	55.9	77.387	0.82
7	0.1	89.0	77.606	0.97

Level of Left Bank 77.846 mAOD
 Level of Right Bank 77.126 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4436

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4565

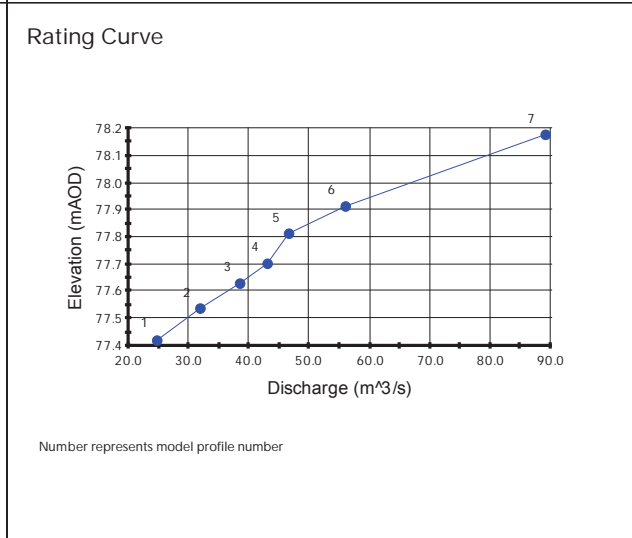
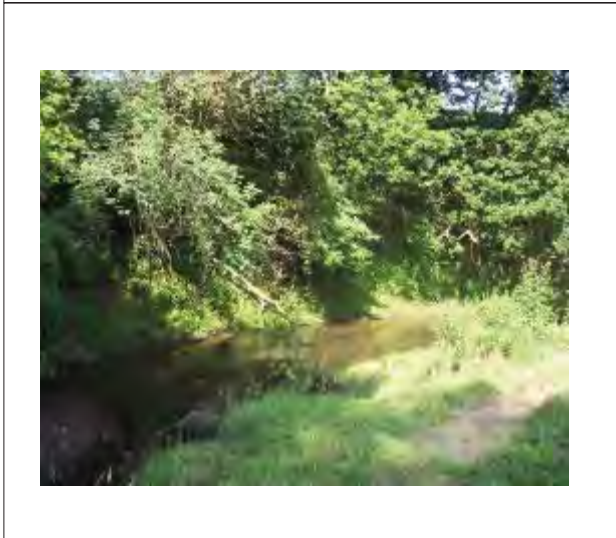
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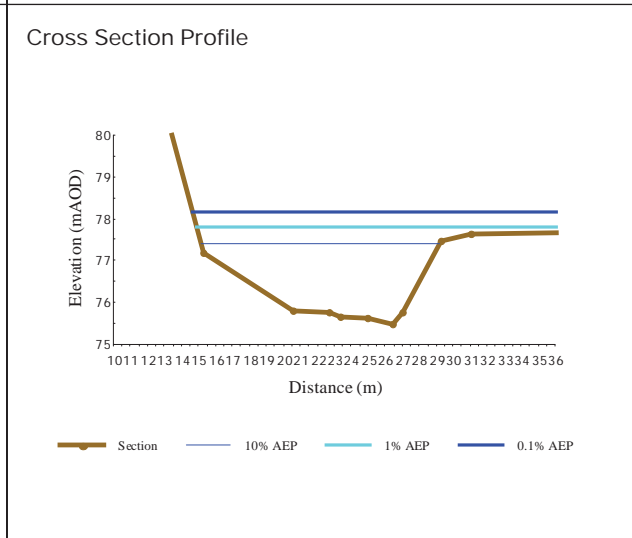
Next
 Section d/s: 4436
 Section u/s: 4708d



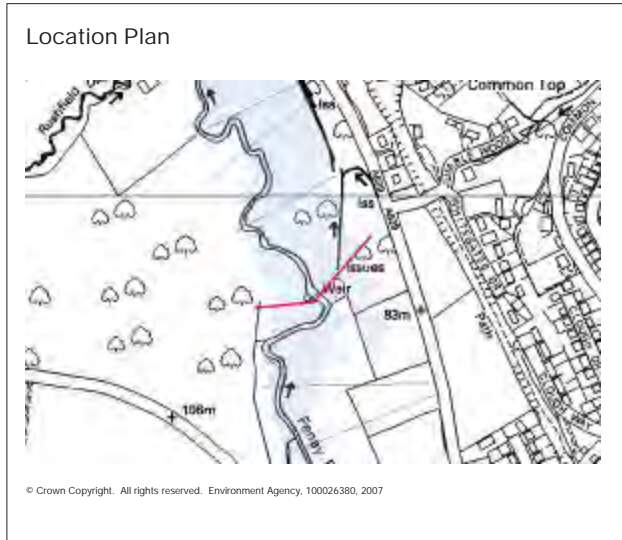
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	77.422	1.40
2	4.0	31.9	77.540	1.65
3	2.0	38.5	77.631	1.86
4	1.3	43.0	77.704	1.85
5	1.0	46.6	77.814	1.41
6	1.0	55.9	77.913	1.26
7	0.1	89.0	78.175	1.18

Level of Left Bank 77.199 mAOD
 Level of Right Bank 77.647 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4565



Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4708

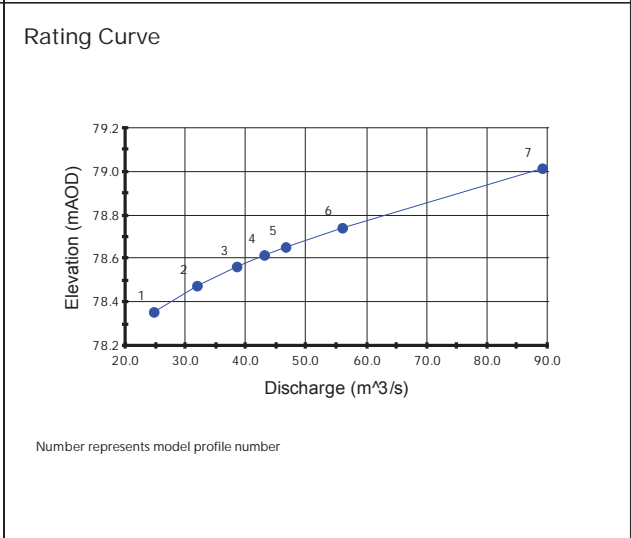
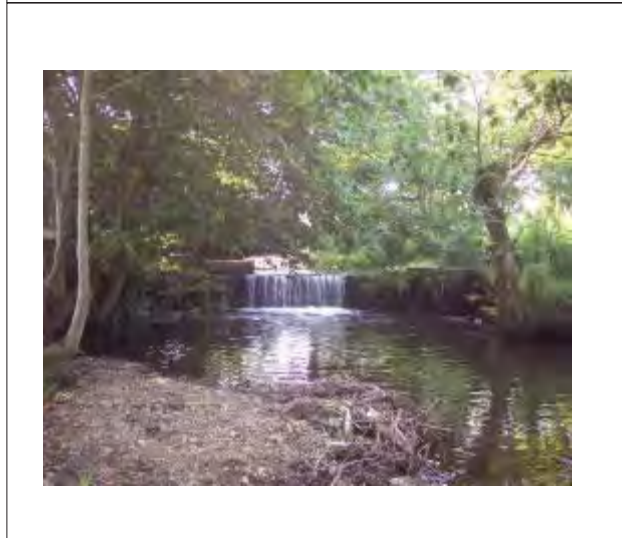
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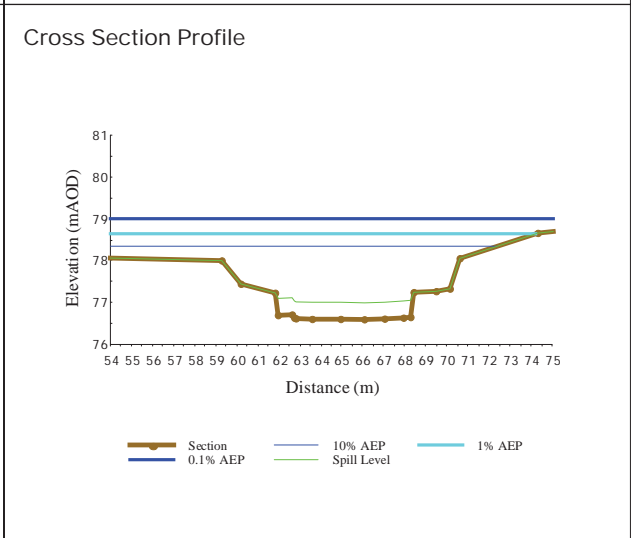
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 Section u/s: 4890



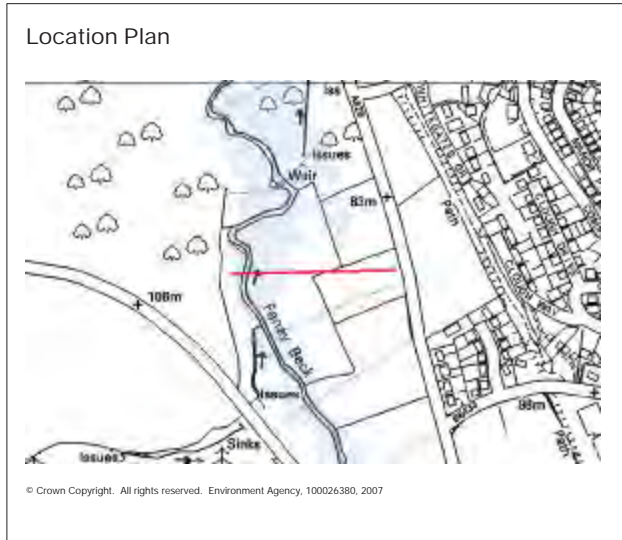
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	78.358	1.20
2	4.0	31.9	78.478	1.19
3	2.0	38.5	78.566	1.20
4	1.3	43.0	78.618	1.23
5	1.0	46.6	78.655	1.26
6	1.0	55.9	78.742	1.28
7	0.1	89.0	79.015	1.19

Level of Left Bank 78.015 mAOD
 Level of Right Bank 78.070 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)


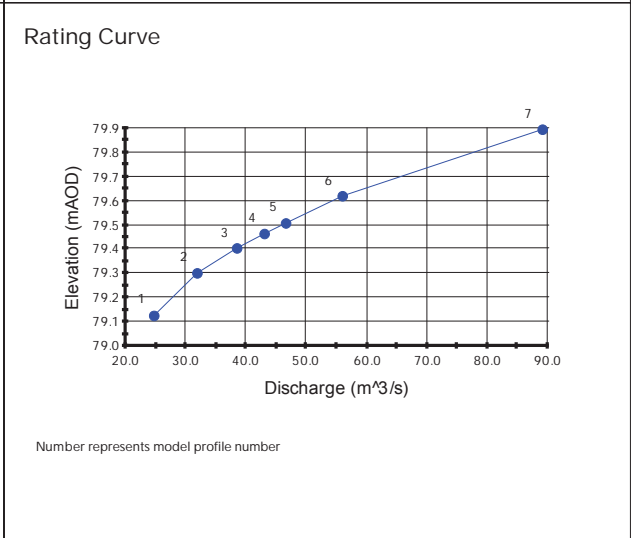
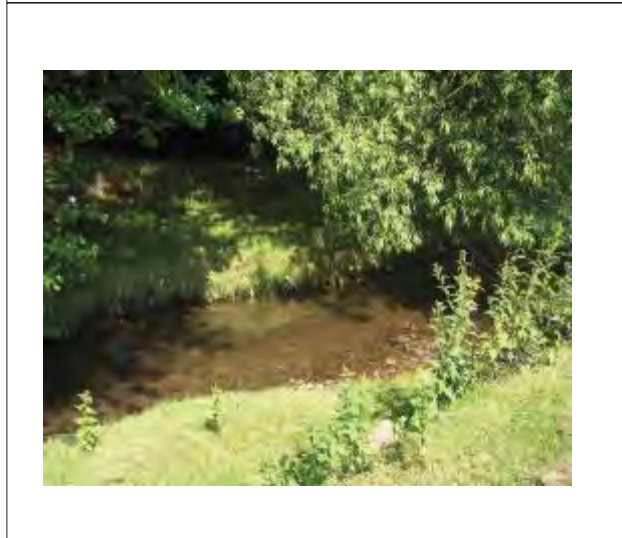


FENAY BECK: 1: CROSS SECTION NUMBER 4708u



Cross Section References

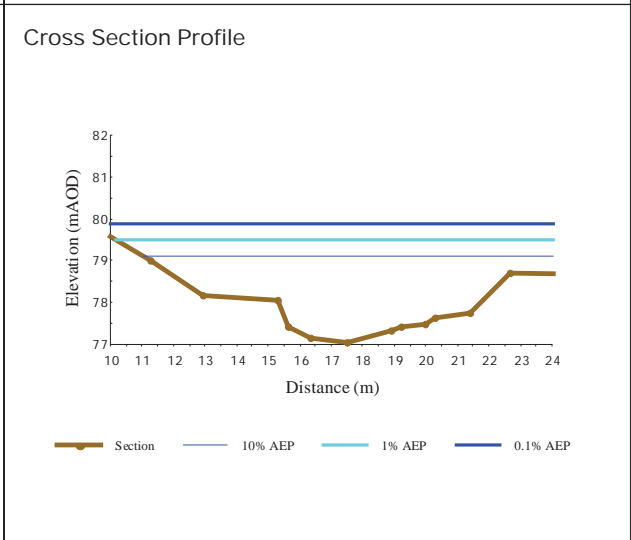
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Reach:	1
Chainage:	4890
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Survey Dwg Ref:	N/A
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Next	
Section d/s:	4708u
Section u/s:	4981

Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	79.127	1.25
2	4.0	31.9	79.303	1.16
3	2.0	38.5	79.405	1.14
4	1.3	43.0	79.464	1.15
5	1.0	46.6	79.508	1.16
6	1.0	55.9	79.620	1.15
7	0.1	89.0	79.893	0.96

Level of Left Bank 78.188 mAOD
 Level of Right Bank 78.720 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4890

Location Plan



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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4981


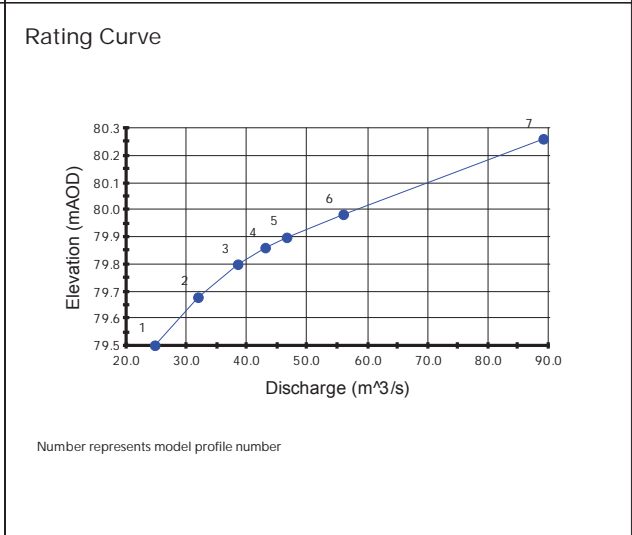
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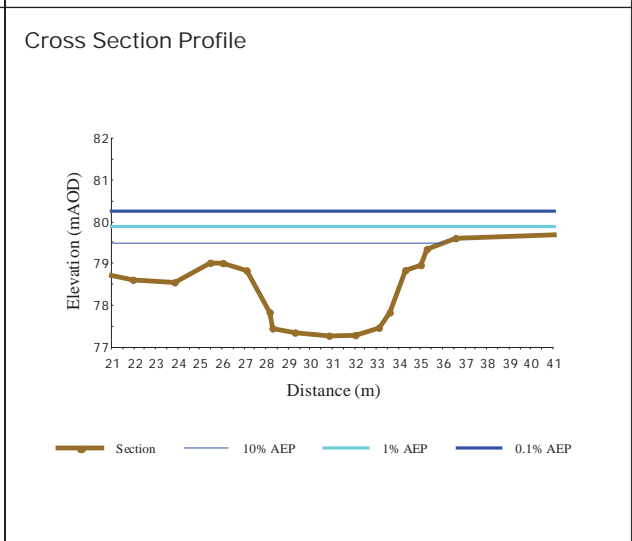
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 Section d/s: 4890
 Section u/s: 5087

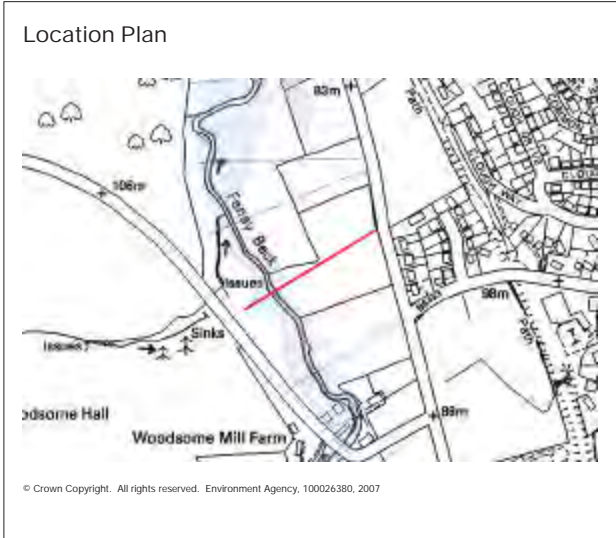
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	79.504	1.16
2	4.0	31.9	79.680	1.24
3	2.0	38.5	79.801	1.31
4	1.3	43.0	79.861	1.34
5	1.0	46.6	79.899	1.37
6	1.0	55.9	79.983	1.48
7	0.1	89.0	80.259	1.76

Level of Left Bank 79.025 mAOD
 Level of Right Bank 79.619 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

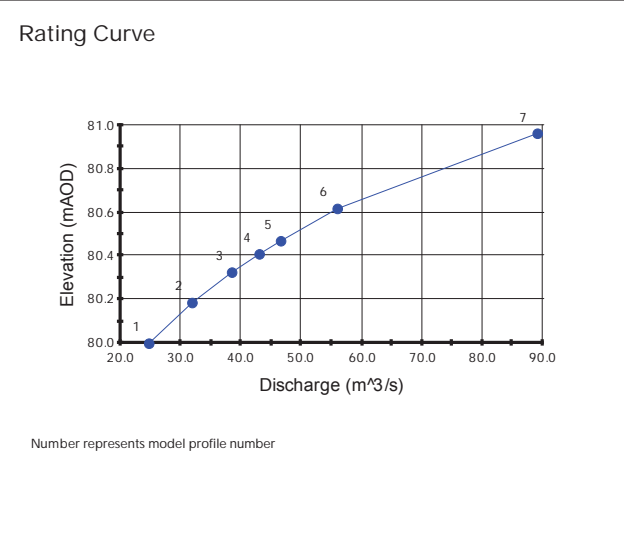


FENAY BECK: 1: CROSS SECTION NUMBER 4981



Cross Section References

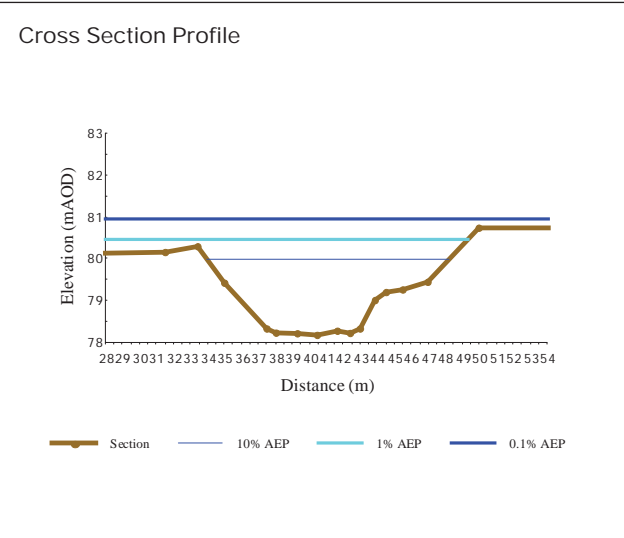
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Reach:	1
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OS NGR:	Unknown
Survey Dwg Ref:	N/A
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Next	
Section d/s:	4981
Section u/s:	5209



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	80.000	1.52
2	4.0	31.9	80.187	1.63
3	2.0	38.5	80.326	1.62
4	1.3	43.0	80.409	1.59
5	1.0	46.6	80.470	1.58
6	1.0	55.9	80.617	1.59
7	0.1	89.0	80.960	1.60

Level of Left Bank 80.303 mAOD
 Level of Right Bank 80.745 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5087

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5209

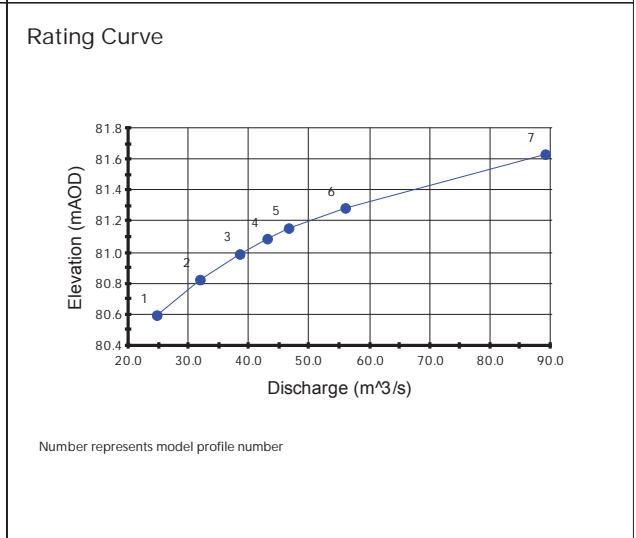
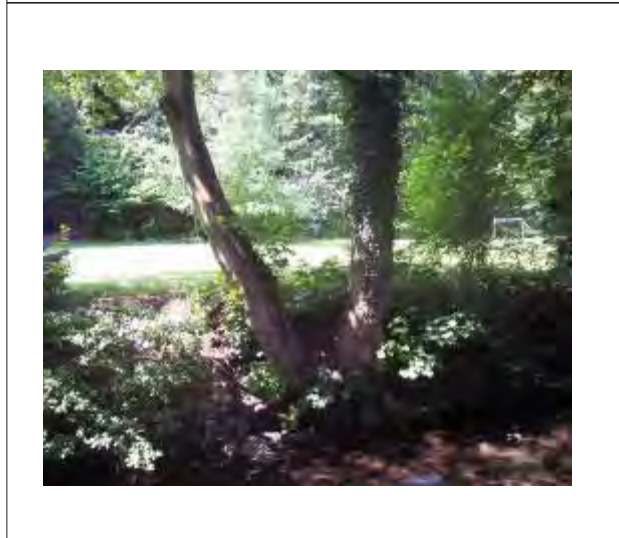
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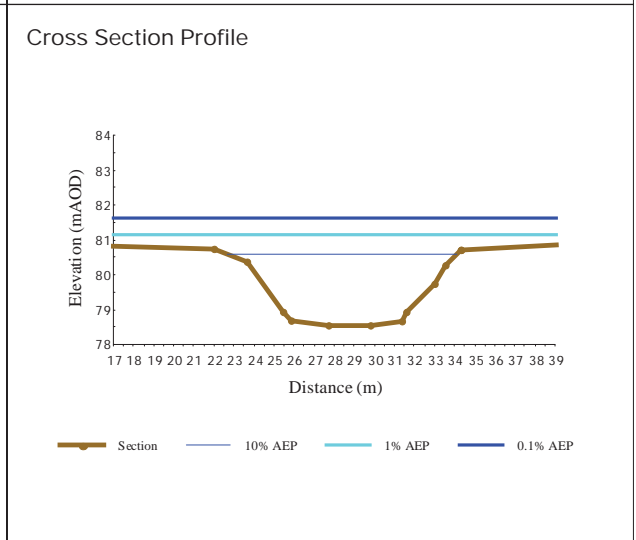
Next
 Section d/s: 5087
 Section u/s: 5298d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	80.601	1.54
2	4.0	31.9	80.828	1.64
3	2.0	38.5	80.991	1.61
4	1.3	43.0	81.089	1.55
5	1.0	46.6	81.158	1.51
6	1.0	55.9	81.286	1.48
7	0.1	89.0	81.631	1.57

Level of Left Bank 80.749 mAOD
 Level of Right Bank 80.726 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5209

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5298

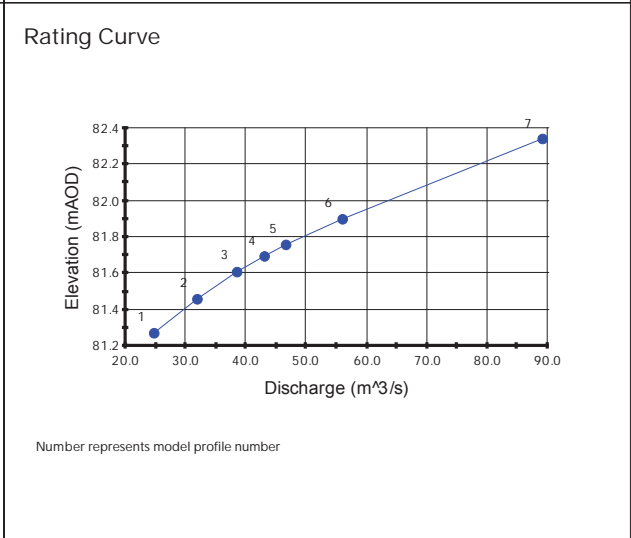
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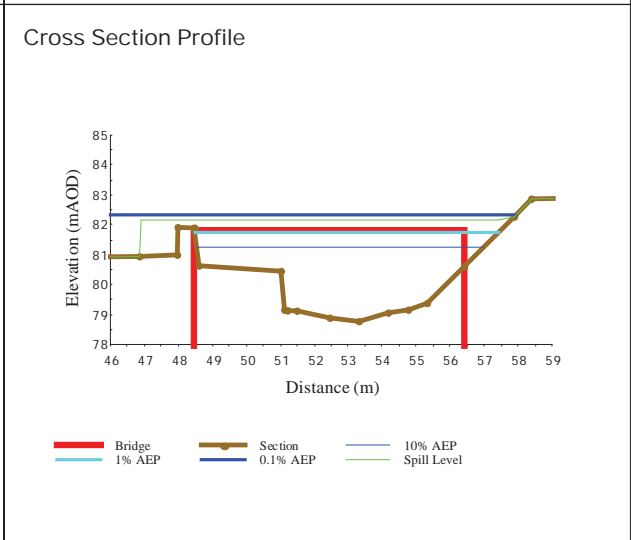
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 Section u/s: 5345d



Summary of Results

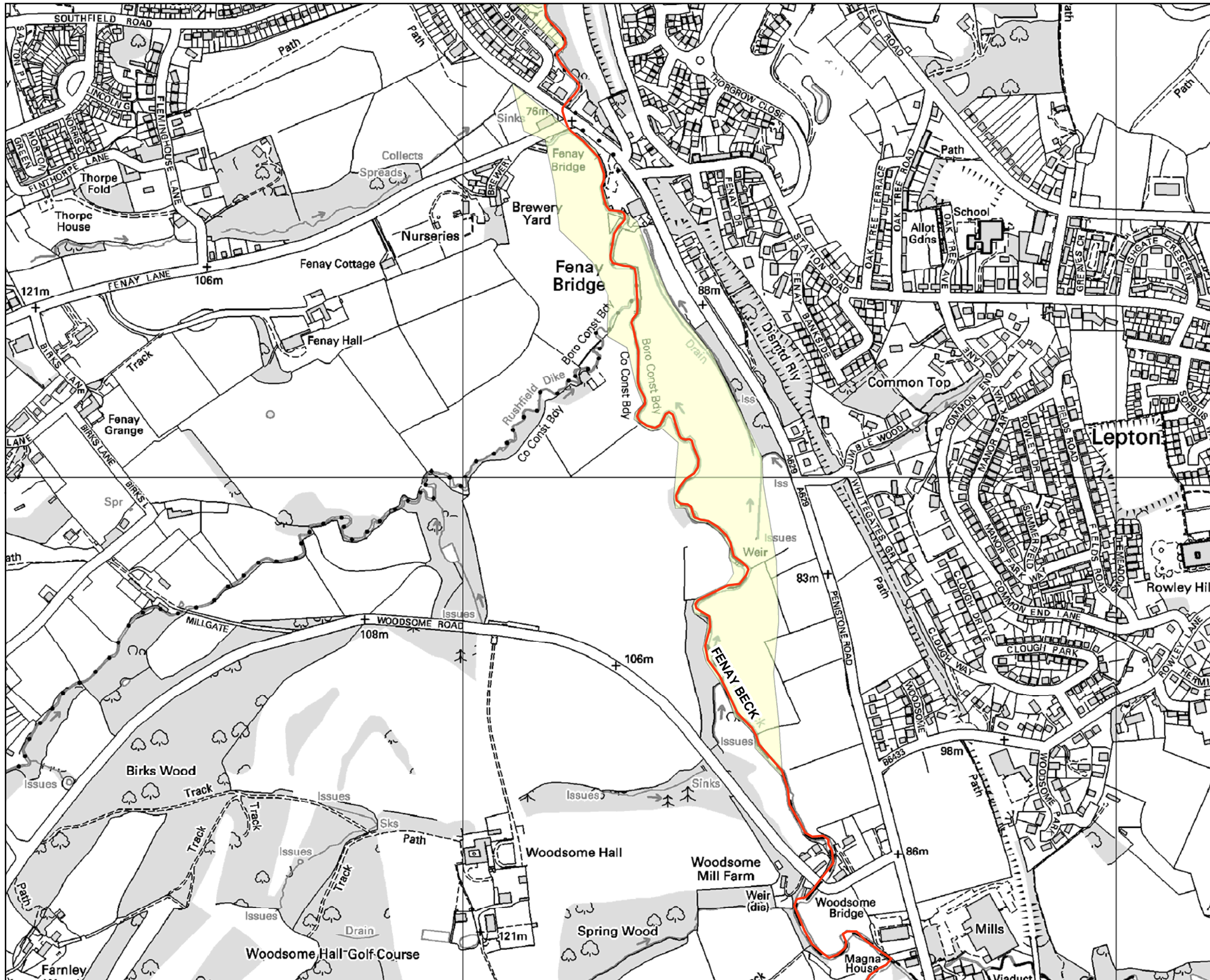
Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	81.273	1.28
2	4.0	31.9	81.462	1.25
3	2.0	38.5	81.611	1.26
4	1.3	43.0	81.697	1.28
5	1.0	46.6	81.759	1.30
6	1.0	55.9	81.900	1.37
7	0.1	89.0	82.340	1.53

Level of Left Bank 81.912 mAOD
 Level of Right Bank 82.281 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5298d

Flood History Map for Woodsome Road/ Penistone Road, Kirklees - dated: 21/06/2013 [Ref: 26205]



www.environment-agency.gov.uk

Scale: 1:6,000

when reproduced @ A3



Flood Extents

Legend

- Main River
- 1970 Flood Event

APPENDIX C – Calculations
Existing Greenfield Run Off Estimate

Sanderson House
Jubilee Way
Huddersfield, WF4 4TD



Date 12/01/2016 10:09
File

Designed by darren.hawkyard
Checked by

Micro Drainage Source Control 2015.1

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	50.000	Urban	0.000
SAAR (mm)	931	Region Number	Region 3

Results l/s

QBAR Rural 127.2
QBAR Urban 127.2

Q1 year 109.4

Q1 year 109.4
Q2 years 120.0
Q5 years 159.0
Q10 years 184.5
Q20 years 208.9
Q25 years 217.0
Q30 years 223.6
Q50 years 240.9
Q100 years 264.6
Q200 years 300.2
Q250 years 311.7
Q1000 years 386.7

109.4 / 50ha = 2.19l/s
2.19 x 0.76ha = 1.67/s
1.67/s

APPENDIX 4

CONTAINS A MASTERPLAN AND FLOOD RISK ASSESSMENT FOR REJECTED
HOUSING SITE H256 (LAND NORTH OF WOODSOME ROAD, FENAY BRIDGE)

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 16a - Land north of Woodsome Road, Fenay Bridge

Site Area: 13.3Ha

Existing Site Description:

The site is made up of open agricultural fields divided by dry stone walls and containing and surrounded by groups of mature vegetation. The site slopes from the southern and western boundaries towards Fenay Beck to the east, and Rushfield Dike to the north. Woodsome Road forms the Southern boundary, with Woodsome Hall Golf Club located to the south. Distant views are afforded to the hills and residential areas of Rowley Hill and Fenay Bridge to the north-east. The site is generally surrounded by open countryside, with surrounding residential developments visible to the north-east.

Planning Context:

The site is located within Green Belt, however, it is being actively promoted by Farnley Estates to be allocated as an "Accepted-Site Option" in the Kirklees Council Draft Local Plan - November 2015.

There are area TPO's along much of the northern and eastern site boundaries.

The site sits within the Fenay Beck Corridor Strategic Green Infrastructure Network and, abuts areas of the Kirklees Wildlife Habitat Network, as identified within the Draft Local Plan.

Part of the northern and eastern areas of the site sit within EA Flood Zones 2 and 3, and SFRA Flood Zone 3a, as identified in the Draft Local Plan.

Landscape Character Area:

The site is located within National Character Area (NCA) **37: Yorkshire Southern Pennine Fringe** and the Kirklees District Landscape Character Assessment: **G9: Fenay Beck Valley & Tributaries**. A site visit was also undertaken to carry out a localised character assessment.

The landscape character of the site and its surrounding area can be summarised as:

- made up of the main valley of the Fenay Beck River
- broadleaved woodland cover
- regular fields of medium scale, with smaller fields found around the edges of settlements. Land is predominantly pastoral with occasional arable use.
- Field boundaries are commonly hedgerows or stone walls
- visually enclosed along the bottoms of the valleys



Site photograph looking to the north-east from Woodsome Road at southern edge of Site 16a
Existing landscape features and assets:

Topography: Rolling: sloping from south west to north-east.

Vegetation Cover: Generally open. Scattered vegetation along field boundaries within the site, and mature belts of vegetation to the west, south and east.

Public Rights of Way: Non through the site

Ecological Features: Boundary vegetation, Fenay Beck and Rushfield Dike

Water features and Flood Zones: Fenay Beck and Rushfield Dike (Areas within EA Flood Zones 2 and 3 and SFRA Flood Zone 3a)

Visual Analysis:

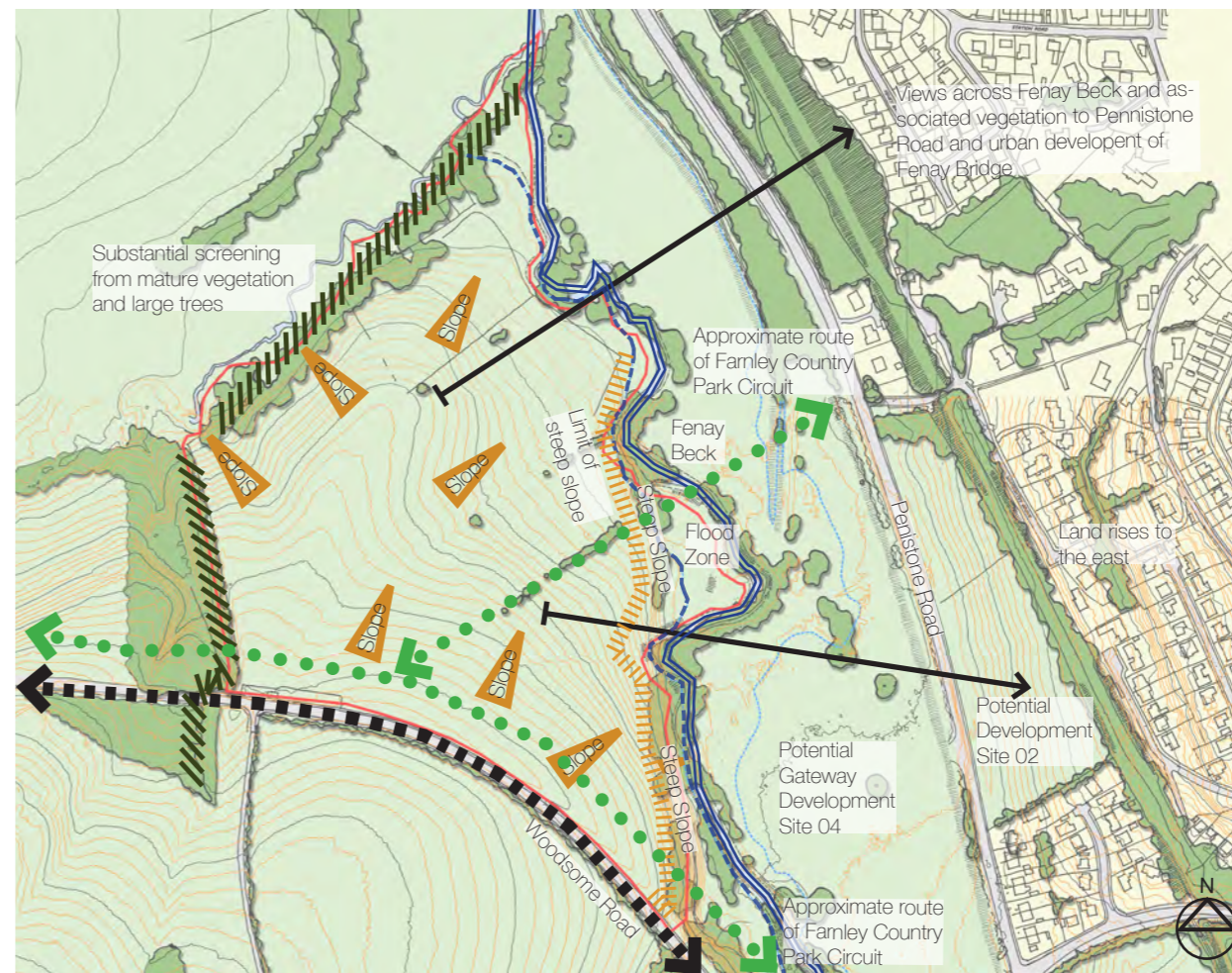
A site visit was undertaken to carry out a visual appraisal of key views into and out of the site. Due to the sloping nature of the site, clear views are afforded to the north east across Fenay Beck from Woodsome Road towards residential properties at Fenay Bridge and beyond.

Aims for Landscape and Masterplan Strategy:

The key feature of the proposals will to: respond to the site and its context; and develop a robust landscape structure and framework that delivers a multi-functional green infrastructure within which development can take place.

The aim of the green infrastructure will be to:

- Provide wildlife habitats to enhance the local ecological value;
- Provide space for recreational and amenity use;
- Creating a network of engaging green spaces;
- Connecting the development with the surrounding landscape;
- Integrating the development proposals into the local landscape; and where necessary



Landscape Analysis Plan. NTS

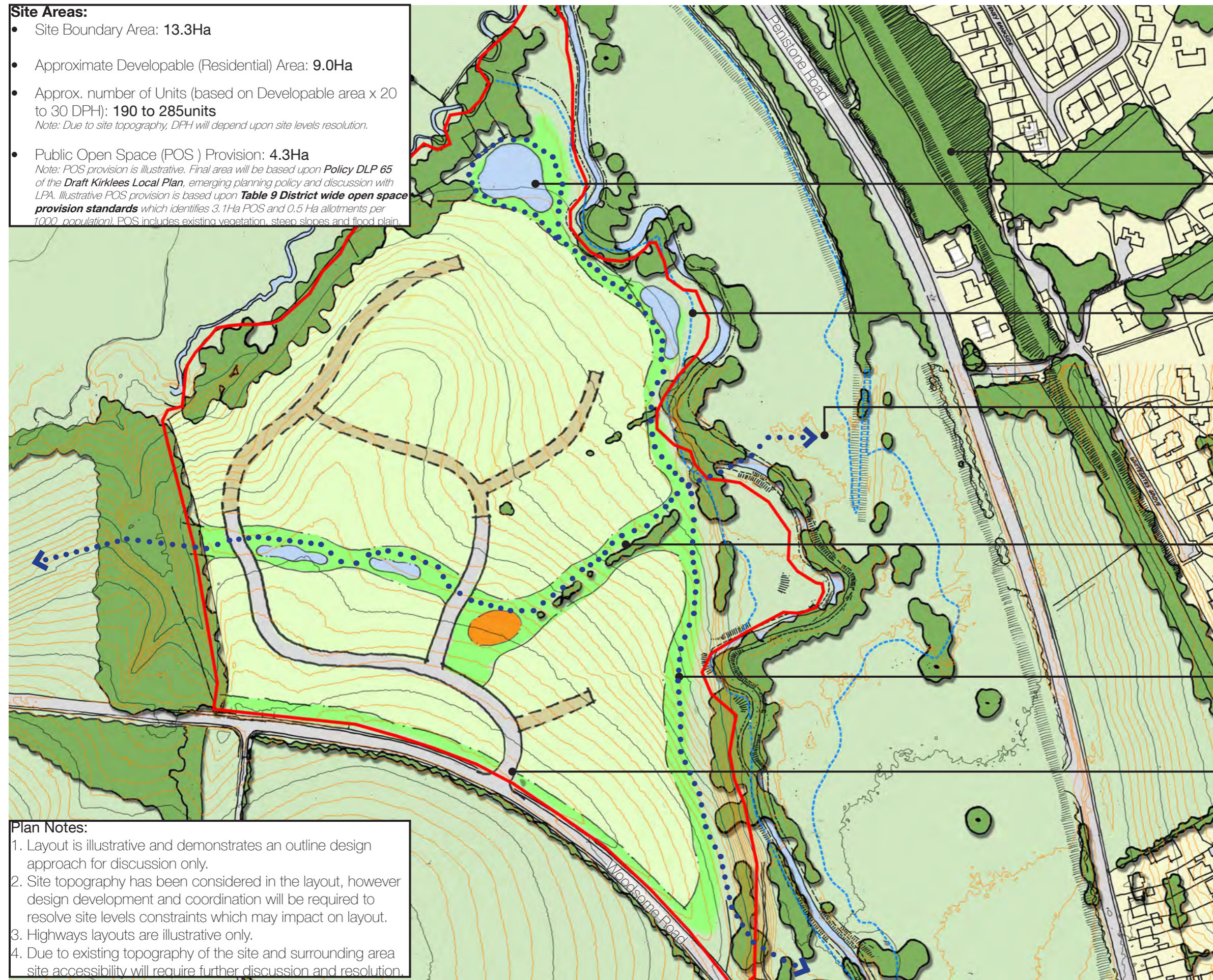


Landscape Opportunities and Structure Plan. NTS

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 16a - Land north of Woodsome Road, Fenay Bridge

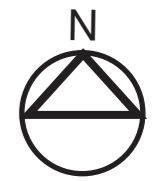
- Site Areas:**
- Site Boundary Area: 13.3Ha
 - Approximate Developable (Residential) Area: 9.0Ha
 - Approx. number of Units (based on Developable area x 20 to 30 DPH): 190 to 285units
Note: Due to site topography, DPH will depend upon site levels resolution.
 - Public Open Space (POS) Provision: 4.3Ha
Note: POS provision is illustrative. Final area will be based upon Policy DLP 65 of the Draft Kirklees Local Plan, emerging planning policy and discussion with LPA. Illustrative POS provision is based upon Table 9 District wide open space provision standards which identifies 3.1Ha POS and 0.5 Ha allotments per 1000 population. POS includes existing vegetation, steep slopes and flood plain.



- Dismantled Railway
- POS utilising SuDs features and habitat creation. Houses fronting onto space to be aligned with secure by design principles.
- Fenay Beck and floodplain area - developed as amenity and habitat space with trails connecting into wider footpath network. SuDs features created along this area subject to flood risk assessments.
- Connection to wider Farnley Country Park Circuit.
- Green link through development connecting existing landscape features. Potential to incorporate pedestrian links (as part of wider Farnley Country Park Circuit), play area and SuDs features to create connected multifunctional Green Infrastructure
- Trail along Fenay Beck connected into development and wider Farnley Country Park Circuit.
- Vehicular Access via bellmouth on Woodsome Road

- Plan Notes:**
1. Layout is illustrative and demonstrates an outline design approach for discussion only.
 2. Site topography has been considered in the layout, however design development and coordination will be required to resolve site levels constraints which may impact on layout.
 3. Highways layouts are illustrative only.
 4. Due to existing topography of the site and surrounding area site accessibility will require further discussion and resolution.

Note: Plan is illustrative only. Final design and layout subject to detail design, site surveys and coordination with other consultants and LPA.



Prepared on behalf of

Farnley Estates Ltd

FLOOD RISK ASSESSMENT

**Proposed Development
Farnley Tyas, Huddersfield
Allocation 16A**

Flood Risk Overview

Acknowledgements:

Environment Agency

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

Any information provided by third parties and referred to herein has not been checked or verified by Sanderson Associates (Consulting Engineers) Ltd, unless otherwise expressly stated within this report.

This report was checked and approved on the 19 January 2016 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

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Report Ref:	9069/DH/006/01	January 2016	
Author:	Darren Hawkyard		
Checked & Approved:	Thomas Walker	Date:	19 January 2016

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3	Consultations.....	8
4	Flood Risk.....	9
5	Drainage Constraints	11
6	Conclusion.....	13

Appendices

Appendix A - Drawings

Site Location: 9069/001

Flood Extent Plan: 9069/601

Appendix B - Consultations

Environment Agency

APPENDIX C – Calculations

Existing Greenfield Run Off Estimate

1 Introduction

- 1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Overview for possible development sites Farnley Tyas, Huddersfield, this report will focus on the area designated 16A. The aim of this assessment is to discuss the present and future flood risk to the site and to assess possible uses and mitigation measures required. The location of the site is shown on drawing 9069/001 contained in Appendix A.
- 1.2 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF) March 2012 and the associated Planning Practice Guidance, 2014.
- 1.3 Consultation with Environment Agency (EA) has taken place. The consultation response is discussed in Section 3 and contained within Appendix B.
- 1.4 Each site allocation has been separated into individual reports and assessed on their own merits. A site Location plan showing each of the site allocations is located in Appendix A.

2 Existing Situation

2.1 Existing Site Description

2.1.1 Site 16A is currently open agricultural, grazing land located to the north of Woodsome Road in Farnley Tyas, Huddersfield. Drawing 9069/001 included in Appendix A shows the site limits and location.

2.1.2 The land is currently accessed off Woodsome Road via a number of agricultural gates.

2.1.3 The site is bound to the north by Rushfield Dike and agricultural land. To the east by Fenay Beck. To the south by Woodsome Road and agricultural land. To the west by woodland and agricultural land.

2.1.4 The closest main river is the Fenay Beck which is located upon the eastern boundary of the site. The Fenay Beck generally flows from south to north. Rushfield Dike is located on the northern boundary of the site and joins the Fenay Beck at the northeastern boundary of the site.

2.2 Existing Site Analysis

2.2.1 The site area is 130,000m² (13.00Ha) taken from information provided by the client is considered to be permeable (not positively drained). Therefore the site is considered to be 0% impermeable and 100% permeable.

2.2.2 The estimated Greenfield runoff rate from the site has been assessed using WinDES Source Control software. The run off rate has been calculated at 29.50l/s or 2.19l/s/Ha for a 1 in 1 year return period (IH124 Method requires calculations based on 50Ha reduced to the site area). The WinDES output files are contained within Appendix C.

- 2.2.3 The topography of the site generally grades from west to east. On the eastern boundary of the site an escarpment grades down to Fenay Beck in a number of locations raising the to a relatively higher elevation than the adjacent watercourse.

3 Consultations

- 3.1 As part of this assessment, the Environment Agency (EA) information has been reviewed in relation to flood zones and groundwater. All responses are contained in Appendix B.
- 3.2 The response from the Environment Agency confirms that the site falls within Flood Zones 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%). It should be noted that areas of higher probability Flood Zones 2 and 3 are restricted to the eastern boundary of the site due to the relative level difference from this area to the main body of the site as outlined in paragraph 2.2.3.
- 3.3 The Environment Agency provided modelled flood levels for the Fenay Beck in the vicinity of the site. These include levels for the 1 in 100 + climate change and 1 in 1000 year events. There are no flood defences in close proximity to the site.
- 3.4 The Environment Agency have provided historic flooding maps and shows that the site was subject to historic flooding in 1970 due to channel capacity being exceeded.
- 3.5 The Environment Agency website show that the site is not within a Groundwater Source Protection Zone.

4 Flood Risk

- 4.1 The main risk of flooding to the site comes from the Fenay Beck and Rushfield Dike which are located on the eastern and northern boundary of the site, respectively. No flood defences are located within close proximity to the site for either watercourse.
- 4.2 The Environment Agency confirms that the site falls within Flood Zone 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%).
- 4.3 Drawing 9069-601 contained within Appendix A shows the flood extents of a 1 in 100 year + climate change and 1 in 1000 year flood event (For the site local levels are based on 1.0m grid LIDAR data and modelled flood levels supplied by the Environment Agency).
- 4.4 There are no constraints to the type of proposal on this allocation assuming that building structures are located wholly within Flood Zone 1. It is likely that there would be few issues for this site as the steep gradients on the eastern boundary of the site which represents the limits of Flood Zones 2 and 3 would likely remain undeveloped.
- 4.5 The Environment Agency online surface water mapping shows areas of modelled surface water flooding within the boundary of the site. A number of areas shown to be at a low risk of surface water flooding (between 1 in 100 and 1 in 1000 annual probability) are located on the eastern boundary of the site and mimic the extents of modelled fluvial flooding at these locations. A number of low risk areas are shown on the banks of Rushfield Dike to the north of the site, these areas are relatively small, isolated and constrained to the immediate vicinity of the watercourse. The main body of the site is shown to be at a very low risk (greater than 1 in 1000 annual probability) which is the lowest risk classification in line with EA delineation.

- 4.6 Mitigation measures can be implemented within the Full Flood Risk Assessment to ensure surface water localised to, and conveyed within the sites road network would not affect any of the proposed development.

5 Drainage Constraints

5.1 The current building regulations, Part H3, detail the favoured hierarchy of surface water disposal being in order of preference, to ground by infiltration, to watercourse and then to sewer.

1. Infiltration

2. Watercourse

3. Sewer

1. Infiltration Drainage

5.2 Infiltration methods of drainage such as soakaways and filter drains percolate surface water runoff allowing it to permeate into the subsoil at its natural rate mimicking the natural process of drainage and as such are subject to the local ground conditions.

5.3 The Local Authority will request that a site investigation is carried out to deem whether infiltration methods are viable within the site.

2. Discharge to Watercourse

5.4 If the above is not deemed viable the Local Authority will accept discharge to watercourse. The closest main watercourse to the site is the Fenay Beck which is located on the western boundary of the site.

5.5 The Environment Agency and internal drainage board would have to be consulted in regards to agreeing an acceptable discharge rate into the Fenay Beck. A rate no greater than 1.4l/s/ha for discharge into local watercourse is normally requested.

3. Discharge to Sewer

- 5.6 If neither of the above are deemed viable Yorkshire Water should be consulted in order to agree possible surface water outfall. In addition Yorkshire Water will have to be consulted to agree a point of foul connection.

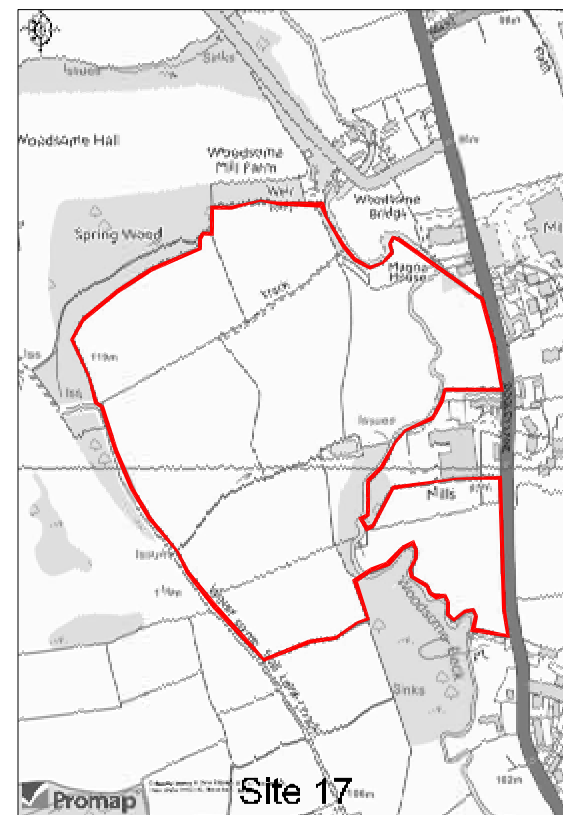
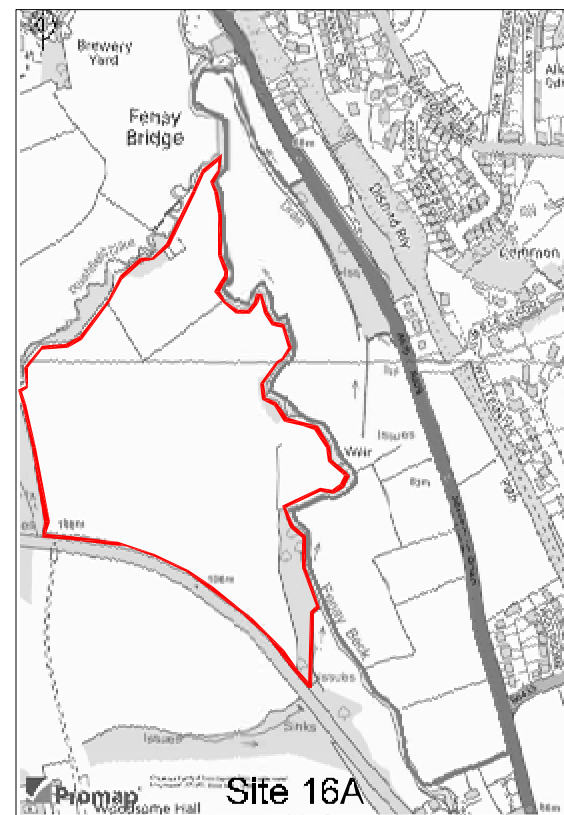
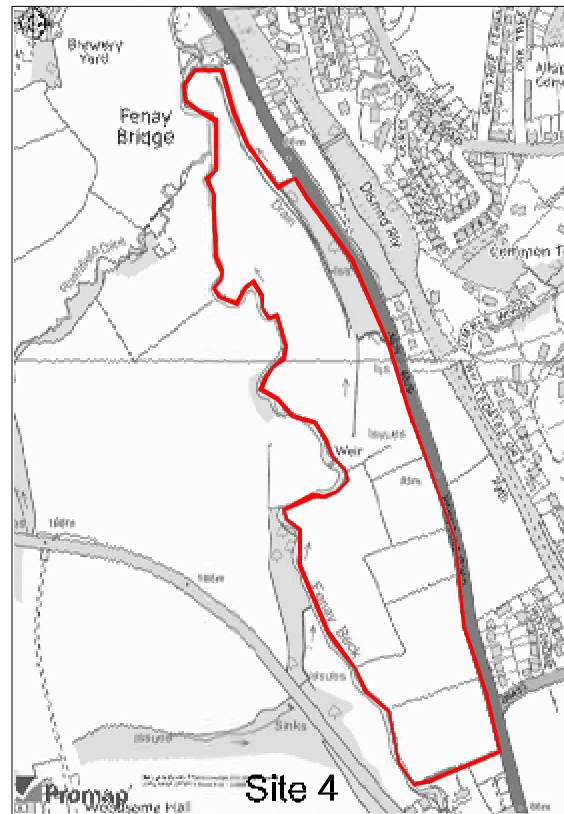
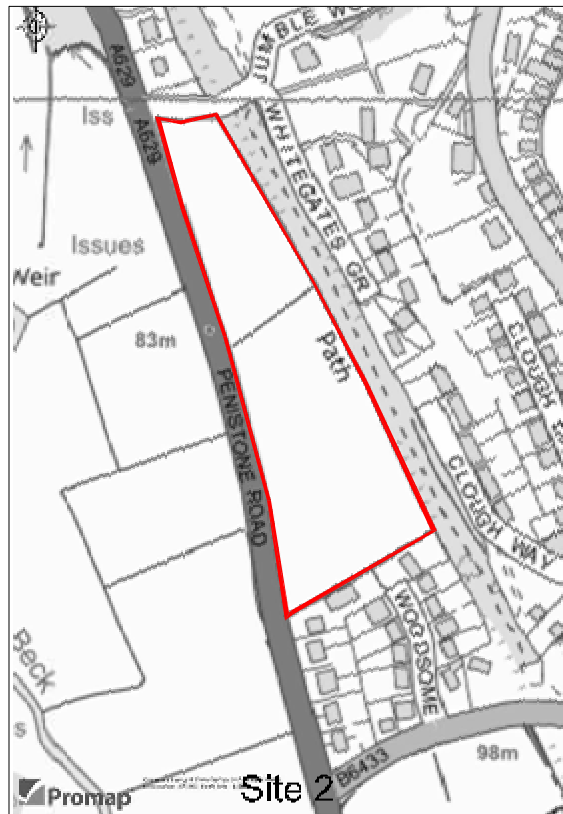
6 Conclusion

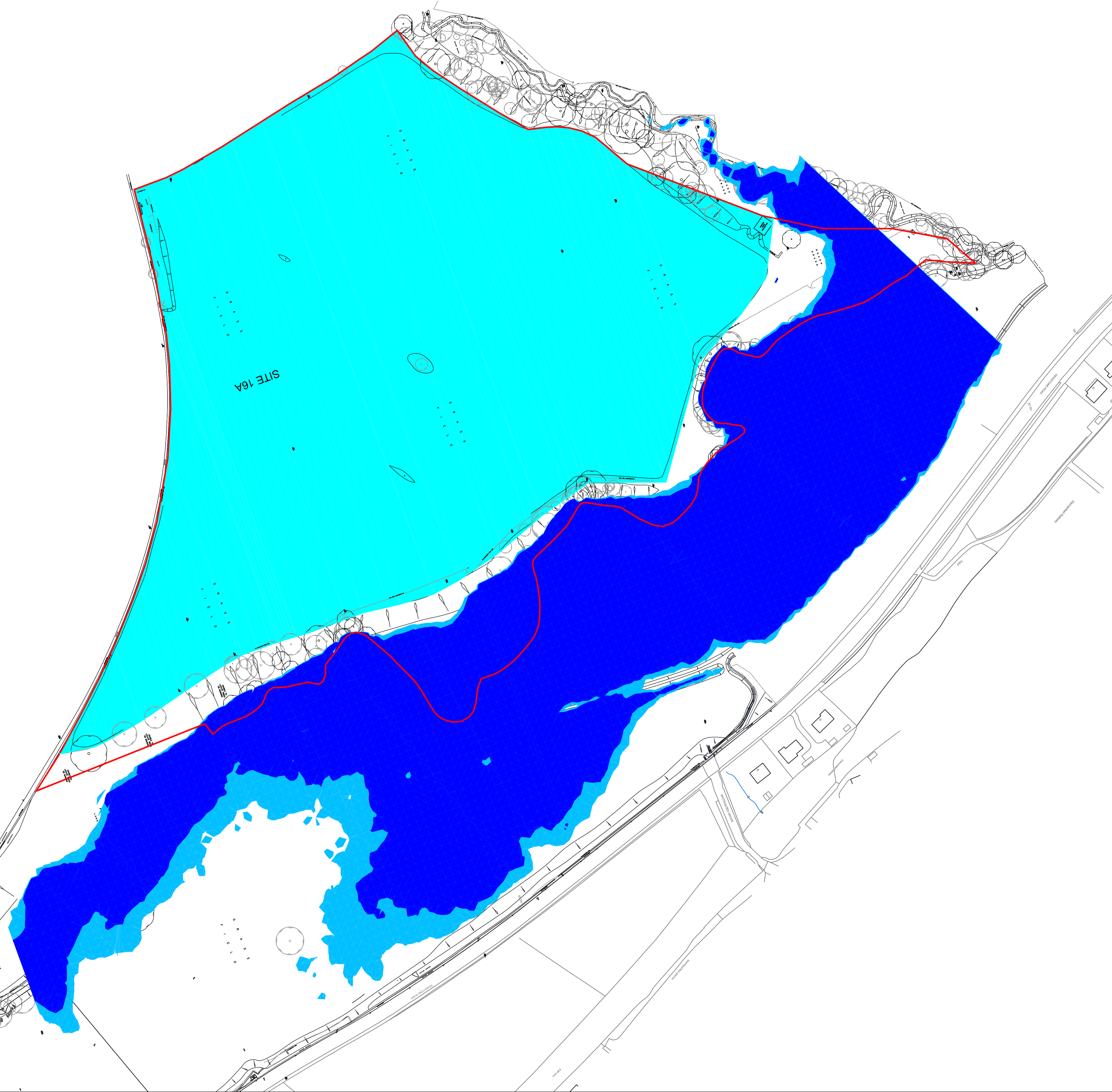
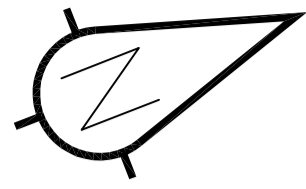
- 6.1 This flood risk overview serves to review and assess the sources of potential flooding to the site
- 6.2 As concluded in section 3 the site is considered to lie within Flood Zone 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%). Although it should be noted that the majority of the site lies within Flood Zone 1.
- 6.3 All buildings should be located wholly within Flood Zone 1.
- 6.4 In line with current guidance the Environment Agency would require an 8-10m undeveloped easement, measured from the top of river bank, in order to safeguard future channel maintenance and emergency access to the watercourse.
- 6.5 A full flood risk assessment and surface water management strategy would have to be written and submitted to the Local Authority in order to gain planning permission. This document serves as an overview to inform the client of possible risk and constraints that could arise at the site.

Appendix A - Drawings




Site Location: 9069/001

Flood Extent Plan: 9069/601





- Sanderson Associates (Consulting Engineers) Ltd ("the consultant"), has not checked or verified, and shall have no liability whatsoever for any inaccuracies which may be attributable to any data, reports, base plans(s) and drawings provided by the client, or purchased by the consultant on the client's behalf, that may have been utilised within this drawing.
- The consultant shall not be liable for the use by any person of any document for any purpose other than that for which the same were provided by the consultant.
- No liability whatsoever is accepted by the consultant for any error or omissions.
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- The locations of utilities apparatus, if shown, is reproduced from plans supplied to the consultant, although care has been taken when duplicating this information. These locations are approximate only and no guarantees can be given for their accuracy. It is the client's or it's appointed agent/contractors responsibility to verify the exact locations on site by hand dug trial holes or other appropriate means prior to mechanical excavation.
- Service connections are not shown but their presence should be anticipated.
- Reference to any third party equipment shown on this drawing was only relevant at the time the drawing was prepared.
- It is the client's responsibility to ensure that any equipment ordered meets the design.

-  - Flood Zone 3
-  - Flood Zone 2
-  - Flood Zone 1 (Developable Land)

Rev	Amendment	Drawn	Date	Checked




Client
Farnley Estates Ltd

Project Title
Proposed Development
Farnley Tyas, Huddersfield
Allocation 16A

Drawing Title
Flood Extent Plan

Scale	1:1250	Drawn By	DH
Drawing Size	A1	Checked By	IE
Date	Jan 16	Approved By	IE

	Drawing Number	Rev
	9069-601	

Appendix B - Consultations
Environment Agency

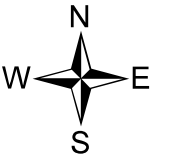


Flood Map Woodsome Road/ Penistone Road, Kirklees - Date Created: 21/06/2013 Ref: 26205



www.environment-agency.gov.uk





Scale: 1:10,000

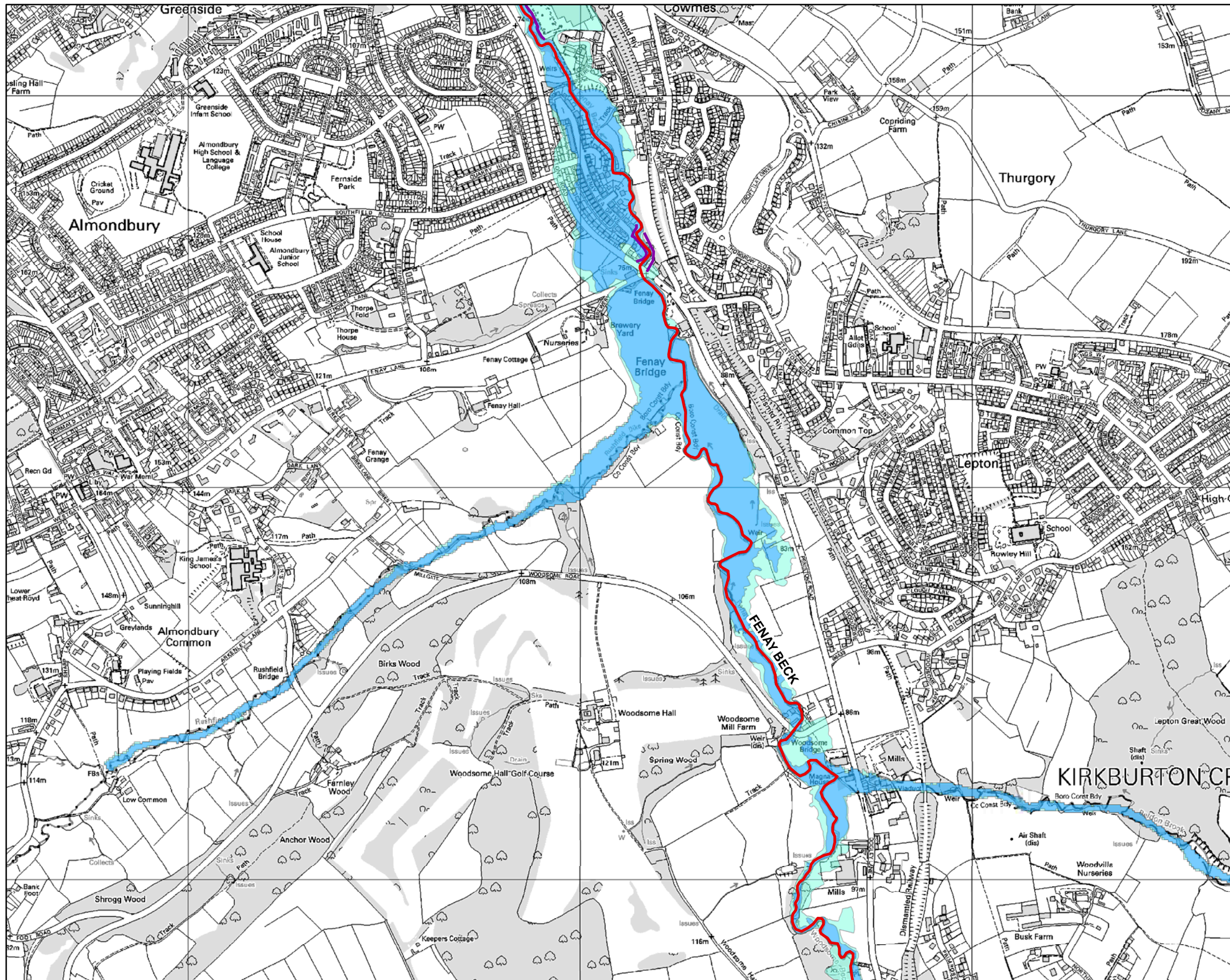


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LEGEND

-  Main River
-  Flood Map Flood Defences
-  Flood Zone 3 (FZ3)
-  Flood Zone 2 (FZ2)



Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3758

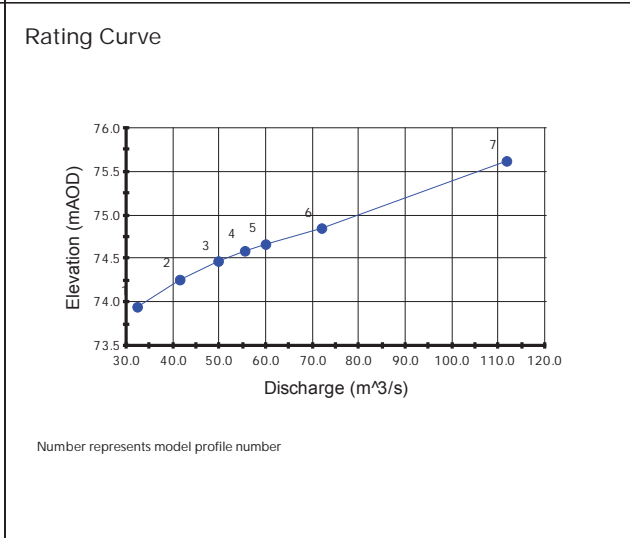
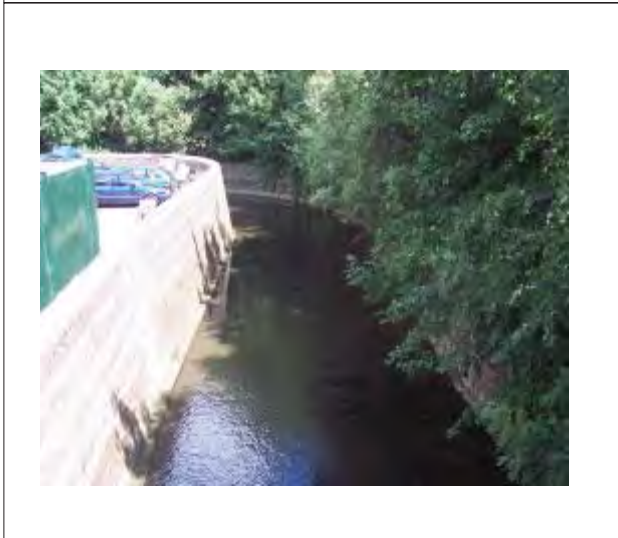
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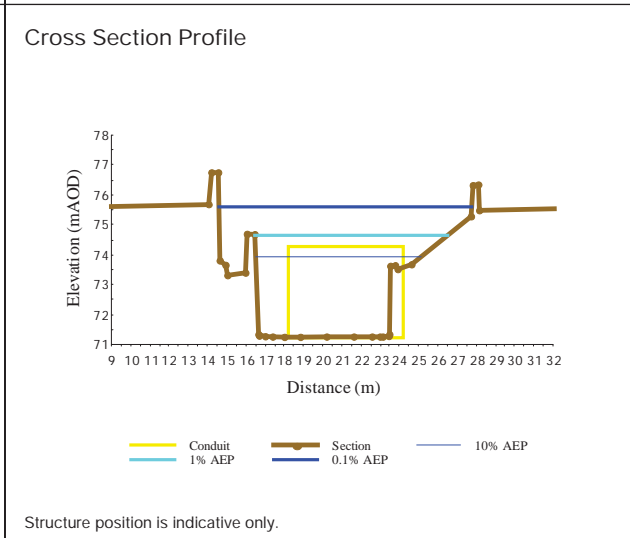
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 Section u/s: 3801



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	73.954	1.66
2	4.0	41.5	74.263	1.83
3	2.0	49.8	74.477	1.99
4	1.3	55.5	74.593	2.11
5	1.0	59.9	74.669	2.21
6	1.0	71.9	74.852	2.45
7	0.1	111.5	75.619	2.70

Level of Left Bank 76.758 mAOD
 Level of Right Bank 76.330 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3758

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3801

Section Type: CONDUIT, SECTION, SPILL

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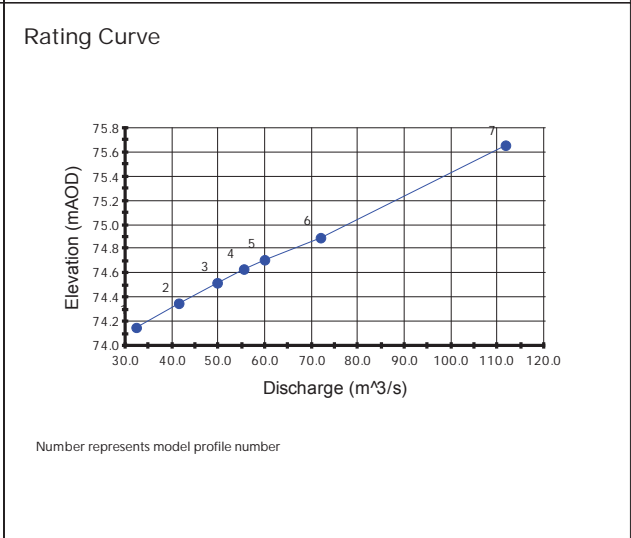
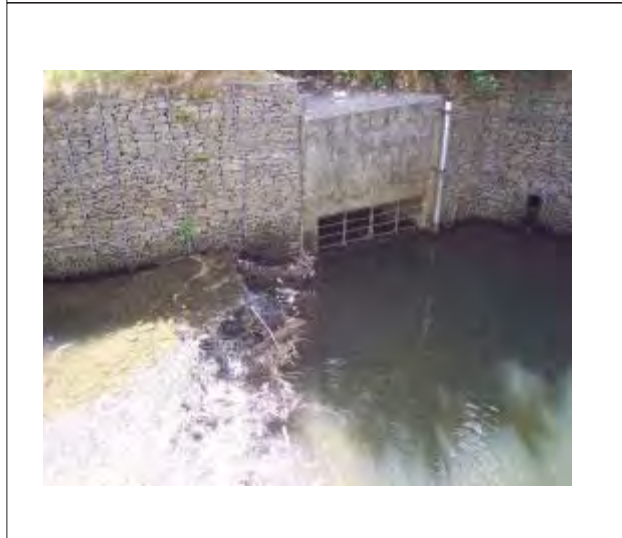
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Section d/s: 3758

Section u/s: 3811d



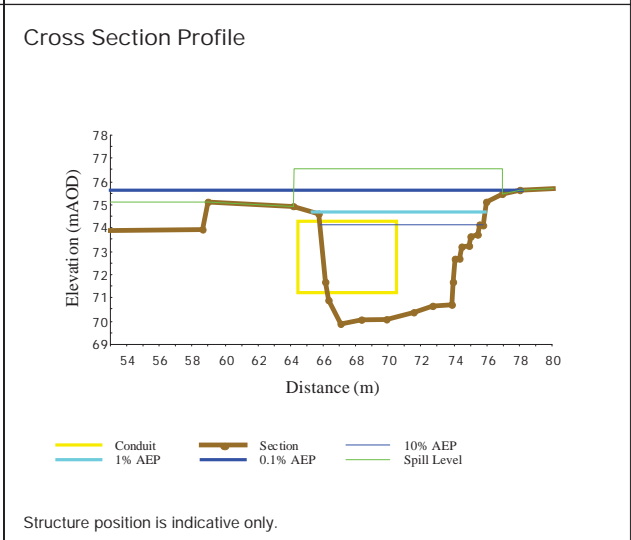
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.156	0.76
2	4.0	41.5	74.355	0.73
3	2.0	49.8	74.524	0.72
4	1.3	55.5	74.637	0.72
5	1.0	59.9	74.713	0.72
6	1.0	71.9	74.896	0.74
7	0.1	111.5	75.654	0.68

Level of Left Bank 75.149 mAOD

Level of Right Bank 75.145 mAOD

AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3801

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3811

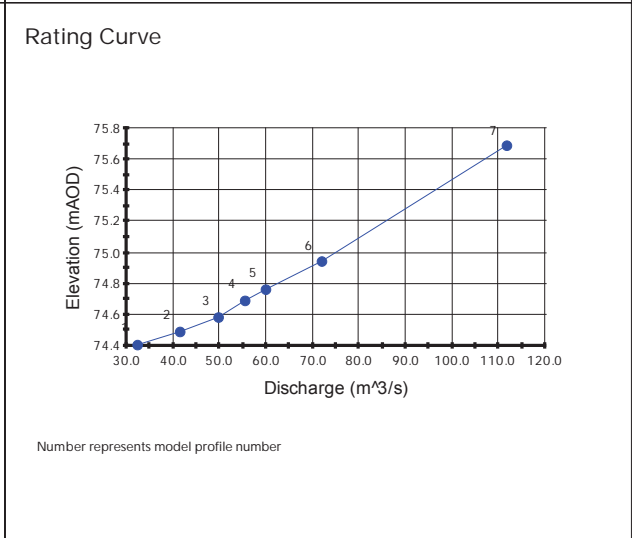
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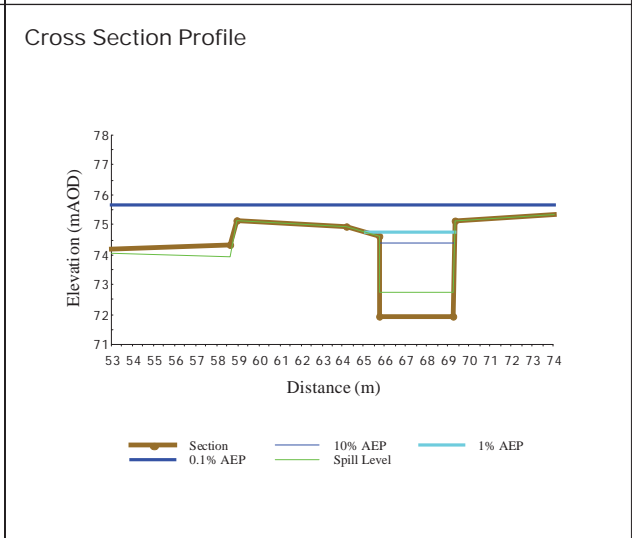
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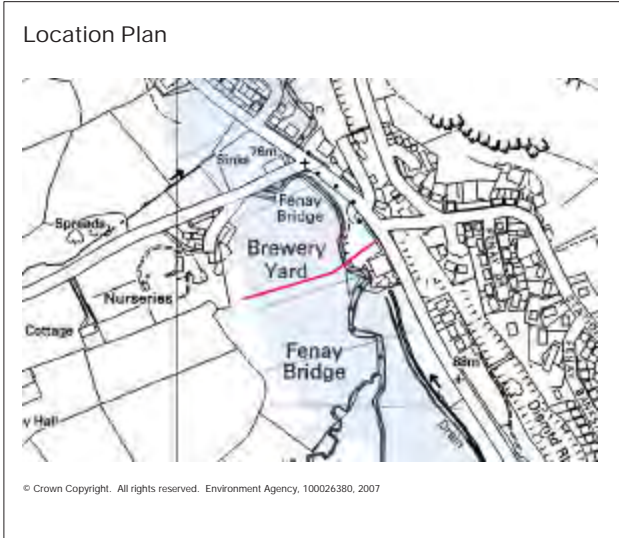
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.411	0.93
2	4.0	41.5	74.494	0.97
3	2.0	49.8	74.589	0.97
4	1.3	55.5	74.694	0.90
5	1.0	59.9	74.767	0.86
6	1.0	71.9	74.947	0.81
7	0.1	111.5	75.688	0.63

Level of Left Bank 75.149 mAOD
 Level of Right Bank 75.145 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3941

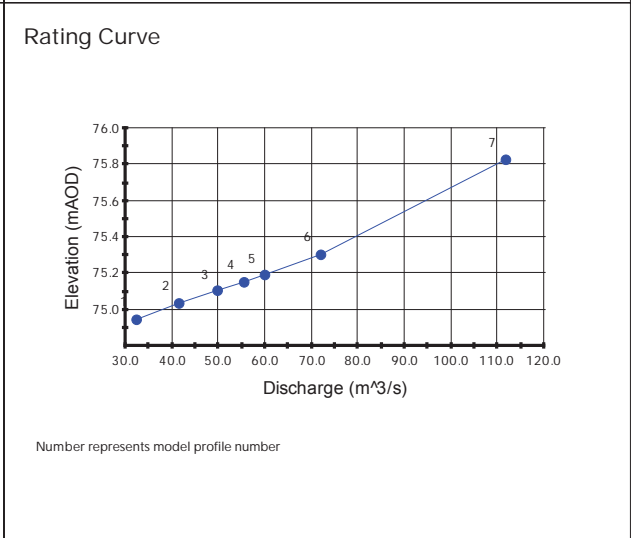
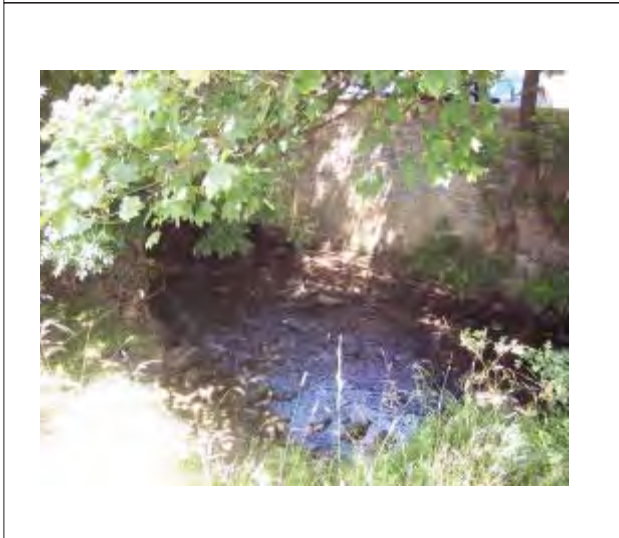
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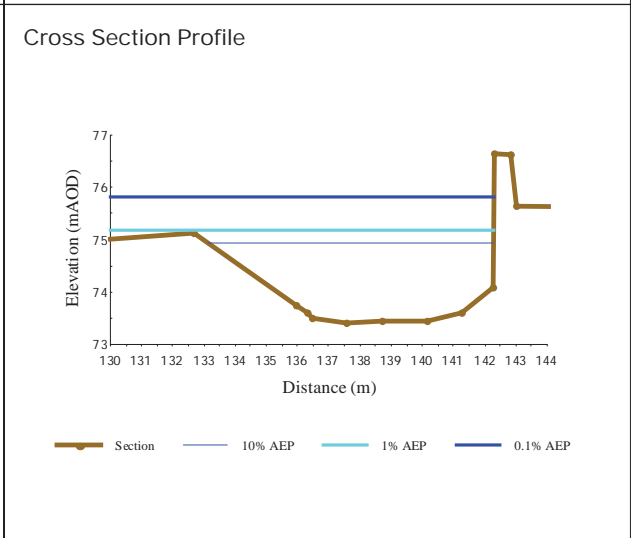
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 Section u/s: 3981d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.949	0.91
2	4.0	41.5	75.038	0.91
3	2.0	49.8	75.108	0.92
4	1.3	55.5	75.154	0.93
5	1.0	59.9	75.194	0.92
6	1.0	71.9	75.306	0.90
7	0.1	111.5	75.827	0.73

Level of Left Bank 75.138 mAOD
 Level of Right Bank 76.650 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3941

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 3981

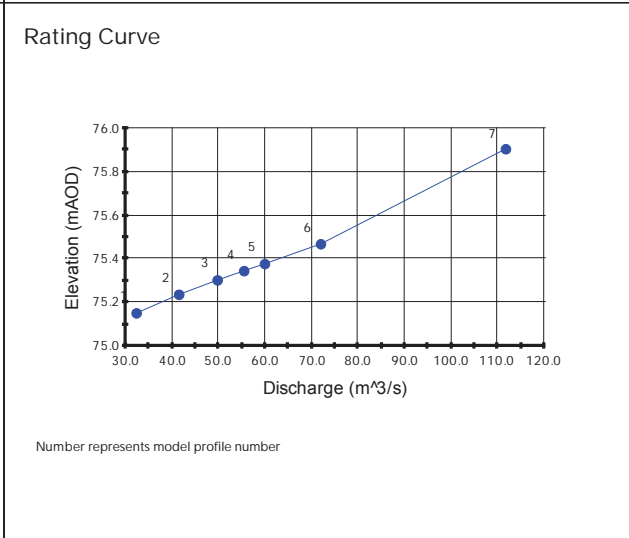
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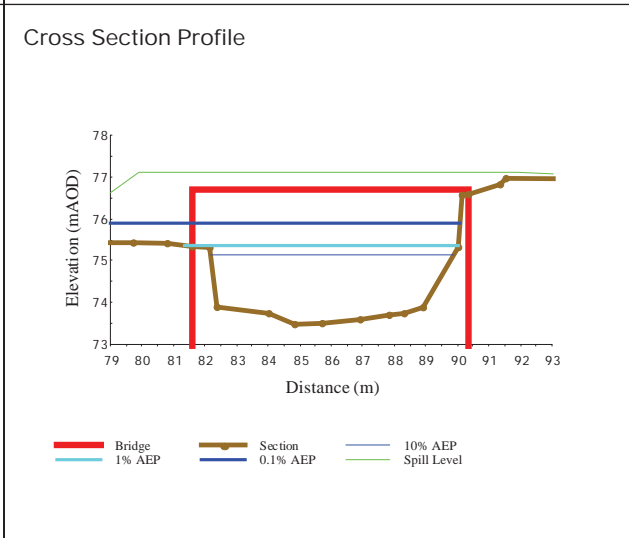
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 Section d/s: 3981d
 Section u/s: 4095



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	75.154	0.47
2	4.0	41.5	75.238	0.49
3	2.0	49.8	75.304	0.52
4	1.3	55.5	75.346	0.53
5	1.0	59.9	75.378	0.54
6	1.0	71.9	75.469	0.55
7	0.1	111.5	75.904	0.49

Level of Left Bank 75.333 mAOD
 Level of Right Bank 76.977 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3981u

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4095

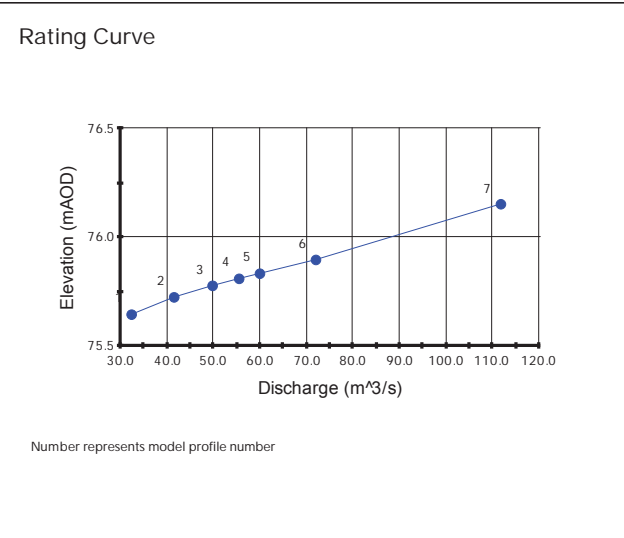
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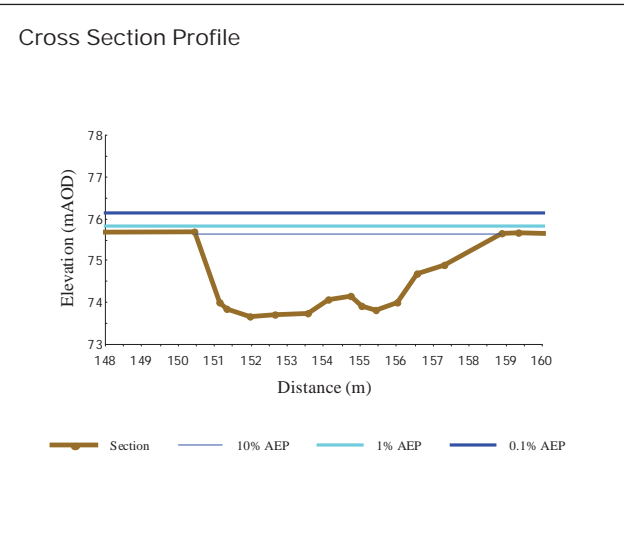
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 Section u/s: 4184d



Summary of Results


Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	75.647	0.89
2	4.0	41.5	75.727	0.86
3	2.0	49.8	75.779	0.89
4	1.3	55.5	75.811	0.91
5	1.0	59.9	75.835	0.92
6	1.0	71.9	75.897	0.96
7	0.1	111.5	76.152	0.97

Level of Left Bank 75.704 mAOD
 Level of Right Bank 75.661 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4095

Location Plan



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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4184


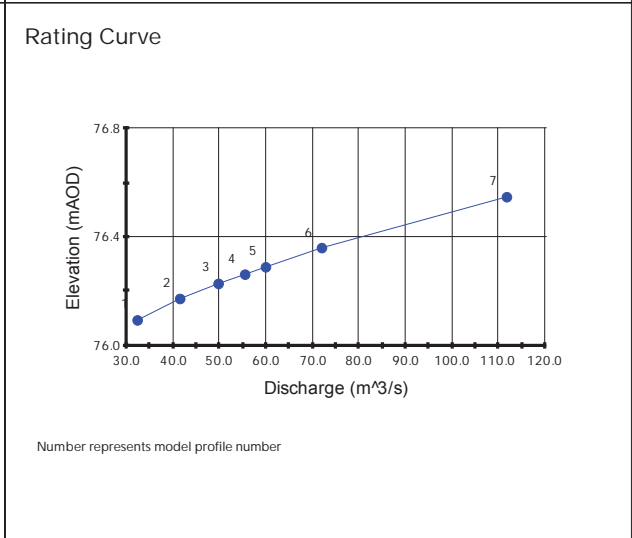
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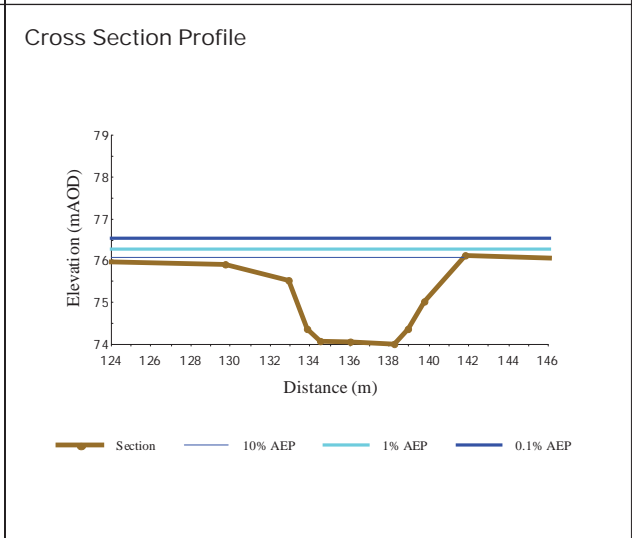
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 Section u/s: 4184u

Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	76.097	0.75
2	4.0	41.5	76.175	0.75
3	2.0	49.8	76.230	0.76
4	1.3	55.5	76.264	0.77
5	1.0	59.9	76.291	0.78
6	1.0	71.9	76.361	0.81
7	0.1	111.5	76.547	0.89

Level of Left Bank 75.926 mAOD
 Level of Right Bank 76.140 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4184d

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4336

Section Type: SECTION

OS NGR: Unknown

Survey Dwg Ref: N/A

Photograph Ref: FENA1_4335a.jpg

Next
 Section d/s: 4184u
 Section u/s: 4436

Rating Curve

Profile No	Discharge (m ³ /s)	Elevation (mAOD)
1	24.8	76.757
2	31.9	76.841
3	38.5	76.901
4	43.0	76.932
5	46.6	76.954
6	55.9	77.016
7	89.0	77.205

Number represents model profile number

Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	76.757	0.83
2	4.0	31.9	76.841	0.78
3	2.0	38.5	76.901	0.78
4	1.3	43.0	76.932	0.80
5	1.0	46.6	76.954	0.81
6	1.0	55.9	77.016	0.84
7	0.1	89.0	77.205	0.94

Level of Left Bank 81.165 mAOD
 Level of Right Bank 76.819 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile

Legend: Section (brown line), 10% AEP (light blue line), 1% AEP (medium blue line), 0.1% AEP (dark blue line)

FENAY BECK: 1: CROSS SECTION NUMBER 4336

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4436

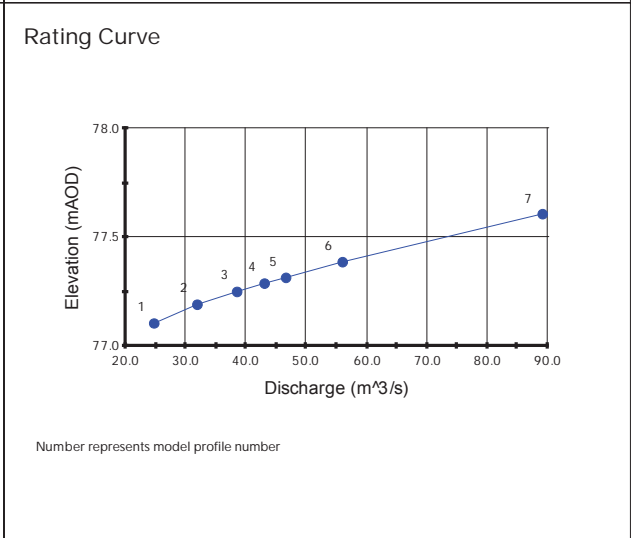
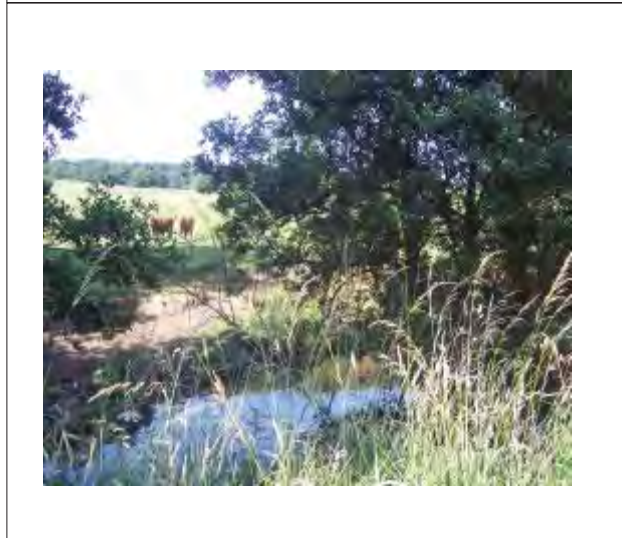
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Survey Dwg Ref: N/A

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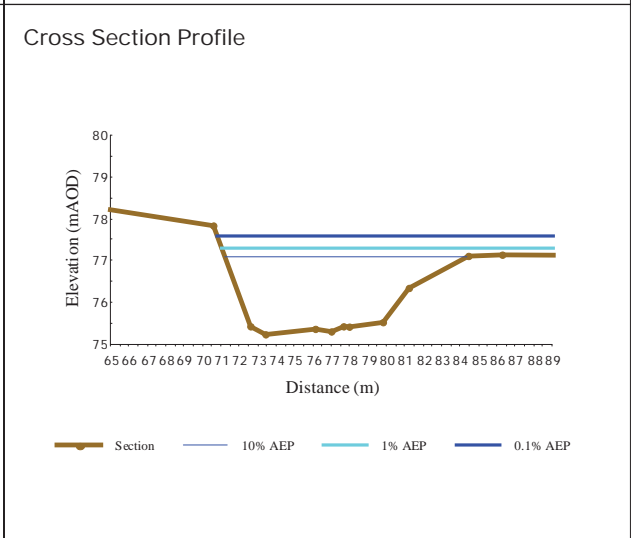
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 Section d/s: 4336
 Section u/s: 4565



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	77.106	0.64
2	4.0	31.9	77.193	0.67
3	2.0	38.5	77.252	0.72
4	1.3	43.0	77.289	0.75
5	1.0	46.6	77.316	0.77
6	1.0	55.9	77.387	0.82
7	0.1	89.0	77.606	0.97

Level of Left Bank 77.846 mAOD
 Level of Right Bank 77.126 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4436

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4565

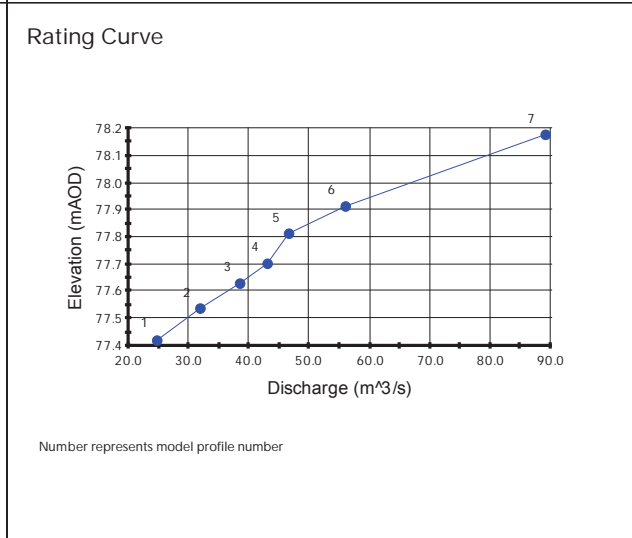
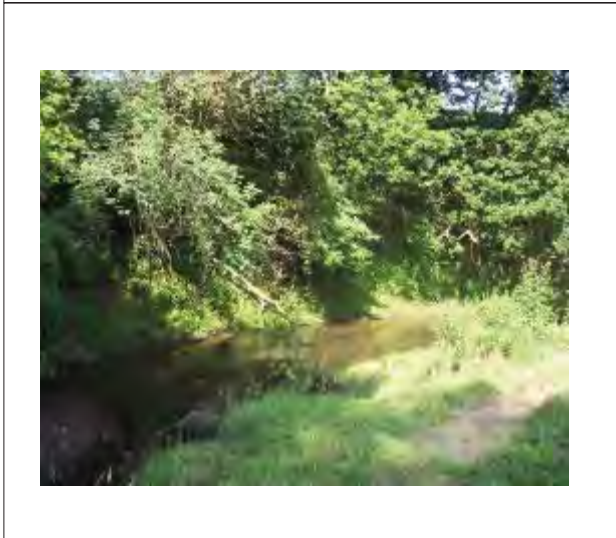
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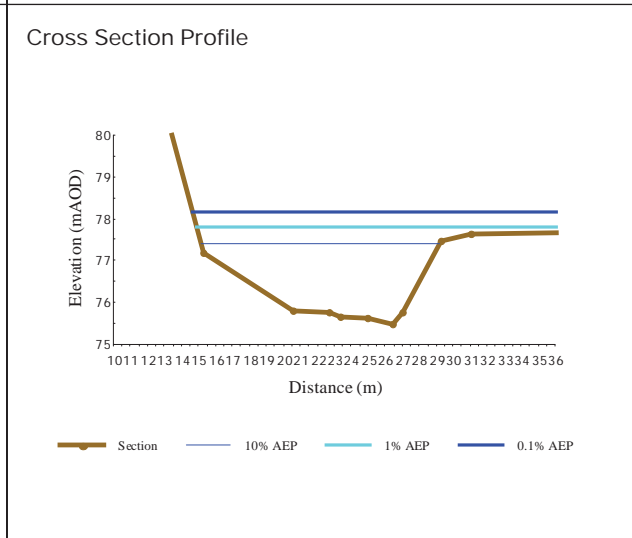
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 Section u/s: 4708d



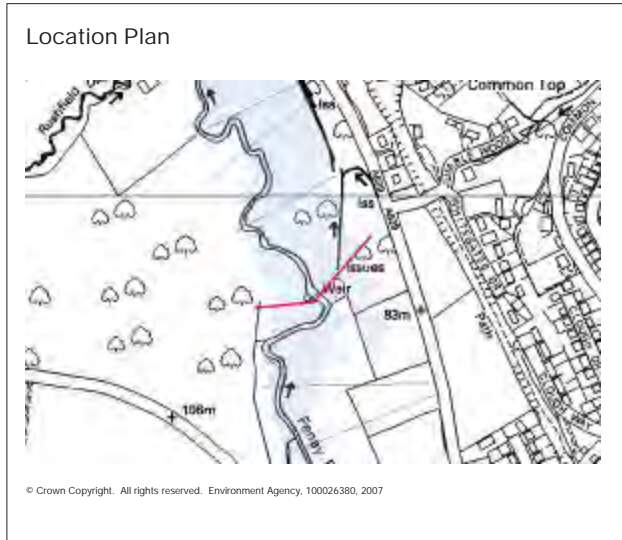
Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	77.422	1.40
2	4.0	31.9	77.540	1.65
3	2.0	38.5	77.631	1.86
4	1.3	43.0	77.704	1.85
5	1.0	46.6	77.814	1.41
6	1.0	55.9	77.913	1.26
7	0.1	89.0	78.175	1.18

Level of Left Bank 77.199 mAOD
 Level of Right Bank 77.647 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4565



Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4708

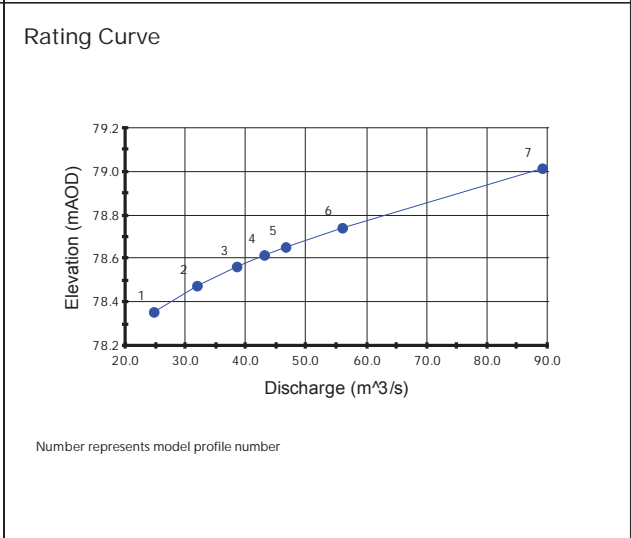
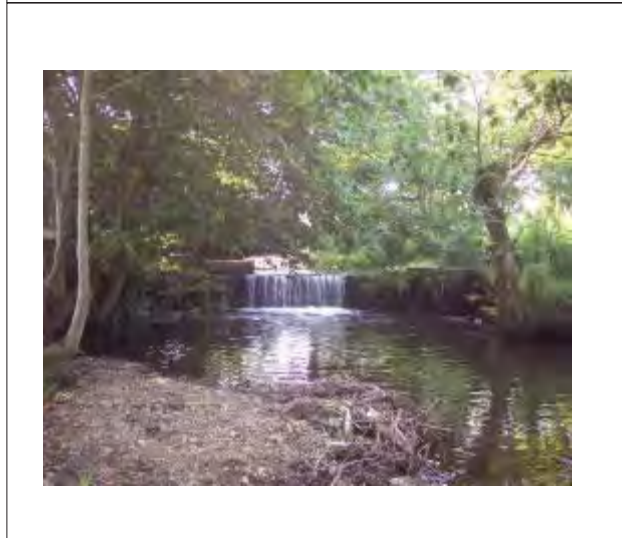
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Survey Dwg Ref: N/A

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Next
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 Section u/s: 4890

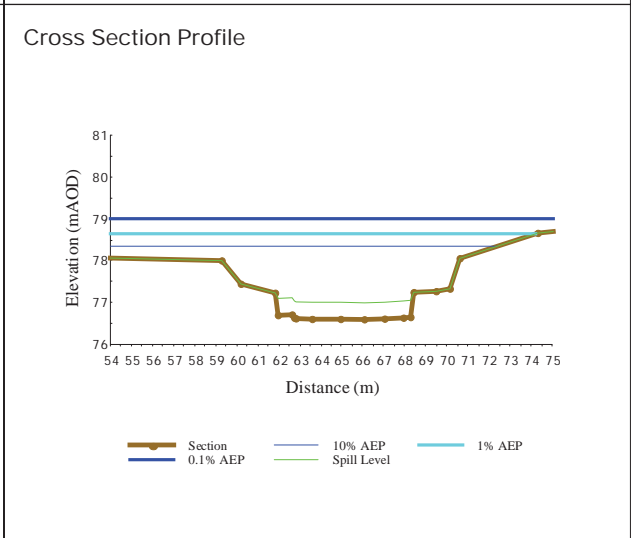


Summary of Results

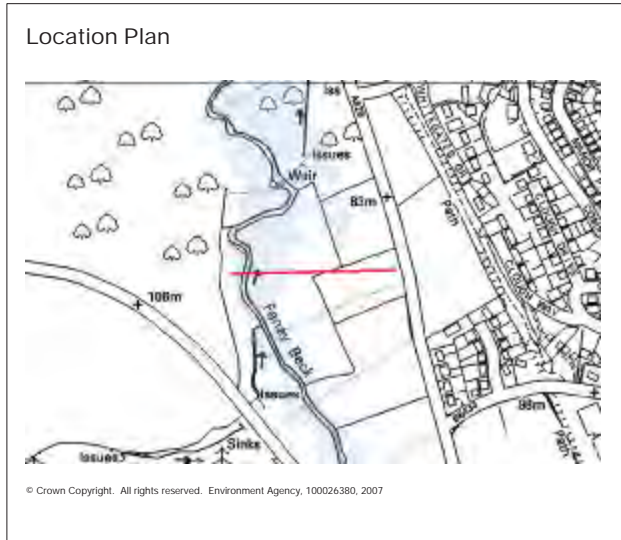
Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	78.358	1.20
2	4.0	31.9	78.478	1.19
3	2.0	38.5	78.566	1.20
4	1.3	43.0	78.618	1.23
5	1.0	46.6	78.655	1.26
6	1.0	55.9	78.742	1.28
7	0.1	89.0	79.015	1.19

Level of Left Bank 78.015 mAOD
 Level of Right Bank 78.070 mAOD

AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)


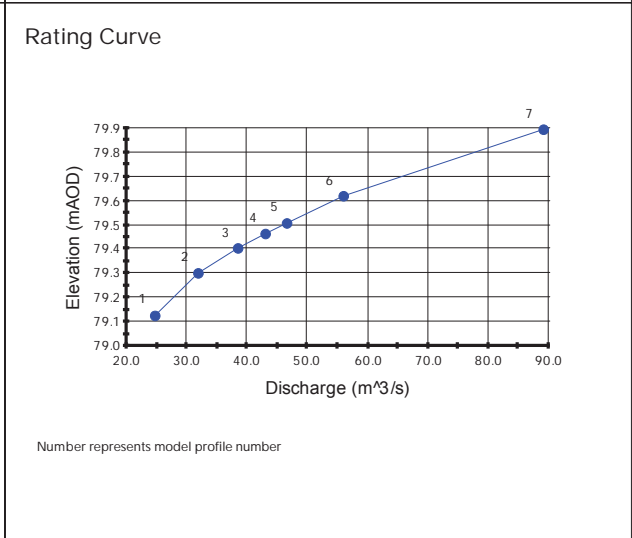
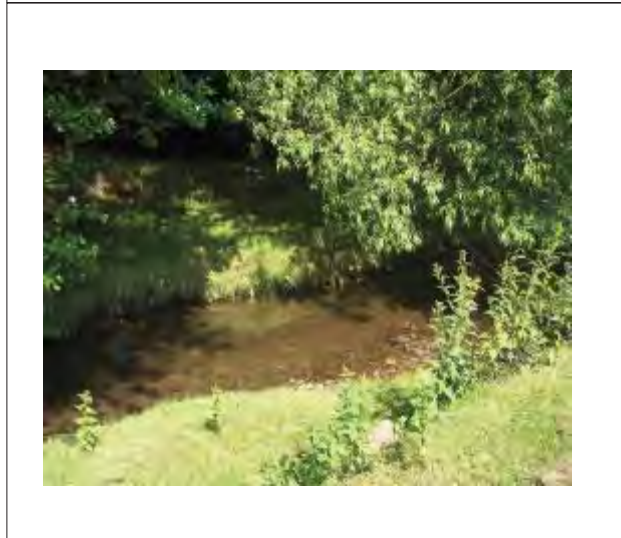


FENAY BECK: 1: CROSS SECTION NUMBER 4708u



Cross Section References

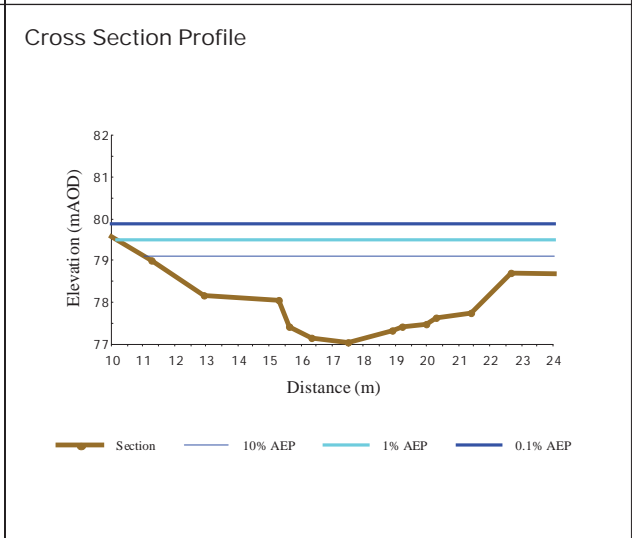
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Reach:	1
Chainage:	4890
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OS NGR:	Unknown
Survey Dwg Ref:	N/A
Photograph Ref:	FENA1_4890a.jpg
Next	
Section d/s:	4708u
Section u/s:	4981

Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	79.127	1.25
2	4.0	31.9	79.303	1.16
3	2.0	38.5	79.405	1.14
4	1.3	43.0	79.464	1.15
5	1.0	46.6	79.508	1.16
6	1.0	55.9	79.620	1.15
7	0.1	89.0	79.893	0.96

Level of Left Bank 78.188 mAOD
 Level of Right Bank 78.720 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4890

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4981

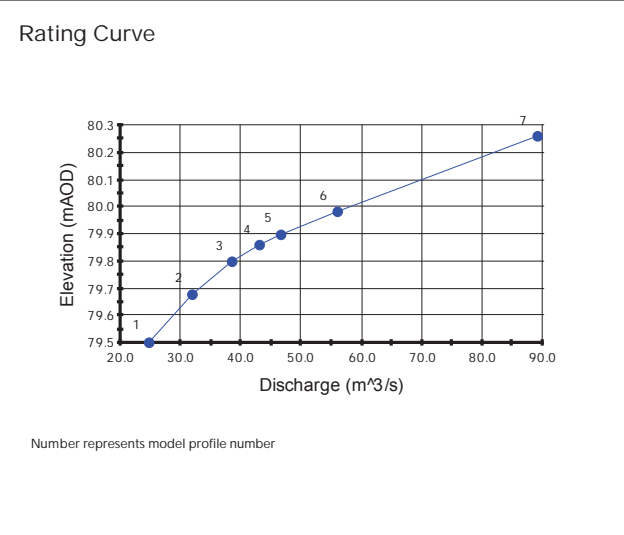
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Survey Dwg Ref: N/A

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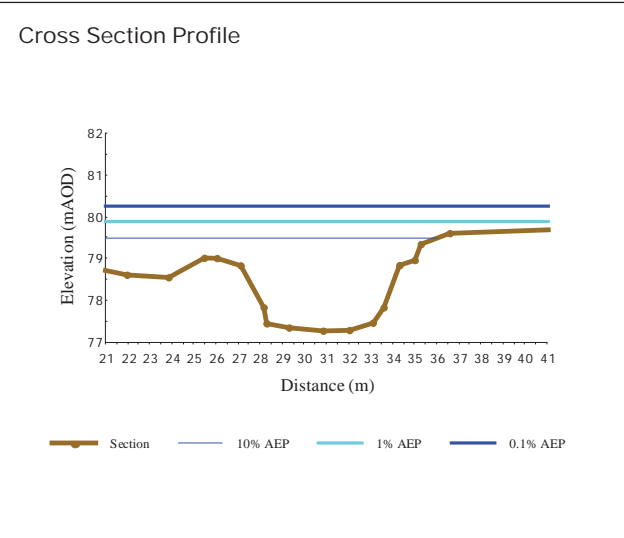
Next
 Section d/s: 4890
 Section u/s: 5087



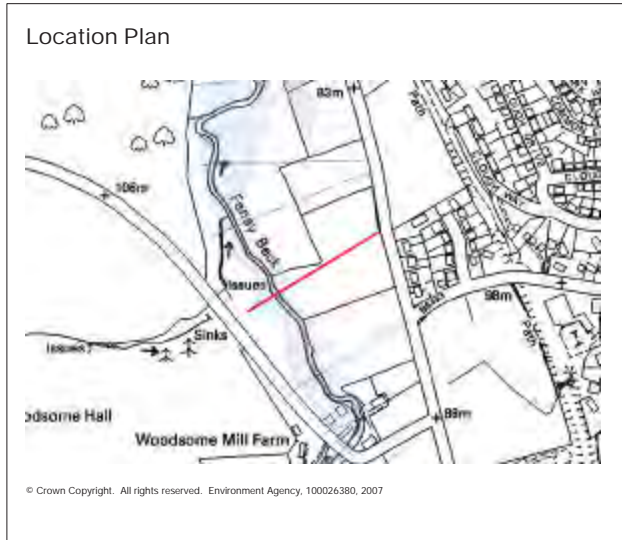
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	79.504	1.16
2	4.0	31.9	79.680	1.24
3	2.0	38.5	79.801	1.31
4	1.3	43.0	79.861	1.34
5	1.0	46.6	79.899	1.37
6	1.0	55.9	79.983	1.48
7	0.1	89.0	80.259	1.76

Level of Left Bank 79.025 mAOD
 Level of Right Bank 79.619 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

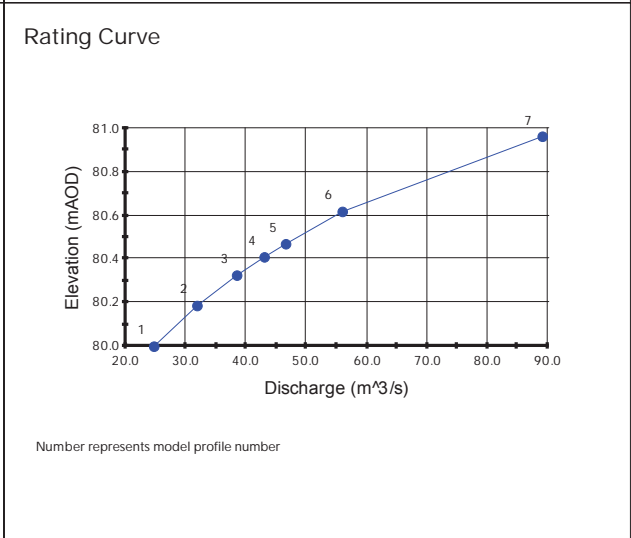


FENAY BECK: 1: CROSS SECTION NUMBER 4981



Cross Section References

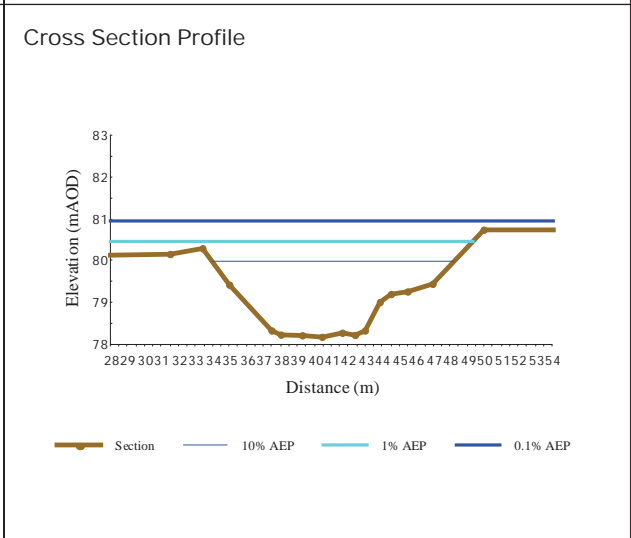
River:	FENAY BECK
Reach:	1
Chainage:	5087
Section Type:	SECTION
OS NGR:	Unknown
Survey Dwg Ref:	N/A
Photograph Ref:	FENA1_5087a.jpg
Next	
Section d/s:	4981
Section u/s:	5209



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	80.000	1.52
2	4.0	31.9	80.187	1.63
3	2.0	38.5	80.326	1.62
4	1.3	43.0	80.409	1.59
5	1.0	46.6	80.470	1.58
6	1.0	55.9	80.617	1.59
7	0.1	89.0	80.960	1.60

Level of Left Bank 80.303 mAOD
 Level of Right Bank 80.745 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5087

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5209

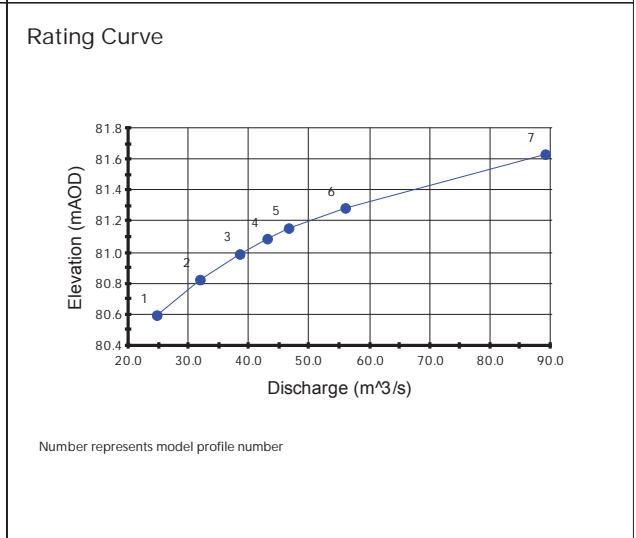
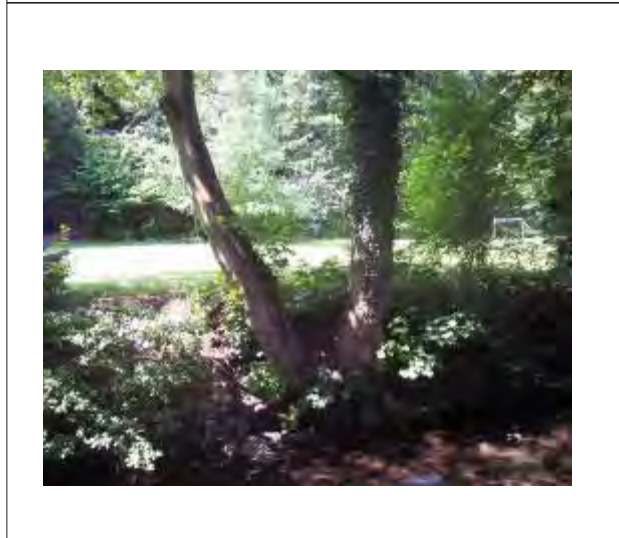
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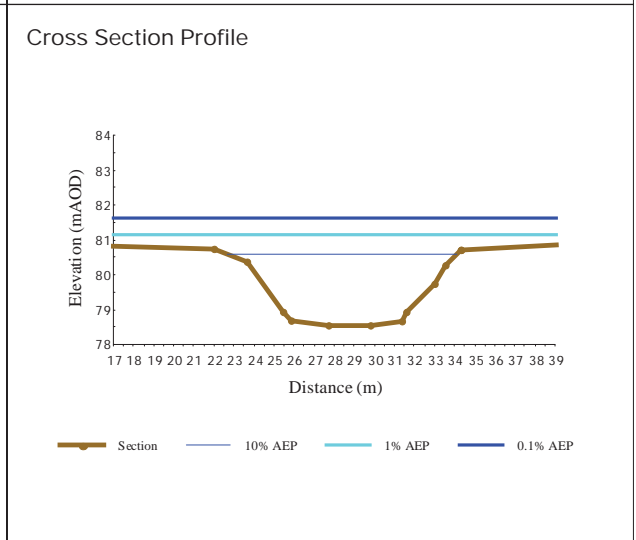
Next
 Section d/s: 5087
 Section u/s: 5298d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	80.601	1.54
2	4.0	31.9	80.828	1.64
3	2.0	38.5	80.991	1.61
4	1.3	43.0	81.089	1.55
5	1.0	46.6	81.158	1.51
6	1.0	55.9	81.286	1.48
7	0.1	89.0	81.631	1.57

Level of Left Bank 80.749 mAOD
 Level of Right Bank 80.726 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5209

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5298

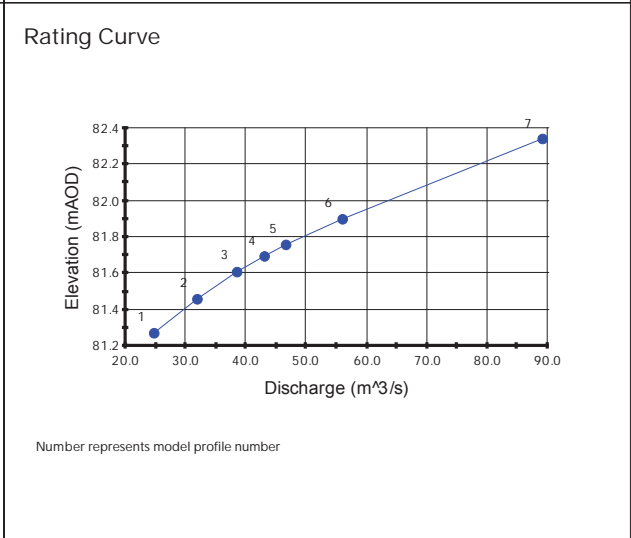
Section Type: BRIDGE, SECTION, SPILL

OS NGR: Unknown

Survey Dwg Ref: N/A

Photograph Ref: FENA1_5298d.jpg

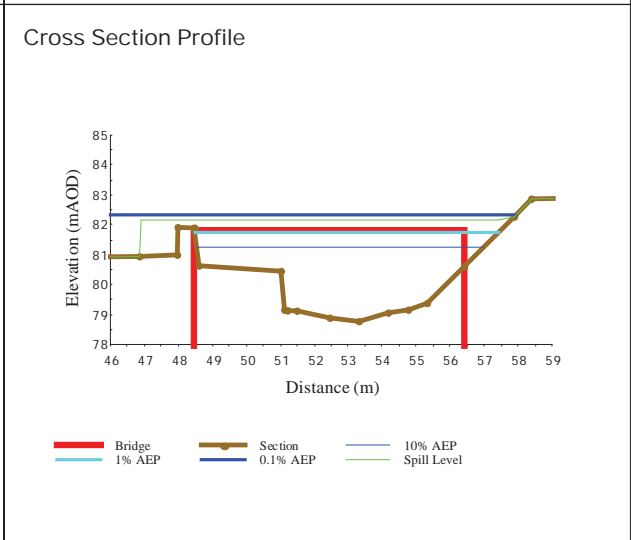
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 Section d/s: 5298d
 Section u/s: 5345d



Summary of Results

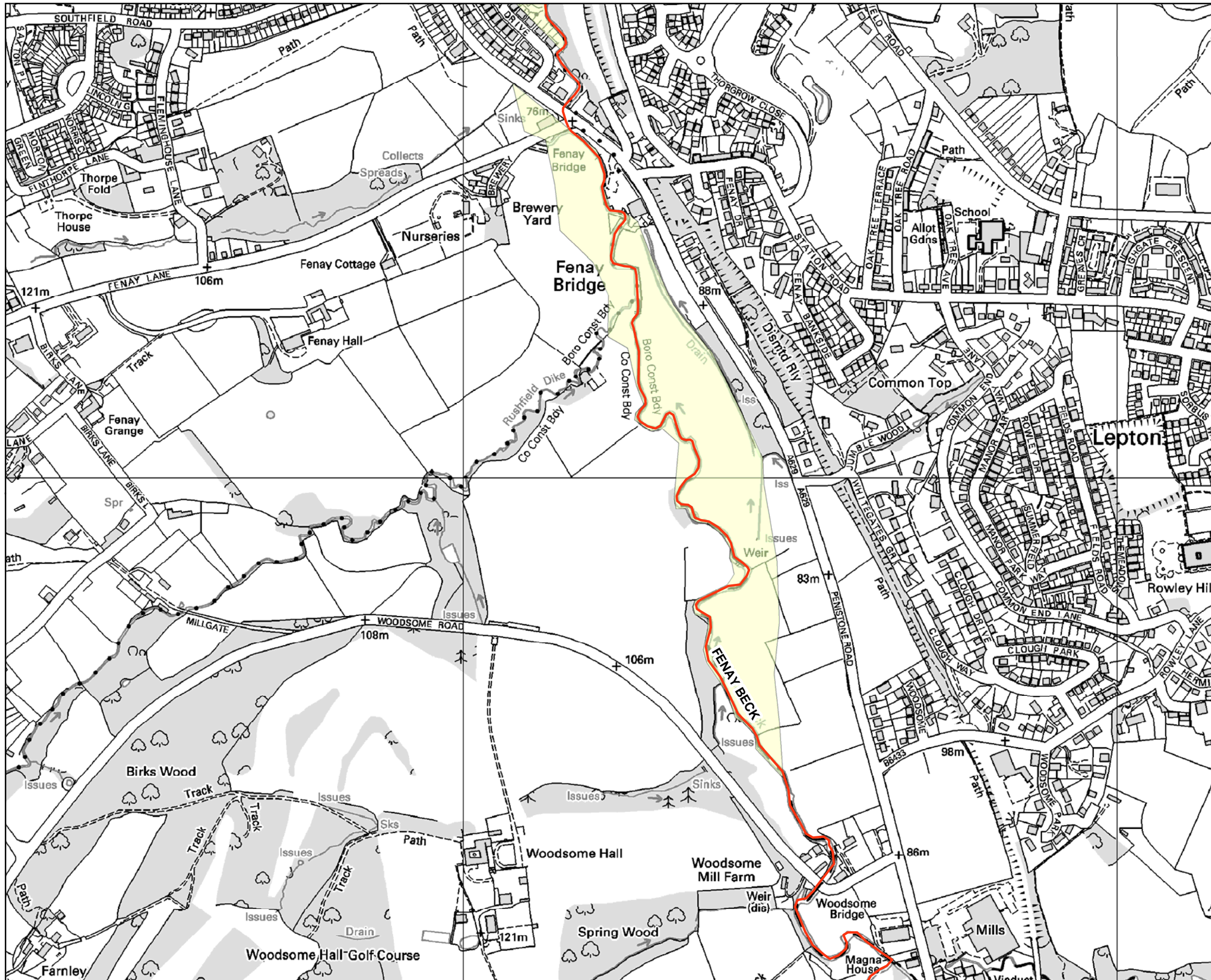
Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	81.273	1.28
2	4.0	31.9	81.462	1.25
3	2.0	38.5	81.611	1.26
4	1.3	43.0	81.697	1.28
5	1.0	46.6	81.759	1.30
6	1.0	55.9	81.900	1.37
7	0.1	89.0	82.340	1.53

Level of Left Bank 81.912 mAOD
 Level of Right Bank 82.281 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5298d

Flood History Map for Woodsome Road/ Penistone Road, Kirklees - dated: 21/06/2013 [Ref: 26205]



www.environment-agency.gov.uk

Scale: 1:6,000

when reproduced @ A3



Flood Extents

Legend

- Main River
- 1970 Flood Event

APPENDIX C – Calculations
Existing Greenfield Run Off Estimate

Sanderson House
Jubilee Way
Huddersfield, WF4 4TD



Date 12/01/2016 10:09
File

Designed by darren.hawkyard
Checked by

Micro Drainage Source Control 2015.1

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	50.000	Urban	0.000
SAAR (mm)	931	Region Number	Region 3

Results l/s

QBAR Rural 127.2
QBAR Urban 127.2

Q1 year 109.4

Q1 year 109.4
Q2 years 120.0
Q5 years 159.0
Q10 years 184.5
Q20 years 208.9
Q25 years 217.0
Q30 years 223.6
Q50 years 240.9
Q100 years 264.6
Q200 years 300.2
Q250 years 311.7
Q1000 years 386.7

109.4 / 50ha = 2.19l/s

2.19 x 13ha = 29.5/s

29.5/s

APPENDIX 5

CONTAINS A MASTERPLAN AND FLOOD RISK ASSESSMENT FOR REJECTED HOUSING
SITE H257 (LAND WEST OF PENISTONE ROAD, FENAY BRIDGE)

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 17 - Land to the west of Penistone Road, Lepton

Site Area: 21.0Ha

Existing Site Description:

The site is made up of open agricultural fields divided by dry stone walls and containing groups of mature vegetation. Areas of vegetation also create enclosure to the edge of the site. Woodsome Beck runs north to south along the eastern boundary, cutting through the site to the north of an area of mature woodland. Woodsome Hall Lane forms the western boundary, with Penistone Road to the east. The site slopes from west to east towards Woodsome Beck, with a level area surrounding the Beck, before sloping up again towards Penistone Road. Woodsome Hall Golf Club is located to the west, with views across Woodsome Hall Lane. The site wraps around an existing commercial development and properties to the west of Penistone Road.

Planning Context:

The site is located within Green Belt, however, it is being actively promoted by Farnley Estates to be allocated as an "Accepted-Site Option" in the Kirklees Council Draft Local Plan - November 2015.

The site sits within the Fenay Beck Corridor Strategic Green Infrastructure Network and, abuts areas of the Kirklees Wildlife Habitat Network, as identified within the Draft Local Plan.

Part of the northern and eastern areas of the site sit within EA Flood Zones 2 and 3, and SFRA Flood Zone 3a, as identified in the Draft Local Plan.

Part of the site abuts the Highburton Conservation Area boundary, as identified within the Draft Local Plan.

Landscape Character Area:

The site is located within National Character Area (NCA) **37: Yorkshire Southern Pennine Fringe** and the Kirklees District Landscape Character Assessment: **G9: Fenay Beck Valley & Tributaries**. A site visit was also undertaken to carry out a localised character assessment.

The landscape character of the site and its surrounding area can be summarised as:

- made up of the main valley of the Fenay Beck River
- broadleaved woodland cover
- regular fields of medium scale, with smaller fields found around the edges of settlements. Land is predominantly pastoral with occasional arable use.
- field boundaries are commonly hedgerows or stone walls



Site photograph looking to the north-west from Penistone Road at eastern edge of Site 17

- visually enclosed along the bottoms of the valleys

Existing landscape features and assets:

Topography: Rolling: sloping towards Woodsome Beck with a level area directly surrounding the beck.

Vegetation Cover: Generally open within the site, with scattered trees along field boundaries and mature woodland belts to the majority of the site boundary.

Public Rights of Way: Non through the site

Ecological Features: Mature vegetation

Water features and Flood Zones: Fenay Beck and Rushfield Dike (Areas within EA Flood Zones 2 and 3 and SFRA Flood Zone 3a)

Visual Analysis:

A site visit was undertaken to carry out a visual appraisal of key views into and out of the site. Due to the sloping nature of the site, clear views are afforded to the west across Woodsome Beck towards mature woodland surrounding Woodsome Hall Golf Club. From within the site, Penistone Road is a prominent feature due to its elevated nature.

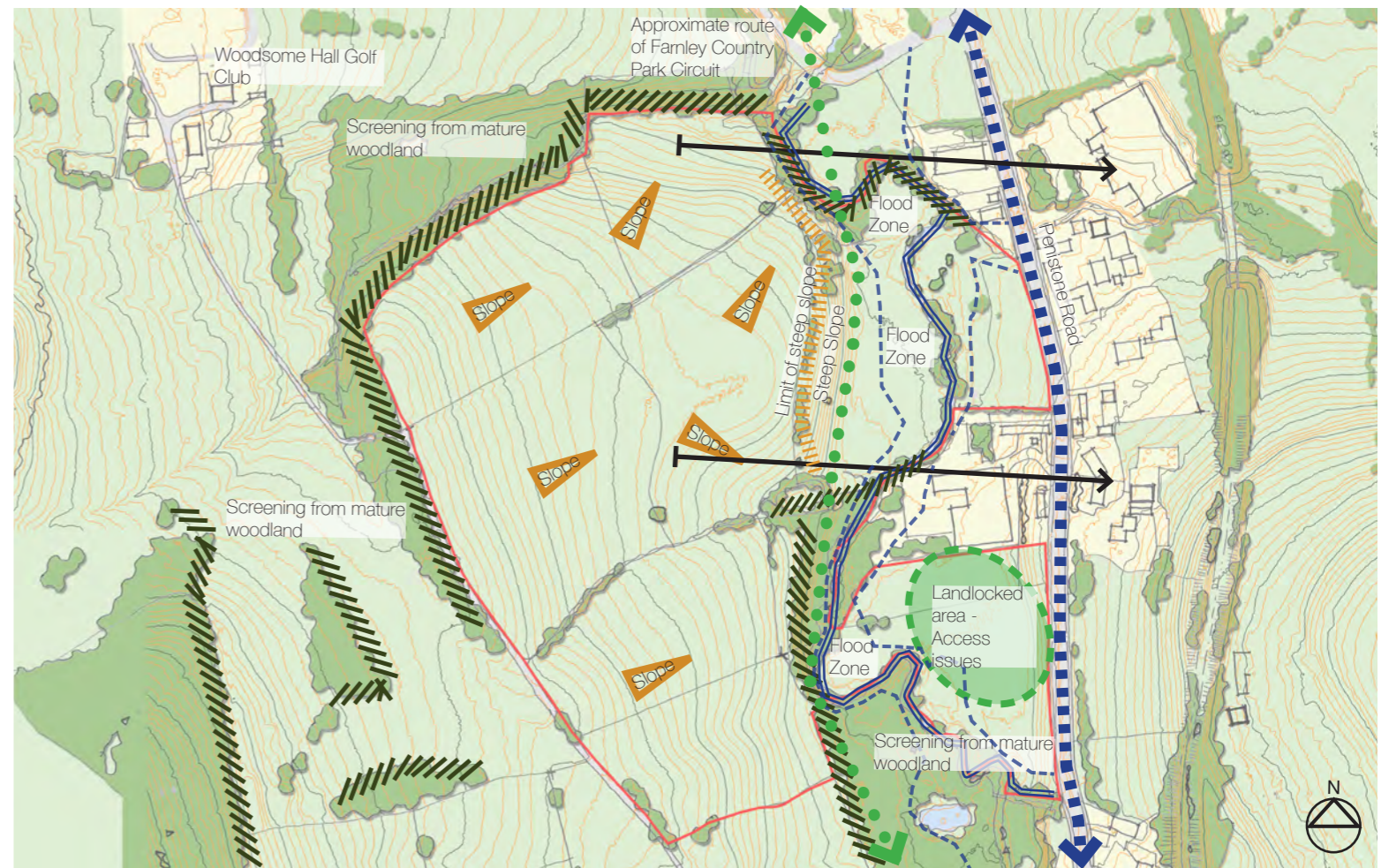
Aims for Landscape and Masterplan Strategy:

The key feature of the proposals will to:

- respond to the site and its context; and
- develop a robust landscape structure and framework that delivers a multi-functional green infrastructure within which development can take place.

The aim of the green infrastructure will be to:

- Provide wildlife habitats to enhance the local ecological value;
- Provide space for recreational and amenity use;
- Creating a network of engaging green spaces;
- Connecting the development with the surrounding landscape;
- Integrating the development proposals into the local landscape



Landscape Analysis Plan. NTS



Landscape Opportunities and Structure Plan. NTS

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

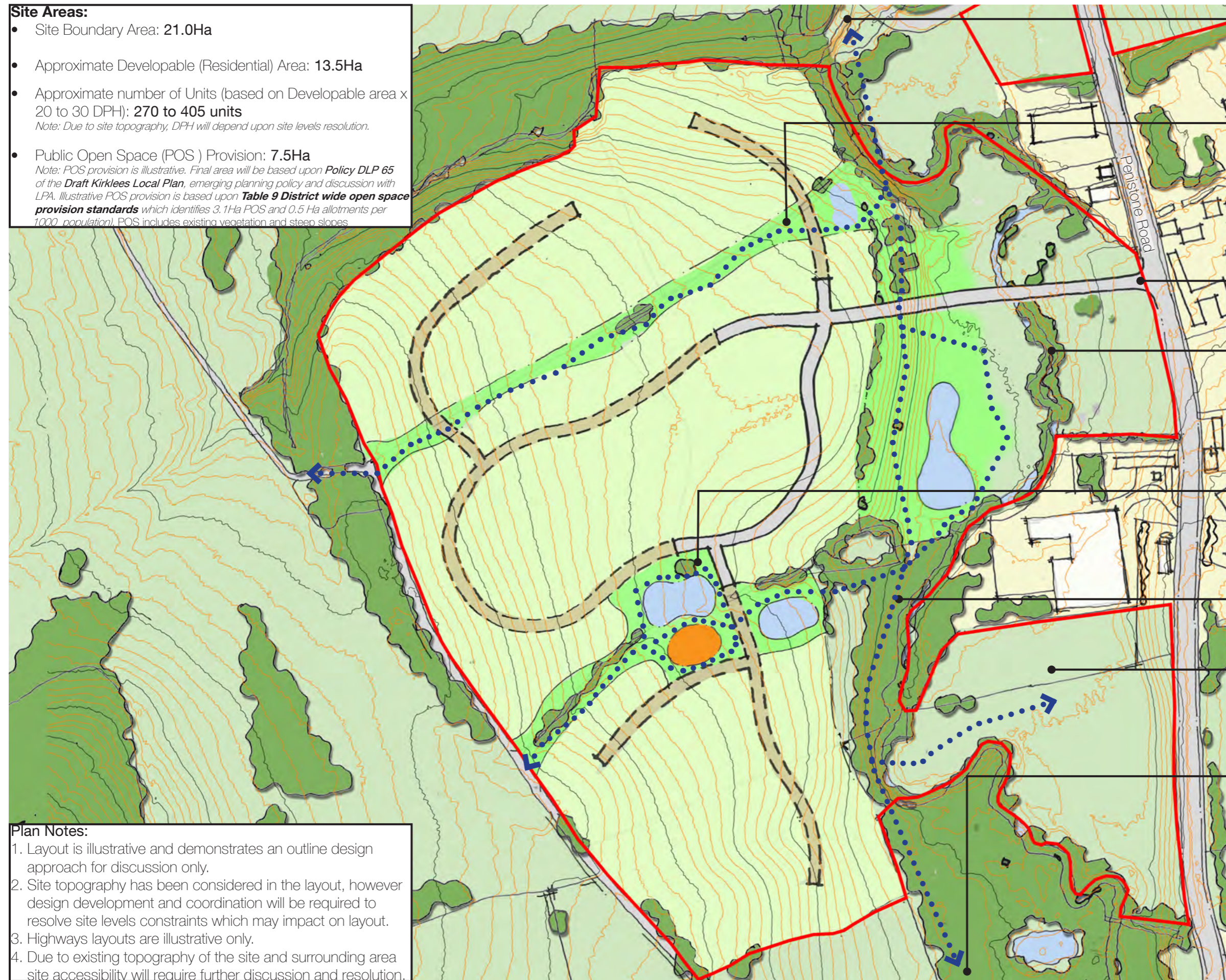
Site 17 - Land to the west of Penistone Road, Lepton

Site Areas:

- Site Boundary Area: 21.0Ha
- Approximate Developable (Residential) Area: 13.5Ha
- Approximate number of Units (based on Developable area x 20 to 30 DPH): **270 to 405 units**
Note: Due to site topography, DPH will depend upon site levels resolution.
- Public Open Space (POS) Provision: **7.5Ha**
Note: POS provision is illustrative. Final area will be based upon Policy DLP 65 of the Draft Kirklees Local Plan, emerging planning policy and discussion with LPA. Illustrative POS provision is based upon Table 9 District wide open space provision standards which identifies 3.1Ha POS and 0.5 Ha allotments per 1000 population. POS includes existing vegetation and steep slopes

Plan Notes:

1. Layout is illustrative and demonstrates an outline design approach for discussion only.
2. Site topography has been considered in the layout, however design development and coordination will be required to resolve site levels constraints which may impact on layout.
3. Highways layouts are illustrative only.
4. Due to existing topography of the site and surrounding area site accessibility will require further discussion and resolution.



- Connection to wider Farnley Country Park Circuit.
- POS running through the development connecting existing landscape features. Potential to incorporate pedestrian links (as part of wider Farnley Country Park Circuit), play area and SuDs features to create connected multifunctional Green Infrastructure Houses fronting onto space to be aligned with secure by design principles.
- Vehicular Access via bellmouth on Penistone Road
- Fenay Beck and floodplain area - developed as amenity and habitat space with trails connecting into wider footpath network. SuDs features created along this area subject to flood risk assessments.
- Green link through development connecting existing landscape features. Potential to incorporate pedestrian links (as part of wider Farnley Country Park Circuit), play area and SuDs features to create connected multifunctional Green Infrastructure
- Trail along Fenay Beck connected into development and wider Farnley Country Park Circuit.
- Fenay Beck floodplain area - area developed as POS for either sport, amenity or habitat enhancement subject to discussions with LPA and identification of need and requirement through open space studies.
- Connection to wider Farnley Country Park Circuit.

Note: Plan is illustrative only. Final design and layout subject to detail design, site surveys and coordination with other consultants and LPA.



Prepared on behalf of

Farnley Estates Ltd

FLOOD RISK ASSESSMENT

**Proposed Development
Farnley Tyas, Huddersfield
Allocation 17**

Flood Risk Overview

Acknowledgements:

Environment Agency

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

Any information provided by third parties and referred to herein has not been checked or verified by Sanderson Associates (Consulting Engineers) Ltd, unless otherwise expressly stated within this report.

This report was checked and approved on the 19 January 2016 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

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Report Ref:	9069/DH/007/01	January 2016	
Author:	Darren Hawkyard		
Checked & Approved:	Thomas Walker	Date:	19 January 2016

Contents

Page No

1	Introduction.....	5
2	Existing Situation	6
3	Consultations.....	7
4	Flood Risk.....	8
5	Drainage Constraints	10
6	Conclusion.....	12

Appendices

Appendix A - Drawings

Site Location: 9069/001

Flood Extent Plan: 9069/701

Appendix B - Consultations

Environment Agency

APPENDIX C – Calculations

Existing Greenfield Run Off Estimate

1 Introduction

- 1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Overview for possible development sites Farnley Tyas, Huddersfield. The aim of this assessment is to discuss the present and future flood risk to the site and to assess possible uses and mitigation measures required. The location of the site is shown on drawing 9069/001 contained in Appendix A.
- 1.2 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF) March 2012 and the associated Planning Practice Guidance, 2014.
- 1.3 Consultation with Environment Agency (EA) has taken place. The consultation response is discussed in Section 3 and contained within Appendix B.
- 1.4 Each site allocation will be separated into individual reports and assessed on their own merits. A site Location plan showing each of the site allocations is located in Appendix A.

2 Existing Situation

2.1 *Existing Site Description*

2.1.1 The site is currently open fields and located to the west of Penistone Road, Huddersfield. Drawing 9069/001 included in Appendix A shows the site limits and location.

2.1.2 Access is currently gained from Woodsome Mill Farm via Woodsome Road.

2.1.3 The site is bound to the north by Woodsome Mill Farm with Penistone Road and Dogley Lane bounding the site to the east. Woodsome Hall Lane bounds the site to the west with adjoining fields to the south.

2.1.4 The closest main river is the Fenay Beck which runs through the site.

2.2 *Existing Site Analysis*

2.2.1 The site area is 215,000m² (21.5Ha) taken from information provided by the client is considered to be permeable (not positively drained). Therefore the site is considered to be 0% impermeable and 100% permeable.

2.2.2 The estimated Greenfield Surface Water runoff rate from the site has been assessed using WinDES Source Control software. The run off rate has been calculated at 47.00l/s or 2.19l/s/Ha for a 1 in 1 year return period (IH124 Method requires calculations based on 50Ha reduced to the site area). The WinDES output files are contained within Appendix C.

2.2.3 The topography of the site generally grades from south to north. Levels range from approximately 119.0m AOD at the western boundary of the site to 84.00m AOD adjacent to the Fenay Beck running through the site.

3 Consultations

- 3.1 As part of this assessment, the Environment Agency (EA) information has been reviewed in relation to flood zones and groundwater. All responses are contained in Appendix B.
- 3.2 At the time of writing the report the Environment Agency has not provided the relevant flood model data for the site.
- 3.3 The Environment Agency online map shows that the site falls within Flood Zones 1 and 2 with the worst case scenario of a between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%).
- 3.4 The Environment Agency website show that the site is not within a Groundwater Source Protection Zone.

4 Flood Risk

- 4.1 The main risk of flooding to the site comes from the Fenay Beck which runs through the site. No flood defences are located within close proximity to the site.
- 4.2 The Environment Agency confirms that the site falls within Zones 1 and 2 with the worst case scenario of a between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%).
- 4.3 Drawing 9069-701 contained within Appendix A shows the flood extents of Flood Zone 1, 2 and 3 based upon the Environment Agency online maps as at the time of writing the report the Environment Agency has not provided the relevant flood model data for the site.
- 4.4 There are no constraints to the type of proposal on this allocation assuming that building structures are located wholly within Flood Zone 1. Areas of the site that are located within Flood Zone 2 and 3 should be allocated for car parking and access roads.
- 4.5 Upon receiving the Environment Agency flood model data drawing 9069-701 will be updated to show a more detailed flood extents plan.
- 4.6 There are no constraints to the type of proposal on this allocation assuming that building structures are located wholly within Flood Zone 1.
- 4.7 The Environment Agency online surface water mapping shows areas of modelled surface water flooding in the northern area of the site, in the location of the extensive area fluvial Flood Zone 3. The EA classify this flooding to have an annual probability of occurring at between a 1 in 100 and 1 in 1000 and is deemed to have a low risk.

- 4.8 Mitigation measures can be implemented within the Full Flood Risk Assessment to ensure surface water localised to, and conveyed within the sites road network would not affect any of the proposed development.

5 Drainage Constraints

5.1 The current building regulations, Part H3, detail the favoured hierarchy of surface water disposal being in order of preference, to ground by infiltration, to watercourse and then to sewer.

1. Infiltration

2. Watercourse

3. Sewer

1. Infiltration Drainage

5.2 Infiltration methods of drainage such as soakaways and filter drains percolate surface water runoff allowing it to permeate into the subsoil at its natural rate mimicking the natural process of drainage and as such are subject to the local ground conditions.

5.3 The Local Authority will request that a site investigation is carried out to deem whether infiltration methods are viable within the site.

2. Discharge to Watercourse

5.4 If the above is not deemed viable the Local Authority will accept discharge to watercourse. The closest main watercourse to the site is the Fenay Beck which is runs through the site.

5.5 The Environment Agency and internal drainage board would have be consulted in regards to agreeing an acceptable discharge rate into the Fenay Beck. A rate no greater than 1.4l/s/ha for discharge into local watercourse is normally requested.

3. Discharge to Sewer

- 5.6 If neither of the above are deemed viable Yorkshire Water should be consulted in order to agree possible surface water outfall. In addition Yorkshire Water will have to be consulted to agree a point of foul connection.

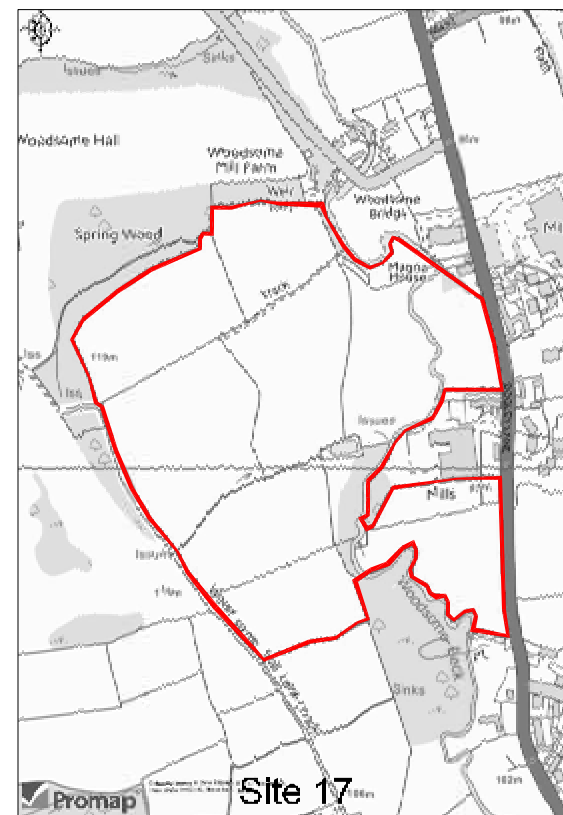
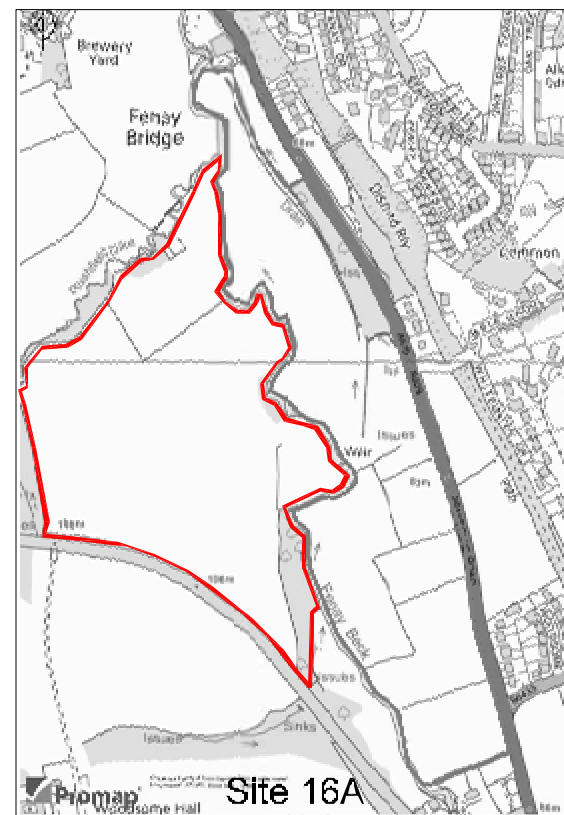
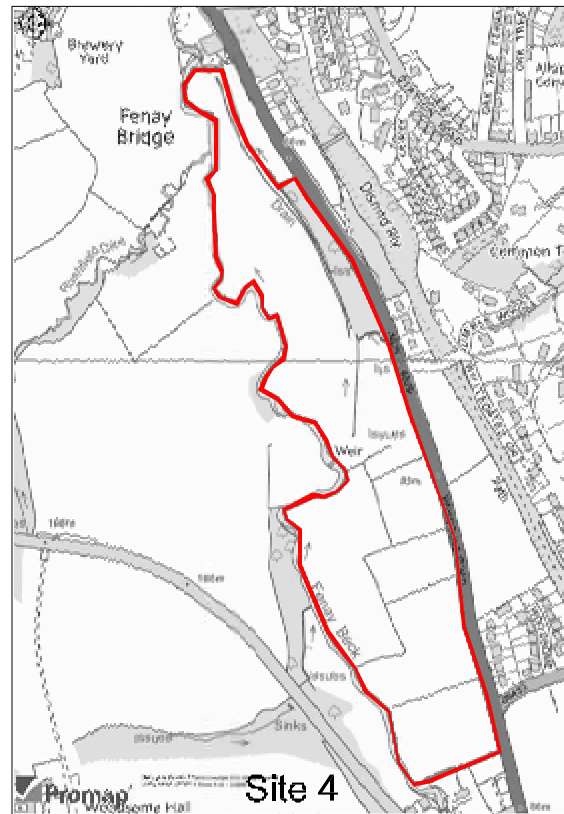
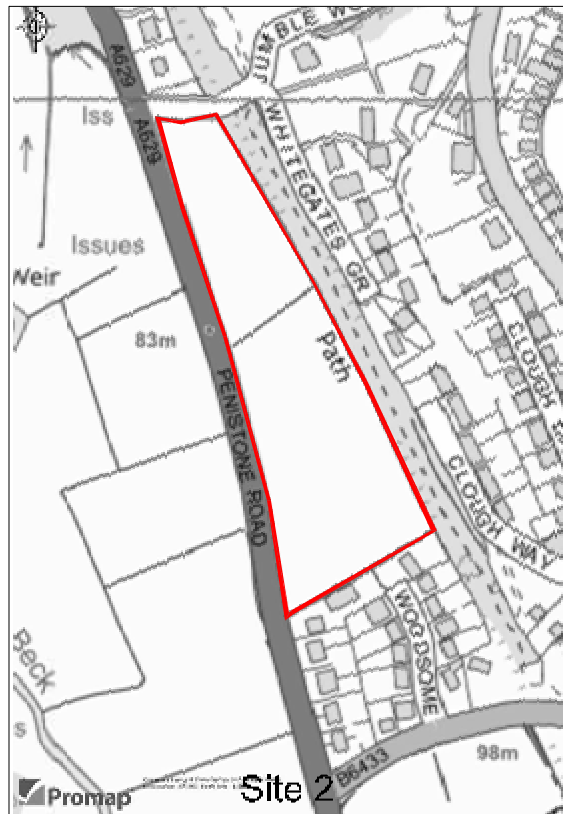
6 Conclusion

- 6.1 This flood risk overview serves to review and assess the sources of potential flooding to the site
- 6.2 As concluded in section 3 the site is considered to lie within Flood Zone 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%).
- 6.3 All buildings should be located wholly within Flood Zone 1.
- 6.4 In line with current guidance the Environment Agency would require an 8-10m undeveloped easement, measured from the top of river bank, in order to safeguard future channel maintenance and emergency access to the watercourse.
- 6.5 A full flood risk assessment and surface water management strategy would have to be written and submitted to the Local Authority in order to gain planning permission. This document serves as an overview to inform the client of possible risk and constraints that could arise at the site.

Appendix A - Drawings

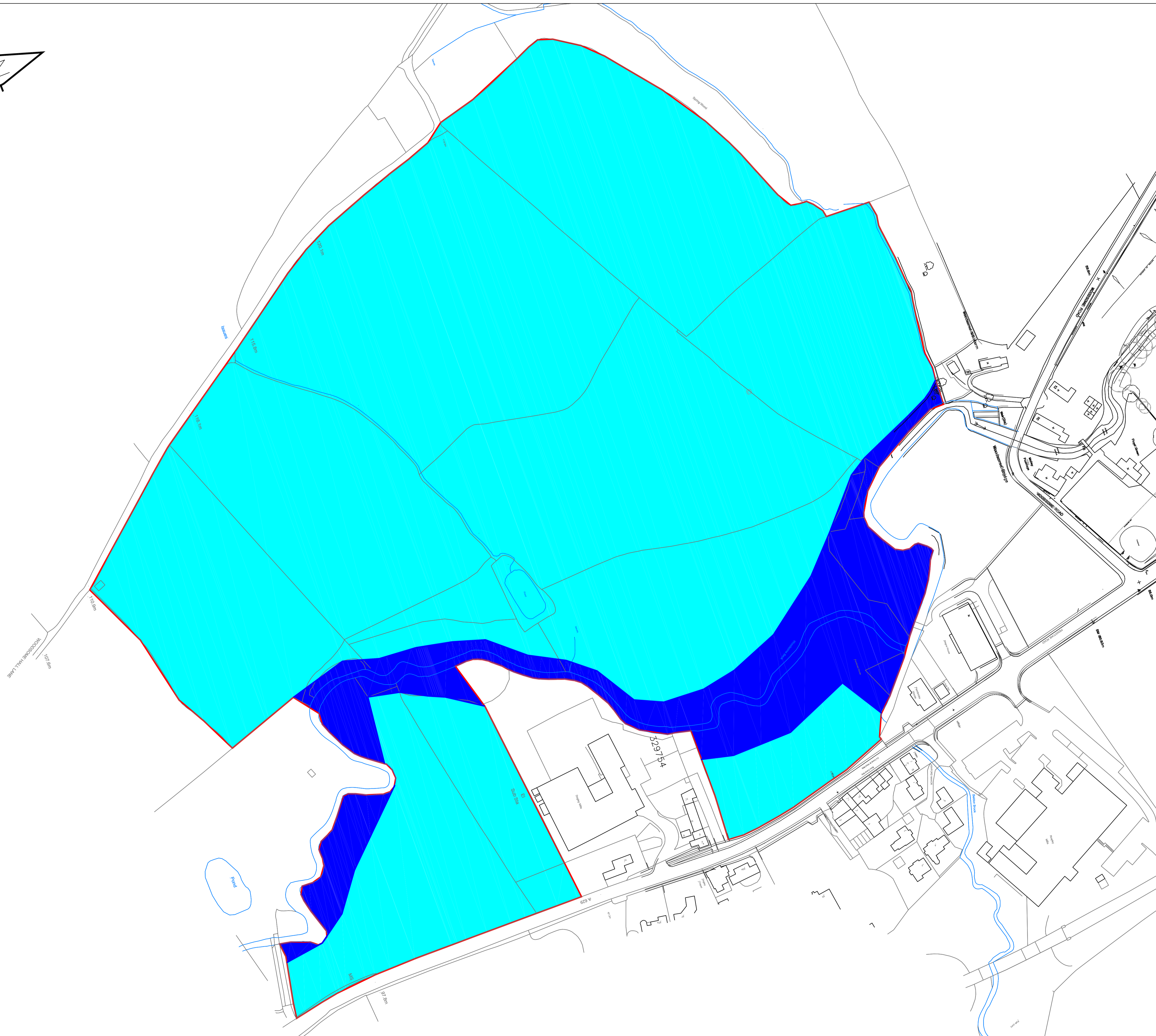
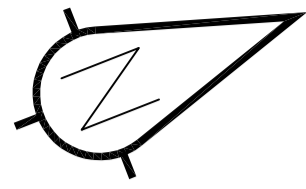
Site Location: 9069/001

Flood Extent Plan: 9069/701





Scale	NTS	Drawn By	KB
Drawing Size	A3	Checked By	AND
Date	Jan. 2016	Approver By	AND
	Drawing Number	Rev	
	9069-001		

Rev	Amendment	Drawn	Date	Checked
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- Sanderson Associates (Consulting Engineers) Ltd ("the consultant"), has not checked or verified, and shall have no liability whatsoever for any inaccuracies which may be attributable to any data, reports, base plans(s) and drawings provided by the client, or purchased by the consultant on the client's behalf, that may have been utilised within this drawing.
- The consultant shall not be liable for the use by any person of any document for any purpose other than that for which the same were provided by the consultant.
- No liability whatsoever is accepted by the consultant for any error or omissions.
- The consultant accepts no liability for any vehicle specification errors within the vehicle track software used and / or it's vehicle libraries.
- The locations of utilities apparatus, if shown, is reproduced from plans supplied to the consultant, although care has been taken when duplicating this information. These locations are approximate only and no guarantees can be given for their accuracy. It is the client's or it's appointed agent/contractors responsibility to verify the exact locations on site by hand dug trial holes or other appropriate means prior to mechanical excavation.
- Service connections are not shown but their presence should be anticipated.
- Reference to any third party equipment shown on this drawing was only relevant at the time the drawing was prepared.
- It is the client's responsibility to ensure that any equipment ordered meets the design.

-  - Flood Zone 2 and 3
-  - Flood Zone 1 (Developable Land)

Rev	Amendment	Drawn	Date	Checked




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F 01924 844081 www.sandersonassociates.co.uk

Client
Farnley Estates Ltd

Project Title
**Proposed Development
Farnley Tyas, Huddersfield
Allocation 17**

Drawing Title
Flood Extent Plan

Scale	1:1250	Drawn By	DH
Drawing Size	A1	Checked By	IE
Date	Jan 16	Approved By	IE

	Drawing Number	Rev
	9069-701	

Appendix B - Consultations
Environment Agency

Flood Map Woodsome Road/ Penistone Road, Kirklees - Date Created: 21/06/2013 Ref: 26205



www.environment-agency.gov.uk





Scale: 1:10,000

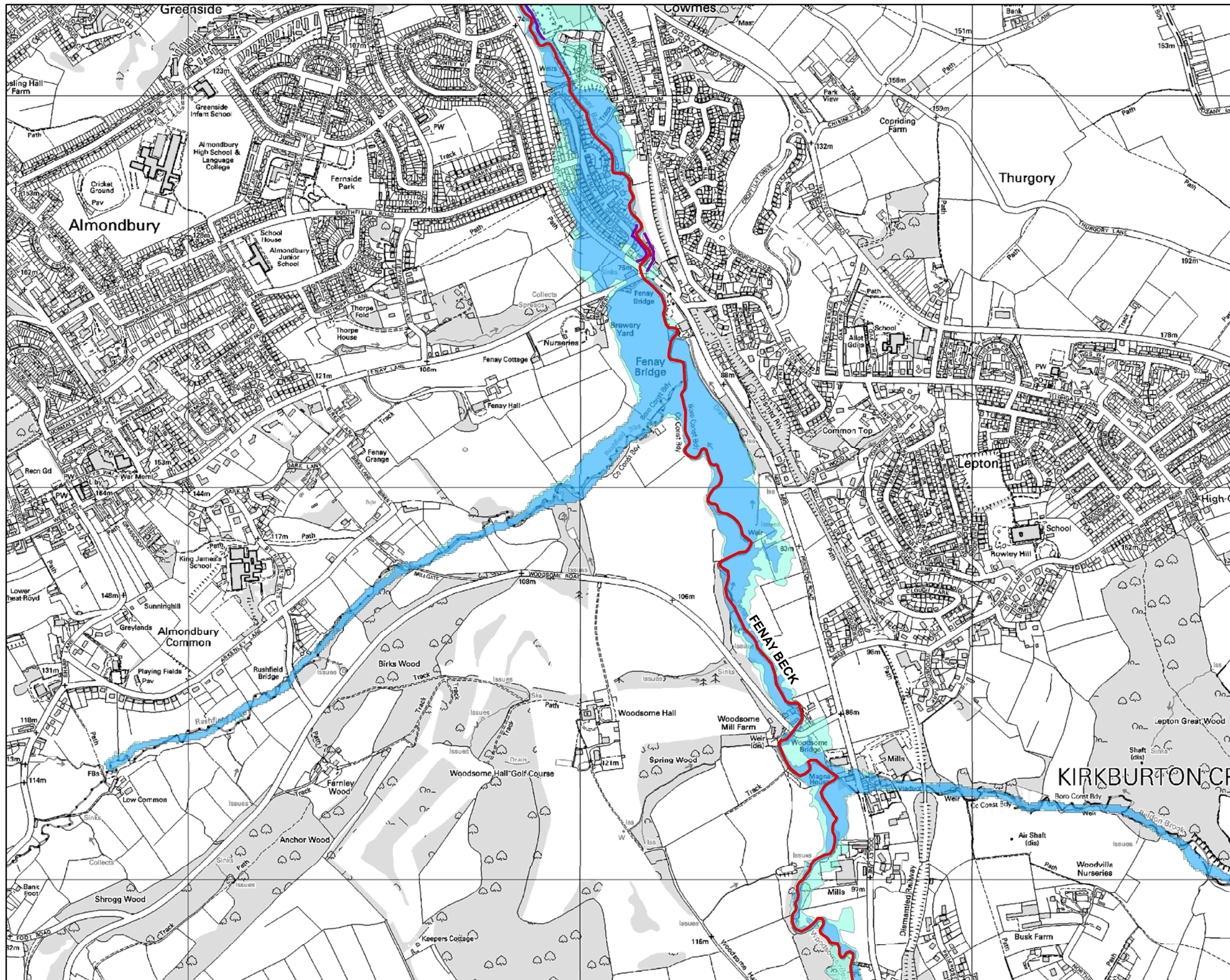


when reproduced @ A3



LEGEND

-  Main River
-  Flood Map Flood Defences
-  Flood Zone 3 (FZ3)
-  Flood Zone 2 (FZ2)



APPENDIX C – Calculations
Existing Greenfield Run Off Estimate

Sanderson House
Jubilee Way
Huddersfield, WF4 4TD

Designed by darren.hawkyard



Date 12/01/2016 10:09
File

Checked by

Micro Drainage Source Control 2015.1

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	50.000	Urban	0.000
SAAR (mm)	931	Region Number	Region 3

Results l/s

QBAR Rural 127.2
QBAR Urban 127.2

Q1 year 109.4

Q1 year 109.4
Q2 years 120.0
Q5 years 159.0
Q10 years 184.5
Q20 years 208.9
Q25 years 217.0
Q30 years 223.6
Q50 years 240.9
Q100 years 264.6
Q200 years 300.2
Q250 years 311.7
Q1000 years 386.7

109.4 / 50ha = 2.19l/s
2.19 x 21.5ha = 29.5/s
47.0/s

APPENDIX 6

CONTAINS A MASTERPLAN FOR REJECTED HOUSING SITE H252 (LAND WEST
OF FARNLEY ROAD, FARNLEY TYAS)

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 24 - Hunters Nab, Farnley Tyas

Site Area: 1.1Ha

Existing Site Description:

The site consists of a number of open agricultural fields bounded by drystone walls gently sloping from the western boundary at the public right of way (PROW) of the Holme Valley Circular Walk, towards the south eastern boundary at Farnley Road. Farm buildings and residential properties lie to the northern boundary at New Lane Farm. St Lucius Church and surrounding mature vegetation sits to the north west of the site boundary. The site lies on the edge of the open countryside to the west, south and east.

Planning Context:

The site is located within Green Belt, however, it is being actively promoted by Farnley Estates to be allocated as an "Accepted-Site Option" in the Kirklees Council Draft Local Plan - November 2015.

There is a group TPO within the grounds of St Lucius' Church outside the north western boundary of the site. St Lucius' Church grounds are proposed to be allocated as "Urban Green Space" in the Kirklees Council Draft Local Plan - November 2015.

Part of the site abuts the Farnley Tyas Conservation Area boundary, as identified within the Draft Local Plan.

Landscape Character Area:

The site is located within **National Character Area (NCA) 37: Yorkshire Southern Pennine Fringe** and the **Kirklees District Landscape Character Assessment: E6: Fenay Beck Valley Rural Fringes**. A site visit was also undertaken to carry out a localised character assessment.

The landscape character of the site and its surrounding area can be summarised as:

- gently undulating plateau
- broadleaved woodlands with occasional mixed woodlands
- land cover patterns are small scale with varied vegetation cover
- small grassland pastures are enclosed by gritstone walls as well as some hedgerow boundaries
- dense network of minor roads and narrow winding lanes
- mostly a settled and rural landscape



Site photograph looking to the north-west from Farnley Road at south-west corner of Site 24

Existing landscape features and assets:

- Topography:** Gentle slope west to south east
- Vegetation Cover:** None within the site boundary
- Public Rights of Way:** Public right of way runs along western site boundary
- Ecological Features:** None evident
- Water features and Flood Zones:** None

Visual Analysis:

A site visit was undertaken to carry out a visual appraisal of key views into and out of the site. Key views include expansive views to the south and east across open countryside due to elevated position. Emley Moor mast is a prominent feature within the distant views.

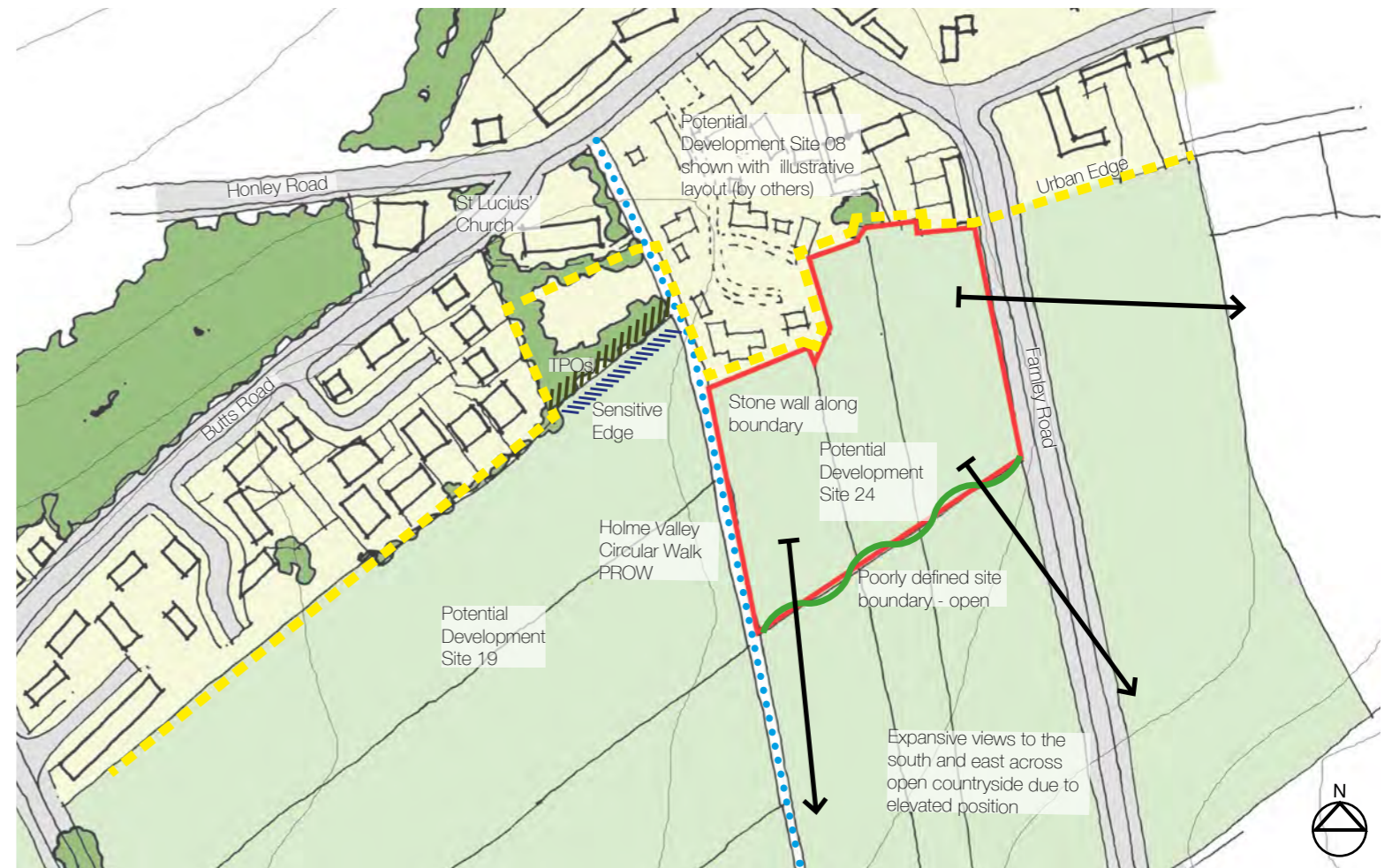
Aims for Landscape and Masterplan Strategy:

The key feature of the proposals will to:

- respond to the site and its context; and
- develop a robust landscape structure and framework that delivers a multi-functional green infrastructure within which development can take place.

The aim of the green infrastructure will be to:

- Enhance the setting of the Holme Valley Circular Walk PROW;
- Provide space for recreational and amenity use;
- Provide wildlife habitats to enhance the local ecological value;
- Creating a network of engaging green spaces;
- Connecting the development with the surrounding landscape;
- Integrating the development proposals into the local landscape and incorporate existing landscape features.



Landscape Analysis Plan. NTS



Landscape Opportunities and Structure Plan. NTS

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 24 - Hunters Nab, Farnley Tyas

- Site Areas:**
- Site Boundary Area: 1.10Ha
 - Developable (Residential) Area: 0.8Ha
 - Approx. number of Units (based on Developable area x 20 to 30 DPH): **16 to 24 units**
Note: Due to site topography, DPH will depend upon site levels resolution.
 - Number of units illustrated on plan: **22 units**
 - Public Open Space (POS) Provision: **0.30Ha**
Note: POS provision is illustrative. Final area will be based upon Policy DLP 65 of the Draft Kirklees Local Plan, emerging planning policy and discussion with LPA. Illustrative POS provision is based upon Table 9 District wide open space provision standards which identifies 3.1Ha POS and 0.5 Ha allotments per 1,000 population. POS includes existing vegetation and steep slopes.



St Lucius Church and Churchyard

Housing Development: with housing fronting onto greenspace (secure by design principles).

Vehicular Access via bellmouth on Farnley Road.

Green buffer to PROW

POS along frontage to create strong defined urban edge to urban area with potential to incorporate pedestrian link and SuDs features to create multifunctional Green Infrastructure.

Pedestrian links to PROW

Note: Plan is illustrative only. Final design and layout subject to detail design, site surveys and coordination with other consultants and LPA.

- Plan Notes:**
1. Layout is illustrative and demonstrates an outline design approach for discussion only.
 2. Site topography has been considered in the layout, however design development and coordination will be required to resolve site levels constraints which may impact on layout.
 3. Highways layouts are illustrative only.
 4. Due to existing topography of the site and surrounding area site accessibility will require further discussion and resolution.

APPENDIX 7

CONTAINS A MASTERPLAN FOR REJECTED HOUSING SITE H254 (LAND EAST OF
THURSTON LAND ROAD, FARNLEY TYAS)

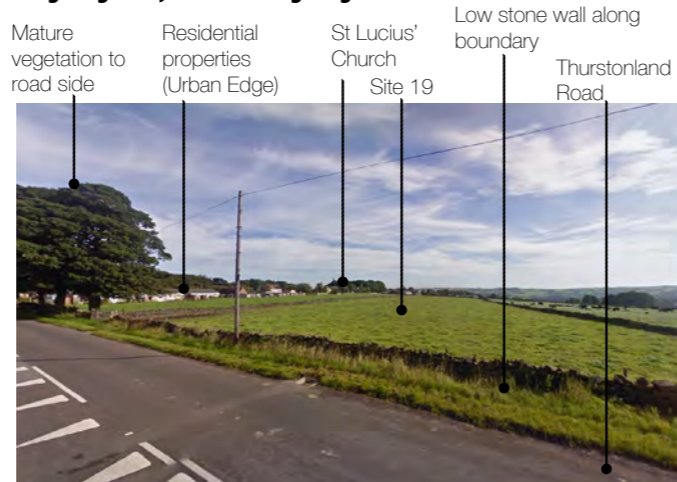
FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES

Site 19 - Land to the south west of Farnley Tyas, Farnley Tyas

Site Area: 3.3Ha

Existing Site Description:

The site consists of two open agricultural fields bounded by dry stone walls, gently sloping from the western boundary at Thurstonland Road, to a track and public right of way (PROW) of the Holme Valley Circular Walk on the eastern site boundary. Residential properties lie to the northern boundary at Butts Close, Butts Way and St Lucius's Close, along with St Lucius Church and surrounding mature vegetation. The site sits on the edge of the open countryside to the east and south, with a recreation ground and children's play area surrounded by mature woodland to the west.



Site photograph looking to the north-east from Thurstonland Road at southern corner of Site 19

Planning Context:

The site is located within Green Belt, however, it is being actively promoted by Farnley Estates to be allocated as an "Accepted-Site Option" in the Kirklees Council Draft Local Plan - November 2015.

There is a group TPO within the grounds of St Lucius' Church outside the northern boundary of the site. St Lucius' Church grounds are proposed to be allocated as "Urban Green Space" in the Kirklees Council Draft Local Plan - November 2015.

The site is located to the west of the Holme Valley Corridor Green Infrastructure Network, as identified within the Draft Local Plan. Part of the site abuts the Farnley Tyas Conservation Area boundary, as identified within the Draft Local Plan.

Landscape Character Area:

The site is located within National Character Area (NCA) 37: Yorkshire Southern Pennine Fringe and the Kirklees District Landscape Character Assessment: E6: Fenay Beck Valley Rural Fringes. A site visit was also undertaken to carry out a localised character assessment.

The landscape character of the site and its surrounding area can be summarised as:

- gently undulating plateau
- broadleaved woodlands with occasional mixed woodlands
- land cover patterns are small scale with varied vegetation cover
- small grassland pastures are enclosed by gritstone walls as well as some hedgerow boundaries
- dense network of minor roads and narrow winding lanes
- mostly a settled and rural landscape

Existing landscape features and assets:

Topography: Gentle slope west to east

Vegetation Cover: Generally open, with mature vegetation along both western and northern field boundary and within grounds of St Lucius' Church

Public Rights of Way: Local right of way runs along eastern site boundary

Ecological Features: Boundary Vegetation

Water features and Flood Zones: None

Visual Analysis:

A site visit was undertaken to carry out a visual appraisal of key views into and out of the site. Key views include expansive views to the south and east across open countryside due to elevated position. Emley Moor mast is a prominent feature within the distant views.

Aims for Landscape and Masterplan Strategy:

The key feature of the proposals will to:

- respond to the site and its context; and
- develop a robust landscape structure and framework that delivers a multi-functional green infrastructure within which development can take place.

The aim of the green infrastructure will be to:

- Enhance the setting of the Holme Valley Circular Walk PROW and St Lucius' Church
- Provide space for recreational and amenity use;
- Provide wildlife habitats to enhance the local ecological value;
- Creating a network of engaging green spaces;
- Connecting the development with the surrounding landscape;
- Integrating the development proposals into the local landscape and incorporate existing landscape features.



Landscape Analysis Plan. NTS

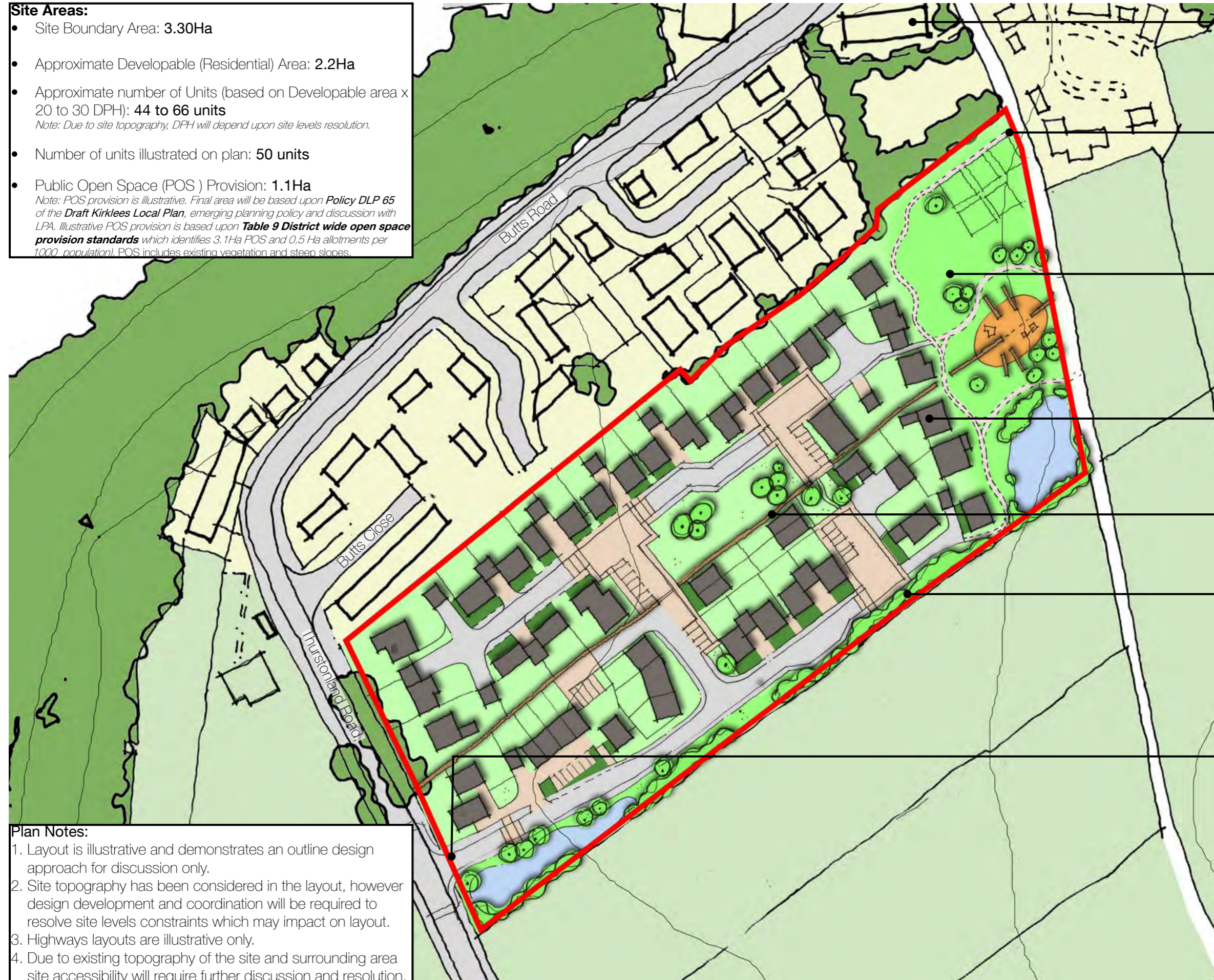


Landscape Opportunities and Structure Plan. NTS

FARNLEY MASTERPLAN POTENTIAL DEVELOPMENT SITES
Site 19 - Land to the south west of Farnley Tyas, Farnley Tyas

Site Areas:

- Site Boundary Area: 3.30Ha
- Approximate Developable (Residential) Area: 2.2Ha
- Approximate number of Units (based on Developable area x 20 to 30 DPH): **44 to 66 units**
Note: Due to site topography, DPH will depend upon site levels resolution.
- Number of units illustrated on plan: **50 units**
- Public Open Space (POS) Provision: **1.1Ha**
Note: POS provision is illustrative. Final area will be based upon Policy DLP 65 of the Draft Kirklees Local Plan, emerging planning policy and discussion with LPA. Illustrative POS provision is based upon Table 9 District wide open space provision standards which identifies 3.1Ha POS and 0.5 Ha allotments per 1,000 population. POS includes existing vegetation and steep slopes.



St Lucius Church and Churchyard

Pedestrian links to PROW

POS along PROW to create an appropriate green setting for Holme Valley Circular Walk and allowing views to church from the wider countryside. Potential to incorporate pedestrian links, play area, allotments and SuDs features to create multifunctional Green Infrastructure.

Housing Development: with housing fronting onto greenspace (secure by design principles).

Existing field boundary stone wall retained where possible providing unifying element running through development.

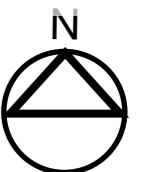
POS along frontage to create strong defined urban edge to urban area with potential to incorporate pedestrian link and SuDs features to create multifunctional Green Infrastructure.

Vehicular Access via bellmouth on Thurstonland Road.

Plan Notes:

1. Layout is illustrative and demonstrates an outline design approach for discussion only.
2. Site topography has been considered in the layout, however design development and coordination will be required to resolve site levels constraints which may impact on layout.
3. Highways layouts are illustrative only.
4. Due to existing topography of the site and surrounding area site accessibility will require further discussion and resolution.

Note: Plan is illustrative only. Final design and layout subject to detail design, site surveys and coordination with other consultants and LPA.



APPENDIX 8

CONTAINS A TRANSPORT ASSESSMENT OF THE LIKELY TRAFFIC GENERATION AND
SUGGESTED IMPROVEMENTS TO THE LOCAL HIGHWAY NETWORK

Prepared on behalf of

Farnley Estates

**Farnley Masterplan
Huddersfield**

Access Appraisal

Acknowledgements:

The TRICS database has been used in this report to calculate traffic generation rates.

Traffic Data has been supplied by RDS Ltd.

Census data has been obtained from ONS.

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

Any information provided by third parties and referred to herein has not been checked or verified by Sanderson Associates (Consulting Engineers) Ltd, unless otherwise expressly stated within this report.

This report was checked and approved on the 14th January 2016 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

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Report Ref:	9058/AND/001/01	January 2016	
Author:	Adam Darwin		
Checked & Approved:	Tracy Hargreaves	Date:	14 th January 2016

Contents

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2	Access Appraisal.....	6
3	Traffic generations and assessment.....	12

Appendices

APPENDIX A

Figure 1 - Site Location Plan

Figure 2 - 2015 Base Traffic Flows

Figure 3 - 2025 Base Traffic Flows

Figure 4 - Site 2 Flows

Figure 5 - Site 3 Flows

Figure 6 - Site 4 Flows

Figure 7 - Site 6 Flows

Figure 8 - Site 16A Flows

Figure 9 - Site 17 Flows

APPENDIX B

Drawing 9058/001A

Drawing 9058/003

Drawing 9058/004

APPENDIX C

TRICS Output Data

APPENDIX D

Gravity Model Data

APPENDIX E

ARCADY Output - Site 2/4 Roundabout

APPENDIX F

ARCADY Output - Site 3/6 Roundabout

APPENDIX G

PICADY Output - Site 17 Priority Junction

1 Introduction

- 1.1 This report has been prepared to support the Farnley Estates Masterplan proposals, which include the promotion of a number of sites for development within Farnley Tyas and along the A629 Penistone Road corridor.
- 1.2 Sanderson Associates has provided advice to the professional team regarding suitable means of access to serve each site, which has been incorporated into the Illustrative layouts that have been produced by DLA Design.
- 1.3 The reports comments on the access options in relation to sites 2, 3, 4, 5, 6, 16A, 17, 19 and 24, which are shown on Figure 1 included in **Appendix A**.
- 1.4 A preliminary assessment has also been undertaken of the peak hour traffic that could be generated by the sites on the Penistone Road corridor, to enable Kirklees Council to consider the wider implications of all Local Plan sites. This information has also be utilised to assess the potential access arrangements suggested on Penistone Road, to confirm that the arrangements are feasible access options.

2 Access Appraisal

2.1 *Site 2 - Land northwest of Woodsome Drive, Fenay Bridge*

2.1.1 The illustrative plans indicate that this site could accommodate approximately 81 no. dwellings. Based on this scale of development, the site could be served by a simple priority junction as shown on drawing 9058/001A included in **Appendix B**.

2.1.2 For a site of this scale, a priority junction with a single lane exit would be appropriate, with right turn lane provision on Penistone Road. The junction would also require radii of 10m due to the current 40mph speed limit; and have visibility splays of 2.4 x 90-120m, although these splays may be reduced should the speed limit be reduced on Penistone Road (or if actual speeds are lower), which may be considered appropriate by the Local Highway Authority (LHA). Due to the long site frontage on Penistone Road, there is considerable scope to locate the site access, which achieves adequate junction spacing and visibility.

2.1.3 As identified below, should site 4 be developed, it would be possible to access both site 4 and site 2 via a new 4 arm roundabout on Penistone Road, with a single lane entry being adequate to serve site 2, as shown on drawing 9058/001A included in **Appendix B**.

2.2 *Site 3 - Land south of Woodsome Drive, Lepton*

2.2.1 The illustrative plans indicate that this site could accommodate approximately 63 no. dwellings. Based on this scale of development, the site could be served by a simple priority junction on to Rowley Lane, as shown on drawing 9058/003 included in **Appendix B**. As can be seen from the plan, the junction could be provided as a crossroads with Woodsome Drive.

2.2.2 For a site of this scale, a priority junction with a single lane exit would be appropriate. No right turn lane provision on Rowley Lane is considered to be required. The junction would also require radii of 6m due to the current 30mph speed limit; and have visibility splays of 2.4 x 43m that can be achieved in the suggested location.

-
- 2.2.3 As discussed with the LHA, capacity problems are experienced at peak times at the Rowley Lane/Penistone Road priority junction. Therefore, to accommodate additional development traffic on Rowley Lane, improvements to this junction may be required. As such, consideration has been given to the feasibility of utilising site 3 to provide a new roundabout on Penistone Road, which would replace the existing Rowley Lane and Woodsome Road junctions, as shown on drawing 9058/001A included in **Appendix B**.
- 2.2.4 The provision of a new roundabout would address existing problems at the Rowley Lane junction and accommodate development traffic from Site 3 and 6 (and also other potential sites within the Lepton area).
- 2.2.5 Preliminary capacity analysis has been undertaken of the roundabout (outlined in Section 3), which indicates that single lane approaches on both the Woodsome Road and Rowley Lane/Site 3 arms are adequate, with two lane flared approaches on both of the Penistone Road arms.
- 2.3 Site 4 – Land to the west of Penistone Road, Fenay Bridge**
- 2.3.1 It is proposed that site 4 could accommodate ‘The Hub’, which would be the main gateway/commercial hub associated with the proposed Farnley Country Park. The site is likely to include a range of facilities that would complement the County Park, which could include a Visitor/Education centre, café, farm shop, garden centre, craft and design workshops, event spaces, visitor parking and welfare facilities.
- 2.3.2 Due to the trips that are likely to be generated by the site, it is considered that a roundabout would provide an appropriate means of access; and could also serve site 2, with an indicative roundabout design shown on drawing 9058/001A included in **Appendix B**.

2.3.3 Preliminary capacity analysis has been undertaken of the roundabout (as outlined in Section 3), which indicates that single lane approaches on the site 2 and 4 arms are adequate, with two lane flared approaches on both of the Penistone Road arms. It is noted that accurate traffic generations cannot at this stage be determined for site 4, due to the range of potential uses for the site. Therefore, the assessment includes an assumed traffic generation for site 4 of 100 two-way vehicle movements for weekday AM and PM peak hour periods and 200 two-way vehicle movements for weekend peak hour periods (split evenly for inbound/outbound traffic). However, the test ARCADY modelling indicates that the Site 4 arm could accommodate significantly higher traffic flows (approx. 500-600 pcu's per hour outbound) before additional exit lanes would be required. Due to the long site frontage on Penistone Road, there is considerable scope to locate the junction, which will allow flexibility in the site layout options for sites 2 and 4.

2.4 *Site 5 – Land north/south of Woodsome Road, Lepton*

2.4.1 The illustrative plans indicate that these small sites could accommodate approximately 11 no. dwellings. Based on this scale of development, the sites could be served by simple priority junctions or private drives, as shown on drawing 9058/004 included in **Appendix B** and would replace the existing accesses. Drawing 9058/001A included in **Appendix B** also shows how access to these sites could be accommodated should the roundabout identified at paragraph 2.2.3 be implemented.

2.5 *Site 6 - Land southeast of Hermitage Park, Lepton*

2.5.1 There are currently no main public highways within the immediate vicinity of site 6. Therefore, to provide access to this site, some land acquisition is likely to be required. To provide access via Hermitage Park, it would be necessary to purchase land from some of the existing properties to allow a suitable means of access to be created.

2.5.2 Based on access via the existing Hermitage Park junction on to Rowley Lane, the illustrative masterplans indicate that the site could accommodate approximately 45 no. dwellings, which could be adequately served by the existing junction, which benefits from adequate visibilities splays.

2.5.3 As with site 3, to accommodate additional development traffic on Rowley Lane, improvements to the Rowley Lane/Penistone Road junction may be required. Therefore, it may be possible to provide an alternative means of access to site 6 via site 3, subject to a connection being made across the dismantled railway. This access road could then connect into the proposed highway network in site 3 and could include the new roundabout on Penistone Road identified in paragraph 2.2.3.

2.6 Site 16A - Land to northeast of Woodsome Road, Woodsome

2.6.1 The illustrative plans indicate that this site could accommodate approximately 285 no. dwellings. Based on this scale of development and as Woodsome Road is relatively lightly trafficked, the site could be served by a simple priority junction, as shown on drawing 9058/001A included in **Appendix B**.

2.6.2 For a site of this scale, a priority junction with a single lane exit would be appropriate, with right turn lane provision on Woodsome Road. The junction would also require radii of 10m due to the current National speed limit; and have visibility splays of 2.4 x 160-215m, although these splays may be reduced should the speed limit be reduced on Woodsome Road (or if actual speeds are lower), which may be considered appropriate by the Local Highway Authority (LHA). Due to the long site frontage on Woodsome Road, there is scope to locate the site access in a number of locations, which achieves adequate junction spacing and visibility.

2.6.3 To accommodate develop of this site, improvements to the Woodsome Road/Penistone Road junction are likely to be required, which may be a roundabout as identified on drawing 9058/001A included in **Appendix B**, or potentially by a three arm roundabout if not serving site 3, or instead by conversion to a signalisation junction. In addition to improvements at this junction, improvements are also likely to be required at the narrow bridge on Woodsome Road located between the site and Penistone Road.

2.7 Site 17 - Land to the west of Penistone Road, Kirkburton

2.7.1 The illustrative plans indicate that this site could accommodate approximately 270-405 no. dwellings. For a development of approximately 200-300 dwellings, the site could be served by a single simple priority junction, as shown on drawing 9058/001A included in **Appendix B**, which would link to the main area of the site via a bridge over the beck. However, for a larger development, a second point of access (and additional bridge) is likely to be required, which could be provided via a second priority junction located further south on Penistone Road.

2.7.2 Preliminary capacity analysis has been undertaken of the single priority junction (outlined in Section 3), which indicates that a priority junction with a single lane exit would be appropriate, with right turn lane provision on Penistone Road. The junction would also require radii of 10m due to the current 40mph speed limit; and have visibility splays of 2.4 x 90-120m, although these splays may be reduced should the speed limit be reduced on Penistone Road (or if actual speeds are lower), which may be considered appropriate by the Local Highway Authority (LHA).

2.8 Site 19 – Land to south of Butts Way, Farnley Tyas

2.8.1 The illustrative plans indicate that this site could accommodate approximately 66 no. dwellings. Based on this scale of development, the site could be served by a simple priority junction on to Thurstonland Road, with no right turn facility consider necessary. As Thurstonland Road along the site frontage is subject to the national speed limit, it would be desirable to relocate the 30mph speed limit change on entry to Farnley Tyas Village to the south of the access. Subject to the relocation of the speed limit change, visibility splays of 2.4x43m would be required, with 6m junction radii. Due to the relatively long site frontage on Thurstonland Road, there is scope to locate the site access in a number of locations, which achieves adequate junction spacing and visibility.

2.9 Site 24 - Land south of Yew Tree Farm, Farnley Tyas

2.9.1 The illustrative plans indicate that this site could accommodate approximately 24 no. dwellings. Based on this scale of development, the site could be served by a simple priority junction on to Farnley Road, with no right turn facility considered necessary. As Farnley Road along the site frontage is subject to the national speed limit, it would be desirable to relocate the 30mph speed limit change on entry to Farnley Tyas Village to the south of the access. Subject to the relocation of the speed limit change, visibility splays of 2.4x43m would be required, with 6m junction radii. Due to the relatively long site frontage on Farnley Road, there is scope to locate the site access in a number of locations, which achieves adequate junction spacing and visibility.

3 Traffic generations and assessment

3.1 *Scope of assessment*

3.1.1 A preliminary assessment has been undertaken of the peak hour traffic that could be generated by the sites that could generate significant levels of traffic on to the Penistone Road Corridor (sites 2, 3, 4, 6, 16A & 17), to enable Kirklees Council to consider the wider implications of the Local Plan sites.

3.1.2 The traffic generation information has also be utilised to assess the potential access arrangements suggested on Penistone Road, to confirm that the arrangements are feasible. This includes the assessment of the two roundabouts that have been suggested, together with the Site 17 priority junction site access.

3.2 *Based traffic data and growth*

3.2.1 Traffic count data has been obtained at the Rowley Lane/Penistone Road and Woodsome Road/Penistone Road junctions on Thursday 3rd December and Saturday 5th December, with the surveys recording cross movements between the Rowley Lane and Penistone Road arms. This data has been analysed, with the network peak hour flows (in PCU's) shown on Figure 2 in **Appendix A**.

3.2.2 For feasibility assessment purposes, 10 years traffic growth has been applied to the above survey data to ensure a robust assessment is undertaken, with the following traffic growth factors obtained from the TEMPRO database (urban principle roads in 00C212 Kirkburton dataset):

	TEMPRO Growth Factors 2015-2025 (00C212 Kirkburton)
AM Peak	1.1945
PM Peak	1.1995
Saturday Peak	1.2088

3.2.3 The 2015 base traffic data has been growthed to 2025, with the flows shown on Figure 3 in **Appendix A**.

3.3 Traffic generations and distribution

3.3.1 The TRICS database has been utilised to calculate potential traffic generations for the sites. As the type of housing that may be proposed on each site is not currently known, detailed interrogation of the TRICS database has not been undertaken. Instead, average rates has been derived for sites in England (excluding London) from the 'Houses Privately Owned' dataset, which are considered to give a reasonable indication of the likely vehicles trips that would be generated by the sites, with further detailed assessment required in due course.

3.3.2 The TRICS output data is included in **Appendix C**, with the network peak hour trip rates shown in the following table:

	AM Peak Hour	PM Peak Hour	Weekend Peak Hour
IN	0.151	0.353	0.226
OUT	0.399	0.203	0.206

3.3.3 To determine the potential traffic distribution from the sites, a simple gravity model has been produced using method of travel to work data from the 2011 census for the Kirklees 51 Middle Output Layer, with a summary of the trip distribution and route allocation included in **Appendix D**. Based on this assessment, site traffic has been distributed as follows:

Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West
58.6%	29.5%	5.5%	6.9%

3.3.4 Based on the information shown on the illustrative masterplan drawings, the residential sites could accommodate the following units:

Site No.	Max. Units
2	81
3	63
5	11
6	45
16A	285
17	405

3.3.5 Based on the aforementioned dwelling numbers, the trip rates identified in paragraph 3.3.2 and the traffic distribution identified in paragraph 3.3.3, the peak hour trip distribution for each site (excluding site 5 due to its scale) have been calculated and are shown on Figures 4-9 in **Appendix A**. As mentioned in paragraph 2.3.3, accurate traffic generations cannot at this stage be determined for site 4, due to the range of potential uses for this site. Therefore, the assessment includes an assumed traffic generation for site 4 of 100 two-way vehicle movements for weekday AM and PM peak hour periods and 200 two-way vehicle movements for weekend peak hour period (split evenly inbound/outbound).

3.4 *Traffic modelling*

3.4.1 The proposed roundabout that could serve sites 2 and 4 has been assessed using ARCADY modelling software, with output data included in **Appendix E**. As can be seen from the modelling results, the roundabout would be able to operate within capacity (RFC of below 1.000) utilising the ODTab flow profile in 2025. Therefore, it is considered that a roundabout junction of this scale would be appropriate to serve these sites.

3.4.2 The proposed roundabout that could serve sites 3, 6 and 16A and replace the existing Rowley Lane and Woodsome Road junctions has been assessed using ARCADY modelling software, with output data included in **Appendix F**. As can be seen from the modelling results, the roundabout would be able to operate within capacity (RFC of below 1.000) utilising the ODTab flow profile in 2025. Therefore, it is considered that a roundabout junction of this scale would be appropriate to serve these sites and would address the existing capacity issues at the Rowley Lane and Woodsome Road junctions.

3.4.3 The proposed priority junction that could serve sites 17 has been assessed using PICADY modelling software, with output data included in **Appendix G**. The junction has been assessed based on traffic generation for a 300 dwelling development, as this is the maximum that would be served from a single access point. As can be seen from the modelling results, the junction would be able to operate within capacity (RFC of below 1.000) utilising the ODTab flow profile in 2025. Therefore, it is considered that a priority junction would be appropriate to serve this site.

3.4.4 It is concluded that the access arrangements proposed are appropriate to serve the various development sites, would be able to adequately accommodate development traffic and background traffic growth; and would help address existing capacity issues at the Rowley Lane and Woodsome Road junctions on to Penistone Road.

APPENDIX A

Figure 1 - Site Location Plan

Figure 2 - 2015 Base Traffic Flows

Figure 3 - 2025 Base Traffic Flows

Figure 4 - Site 2 Flows

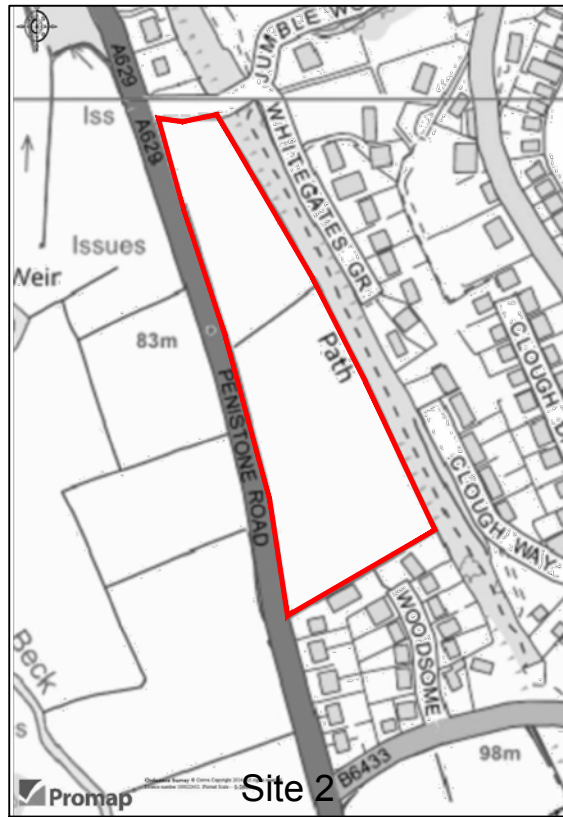
Figure 5 - Site 3 Flows

Figure 6 - Site 4 Flows

Figure 7 - Site 6 Flows

Figure 8 - Site 16A Flows

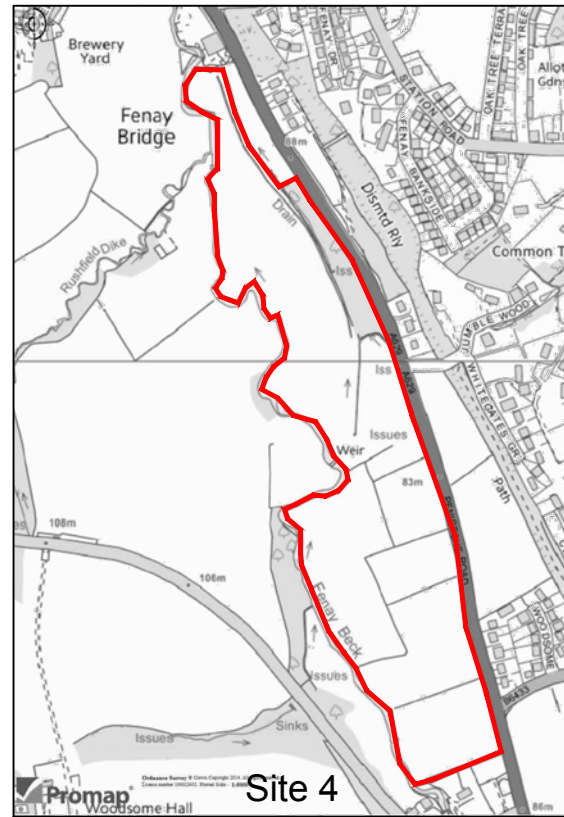
Figure 9 - Site 17 Flows



Site 2



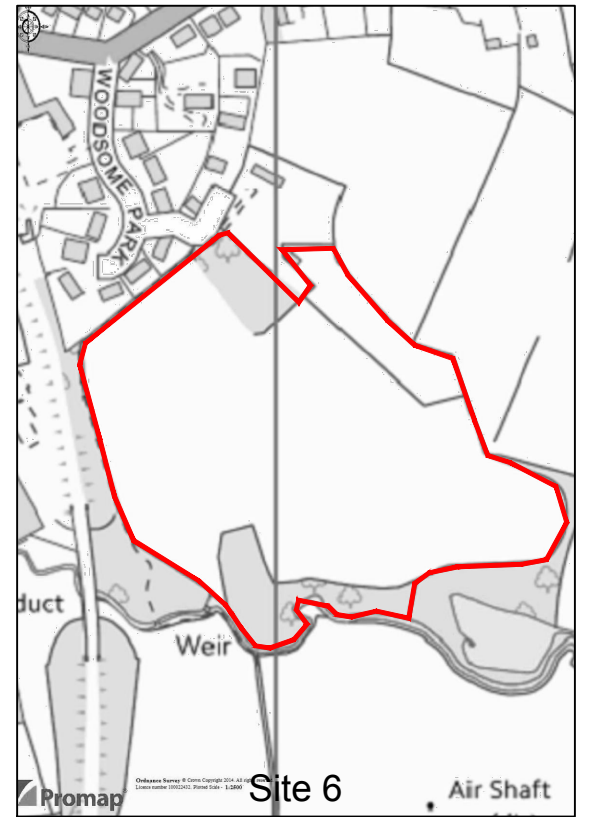
Site 3



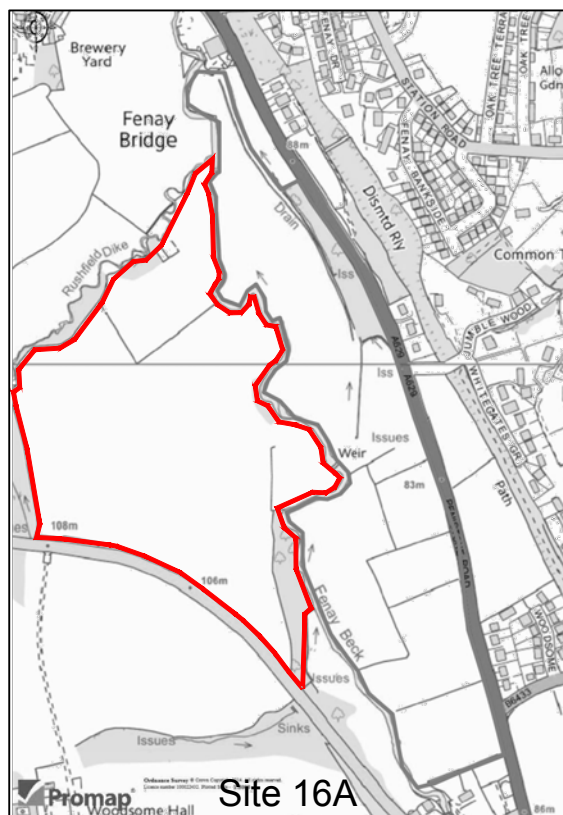
Site 4



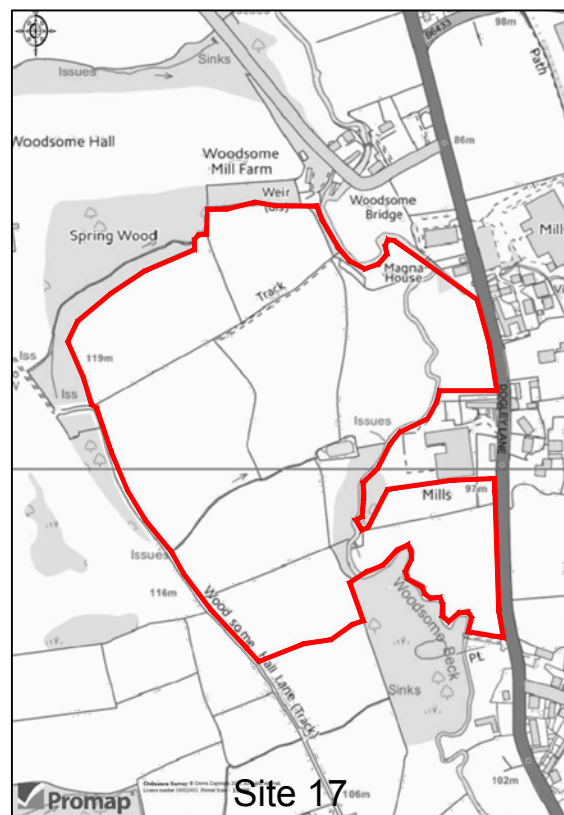
Site 5



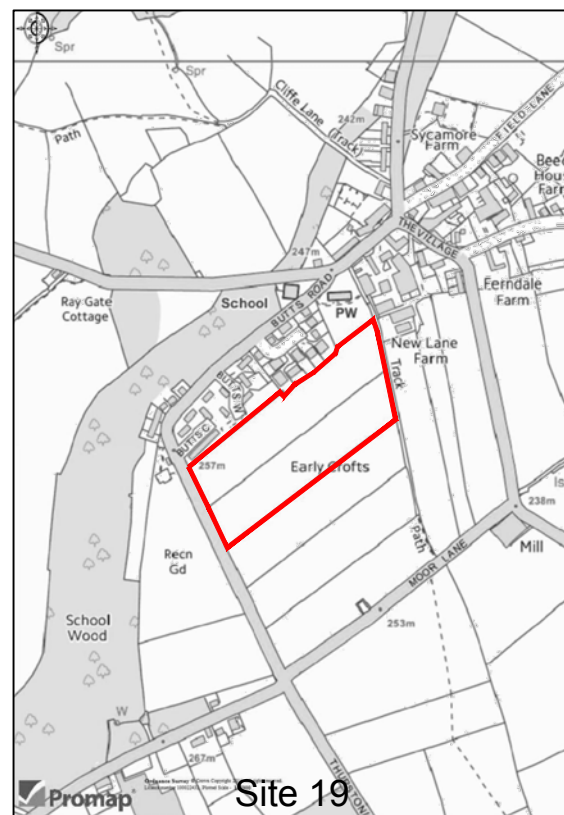
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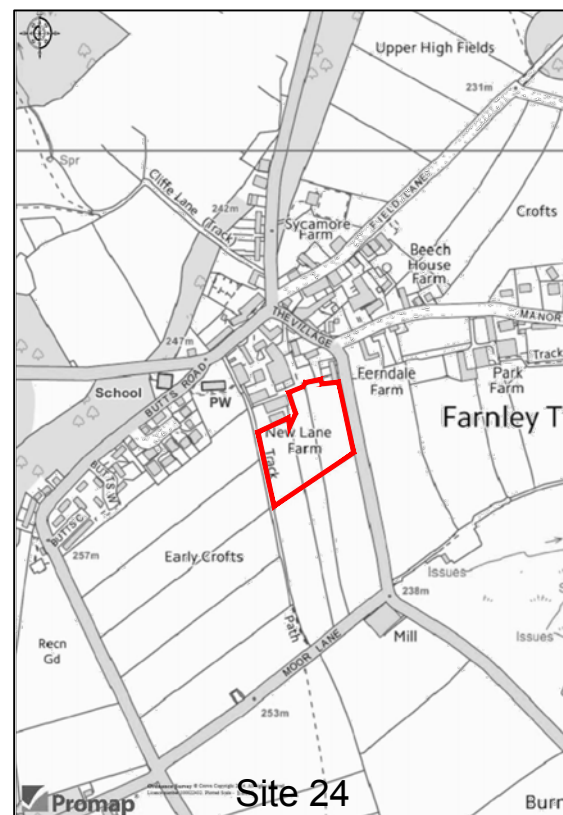
Site 16A



Site 17



Site 19



Site 24



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Farnley Masterplan

Site Location Plan

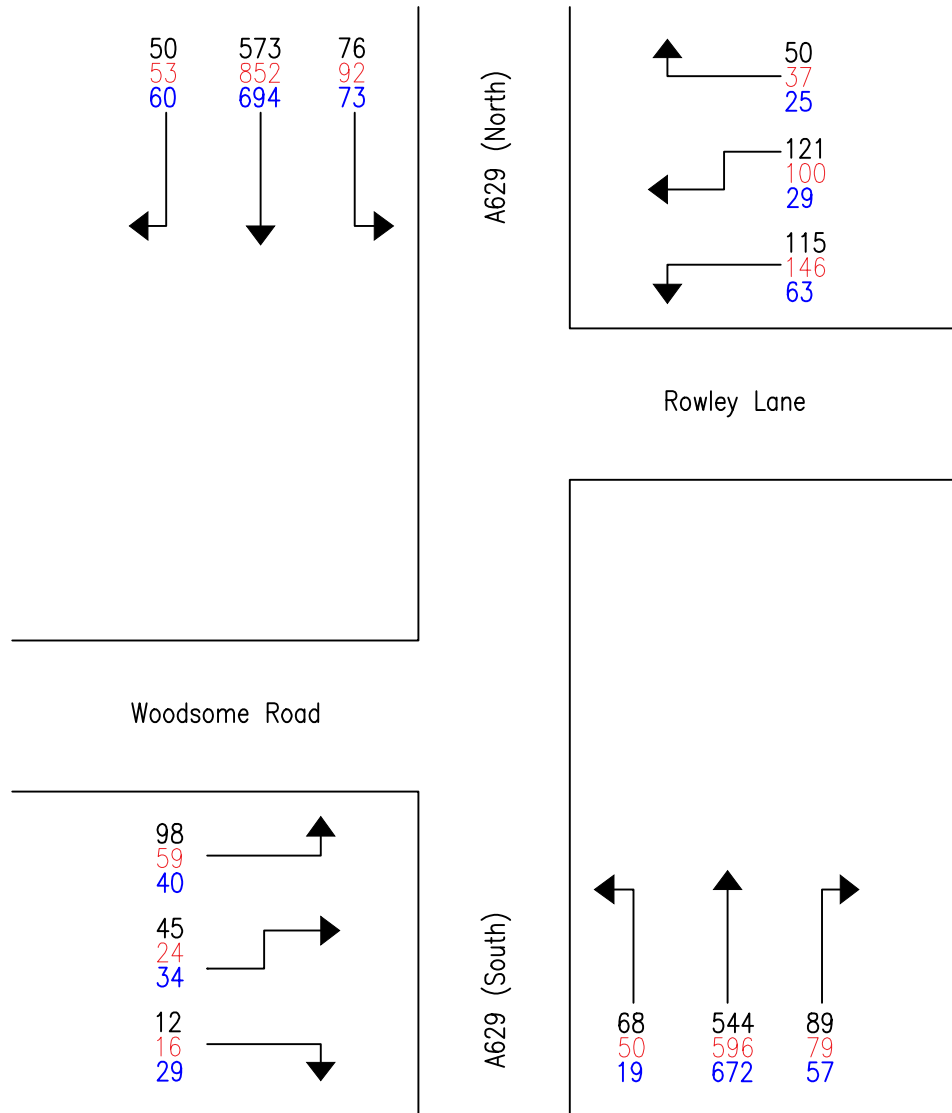
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Date	Jan. 2016	Approved By	AND

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Rev	Amendment	Drawn	Date	Checked

Key

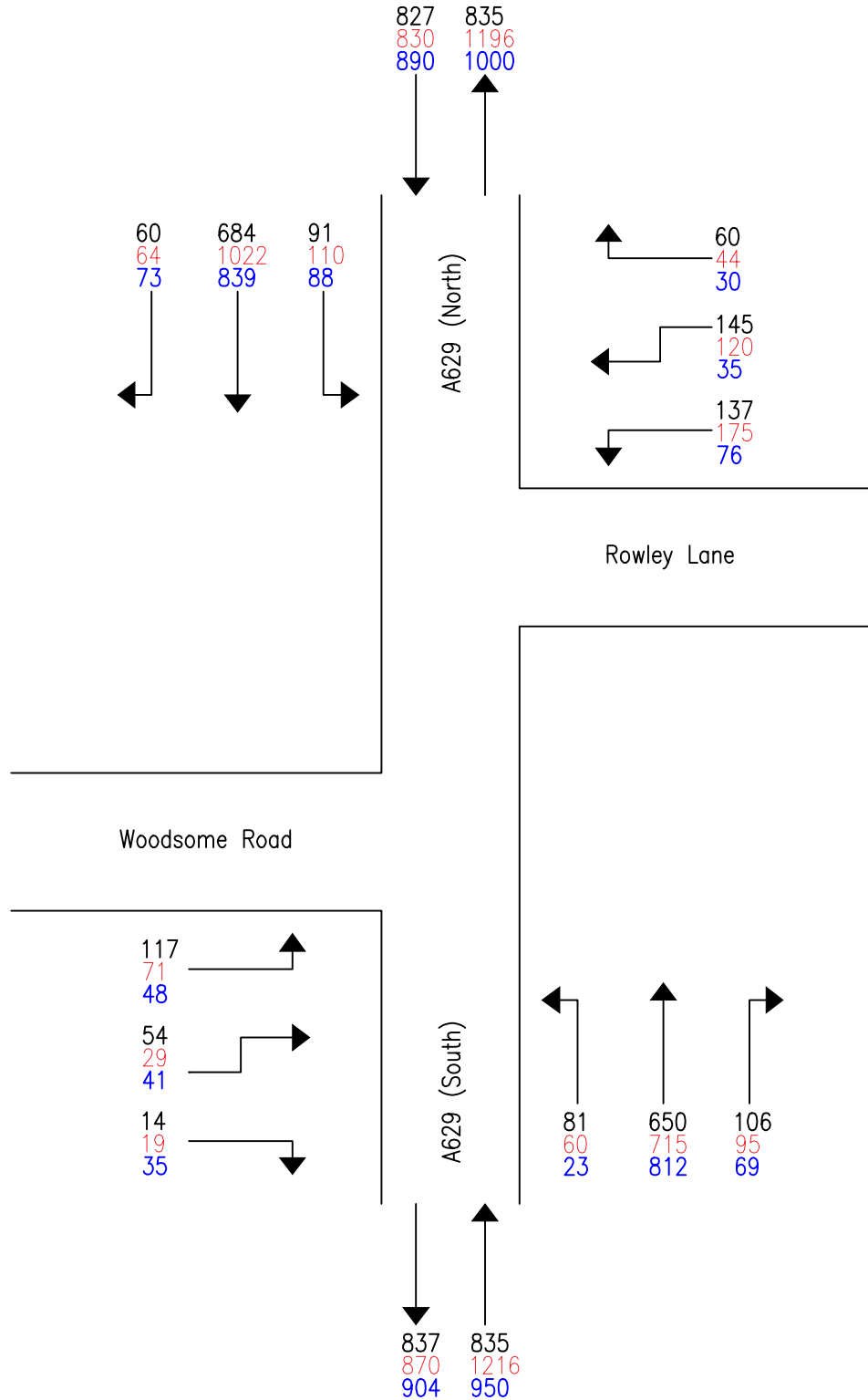
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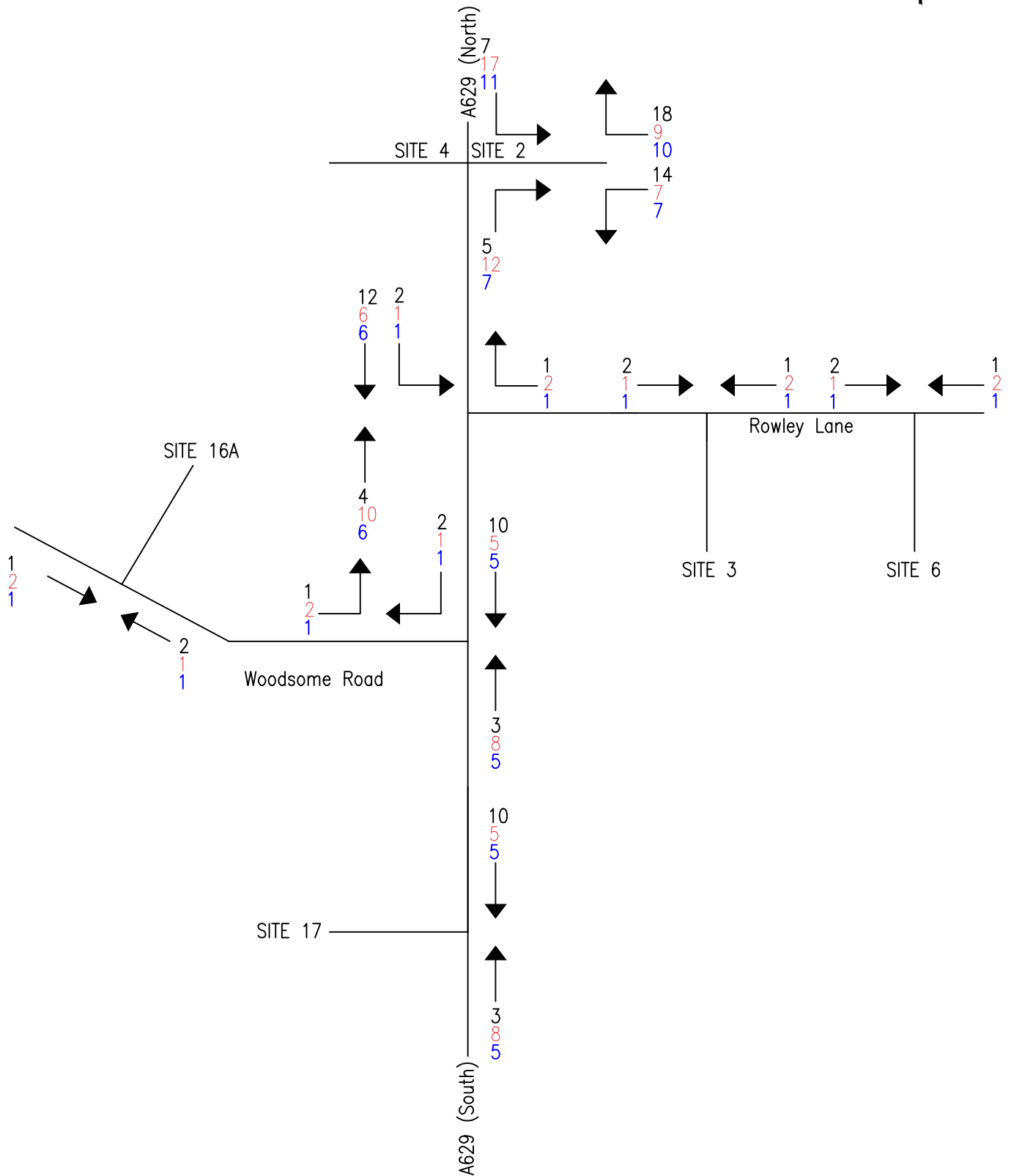
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Approved AD	Drawing Number Figure 2	Size A4

Key

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 PM 17:15 – 18:15
 SAT 12:15 – 13:15



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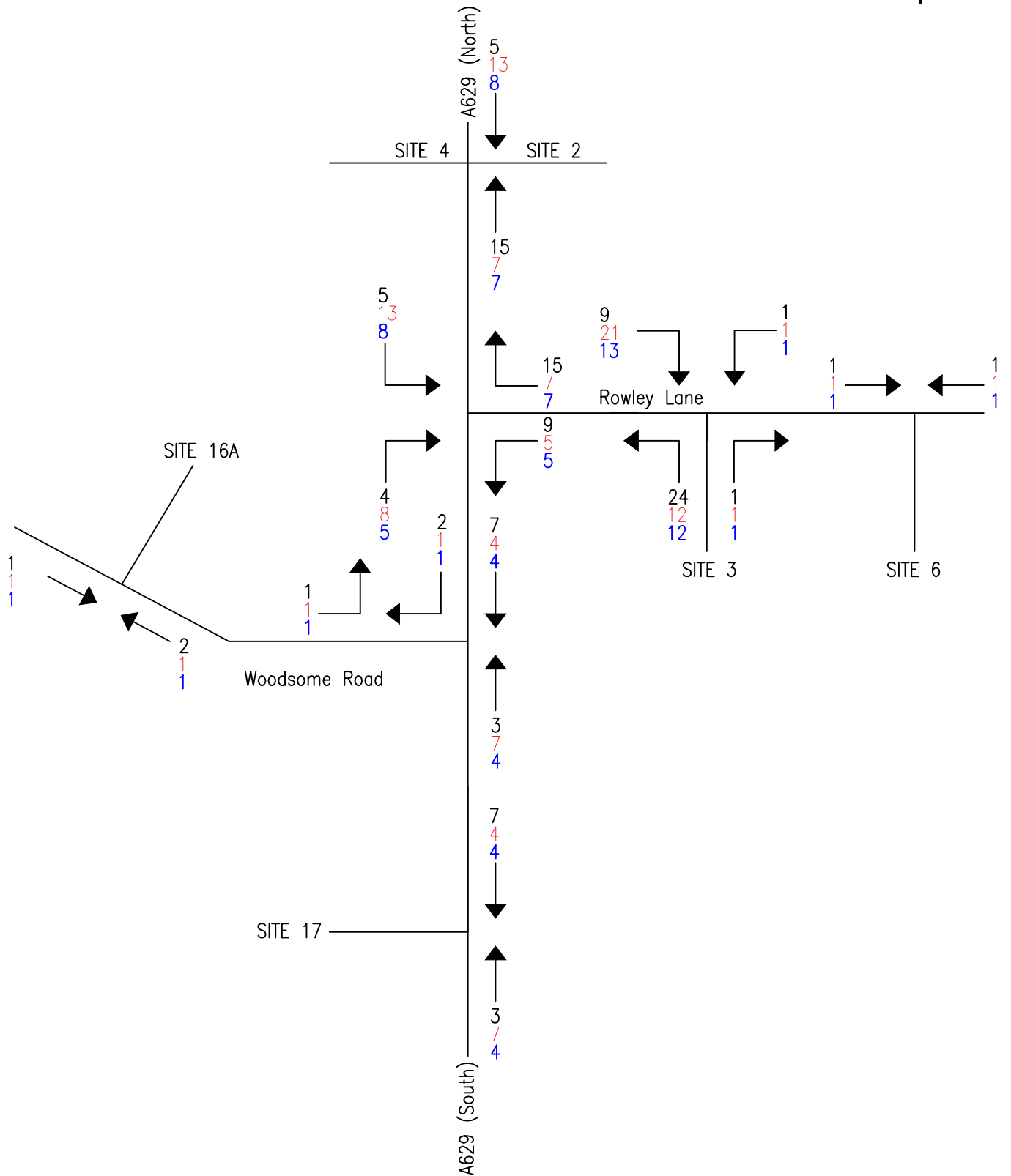
Site 2 Flows

Farnley Masterplan

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Approved AD	Drawing Number Figure 4	Size A4

Key

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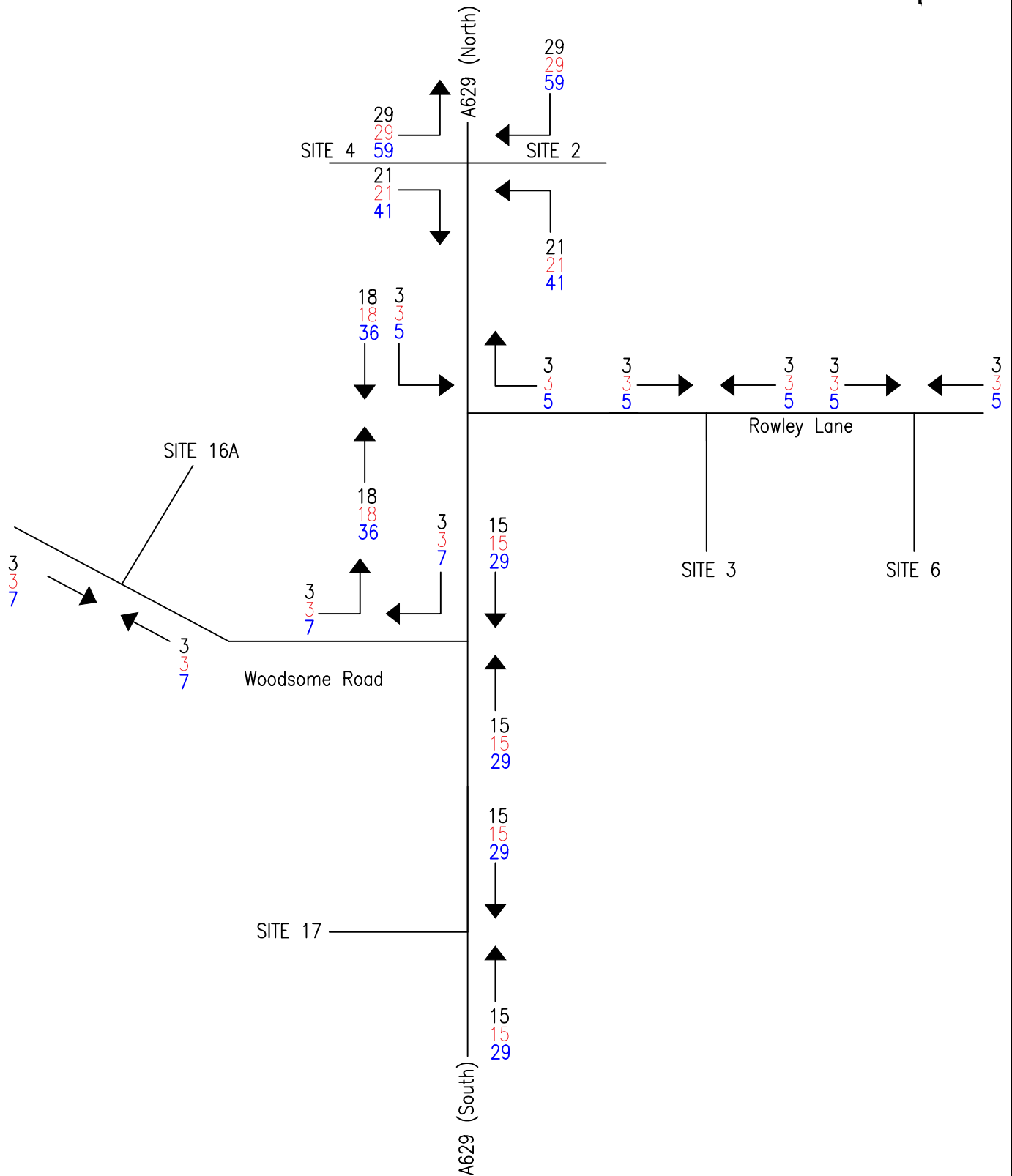
Site 3 Flows

Farnley Masterplan

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Approved AD	Drawing Number Figure 5	Size A4

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 PM 17:15 – 18:15
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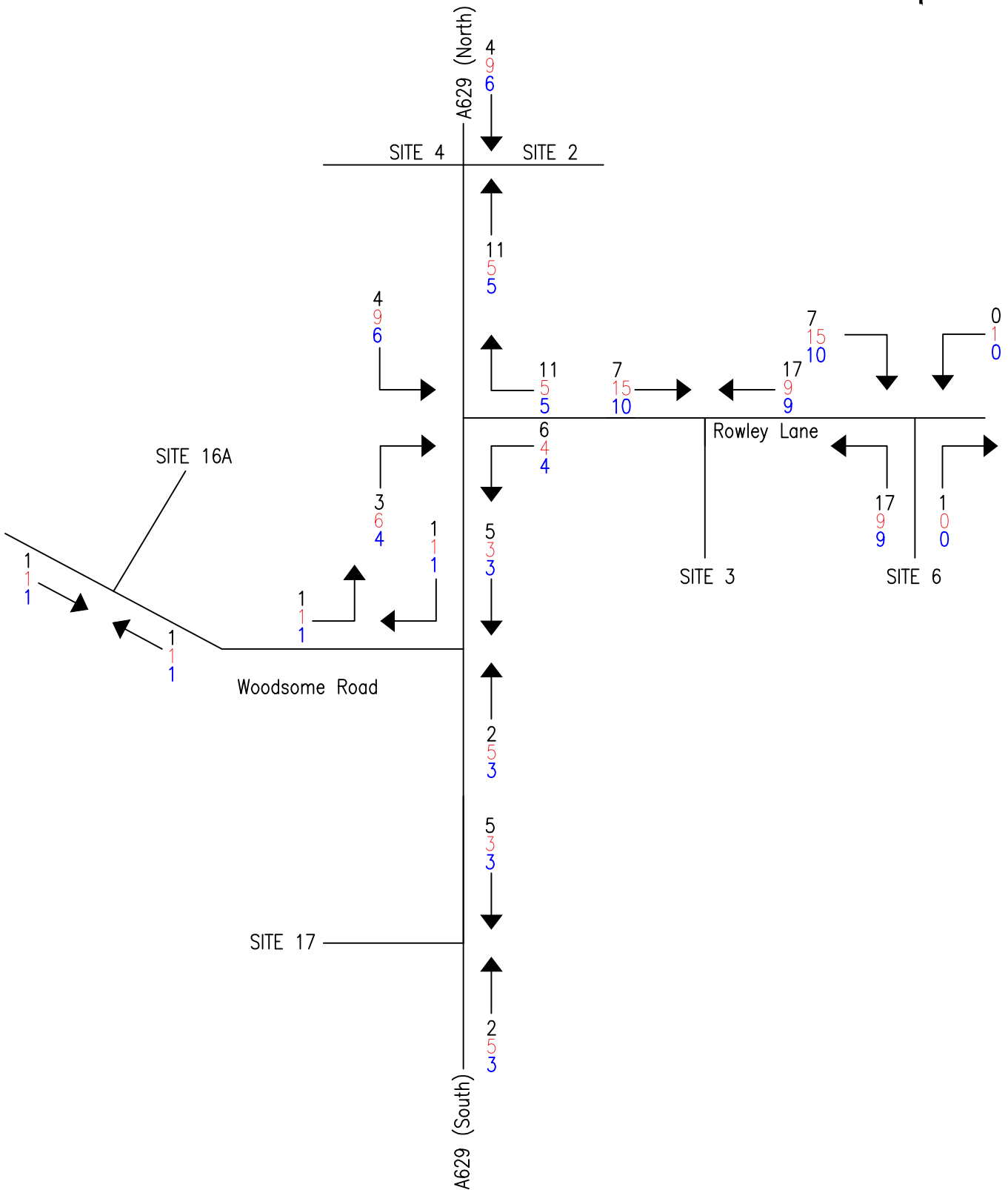
Site 4 Flows

Farnley Masterplan

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Checked AD	Date Jan. 2016	
Approved AD	Drawing Number Figure 6	Size A4

Key

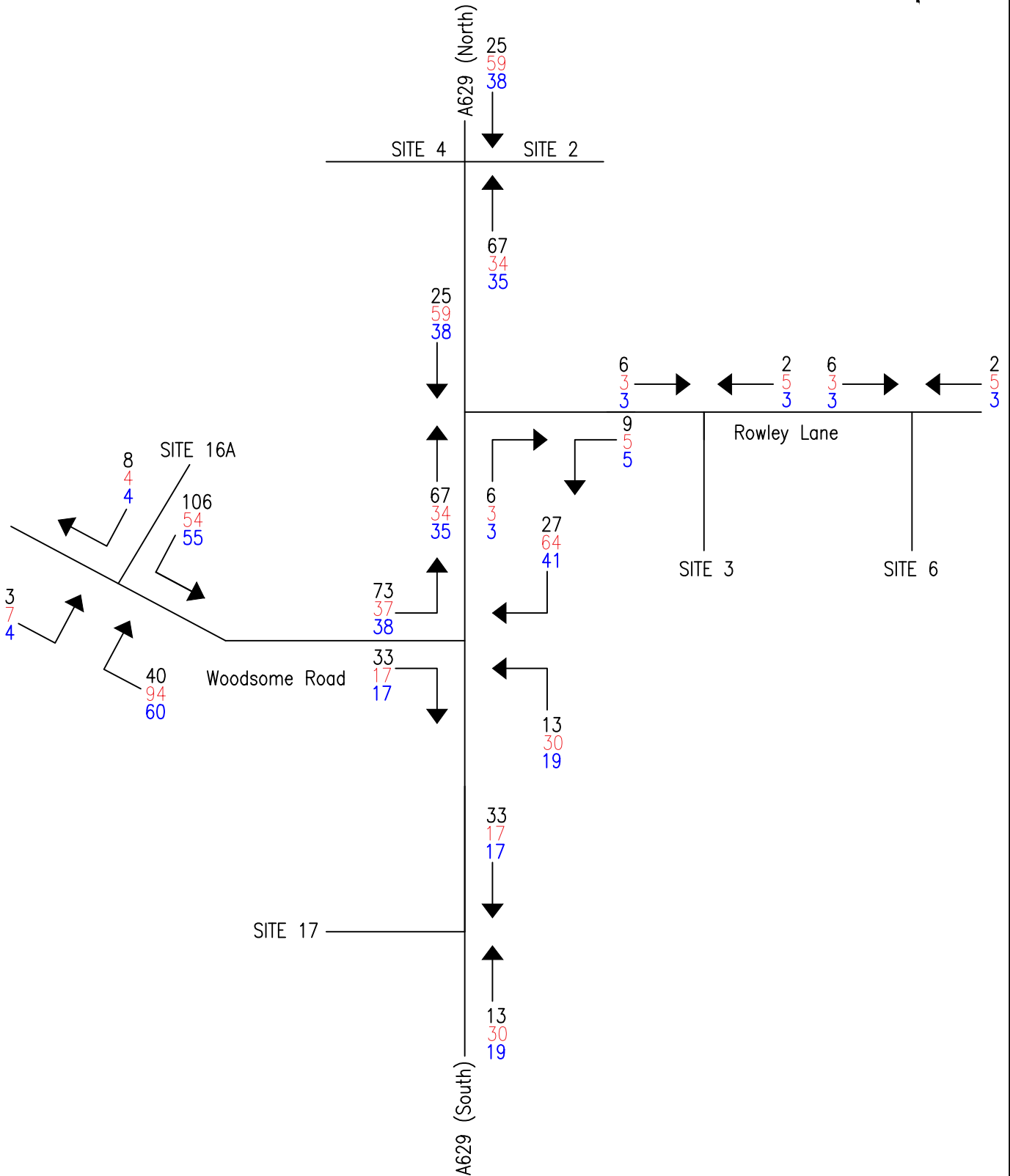
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Approved AD	Drawing Number Figure 7	Size A4

Key

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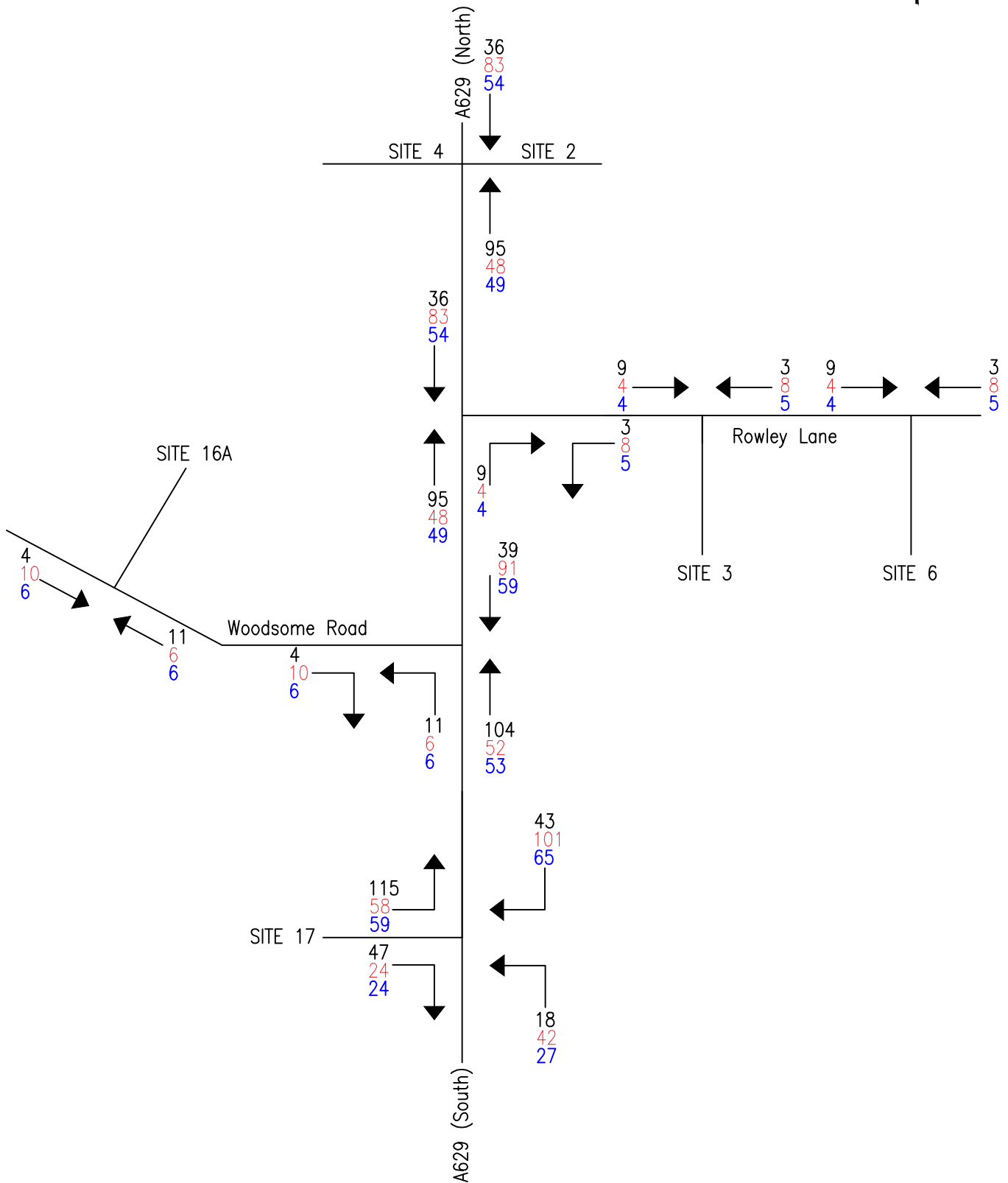
Site 16A Flows

Farnley Masterplan

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Checked AD	Date Jan. 2016	
Approved AD	Drawing Number Figure 8	Size A4

Key

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 PM 17:15 - 18:15
 SAT 12:15 - 13:15



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Site 17 Flows

Farnley Masterplan

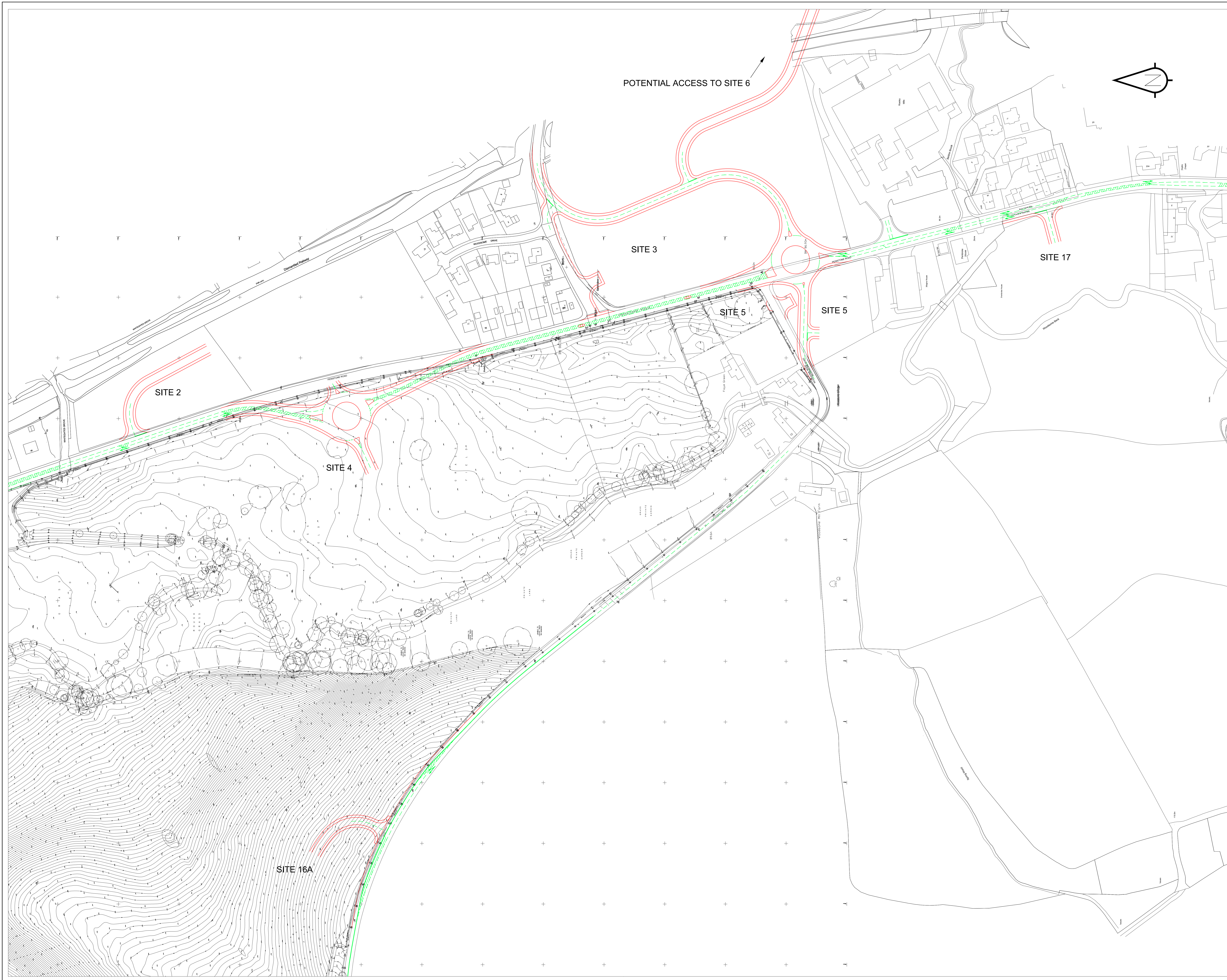
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Checked AD	Date Jan. 2016	
Approved AD	Drawing Number Figure 9	Size A4

APPENDIX B

Drawing 9058/001A

Drawing 9058/003

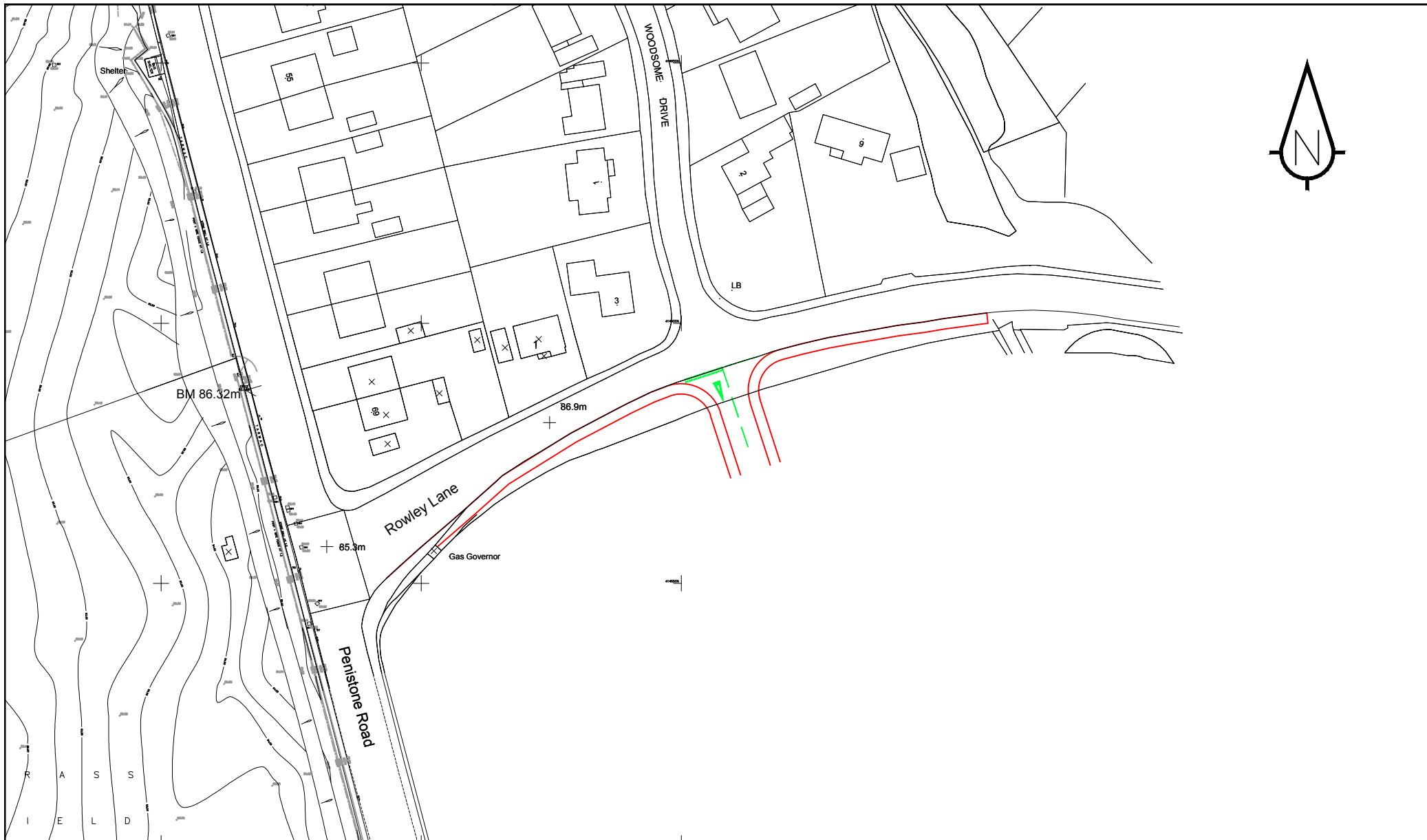
Drawing 9058/004



Rev	Amendment	AND	11.01.16	AND
		Drawn	Site	Checked


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Client			
FARNLEY ESTATES			
Project Title			
FARNLEY MASTERPLAN			
Drawing Title			
PRELIMINARY ACCESS OPTIONS SITES 2, 3, 4, 5, 6, 16A & 17			
Drawn By	AND	Checked By	AJF
Approved By	AJF	Date	12.12.15
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Rev			



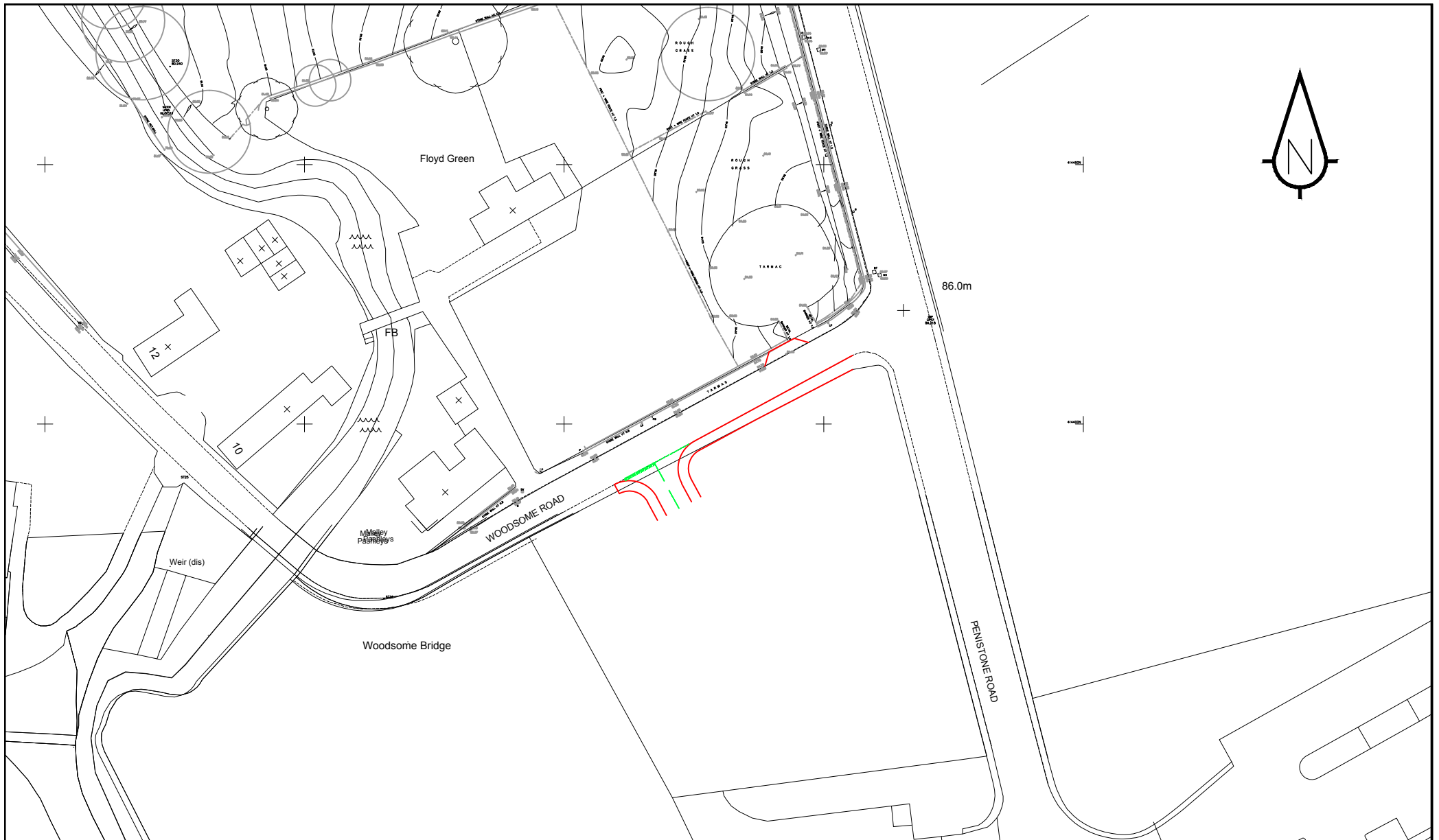
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FARNLEY MASTERPLAN

PRELIMINARY ACCESS OPTION SITE NO. 3


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Approved AND	Drawing Number 9058/003	Size A4




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FARNLEY MASTERPLAN

PRELIMINARY ACCESS OPTION
SITE NO. 5

Drawn KB	Scale 1:1000	
Checked AND	Date Jan. 2016	
Approved AND	Drawing Number 9058/004	Size A4

APPENDIX C
TRICS Output Data

Calculation Reference: AUDIT-311901-160105-0139

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED
 VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	ES EAST SUSSEX	1 days
	EX ESSEX	1 days
	HC HAMPSHIRE	1 days
	SC SURREY	1 days
	WS WEST SUSSEX	1 days
03	SOUTH WEST	
	CW CORNWALL	1 days
	DC DORSET	1 days
04	EAST ANGLIA	
	CA CAMBRIDGESHIRE	1 days
	NF NORFOLK	2 days
	SF SUFFOLK	3 days
05	EAST MIDLANDS	
	LN LINCOLNSHIRE	3 days
06	WEST MIDLANDS	
	SH SHROPSHIRE	4 days
	ST STAFFORDSHIRE	1 days
	WK WARWICKSHIRE	2 days
	WM WEST MIDLANDS	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NE NORTH EAST LINCOLNSHIRE	1 days
	NY NORTH YORKSHIRE	6 days
	SY SOUTH YORKSHIRE	1 days
08	NORTH WEST	
	CH CHESHIRE	4 days
	GM GREATER MANCHESTER	1 days
	MS MERSEYSIDE	1 days
09	NORTH	
	CB CUMBRIA	2 days
	TW TYNE & WEAR	1 days

Filtering Stage 2 selection:

Parameter: Number of dwellings
 Actual Range: 6 to 432 (units:)
 Range Selected by User: 6 to 4334 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/07 to 12/11/15

Selected survey days:

Monday	7 days
Tuesday	13 days
Wednesday	6 days
Thursday	9 days
Friday	6 days

Selected survey types:

Manual count	41 days
Directional ATC Count	0 days

Selected Locations:

Suburban Area (PPS6 Out of Centre)	21
Edge of Town	20

Selected Location Sub Categories:

Residential Zone	34
No Sub Category	7

Filtering Stage 3 selection:

Use Class:

C3	40 days
----	---------

Population within 1 mile:

1,001 to 5,000	6 days
5,001 to 10,000	12 days
10,001 to 15,000	6 days
15,001 to 20,000	9 days
20,001 to 25,000	5 days
25,001 to 50,000	3 days

Population within 5 miles:

5,001 to 25,000	3 days
25,001 to 50,000	5 days
50,001 to 75,000	2 days
75,001 to 100,000	10 days
100,001 to 125,000	7 days
125,001 to 250,000	7 days
250,001 to 500,000	6 days
500,001 or More	1 days

Car ownership within 5 miles:

0.6 to 1.0	13 days
1.1 to 1.5	28 days

Travel Plan:

Yes	2 days
No	39 days

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	41	75	0.078	41	75	0.277	41	75	0.355
08:00 - 09:00	41	75	0.151	41	75	0.399	41	75	0.550
09:00 - 10:00	41	75	0.150	41	75	0.187	41	75	0.337
10:00 - 11:00	41	75	0.141	41	75	0.172	41	75	0.313
11:00 - 12:00	41	75	0.169	41	75	0.160	41	75	0.329
12:00 - 13:00	41	75	0.181	41	75	0.164	41	75	0.345
13:00 - 14:00	41	75	0.163	41	75	0.156	41	75	0.319
14:00 - 15:00	41	75	0.175	41	75	0.188	41	75	0.363
15:00 - 16:00	41	75	0.284	41	75	0.207	41	75	0.491
16:00 - 17:00	41	75	0.297	41	75	0.180	41	75	0.477
17:00 - 18:00	41	75	0.353	41	75	0.203	41	75	0.556
18:00 - 19:00	41	75	0.257	41	75	0.188	41	75	0.445
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.399			2.481			4.880

Parameter summary

Trip rate parameter range selected: 6 - 432 (units:)
 Survey date date range: 01/01/07 - 12/11/15
 Number of weekdays (Monday-Friday): 41
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 2

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED
 VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	HF HERTFORDSHIRE	1 days
04	EAST ANGLIA	
	CA CAMBRIDGESHIRE	1 days
05	EAST MIDLANDS	
	NR NORTHAMPTONSHIRE	1 days
06	WEST MIDLANDS	
	SH SHROPSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NY NORTH YORKSHIRE	2 days
08	NORTH WEST	
	CH CHESHIRE	2 days
	MS MERSEYSIDE	1 days

Filtering Stage 2 selection:

Parameter: Number of dwellings
 Actual Range: 22 to 195 (units:)
 Range Selected by User: 6 to 4334 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/07 to 12/11/15

Selected survey days:

Saturday	1 days
Sunday	8 days

Selected survey types:

Manual count	9 days
Directional ATC Count	0 days

Selected Locations:

Suburban Area (PPS6 Out of Centre)	5
Edge of Town	4

Selected Location Sub Categories:

Residential Zone	9
------------------	---

Filtering Stage 3 selection:

Use Class:

C3	9 days
----	--------

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	1 days
10,001 to 15,000	3 days
15,001 to 20,000	1 days
20,001 to 25,000	2 days
25,001 to 50,000	1 days

Filtering Stage 3 selection (Cont.):

Population within 5 miles:

5,001 to 25,000	2 days
100,001 to 125,000	3 days
125,001 to 250,000	3 days
500,001 or More	1 days

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	5 days
1.6 to 2.0	2 days

Travel Plan:

No	9 days
----	--------

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	63	0.032	9	63	0.043	9	63	0.075
08:00 - 09:00	9	63	0.050	9	63	0.080	9	63	0.130
09:00 - 10:00	9	63	0.075	9	63	0.179	9	63	0.254
10:00 - 11:00	9	63	0.155	9	63	0.211	9	63	0.366
11:00 - 12:00	9	63	0.165	9	63	0.263	9	63	0.428
12:00 - 13:00	9	63	0.226	9	63	0.206	9	63	0.432
13:00 - 14:00	9	63	0.201	9	63	0.155	9	63	0.356
14:00 - 15:00	9	63	0.202	9	63	0.188	9	63	0.390
15:00 - 16:00	9	63	0.204	9	63	0.160	9	63	0.364
16:00 - 17:00	9	63	0.190	9	63	0.124	9	63	0.314
17:00 - 18:00	9	63	0.181	9	63	0.147	9	63	0.328
18:00 - 19:00	9	63	0.153	9	63	0.117	9	63	0.270
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.834			1.873			3.707

Parameter summary

Trip rate parameter range selected: 22 - 195 (units:)
Survey date date range: 01/01/07 - 12/11/15
Number of weekdays (Monday-Friday): 0
Number of Saturdays: 1
Number of Sundays: 8
Surveys manually removed from selection: 0

APPENDIX D
Gravity Model Data

Employment Distribution Gravity Model -Sheet 1

Location	Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West
Barnsley		100%		
Bradford	100%			
Calderdale	100%			
Doncaster		100%		
Kirklees 001	100%			
Kirklees 002	100%			
Kirklees 003	100%			
Kirklees 004	100%			
Kirklees 005	100%			
Kirklees 006	100%			
Kirklees 007	100%			
Kirklees 008	100%			
Kirklees 009	100%			
Kirklees 010	100%			
Kirklees 011	100%			
Kirklees 012	100%			
Kirklees 013	100%			
Kirklees 014	100%			
Kirklees 015	100%			
Kirklees 016	100%			
Kirklees 017	100%			
Kirklees 018			100%	
Kirklees 019	100%			
Kirklees 020	100%			
Kirklees 021	100%			
Kirklees 022	100%			
Kirklees 023	100%			
Kirklees 024			100%	
Kirklees 025	100%			
Kirklees 026	100%			
Kirklees 027	100%			
Kirklees 028			100%	
Kirklees 029	100%			
Kirklees 030	100%			
Kirklees 031	100%			
Kirklees 032	100%			
Kirklees 033	100%			
Kirklees 034	100%			
Kirklees 035	100%			
Kirklees 036	100%			
Kirklees 037	100%			
Kirklees 038	100%			
Kirklees 039	100%			
Kirklees 040	100%			
Kirklees 041	100%			
Kirklees 042	100%			
Kirklees 043	100%			
Kirklees 044	100%			
Kirklees 045	100%			
Kirklees 046			100%	
Kirklees 047	100%			
Kirklees 048	50%			50%
Kirklees 049	100%			
Kirklees 050	100%			100%
Kirklees 051		100%		
Kirklees 052	100%			
Kirklees 053				100%
Kirklees 054		100%		
Kirklees 055				100%
Kirklees 056		100%		
Kirklees 057		100%		
Kirklees 058				100%
Kirklees 059				100%
Leeds	50%	50%		
Manchester	100%			
Oldham	100%			
Rochdale	100%			
Rotherham		100%		
Selby	50%	50%		
Sheffield		100%		
Tameside	100%			
Trafford	100%			
Wakefield		50%	50%	
Other	50%	50%		

Employment Distribution Gravity Model -Sheet 2

Location	No.	Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West
Barnsley	64	0.0%	3.0%	0.0%	0.0%
Bradford	73	3.4%	0.0%	0.0%	0.0%
Calderdale	128	6.0%	0.0%	0.0%	0.0%
Doncaster	13	0.0%	0.6%	0.0%	0.0%
Kirklees 001	1	0.0%	0.0%	0.0%	0.0%
Kirklees 002	3	0.1%	0.0%	0.0%	0.0%
Kirklees 003	5	0.2%	0.0%	0.0%	0.0%
Kirklees 004	1	0.0%	0.0%	0.0%	0.0%
Kirklees 005	5	0.2%	0.0%	0.0%	0.0%
Kirklees 006	2	0.1%	0.0%	0.0%	0.0%
Kirklees 007	1	0.0%	0.0%	0.0%	0.0%
Kirklees 008	2	0.1%	0.0%	0.0%	0.0%
Kirklees 009	2	0.1%	0.0%	0.0%	0.0%
Kirklees 010	8	0.4%	0.0%	0.0%	0.0%
Kirklees 011	5	0.2%	0.0%	0.0%	0.0%
Kirklees 012	1	0.0%	0.0%	0.0%	0.0%
Kirklees 013	7	0.3%	0.0%	0.0%	0.0%
Kirklees 014	2	0.1%	0.0%	0.0%	0.0%
Kirklees 015	11	0.5%	0.0%	0.0%	0.0%
Kirklees 016	11	0.5%	0.0%	0.0%	0.0%
Kirklees 017	15	0.7%	0.0%	0.0%	0.0%
Kirklees 018	1	0.0%	0.0%	0.0%	0.0%
Kirklees 019	5	0.2%	0.0%	0.0%	0.0%
Kirklees 020	1	0.0%	0.0%	0.0%	0.0%
Kirklees 021	7	0.3%	0.0%	0.0%	0.0%
Kirklees 022	18	0.8%	0.0%	0.0%	0.0%
Kirklees 023	8	0.4%	0.0%	0.0%	0.0%
Kirklees 024	10	0.0%	0.0%	0.5%	0.0%
Kirklees 025	36	1.7%	0.0%	0.0%	0.0%
Kirklees 026	25	1.2%	0.0%	0.0%	0.0%
Kirklees 027	5	0.2%	0.0%	0.0%	0.0%
Kirklees 028	4	0.0%	0.0%	0.2%	0.0%
Kirklees 029	205	9.7%	0.0%	0.0%	0.0%
Kirklees 030	9	0.4%	0.0%	0.0%	0.0%
Kirklees 031	19	0.9%	0.0%	0.0%	0.0%
Kirklees 032	25	1.2%	0.0%	0.0%	0.0%
Kirklees 033	54	2.5%	0.0%	0.0%	0.0%
Kirklees 034	34	1.6%	0.0%	0.0%	0.0%
Kirklees 035	10	0.5%	0.0%	0.0%	0.0%
Kirklees 036	4	0.2%	0.0%	0.0%	0.0%
Kirklees 037	20	0.9%	0.0%	0.0%	0.0%
Kirklees 038	9	0.4%	0.0%	0.0%	0.0%
Kirklees 039	22	1.0%	0.0%	0.0%	0.0%
Kirklees 040	19	0.9%	0.0%	0.0%	0.0%
Kirklees 041	7	0.3%	0.0%	0.0%	0.0%
Kirklees 042	110	5.2%	0.0%	0.0%	0.0%
Kirklees 043	21	1.0%	0.0%	0.0%	0.0%
Kirklees 044	24	1.1%	0.0%	0.0%	0.0%
Kirklees 045	22	1.0%	0.0%	0.0%	0.0%
Kirklees 046	24	0.0%	0.0%	1.1%	0.0%
Kirklees 047	7	0.3%	0.0%	0.0%	0.0%
Kirklees 048	22	0.5%	0.0%	0.0%	0.5%
Kirklees 049	17	0.8%	0.0%	0.0%	0.0%
Kirklees 050	14	0.7%	0.0%	0.0%	0.7%
Kirklees 051	116	0.0%	5.5%	0.0%	0.0%
Kirklees 052	6	0.3%	0.0%	0.0%	0.0%
Kirklees 053	37	0.0%	0.0%	0.0%	1.7%
Kirklees 054	51	0.0%	2.4%	0.0%	0.0%
Kirklees 055	13	0.0%	0.0%	0.0%	0.6%
Kirklees 056	56	0.0%	2.6%	0.0%	0.0%
Kirklees 057	55	0.0%	2.6%	0.0%	0.0%
Kirklees 058	17	0.0%	0.0%	0.0%	0.8%
Kirklees 059	55	0.0%	0.0%	0.0%	2.6%
Leeds	187	4.4%	4.4%	0.0%	0.0%
Manchester	8	0.4%	0.0%	0.0%	0.0%
Oldham	11	0.5%	0.0%	0.0%	0.0%
Rochdale	7	0.3%	0.0%	0.0%	0.0%
Rotherham	14	0.0%	0.7%	0.0%	0.0%
Selby	15	0.4%	0.4%	0.0%	0.0%
Sheffield	30	0.0%	1.4%	0.0%	0.0%
Tameside	6	0.3%	0.0%	0.0%	0.0%
Trafford	5	0.2%	0.0%	0.0%	0.0%
Wakefield	157	0.0%	3.7%	3.7%	0.0%
Other	94	2.2%	2.2%	0.0%	0.0%
Total	2,118	58.6%	29.5%	5.5%	6.9%

		Site 2 (81 units)				
		Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West	Total
AM PEAK	IN	7	3	1	1	12
	OUT	18	10	2	2	32
PM PEAK	IN	17	8	2	2	29
	OUT	9	5	1	1	16
WEEKEND PEAK	IN	11	5	1	1	18
	OUT	10	5	1	1	17

		Site 3 (63 units)				
		Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West	Total
AM PEAK	IN	5	3	1	1	10
	OUT	15	7	1	2	25
PM PEAK	IN	13	7	1	1	22
	OUT	7	4	1	1	13
WEEKEND PEAK	IN	8	4	1	1	14
	OUT	7	4	1	1	13

		Site 4 (Hub Uses)				
		Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West	Total
AM PEAK	IN	29	15	3	3	50
	OUT	29	15	3	3	50
PM PEAK	IN	29	15	3	3	50
	OUT	29	15	3	3	50
WEEKEND PEAK	IN	59	29	5	7	100
	OUT	59	29	5	7	100

		Site 6 (45 units)				
		Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West	Total
AM PEAK	IN	4	2	0	1	7
	OUT	11	5	1	1	18
PM PEAK	IN	9	5	1	1	16
	OUT	5	3	0	1	9
WEEKEND PEAK	IN	6	3	0	1	10
	OUT	5	3	0	1	9

		Site 16A (285 units)				
		Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West	Total
AM PEAK	IN	25	13	2	3	43
	OUT	67	33	6	8	114
PM PEAK	IN	59	30	5	7	101
	OUT	34	17	3	4	58
WEEKEND PEAK	IN	38	19	3	4	64
	OUT	35	17	3	4	59

		Site 17 (405 units)				
		Penistone Road North	Penistone Road South	Rowley Lane East	Woodsome Road West	Total
AM PEAK	IN	36	18	3	4	61
	OUT	95	47	9	11	162
PM PEAK	IN	83	42	8	10	143
	OUT	48	24	4	6	82
WEEKEND PEAK	IN	54	27	5	6	92
	OUT	49	24	4	6	83

APPENDIX E
ARCADY Output - Site 2/4 Roundabout



A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"j:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Arcady\Site 4 Roundabout AM.vai"
(drive-on-the-left) at 10:55:47 on Monday, 11 January 2016

FILE PROPERTIES

RUN TITLE: Farnley Estates Masterplan Proposals
LOCATION: Penistone Road
DATE: 05/01/16
CLIENT: Farnley Estates
ENUMERATOR: adam.darwin [PC115]
JOB NUMBER: 9058
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - Penistone Road (s)
ARM B - Site 4 Access
ARM C - Penistone Road (n)
ARM D - Site 2 Access

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	T5
I	ARM A	I	3.00	I	7.00	I	10.00	I	20.00	I	40.00	I	40.0	I	0.570	I	23.177	I	
I	ARM B	I	3.50	I	4.00	I	5.00	I	20.00	I	40.00	I	22.0	I	0.552	I	20.132	I	
I	ARM C	I	3.00	I	7.00	I	22.00	I	20.00	I	40.00	I	34.0	I	0.628	I	27.533	I	
I	ARM D	I	3.50	I	4.00	I	4.00	I	20.00	I	40.00	I	21.0	I	0.553	I	20.087	I	

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I ARM	I FLOW	SCALE (%)	I
I A	I	100	I
I B	I	100	I
I C	I	100	I
I D	I	100	I

TIME PERIOD BEGINS(07.15)AND ENDS(08.45)
 LENGTH OF TIME PERIOD -(90) MINUTES
 LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: 2025 Base

T15										
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I
I ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I	I	I
I ARM A	I	15.00	I 45.00	I 75.00	I 10.34	I 15.51	I 10.34	I	I	I
I ARM B	I	15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00	I	I	I
I ARM C	I	15.00	I 45.00	I 75.00	I 10.44	I 15.66	I 10.44	I	I	I
I ARM D	I	15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00	I	I	I

DEMAND SET TITLE: Site 2

T15										
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I
I ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I	I	I
I ARM A	I	15.00	I 45.00	I 75.00	I 0.06	I 0.09	I 0.06	I	I	I
I ARM B	I	15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00	I	I	I
I ARM C	I	15.00	I 45.00	I 75.00	I 0.09	I 0.13	I 0.09	I	I	I
I ARM D	I	15.00	I 45.00	I 75.00	I 0.40	I 0.60	I 0.40	I	I	I

DEMAND SET TITLE: Site 3

T15										
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I
I ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I	I	I
I ARM A	I	15.00	I 45.00	I 75.00	I 0.19	I 0.28	I 0.19	I	I	I
I ARM B	I	15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00	I	I	I
I ARM C	I	15.00	I 45.00	I 75.00	I 0.06	I 0.09	I 0.06	I	I	I
I ARM D	I	15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00	I	I	I

DEMAND SET TITLE: Site 4

T15										
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I
I ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I	I	I
I ARM A	I	15.00	I 45.00	I 75.00	I 0.26	I 0.39	I 0.26	I	I	I
I ARM B	I	15.00	I 45.00	I 75.00	I 0.63	I 0.94	I 0.63	I	I	I
I ARM C	I	15.00	I 45.00	I 75.00	I 0.36	I 0.54	I 0.36	I	I	I
I ARM D	I	15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00	I	I	I

DEMAND SET TITLE: Site 6 T15

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)								
			I	I	I	I	I	I	I					
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER						
I	I	I	I	I	I	I	I	I						
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK						
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.14	I	0.21	I	0.14	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.05	I	0.08	I	0.05	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 16A T15

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)								
			I	I	I	I	I	I	I					
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER						
I	I	I	I	I	I	I	I	I						
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK						
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.84	I	1.26	I	0.84	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.31	I	0.47	I	0.31	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 17 T15

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)								
			I	I	I	I	I	I	I					
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER						
I	I	I	I	I	I	I	I	I						
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK						
I	ARM A	I	15.00	I	45.00	I	75.00	I	1.19	I	1.78	I	1.19	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.45	I	0.67	I	0.45	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: 2025 Base T33

I	I	I	TURNING PROPORTIONS				
			I	I	I	I	
I	I	I	TURNING COUNTS				
I	I	I	(PERCENTAGE OF H.V.S)				
I	I	I	I				
I	TIME	I	FROM/T	ARM A	ARM B	ARM C	ARM D
I	07.15 - 08.45	I	I	I	I	I	I
I	I	I	ARM A	0.000	0.000	1.000	0.000
I	I	I	I	0.0	0.0	827.0	0.0
I	I	I	I	(0.0)	(0.0)	(0.0)	(0.0)
I	I	I	I	I	I	I	I
I	I	I	ARM B	0.000	0.000	0.000	0.000
I	I	I	I	0.0	0.0	0.0	0.0
I	I	I	I	(0.0)	(0.0)	(0.0)	(0.0)
I	I	I	I	I	I	I	I
I	I	I	ARM C	1.000	0.000	0.000	0.000
I	I	I	I	835.0	0.0	0.0	0.0
I	I	I	I	(0.0)	(0.0)	(0.0)	(0.0)
I	I	I	I	I	I	I	I
I	I	I	ARM D	0.000	0.000	0.000	0.000
I	I	I	I	0.0	0.0	0.0	0.0
I	I	I	I	(0.0)	(0.0)	(0.0)	(0.0)
I	I	I	I	I	I	I	I

DEMAND SET TITLE: Site 2

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	5.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	7.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.438	0.000	0.563	0.000				
		14.0	0.0	18.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 3

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	15.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		5.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 4

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	1.000	0.000	0.000				
		0.0	21.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.420	0.000	0.580	0.000				
		21.0	0.0	29.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	1.000	0.000	0.000				
		0.0	29.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 6

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	11.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		4.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 16A

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	67.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		25.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 17

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	95.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		36.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
ARM A	13.06	22.84	0.572	-	0.0	1.3	18.8	-	0.101
ARM B	0.63	12.99	0.048	-	0.0	0.1	0.7	-	0.081
ARM C	11.81	27.33	0.432	-	0.0	0.8	11.0	-	0.064
ARM D	0.40	13.49	0.030	-	0.0	0.0	0.4	-	0.076

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45									
ARM A	15.60	22.78	0.685	-	1.3	2.1	30.1	-	0.137
ARM B	0.75	11.58	0.065	-	0.1	0.1	1.0	-	0.092
ARM C	14.10	27.29	0.517	-	0.8	1.1	15.5	-	0.076
ARM D	0.48	12.19	0.039	-	0.0	0.0	0.6	-	0.085

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
ARM A	19.10	22.69	0.842	-	2.1	4.8	63.9	-	0.254
ARM B	0.92	9.71	0.094	-	0.1	0.1	1.5	-	0.114
ARM C	17.27	27.23	0.634	-	1.1	1.7	24.5	-	0.100
ARM D	0.59	10.43	0.056	-	0.0	0.1	0.9	-	0.101

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	19.10	22.69	0.842	-	4.8	5.1	74.4	-	0.275
ARM B	0.92	9.62	0.095	-	0.1	0.1	1.6	-	0.115
ARM C	17.27	27.23	0.634	-	1.7	1.7	25.7	-	0.100
ARM D	0.59	10.40	0.056	-	0.1	0.1	0.9	-	0.102

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
ARM A	15.60	22.77	0.685	-	5.1	2.2	36.2	-	0.147
ARM B	0.75	11.44	0.065	-	0.1	0.1	1.1	-	0.094
ARM C	14.10	27.29	0.517	-	1.7	1.1	16.7	-	0.076
ARM D	0.48	12.16	0.039	-	0.1	0.0	0.6	-	0.086

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
ARM A	13.06	22.84	0.572	-	2.2	1.4	21.2	-	0.103
ARM B	0.63	12.91	0.049	-	0.1	0.1	0.8	-	0.081
ARM C	11.81	27.33	0.432	-	1.1	0.8	11.8	-	0.065
ARM D	0.40	13.45	0.030	-	0.0	0.0	0.5	-	0.077

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	1.3	*
07.45	2.1	**
08.00	4.8	*****
08.15	5.1	*****
08.30	2.2	**
08.45	1.4	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.1	
07.45	0.1	
08.00	0.1	
08.15	0.1	
08.30	0.1	
08.45	0.1	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.8	*
07.45	1.1	*
08.00	1.7	**
08.15	1.7	**
08.30	1.1	*
08.45	0.8	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.0	
07.45	0.0	
08.00	0.1	
08.15	0.1	
08.30	0.0	
08.45	0.0	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

										T75				
I	ARM	I	TOTAL DEMAND	I	* QUEUEING * * DELAY *	I	* INCLUSIVE QUEUEING * * DELAY *	I		I				
I		I	(VEH)	I	(VEH/H)	I	(MIN)	I	(MIN/VEH)	I	(MIN)	I	(MIN/VEH)	I
I	A	I	1432.9	I	955.2	I	244.6	I	0.17	I	244.7	I	0.17	I
I	B	I	68.8	I	45.9	I	6.7	I	0.10	I	6.7	I	0.10	I
I	C	I	1295.2	I	863.5	I	105.1	I	0.08	I	105.2	I	0.08	I
I	D	I	44.0	I	29.4	I	3.9	I	0.09	I	3.9	I	0.09	I
I	ALL	I	2840.9	I	1894.0	I	360.4	I	0.13	I	360.4	I	0.13	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

==== end of file =====

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
 "j:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Arcady\Site 4 Roundabout PM.vai"
 (drive-on-the-left) at 10:56:43 on Monday, 11 January 2016

FILE PROPERTIES

RUN TITLE: Farnley Estates Masterplan Proposals
 LOCATION: Penistone Road
 DATE: 05/01/16
 CLIENT: Farnley Estates
 ENUMERATOR: adam.darwin [PC115]
 JOB NUMBER: 9058
 STATUS: Preliminary
 DESCRIPTION:

INPUT DATA

ARM A - Penistone Road (s)
 ARM B - Site 4 Access
 ARM C - Penistone Road (n)
 ARM D - Site 2 Access

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	T5
I	ARM	A	I	3.00	I	7.00	I	10.00	I	20.00	I	40.00	I	40.0	I	0.570	I	23.177	I
I	ARM	B	I	3.50	I	4.00	I	5.00	I	20.00	I	40.00	I	22.0	I	0.552	I	20.132	I
I	ARM	C	I	3.00	I	7.00	I	22.00	I	20.00	I	40.00	I	34.0	I	0.628	I	27.533	I
I	ARM	D	I	3.50	I	4.00	I	4.00	I	20.00	I	40.00	I	21.0	I	0.553	I	20.087	I

V = approach half-width L = effective flare length D = inscribed circle diameter
 E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I ARM	I	FLOW SCALE (%)	I
I A	I	100	I
I B	I	100	I
I C	I	100	I
I D	I	100	I

TIME PERIOD BEGINS(17.00)AND ENDS(18.30)
 LENGTH OF TIME PERIOD -(90) MINUTES
 LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: 2025 Base

T15

I ARM	I	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	I	TOP OF PEAK	I	FLOW STOPS	I	RATE OF FLOW (VEH/MIN) BEFORE	I	AT TOP	I	AFTER
I	I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I	PEAK
I ARM A	I	15.00	I	45.00	I	75.00	I	10.38	I	15.56	I	10.38
I ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00
I ARM C	I	15.00	I	45.00	I	75.00	I	14.95	I	22.42	I	14.95
I ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00

DEMAND SET TITLE: Site 2

T15

I ARM	I	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	I	TOP OF PEAK	I	FLOW STOPS	I	RATE OF FLOW (VEH/MIN) BEFORE	I	AT TOP	I	AFTER
I	I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I	PEAK
I ARM A	I	15.00	I	45.00	I	75.00	I	0.15	I	0.23	I	0.15
I ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00
I ARM C	I	15.00	I	45.00	I	75.00	I	0.21	I	0.32	I	0.21
I ARM D	I	15.00	I	45.00	I	75.00	I	0.20	I	0.30	I	0.20

DEMAND SET TITLE: Site 3

T15

I ARM	I	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	I	TOP OF PEAK	I	FLOW STOPS	I	RATE OF FLOW (VEH/MIN) BEFORE	I	AT TOP	I	AFTER
I	I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I	PEAK
I ARM A	I	15.00	I	45.00	I	75.00	I	0.09	I	0.13	I	0.09
I ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00
I ARM C	I	15.00	I	45.00	I	75.00	I	0.16	I	0.24	I	0.16
I ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00

DEMAND SET TITLE: Site 4

T15

I ARM	I	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	I	TOP OF PEAK	I	FLOW STOPS	I	RATE OF FLOW (VEH/MIN) BEFORE	I	AT TOP	I	AFTER
I	I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I	PEAK
I ARM A	I	15.00	I	45.00	I	75.00	I	0.26	I	0.39	I	0.26
I ARM B	I	15.00	I	45.00	I	75.00	I	0.63	I	0.94	I	0.63
I ARM C	I	15.00	I	45.00	I	75.00	I	0.36	I	0.54	I	0.36
I ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00

DEMAND SET TITLE: Site 6 T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 0.06	I 0.09	I 0.06
I	ARM B	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00
I	ARM C	I 15.00	I 45.00	I 75.00	I 0.11	I 0.17	I 0.11
I	ARM D	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00

DEMAND SET TITLE: Site 16A T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 0.43	I 0.64	I 0.43
I	ARM B	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00
I	ARM C	I 15.00	I 45.00	I 75.00	I 0.74	I 1.11	I 0.74
I	ARM D	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00

DEMAND SET TITLE: Site 17 T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 0.60	I 0.90	I 0.60
I	ARM B	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00
I	ARM C	I 15.00	I 45.00	I 75.00	I 1.04	I 1.56	I 1.04
I	ARM D	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00

DEMAND SET TITLE: 2025 Base T33

I	I	TURNING PROPORTIONS				
		I	I	I	I	
I	I	TURNING COUNTS				
I	I	(PERCENTAGE OF H.V.S)				
I	I					
I	TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
I	17.00 - 18.30	I	I	I	I	I
I	I	I	I	I	I	I
I	I	ARM A	I 0.000	I 0.000	I 1.000	I 0.000
I	I	I	I 0.0	I 0.0	I 830.0	I 0.0
I	I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I	I	I	I	I	I	I
I	I	ARM B	I 0.000	I 0.000	I 0.000	I 0.000
I	I	I	I 0.0	I 0.0	I 0.0	I 0.0
I	I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I	I	I	I	I	I	I
I	I	ARM C	I 1.000	I 0.000	I 0.000	I 0.000
I	I	I	I 1196.0	I 0.0	I 0.0	I 0.0
I	I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I	I	I	I	I	I	I
I	I	ARM D	I 0.000	I 0.000	I 0.000	I 0.000
I	I	I	I 0.0	I 0.0	I 0.0	I 0.0
I	I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I	I	I	I	I	I	I

DEMAND SET TITLE: Site 2

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	12.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	17.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.438	0.000	0.563	0.000					
	7.0	0.0	9.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 3

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	7.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		13.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.000	0.000	0.000	0.000					
	0.0	0.0	0.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 4

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	1.000	0.000	0.000				
		0.0	21.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.420	0.000	0.580	0.000				
		21.0	0.0	29.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	1.000	0.000	0.000				
		0.0	29.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.000	0.000	0.000	0.000					
	0.0	0.0	0.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 6

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	5.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		9.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 16A

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	34.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		59.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 17

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	48.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		83.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	12.01	22.91	0.524	-	0.0	1.1	15.7	-	0.091
ARM B	0.63	13.63	0.046	-	0.0	0.0	0.7	-	0.077
ARM C	17.64	27.27	0.647	-	0.0	1.8	25.5	-	0.101
ARM D	0.20	10.38	0.019	-	0.0	0.0	0.3	-	0.098

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	14.34	22.85	0.627	-	1.1	1.7	23.7	-	0.116
ARM B	0.75	12.34	0.061	-	0.0	0.1	0.9	-	0.086
ARM C	21.07	27.22	0.774	-	1.8	3.3	45.6	-	0.157
ARM D	0.24	8.47	0.028	-	0.0	0.0	0.4	-	0.121

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	17.56	22.79	0.771	-	1.7	3.2	44.1	-	0.185
ARM B	0.92	10.61	0.086	-	0.1	0.1	1.4	-	0.103
ARM C	25.80	27.15	0.950	-	3.3	11.9	137.0	-	0.428
ARM D	0.29	6.10	0.048	-	0.0	0.0	0.7	-	0.172

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	17.56	22.78	0.771	-	3.2	3.3	48.7	-	0.191
ARM B	0.92	10.56	0.087	-	0.1	0.1	1.4	-	0.104
ARM C	25.80	27.15	0.950	-	11.9	14.0	196.1	-	0.578
ARM D	0.29	5.87	0.050	-	0.0	0.1	0.8	-	0.179

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	14.34	22.84	0.628	-	3.3	1.7	27.2	-	0.121
ARM B	0.75	12.26	0.061	-	0.1	0.1	1.0	-	0.087
ARM C	21.07	27.22	0.774	-	14.0	3.6	69.4	-	0.204
ARM D	0.24	8.03	0.030	-	0.1	0.0	0.5	-	0.129

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.15-18.30									
ARM A	12.01	22.90	0.524	-	1.7	1.1	17.3	-	0.092
ARM B	0.63	13.56	0.046	-	0.1	0.0	0.7	-	0.077
ARM C	17.64	27.27	0.647	-	3.6	1.9	29.4	-	0.106
ARM D	0.20	10.25	0.020	-	0.0	0.0	0.3	-	0.100

 QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	1.1	*
17.30	1.7	**
17.45	3.2	***
18.00	3.3	***
18.15	1.7	**
18.30	1.1	*

 QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.0
17.30	0.1
17.45	0.1
18.00	0.1
18.15	0.1
18.30	0.0

 QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	1.8	**
17.30	3.3	***
17.45	11.9	*****
18.00	14.0	*****
18.15	3.6	****
18.30	1.9	**

 QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.1
18.15	0.0
18.30	0.0

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

										T75
I	ARM	I	TOTAL DEMAND	I	* QUEUEING * * DELAY *	I	* INCLUSIVE QUEUEING * * DELAY *	I		I
I		I		I		I		I		I
I		I	(VEH)	I	(VEH/H)	I	(MIN)	I	(MIN/VEH)	I
I		I		I		I	(MIN)	I	(MIN/VEH)	I
I	A	I	1317.2	I	878.2	I	176.7	I	0.13	I
I	B	I	68.8	I	45.9	I	6.2	I	0.09	I
I	C	I	1935.3	I	1290.2	I	503.1	I	0.26	I
I	D	I	22.0	I	14.7	I	3.0	I	0.14	I
I	ALL	I	3343.3	I	2228.9	I	689.0	I	0.21	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"j:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Arcady\Site 4 Roundabout AM.vai"
(drive-on-the-left) at 10:55:47 on Monday, 11 January 2016

FILE PROPERTIES

RUN TITLE: Farnley Estates Masterplan Proposals
LOCATION: Penistone Road
DATE: 05/01/16
CLIENT: Farnley Estates
ENUMERATOR: adam.darwin [PC115]
JOB NUMBER: 9058
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - Penistone Road (s)
ARM B - Site 4 Access
ARM C - Penistone Road (n)
ARM D - Site 2 Access

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	T5
I	ARM A	I	3.00	I	7.00	I	10.00	I	20.00	I	40.00	I	40.0	I	0.570	I	23.177	I	
I	ARM B	I	3.50	I	4.00	I	5.00	I	20.00	I	40.00	I	22.0	I	0.552	I	20.132	I	
I	ARM C	I	3.00	I	7.00	I	22.00	I	20.00	I	40.00	I	34.0	I	0.628	I	27.533	I	
I	ARM D	I	3.50	I	4.00	I	4.00	I	20.00	I	40.00	I	21.0	I	0.553	I	20.087	I	

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I ARM	I	FLOW SCALE (%)	I
I A	I	100	I
I B	I	100	I
I C	I	100	I
I D	I	100	I

TIME PERIOD BEGINS(07.15)AND ENDS(08.45)
 LENGTH OF TIME PERIOD -(90) MINUTES
 LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: 2025 Base

T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
		TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK							
I	ARM A	I	15.00	I	45.00	I	75.00	I	10.34	I	15.51	I	10.34	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	10.44	I	15.66	I	10.44	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 2

T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
		TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK							
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.06	I	0.09	I	0.06	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.09	I	0.13	I	0.09	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.40	I	0.60	I	0.40	I

DEMAND SET TITLE: Site 3

T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
		TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK							
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.19	I	0.28	I	0.19	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.06	I	0.09	I	0.06	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 4

T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
		TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK							
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.26	I	0.39	I	0.26	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.63	I	0.94	I	0.63	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.36	I	0.54	I	0.36	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 6 T15

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)								
			I	I	I	I	I	I	I					
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER						
I	I	I	I	I	I	I	I	I						
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK						
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.14	I	0.21	I	0.14	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.05	I	0.08	I	0.05	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 16A T15

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)								
			I	I	I	I	I	I	I					
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER						
I	I	I	I	I	I	I	I	I						
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK						
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.84	I	1.26	I	0.84	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.31	I	0.47	I	0.31	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: Site 17 T15

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)								
			I	I	I	I	I	I	I					
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER						
I	I	I	I	I	I	I	I	I						
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK						
I	ARM A	I	15.00	I	45.00	I	75.00	I	1.19	I	1.78	I	1.19	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.45	I	0.67	I	0.45	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I

DEMAND SET TITLE: 2025 Base T33

I	I	TURNING PROPORTIONS				I						
		I	I	I	I							
I	I	TURNING COUNTS				I						
I	I	(PERCENTAGE OF H.V.S)				I						
I	I					I						
I	TIME	I	FROM/T	I	ARM A	I	ARM B	I	ARM C	I	ARM D	I
I	07.15 - 08.45	I	I	I	I	I	I	I	I	I	I	I
I		I	ARM A	I	0.000	I	0.000	I	1.000	I	0.000	I
I		I		I	0.0	I	0.0	I	827.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I		I		I		I		I		I
I		I	ARM B	I	0.000	I	0.000	I	0.000	I	0.000	I
I		I		I	0.0	I	0.0	I	0.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I		I		I		I		I		I
I		I	ARM C	I	1.000	I	0.000	I	0.000	I	0.000	I
I		I		I	835.0	I	0.0	I	0.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I		I		I		I		I		I
I		I	ARM D	I	0.000	I	0.000	I	0.000	I	0.000	I
I		I		I	0.0	I	0.0	I	0.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I		I		I		I		I		I

DEMAND SET TITLE: Site 2

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	5.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	7.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.438	0.000	0.563	0.000				
		14.0	0.0	18.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 3

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	15.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		5.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 4

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	1.000	0.000	0.000				
		0.0	21.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.420	0.000	0.580	0.000				
		21.0	0.0	29.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	1.000	0.000	0.000				
		0.0	29.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 6

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	11.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		4.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 16A

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	67.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		25.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 17

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	95.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		36.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	0.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
ARM A	13.06	22.84	0.572	-	0.0	1.3	18.8	-	0.101
ARM B	0.63	12.99	0.048	-	0.0	0.1	0.7	-	0.081
ARM C	11.81	27.33	0.432	-	0.0	0.8	11.0	-	0.064
ARM D	0.40	13.49	0.030	-	0.0	0.0	0.4	-	0.076

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45									
ARM A	15.60	22.78	0.685	-	1.3	2.1	30.1	-	0.137
ARM B	0.75	11.58	0.065	-	0.1	0.1	1.0	-	0.092
ARM C	14.10	27.29	0.517	-	0.8	1.1	15.5	-	0.076
ARM D	0.48	12.19	0.039	-	0.0	0.0	0.6	-	0.085

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
ARM A	19.10	22.69	0.842	-	2.1	4.8	63.9	-	0.254
ARM B	0.92	9.71	0.094	-	0.1	0.1	1.5	-	0.114
ARM C	17.27	27.23	0.634	-	1.1	1.7	24.5	-	0.100
ARM D	0.59	10.43	0.056	-	0.0	0.1	0.9	-	0.101

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	19.10	22.69	0.842	-	4.8	5.1	74.4	-	0.275
ARM B	0.92	9.62	0.095	-	0.1	0.1	1.6	-	0.115
ARM C	17.27	27.23	0.634	-	1.7	1.7	25.7	-	0.100
ARM D	0.59	10.40	0.056	-	0.1	0.1	0.9	-	0.102

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
ARM A	15.60	22.77	0.685	-	5.1	2.2	36.2	-	0.147
ARM B	0.75	11.44	0.065	-	0.1	0.1	1.1	-	0.094
ARM C	14.10	27.29	0.517	-	1.7	1.1	16.7	-	0.076
ARM D	0.48	12.16	0.039	-	0.1	0.0	0.6	-	0.086

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
ARM A	13.06	22.84	0.572	-	2.2	1.4	21.2	-	0.103
ARM B	0.63	12.91	0.049	-	0.1	0.1	0.8	-	0.081
ARM C	11.81	27.33	0.432	-	1.1	0.8	11.8	-	0.065
ARM D	0.40	13.45	0.030	-	0.0	0.0	0.5	-	0.077

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	1.3	*
07.45	2.1	**
08.00	4.8	*****
08.15	5.1	*****
08.30	2.2	**
08.45	1.4	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.1	
07.45	0.1	
08.00	0.1	
08.15	0.1	
08.30	0.1	
08.45	0.1	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.8	*
07.45	1.1	*
08.00	1.7	**
08.15	1.7	**
08.30	1.1	*
08.45	0.8	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.0	
07.45	0.0	
08.00	0.1	
08.15	0.1	
08.30	0.0	
08.45	0.0	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

										T75				
I	ARM	I	TOTAL DEMAND	I	* QUEUEING * * DELAY *	I	* INCLUSIVE QUEUEING * * DELAY *	I		I				
I		I	(VEH)	I	(VEH/H)	I	(MIN)	I	(MIN/VEH)	I	(MIN)	I	(MIN/VEH)	I
I	A	I	1432.9	I	955.2	I	244.6	I	0.17	I	244.7	I	0.17	I
I	B	I	68.8	I	45.9	I	6.7	I	0.10	I	6.7	I	0.10	I
I	C	I	1295.2	I	863.5	I	105.1	I	0.08	I	105.2	I	0.08	I
I	D	I	44.0	I	29.4	I	3.9	I	0.09	I	3.9	I	0.09	I
I	ALL	I	2840.9	I	1894.0	I	360.4	I	0.13	I	360.4	I	0.13	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

==== end of file =====

APPENDIX F
ARCADY Output - Site 3/6 Roundabout

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
 "j:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Arcady\Rowley Lane Roundabout AM.vai"
 (drive-on-the-left) at 20:01:33 on Tuesday, 5 January 2016

FILE PROPERTIES

RUN TITLE: Farnley Estates Masterplan Proposals
 LOCATION: Penistone Road
 DATE: 05/01/16
 CLIENT: Farnley Estates
 ENUMERATOR: adam.darwin [PC115]
 JOB NUMBER: 9058
 STATUS: Preliminary
 DESCRIPTION:

INPUT DATA

 ARM A - Penistone Road (s)
 ARM B - Woodsome Road
 ARM C - Penistone Road (n)
 ARM D - Rowley Lane

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	T5	
I	ARM	A	I	3.00	I	6.80	I	15.00	I	20.00	I	40.00	I	39.0	I	0.592	I	24.944	I	
I	ARM	B	I	3.00	I	6.00	I	2.00	I	12.00	I	40.00	I	46.0	I	0.470	I	16.197	I	
I	ARM	C	I	3.00	I	6.90	I	30.00	I	20.00	I	40.00	I	33.0	I	0.644	I	28.756	I	
I	ARM	D	I	3.00	I	6.00	I	6.00	I	20.00	I	40.00	I	34.0	I	0.546	I	20.686	I	

V = approach half-width L = effective flare length D = inscribed circle diameter
 E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I ARM	I FLOW SCALE (%)	I
I A	100	I
I B	100	I
I C	100	I
I D	100	I

TIME PERIOD BEGINS(07.15)AND ENDS(08.45)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: 2025 Base

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER
I ARM A	15.00	45.00	75.00	10.46	15.69	10.46
I ARM B	15.00	45.00	75.00	2.31	3.47	2.31
I ARM C	15.00	45.00	75.00	10.44	15.66	10.44
I ARM D	15.00	45.00	75.00	4.28	6.41	4.28

DEMAND SET TITLE: Site 2

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER
I ARM A	15.00	45.00	75.00	0.04	0.06	0.04
I ARM B	15.00	45.00	75.00	0.01	0.02	0.01
I ARM C	15.00	45.00	75.00	0.17	0.26	0.17
I ARM D	15.00	45.00	75.00	0.01	0.02	0.01

DEMAND SET TITLE: Site 3

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER
I ARM A	15.00	45.00	75.00	0.04	0.06	0.04
I ARM B	15.00	45.00	75.00	0.01	0.02	0.01
I ARM C	15.00	45.00	75.00	0.06	0.09	0.06
I ARM D	15.00	45.00	75.00	0.30	0.45	0.30

DEMAND SET TITLE: Site 4

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER
I ARM A	15.00	45.00	75.00	0.19	0.28	0.19
I ARM B	15.00	45.00	75.00	0.04	0.06	0.04
I ARM C	15.00	45.00	75.00	0.26	0.39	0.26
I ARM D	15.00	45.00	75.00	0.04	0.06	0.04

DEMAND SET TITLE: Site 6

----- T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
		I	I	I	I	I	I				I			
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.03	I	0.04	I	0.03	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.01	I	0.02	I	0.01	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.05	I	0.08	I	0.05	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.21	I	0.32	I	0.21	I

DEMAND SET TITLE: Site 16A

----- T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
		I	I	I	I	I	I				I			
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.16	I	0.24	I	0.16	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	1.33	I	1.99	I	1.33	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.31	I	0.47	I	0.31	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.03	I	0.04	I	0.03	I

DEMAND SET TITLE: Site 17

----- T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
		I	I	I	I	I	I				I			
I	ARM	I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I		I	I	I	I	I	I	I	I	I				
I	ARM A	I	15.00	I	45.00	I	75.00	I	1.44	I	2.16	I	1.44	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.05	I	0.08	I	0.05	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.45	I	0.67	I	0.45	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.04	I	0.06	I	0.04	I

DEMAND SET TITLE: 2025 Base

----- T33											
		TURNING PROPORTIONS									
		TURNING COUNTS									
		(PERCENTAGE OF H.V.S)									
I	TIME	I	FROM/T	I	ARM A	I	ARM B	I	ARM C	I	ARM D
I	07.15 - 08.45	I	I	I	I	I	I	I	I	I	I
I		I	ARM A	I	0.000	I	0.097	I	0.777	I	0.127
I		I		I	0.0	I	81.0	I	650.0	I	106.0
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)
I		I		I		I		I		I	
I		I	ARM B	I	0.076	I	0.000	I	0.632	I	0.292
I		I		I	14.0	I	0.0	I	117.0	I	54.0
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)
I		I		I		I		I		I	
I		I	ARM C	I	0.819	I	0.072	I	0.000	I	0.109
I		I		I	684.0	I	60.0	I	0.0	I	91.0
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)
I		I		I		I		I		I	
I		I	ARM D	I	0.401	I	0.424	I	0.175	I	0.000
I		I		I	137.0	I	145.0	I	60.0	I	0.0
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)
I		I		I		I		I		I	

DEMAND SET TITLE: Site 2

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	3.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	1.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.714	0.143	0.000	0.143				
		10.0	2.0	0.0	2.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	1.000	0.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 3

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	3.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	5.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.292	0.083	0.625	0.000				
		7.0	2.0	15.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 4

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	15.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	1.000	0.000				
		0.0	0.0	3.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.714	0.143	0.000	0.143				
		15.0	3.0	0.0	3.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	1.000	0.000				
		0.0	0.0	3.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 6

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	2.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	4.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.294	0.059	0.647	0.000					
	5.0	1.0	11.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 16A

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	1.000	0.000	0.000				
		0.0	13.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.311	0.000	0.632	0.057				
		33.0	0.0	67.0	6.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	1.000	0.000	0.000				
		0.0	25.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.000	1.000	0.000	0.000					
	0.0	2.0	0.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 17

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
07.15 - 08.45	ARM A	0.000	0.096	0.826	0.078				
		0.0	11.0	95.0	9.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	1.000	0.000	0.000	0.000				
		4.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		36.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	1.000	0.000	0.000	0.000					
	3.0	0.0	0.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
ARM A	12.40	22.51	0.551	-	0.0	1.2	17.3	-	0.097
ARM B	3.78	10.50	0.360	-	0.0	0.6	7.9	-	0.147
ARM C	11.79	26.89	0.439	-	0.0	0.8	11.3	-	0.066
ARM D	4.92	14.64	0.336	-	0.0	0.5	7.2	-	0.102

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45									
ARM A	14.80	22.03	0.672	-	1.2	2.0	28.4	-	0.136
ARM B	4.51	9.37	0.481	-	0.6	0.9	12.9	-	0.204
ARM C	14.08	26.52	0.531	-	0.8	1.1	16.3	-	0.080
ARM D	5.87	13.45	0.437	-	0.5	0.8	11.1	-	0.131

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
ARM A	18.13	21.38	0.848	-	2.0	5.0	65.3	-	0.275
ARM B	5.52	7.90	0.699	-	0.9	2.1	28.6	-	0.394
ARM C	17.25	26.04	0.662	-	1.1	1.9	27.5	-	0.112
ARM D	7.19	11.84	0.607	-	0.8	1.5	21.0	-	0.211

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	18.13	21.36	0.849	-	5.0	5.3	77.3	-	0.304
ARM B	5.52	7.82	0.707	-	2.1	2.3	33.5	-	0.430
ARM C	17.25	26.01	0.663	-	1.9	1.9	29.0	-	0.114
ARM D	7.19	11.81	0.609	-	1.5	1.5	22.7	-	0.216

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
ARM A	14.80	22.00	0.673	-	5.3	2.1	34.5	-	0.147
ARM B	4.51	9.25	0.487	-	2.3	1.0	15.8	-	0.219
ARM C	14.08	26.47	0.532	-	1.9	1.1	17.8	-	0.081
ARM D	5.87	13.40	0.438	-	1.5	0.8	12.4	-	0.134

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
ARM A	12.40	22.49	0.551	-	2.1	1.2	19.5	-	0.100
ARM B	3.78	10.43	0.362	-	1.0	0.6	9.0	-	0.152
ARM C	11.79	26.86	0.439	-	1.1	0.8	12.1	-	0.067
ARM D	4.92	14.60	0.337	-	0.8	0.5	7.9	-	0.104

 QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	1.2	*
07.45	2.0	**
08.00	5.0	*****
08.15	5.3	*****
08.30	2.1	**
08.45	1.2	*

 QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.6	*
07.45	0.9	*
08.00	2.1	**
08.15	2.3	**
08.30	1.0	*
08.45	0.6	*

 QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.8	*
07.45	1.1	*
08.00	1.9	**
08.15	1.9	**
08.30	1.1	*
08.45	0.8	*

 QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.30	0.5	*
07.45	0.8	*
08.00	1.5	*
08.15	1.5	**
08.30	0.8	*
08.45	0.5	*

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

										T75	
I	ARM	I	TOTAL DEMAND	I	* QUEUEING * * DELAY *	I	* INCLUSIVE QUEUEING * * DELAY *	I		I	
I		I	(VEH)	I	(MIN)	I	(MIN/VEH)	I	(MIN)	I	(MIN/VEH)
I	A	I	1359.9	I	906.6	I	242.3	I	0.18	I	242.3
I	B	I	414.3	I	276.2	I	107.7	I	0.26	I	107.7
I	C	I	1293.8	I	862.6	I	114.1	I	0.09	I	114.1
I	D	I	539.6	I	359.7	I	82.4	I	0.15	I	82.4
I	ALL	I	3607.6	I	2405.1	I	546.5	I	0.15	I	546.5

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-

"j:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Arcady\Rowley Lane Roundabout PM.vai"
 (drive-on-the-left) at 19:59:00 on Tuesday, 5 January 2016

FILE PROPERTIES

RUN TITLE: Farnley Estates Masterplan Proposals
 LOCATION: Penistone Road
 DATE: 05/01/16
 CLIENT: Farnley Estates
 ENUMERATOR: adam.darwin [PC115]
 JOB NUMBER: 9058
 STATUS: Preliminary
 DESCRIPTION:

INPUT DATA

ARM A - Penistone Road (s)
 ARM B - Woodsome Road
 ARM C - Penistone Road (n)
 ARM D - Rowley Lane

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I	T5
I	ARM A	I	3.00	I	6.80	I	15.00	I	20.00	I	40.00	I	39.0	I	0.592	I	24.944	I	
I	ARM B	I	3.00	I	6.00	I	2.00	I	12.00	I	40.00	I	46.0	I	0.470	I	16.197	I	
I	ARM C	I	3.00	I	6.90	I	30.00	I	20.00	I	40.00	I	33.0	I	0.644	I	28.756	I	
I	ARM D	I	3.00	I	6.00	I	6.00	I	20.00	I	40.00	I	34.0	I	0.546	I	20.686	I	

V = approach half-width L = effective flare length D = inscribed circle diameter
 E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I ARM	I FLOW SCALE(%)	I
I A	100	I
I B	100	I
I C	100	I
I D	100	I

TIME PERIOD BEGINS(17.00)AND ENDS(18.30)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: 2025 Base

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER	I TO RISE	I IS REACHED	I FALLING	I PEAK	I OF PEAK	I PEAK
I ARM A	15.00	45.00	75.00	10.88	16.31	10.88	15.00	45.00	75.00	4.24	6.36	4.24
I ARM B	15.00	45.00	75.00	1.49	2.23	1.49	15.00	45.00	75.00	0.03	0.04	0.03
I ARM C	15.00	45.00	75.00	14.95	22.42	14.95	15.00	45.00	75.00	0.09	0.13	0.09
I ARM D	15.00	45.00	75.00	4.24	6.36	4.24	15.00	45.00	75.00	0.03	0.04	0.03

DEMAND SET TITLE: Site 2

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER	I TO RISE	I IS REACHED	I FALLING	I PEAK	I OF PEAK	I PEAK
I ARM A	15.00	45.00	75.00	0.10	0.15	0.10	15.00	45.00	75.00	0.03	0.04	0.03
I ARM B	15.00	45.00	75.00	0.03	0.04	0.03	15.00	45.00	75.00	0.09	0.13	0.09
I ARM C	15.00	45.00	75.00	0.09	0.13	0.09	15.00	45.00	75.00	0.03	0.04	0.03
I ARM D	15.00	45.00	75.00	0.03	0.04	0.03	15.00	45.00	75.00	0.15	0.23	0.15

DEMAND SET TITLE: Site 3

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER	I TO RISE	I IS REACHED	I FALLING	I PEAK	I OF PEAK	I PEAK
I ARM A	15.00	45.00	75.00	0.09	0.13	0.09	15.00	45.00	75.00	0.19	0.28	0.19
I ARM B	15.00	45.00	75.00	0.01	0.02	0.01	15.00	45.00	75.00	0.04	0.06	0.04
I ARM C	15.00	45.00	75.00	0.16	0.24	0.16	15.00	45.00	75.00	0.26	0.39	0.26
I ARM D	15.00	45.00	75.00	0.15	0.23	0.15	15.00	45.00	75.00	0.04	0.06	0.04

DEMAND SET TITLE: Site 4

T15

I ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER	I TO RISE	I IS REACHED	I FALLING	I PEAK	I OF PEAK	I PEAK
I ARM A	15.00	45.00	75.00	0.19	0.28	0.19	15.00	45.00	75.00	0.04	0.06	0.04
I ARM B	15.00	45.00	75.00	0.04	0.06	0.04	15.00	45.00	75.00	0.26	0.39	0.26
I ARM C	15.00	45.00	75.00	0.26	0.39	0.26	15.00	45.00	75.00	0.04	0.06	0.04
I ARM D	15.00	45.00	75.00	0.04	0.06	0.04	15.00	45.00	75.00	0.04	0.06	0.04

DEMAND SET TITLE: Site 6 T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 0.06	I 0.09	I 0.06
I	ARM B	I 15.00	I 45.00	I 75.00	I 0.01	I 0.02	I 0.01
I	ARM C	I 15.00	I 45.00	I 75.00	I 0.11	I 0.17	I 0.11
I	ARM D	I 15.00	I 45.00	I 75.00	I 0.11	I 0.17	I 0.11

DEMAND SET TITLE: Site 16A T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 0.38	I 0.56	I 0.38
I	ARM B	I 15.00	I 45.00	I 75.00	I 0.68	I 1.01	I 0.68
I	ARM C	I 15.00	I 45.00	I 75.00	I 0.74	I 1.11	I 0.74
I	ARM D	I 15.00	I 45.00	I 75.00	I 0.06	I 0.09	I 0.06

DEMAND SET TITLE: Site 17 T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I	I	I	I	I	I	I	I
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 0.73	I 1.09	I 0.73
I	ARM B	I 15.00	I 45.00	I 75.00	I 0.13	I 0.19	I 0.13
I	ARM C	I 15.00	I 45.00	I 75.00	I 1.04	I 1.56	I 1.04
I	ARM D	I 15.00	I 45.00	I 75.00	I 0.10	I 0.15	I 0.10

DEMAND SET TITLE: 2025 Base T33

I	I	TURNING PROPORTIONS					
		I	I	I	I		
I	I	TURNING COUNTS					
I	I	(PERCENTAGE OF H.V.S)					
I	I						
I	TIME	FROM/T	ARM A	ARM B	ARM C	ARM D	
I	17.00 - 18.30	I	I	I	I	I	
I		I	ARM A	I 0.000	I 0.069	I 0.822	I 0.109
I		I	I	I 0.0	I 60.0	I 715.0	I 95.0
I		I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I		I	I	I	I	I	I
I		I	ARM B	I 0.160	I 0.000	I 0.597	I 0.244
I		I	I	I 19.0	I 0.0	I 71.0	I 29.0
I		I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I		I	I	I	I	I	I
I		I	ARM C	I 0.855	I 0.054	I 0.000	I 0.092
I		I	I	I 1022.0	I 64.0	I 0.0	I 110.0
I		I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I		I	I	I	I	I	I
I		I	ARM D	I 0.516	I 0.354	I 0.130	I 0.000
I		I	I	I 175.0	I 120.0	I 44.0	I 0.0
I		I	I	I (0.0)	I (0.0)	I (0.0)	I (0.0)
I		I	I	I	I	I	I

DEMAND SET TITLE: Site 2

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	8.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	1.000	0.000				
		0.0	0.0	2.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.714	0.143	0.000	0.143				
		5.0	1.0	0.0	1.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	1.000	0.000				
		0.0	0.0	2.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 3

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	7.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	13.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.333	0.083	0.583	0.000				
		4.0	1.0	7.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 4

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
17.00 - 18.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	15.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	1.000	0.000				
		0.0	0.0	3.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.714	0.143	0.000	0.143				
		15.0	3.0	0.0	3.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	0.000	1.000	0.000				
		0.0	0.0	3.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 6

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM	A	B	C	D			
17.00 - 18.30									
	ARM A		0.000	0.000	0.000	1.000			
			0.0	0.0	0.0	5.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM B		0.000	0.000	0.000	1.000			
			0.0	0.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM C		0.000	0.000	0.000	1.000			
			0.0	0.0	0.0	9.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM D		0.333	0.111	0.556	0.000			
			3.0	1.0	5.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			

DEMAND SET TITLE: Site 16A

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM	A	B	C	D			
17.00 - 18.30									
	ARM A		0.000	1.000	0.000	0.000			
			0.0	30.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM B		0.315	0.000	0.630	0.056			
			17.0	0.0	34.0	3.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM C		0.000	1.000	0.000	0.000			
			0.0	59.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM D		0.000	1.000	0.000	0.000			
			0.0	5.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			

DEMAND SET TITLE: Site 17

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM	A	B	C	D			
17.00 - 18.30									
	ARM A		0.000	0.103	0.828	0.069			
			0.0	6.0	48.0	4.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM B		1.000	0.000	0.000	0.000			
			10.0	0.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM C		1.000	0.000	0.000	0.000			
			83.0	0.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			
	ARM D		1.000	0.000	0.000	0.000			
			8.0	0.0	0.0	0.0			
			(0.0)	(0.0)	(0.0)	(0.0)			

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	12.46	22.62	0.551	-	0.0	1.2	17.3	-	0.097
ARM B	2.38	10.59	0.225	-	0.0	0.3	4.2	-	0.121
ARM C	17.42	27.22	0.640	-	0.0	1.7	24.8	-	0.100
ARM D	4.74	11.85	0.400	-	0.0	0.7	9.4	-	0.139

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	14.88	22.17	0.671	-	1.2	2.0	28.3	-	0.135
ARM B	2.85	9.48	0.300	-	0.3	0.4	6.1	-	0.150
ARM C	20.80	26.92	0.773	-	1.7	3.3	45.2	-	0.158
ARM D	5.66	10.12	0.560	-	0.7	1.2	17.3	-	0.221

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	18.22	21.63	0.843	-	2.0	4.8	63.4	-	0.266
ARM B	3.49	8.03	0.434	-	0.4	0.7	10.6	-	0.218
ARM C	25.47	26.52	0.960	-	3.3	13.1	147.1	-	0.467
ARM D	6.94	8.00	0.867	-	1.2	4.8	57.2	-	0.672

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	18.22	21.56	0.845	-	4.8	5.1	75.1	-	0.293
ARM B	3.49	7.95	0.439	-	0.7	0.8	11.4	-	0.224
ARM C	25.47	26.50	0.961	-	13.1	16.0	220.5	-	0.665
ARM D	6.94	7.77	0.892	-	4.8	6.1	84.0	-	0.951

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	14.88	22.02	0.676	-	5.1	2.1	34.9	-	0.148
ARM B	2.85	9.35	0.305	-	0.8	0.4	6.9	-	0.155
ARM C	20.80	26.89	0.773	-	16.0	3.6	73.8	-	0.217
ARM D	5.66	9.66	0.587	-	6.1	1.5	27.6	-	0.292

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.15-18.30									
ARM A	12.46	22.58	0.552	-	2.1	1.2	19.5	-	0.100
ARM B	2.38	10.52	0.227	-	0.4	0.3	4.6	-	0.123
ARM C	17.42	27.21	0.640	-	3.6	1.8	28.6	-	0.105
ARM D	4.74	11.73	0.404	-	1.5	0.7	10.9	-	0.145

 QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	1.2	*
17.30	2.0	**
17.45	4.8	*****
18.00	5.1	*****
18.15	2.1	**
18.30	1.2	*

 QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.3	
17.30	0.4	
17.45	0.7	*
18.00	0.8	*
18.15	0.4	
18.30	0.3	

 QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	1.7	**
17.30	3.3	***
17.45	13.1	*****
18.00	16.0	*****
18.15	3.6	****
18.30	1.8	**

 QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.7	*
17.30	1.2	*
17.45	4.8	*****
18.00	6.1	*****
18.15	1.5	*
18.30	0.7	*

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

										T75
I	ARM	I	TOTAL DEMAND	I	* QUEUEING * * DELAY *	I	* INCLUSIVE QUEUEING * * DELAY *	I		I
I		I	(VEH)	I	(MIN)	I	(MIN)	I	(MIN/VEH)	I
I	A	I	1366.8	I	911.2	I	238.5	I	0.17	I
I	B	I	261.5	I	174.3	I	43.9	I	0.17	I
I	C	I	1910.5	I	1273.7	I	540.1	I	0.28	I
I	D	I	520.3	I	346.9	I	206.4	I	0.40	I
I	ALL	I	4059.1	I	2706.1	I	1028.9	I	0.25	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-

"j:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Arcady\Rowley Lane Roundabout Sat.vai"
 (drive-on-the-left) at 20:12:13 on Tuesday, 5 January 2016

FILE PROPERTIES

RUN TITLE: Farnley Estates Masterplan Proposals
 LOCATION: Penistone Road
 DATE: 05/01/16
 CLIENT: Farnley Estates
 ENUMERATOR: adam.darwin [PC115]
 JOB NUMBER: 9058
 STATUS: Preliminary
 DESCRIPTION:

INPUT DATA

ARM A - Penistone Road (s)
 ARM B - Woodsome Road
 ARM C - Penistone Road (n)
 ARM D - Rowley Lane

GEOMETRIC DATA

I ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I
I ARM A	I	3.00	I	6.80	I	15.00	I	20.00	I	40.00	I	39.0	I	0.592	I	24.944	I
I ARM B	I	3.00	I	6.00	I	2.00	I	12.00	I	40.00	I	46.0	I	0.470	I	16.197	I
I ARM C	I	3.00	I	6.90	I	30.00	I	20.00	I	40.00	I	33.0	I	0.644	I	28.756	I
I ARM D	I	3.00	I	6.00	I	6.00	I	20.00	I	40.00	I	34.0	I	0.546	I	20.686	I

V = approach half-width L = effective flare length D = inscribed circle diameter
 E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

I ARM	I	FLOW SCALE (%)	I
I A	I	100	I
I B	I	100	I
I C	I	100	I
I D	I	100	I

TIME PERIOD BEGINS(12.00)AND ENDS(13.30)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: 2025 Base

T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I
I	ARM D	I	I	I	I	I	I

DEMAND SET TITLE: Site 2

T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I
I	ARM D	I	I	I	I	I	I

DEMAND SET TITLE: Site 3

T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I
I	ARM D	I	I	I	I	I	I

DEMAND SET TITLE: Site 4

T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I
I	ARM D	I	I	I	I	I	I

DEMAND SET TITLE: Site 6

T15

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I		I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I
I	ARM D	I	I	I	I	I	I

DEMAND SET TITLE: Site 16A

----- T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
		I	I	I	I	I	I				I			
I	ARM	I	I	I	I	I	I	I	I	I				
I	I	I	I	I	I	I	I	I	I	I				
I	I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I	PEAK	I	
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.24	I	0.36	I	0.24	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.69	I	1.03	I	0.69	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.47	I	0.71	I	0.47	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.04	I	0.06	I	0.04	I

DEMAND SET TITLE: Site 17

----- T15														
I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I	I	I				
		I	I	I	I	I	I				I			
I	ARM	I	I	I	I	I	I	I	I	I				
I	I	I	I	I	I	I	I	I	I	I				
I	I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	I	OF PEAK	I	PEAK	I	
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.74	I	1.11	I	0.74	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.08	I	0.11	I	0.08	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.68	I	1.01	I	0.68	I
I	ARM D	I	15.00	I	45.00	I	75.00	I	0.06	I	0.09	I	0.06	I

DEMAND SET TITLE: 2025 Base

----- T33												
I	I	TURNING PROPORTIONS			I	I	I	I	I	I		
		I	I	I								
I	I	TURNING COUNTS			I	I	I	I	I	I		
		I	I	I								
I	I	(PERCENTAGE OF H.V.S)			I	I	I	I	I	I		
		I	I	I								
I	TIME	I	FROM/T	I	ARM A	I	ARM B	I	ARM C	I	ARM D	I
I	12.00 - 13.30	I	ARM A	I	0.000	I	0.025	I	0.898	I	0.076	I
I		I		I	0.0	I	23.0	I	812.0	I	69.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I	ARM B	I	0.282	I	0.000	I	0.387	I	0.331	I
I		I		I	35.0	I	0.0	I	48.0	I	41.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I	ARM C	I	0.839	I	0.073	I	0.000	I	0.088	I
I		I		I	839.0	I	73.0	I	0.0	I	88.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I	ARM D	I	0.539	I	0.248	I	0.213	I	0.000	I
I		I		I	76.0	I	35.0	I	30.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I		I		I		I		I		I

DEMAND SET TITLE: Site 2

----- T33												
I	I	TURNING PROPORTIONS			I	I	I	I	I	I		
		I	I	I								
I	I	TURNING COUNTS			I	I	I	I	I	I		
		I	I	I								
I	I	(PERCENTAGE OF H.V.S)			I	I	I	I	I	I		
		I	I	I								
I	TIME	I	FROM/T	I	ARM A	I	ARM B	I	ARM C	I	ARM D	I
I	12.00 - 13.30	I	ARM A	I	0.000	I	0.000	I	1.000	I	0.000	I
I		I		I	0.0	I	0.0	I	5.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I	ARM B	I	0.000	I	0.000	I	1.000	I	0.000	I
I		I		I	0.0	I	0.0	I	0.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I	ARM C	I	0.714	I	0.143	I	0.000	I	0.143	I
I		I		I	5.0	I	1.0	I	0.0	I	1.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I	ARM D	I	0.000	I	0.000	I	1.000	I	0.000	I
I		I		I	0.0	I	0.0	I	0.0	I	0.0	I
I		I		I	(0.0)	I	(0.0)	I	(0.0)	I	(0.0)	I
I		I		I		I		I		I		I

DEMAND SET TITLE: Site 3

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
12.00 - 13.30	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	4.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	8.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.333	0.083	0.583	0.000					
	4.0	1.0	7.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 4

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
12.00 - 13.30	ARM A	0.000	0.000	1.000	0.000				
		0.0	0.0	29.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	1.000	0.000				
		0.0	0.0	7.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.707	0.171	0.000	0.122				
		29.0	7.0	0.0	5.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.000	0.000	1.000	0.000					
	0.0	0.0	5.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 6

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
12.00 - 13.30	ARM A	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	3.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	0.000	0.000	1.000				
		0.0	0.0	0.0	6.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
ARM D	0.333	0.111	0.556	0.000					
	3.0	1.0	5.0	0.0					
	(0.0)	(0.0)	(0.0)	(0.0)					

DEMAND SET TITLE: Site 16A

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
12.00 - 13.30	ARM A	0.000	1.000	0.000	0.000				
		0.0	19.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	0.309	0.000	0.636	0.055				
		17.0	0.0	35.0	3.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	0.000	1.000	0.000	0.000				
		0.0	38.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	0.000	1.000	0.000	0.000				
		0.0	3.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

DEMAND SET TITLE: Site 17

T33

		TURNING PROPORTIONS							
		TURNING COUNTS							
		(PERCENTAGE OF H.V.S)							
TIME	FROM/T	ARM A	ARM B	ARM C	ARM D				
12.00 - 13.30	ARM A	0.000	0.102	0.831	0.068				
		0.0	6.0	49.0	4.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM B	1.000	0.000	0.000	0.000				
		6.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM C	1.000	0.000	0.000	0.000				
		54.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				
	ARM D	1.000	0.000	0.000	0.000				
		5.0	0.0	0.0	0.0				
		(0.0)	(0.0)	(0.0)	(0.0)				

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.00-12.15									
ARM A	12.84	23.42	0.548	-	0.0	1.2	17.2	-	0.093
ARM B	2.45	10.20	0.240	-	0.0	0.3	4.5	-	0.128
ARM C	14.48	27.28	0.531	-	0.0	1.1	16.2	-	0.077
ARM D	2.21	13.16	0.168	-	0.0	0.2	2.9	-	0.091

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.15-12.30									
ARM A	15.33	23.11	0.663	-	1.2	1.9	27.5	-	0.127
ARM B	2.92	9.02	0.324	-	0.3	0.5	6.8	-	0.163
ARM C	17.29	26.99	0.641	-	1.1	1.8	25.2	-	0.102
ARM D	2.64	11.68	0.226	-	0.2	0.3	4.2	-	0.110

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.30-12.45									
ARM A	18.77	22.71	0.827	-	1.9	4.4	58.6	-	0.235
ARM B	3.58	7.45	0.480	-	0.5	0.9	12.6	-	0.255
ARM C	21.18	26.60	0.796	-	1.8	3.7	50.7	-	0.176
ARM D	3.23	9.69	0.333	-	0.3	0.5	7.1	-	0.154

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.45-13.00									
ARM A	18.77	22.70	0.827	-	4.4	4.6	67.4	-	0.252
ARM B	3.58	7.38	0.485	-	0.9	0.9	13.7	-	0.263
ARM C	21.18	26.58	0.797	-	3.7	3.8	56.4	-	0.184
ARM D	3.23	9.63	0.335	-	0.5	0.5	7.5	-	0.156

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
13.00-13.15									
ARM A	15.33	23.10	0.664	-	4.6	2.0	32.5	-	0.135
ARM B	2.92	8.92	0.328	-	0.9	0.5	7.8	-	0.168
ARM C	17.29	26.96	0.641	-	3.8	1.8	28.8	-	0.106
ARM D	2.64	11.58	0.228	-	0.5	0.3	4.6	-	0.112

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
13.15-13.30									
ARM A	12.84	23.40	0.548	-	2.0	1.2	19.2	-	0.095
ARM B	2.45	10.14	0.241	-	0.5	0.3	5.0	-	0.130
ARM C	14.48	27.26	0.531	-	1.8	1.1	17.7	-	0.079
ARM D	2.21	13.10	0.169	-	0.3	0.2	3.1	-	0.092

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.15	1.2 *
12.30	1.9 **
12.45	4.4 ****
13.00	4.6 *****
13.15	2.0 **
13.30	1.2 *

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.15	0.3
12.30	0.5
12.45	0.9 *
13.00	0.9 *
13.15	0.5
13.30	0.3

 QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.15	1.1	*
12.30	1.8	**
12.45	3.7	****
13.00	3.8	****
13.15	1.8	**
13.30	1.1	*

 QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.15	0.2
12.30	0.3
12.45	0.5
13.00	0.5
13.15	0.3
13.30	0.2

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

										T75
I	ARM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	I	I
I		I		I	* DELAY *	I	* DELAY *	I		I
I		I	(VEH)	I	(MIN)	I	(MIN)	I	(MIN/VEH)	I
I		I	(VEH/H)	I	(MIN/VEH)	I	(MIN)	I	(MIN/VEH)	I
I	A	I	1408.1	I	938.7	I	222.4	I	0.16	I
I	B	I	268.4	I	178.9	I	50.4	I	0.19	I
I	C	I	1588.4	I	1058.9	I	195.0	I	0.12	I
I	D	I	242.3	I	161.5	I	29.5	I	0.12	I
I	ALL	I	3507.1	I	2338.1	I	497.2	I	0.14	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

APPENDIX G
PICADY Output - Site 17 Priority Junction



TRL LIMITED

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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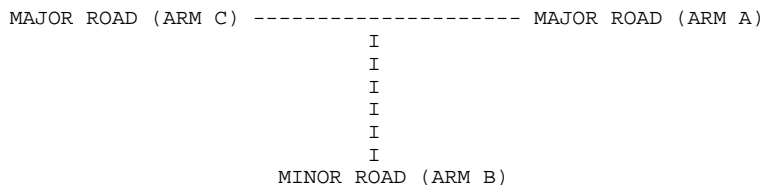
Run with file:-
"J:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Picady\Site 17 Access AM-PM.vpi"
(drive-on-the-left) at 12:12:02 on Tuesday, 12 January 2016

RUN INFORMATION

RUN TITLE : Farnley Estates Masterplan Proposals
LOCATION : Penistone Road - Site 17
DATE : 05/01/16
CLIENT : Farnley Estates
ENUMERATOR : adam.darwin [PC115]
JOB NUMBER : 9058
STATUS : Preliminary
DESCRIPTION :

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Penistone Road (s)
ARM B IS Site Access
ARM C IS Penistone Road (n)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

 GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I	(W) 6.00 M.	I
I	CENTRAL RESERVE WIDTH	I	(WCR) 0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I	(WC-B) 2.50 M.	I
I	- VISIBILITY	I	(VC-B)120.00 M.	I
I	- BLOCKS TRAFFIC (SPACES)	I	YES (5)	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I	(VB-C) 84.0 M.	I
I	- VISIBILITY TO RIGHT	I	(VB-A) 106.0 M.	I
I	- LANE 1 WIDTH	I	(WB-C) -	I
I	- LANE 2 WIDTH	I	(WB-A) -	I
I	WIDTH AT 0 M FROM JUNCTION	I	10.00 M.	I
I	WIDTH AT 5 M FROM JUNCTION	I	4.30 M.	I
I	WIDTH AT 10 M FROM JUNCTION	I	3.00 M.	I
I	WIDTH AT 15 M FROM JUNCTION	I	3.00 M.	I
I	WIDTH AT 20 M FROM JUNCTION	I	3.00 M.	I
I	- LENGTH OF FLARED SECTION	I	DERIVED: 0 PCU	I

 .SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

I	Intercept For	Slope For	Opposing	Slope For	Opposing	I
I	STREAM B-C	STREAM	A-C	STREAM	A-B	I
I	0.00		0.00		0.00	I

* Due to the presence of a flare, data is not available

I	Intercept For	Slope For	Opposing	Slope For	Opposing	Slope For	Opposing	Slope For	Opposing	I
I	STREAM B-A	STREAM	A-C	STREAM	A-B	STREAM	C-A	STREAM	C-B	I
I	0.00		0.00		0.00		0.00		0.00	I

* Due to the presence of a flare, data is not available

I	Intercept For	Slope For	Opposing	Slope For	Opposing	I
I	STREAM C-B	STREAM	A-C	STREAM	A-B	I
I	664.47		0.26		0.26	I

(NB These values do not allow for any site specific corrections)

 TRAFFIC DEMAND DATA

I	ARM	I	FLOW SCALE(%)	I
I	A	I	100	I
I	B	I	100	I
I	C	I	100	I

Demand set: 2025 AM Base

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.

LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	ARM	I	NUMBER OF MINUTES FROM START WHEN	I	RATE OF FLOW (VEH/MIN)	I
I		I	FLOW STARTS	I	BEFORE	I
I		I	TOP OF PEAK	I	AT TOP	I
I		I	IS REACHED	I	OF PEAK	I
I		I	FALLING	I	PEAK	I
I		I		I		I
I	ARM A	I	15.00	I	10.46	I
I	ARM B	I	15.00	I	0.00	I
I	ARM C	I	15.00	I	10.44	I

Demand set: Site 2 AM

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 3 AM

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 4 AM

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 6 AM

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 16A AM

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I					
			I	I	I	I	I	I		I				
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I					
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I					
I	I	I	I	I	I	I	I	I	I					
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.16	I	0.24	I	0.16	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.41	I	0.62	I	0.41	I

Demand set: Site 17 AM (300 Units)

TIME PERIOD BEGINS 07.15 AND ENDS 08.45

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I					
			I	I	I	I	I	I		I				
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I					
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I					
I	I	I	I	I	I	I	I	I	I					
I	ARM A	I	15.00	I	45.00	I	75.00	I	0.16	I	0.24	I	0.16	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	1.50	I	2.25	I	1.50	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	0.40	I	0.60	I	0.40	I

Demand set: 2025 AM Base

I	I	TURNING PROPORTIONS			I							
		I	I	I								
I	I	TURNING COUNTS			I							
I	I	(PERCENTAGE OF H.V.S)			I							
I	I				I							
I	TIME	FROM/TO	I	ARM	A	I	ARM	B	I	ARM	C	I
I	07.15 - 08.45	I	I	I	I	I	I	I	I	I	I	I
I		I	ARM	A	I	0.000	I	0.000	I	1.000	I	I
I		I	I	I	I	0.0	I	0.0	I	837.0	I	I
I		I	I	I	I	(0.0)	I	(0.0)	I	(0.0)	I	I
I		I	I	I	I	I	I	I	I	I	I	I
I		I	ARM	B	I	0.000	I	0.000	I	0.000	I	I
I		I	I	I	I	0.0	I	0.0	I	0.0	I	I
I		I	I	I	I	(0.0)	I	(0.0)	I	(0.0)	I	I
I		I	I	I	I	I	I	I	I	I	I	I
I		I	ARM	C	I	1.000	I	0.000	I	0.000	I	I
I		I	I	I	I	835.0	I	0.0	I	0.0	I	I
I		I	I	I	I	(0.0)	I	(0.0)	I	(0.0)	I	I
I		I	I	I	I	I	I	I	I	I	I	I

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 2 AM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
07.15 - 08.45	ARM A		0.000	0.000	1.000		
			0.0	0.0	3.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			10.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 3 AM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
07.15 - 08.45	ARM A		0.000	0.000	1.000		
			0.0	0.0	3.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			7.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 4 AM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
07.15 - 08.45	ARM A		0.000	0.000	1.000		
			0.0	0.0	15.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			15.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 6 AM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
07.15 - 08.45	ARM A		0.000	0.000	1.000		
			0.0	0.0	2.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			5.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 16A AM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
07.15 - 08.45	ARM A		0.000	0.000	1.000		
			0.0	0.0	13.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			33.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 17 AM (300 Units)

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
07.15 - 08.45	ARM A		0.000	1.000	0.000		
			0.0	13.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.292	0.000	0.708		
			35.0	0.0	85.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		0.000	1.000	0.000		
			0.0	32.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
 AND FOR TIME PERIOD

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
B-C	1.07	8.94	0.119		0.00	0.13	1.9		0.13
B-A	0.44	5.39	0.082		0.00	0.09	1.2		0.20
C-AB	0.40	8.21	0.049		0.00	0.05	0.8		0.13
A-B	0.16								
A-C	10.95								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45									
B-C	1.27	8.25	0.154		0.13	0.18	2.6		0.14
B-A	0.52	4.26	0.123		0.09	0.14	2.0		0.27
C-AB	0.48	7.66	0.063		0.05	0.07	1.0		0.14
A-B	0.19								
A-C	13.08								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-C	1.56	7.21	0.216		0.18	0.27	3.9		0.18
B-A	0.64	2.71	0.237		0.14	0.30	4.1		0.48
C-AB	0.59	6.89	0.085		0.07	0.09	1.4		0.16
A-B	0.24								
A-C	16.02								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-C	1.56	7.21	0.216		0.27	0.27	4.1		0.18
B-A	0.64	2.71	0.237		0.30	0.30	4.5		0.48
C-AB	0.59	6.89	0.085		0.09	0.09	1.4		0.16
A-B	0.24								
A-C	16.02								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-C	1.27	8.25	0.154		0.27	0.18	2.9		0.14
B-A	0.52	4.26	0.123		0.30	0.14	2.3		0.27
C-AB	0.48	7.66	0.063		0.09	0.07	1.0		0.14
A-B	0.19								
A-C	13.08								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-C	1.07	8.94	0.119		0.18	0.14	2.1		0.13
B-A	0.44	5.39	0.082		0.14	0.09	1.4		0.20
C-AB	0.40	8.21	0.049		0.07	0.05	0.8		0.13
A-B	0.16								
A-C	10.95								

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.30	0.1
07.45	0.2
08.00	0.3
08.15	0.3
08.30	0.2
08.45	0.1

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.30	0.1
07.45	0.1
08.00	0.3
08.15	0.3
08.30	0.1
08.45	0.1

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.30	0.1
07.45	0.1
08.00	0.1
08.15	0.1
08.30	0.1
08.45	0.1

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I
I	I	I	I	I	* DELAY *	I	* DELAY *	I
I	I	I	I	I	I	I	I	I
I	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
I	B-C	I 117.0	I 78.0	I	17.6	I 0.15	I 17.6	I 0.15
I	B-A	I 48.2	I 32.1	I	15.6	I 0.32	I 15.6	I 0.32
I	C-AB	I 44.0	I 29.4	I	6.3	I 0.14	I 6.3	I 0.14
I	A-B	I 17.9	I 11.9	I		I	I	I
I	A-C	I 1201.6	I 801.1	I		I	I	I
I	ALL	I 2674.4	I 1782.9	I	39.5	I 0.01	I 39.5	I 0.01

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
 WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
 A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*****END OF RUN*****

 .SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

I	Intercept For	Slope For	Opposing	Slope For	Opposing	I
I	STREAM B-C	STREAM	A-C	STREAM	A-B	I
I	0.00		0.00		0.00	I

* Due to the presence of a flare, data is not available

I	Intercept For	Slope For	Opposing	Slope For	Opposing	Slope For	Opposing	I
I	STREAM B-A	STREAM	A-C	STREAM	A-B	STREAM	C-A	STREAM
I	I	I	I	I	I	I	I	I
I	0.00		0.00		0.00		0.00	I

* Due to the presence of a flare, data is not available

I	Intercept For	Slope For	Opposing	Slope For	Opposing	I
I	STREAM C-B	STREAM	A-C	STREAM	A-B	I
I	664.47		0.26		0.26	I

(NB These values do not allow for any site specific corrections)

 TRAFFIC DEMAND DATA

I	ARM	I	FLOW SCALE (%)	I
I	A	I	100	I
I	B	I	100	I
I	C	I	100	I

Demand set: 2025 PM Base

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	ARM	I	NUMBER OF MINUTES FROM START WHEN	I	RATE OF FLOW (VEH/MIN)	I								
I	I	I	FLOW STARTS	I	BEFORE	I								
I	I	I	TOP OF PEAK	I	AT TOP	I								
I	I	I	TO RISE	I	OF PEAK	I								
I	I	I	IS REACHED	I	PEAK	I								
I	I	I	FALLING	I	AFTER	I								
I	I	I	I	I	PEAK	I								
I	ARM A	I	15.00	I	45.00	I	75.00	I	10.88	I	16.31	I	10.88	I
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.00	I	0.00	I	0.00	I
I	ARM C	I	15.00	I	45.00	I	75.00	I	15.20	I	22.80	I	15.20	I

Demand set: Site 2 PM

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 3 PM

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 4 PM

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 6 PM

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 16A PM

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
			I	I	I	I	I	I	
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I
I	I	I	I	I	I	I	I	I	I
I	ARM A	I	15.00	45.00	75.00	0.38	0.56	0.38	I
I	ARM B	I	15.00	45.00	75.00	0.00	0.00	0.00	I
I	ARM C	I	15.00	45.00	75.00	0.21	0.32	0.21	I

Demand set: Site 17 PM (300 Units)

TIME PERIOD BEGINS 17.00 AND ENDS 18.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
			I	I	I	I	I	I	
I	ARM	I	FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER	I
I	I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK	I
I	I	I	I	I	I	I	I	I	I
I	ARM A	I	15.00	45.00	75.00	0.52	0.79	0.52	I
I	ARM B	I	15.00	45.00	75.00	1.02	1.54	1.02	I
I	ARM C	I	15.00	45.00	75.00	1.26	1.89	1.26	I

Demand set: 2025 PM Base

I	I	TURNING PROPORTIONS			I
		I	I	I	
I	I	TURNING COUNTS			I
I	I	(PERCENTAGE OF H.V.S)			I
I	I	I	I	I	I
I	TIME	FROM/TO	ARM A	ARM B	ARM C
I	I	I	I	I	I
I	17.00 - 18.30	I	I	I	I
I	I	I	ARM A	0.000	0.000
I	I	I	I	0.0	0.0
I	I	I	I	(0.0)	(0.0)
I	I	I	I	(0.0)	(0.0)
I	I	I	I	I	I
I	I	I	ARM B	0.000	0.000
I	I	I	I	0.0	0.0
I	I	I	I	(0.0)	(0.0)
I	I	I	I	(0.0)	(0.0)
I	I	I	I	I	I
I	I	I	ARM C	1.000	0.000
I	I	I	I	1216.0	0.0
I	I	I	I	(0.0)	(0.0)
I	I	I	I	(0.0)	(0.0)
I	I	I	I	I	I

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 2 PM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
17.00 - 18.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	8.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			5.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 3 PM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
17.00 - 18.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	7.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			4.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 4 PM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
17.00 - 18.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	15.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			15.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 6 PM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
17.00 - 18.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	5.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			3.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 16A PM

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
17.00 - 18.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	30.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		1.000	0.000	0.000		
			17.0	0.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

Demand set: Site 17 PM (300 Units)

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
17.00 - 18.30	ARM A		0.000	1.000	0.000		
			0.0	42.0	0.0		
			(0.0)	(0.0)	(0.0)		
	ARM B		0.293	0.000	0.707		
			24.0	0.0	58.0		
			(0.0)	(0.0)	(0.0)		
	ARM C		0.000	1.000	0.000		
			0.0	101.0	0.0		
			(0.0)	(0.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
 AND FOR TIME PERIOD

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-C	0.73	8.69	0.084		0.00	0.09	1.3		0.13
B-A	0.30	3.86	0.078		0.00	0.08	1.2		0.28
C-AB	1.27	7.92	0.160		0.00	0.19	2.8		0.15
A-B	0.53								
A-C	11.73								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-C	0.87	7.90	0.110		0.09	0.12	1.8		0.14
B-A	0.36	2.43	0.148		0.08	0.17	2.3		0.48
C-AB	1.51	7.31	0.207		0.19	0.26	3.9		0.17
A-B	0.63								
A-C	14.01								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-C	1.06	5.54	0.192		0.12	0.23	3.4		0.22
B-A	0.44	0.47	0.938		0.17	1.98	19.2		5.13
C-AB	1.85	6.46	0.287		0.26	0.40	5.9		0.22
A-B	0.77								
A-C	17.16								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-C	1.06	5.47	0.195		0.23	0.24	3.6		0.23
B-A	0.44	0.47	0.946		1.98	2.87	36.8		6.14
C-AB	1.85	6.46	0.287		0.40	0.40	6.1		0.22
A-B	0.77								
A-C	17.16								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-C	0.87	7.74	0.112		0.24	0.13	2.0		0.15
B-A	0.36	2.43	0.148		2.87	0.18	5.4		0.57
C-AB	1.51	7.31	0.207		0.40	0.27	4.0		0.17
A-B	0.63								
A-C	14.01								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.15-18.30									
B-C	0.73	8.69	0.084		0.13	0.09	1.4		0.13
B-A	0.30	3.85	0.078		0.18	0.09	1.4		0.28
C-AB	1.27	7.92	0.160		0.27	0.19	2.9		0.15
A-B	0.53								
A-C	11.73								

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.1
17.30	0.1
17.45	0.2
18.00	0.2
18.15	0.1
18.30	0.1

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.1	
17.30	0.2	
17.45	2.0	**
18.00	2.9	***
18.15	0.2	
18.30	0.1	

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.2
17.30	0.3
17.45	0.4
18.00	0.4
18.15	0.3
18.30	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I
I		I		I	* DELAY *	I	* DELAY *	I
I		I	(VEH)	I	(MIN)	I	(MIN)	I
I		I	(VEH/H)	I	(MIN/VEH)	I	(MIN/VEH)	I
I	B-C	I	79.8	I	53.2	I	13.4	I
I	B-A	I	33.0	I	22.0	I	66.3	I
I	C-AB	I	139.0	I	92.7	I	25.6	I
I	A-B	I	57.8	I	38.5	I		I
I	A-C	I	1287.0	I	858.0	I		I
I	ALL	I	3331.0	I	2220.6	I	105.3	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*****END OF RUN*****

===== end of file =====

TRL LIMITED

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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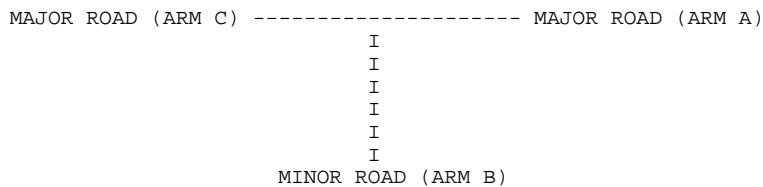
Run with file:-
"J:\9000\9000\9058_FarnleyTyas\engineering\Traffic_Programs\Picady\Site 17 Access Sat.vpi"
(drive-on-the-left) at 12:13:26 on Tuesday, 12 January 2016

RUN INFORMATION

RUN TITLE : Farnley Estates Masterplan Proposals
LOCATION : Penistone Road - Site 17
DATE : 05/01/16
CLIENT : Farnley Estates
ENUMERATOR : adam.darwin [PC115]
JOB NUMBER : 9058
STATUS : Preliminary
DESCRIPTION :

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Penistone Road (s)
ARM B IS Site Access
ARM C IS Penistone Road (n)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

 GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I	(W) 6.00 M.	I
I	CENTRAL RESERVE WIDTH	I	(WCR) 0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I	(WC-B) 2.50 M.	I
I	- VISIBILITY	I	(VC-B)120.00 M.	I
I	- BLOCKS TRAFFIC (SPACES)	I	YES (5)	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I	(VB-C) 84.0 M.	I
I	- VISIBILITY TO RIGHT	I	(VB-A) 106.0 M.	I
I	- LANE 1 WIDTH	I	(WB-C) -	I
I	- LANE 2 WIDTH	I	(WB-A) -	I
I	WIDTH AT 0 M FROM JUNCTION	I	10.00 M.	I
I	WIDTH AT 5 M FROM JUNCTION	I	4.30 M.	I
I	WIDTH AT 10 M FROM JUNCTION	I	3.00 M.	I
I	WIDTH AT 15 M FROM JUNCTION	I	3.00 M.	I
I	WIDTH AT 20 M FROM JUNCTION	I	3.00 M.	I
I	- LENGTH OF FLARED SECTION	I	DERIVED: 0 PCU	I

 .SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

I	Intercept For	Slope For	Opposing	Slope For	Opposing	I
I	STREAM B-C	STREAM	A-C	STREAM	A-B	I
I	0.00		0.00		0.00	I

* Due to the presence of a flare, data is not available

I	Intercept For	Slope For	Opposing	Slope For	Opposing	Slope For	Opposing	Slope For	Opposing	I
I	STREAM B-A	STREAM	A-C	STREAM	A-B	STREAM	C-A	STREAM	C-B	I
I	0.00		0.00		0.00		0.00		0.00	I

* Due to the presence of a flare, data is not available

I	Intercept For	Slope For	Opposing	Slope For	Opposing	I
I	STREAM C-B	STREAM	A-C	STREAM	A-B	I
I	664.47		0.26		0.26	I

(NB These values do not allow for any site specific corrections)

 TRAFFIC DEMAND DATA

I	ARM	I	FLOW SCALE(%)	I
I	A	I	100	I
I	B	I	100	I
I	C	I	100	I

Demand set: 2025 Sat Base

TIME PERIOD BEGINS 12.00 AND ENDS 13.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	ARM	I	NUMBER OF MINUTES FROM START WHEN	I	RATE OF FLOW (VEH/MIN)	I
I		I	FLOW STARTS	I	BEFORE	I
I		I	TOP OF PEAK	I	AT TOP	I
I		I	IS REACHED	I	OF PEAK	I
I		I	FALLING	I	PEAK	I
I		I		I		I
I	ARM A	I	15.00	I	11.30	I
I	ARM B	I	15.00	I	0.00	I
I	ARM C	I	15.00	I	11.88	I

Demand set: Site 2 Sat

TIME PERIOD BEGINS 12.00 AND ENDS 13.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 3 Sat

TIME PERIOD BEGINS 12.00 AND ENDS 13.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 4 Sat

TIME PERIOD BEGINS 12.00 AND ENDS 13.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 6 Sat

TIME PERIOD BEGINS 12.00 AND ENDS 13.30

LENGTH OF TIME PERIOD - 90 MIN.
 LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)			I
		I	I	I	I	I	I	
I	ARM	I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I		I	I	I	I	I	I	I
I	ARM A	I	I	I	I	I	I	I
I	ARM B	I	I	I	I	I	I	I
I	ARM C	I	I	I	I	I	I	I

Demand set: Site 2 Sat

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
12.00 - 13.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	5.0		
			(0.0)	(10.0)	(10.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(10.0)	(0.0)	(10.0)		
	ARM C		1.000	0.000	0.000		
			5.0	0.0	0.0		
			(10.0)	(10.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

Demand set: Site 3 Sat

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
12.00 - 13.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	4.0		
			(0.0)	(10.0)	(10.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(10.0)	(0.0)	(10.0)		
	ARM C		1.000	0.000	0.000		
			4.0	0.0	0.0		
			(10.0)	(10.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

Demand set: Site 4 Sat

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
12.00 - 13.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	29.0		
			(0.0)	(10.0)	(10.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(10.0)	(0.0)	(10.0)		
	ARM C		1.000	0.000	0.000		
			29.0	0.0	0.0		
			(10.0)	(10.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

Demand set: Site 6 Sat

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
12.00 - 13.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	3.0		
			(0.0)	(10.0)	(10.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(10.0)	(0.0)	(10.0)		
	ARM C		1.000	0.000	0.000		
			3.0	0.0	0.0		
			(10.0)	(10.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

Demand set: Site 16A Sat

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
12.00 - 13.30	ARM A		0.000	0.000	1.000		
			0.0	0.0	19.0		
			(0.0)	(10.0)	(10.0)		
	ARM B		0.000	0.000	0.000		
			0.0	0.0	0.0		
			(10.0)	(0.0)	(10.0)		
	ARM C		1.000	0.000	0.000		
			17.0	0.0	0.0		
			(10.0)	(10.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

Demand set: Site 17 Sat (300 units)

		TURNING PROPORTIONS					
		TURNING COUNTS					
		(PERCENTAGE OF H.V.S)					
TIME	FROM/TO	ARM	A	ARM	B	ARM	C
12.00 - 13.30	ARM A		0.000	1.000	0.000		
			0.0	20.0	0.0		
			(0.0)	(10.0)	(10.0)		
	ARM B		0.290	0.000	0.710		
			18.0	0.0	44.0		
			(10.0)	(0.0)	(10.0)		
	ARM C		0.000	1.000	0.000		
			0.0	48.0	0.0		
			(10.0)	(10.0)	(0.0)		

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
 AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.00-12.15									
B-C	0.55	7.56	0.073		0.00	0.08	1.1		0.14
B-A	0.23	3.67	0.062		0.00	0.06	0.9		0.29
C-AB	0.60	6.89	0.087		0.00	0.09	1.4		0.16
A-B	0.25								
A-C	12.10								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.15-12.30									
B-C	0.66	6.80	0.097		0.08	0.11	1.5		0.16
B-A	0.27	2.41	0.112		0.06	0.12	1.7		0.47
C-AB	0.72	6.27	0.115		0.09	0.13	1.9		0.18
A-B	0.30								
A-C	14.44								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.30-12.45									
B-C	0.81	5.30	0.152		0.11	0.18	2.5		0.22
B-A	0.33	0.67	0.494		0.12	0.73	8.5		2.45
C-AB	0.88	5.42	0.163		0.13	0.19	2.9		0.22
A-B	0.37								
A-C	17.69								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
12.45-13.00									
B-C	0.81	5.21	0.155		0.18	0.18	2.7		0.23
B-A	0.33	0.67	0.495		0.73	0.83	11.9		2.80
C-AB	0.88	5.42	0.163		0.19	0.19	2.9		0.22
A-B	0.37								
A-C	17.69								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
13.00-13.15									
B-C	0.66	6.77	0.097		0.18	0.11	1.7		0.16
B-A	0.27	2.41	0.112		0.83	0.13	2.4		0.49
C-AB	0.72	6.27	0.115		0.19	0.13	2.0		0.18
A-B	0.30								
A-C	14.44								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
13.15-13.30									
B-C	0.55	7.55	0.073		0.11	0.08	1.2		0.14
B-A	0.23	3.67	0.062		0.13	0.07	1.1		0.29
C-AB	0.60	6.89	0.087		0.13	0.10	1.5		0.16
A-B	0.25								
A-C	12.10								

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.15	0.1
12.30	0.1
12.45	0.2
13.00	0.2
13.15	0.1
13.30	0.1

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
12.15	0.1	
12.30	0.1	
12.45	0.7	*
13.00	0.8	*
13.15	0.1	
13.30	0.1	

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
12.15	0.1
12.30	0.1
12.45	0.2
13.00	0.2
13.15	0.1
13.30	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I
I		I		I	* DELAY *	I	* DELAY *	I
I		I	(VEH)	I	(MIN)	I	(MIN)	I
I		I	(VEH/H)	I	(MIN/VEH)	I	(MIN/VEH)	I
I	B-C	I	60.6	I	10.8	I	10.8	I
I	B-A	I	24.8	I	26.4	I	26.4	I
I	C-AB	I	66.1	I	12.5	I	12.5	I
I	A-B	I	27.5	I		I		I
I	A-C	I	1326.9	I		I		I
I	ALL	I	2893.2	I	49.8	I	49.8	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*****END OF RUN*****

===== end of file =====

APPENDIX 9

CONTAINS A FLOOD RISK ASSESSMENT FOR REJECTED SITE SGI2109/H188
(THE GATEWAY, LAND WEST OF PENISTONE ROAD, FENAY BRIDGE)

Prepared on behalf of

Farnley Estates Ltd

FLOOD RISK ASSESSMENT

**Proposed Development
Farnley Tyas, Huddersfield
Allocation 04**

Flood Risk Overview

Acknowledgements:

Environment Agency

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

Any information provided by third parties and referred to herein has not been checked or verified by Sanderson Associates (Consulting Engineers) Ltd, unless otherwise expressly stated within this report.

This report was checked and approved on the 19 January 2016 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

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Report Ref:	9069/DH/003/01	January 2016	
Author:	Darren Hawkyard		
Checked & Approved:	Thomas Walker	Date:	19 January 2016

Contents

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2	Existing Situation	6
3	Consultations.....	7
4	Flood Risk.....	8
5	Drainage Constraints	10
6	Conclusion.....	12

Appendices

Appendix A - Drawings

Site Location: 9069/001

Flood Extent Plan: 9069/301

Appendix B - Consultations

Environment Agency

APPENDIX C – Calculations

Existing Greenfield Run Off Estimate

1 Introduction

- 1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Overview for possible development sites Farnley Tyas, Huddersfield. The aim of this assessment is to discuss the present and future flood risk to the site and to assess possible uses and mitigation measures required. The location of the site is shown on drawing 9069/001 contained in Appendix A.
- 1.2 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF) March 2012 and the associated Planning Practice Guidance, 2014.
- 1.3 Consultation with Environment Agency (EA) has taken place. The consultation response is discussed in Section 3 and contained within Appendix B.
- 1.4 Each site allocation will be separated into individual reports and assessed on their own merits. A site Location plan showing each of the site allocations is located in Appendix A.

2 Existing Situation

2.1 Existing Site Description

2.1.1 The site is currently open fields and located to the west of Penistone Road, Huddersfield. Drawing 9069/001 included in Appendix A shows the site limits and location.

2.1.2 There is currently no existing formal access to the site, access is currently gained via a piece of land off Woodsome Road.

2.1.3 The site is bound by adjoining fields to the north with Penistone Road bounding the site to the east. The Fenay Beck bounds the site to the west with neighbouring properties and gardens to the south.

2.1.4 The closest main river is the Fenay Beck which is located upon the western boundary of the site. The Fenay Beck generally flows from south to north.

2.2 Existing Site Analysis

2.2.1 The site area is 126,868m² (12.69Ha) taken from information provided by the client is considered to be permeable (not positively drained). Therefore the site is considered to be 0% impermeable and 100% permeable.

2.2.2 The estimated Greenfield runoff rate from the site has been assessed using WinDES Source Control software. The run off rate has been calculated at 28.00l/s or 2.19l/s/Ha for a 1 in 1 year return period (IH124 Method requires calculations based on 50Ha reduced to the site area). The WinDES output files are contained within Appendix C.

2.2.3 The topography of the site generally grades from south to north. Levels range from approximately 85.0m AOD at the south eastern corner of the site to 75.00m AOD upon the northern boundary of the site.

3 Consultations

- 3.1 As part of this assessment, the Environment Agency (EA) information has been reviewed in relation to flood zones and groundwater. All responses are contained in Appendix B.
- 3.2 The response from the Environment Agency confirms that the site falls within Flood Zones 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%).
- 3.3 The Environment Agency provided modelled flood levels for the Fenay Beck in the vicinity of the site. These include levels for the 1 in 100 + climate change and 1 in 1000 year events. There are no flood defences in close proximity to the site.
- 3.4 The Environment Agency have provided historic flooding maps and shows that the site was subject to historic flooding in 1970 due to channel capacity being exceeded.
- 3.5 The Environment Agency website show that the site is not within a Groundwater Source Protection Zone.

4 Flood Risk

- 4.1 The main risk of flooding to the site comes from the Fenay Beck which is located upon the western boundary of the site. No flood defences are located within close proximity to the site.
- 4.2 The Environment Agency confirms that the site falls within Flood Zone 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%).
- 4.3 Drawing 9069-301 contained within Appendix A shows the flood extents of a 1 in 100 year + climate change and 1 in 1000 year flood event (For this site local levels are based on a site specific topographical survey and modelled flood levels supplied by the Environment Agency). The drawing highlights areas of the site where building structures can be built.
- 4.4 There are no constraints to the type of proposal on this allocation assuming that building structures are located wholly within Flood Zone 1. Areas of the site that are located within Flood Zone 2 and 3 should be allocated for car parking and access roads.
- 4.5 The Environment Agency online surface water mapping shows areas of modelled surface water flooding within the boundary of the site, in the northern area of the site, in the location of the extensive area fluvial Flood Zone 3, modelled surface water flooding is shown to be widespread. The EA classify this flooding to have an annual probability of occurring at between a 1 in 100 and 1 in 1000 and is deemed to have a low risk. Isolated patches of the site are shown to be at an elevated risk suggesting they would be potentially effected more frequently. At the south of the site modelled surface water flooding is shown in Penistone Road to the east, these areas are shown to be at medium to high risk (between a 1 in 30 and 1 in 100 annual probability of occurring) the flooding is shown to be contained within the carriageway until the magnitude of the storm exceeds the 1 in 100 year event at

this point the capacity of the carriageway to hold the storm water is exceeded and surface water is shown to encroach within the eastern boundary of the site.

- 4.6 Drawing 9069-301 also identifies a combined sewer and surface water sewer running directly through the middle of the site. Yorkshire Water should be consulted before any planning application is made as they normally request a 3.0m easement to either side of existing sewers.
- 4.7 Mitigation measures can be implemented within the Full Flood Risk Assessment to ensure surface water localised to, and conveyed within the sites road network would not affect any of the proposed development.

5 Drainage Constraints

5.1 The current building regulations, Part H3, detail the favoured hierarchy of surface water disposal being in order of preference, to ground by infiltration, to watercourse and then to sewer.

1. Infiltration

2. Watercourse

3. Sewer

1. Infiltration Drainage

5.2 Infiltration methods of drainage such as soakaways and filter drains percolate surface water runoff allowing it to permeate into the subsoil at its natural rate mimicking the natural process of drainage and as such are subject to the local ground conditions.

5.3 The Local Authority will request that a site investigation is carried out to deem whether infiltration methods are viable within the site.

2. Discharge to Watercourse

5.4 If the above is not deemed viable the Local Authority will accept discharge to watercourse. The closest main watercourse to the site is the Fenay Beck which is located on the western boundary of the site.

5.5 The Environment Agency and internal drainage board would have to be consulted in regards to agreeing an acceptable discharge rate into the Fenay Beck. A rate no greater than 1.4l/s/ha for discharge into local watercourse is normally requested.

3. Discharge to Sewer

- 5.6 If neither of the above are deemed viable Yorkshire Water should be consulted in order to agree possible surface water outfall. In addition Yorkshire Water will have to be consulted to agree a point of foul connection.

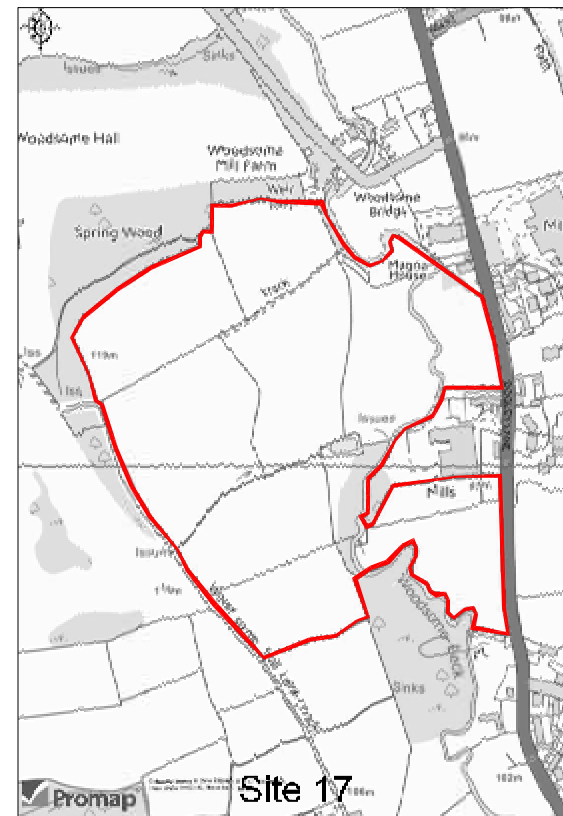
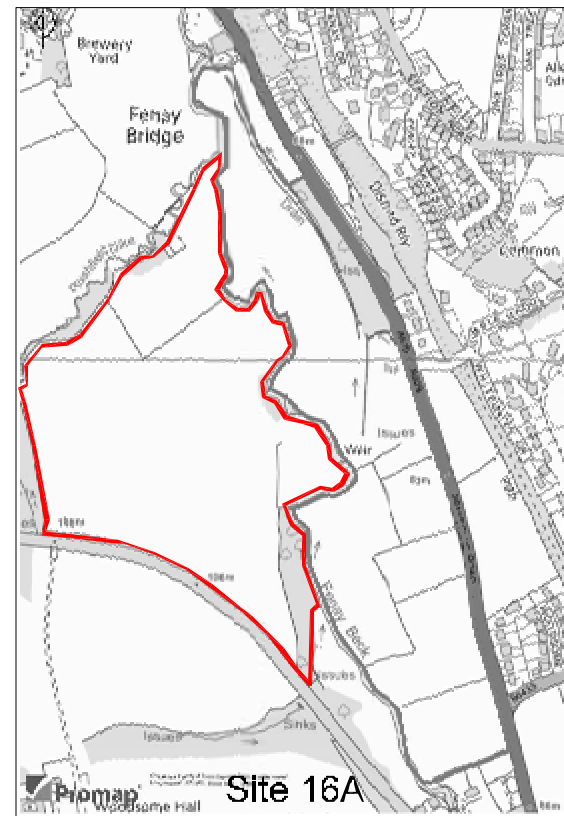
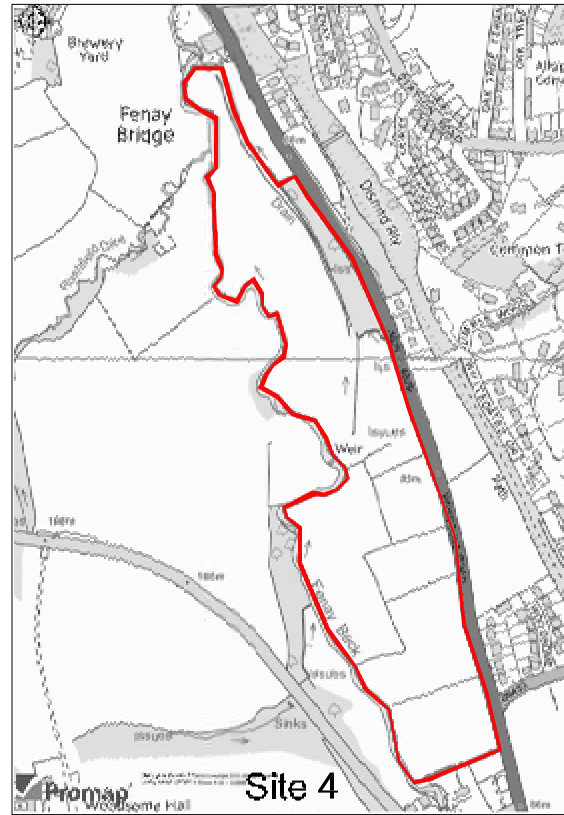
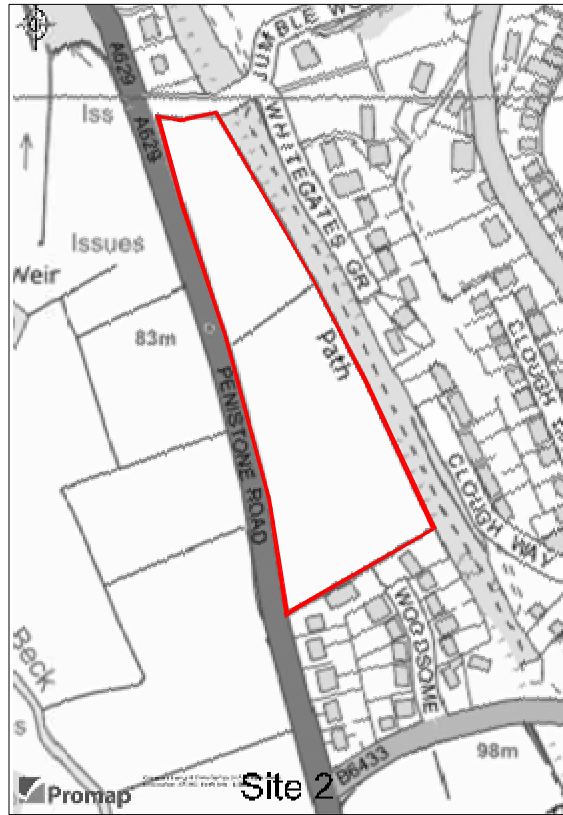
6 Conclusion

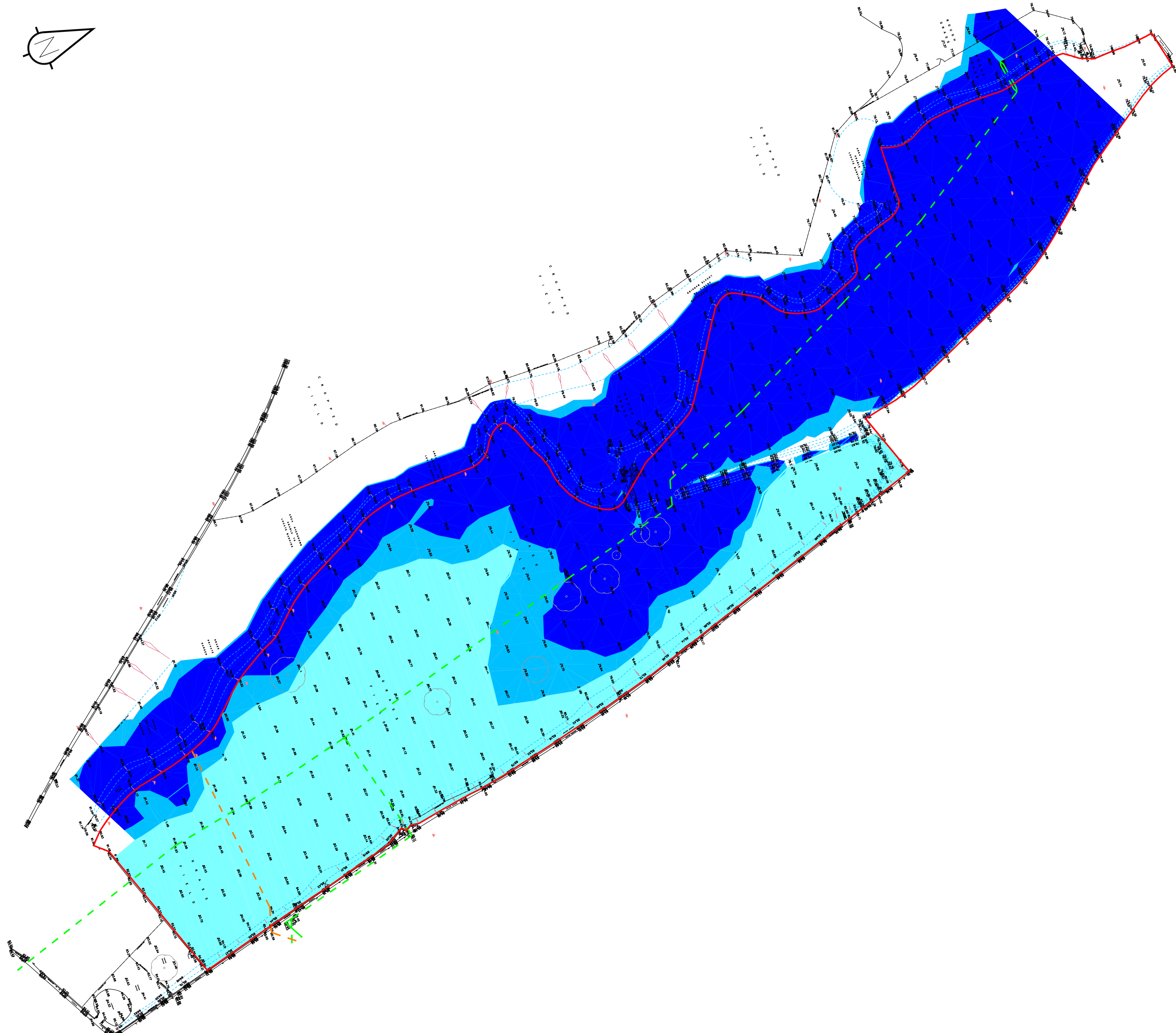
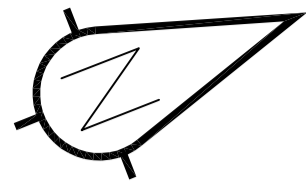
- 6.1 This flood risk overview serves to review and assess the sources of potential flooding to the site
- 6.2 As concluded in section 3 the site is considered to lie within Flood Zone 1,2 and 3 with the worst case scenario of a 1 in 100 or greater annual probability of river flooding (>1%).
- 6.3 All buildings should be located wholly within Flood Zone 1.
- 6.4 In line with current guidance the Environment Agency would require an 8-10m undeveloped easement, measured from the top of river bank, in order to safeguard future channel maintenance and emergency access to the watercourse.
- 6.5 A full flood risk assessment and surface water management strategy would have to be written and submitted to the Local Authority in order to gain planning permission. This document serves as an overview to inform the client of possible risk and constraints that could arise at the site.

Appendix A - Drawings






Site Location: 9069/001

Flood Extent Plan: 9069/301





- Sanderson Associates (Consulting Engineers) Ltd ("the consultant"), has not checked or verified, and shall have no liability whatsoever for any inaccuracies which may be attributable to any data, reports, base plans(s) and drawings provided by the client, or purchased by the consultant on the client's behalf, that may have been utilised within this drawing.
- The consultant shall not be liable for the use by any person of any document for any purpose other than that for which the same were provided by the consultant.
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- The consultant accepts no liability for any vehicle specification errors within the vehicle track software used and / or it's vehicle libraries.
- The locations of utilities apparatus, if shown, is reproduced from plans supplied to the consultant, although care has been taken when duplicating this information. These locations are approximate only and no guarantees can be given for their accuracy. It is the client's or it's appointed agent/contractors responsibility to verify the exact locations on site by hand dug trial holes or other appropriate means prior to mechanical excavation.
- Service connections are not shown but their presence should be anticipated.
- Reference to any third party equipment shown on this drawing was only relevant at the time the drawing was prepared.
- It is the client's responsibility to ensure that any equipment ordered meets the design.

-  - Flood Zone 3
-  - Flood Zone 2
-  - Flood Zone 1
-  - Combined Water Sewer
-  - Surface Water Sewer

Rev	Amendment	Drawn	Date	Checked




Client
Farnley Estates Ltd

Project Title
Proposed Development
Farnley Tyas, Huddersfield
Allocation 04

Drawing Title
Flood Extent Plan

Scale	1:1250	Drawn By	DH
Drawing Size	A1	Checked By	IE
Date	Jan 16	Approved By	IE

	Drawing Number	Rev
	9069-301	

Appendix B - Consultations
Environment Agency

Flood Map Woodsome Road/ Penistone Road, Kirklees - Date Created: 21/06/2013 Ref: 26205



www.environment-agency.gov.uk

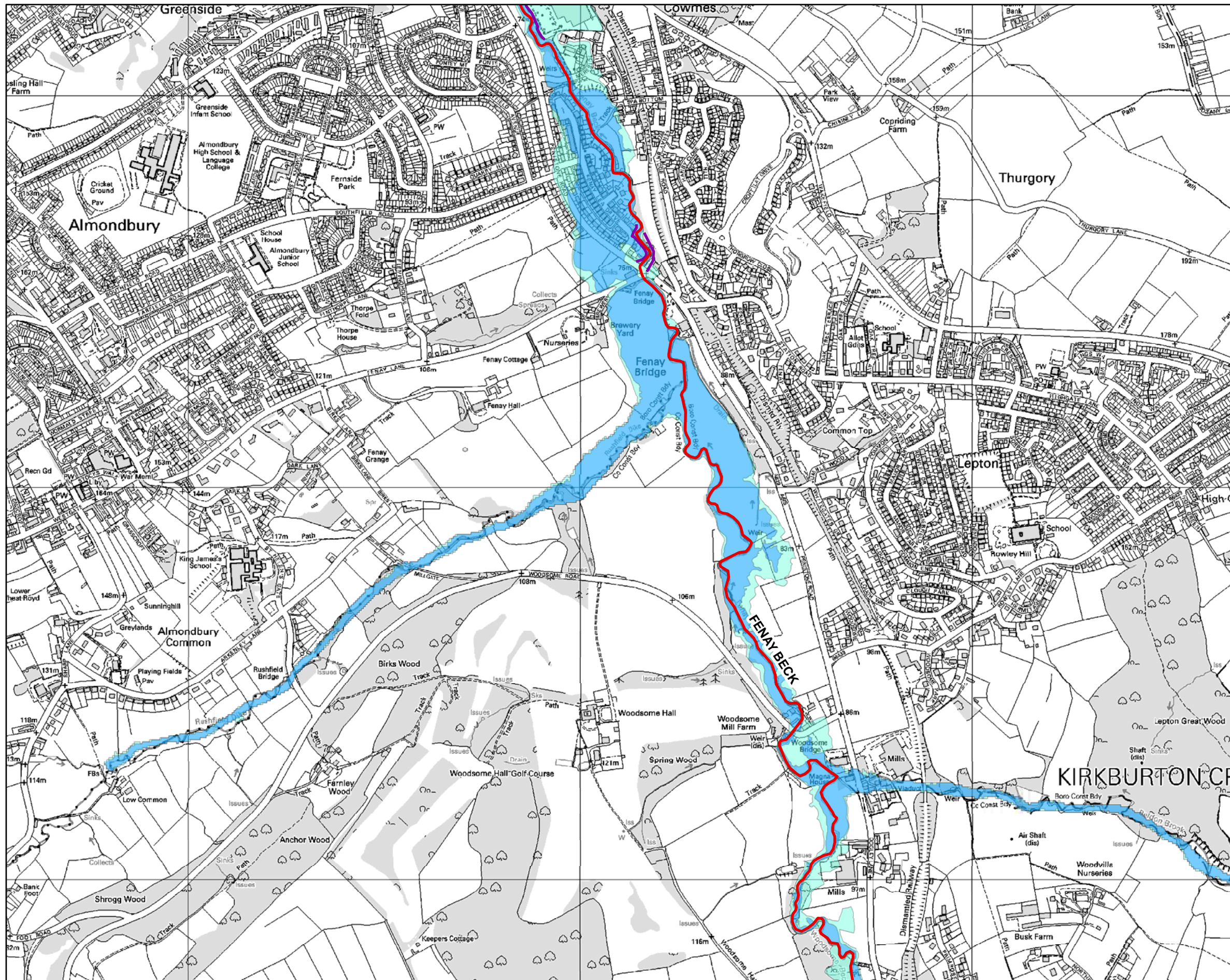
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when reproduced @ A3



LEGEND

- Main River
- Flood Map Flood Defences
- Flood Zone 3 (FZ3)
- Flood Zone 2 (FZ2)



Location Plan

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Cross Section References

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Reach: 1

Chainage: 3758

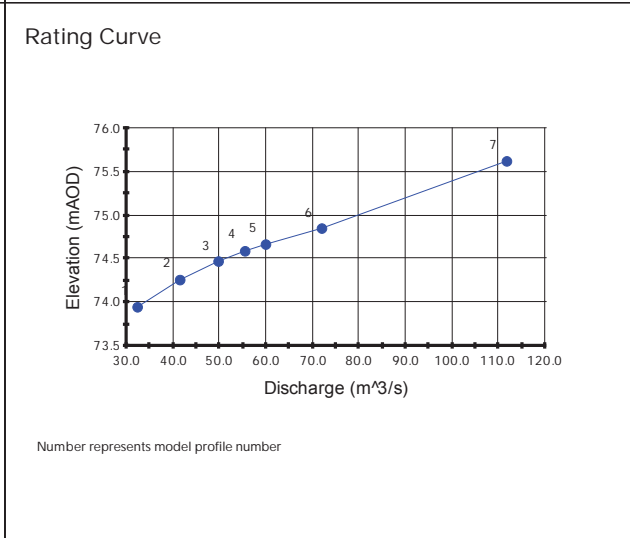
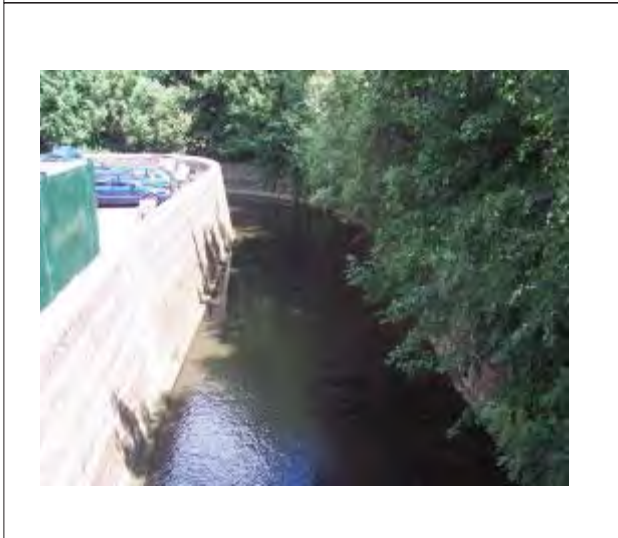
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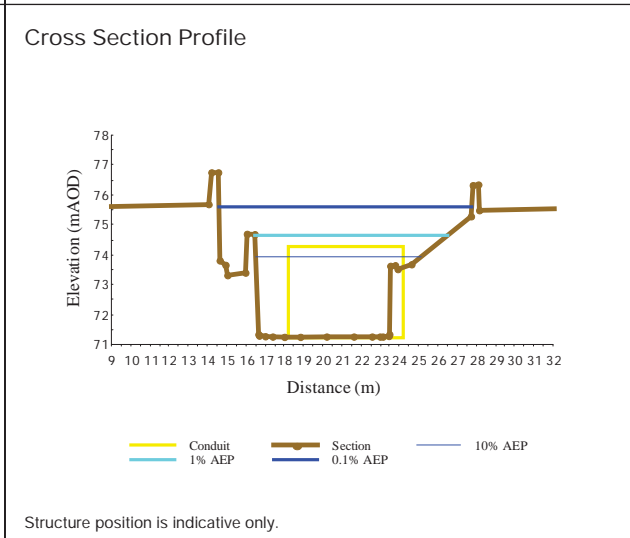
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 Section u/s: 3801



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	73.954	1.66
2	4.0	41.5	74.263	1.83
3	2.0	49.8	74.477	1.99
4	1.3	55.5	74.593	2.11
5	1.0	59.9	74.669	2.21
6	1.0	71.9	74.852	2.45
7	0.1	111.5	75.619	2.70

Level of Left Bank 76.758 mAOD
 Level of Right Bank 76.330 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3758

Location Plan

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Cross Section References

River: FENAY BECK

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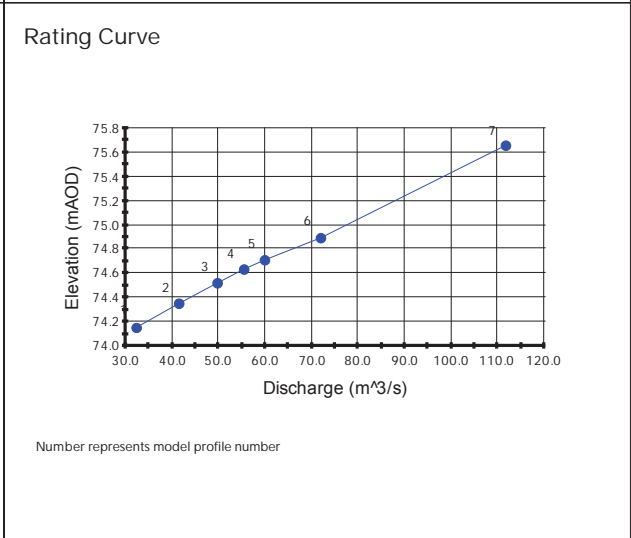
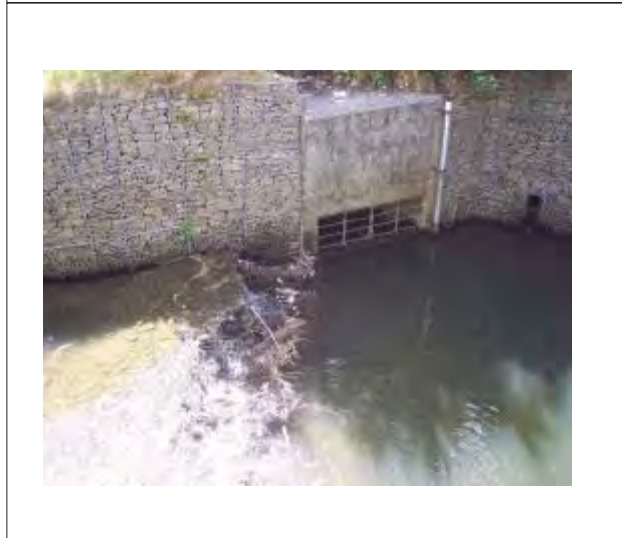
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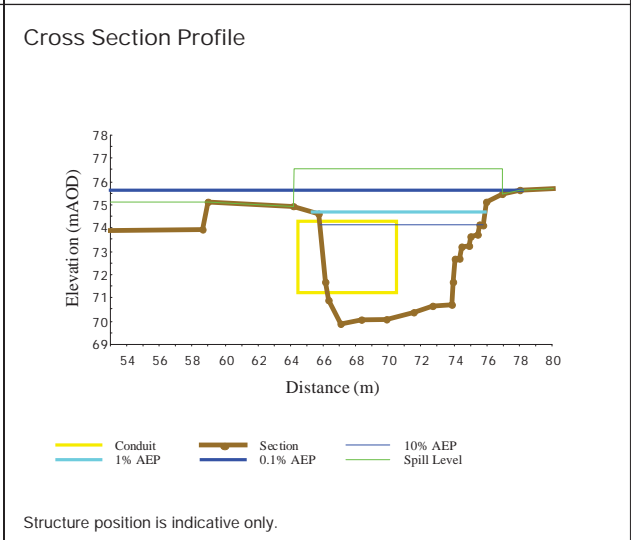
Section u/s: 3811d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.156	0.76
2	4.0	41.5	74.355	0.73
3	2.0	49.8	74.524	0.72
4	1.3	55.5	74.637	0.72
5	1.0	59.9	74.713	0.72
6	1.0	71.9	74.896	0.74
7	0.1	111.5	75.654	0.68

Level of Left Bank 75.149 mAOD
 Level of Right Bank 75.145 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3801

Location Plan

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Cross Section References

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Reach: 1

Chainage: 3811

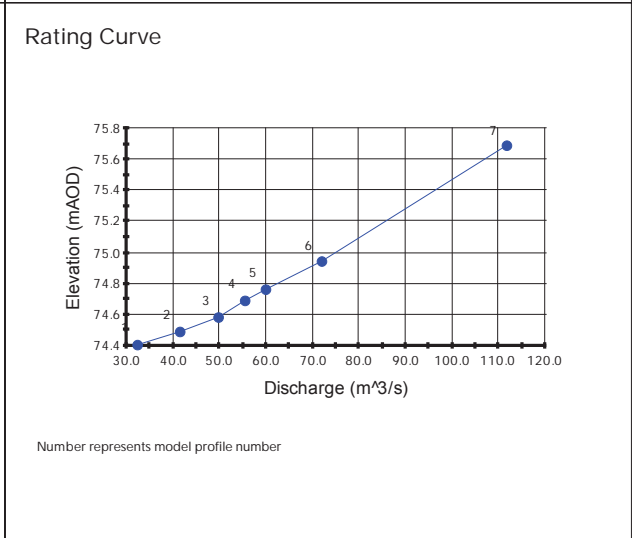
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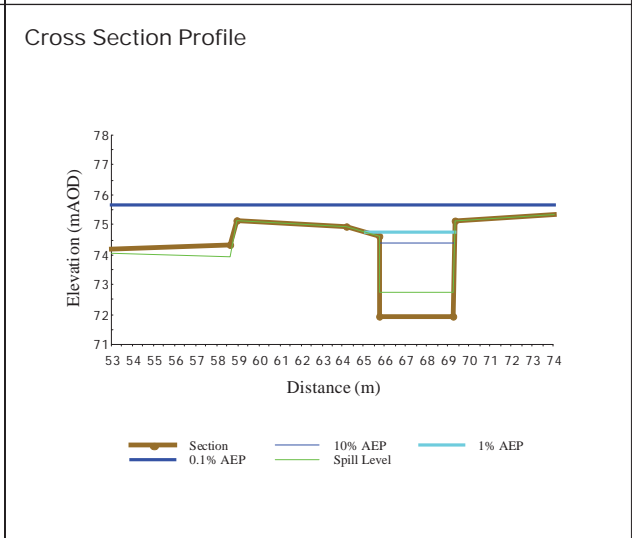
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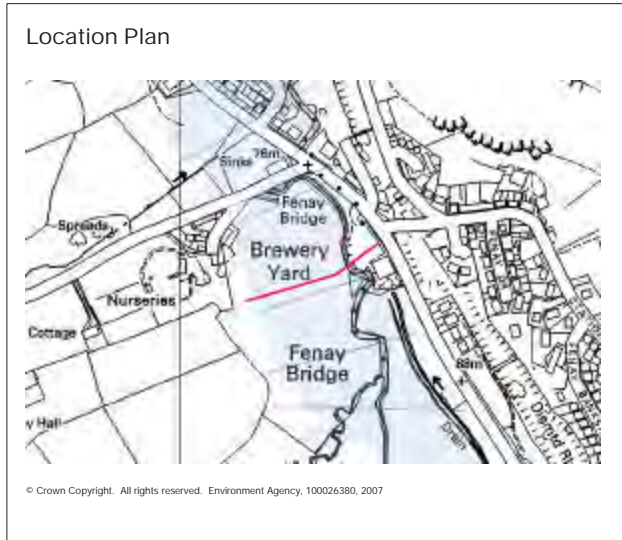
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.411	0.93
2	4.0	41.5	74.494	0.97
3	2.0	49.8	74.589	0.97
4	1.3	55.5	74.694	0.90
5	1.0	59.9	74.767	0.86
6	1.0	71.9	74.947	0.81
7	0.1	111.5	75.688	0.63

Level of Left Bank 75.149 mAOD
 Level of Right Bank 75.145 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3811u



Cross Section References

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Reach: 1

Chainage: 3941

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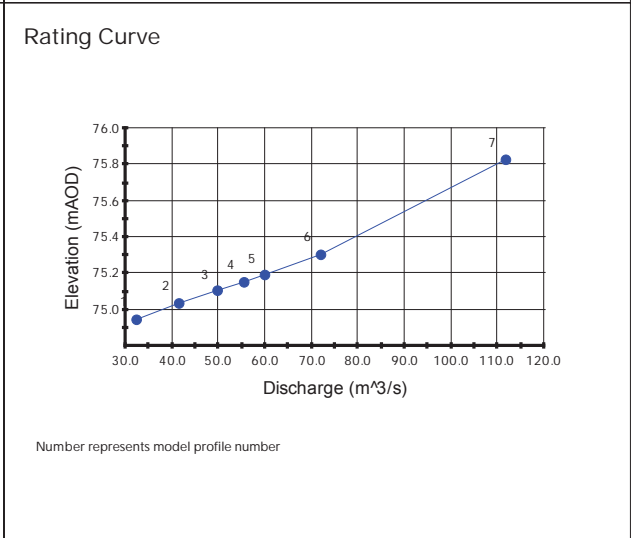
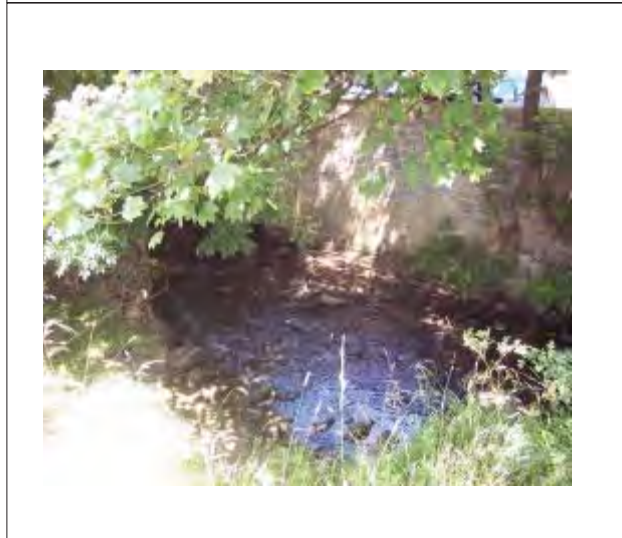
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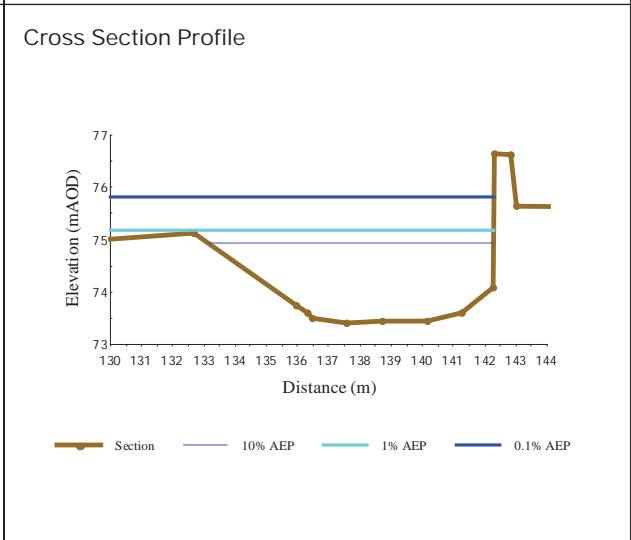
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 Section u/s: 3981d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	74.949	0.91
2	4.0	41.5	75.038	0.91
3	2.0	49.8	75.108	0.92
4	1.3	55.5	75.154	0.93
5	1.0	59.9	75.194	0.92
6	1.0	71.9	75.306	0.90
7	0.1	111.5	75.827	0.73

Level of Left Bank 75.138 mAOD
 Level of Right Bank 76.650 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3941

Location Plan

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Cross Section References

River: FENAY BECK

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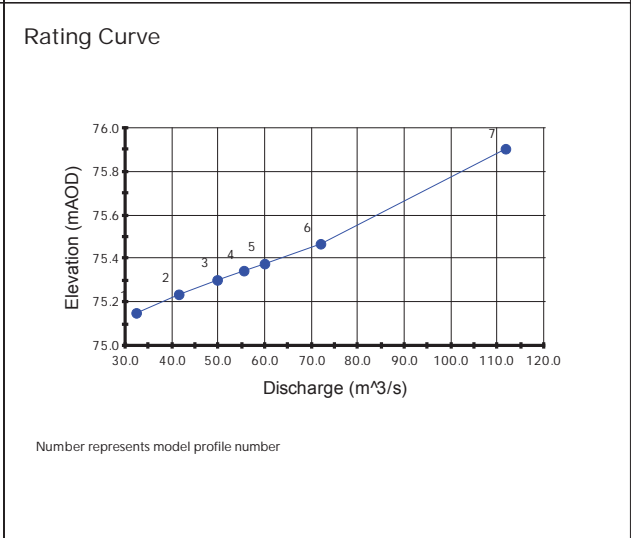
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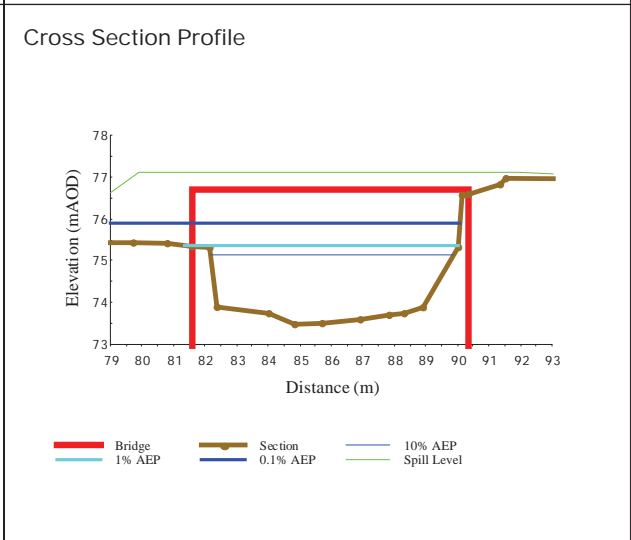
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 Section u/s: 4095



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	75.154	0.47
2	4.0	41.5	75.238	0.49
3	2.0	49.8	75.304	0.52
4	1.3	55.5	75.346	0.53
5	1.0	59.9	75.378	0.54
6	1.0	71.9	75.469	0.55
7	0.1	111.5	75.904	0.49

Level of Left Bank 75.333 mAOD
 Level of Right Bank 76.977 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 3981u

Location Plan

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Cross Section References

River: FENAY BECK

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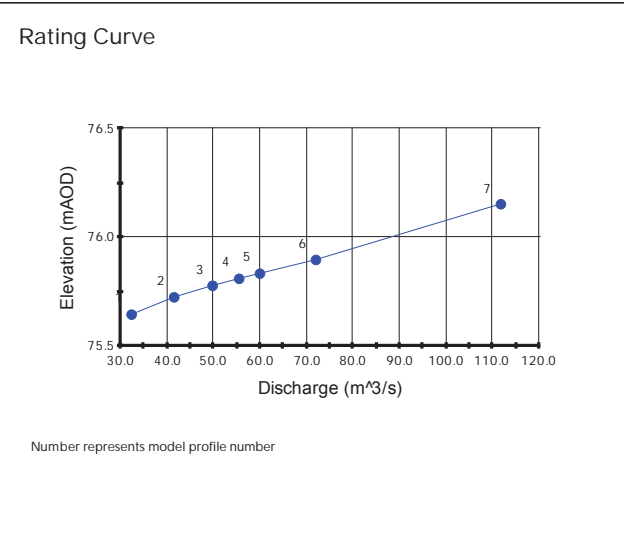
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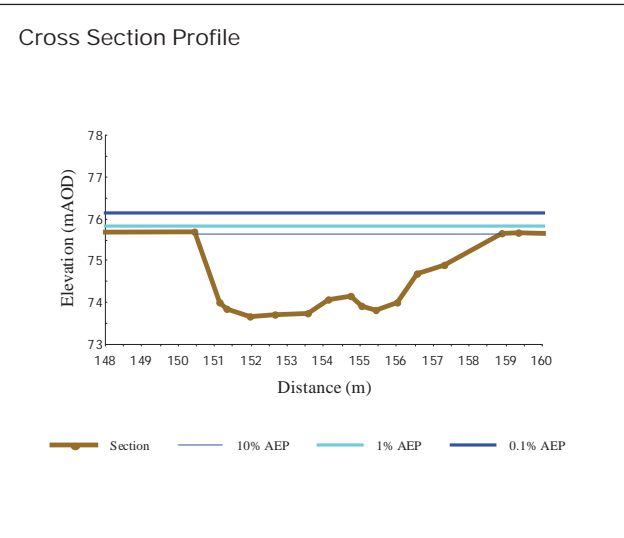
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 Section u/s: 4184d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	75.647	0.89
2	4.0	41.5	75.727	0.86
3	2.0	49.8	75.779	0.89
4	1.3	55.5	75.811	0.91
5	1.0	59.9	75.835	0.92
6	1.0	71.9	75.897	0.96
7	0.1	111.5	76.152	0.97

Level of Left Bank 75.704 mAOD
 Level of Right Bank 75.661 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4095

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

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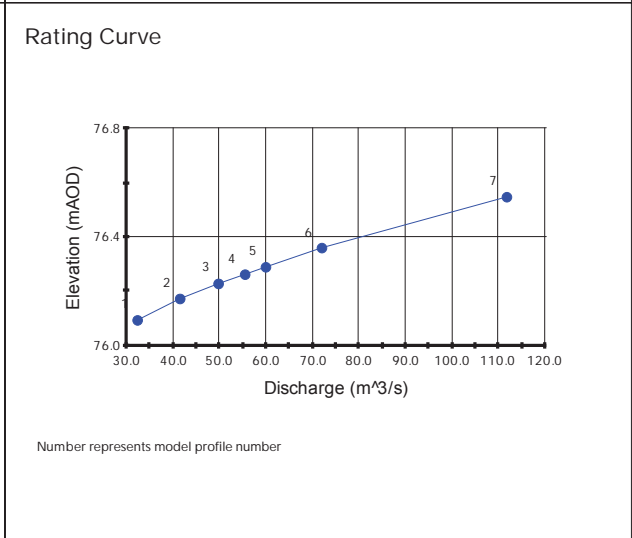
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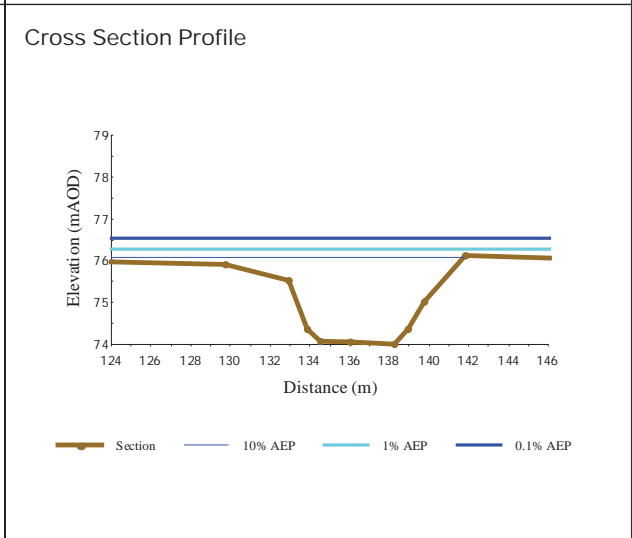
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 Section u/s: 4184u



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	32.4	76.097	0.75
2	4.0	41.5	76.175	0.75
3	2.0	49.8	76.230	0.76
4	1.3	55.5	76.264	0.77
5	1.0	59.9	76.291	0.78
6	1.0	71.9	76.361	0.81
7	0.1	111.5	76.547	0.89

Level of Left Bank 75.926 mAOD
 Level of Right Bank 76.140 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4184d

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

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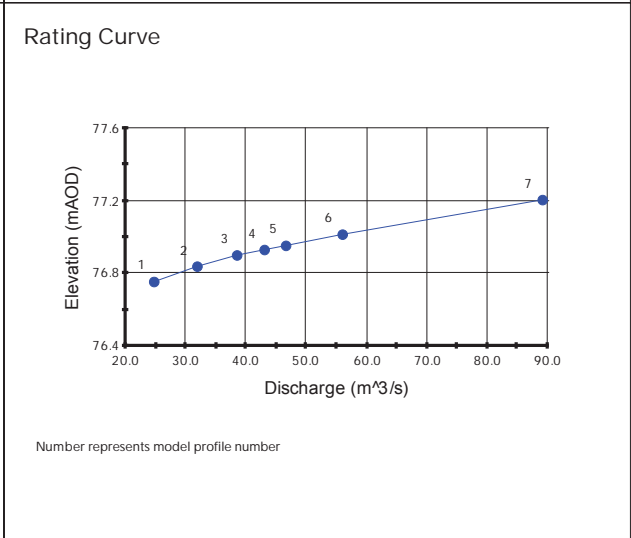
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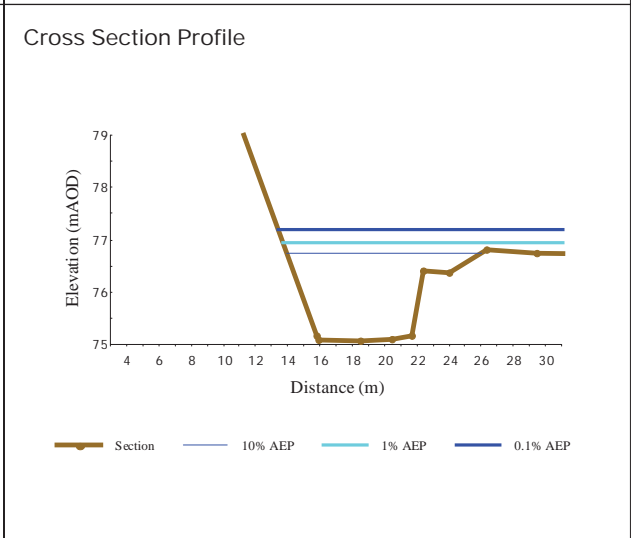
Next
 Section d/s: 4184u
 Section u/s: 4436



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	76.757	0.83
2	4.0	31.9	76.841	0.78
3	2.0	38.5	76.901	0.78
4	1.3	43.0	76.932	0.80
5	1.0	46.6	76.954	0.81
6	1.0	55.9	77.016	0.84
7	0.1	89.0	77.205	0.94

Level of Left Bank 81.165 mAOD
 Level of Right Bank 76.819 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4336

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4436

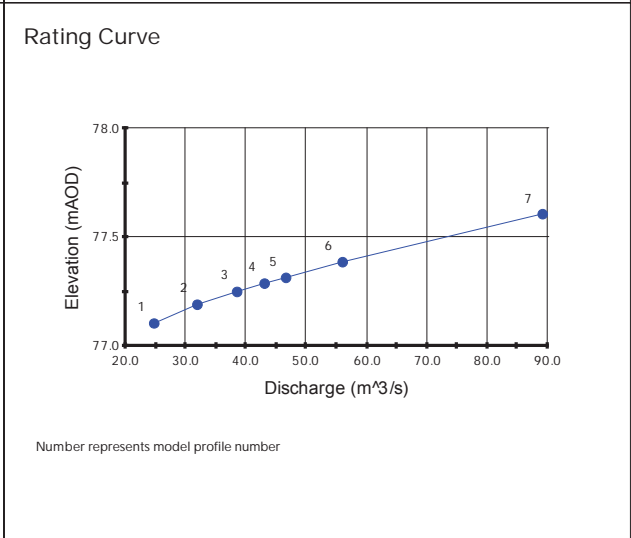
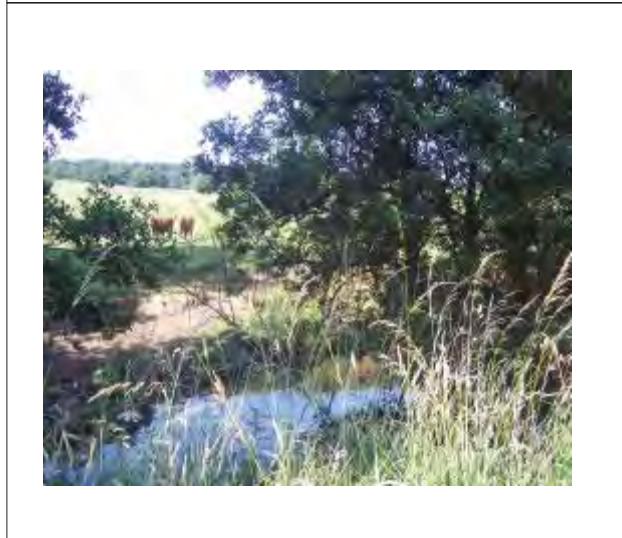
Section Type: SECTION

OS NGR: Unknown

Survey Dwg Ref: N/A

Photograph Ref: FENA1_4436.jpg

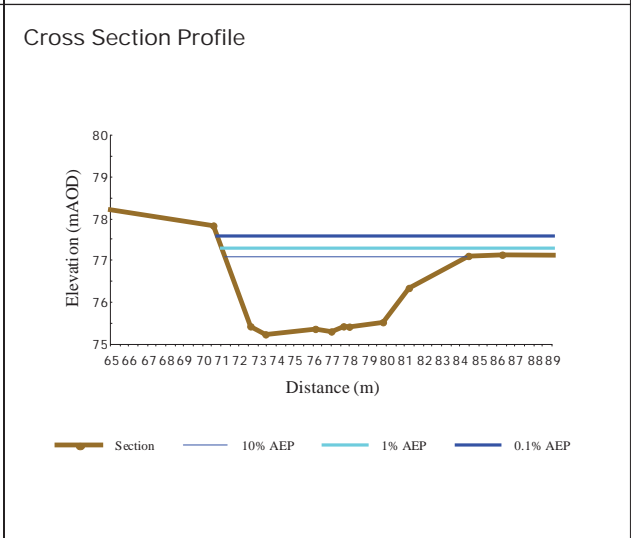
Next
 Section d/s: 4336
 Section u/s: 4565



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	77.106	0.64
2	4.0	31.9	77.193	0.67
3	2.0	38.5	77.252	0.72
4	1.3	43.0	77.289	0.75
5	1.0	46.6	77.316	0.77
6	1.0	55.9	77.387	0.82
7	0.1	89.0	77.606	0.97

Level of Left Bank 77.846 mAOD
 Level of Right Bank 77.126 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4436

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4565

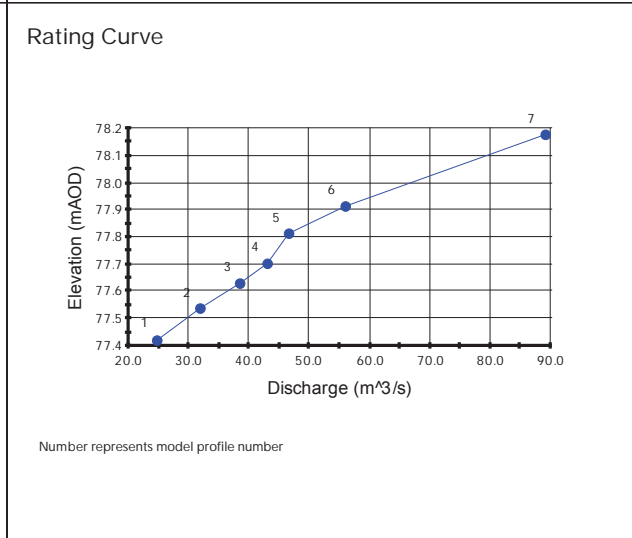
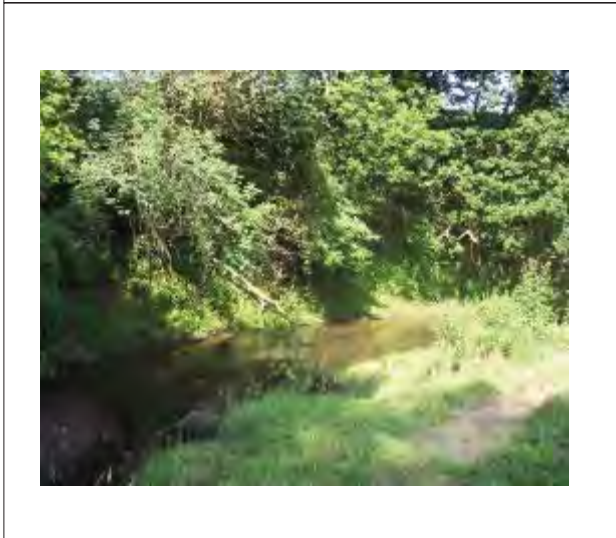
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Survey Dwg Ref: N/A

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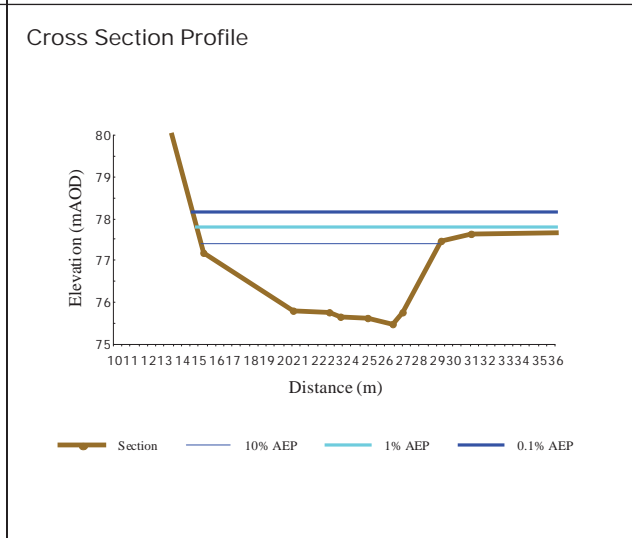
Next
 Section d/s: 4436
 Section u/s: 4708d



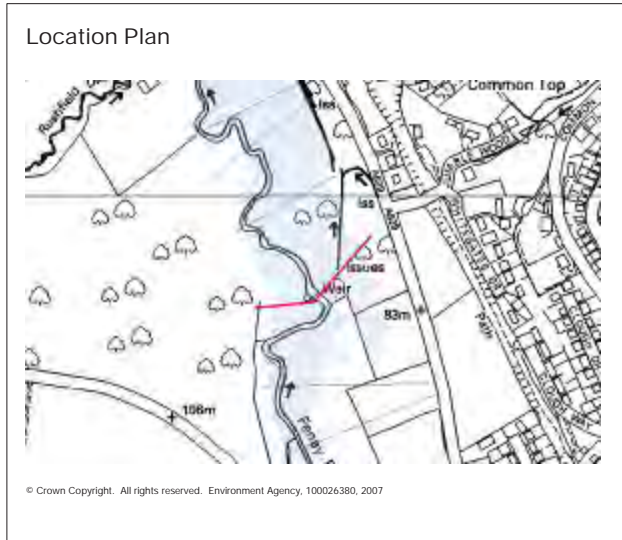
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	77.422	1.40
2	4.0	31.9	77.540	1.65
3	2.0	38.5	77.631	1.86
4	1.3	43.0	77.704	1.85
5	1.0	46.6	77.814	1.41
6	1.0	55.9	77.913	1.26
7	0.1	89.0	78.175	1.18

Level of Left Bank 77.199 mAOD
 Level of Right Bank 77.647 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4565



Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4708

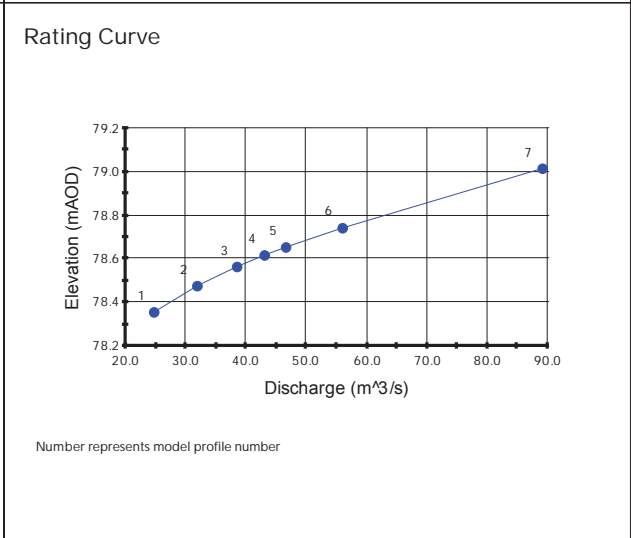
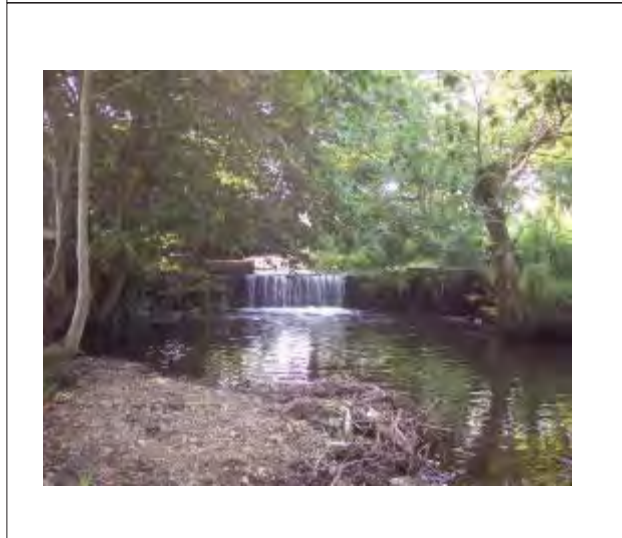
Section Type: SECTION, SPILL

OS NGR: Unknown

Survey Dwg Ref: N/A

Photograph Ref: FENA1_4708a.jpg

Next
 Section d/s: 4708d
 Section u/s: 4890

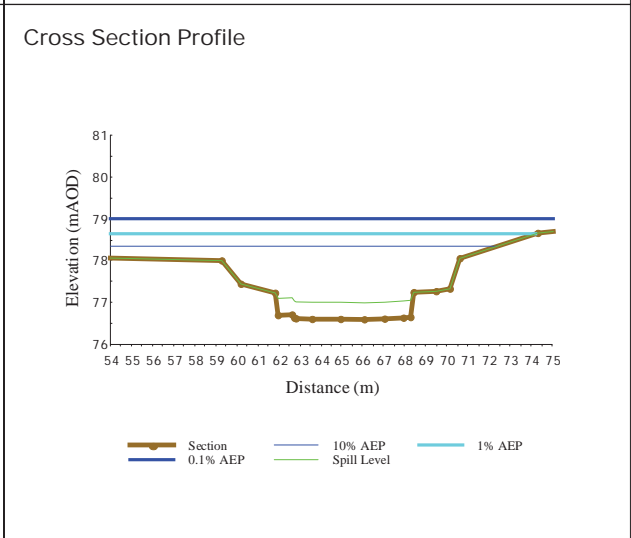


Summary of Results

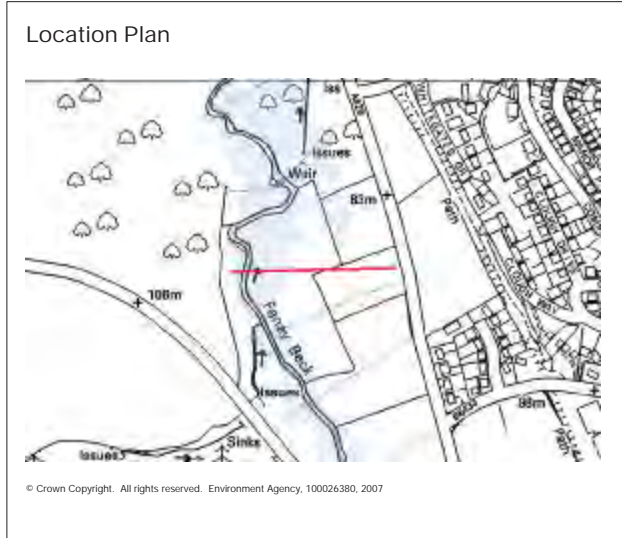
Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	78.358	1.20
2	4.0	31.9	78.478	1.19
3	2.0	38.5	78.566	1.20
4	1.3	43.0	78.618	1.23
5	1.0	46.6	78.655	1.26
6	1.0	55.9	78.742	1.28
7	0.1	89.0	79.015	1.19

Level of Left Bank 78.015 mAOD
 Level of Right Bank 78.070 mAOD

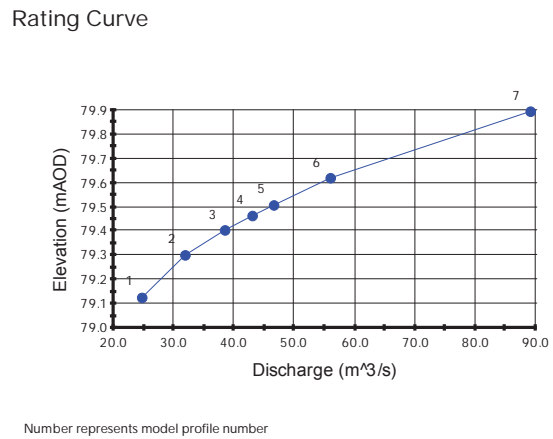
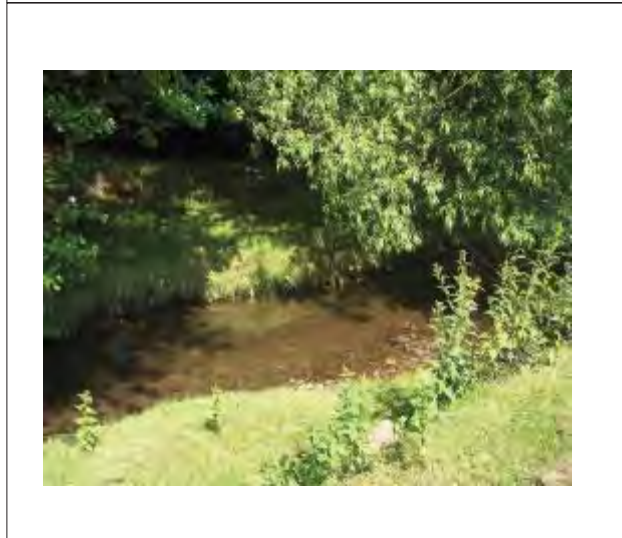
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4708u



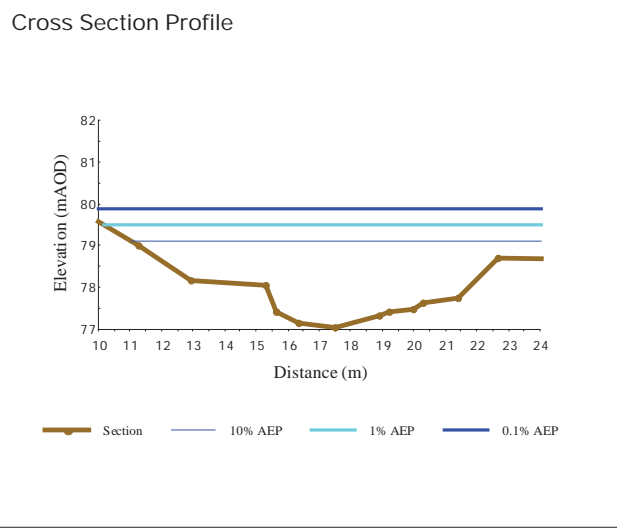
Cross Section References
 River: FENAY BECK
 Reach: 1
 Chainage: 4890
 Section Type: SECTION
 OS NGR: Unknown
 Survey Dwg Ref: N/A
 Photograph Ref: FENA1_4890a.jpg
 Next
 Section d/s: 4708u
 Section u/s: 4981



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	79.127	1.25
2	4.0	31.9	79.303	1.16
3	2.0	38.5	79.405	1.14
4	1.3	43.0	79.464	1.15
5	1.0	46.6	79.508	1.16
6	1.0	55.9	79.620	1.15
7	0.1	89.0	79.893	0.96

Level of Left Bank 78.188 mAOD
 Level of Right Bank 78.720 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4890

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 4981

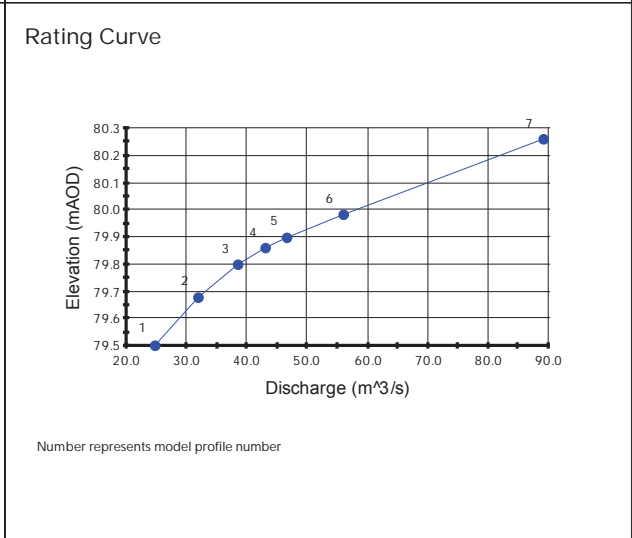
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Survey Dwg Ref: N/A

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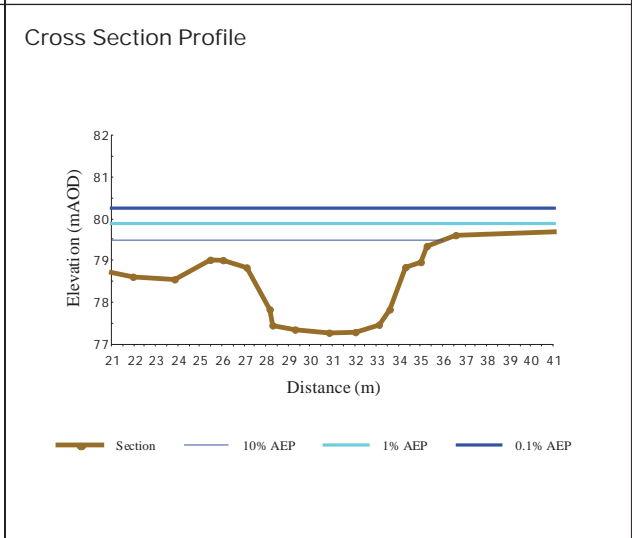
Next
 Section d/s: 4890
 Section u/s: 5087



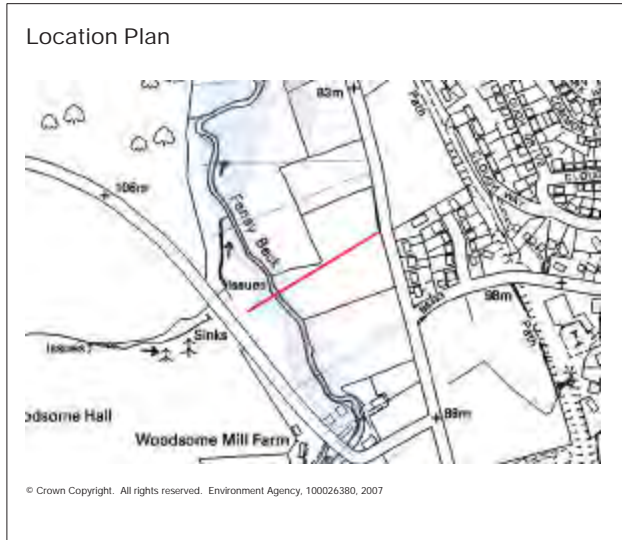
Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	79.504	1.16
2	4.0	31.9	79.680	1.24
3	2.0	38.5	79.801	1.31
4	1.3	43.0	79.861	1.34
5	1.0	46.6	79.899	1.37
6	1.0	55.9	79.983	1.48
7	0.1	89.0	80.259	1.76

Level of Left Bank 79.025 mAOD
 Level of Right Bank 79.619 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 4981



Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5087

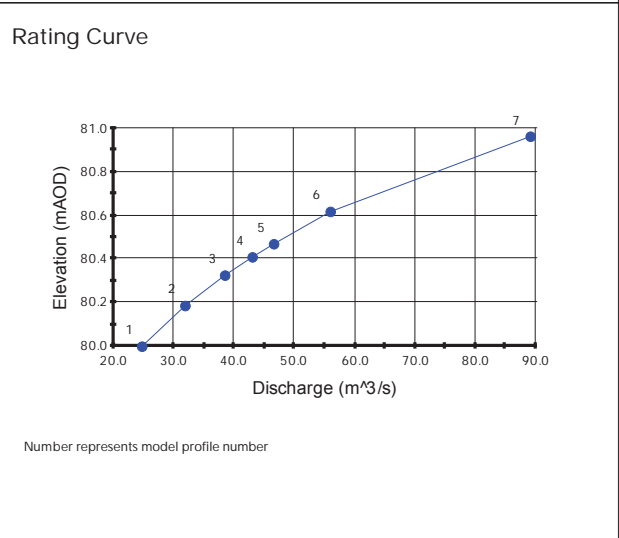
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Survey Dwg Ref: N/A

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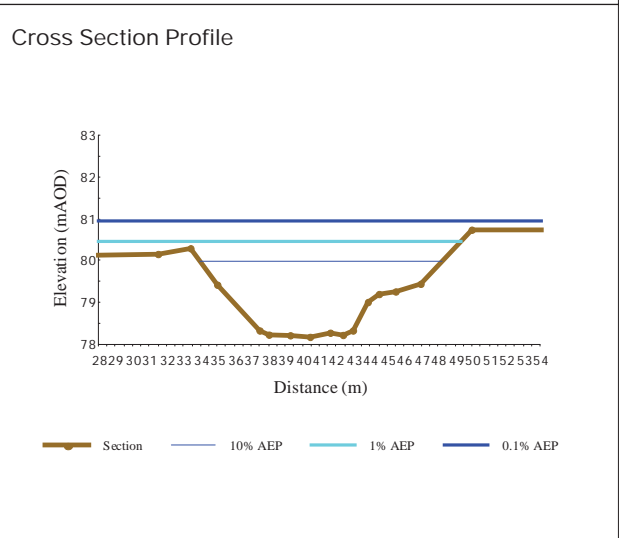
Next
 Section d/s: 4981
 Section u/s: 5209



Summary of Results

Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	80.000	1.52
2	4.0	31.9	80.187	1.63
3	2.0	38.5	80.326	1.62
4	1.3	43.0	80.409	1.59
5	1.0	46.6	80.470	1.58
6	1.0	55.9	80.617	1.59
7	0.1	89.0	80.960	1.60

Level of Left Bank 80.303 mAOD
 Level of Right Bank 80.745 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5087

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5209

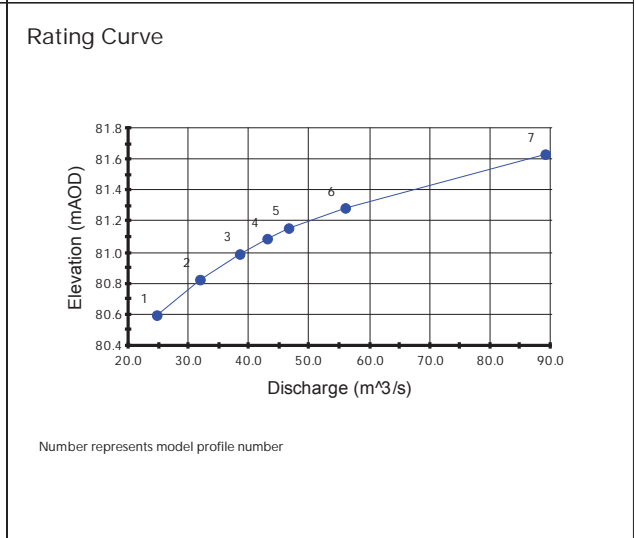
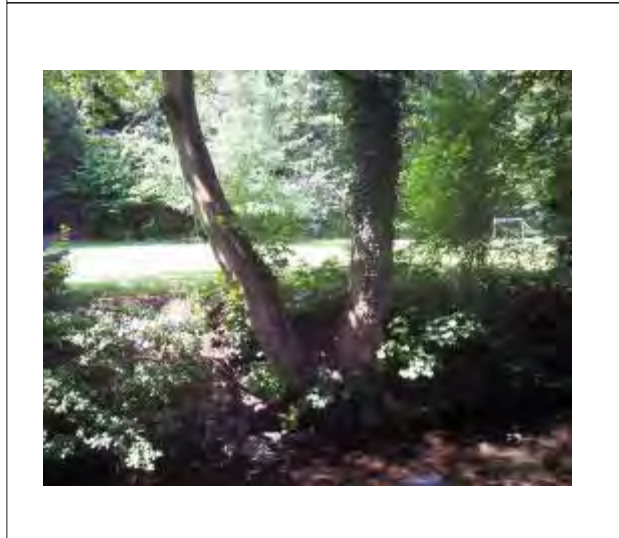
Section Type: SECTION

OS NGR: Unknown

Survey Dwg Ref: N/A

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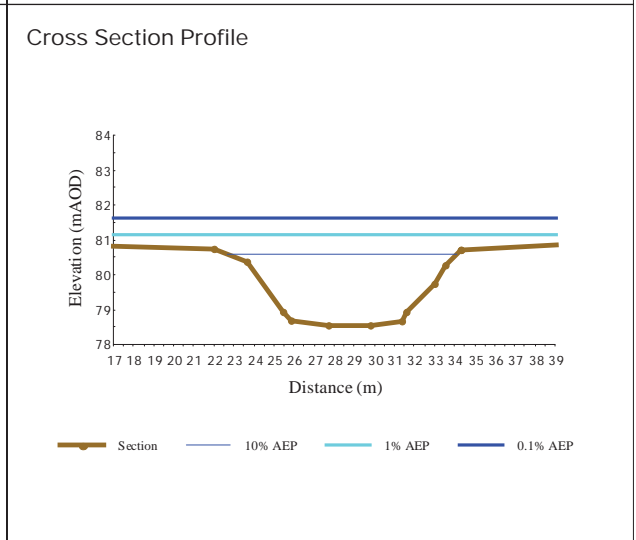
Next
 Section d/s: 5087
 Section u/s: 5298d



Summary of Results

Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	80.601	1.54
2	4.0	31.9	80.828	1.64
3	2.0	38.5	80.991	1.61
4	1.3	43.0	81.089	1.55
5	1.0	46.6	81.158	1.51
6	1.0	55.9	81.286	1.48
7	0.1	89.0	81.631	1.57

Level of Left Bank 80.749 mAOD
 Level of Right Bank 80.726 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5209

Location Plan

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Cross Section References

River: FENAY BECK

Reach: 1

Chainage: 5298

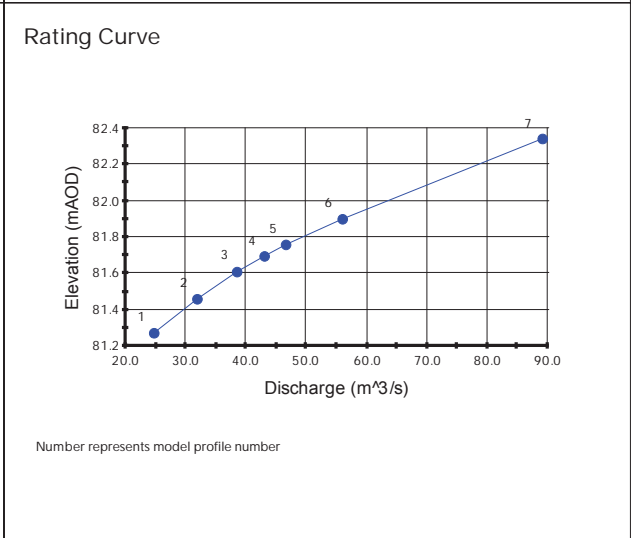
Section Type: BRIDGE, SECTION, SPILL

OS NGR: Unknown

Survey Dwg Ref: N/A

Photograph Ref: FENA1_5298d.jpg

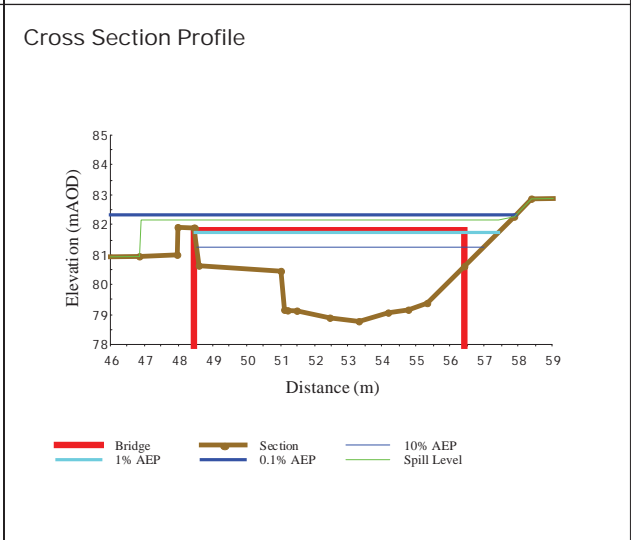
Next
 Section d/s: 5298d
 Section u/s: 5345d



Summary of Results

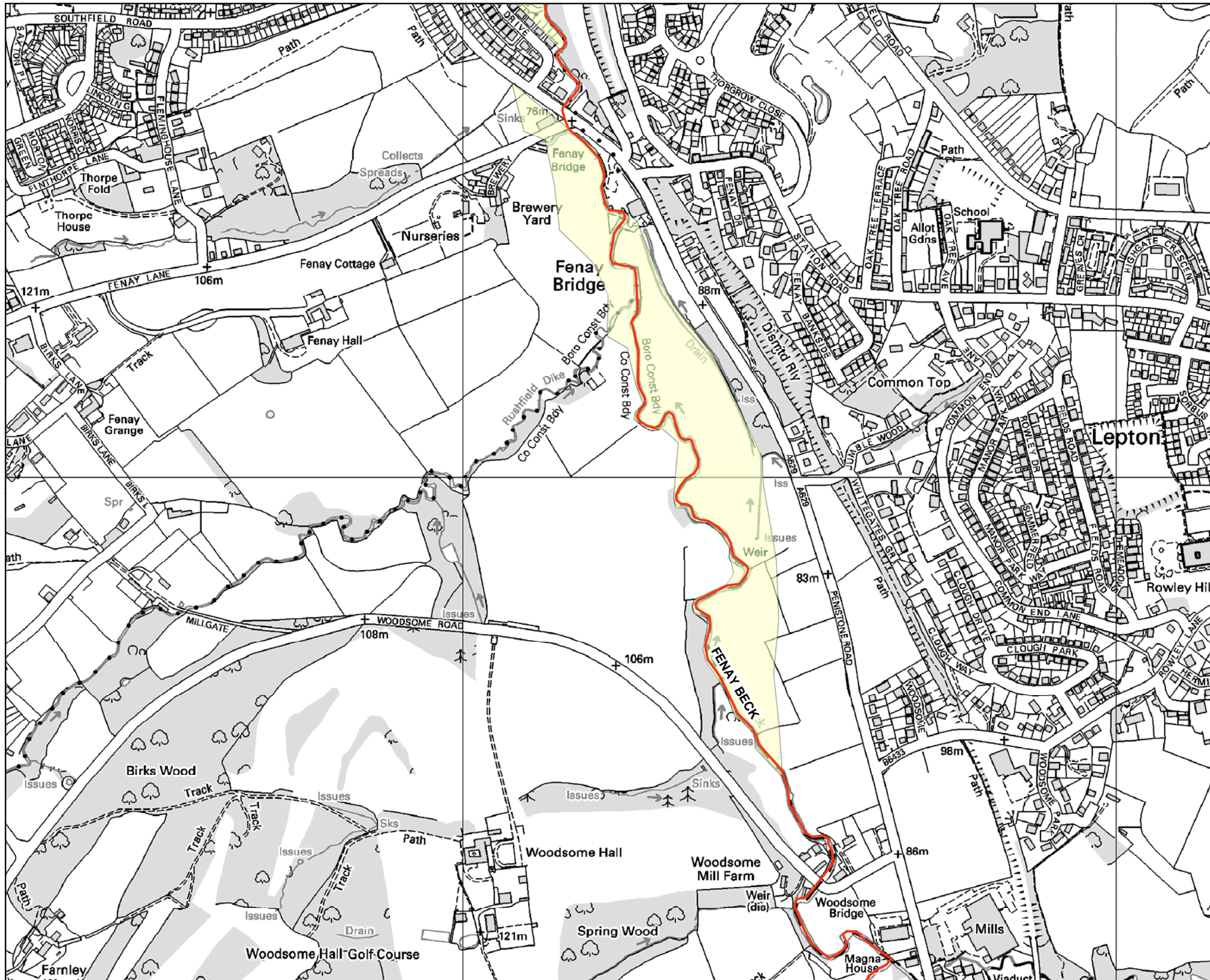
Profile No	AEP (%)	Flow (m³/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	24.8	81.273	1.28
2	4.0	31.9	81.462	1.25
3	2.0	38.5	81.611	1.26
4	1.3	43.0	81.697	1.28
5	1.0	46.6	81.759	1.30
6	1.0	55.9	81.900	1.37
7	0.1	89.0	82.340	1.53

Level of Left Bank 81.912 mAOD
 Level of Right Bank 82.281 mAOD
 AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)



FENAY BECK: 1: CROSS SECTION NUMBER 5298d

Flood History Map for Woodsome Road/ Penistone Road, Kirklees - dated: 21/06/2013 [Ref: 26205]



www.environment-agency.gov.uk

Scale: 1:6,000

when reproduced @ A3



Flood Extents

Legend

- Main River
- 1970 Flood Event

APPENDIX C – Calculations
Existing Greenfield Run Off Estimate

Sanderson House
Jubilee Way
Huddersfield, WF4 4TD

Designed by darren.hawkyard



Date 12/01/2016 10:09
File

Checked by

Micro Drainage Source Control 2015.1

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	50.000	Urban	0.000
SAAR (mm)	931	Region Number	Region 3

Results l/s

QBAR Rural 127.2
QBAR Urban 127.2

Q1 year 109.4

Q1 year 109.4
Q2 years 120.0
Q5 years 159.0
Q10 years 184.5
Q20 years 208.9
Q25 years 217.0
Q30 years 223.6
Q50 years 240.9
Q100 years 264.6
Q200 years 300.2
Q250 years 311.7
Q1000 years 386.7

109.4 / 50ha = 2.19l/s
2.19 x 12.7ha = 28.0l/s
28.0l/s